AGENDA

FOR THE REGULAR MEETING OF THE CARPINTERIA SANITARY DISTRICT GOVERNING BOARD TO BE HELD October 3, 2023

The regular meeting of the Governing Board will be held commencing at 5:30 p.m. The location of the meeting is at 5300 Sixth Street, Carpinteria, CA.

The public is encouraged to participate in one of the following ways:

1. Submitting a Written Comment. If you wish to submit a written comment, please email your comment to the Board Clerk at kimg@carpsan.com by **3:00 P.M. on the day of the meeting.** Every effort will be made to read your comment into the record, but some comments may not be read due to time limitations.
2. Attend the in-person meeting at the Carpinteria Sanitary District Board room.

I. CALL TO ORDER

II. PLEDGE OF ALLEGIANCE

III. BOARD APPROVAL OF AGENDA AS [SUBMITTED] [MODIFIED]

Board President asks the Board, public, staff, and legal counsel if there are any additions and/or modifications to the Agenda.

IV. APPROVAL OF MINUTES

September 5, 2023 AS [SUBMITTED] [MODIFIED]

September 8, 2023-Special AS [SUBMITTED] [MODIFIED]

V. PUBLIC FORUM

The public may address the Governing Board on items of interest to the public which are not already on this evening's agenda and are within the subject matter jurisdiction of the Board. The time allotted for this discussion shall be pursuant to Board Bylaws.

VI. MATTERS BEFORE THE BOARD

A. GENERAL REPORTS:

1. General Manager's Status Report **(Pages 1 - 10)**

Description: General Manager to review his written report regarding the following issues:

- Quarterly Incident Report
- Recruiting Update
- Santa Barbara LAFCO Policy Review on Agricultural Parcels
- Lift Station No. 2 Rehabilitation Project Update
- Lower Lateral Rehabilitation Project Update

- CASA Strategic Planning Session
- September SAMA Meeting
- WateReuse California Annual Conference
- Operations Update

2. District's Ocean Outfall Pipeline Continuation of Emergency Action **(Pages 11 - 20)**

Description: The Board to review the emergency condition status and continue the emergency action related to the emergency condition associated with apparent damage of the District's ocean outfall pipeline system as required by Public Contract Code Section 22050 (c)(1).

Staff Recommendation: Staff recommends that the Board review the emergency condition status and continue the emergency action as prescribed in Resolution No. R-367.

3. Carpinteria Advanced Purification Project (CAPP) Update **(Pages 21 - 80)**

Description: The Board will receive an update status report on the Carpinteria Advanced Purification Project being pursued in conjunction with the Carpinteria Valley Water District. Information on current activities and future tasks or milestones will be presented.

Staff Recommendation: None. Information only.

VII. BOARD ITEMS

D. COMMITTEE REPORTS

Description: Verbal reports by the committee chairperson(s) of the following committees:

- Standing Finance Committee
- Standing Personnel Committee
- Standing Public Relations Committee
- Standing Utilities Committee
- Standing Recycled Water Committee
- Ad-Hoc Summerland Sanitary Coordination Committee

E. GENERAL ITEMS

1. SBCSDA (Santa Barbara – California Special Districts Association) Report
2. Board Member Vacation Dates
3. Future Agenda Items

VIII. ADJOURNMENT

FURTHER INFORMATION AVAILABLE

A staff report providing more detailed information is available for most agenda items and may be reviewed in the District office during regular hours (Monday - Friday from 8:00 a.m. to 12:00 p.m. and/or 1:00 p.m. to 5:00 p.m.). Copies of individual reports may be requested at this office. Call (805) 684-7214 extension 110 for more information.

In compliance with the Ralph M. Brown Act and the Americans with Disabilities Act, if you need a disability-related modification, accommodation, or other special assistance to participate in this meeting, please contact the District's Board Secretary at (805) 684-7214, extension 111, at least 48 hours prior to the start of the meeting.

Next Ordinance Available.....#20
Next Resolution Available.....R-368
Posting Date.....9/29/23

MINUTES OF THE REGULAR MEETING OF THE
CARPINTERIA SANITARY DISTRICT GOVERNING BOARD
September 5, 2023

These are the **minutes** of the **regular** meeting of the Governing Board of the Carpinteria Sanitary District in the City of Carpinteria, County of Santa Barbara, and State of California.

The Governing Board of the Carpinteria Sanitary District held a regular meeting on **September 5, 2023**, at 5:30 p.m. at its District administrative office located at 5300 Sixth Street, Carpinteria, California.

The agenda notice for this meeting, including instructions for the public to provide comments, was posted in the front window of the administrative office of the Carpinteria Sanitary District and on the District's website at least 72 hours in advance of the meeting.

I. CALL TO ORDER

President Modugno called the meeting to order at 5:30 p.m. and noted that Director Damron and Director Velasco were absent from tonight's meeting.

Directors Present:	Mike Modugno – President Debbie Murphy – Secretary Pro-Tem Lin Graf - Treasurer
Staff Present:	Craig Murray – General Manager Kim Garcia – District Administrator
Legal Counsel Present:	Karl Berger – Burke, Williams & Sorenson (by Zoom video-conference)
Public Present:	None.

II. PLEDGE OF ALLEGIANCE

President Modugno led the Pledge of Allegiance.

III. BOARD APPROVAL OF AGENDA

President Modugno asked if there were any modifications and/or changes to the agenda. Hearing none, the agenda was approved as submitted.

IV. BOARD APPROVAL OF MINUTES OF THE MEETING OF August 15, 2023

Director Murphy made a motion, seconded by Director Graf that the Board approve the minutes of the August 15, 2023 Regular Board meeting as presented. The motion carried by the following vote:

AYES:	3	Murphy, Graf, Modugno
NOES:	0	None
ABSENT:	2	Damron, Velasco
ABSTAIN:	0	None

V. PUBLIC FORUM

None.

VI. MATTERS BEFORE THE BOARD

A. GENERAL REPORTS:

1. General Manager's Status Report

General Manager reviewed his written report regarding the following items:

- Recruiting Update
- Team Updates
- Accounting Software Transition
- WateReuse California Central Coast Chapter Meeting
- Operations Update

2. MKN Associates – Agreement for As-Needed Engineering Services Three Year On-Call Services

General Manager reviewed his staff report related to an agreement for as-needed engineering services with MKN Associates. If approved, the agreement for as-needed engineering services would cover a three year on-call services period.

Director Graf made a motion, seconded by Director Murphy that the Board approve and execute the as-needed engineering services agreement between the District and MKN Associates for three year on-call services. The motion carried by the following roll call vote:

AYES:	3	Murphy, Graf, Modugno
NOES:	0	None
ABSENT:	2	Damron, Velasco
ABSTAIN:	0	None

3. Capital Improvement Project Budget Adjustment – Lift Station No. 2 Rehabilitation Project (P-212)

General Manager reviewed his staff report related to the CIP budget adjustment for Lift Station No. 2 Rehabilitation Project. If approved, CIP (P-212) budget would be amended for the Lift Station No. 2 Rehabilitation Project with a not to exceed total of $265,000.

Director Murphy made a motion, seconded by Director Graf that the Board amend CIP for the Lift Station No. 2 Rehabilitation Project. The motion carried by the following roll call vote:

AYES:	3	Murphy, Graf, Modugno
NOES:	0	None
ABSENT:	2	Damron, Velasco
ABSTAIN:	0	None

4. Resolution No. R-367: Declaring an Emergency With regard to Certain District Facilities, Authorizing Remedial Work to be Performed Without Competitive Bidding, Declaring the Project to be Exempt From The Requirements of the California Environmental Quality Act, and Making Necessary Findings Thereof

General Manager reviewed his staff report related to Resolution No. R-367. A required 4/5 vote was not met for this item. The item was tabled to a subsequent meeting where the quorum could be met. Director Murphy excused herself. The quorum was lost which caused the meeting to adjourn at 6:00 p.m.

The remaining items in the minutes are provided as information only; they do not constitute official actions of the Board.

5. Carpinteria Advanced Purification Project

General Manager provided an update related to the Carpinteria Advanced Purification Project.

No Board action was taken on this item.

VII. BOARD ITEMS

A. COMMITTEE REPORTS

Standing Finance Committee
None.

Standing Personnel Committee
None.

Standing Public Relations Committee
None.

Standing Utilities Committee
None.

Standing Recycled Water Committee
None.

Summerland Sanitary Coordination Ad-Hoc Committee
None.

B. GENERAL ITEMS

SBCSDA (Santa Barbara California Special Districts Association) Report
None.

CSRMA Report
None.

Board Member Vacation Dates
None.

Future Agenda Items
None

Mike Modugno
President

Michael Damron
President Pro-Tem

Gerald Velasco
Secretary

Debbie Murphy
Secretary Pro-Tem

Lin Graf
Treasurer

MINUTES OF THE SPECIAL MEETING OF THE CARPINTERIA SANITARY DISTRICT GOVERNING BOARD
September 8, 2023

These are the **minutes** of the **special** meeting of the Governing Board of the Carpinteria Sanitary District in the City of Carpinteria, County of Santa Barbara, and State of California.

The Governing Board of the Carpinteria Sanitary District held a regular meeting on **September 8, 2023**, at 11:00 a.m. at its District administrative office located at 5300 Sixth Street, Carpinteria, California.

The agenda notice for this meeting, including instructions for the public to provide comments, was posted in the front window of the administrative office of the Carpinteria Sanitary District and on the District's website at least 24 hours in advance of the meeting.

I. CALL TO ORDER

President Modugno called the meeting to order at 11:00 a.m. and noted that all directors were present at today's meeting.

Directors Present:	Mike Modugno – President Michael Damron – President Pro-Tem Gerald Velasco - Secretary Debbie Murphy – Secretary Pro-Tem Lin Graf - Treasurer
Staff Present:	Craig Murray – General Manager Kim Garcia – District Administrator
Legal Counsel Present:	Karl Berger – Burke, Williams & Sorenson (by Zoom video-conference)
Public Present:	None.

II. PLEDGE OF ALLEGIANCE

President Modugno led the Pledge of Allegiance.

III. MATTERS BEFORE THE BOARD

A. GENERAL REPORTS:

1. Resolution No. R-367: Declaring an Emergency With regard to Certain District Facilities, Authorizing Remedial Work to be Performed Without Competitive Bidding, Declaring the Project to be Exempt From The Requirements of the California Environmental Quality Act, and Making Necessary Findings Thereof

General Manager reviewed his staff report related to Resolution No. R-367. Based on assessments and engineering opinion it was determined that an emergency condition exists requiring immediate measures be undertaken to repair damage to the District's outfall pipe.

If adopted Resolution No. R-367 would provide the required determination that an emergency condition exists pursuant to Public Contract Code sections 20806 and 1102.

Director Damron made a motion, seconded by Director Graf that the Board adopt Resolution No. R-367 as presented. The motion carried by the following roll call vote:

AYES:	5	Murphy, Graf, Modugno, Damron, Velasco
NOES:	0	None
ABSENT:	0	None
ABSTAIN:	0	None

IV. ADJOURNMENT

There being no further items to discuss, President Modugno adjourned the meeting at 11:04 a.m.

Mike Modugno
President

Michael Damron
President Pro-Tem

Gerald Velasco
Secretary

Debbie Murphy
Secretary Pro-Tem

Lin Graf
Treasurer

Carpinteria Sanitary District

Board of Directors Meeting
General Manager's Status Report

TO: Board of Directors

FROM: Craig Murray, P.E. – General Manager

SUBJECT: General Manager's Status Report

DATE: October 3, 2023

Quarterly Incident Report. Attached is the incident summary report for the third quarter of 2023.

Recruiting Update. An open recruitment for two newly authorized Operator in Training (OIT) positions was successful. The District welcomed two new members to the team – Christian Jimenez and Joe Aguilar. Christian and Joe are both excited for the opportunity and eager to learn. We have continued to post the job announcement for the vacant Operator 2 through 4 position and will be reviewing strategies to enhance this solicitation, and others going forward, with the Board Personnel Committee this week.

Santa Barbara LAFCO Policy Review on Agricultural Parcels. Santa Barbara LAFCO has continued to review existing policy provisions related to extension of public services to agriculturally zoned parcels. This review was directed following consideration and adoption of the District's Municipal Service Review. Attached is a staff report from LAFCO's Executive Officer that summarizes the current status of this review for the commission's October 5th hearing.

Lift Station No. 2 Rehabilitation Project Update. Sancon is scheduled to mobilize their crews on October 3rd to begin the wetwell restoration and coating part of this project. The Board had previously approved a contract with Rain for Rent to provide bypass pumping equipment for the duration of the rehabilitation work. This supplier has not been responsive and we are potentially pivoting to an alternate equipment provider. A purchase order was issued to Pulsed Hydraulics for the large bubble mixing system that will be part of this restoration project. The bubble forming plate and stainless air piping will be installed in the newly coated wetwell. The screw compressor for this system was procured directly from Kaeser Compressors.

Lower Lateral Rehabilitation Project Update. National Plant Services is making good progress on this project so far. As of Friday 9/29, they had completed 12 of the 31 laterals in their scope. Photos of two wyes with installed liners are attached. Staff recently identified a failing orangeburg lateral that we may add to the project via change order.

CASA Strategic Planning Session. I participated in a one-day strategic planning workshop with the CASA Board of Directors on September 24th in Lafayette. This was a productive meeting that identified and prioritized focus areas for the organization over the coming year.

September SAMA Meeting. The District hosted a meeting of the Sanitation Agency Managers Association on September 13th. We gave an overview presentation on the CAPP and a short tour of the UF pilot project.

WateReuse California Annual Conference. I am planning to attend the WateReuse California Conference in Indian Wells from November 5th through 7th.

Operations Update

System operations updates are as follows:

- The treatment plant is operating in full compliance with our NPDES permit. Effluent quality has been consistently high.
- The ELAP accreditation inspection of the District laboratory went well and we are awaiting the written report at this time.
- The collection system is operating well with no reported mainline problems or SSO events.
- We have necessarily transitioned to a new software platform for management and tracking of USA DigAlert tickets and field marking.
- Collections staff responded to a lateral blockage on Carpinteria Avenue which serves a market and restaurant establishment. It was determined that the connection at the main had failed and we were unable to clear the blockage. Tierra Contracting was engaged to perform an emergency repair.


1317 camino trillado


595 calle dia

CARPINTERIA SANITARY DISTRICT
QUARTERLY SUMMARY INCIDENT REPORT
July 1 - September 30, 2023

Date	Location	Incident/Complaint	Determination/Resolution
8/26/2023	Del Mar Ave	E-ONE	On call staff were called out to a high level E-One pump alarm. Pump replaced and tested ok.

LAFCO MEMORANDUM

SANTA BARBARA LOCAL AGENCY FORMATION COMMISSION
105 East Anapamu Street • Santa Barbara CA 93101 • (805) 568-3391 + Fax (805) 568-2249

October 5, 2023 (Agenda)

TO: Each Member of the Commission

FROM: Mike Prater
Executive Officer

SUBJECT: REPORT ON URBAN UTILITY SERVICES FOR AG PARCELS UPDATE

This is an Informational Report. No Action is Necessary

DISCUSSION

This status report is to bring the Commission and public up-to-date on the efforts to consider revisions to Commission's policies regarding Urban Utility services for Agricultural Parcels. The Commission directed, at the August 3, 2023 meeting, the matter be presented to the County Agricultural Advisory Committee (AAC) for input. The item was placed on their August 10, 2023 agenda.

Agricultural Advisory Committee Outcome:

The AAC discussed the proposed policy changes presented to the Commission on August 3, 2023. The AAC appreciated the matter be presented for input and requested continued involvement in the matter as the discussion evolves. AAC expressed that no exclusivity be included and that any policy change should not carve out a specific area. Greater information and study of the issue is warranted particularly regarding discharge and operations of cannabis cultivation countywide. AAC raised the need to better understand other uses that may benefit from urban utilities within the agricultural lands that this might be applicable to. Lastly, they questioned whether the definition of agriculture uses includes cannabis. Under the law, cannabis is defined as agricultural use regulated by the California Department of Food and Agriculture consistent with the Medicinal and Adult-Use Cannabis Regulation and Safety Act codified under Business and Professional Code 26000.

Other AAC members expressed that cannabis cultivation operations are a leading industry in recycled water on-site to maximize production and some may use a reverse osmosis (RO) water filter system that concentrates discharge and that concentrated discharge may not be suitable for wastewater treatment plant operations.

State Water Quality Control Board Waste Discharge Requirements Associated with Cannabis Cultivation Activities:

The Water Board under Order WQ 2019-0001 DWQ required the State Water Board to adopt principles and guidelines for diversion and use of water for cannabis cultivation in areas where cannabis cultivation may have the potential to substantially affect instream flows.

The Cannabis Policy Order provides a statewide tiered approach for permitting discharges and threatened discharges of waste from cannabis cultivation and associated activities. The Order establishes a personal use exemption standard, and provides conditional exemption criteria for low threat to water quality activities. Tiers are defined by the amount of disturbed area. The criteria consist of:

a. Personal use exempt Dischargers are very small non-commercial cultivators that are exempt from this General Order. (Refer to the Exemptions for Certain Cultivation Activities section of this General Order for more information.)
b. Indoor commercial cultivation activities are conditionally exempt under this General Order. (Refer to the Exemptions for Certain Cultivation Activities section of this General Order for more information.)
c. Outdoor commercial cultivation activities that disturb less than 2,000 square feet may be conditionally exempt under this General Order. (Refer to the Exemptions for Certain Cultivation Activities section of this General Order for more information.)
d. Tier 1 Dischargers cultivate cannabis commercially outdoors, and have a disturbed area equal to or greater than 2,000 square feet and less than 1 acre (43,560 square feet).
e. Tier 2 Dischargers cultivate cannabis commercially outdoors, and have a disturbed area equal to or greater than 1 acre.

The Cannabis Policy provides criteria to evaluate the threat to water quality based on site conditions. The threat is risk-based as described below:

a. Disturbed area: The disturbed area indicates the threat to water quality because level of threat is proportional to the area of disturbed soil, the amount of irrigation water used, the potential for storm water runoff, and the potential impacts to groundwater (e.g., the use of fertilizers or soil amendments, the possible number of employees on site, etc.).
b. Slope of disturbed area: Increased slopes may be associated with decreased soil stability, especially when associated with vegetation removal. Storm water and excess irrigation water are more likely to runoff and discharge off-site from sloped surfaces.
c. Proximity to a surface water body: The Cannabis Policy provides setbacks from surface water bodies to reduce water quality impacts. Disturbed areas within the setbacks are more likely to discharge waste constituents to surface water and/or result in removal of riparian vegetation.

Outdoor cannabis cultivation activities that disturb an area (in aggregate) less than 2,000 square feet on any one parcel or on contiguous parcels managed as a single operation and that comply with all of the additional cultivation area criteria listed below are conditionally exempt and are required to obtain coverage under the Waiver. The 2,000 square feet conditional exemption criterion provides sufficient area for outdoor cultivation for small commercial activities. Facilities with larger disturbed

areas are inherently a higher threat to water quality and are subject to additional regulatory oversight. The conditional exemption applies per parcel or contiguous parcels; no coalitions, cooperatives, or other combination of cultivation activities can claim the conditional exemption for activities on the same parcel. To be conditionally exempt, a Discharger must comply with all of the following:

a. The cultivation area shall be contiguous (all located in one area).
b. The disturbed area complies with the setback requirements contained in this General Order (refer to Attachment A) and occupies less than 2,000 square feet.
c. No part of the disturbed area is located on land with a slope greater than 20 percent.
d. The Discharger implements all applicable BPTC measures listed in Attachment A.

Discharges from cannabis cultivation activities eligible for coverage under this General Order are exempt from the requirements of Consolidated Regulations for Treatment, Storage, Processing, or Disposal of Solid Waste in California Code of Regulations, title 27, division 2, subdivision 1, section 20005, et seq. The activities are exempt from the requirements of title 27 so long as the activity meets and continues to meet all preconditions listed below. (Cal. Code Regs., tit. 27, §20090).

a. Wastewater – Discharges of wastewater to land, including but not limited to evaporation ponds, percolation ponds, or subsurface leach fields if all of the following conditions are met:
    i. The applicable Regional Water Board has issued WDRs, reclamation requirements, or waived such issuance.
    ii. The discharge complies with the applicable water quality control plan.
    iii. The wastewater does not need to be managed according to California code of Regulations, title 22, division 4.5, chapter 11, as a hazardous waste. (Cal. Code Regs., tit. 27, §20090(b).)
b. Soil Amendments – Use of nonhazardous decomposable waste as a soil amendment pursuant to applicable BPTC measures, provided that Regional Water Boards may issue waste discharge or reclamation requirements for such use. (Cal. Code Regs., tit. 27, §20090(f).)

The guidelines can make it exceedingly more difficult to achieve and may lead many not to warrant a waiver. This in turn, may lead to an alternative to seek other means for discharge of waste from cannabis cultivation activities.

Background:

As background, on how and why the Commission pursued changes to Section 7 of the Commissioner's Handbook, to address Urban Utility services for Agricultural Parcels Commissioner Willams requested staff evaluate a Sphere of Influence (SOI) revisions to Carpinteria Sanitary District (CSD) boundary, with Commission support. On May 4, 2023, the Commission considered and adopted the Municipal Service Review (MSR) for 33 agencies that provider water and sewer services countywide. As part of that report, the Carpinteria Sanitary District requested that a large study area be considered for a sphere amendment. The area generally covered 423-acres located south of SR 192 (Foothill Road) and north of Via Real between Nidever Road and Cravens Lane that included various agricultural properties, some of which includes greenhouses. The reason for the request was documented in the MSR under Chapter 3(A) "Carpinteria Sanitary District" Profile. In part it states, "*The District has been approached by surrounding agricultural property owners, particularly with greenhouse*

structures and related improvements, regarding the potential for sewer service for retail operations, higher density employees, and on-site housing options. The transition from flower production to cannabis cultivation and processing has intensified the use of these properties and increased the need for effective wastewater management." A request, by the CSD, to consider this policy raises concerns related to these greenhouse parcels that may likely be in need of public sewer service in the future and, if so, is the CSD the utility provider who would logically deliver it? These policy discussions include water quality protection, public health and safety, and water supply enhancement. The idea of expanding the District's SOI to strategically include properties likely in need of public sewer service in the future may offer a higher public benefit than excluding them. Study Area #2 was identified as some of these areas meeting the service needs for public sewers.

Additional testimony was presented to the Commission by the CSD General Manager at the May 4th meeting that the district was working with the Carpinteria Valley Water District to embark on a recycled water treatment project. The added service area could result in increased flows that would need to be considered in the designing of the treatment facility while providing sewer services for needed properties to help off-set future costs.

Additional testimony was raised that existing LAFCO policies would need to revised to achieve a sphere of influence revision. LAFCO has policies that encourage the conservation of prime agricultural lands and open spaces as defined by *Gov. Code § 56064* that promote the preservation of agricultural uses and consistency with City and County General Plans. Conflict with the goals of maintaining the physical and economic integrity of such lands would be discouraged. Development shall be guided towards areas containing nonprime agricultural lands. The extension of potable water or wastewater services to a parcel zoned for agricultural use will only be approved, if at all, if the approval is limited to that portion of the parcel that includes an approved use that needs potable water or wastewater services, provided the use does not compromise agricultural viability. All of these policies would need to be reconsidered to allow for a broader sphere expansion of the west and east greenhouse developed parcels within the CSD request. No other agency had requested expansion to their SOI to address urban utility service needs.

Under existing policy, on a case-by-case basis, the Commission can evaluate and consider the appropriateness of extending sewer service under an out-of-agency service agreement (OASA) consistent with the policy to limit the portion of the parcel that includes the needed service. The CSD's desire was to allow for future annexation and not seek individual OASA's. Annexation can only occur if first the properties are included within the district SOI. Hence, the direction given at the Mat 4, 2023 meeting was to adopt the CSD Sphere of Influence as proposed by staff and direct LAFCO staff to bring back revisions to the necessary policies. Staff would later bring back a supplement report to the MSR for future revisions to the CSD SOI that included appropriate CEQA analysis. Conversations with the CSD General Manager has indicated the district does not have further interest in perusing technical studies and CEQA analysis at this time.

California Environmental Quality Act (CEQA):

Staff was directed, at the August 3, 2023 meeting, to re-evaluate the appropriate CEQA analysis to revise the Commission's policies concerning Section 7 II – Sphere of Influence Policies, Section 7 V –

Policies Encouraging Conservation of Prime Agricultural Lands and Open Space Areas, and Section 7 XII – Extending Urban Utility Services to Agricultural Parcels. The three sections were policies that needed revisions to allow for SOI change and future annexation versus an OASA. Direction from AAC and Commissioners felt any policy revisions should address countywide consideration and not a specific localized area, such as, Carpinteria Valley.

In the CEQA case ***City of Livermore V LAFCO***, the court held the amendment to the SOI guidelines was a policy change that may have a significant impact on the environment and therefore an EIR was required. In addition, the appropriate CEQA review for expanding the CSD Sphere of Influence to include the ~423-acres would also require greater CEQA analysis. It may make sense to combine these efforts, if the Commission desires to do so. Generally, a consultant would be requested to conduct an EIR. Again, the CSD has indicated they do not have further interest in perusing technical studies and CEQA analysis at this time.

The County of Santa Barbara is currently working through the Agricultural Enterprise Ordinance which would allow incidental agricultural uses that allow for more intense development such as Farmstays, small scale campgrounds, and other enterprise uses that could benefit from urban utility services. This effort has taken approximately three years and approximately $170,000 with the use of consultants to draft an ordinance and EIR for Board of Supervisor action later this year. Similar efforts would likely be necessary or tiering from the CEQA document might be possible to make Commission policy changes that would allow a sphere of influence amendment and future annexation of agricultural parcels to receive urban utility services. Otherwise, the exiting policy would allow for, on a case-by-case basis, extending sewer service under an out-of-agency service agreement consistent with the current policy to limit the portion of the parcel that includes the needed service. The status report regarding history of OASA's is on the October agenda that outlines and documents the use of such agreements. The current work plan and adopted budget did not include consultant work for the fiscal year. The cost could be covered by contingency reserves and would be covered by membership in next year's budget plan.

Attachments

Attachment A – Public Comments

Please contact the LAFCO office if you have any questions.

lafco@sblafco.org

From: Streamline <noreply@specialdistrict.org>
Sent: Monday, August 14, 2023 5:15 PM
To: lafco@sblafco.org
Subject: New form submission received: Contact Us

Contact Us

Your name:	Curtis Cloud Thornton
Your email:	swqmisturtlebird17@gmail.com
Subject:	Commission handbook section 7
Message:	Members of the commission: I'm a concerned citizen of Carpinteria. I read the comments regarding the proposed changes to your handbook that Carpinteria sanitation department wants to add more greenhouses to their service .None of the comments noted that the greenhouses in Carpinteria are actually pharmaceutical production companies with an agriculture designation. Are the members aware the Carpinteria sanitation department plans on putting the discharge of this into the communities well? Discharge from a pharmaceutical manufacturing company in the community well? Are the members aware that other sanitation districts in Ventura county and Santa Barbara county have already been denied doing this by reasonable water districts. Why should Carpinteria have this exception to enable these pharmaceutical companies to discharge pollution from poor use of their water for drug production and increase the pollution of the water of very wells they plan on using in the future. The Carpinteria water district is the only district that is also going to be directing its sewer into the public's water well. Is this also the policy of the regional water quality control board? I have decades of experience in horticulture and know very well the practices of these companies. I ask you to be very thoughtful of the consequences of your decisions and your faith in these companies and the sanitation districts ability to as they say provide "pure" water to its community! Thank you for your attention, Curtis Cloud Thornton
Attachment:	

Reply / Manage

ATTACHMENT A

Carpinteria Sanitary District

Board of Directors Meeting

STAFF REPORT

TO: Board of Directors

FROM: Craig Murray, P.E. - General Manager

SUBJECT: District's Ocean Outfall Pipeline Continuation of Emergency Action

DATE: October 3, 2023

REQUESTED ACTION: That the Board review the emergency condition status and continue the emergency action related to the emergency condition associated with apparent damage of the District's ocean outfall pipeline system as required by Public Contract Code Section 22050 (c)(1).

BACKGROUND: At a Regular Meeting of the Board of Directors held on September 8, 2023, the Board passed Resolution No. R-367 which determined the existence of an emergency condition pursuant to Public Contract Code sections 20806 and 1102. The District is now proceeding with emergency work related to the District's ocean outfall pipeline repairs.

Current Status:

District staff obtained emergency permit coverage from the California Coastal Commission for the emergency repair work. Notifications were provided to the US Army Corps of Engineers field office. Information about the project was distributed via several social media platforms and posted to the District's website.

Based on authority granted via Resolution No. R-367, the District engaged Global Diving and Salvage, Inc. (Global) to perform the repair work, based on their specific knowledge of the work and comparably favorable pricing. A copy of Cash Contract No. 514 between the District and Global is attached for reference. Global mobilized on October 2nd, employing the dive support vessel Danny C. The District directly procured materials necessary to make the repairs and to adjust the outfall diffuser risers to restore full functionality of the outfall system. We expect the work to be completed within 10 to 12 working days.

The District has continued to work closely with FEMA and CalOES staff on disaster assistance grant funding for this emergency work. Based on the current timing, we intend to submit complete information and costs incurred following completion of the work.

Section 22050(c)(1) of the Public Contract Code requires that the Board continue the emergency action at each regularly scheduled meeting until the action is terminated. At this time, the emergency condition still exists and it is recommended that the Board continue the emergency action. An action to terminate the emergency action is expected to come back to the Board for consideration at the next regular meeting. **Section 22050(c)(1)of the Public Contract Code requires that this motion pass by a four-fifths majority vote.**

RECOMMENDATION: Staff recommends that the Board review the emergency condition status and continue the emergency action as prescribed in Resolution No. R-367.

SUGGESTED MOTION: I move that the Board continue the emergency action as prescribed in Resolution No. R-367.

M_____ S_____

Ayes:_____ Nays:_____ Abstentions:_____

Prepared By: _____
Craig Murray, P.E. - General Manager

CASH CONTRACT NO. 514

MAINTENANCE SERVICES AGREEMENT
BETWEEN
THE CARPINTERIA SANITARY DISTRICT AND
GLOBAL DIVING AND SALVAGE, INC.
FOR
EMERGENCY OUTFALL REPAIRS

THIS MAINTENANCE AGREEMENT is entered into this 20th day of September 2023, by and between the CARPINTERIA SANITARY DISTRICT, a public utility district formed under the laws of California ("DISTRICT") and GLOBAL DIVING AND SALVAGE, INC., a Washington Corporation ("CONTRACTOR").

The Parties agree as follows:

1. CONSIDERATION.

A. As partial consideration, CONTRACTOR agrees to perform the work listed in the SCOPE OF SERVICES, below;

B. As additional consideration, CONTRACTOR and DISTRICT agree to abide by the terms and conditions contained in this Agreement;

C. As additional consideration, DISTRICT agrees to pay CONTRACTOR on a time and materials reimbursement basis, a sum not to exceed $250,000 for CONTRACTOR's services. DISTRICT may modify this amount as set forth below. Unless otherwise specified by written amendment to this Agreement, DISTRICT will pay this sum as specified in the attached Exhibit "A" which is incorporated by reference.

D. DISTRICT will pay such amount promptly, but not later than 30 days after receiving CONTRACTOR's invoice.

2. TERM. The term of this Agreement commences upon execution and continues until the Work in Exhibit "A" is complete. It is anticipated that the Work will be completed within 25 working days after DISTRICT issues a Notice to Proceed.

3. SCOPE OF SERVICES.

A. CONTRACTOR will perform services generally described in "Exhibit A," which is incorporated by reference.

B. CONTRACTOR will, in a workmanlike manner, furnish all of the labor, technical, administrative, equipment, printing, vehicles, transportation, office space and facilities, and all other means whatsoever, except as herein otherwise expressly specified to be furnished by DISTRICT, necessary or proper to perform and complete the work and provide the professional services required of

CONTRACTOR by this Agreement.

4. FAMILIARITY WITH WORK.

A. By executing this Agreement, CONTRACTOR represents that CONTRACTOR has

i. Thoroughly investigated and considered the scope of services to be performed;

ii. Carefully considered how the services should be performed; and

iii. Understands the facilities, difficulties, and restrictions attending performance of the services under this Agreement.

B. If services involve work upon any site, CONTRACTOR warrants that CONTRACTOR has or will investigate the site and is or will be fully acquainted with the conditions there existing, before commencing the services hereunder. Should CONTRACTOR discover any latent or unknown conditions that may materially affect the performance of the services, CONTRACTOR will immediately inform DISTRICT of such fact and will not proceed except at CONTRACTOR's own risk until written instructions are received from DISTRICT.

5. INSURANCE.

A. Before commencing performance under this Agreement, and at all other times this Agreement is effective, CONTRACTOR will procure and maintain the following types of insurance with coverage limits complying, at a minimum, with the limits set forth below:

Type of Insurance	Limits (combined single)
Commercial general liability:	$2,000,000
Business automobile liability	$1,000,000
Workers compensation	Statutory requirement.

B. Commercial general liability insurance will meet or exceed the requirements of ISO-CGL Form No. CG 00 01 11 85 or 88. The amount of insurance set forth above will be a combined single limit per occurrence for bodily injury, personal injury, and property damage for the policy coverage. Liability policies will be endorsed to name DISTRICT, its officials, and employees as "additional insureds" under said insurance coverage and to state that such insurance will be deemed "primary" such that any other insurance that may be carried by DISTRICT will be excess thereto. Such insurance will be on an "occurrence," not a "claims made," basis and will not be cancelable or subject to reduction except upon thirty (30) days prior written notice to DISTRICT.

C. Automobile coverage will be written on ISO Business Auto Coverage Form CA 00 01 06 92, including symbol 1 (Any Auto).

D. CONTRACTOR will furnish to DISTRICT duly authenticated Certificates of Insurance evidencing maintenance of the insurance required under this Agreement, endorsements as required herein, and such other evidence of insurance or copies of policies as may be reasonably required by DISTRICT from time to time. Insurance must be placed with insurers with a current A.M. Best Company Rating equivalent to at least a Rating of "A:VII." Certificate(s) must reflect that the insurer will provide thirty (30) day notice of any cancellation of coverage. CONTRACTOR will require its insurer to modify such certificates to delete any exculpatory wording stating that failure of the insurer to mail written notice of cancellation imposes no obligation, and to delete the word "endeavor" with regard to any notice provisions.

E. Should CONTRACTOR, for any reason, fail to obtain and maintain the insurance required by this Agreement, DISTRICT may obtain such coverage at CONTRACTOR's expense and deduct the cost of such insurance from payments due to CONTRACTOR under this Agreement or terminate.

F. Self-Insured Retention/Deductibles. All policies required by this Agreement must allow DISTRICT, as additional insured, to satisfy the self-insured retention ("SIR") and deductible of the policy in lieu of CONTRACTOR (as the named insured) should CONTRACTOR fail to pay the SIR or deductible requirements. The amount of the SIR or deductible is subject to the approval of the District Counsel and the General Manager. CONTRACTOR understands and agrees that satisfaction of this requirement is an express condition precedent to the effectiveness of this Agreement. Failure by CONTRACTOR as primary insured to pay its SIR or deductible constitutes a material breach of this Agreement. Should DISTRICT pay the SIR or deductible on DISTRICT's behalf upon the CONTRACTOR'S failure or refusal to do so in order to secure defense and indemnification as an additional insured under the policy, DISTRICT may include such amounts as damages in any action against CONTRACTOR for breach of this Agreement in addition to any other damages incurred by DISTRICT due to the breach.

6. TIME FOR PERFORMANCE. CONTRACTOR will not perform any work under this Agreement until:

A. CONTRACTOR furnishes proof of insurance as required under Section 5 of this Agreement; and

B. DISTRICT gives CONTRACTOR a written Notice to Proceed.

C. Should CONTRACTOR begin work in advance of receiving written authorization to proceed, any such professional services are at CONTRACTOR's own risk.

7. TERMINATION.

A. Except as otherwise provided, DISTRICT may terminate this Agreement at any time with or without cause. Notice of termination will be in writing.

B. CONTRACTOR may terminate this Agreement upon providing written notice to DISTRICT at least thirty (30) days before the effective termination date.

C. Should the Agreement be terminated pursuant to this Section, DISTRICT may procure on its own terms services similar to those terminated.

D. By executing this document, CONTRACTOR waives any and all claims for damages that might otherwise arise from DISTRICT's termination under this Section.

8. INDEMNIFICATION.

A. CONTRACTOR indemnifies and holds DISTRICT harmless from and against any claim, action, damages, costs (including, without limitation, attorney's fees), injuries, or liability, arising out of this Agreement, or its performance, except for such loss or damage arising from DISTRICT's sole negligence or willful misconduct. Should DISTRICT be named in any suit, or should any claim be brought against it by suit or otherwise, whether the same be groundless or not, arising out of this Agreement, or its performance, CONTRACTOR will defend DISTRICT (at DISTRICT's request and with counsel satisfactory to DISTRICT) and will indemnify DISTRICT for any judgment rendered against it or any sums paid out in settlement or otherwise.

B. For purposes of this section "DISTRICT" includes DISTRICT's officers, officials, employees, agents, representatives, and certified volunteers.

C. It is expressly understood and agreed that the foregoing provisions will survive termination of this Agreement.

9. INDEPENDENT CONTRACTOR. DISTRICT and CONTRACTOR agree that CONTRACTOR will act as an independent contractor and will have control of all work and the manner in which is it performed. CONTRACTOR will be free to contract for similar service to be performed for other employers while under contract with DISTRICT. CONTRACTOR is not an agent or employee of DISTRICT and is not entitled to participate in any pension plan, insurance, bonus or similar benefits DISTRICT provides for its employees. Any provision in this Agreement that may appear to give DISTRICT the right to direct CONTRACTOR as to the details of doing the work or to exercise a measure of control over the work means that CONTRACTOR will follow the direction of the DISTRICT as to end results of the work only.

10. NOTICES.

A. All notices given or required to be given pursuant to this Agreement will be in writing and may be given by personal delivery or by mail. Notice sent by mail will be addressed as follows:

If to CONTRACTOR:
Attention: Jim Greene.
Global Diving and Salvage, Inc.
2880 Walnut Avenue
Signal Hill, CA 90755
(805) 562-4046
jgreene@gdiving.com
w/copy to legal@moranenvironmental.com

If to DISTRICT:
Attention: Craig Murray
Carpinteria Sanitary District
5300 Sixth Street
Carpinteria, CA 93013
(805) 684-7214 x112
craigm@carpsan.com

B. When addressed in accordance with this paragraph, notices will be deemed given upon deposit in the United States mail, postage prepaid. In all other instances, notices will be deemed given at the time of actual delivery.

C. Changes may be made in the names or addresses of persons to whom notices are to be given by giving notice in the manner prescribed in this paragraph.

11. TAXPAYER IDENTIFICATION NUMBER. CONTRACTOR will provide DISTRICT with a Taxpayer Identification Number.

12. NON-APPROPRIATION OF FUNDS. Payments due and payable to CONTRACTOR for current services are within the current budget and within an available, unexhausted and unencumbered appropriation of the DISTRICT.

13. THIRD PARTY BENEFICIARIES. This Agreement and every provision herein is generally for the exclusive benefit of CONTRACTOR and DISTRICT and not for the benefit of any other party. There will be no incidental or other beneficiaries of any of CONTRACTOR's or DISTRICT's obligations under this Agreement.

14. WAIVER. A waiver by DISTRICT of any breach of any term, covenant, or condition contained in this Agreement will not be deemed to be a waiver of any subsequent breach of the same or any other term, covenant, or condition contained in this Agreement, whether of the same or different character.

15. CONSTRUCTION. The language of each part of this Agreement will be construed simply and according to its fair meaning, and this Agreement will never be construed either for or against either party.

16. SEVERABLE. If any portion of this Agreement is declared by a court of competent jurisdiction to be invalid or unenforceable, then such portion will be deemed modified to the extent necessary in the opinion of the court to render such portion enforceable and, as so modified, such portion and the balance of this Agreement will continue in full force and effect.

17. CAPTIONS. The captions of the paragraphs of this Agreement are for convenience of reference only and will not affect the interpretation of this Agreement.

18. WAIVER. Waiver of any provision of this Agreement will not be deemed to constitute a waiver of any other provision, nor will such waiver constitute a continuing waiver.

19. INTERPRETATION. This Agreement was drafted in, and will be construed in accordance with the laws of the State of California, and exclusive venue for any action involving this agreement will be in Santa Barbara County.

20. AUTHORITY/MODIFICATION. This Agreement may be subject to and conditioned upon approval and ratification by the DISTRICT's Board of Directors. This Agreement is not binding upon DISTRICT until executed by the General Manager. The Parties represent and warrant that all necessary action has been taken by the Parties to authorize the undersigned to execute this Agreement and to engage in the actions described herein. This Agreement may be modified by written agreement. DISTRICT's General Manager may execute any such amendment on behalf of DISTRICT.

21. ACCEPTANCE OF ELECTRONIC SIGNATURES. In accordance with Government Code § 16.5, the Parties agree that this Agreement, agreements ancillary to this Agreement, and related documents to be entered into in connection with this Agreement will be considered signed when the signature of a party is delivered by electronic transmission. Such electronic signature will be treated in all respects as having the same effect as an original signature.

22. EFFECT OF CONFLICT. In the event of any conflict, inconsistency, or incongruity between any provision of this Agreement, its attachments, the purchase order, or notice to proceed, the provisions of this Agreement will govern and control.

23. CAPTIONS. The captions of the paragraphs of this Agreement are for convenience of reference only and will not affect the interpretation of this Agreement.

24. FORCE MAJEURE. Should performance of this Agreement be prevented due to fire, flood, explosion, war, terrorist act, embargo, government action, civil or military authority, the natural elements, or other similar causes beyond the Parties' control, then the Agreement will immediately terminate without obligation of either party to the other.

25. ENTIRE AGREEMENT. This Agreement and its one attachment constitutes the sole agreement between CONTRACTOR and DISTRICT. To the extent that there are additional terms and conditions contained in Exhibit "A" that are not in conflict with this Agreement, those terms are incorporated as if fully set forth above. There are no other understandings, terms or other agreements expressed or implied, oral or written.

IN WITNESS WHEREOF the parties hereto have executed this contract the day and year first hereinabove written.

CARPINTERIA SANITARY DISTRICT

_____

Craig Murray, General Manager
Carpinteria Sanitary District

GLOBAL DIVING AND SALVAGE, INC.

_____

By:_____

Title:_____-

EXHIBIT "A"

GLOBAL
a MER company

August 28, 2023

Carpinteria Sanitary District
5300 Sixth Street
Carpinteria, CA 03013

Attn: Craig Murray, P.E.

Re: Marine Outfall Inspection and Repairs

Scope of Work

Global Diving & Salvage will provide a 4 Man dive crew, equipment, and support vessel to excavate each diffuser location, remove the existing, damaged diffuser assembly, and install new owner provided flanged riser/discharge assemblies. Final design details are still being discussed at the time of this proposal, however the crew and equipment proposed below will be adequate for any minor design variations presently under consideration.

The pipeline will be cleared of accumulated material as work progress from inshore to offshore until full flow capacity is restored to the diffuser section. It is estimated that work will be completed in about 10-14 working days, depending on depth of material to be excavated.

All work will be documented in detail with written logs, video recorded in digital format, and include a detailed final written report.

Pricing

The following daily rates are provided for the Phase II construction effort:

Description	Unit	Unit Total
Mobilization (per occurrence)	LS	$4,631
4 Man Dive Crew 8 Hour ST Shift	DY	$6,116
4 Man Dive Crew Overtime	Per Hour	$1,092
Dive Station Equipment	DY	$1,900
4 Man Crew Per Diem	$275 per man/Per Day	$1,100
Dive Support Vessel *Danny C* (NTE 10 Hrs. dock to dock)	Day Rate	$7,600
Danny C Fuel	Gallon	$6.80 per Gallon

- Pricing is based on two wet divers per day, working a 10 hour shift Monday through Friday. Shift time is dock to dock, Santa Barbara Harbor. Vessel fuel consumption is estimated at 50 gallons per day.

- In the event unfavorable ocean conditions or other situation beyond the control of GDS occurs after project start, a reasonable standby time will be negotiated with CSD.

- CSD to provide all permanent materials, i.e. flanged diffuser saddles, riser assemblies, sealing epoxy or neoprene gaskets, and *Tideflex* check valves.

- Equipment includes 1500 GPM diesel dredge/jet pump, pneumatic chippers, U/W Burning gear, video system (including drop camera for pipe internal inspection) Tool Air Compressor, and standard surface supplied air dive station/safety equipment.

- Dive support vessel *Danny C* cost is based on availability.

- All work will be conducted in strict regulatory compliance with USCG, OHSA, and the International Association of Diving Contractors *Consensus Standards for Commercial Diving and Underwater Operations*.

Respectfully Submitted,

Jim Greene
Operations Manager

Global Diving & Salvage, Inc.
2743 Signal Parkway
Signal Hill, CA 90755

562.424.4046 Office
707.561.6811 Fax
805.284.4945 Mobile
800.441.3483 24hr Line
jgreene@gdiving.com | www.gdiving.com

GLOBAL
a MER company

Carpinteria Sanitary District

Board of Directors Meeting

STAFF REPORT

TO: Board of Directors

FROM: Craig Murray, P.E. - General Manager

SUBJECT: **Carpinteria Advanced Purification Project (CAPP) Update**

DATE: October 3, 2023

REQUESTED ACTION: None. Information Only.

BACKGROUND: Progress continues to be made on development of an indirect potable reuse (IPR) recycled water project in conjunction with the Carpinteria Valley Water District (CVWD). A brief summary of activities underway is provided below.

Design Activities. The design team submitted the Final Basis of Design Memorandum, incorporating feedback and comments from CSD and CVWD. A copy is attached for reference. The ultrafiltration pilot project is continuing to run and generate comprehensive performance data to inform the full scale design. Carollo staff gave an excellent presentation to CSD operations staff that explained membrane performance and response to daily maintenance backwash and to full clean in place processes. An important aspect of the project is updating the District's NPDES discharge permit in light of the anticipated changes to effluent quality and quantity. To support that process, a bench scale reverse osmosis unit will be set up at the UF pilot location. Filtered water will be run through the RO system and samples of both the demineralized filtrate and the RO reject will be collected for comprehensive chemical analyses. The purpose is to provide true characterization of the anticipated effluent discharge to the ocean when the AWPF is up and running. A series of focused meetings and workshops have been held over the past several weeks focusing on different elements of the design. The main AWPF building layout is being established in order to pass on to the architectural design group.

Joint Exercise of Powers Agreement. Development and finalization of the draft Joint Exercise of Powers Agreement has continued. A lease agreement and primary operating memorandum are also being drafted. A review meeting with staff and legal counsel was held on October 3rd. An oral summary and status report will be provided.

Funding Update. The team has been meeting with the SWRCB Division of Financial Assistance staff in an effort to finalize the State Revolving Fund loan contract. The State is under pressure to finalize awarded SRF loans and setting short deadlines for legal concurrence and other related tasks.

RECOMMENDATION: None. Information Only.

SUGGESTED MOTION: None.

Prepared by: _____

Craig Murray, P.E. - General Manager

CARPINTERIA ADVANCED PURIFICATION PROJECT

CAPP | Replenishing Our Groundwater for the Future

BASIS OF DESIGN VALIDATION

TECHNICAL MEMORANDUM

FINAL

0012181.00

Carpinteria Valley Water District

September 2023

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TABLES

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1. INTRODUCTIONS AND OBJECTIVES

1.1 Introduction

The Carpinteria Valley Water District (CVWD) has partnered with the Carpinteria Sanitary District (CSD) to develop the Carpinteria Advanced Purification Project (CAPP), in which purified recycled water will be produced on-site at the CSD Wastewater Treatment Plant (WWTP) with the proposed Advanced Water Purification Facility (AWPF), conveyed through a Purified Water Conveyance System, then injected into the Carpinteria Groundwater Basin using Injection Wells and extracted from the Groundwater Basin through existing CVWD production wells.

This Basis of Design Validation Technical Memorandum (TM) documents key design decisions and will supplement the CAPP AWPF Preliminary Design Report (PDR) (Woodard & Curran, June 2019) and Conveyance System PDR (Woodard & Curran, October 2019).

1.2 Objectives

The objectives of this Basis of Design Validation TM are to provide the design criteria and elements that will serve as the basis for the final design of the CAPP AWPF and Conveyance Systems. Design criteria that have changed since development of the AWPF PDR (Woodard & Curran, June 2019) and Conveyance System PDR (Woodard & Curran, 2019) are documented herein.

Several preliminary decisions have been made related to (but not limited to):

- AWPF production capacities
- Equalization tank diversion
- Treatment process design criteria
- Purified Water Clearwell and Pump Station design criteria
- Electrical loading requirements
- Site plan and building layout(s)
- Wellhead locations, facilities, and maintenance water discharge

1.3 Organization

Following the same outline and section numbering as the AWPF PDR (Woodard & Curran, June 2019), this TM documents the design criteria changes presented in Sections 1 through 4. If there has been no change to the design criteria in the PDR, that is also documented as *No change from the Preliminary Design Report (2019)*. This memorandum also documents the next steps and activities that will be completed during the 50% design phase. Sections 5 through 7 of the AWPF PDR were not updated as part of this TM.

Section 5 of this TM has been created to document design changes to the offsite facilities, consisting of the conveyance pipeline, the two injection wells, wellhead equipment and backwash disposal method for the injection wells, and the monitoring wells. The design criteria for the below-ground components of injection and monitoring wells are not included in this TM.

Topographic survey, geotechnical investigations, and potholing were not completed at the time of this TM. These field investigations will be completed to support the subsequent AWPF 50% design package and Conveyance Pipeline 75% design package.

2. BASIS FOR FACILITY PLANNING AND DESIGN

2.1 Overview of Conventional Full Advanced Treatment Train

No change from the Preliminary Design Report (2019).

2.2 Source Water Quality and Flows

2.2.1 Source Water Quality from Carpinteria WWTP

The AWPF will receive undisinfected secondary effluent from the CSD WWTP as its source water. Secondary effluent will be redirected to the AWPF's Equalization (EQ) Tank upstream of the WWTP's Chlorine Contact Basin (CCB). CSD will be taking grab samples of undisinfected secondary effluent and sending the samples to a third-party laboratory for testing of water quality constituents that are critical to UF/RO/UV-AOP design. Woodard & Curran and Carollo developed a water quality sampling list in April 2023 that included the requested water quality constituents for testing and sampling frequency. In addition to grab samples, the water quality for the AWPF feed will be analyzed as part of the upcoming membrane pilot testing that will occur for a minimum of four months beginning in August and using CSD's NPDES compliance data. The updated feed water quality basis of design based on historical sampling and May-June 2023 sampling events is presented in **Table 2-1**.

Table 2-1: AWPF Feed Water Quality Basis

Parameter	Units	Average	Minimum	Maximum	Design Value	Notes
1,4-dioxane	ug/L	0.63	<0.34 (ND)	0.98	0.95	3,4,8
Alkalinity, Total	mg/L as HCO_3	215	200	200	228	3,4,8
Aluminum	mg/L	0.03	<0.02 (ND)	0.05	0.04	3,4,8
Ammonia, Total	mg/L as N	0.17	<0.2 (ND)	4.32	0.55	1,3,4,5,8
Barium	mg/L	0.06	0.062	0.064	0.064	3,4,8
Boron	mg/L	0.58	0.4	0.5	0.69	2,3,4,8
Bromate	ug/L	<5.0 (ND)	<5.0 (ND)	<5.0 (ND)	<5.0 (ND)	6,8
Bromide	mg/L	0.93	0.66	1.26	1.27	6,8
Calcium	mg/L	107	90	100	117.8	3,4,8
Chloride	mg/L	289	333	354	341	3,4,8
Free Chlorine	mg/L	<0.1 (ND)	<0.1 (ND)	<0.1 (ND)	<0.1 (ND)	3,4,8
Specific Conductance	µmhos/cm	2130	2180	2370	2256	3,4,8
Fluoride	mg/L	0.47	0.3	0.5	0.5	3,4,8
Hardness, Total	mg/L as $CaCO_3$	505	431	555	543	3,4,8
Iron	ug/L	97.5	<30 (ND)	154	149	3,4,5,8
Magnesium	mg/L	58	44	63	61.8	3,4,8
Manganese	ug/L	15.7	<10 (ND)	20	20	3,4,8
N-Nitrosodimethylamine (NDMA)	ng/L	3.03	<0.54 (ND)	5.7	5.35	3,4,8
Nitrate	mg/L as NO_3	153.9	100	178	163.3	2,3,4,8
Nitrate-N	mg/L as N	34.8	23	40.1	37	2,3,4,8

Parameter	Units	Average	Minimum	Maximum	Design Value	Notes
Nitrate + Nitrite	mg/L as N	35.8	23	40.1	38.1	2,3,4,8
Oil and Grease	mg/L	3.3	0.08	15.2	5.5	5,8
pH	unit	7.28	6.21	7.96	7.28	5
ortho-Phosphate	mg/L as PO_4	10.6	6.3	11.96	11.8	6,8
Phosphorus, Total	mg/L as P	4.1	3.6	4.8	4.7	3,4,8
Potassium	mg/L	24.5	20	32	30.2	3,4,8
Silica	mg/L as SiO_2	17.1	13	30	22.2	3,4,8
Sodium	mg/L	214	188	264	240	3,4,8
Strontium	mg/L	1.1	0.863	1.24	1.2	3,4,8
Sulfate	mg/L	276	193	273	303.6	3,4,8
Temperature	°F	73	65	81.5	73	5
Total Dissolved Solids (TDS)	mg/L	1,379	1,330	1,500	1,444	2,3,4,8
Total Organic Carbon (TOC)	mg/L	8.5	2.4	2.9	11	3,4,8
Total Suspended Solids (TSS)	mg/L	6.82	1	30.0[7]	10	5
Turbidity	NTU	2.59	0.55	16.5	4.45	5

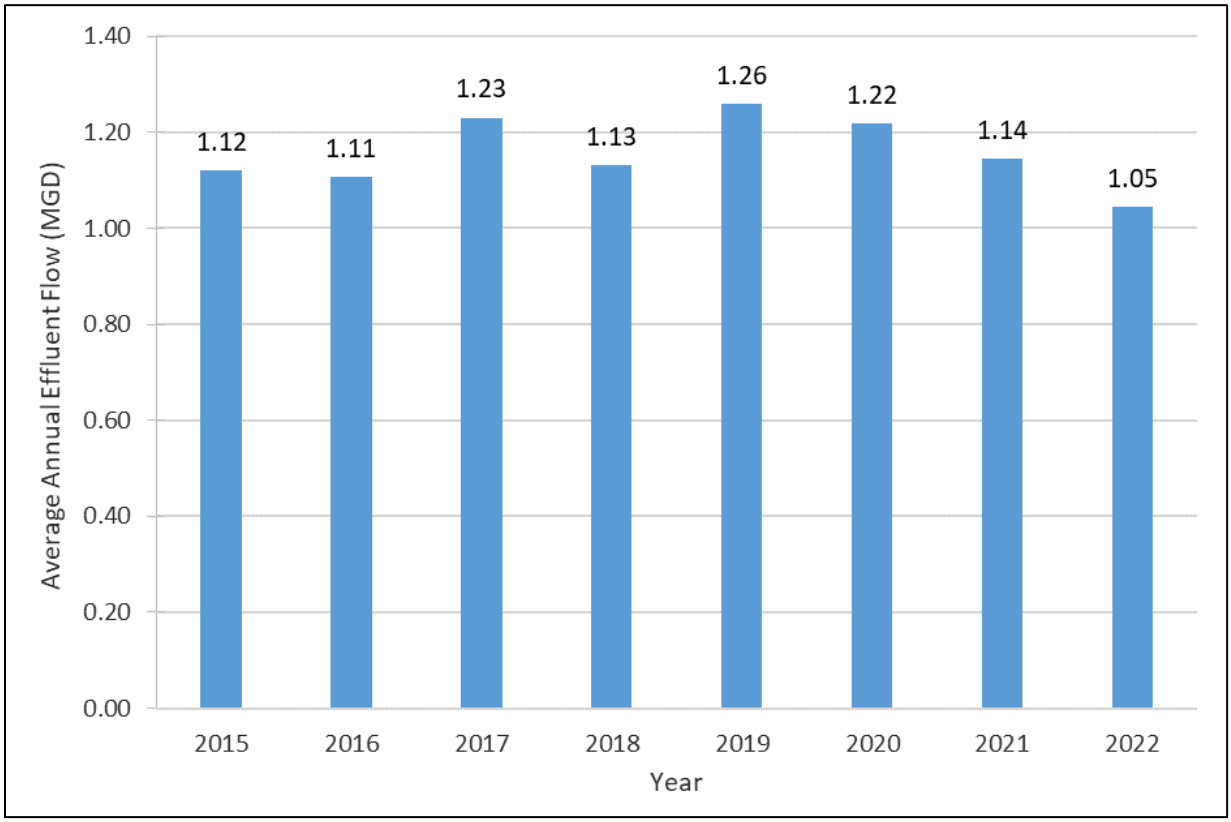
Notes:

1. Source: FGL Environmental Agricultural Analytical Chemists, Laboratory Report No. SP 1502531, dated March 31, 2015. Water quality samples collected on March 5, 2015.
2. Source: FGL Environmental Agricultural Analytical Chemists, Laboratory Report No. SP 1502531, dated May 14, 2015. Water quality samples collected on April 22, 2015.
3. Source: FGL Environmental Agricultural Analytical Chemists, Laboratory Report No. SP 1811809, dated October 5, 2018. Water quality samples collected on September 5, 2018.
4. Source: FGL Environmental Agricultural Analytical Chemists, Laboratory Report No. SP 1813267, dated February 14, 2019. Water quality samples collected on October 3, 2018
5. Carpinteria WWTP NPDES Water Quality Compliance Data, from May 2006 to May 2018.
6. Source: FGL Environmental Agricultural Analytical Chemists, Laboratory Report No. SP 1901680, dated February 26, 2019. Water quality samples collected on February 5, 2019.
7. Maximum TSS concentration specified was based on the maximum allowable concentration in the NPDES permit.
8. Source: May and June 2023 WWTP effluent water quality sampling data.

2.2.2 Historical and Current Flow Rates from Carpinteria WWTP

Woodard & Curran and Carollo received WWTP average and peak effluent flow data from December 1, 2018 to May 10, 2023 and diurnal effluent flow data from December 1, 2021 to May 10, 2023 from CSD. The data were incorporated into the previous flow analysis data set from the 2019 PDR. Current WWTP flow rates were characterized using flow data from January 2015 through December 2022. The 2023 flow data were excluded because it was limited to January to May, and during that time Carpinteria experienced significant rainfall well above average, resulting in higher than normal WWTP flow rates for prolonged periods of time. The average annual WWTP effluent flows from January 2015 through December 2022 are presented in **Figure 2-1**. The average annual effluent flow across this time period is approximately 1.16 MGD.

Figure 2-1: Summary of Average Annual WWTP Effluent Flows from 2015 through 2022



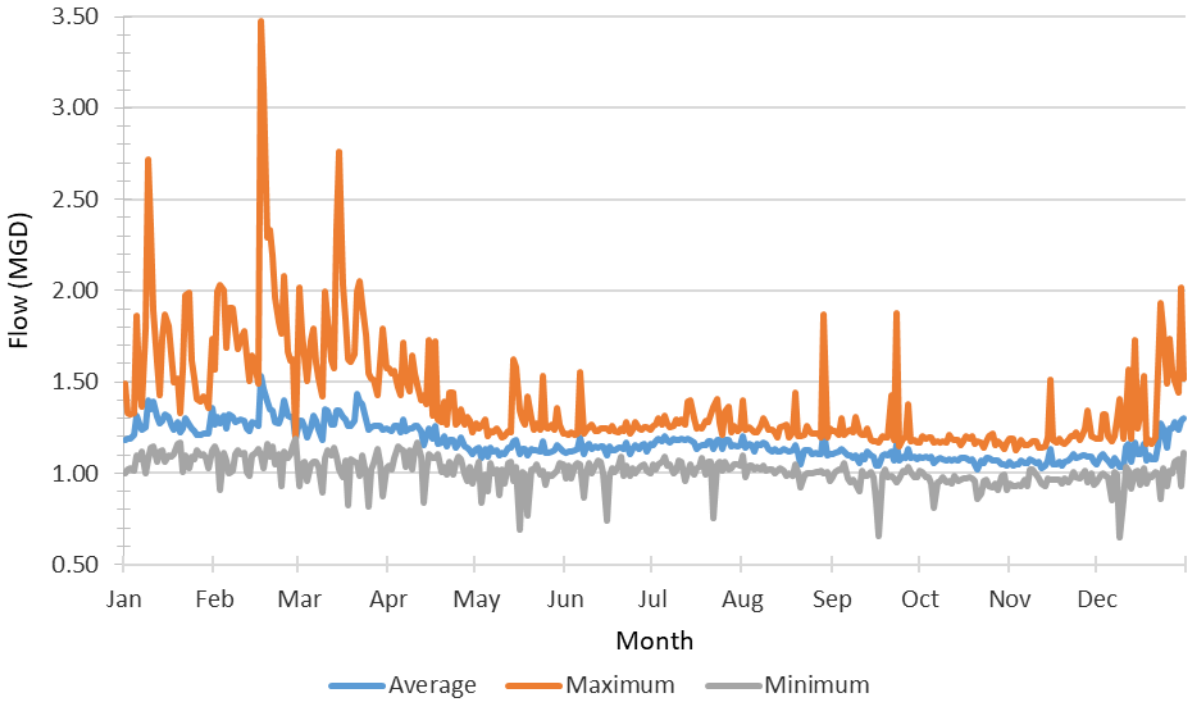
Note:

1. Flow data represents CSD WWTP effluent flows. Flow monitoring location is the downstream of the WWTP CCB.

A summary of average, maximum, and minimum daily WWTP effluent flows from January 2015 to May 2023 is provided in **Figure 2-2**. The maximum line indicates the highest average flow rate for each calendar day across the data set. The average line is the calculated average of all daily average flow data for each calendar day across the data set. The minimum line indicates the lowest measured average flow rate for each calendar day across the data set. This figure shows the annual variation in flow between minimum, maximum, and average flows recorded over those years.

WWTP flows are generally highest during the wet winter months (January through March) when the City experiences most of its seasonal rainfall. Flows are generally lowest during the dry fall months (September through November) when rainfall is minimal and tourism is significantly less compared to the summer months. This approx. 20-25% season variation in flow affects AWPF production when trying to maximize reuse.

Figure 2-2: Average, Maximum, and Minimum Daily WWTP Effluent Flows from 2015 to 2023



2.2.3 Projected Flow Rates from Carpinteria WWTP

No change from the Preliminary Design Report (2019).

2.3 Purified Water Requirements

No change from the Preliminary Design Report (2019).

2.3.1 Treatment Credits for AWPF

The pathogen removal (virus and protozoa (with protozoa referring to Giardia and Cryptosporidium) will be as follows:

- Ultrafiltration
  - Virus: 0-log
  - Protozoa: 4-log
- Reverse Osmosis
  - Virus: 1.5-log
  - Protozoa: 1.5-log
- UV/AOP
  - Virus: 6-log
  - Protozoa: 6-log
- Free Chlorination
  - Virus: ***up to*** 4-log

    - Protozoa: 0-log
- Aquifer Retention
    - Virus: ***up to*** 6-log
    - Protozoa: 0-log

Several notes on the credits above are important to understand:

- The total credits for virus must be 12 or higher. The total credits for protozoa must be 10 or higher.
- The ultrafiltration system (as opposed to microfiltration which is not being implemented) can provide 3+ log reduction of virus, but is currently not credited by DDW. There are online monitoring systems under development that will in the future allow for virus credits by ultrafiltration.
- The reverse osmosis system may attain ~2 log reduction credit for both virus and protozoa, after the AWPF is operational and depending upon the results of online electrical conductivity and total organic carbon monitoring across reverse osmosis.
- The virus credit for aquifer retention must be validated with a tracer study after the AWPF is commissioned. Lower credits, in the range of 2 to <6 may be demonstrated.
- Additional virus credits, if they are needed, will be provided by free chlorination in the finished water Clearwell. The finished water storage tank will be designed as a clearwell to provide up to 4-log virus inactivation through free chlorine dosing. Based on the information provided in **Table 2-2**, the target chlorine contact time (CT) value in the clearwell will be 4 mg/L*min based upon low turbidity (<0.2 NTU), low pH (<7), and a water temperature of at least 15 degrees C. The dimensions and baffling of the clearwell will be finalized in detailed design. Note that DDW allows extrapolation of the data in the table below to attain the 4-log target. In pipeline contact time will also be evaluated during detailed design as an alternative.

Table 2-2: CT Values for 1-4 log reduction values of viruses at a range of turbidity, pH and temperature[1]

pH	Log_{10} inactivation	≤0.2 NTU					≤2 NTU					≤5 NTU				
		5 °C	10 °C	15 °C	20 °C	25 °C	5 °C	10 °C	15 °C	20 °C	25 °C	5 °C	10 °C	15 °C	20 °C	25 °C
≤7	1	4	3	2	2	1	4	3	2	2	1	4	3	2	2	1
	2	5	4	3	2	2	5	4	3	2	2	6	4	3	2	2
	3	7	5	4	3	2	7	5	4	3	2	7	5	4	3	2
	4	8	6	4	3	2	9	6	4	3	2	9	7	5	3	3
≤7.5	1	7	5	4	3	2	7	5	4	3	2	8	6	4	3	2
	2	10	7	5	4	3	10	7	5	4	3	13	9	6	5	4
	3	13	9	7	5	4	13	9	7	5	4	16	12	9	6	5
	4	16	11	8	6	4	16	11	8	6	4	21	15	11	7	6
≤8	1	9	7	5	3	3	10	7	5	4	3	12	9	6	4	3
	2	14	10	7	5	4	15	10	7	5	4	19	13	9	7	5
	3	18	13	9	7	5	19	13	10	7	5	25	18	13	9	7
	4	23	16	12	8	6	23	16	12	8	6	32	23	16	11	8
≤8.5	1	11	8	6	4	3	12	9	6	5	4	14	10	7	5	4
	2	17	12	9	6	5	19	13	9	7	5	21	15	11	8	6
	3	23	16	12	9	6	25	17	13	9	7	29	21	15	10	8
	4	29	21	15	10	8	31	22	16	11	8	37	26	18	13	9
≤9	1	13	9	6	5	3	14	10	7	5	4	15	10	7	5	4
	2	20	14	10	7	5	22	16	11	8	6	23	16	12	8	6
	3	28	19	14	10	7	30	21	15	11	8	32	23	16	11	8
	4	35	25	17	12	9	38	27	19	13	10	41	29	20	14	10

[1] WaterVal (2017). WaterVal Chlorine Disinfection Validation Protocol. From Australian WaterSecure Innovations Ltd. Brisbane, Australia.

2.3.2 Treatment Credits for Underground Retention

No change from the Preliminary Design Report (2019).

2.3.3 Pathogen Control Summary

No change from the Preliminary Design Report (2019).

2.3.4 Groundwater Anti-Degradation

No change from the Preliminary Design Report (2019).

3. ADVANCED WATER PURIFICATION FACILITY DESIGN CRITERIA

3.1 Overview of Carpinteria AWPF

See **Appendix A** for a detailed process flow diagram for the proposed AWPF system that includes all major processes, instrumentation, and chemical addition points.

3.1.1 Initial and Ultimate Treatment Capacity

The proposed initial and ultimate production capacity of the AWPF from the 2019 PDR equaled 1.00 MGD and 1.20 MGD, respectively. These capacities were based on average flow conditions based on the data available at that time. After an analysis of the expanded flow data set ending on May 2023, it is recommended to design the initial capacity of the AWPF towards capturing 95th percentile of flow conditions, which corresponds to a production capacity of 1.30 MGD. Increasing the capacity of the AWPF to 1.30 MGD will maximize yield for groundwater injection during the higher flow winter months by reducing the volume of water that would overflow out of the AWPF EQ Tank into the existing CCB with a 1.00 MGD system.

Table 3-1 quantifies the approx. number of days that WWTP secondary effluent would have overflowed out of the AWPF EQ Tank and into the existing CCB based on WWTP flow data from January 2015 to May 2023. Designing the AWPF around 1.00 mgd production capacity would spill on average 50.5 acre-feet per year (AFY) versus a 1.30 mgd production capacity will spill only 9.2 AFY on average. On average, the total volume of additional water that would be treated by a 1.30 MGD AWPF versus a 1.00 MGD system is approximately 41.3 AFY (36,900 GPD).

Table 3-1: AWPF Capacity and Potential Spill Volumes to the Chlorine Contact Basin

Year	Days Overflowing		Spill Volume (MG)		Additional Treated Water (MG)
	1.00 mgd	1.30 mgd	1.00 mgd	1.30 mgd	
2015	75	1	5.6	0.2	5.4
2016	52	3	5.0	0.2	4.8
2017	142	23	31.6	9.3	22.3
2018	53	4	5.6	0.8	4.8
2019	270	19	35.5	3.8	31.7
2020	279	8	20.1	1.3	18.8
2021	139	4	10.0	0.8	9.2
2022	28	1	2.8	0.0	2.8
2023	89	37	32.5	10.8	21.7

Notes:

1. Based on WWTP effluent flow data from January 2015 to May 2023. In 2023, the WWTP effluent flow data is from January to May.
2. Based on UF/RO flow rates and recoveries presented in **Table 3-2**.

Equipping the AWPF for an ultimate production capacity of 1.30 MGD at the time of construction would increase the total construction cost by approximately $150,000 compared to the approach in the 2019 PDR, which was equipping for an initial capacity of 1.00 MGD and expanding to ultimate capacity in the future with on-skid expansion. The additional cost of approximately $150,000 is for the additional membranes and

bigger pumps sized for 1.30 MGD. Equipping for ultimate capacity now removes the need for remobilizing the membrane suppliers and replacing the pumps when it comes time to increase capacity from initial to ultimate production. The overall size of the building, tanks, piping, etc. would not change because those components are sized based on ultimate capacity.

The UF and UV systems can freely turn down to meet any flow setpoints required of them. The RO System will cycle trains on and off as required to fully treat all the water according to a moving level setpoint in the AWPF EQ Tank. RO train cycling is fully automated and does not require operator involvement to complete (see **Section 3.2.4** for further discussion). Additionally, since operator involvement is required when the CCB receives overflow water from the EQ Tank, reducing the number of days the water enters the CCB will reduce O&M requirements. Overflow events into the CCB from the EQ Tank will require that operators manage the water in the basin by either dosing chemicals as required when overflowing, or by draining the tank after each overflow.

Updated production capacities are listed in **Table 3-2**. The UF system has been upsized to account for recirculation of UF backwash to the WWTP headworks.

Table 3-2: Evaluation of AWPF Proposed Production Capacity

Parameter	Unit	Original Capacity (from PDR)	Proposed Capacity
AWPF Production Capacity	MGD	1.00	1.30
AWPF Influent Flow	MGD	1.29	1.68
UF System			
Feed	MGD	1.29	1.68
Recovery	%	92	92
Backwash Waste	MGD	0.10	0.13
Filtrate	MGD	1.19	1.55
RO System			
Feed	MGD	1.19	1.55
RO Recovery, Maximum	%	84	84
Permeate	MGD	1.00	1.30
UV-AOP Feed	MGD	1.00	1.30

There are several potential additional flows that could come to the CSD, though no agreements or projects have been developed and thus there are speculative at this point. One is for a sewer connection with the Summerland Sanitary District (SSD), with an average flowrate of 67,000 gpd (2022). SSD flow would be partially equalized before connection into CSD. Another potential future source of flows is through the Regional Housing Needs Assessment growth, which may result in approximately 0.10 MGD of additional flows. There is also the potential for diversion of urban runoff into the CSD collection system.

Given the uncertainty with potential additional flow sources in the future, the AWPF process building will not have space reserved for future trains. On-skid expansions of UF and RO trains are possible but have limits. For UF trains, on-skid expansions increase the footprint of a train. The current AWPF building layout, as presented in **Section 4**, does not reserve space for on-skid expansion with additional membrane modules. If membrane modules are to be added in the future, it would reduce the clear area around the

skid and restrict working conditions. On-skid expansion of RO trains increases the height of each skid, but not the footprint. Limitations with RO on-skid expansion are typically governed by on-skid pipe sizes and the high-pressure feed pumps. Given the limited space available for on-skid expansion of the UF system, the current layout suggests the ultimate capacity of the AWPF is 1.30 MGD. The sizing and design criteria for the UF trains will be re-evaluated after the completion of the membrane pilot testing. Results of the pilot testing may show less membrane modules are required than what was assumed as part of this TM, thus reducing the footprint of the UF skids and leaving space for on-skid expansion in the future if needed.

3.1.2 Projected Purified Water Quality

No change from the Preliminary Design Report (2019).

3.1.3 Facility Reliability and Redundancy

The EQ Tank will be bisected by a concrete wall, splitting the tank in half. This will allow for half of the tank to come out of service at a time for cleaning while the other half remains in production. During the April 24, 2023 site walk, it was noted that the existing CCB must be periodically cleaned of solids that carry over from the WWTP final clarifiers. Splitting the EQ Tank in this manner gives more flexibility to the operations team with minimal impacts to storage concerns. The RO Trains may need to cycle more frequently while one half of the tank is being cleaned depending on influent flow rates.

The UF System will be operated as an N+1 system, with a total of three trains. The redundancy allows for one train to be taken out of service for backwashing, cleaning, or maintenance without impacting production. Typically, all skids will operate at the same time unless one train is out of service for maintenance.

The RO Transfer Pumps are removed from the project to save on cost and footprint. Each RO Train will function as a self-sufficient system with N+0 units (two trains, both in service to meet peak production). If one RO train is out of service plant capacity is reduced from 1.30 mgd to 0.65 mgd.

The UV System and Chemical Systems have not been changed from the Preliminary Design Report (2019).

3.1.4 General AWPF Operating Strategy

All WWTP effluent will flow by gravity into the AWPF EQ Tank. Any WWTP effluent that the AWPF cannot treat will passively overflow into the existing CCB.

The RO System has very little flexibility to turn down and will instead rely on cycling the RO Trains on and off, typically once per day. When the EQ Tank reaches a high level setpoint, both RO Trains will be put into service, treating as much water as possible (up to 1.30 MGD). The UF System will produce what is required to feed the RO and the UV System will treat all available RO Permeate. Once the EQ Tank has been drawn down to a low level setpoint, one RO Train will turn off and allow the tank to fill to the high level before restarting the offline RO Train. RO train cycling is fully automated and does not require operator involvement to complete. See **Section 3.2.4** for an evaluation of RO train on/off cycling based on EQ Tank level and WWTP flow rates.

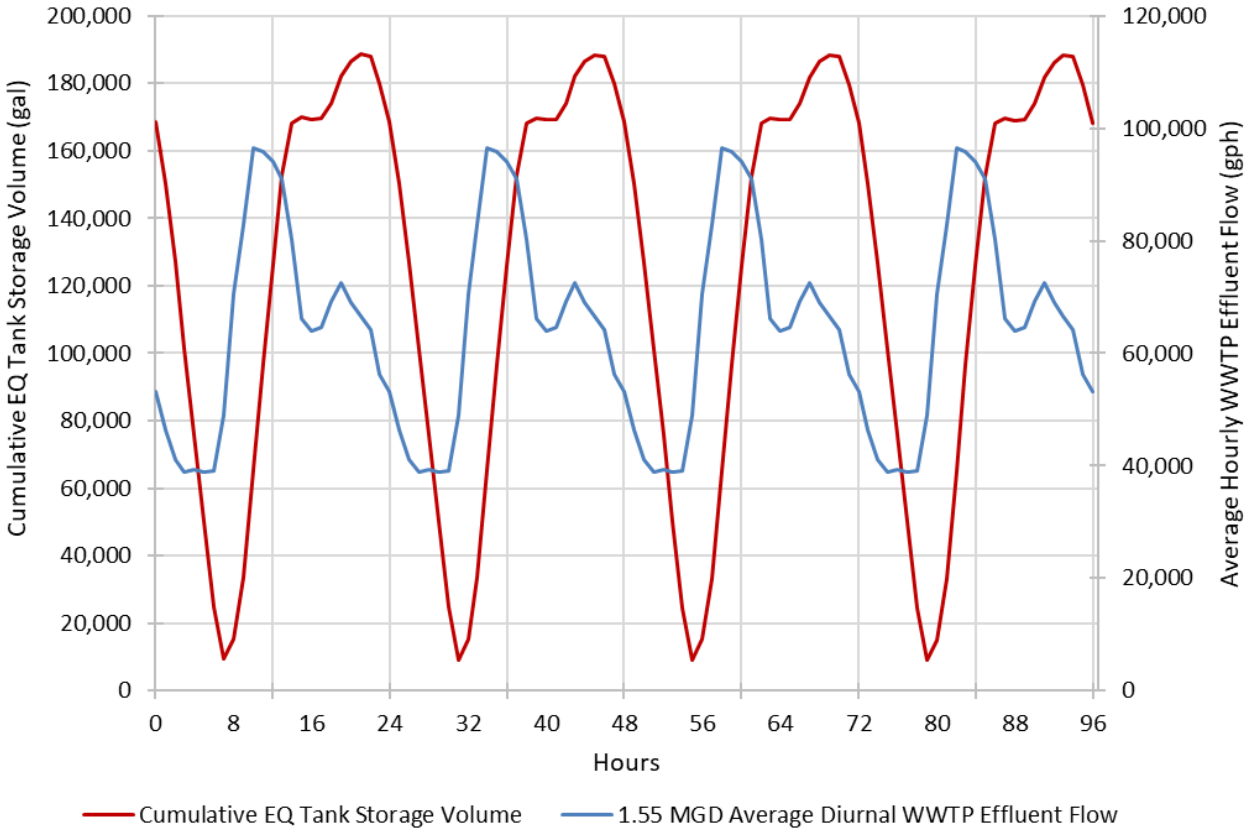
3.2 Process Descriptions and Design Criteria

3.2.1 Flow Equalization

UF/RO/UV-AOP systems function best when the source water is fed at a continuous rate with limited fluctuations. Therefore, an EQ Tank will be required upstream of the AWPF to equalize the diurnal secondary effluent flow variance. The EQ tank will be located upstream of the existing CCB and receive WWTP effluent by gravity from a diversion connecting to the existing 24-inch secondary effluent pipeline. As previously mentioned, the EQ Tank will be divided into two halves to allow for cleaning and maintenance of one side at a time without requiring a complete AWPF shutdown, with one UF Feed Pump and one Plant Water Pump located in each half. The EQ Tank will overflow at one end to the existing CCB. Whenever the EQ Tank receives more flow than the AWPF can treat the excess water will overflow to the CCB where it can be chlorinated and dechlorinated with the existing equipment before being discharged to the ocean outfall.

The AWPF EQ Tank was sized to provide enough operating volume to produce 1.30 MGD of RO permeate, equivalent to approximately 1.68 MGD of secondary effluent fed to the AWPF, as shown in **Table 3-2**. This 1.68 MGD value includes the UF backwash waste return flow of approximately 0.13 MGD. Therefore, the required WWTP secondary effluent base flow is approximately 1.55 MGD. To size the AWPF EQ Tank, a design diurnal flow curve was developed using hourly flow data from days where the WWTP effluent was approximately 1.55 MGD. The minimum required EQ tank working volume was determined by developing a cumulative storage volume curve over a 24-hour span using the design diurnal curve as the basis to fill the tank and 1.68 MGD (70,202 gph) drawn out of the tank on a constant basis to feed the AWPF. The peak cumulative storage volume over the 24-hour period would be the minimum working volume required for the EQ Tank. The design diurnal and cumulative storage volume curves are shown in **Figure 3-1**.

Figure 3-1: 1.55 MGD WWTP Diurnal Flow and Cumulative EQ Storage Volume



Notes:

1. A constant UF backwash return flow rate of 0.13 MGD (5,619 gph) was included in the cumulative EQ tank storage volume estimates.

As shown in **Figure 3-1**, the minimum EQ working volume required to produce 1.30 MGD of RO permeate is approximately 190,000 gallons. This was increased to 200,000 gallons for the AWPF basis of design, which approximately matches the working volume identified in the 2019 PDR. The EQ tank will not utilize its full 200,000 gallon working volume on days where the AWPF is producing less than 1.30 MGD due to WWTP effluent flows below 1.55 MGD. During these days, the RO trains will cycle on/off based on the water level in the EQ Tank. See **Section 3.2.4** for further discussion of RO train cycling based on the EQ Tank water level and WWTP effluent flow rate.

The EQ Tank design criteria are summarized in **Table 3-3**. A cast-in-place concrete tank constructed below-grade is recommended over an above-ground steel or concrete tank to minimize impacts to WWTP vehicle access in the area. See Appendix B for a site plan of the AWPF with the location of the EQ Tank identified.

Table 3-3: Equalization Tank Design Criteria

Description	Units	Value
In-Service	No.	1
Reliability	No.	0
Total	No.	1
Required Volume for EQ	gal	200,000
Required Volume	ft3	26,736
UF Feed Flowrate	gpm	1,170
Storage Time	min	175
Tank Dimensions		
Length	ft	60
Width	ft	45
Side Water Depth	ft	12
Freeboard	ft	2
Total Depth	ft	14
Tank Type	--	Buried Cast-in-Place Concrete

3.2.2 Disc Strainers

The UF System requires straining of large particulates to maintain the module warranty for the system. Originally wedge wire strainers were selected for this purpose, but the performance of this technology on recent and similar projects has shown that biological fouling is incredibly detrimental to their fouling. Disc filters will be used as an alternative technology. These filters expand during a backwash step to remove physical and biological fouling more completely. This system will require a backwash supply tank and pumps to properly function. The design criteria for the disc filters are shown in **Table 3-4**.

Table 3-4: Disc Filters Design Criteria

Description	Units	Design
System Capacity	gpm	1,377
Number of Strainers	No.	5
Reliability	No.	1
Total	No.	6
Capacity (per Screen)	gpm	275
Filter Media Type	-	Disc Filtration
Filter Material	-	Polypropylene
Filter Rating	microns	200
Clean Pressure Drop	psi	3
Maximum Pressure Drop	psi	7
Maximum Backwash Flowrate	gpm	250
Backwash Duration	sec	150

Description	Units	Design
Backwash Waste per Strainer	gal	625
Strainer Backwash Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Type	-	Horizontal Centrifugal
Capacity (per pump)	gpm	250
Total Dynamic Head	ft	104
Motor Size	hp	10
Drive	type	VFD
Strainer Backwash Tank		
No. of Tanks	No.	1
Required Volume	gal	4,500
Diameter	ft	8
Height	ft	10

3.2.3 Ultrafiltration

The UF Feed Pumps have been changed to a 1+1 arrangement to match the modifications to the UF Feed Tank. Due to the EQ Tank being located below grade the pumps have been changed to submersible pumps. Pump type will be confirmed during the 50% design. Design criteria for the UF Feed Pumps are presented in **Table 3-5**.

Table 3-5: UF Feed Pump Design Criteria

Description	Units	Value
UF Feed Pumps		
In Service	No.	1
Reliability	No.	1
Total	No.	2
Type	--	Submersible
Instantaneous Capacity (Total)		
For Trains in Filtration	gpm	1,377
Capacity (per pump)	gpm	1,377
Total Dynamic Head Required (TDH)	ft	135
Motor Size		
Required	hp	72
Selected	hp	75
Drive Type	--	VFD

When designing any UF System there are several periods over the course of the day when a train is offline. The UF System has a goal to produce an average flow rate, but it must produce more than that at any given time to make up for when it was not producing water. This flow is known as instantaneous production and is limited by the instantaneous flux that a train can produce in gallons per square foot per day. The instantaneous flux will be determined during pilot testing. All equipment involved with the UF System must accommodate the larger flows.

The Automatic Strainers have not been changed from the Preliminary Design Report (2019).

The UF system design criteria are summarized in **Table 3-6**. The final design of the UF Trains will be finalized after pilot testing has been completed.

Table 3-6: Pressure UF System Design Criteria

Description	Units	Value
UF System		
Type	-	Pressurized, Polymeric Hollow Fiber Ultrafiltration
Overall Recovery	-	92.0%
Minimum No. of Trains in Service at Capacity	No.	2
No. of Redundant Trains	No.	1
No. of Total Trains	No.	3
Installed Modules Per Train	No.	44
Spare Module Slots Per Train	No.	4
Flow Criteria		
System Feed	gpm	1,170
Overall Recovery	%	92.0%
Instantaneous Filtrate Production	gpm	1,377
Module Criteria		
Membrane Area Per Module	sf	775
Instantaneous Flux Rate	gfd	25.6
Backwash Criteria		
Type	-	Reverse Flow Followed By Air Scour and Drain
Backwash Interval Per Train		
Minimum	min	20
Maximum	min	30
Backwash flow ratio	Ratio	1.5
Backwash Flow	gpm	2,066
Backwash Duration	sec	30
Air Scour Flowrate	ACFM	350
Air Scour Duration	sec	30-60
Forward Flush Flowrate	gpm	900

Description	Units	Value
Forward Flush Duration	sec	20

The UF Backwash Pumps design criteria are summarized in **Table 3-7**. The UF Backwash Pumps have been resized to increase the reverse flow flux rate to 45 gfd, or 1.5 times the forward flush rate. This has been shown to remove solids buildup more effectively on open platform systems where multiple styles modules may be installed.

Table 3-7: UF Backwash Pump Design Criteria

Description	Units	Value
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Type	-	Horizontal Centrifugal
Capacity (per pump)	gpm	2,066
Total Dynamic Head	ft	55
Motor Size		
Required	hp	44
Selected	hp	45
Drive Type	--	VFD

3.2.4 RO System

To control the permeate production of each stage of the RO System the interstage recovery device was moved between the second and third stages, and a permeate throttling valve was added to the first stage permeate. The RO Feed Pump provides the pressure for the first two stages. The differential pressure across the first stage is controlled by the permeate throttling valve. The remaining feed pressure in the second stage will produce the required amount of permeate. The interstage boost pump between the second and third stage will add the remaining pressure needed for the third stage. RO system design criteria are summarized in **Table 3-8**.

Table 3-8: RO System Design Criteria

Description	Units	Value
Feed Flowrate	gpm	1,075
Recovery	%	84%
Permeate Flowrate	gpm	903
Concentrate Flowrate	gpm	173
RO Trains		
Feed Per Train	gpm	537
Permeate Per Train	gpm	451
Concentrate Per Train	gpm	86
In-Service	No.	2
Reliability	No.	0
Total	No.	2
Staging of RO Trains		
1st Stage		
Pressure Vessels per Train	No.	10
Elements per Pressure Vessel	No.	7
2nd Stage		
Pressure Vessels per Train	No.	6
Elements per Pressure Vessel	No.	7
3rd Stage		
Pressure Vessels per Train	No.	4
Elements per Pressure Vessel	No.	7
Average Flux Rate	gfd	11.6

RO systems perform best when they are operating at constant setpoints. Because of this, the AWPF will essentially run at one of two flow rates at all times: 1 RO Train in production or 2 RO Trains in production. This will be controlled by the level in the EQ Tank. The plant control system will relay to the UF System how much flow is needed based on how many RO Trains are in production. The actual control of the system does not vary from the 2019 PDR and will be fully automated without operator intervention. When the water level in the EQ Tank drops to a low level setpoint one RO Train will shut down, leaving the other in production. While only one train is in operation the water surface in the EQ Tank will rise until the high level setpoint is reached and the other RO Train turns back on. The cycling and flushing of trains are completely automated and will happen as frequently as the system requires. RO train cycling is shown at different WWTP flow rates ranging from 0.70 mgd to 1.55 mgd in **Figure 3-2** through **Figure 3-5**.

Figure 3-2: EQ Tank Storage and RO Train Cycling with 0.70 mgd WWTP Flow Rate

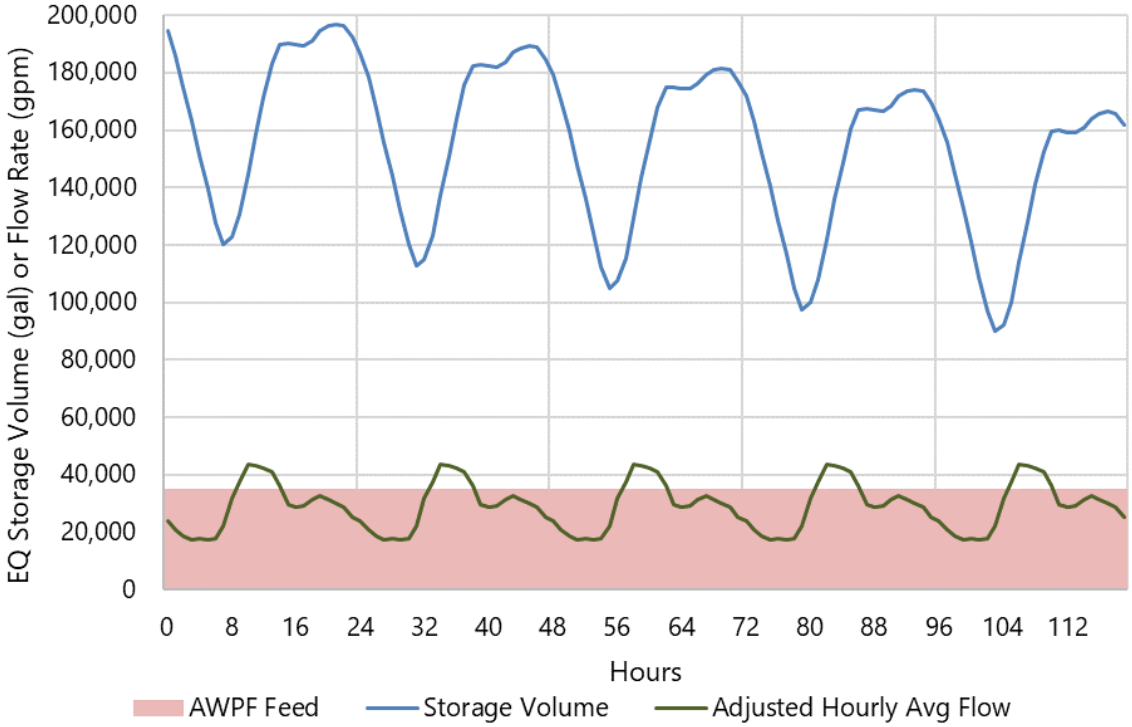


Figure 3-3: EQ Tank Storage and RO Train Cycling at 1.00 mgd WWTP Flow Rate

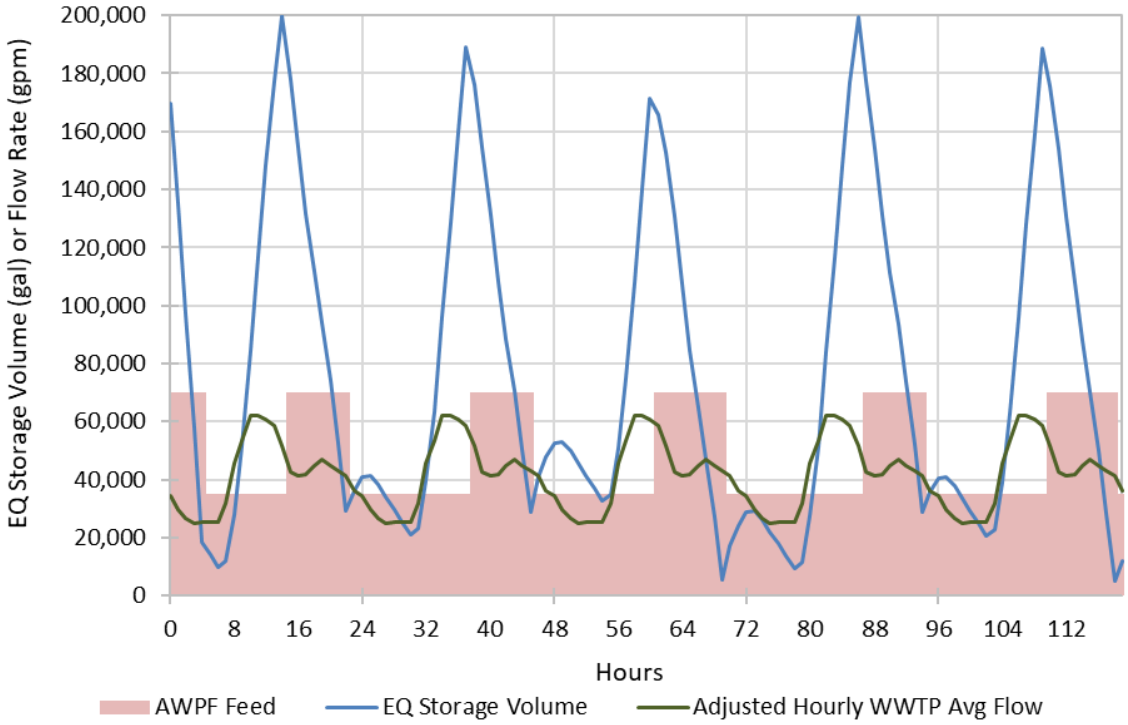


Figure 3-4: EQ Tank Storage and RO Train Cycling at 1.17 mgd WWTP Flow Rate

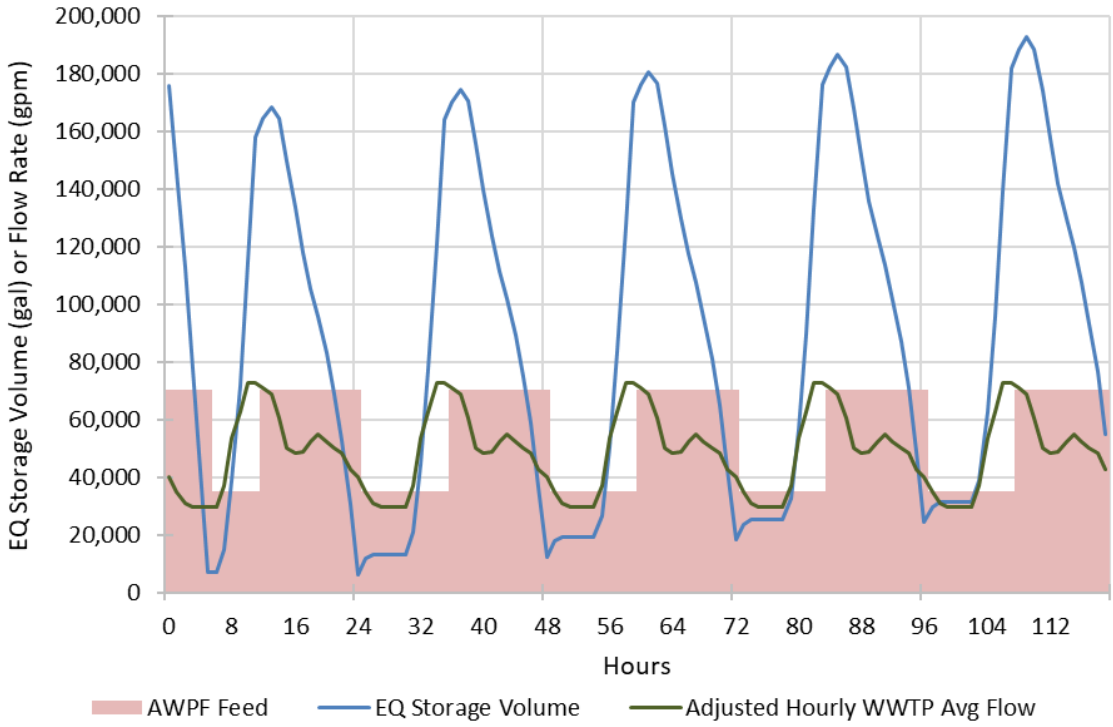
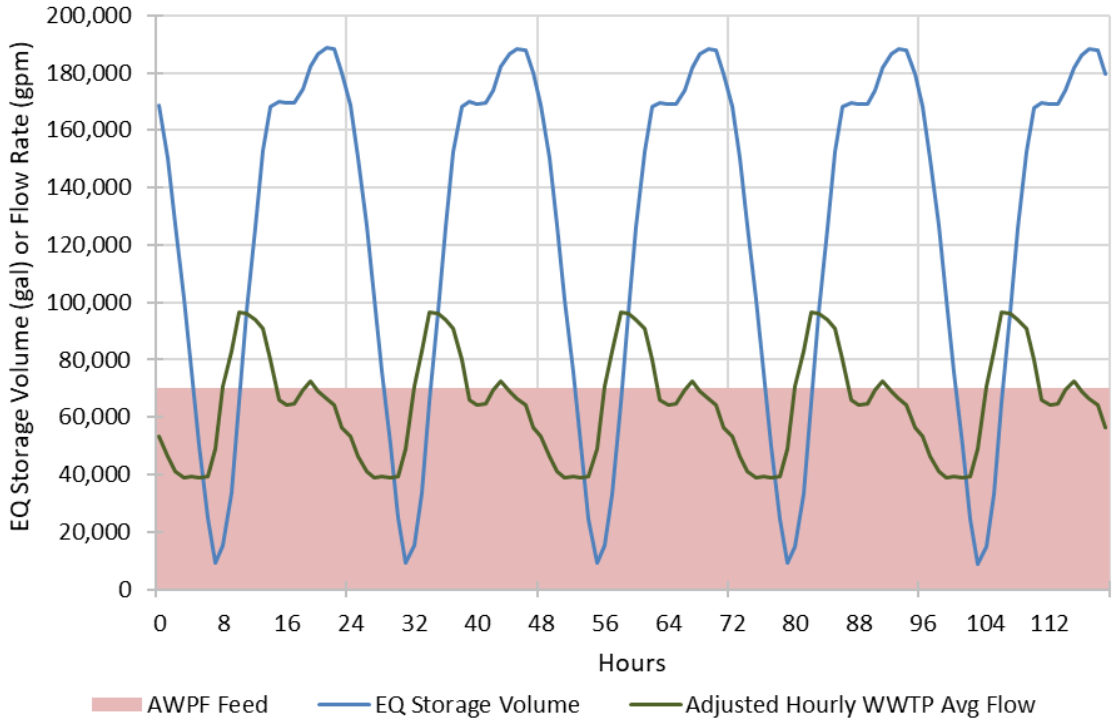


Figure 3-5: EQ Tank Storage and RO Train Cycling at 1.55 mgd WWTP Flow Rate



The RO Cartridge Filters have been moved to coincide with each RO Train. Since each RO Train has its own dedicated cartridge filter, the RO Feed Pump will be used to provide the pressure for that filtration step. As a result, the low-pressure RO booster pumps that were previously used in the 2019 PDR to accommodate the pressure loss associated with the cartridge filters, were removed from the system. RO Cartridge Filter design criteria are summarized in **Table 3-9**.

Table 3-9: RO Cartridge Filter Design Criteria

Description	Units	Criteria
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Capacity (per Filter)	gpm	537
Filter Media Type	-	Meltblown
Filter Material	-	Polypropylene
Filter Length	in	40
Number of Filters	No.	36
Filter Loading Rate	gpm/10" filter	3.7
Filter Rating	microns	5
Clean Pressure Drop	psi	3
Maximum Pressure Drop	psi	15
Housing Design Pressure	psi	150

The RO Feed Pumps have been upsized to account for the increased RO Train sizes. Design criteria for the RO Feed Pumps are listed in **Table 3-10**.

Table 3-10: RO Feed Pumps Design Criteria

Description	Units	Criteria
In-Service	No.	2
Reliability	No.	0
Total	No.	2
Type	-	Vertical Centrifugal
Capacity (Per Pump)	gpm	537
TDH	ft	480
Motor Size	hp	100
Drive Type	--	VFD

Design criteria for the RO Interstage Pumps are listed in **Table 3-11**.

Table 3-11: RO Interstage Pumps Design Criteria

Description	Units	Criteria
In-Service, per train	No.	2
Reliability, per train	No.	0
Total, per train	No.	2
Type	-	Horizontal Centrifugal
Capacity (Per Pump)	gpm	146
TDH	ft	118
Motor Size	hp	10
Drive	type	VFD

RO Permeate has several uses across the facility as it is required for all chemical cleaning and flushing of the RO Trains when they go out of service. The RO Flush Pumps will provide the motive pressure for both flushing of the RO Trains when they go out of service and for transferring RO Permeate to the CIP Tanks. RO Flush Pump design criteria are summarized in **Table 3-12**.

Table 3-12: RO Flush Pump Design Criteria

Description	Units	Value
In Service	No.	1
Reliability	No.	1
Total	No.	2
Type	-	End Suction Centrifugal
Capacity	gpm	240
Total Dynamic Head Required (TDH)	ft	139
Motor Size		
Required	hp	13
Selected	hp	15
Drive	type	VFD

3.2.5 Ultraviolet Advanced Oxidation Process

No change from the Preliminary Design Report (2019). Any alterations to the design will happen as a part of detailed hydraulic modeling to ensure idea flow conditions are present in the UV-AOP System.

During the 50-percent design, the project team will begin developing UV/AOP procurement documents to pre-select the UV/AOP system. The two primary system suppliers are TrojanUV and WEDECO. The project team will obtain proposals from the suppliers, present the proposals and pricing to CVWD/CSD, and make a recommendation. After the contract has been awarded, the final design of the UV/AOP system will be designed around the selected supplier.

3.2.6 Post-Treatment Stabilization

No change from the Preliminary Design Report (2019).

3.2.7 Purified Water Clearwell and Pump Station

Following the UV-AOP system, the purified water will flow by residual head to the Purified Water Clearwell and Pump Station for conveyance to the off-site Injection Wells. This subsection presents the updated basis of design for the Purified Water Clearwell structure and Pump Station with an increased AWPF capacity of 1.30 MGD.

3.2.7.1 Clearwell Sizing

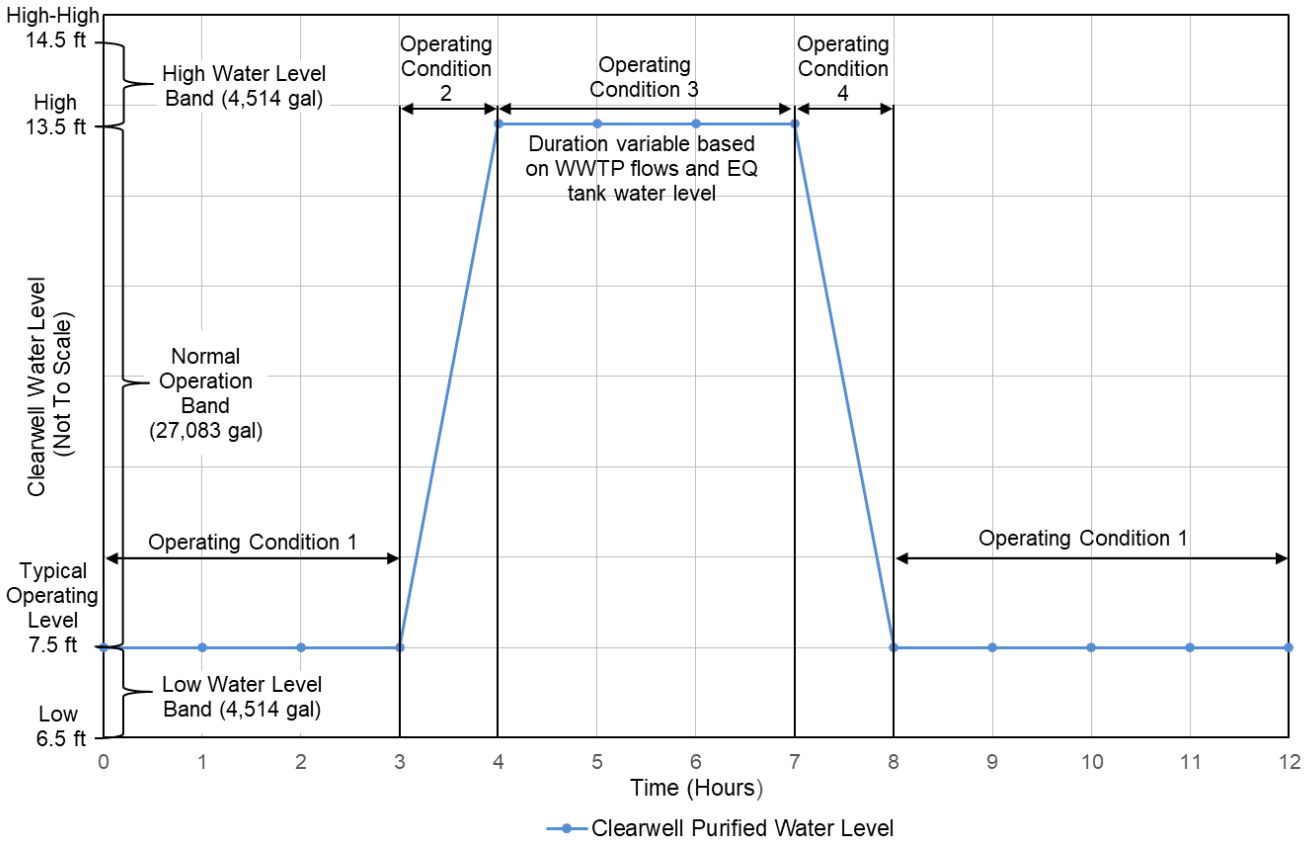
The Clearwell will provide operational storage of purified water for the AWPF and injection well systems. Under normal operating conditions when both injection wells are in operation and receiving water, the Pump Station flow rate will approximately match the AWPF production flow rate, so the water level in the Clearwell remains relatively constant. The operating volume of the Clearwell must allow for storage during periods when the AWPF production flow rate does not match the flow rate conveyed to the injection wells. The basis of design storage volumes during these periods of misbalanced flows are described herein.

The Clearwell will also provide up to 4-log virus inactivation credits through free chlorine dosing, as discussed in **Section 2.3.1**. Based on the information provided in **Table 2-1**, the target CT in the Clearwell will be 4 mg/L*min based upon low turbidity (<0.2 NTU), low pH (<7), and a water temperature of at least 15 degrees-C. The baffling inside the Clearwell to achieve this target CT will be finalized in detailed design.

Normal Operation Band (includes Injection Well Backflushing)

It is anticipated that under normal operating conditions, each injection well will backflush once a week to remove particulates that have accumulated in and around the well casing and gravel pack. It is assumed that the duration of each backflushing event will be approximately one hour. No water can be injected at the well that is in a backflushing event. Therefore, Purified Water Pump Station must reduce its flow by approximately 50% for approximately one hour until the backflush event has concluded and the well has returned to service. The AWPF production rate will not decrease during an injection well backflush event, so the influent flow into the clearwell will be twice as much as the pump station flow rate during this period. Therefore, the Clearwell has been sized to provide one hour's worth of storage during normal backflush event when the Purified Water Pump Station flow is approximately 50% of the AWPF production rate (451 gpm difference). The resulting storage volume for the normal operation band is equal to 27,083 gallons. See **Figure 3-6** for a graphical representation of the water level in the normal operating band during a well backflush event. If an injection well backflush event occurs while the AWPF is operating at half capacity (i.e., one RO train is online), then this full operating band will not be utilized.

Figure 3-6: Purified Water Clearwell Operation During Typical Injection Well Backflush Event



Notes:

1. Approximate Clearwell water levels shown represent the expected conditions during a typical scheduled one-hour long injection well backflush event. Assumes the AWPF is operating at full capacity of 1.30 MGD. The Clearwell level will not rise as shown in this figure if the injection well backflush event occurs while the AWPF is operating at half capacity.
2. Operating Condition 1 represents the scenario where the Purified Water Pump Station flow rate approximately matches the AWPF production rate (1.30 MGD [903 gpm]) and both injection wells are operational. The Clearwell water level stays relatively constant at its typical operating level.
3. Operating Condition 2 represents the scenario when one injection well is in a one hour long backflush event, resulting in a 50% decrease in the Pump Station flow rate (approx. 451 gpm) while the AWPF continues operating at full capacity of approx. 903 gpm. As a result, the water level in the Clearwell increases during this one-hour well backflush period to at or near the designated high-water level.
4. Operating Condition 3 represents the scenario after the well backflush period has concluded and both injection wells are receiving water, so the Purified Water Pump Station flow rate has resumed matching the AWPF production rate. The water level remains at or near the designated high-water level in the Clearwell if the AWPF is operating at full capacity.
5. Operating Condition 4 represents a scenario when a RO train has cycled off based on the water level in the EQ Tank (see **Section 3.2.4** for further discussion of RO train cycling and EQ Tank level), resulting in a 50% decrease in the AWPF production flow rate. The pump station continues operating at full capacity to decrease the Clearwell water level until it reaches its typical operating level. At that point the pump station flow rate adjusts to match the AWPF production flow rate.

High Water Level Band (Unplanned Pump Station Shutdown)

The Clearwell will have operating storage volume to accommodate an event where the pump station unexpectedly shuts down, but the AWPF is operating at full capacity (1.30 MGD). It may take up to approximately three minutes for the AWPF to perform a controlled shutdown after receiving a signal that the pump station pumps are not running. During this time, the Clearwell will continue to receive purified water from the AWPF but will be unable to pump out. The Clearwell will be sized to provide approximately five minutes of storage while receiving 1.30 MGD from the AWPF, which amounts to a storage volume of 4,514 gallons. The five-minute duration provides some buffer in case the AWPF shutdown takes longer than anticipated (approximately three minutes) without having water spill out into the passive overflow. See **Figure** for a graphical representation of the high-water level band.

An emergency passive overflow will be provided to prevent the Clearwell from becoming pressurized in an unlikely event that the AWPF does not automatically shut down, or takes much longer than expected to shut down, while the pumps are offline. The invert elevation of the overflow pipeline will be set to the designated high-high water level. The overflow piping will be routed to the ocean outfall and to the EQ tank. Valves will be provided to direct flow to one discharge point. Directing overflowed purified water to the EQ tank will ensure no water is lost. The final design plans will include provisions to ensure no cross-contamination potential with the WWTP secondary effluent in the EQ tank.

Low Water Level Band (Unplanned AWPF Shutdown)

The Clearwell will also have operating storage volume to accommodate an event where the AWPF has shut down while two duty pumps are running at full speed. The pump station will begin a controlled shutdown after receiving a signal that the AWPF has gone offline to maintain minimum submergence levels for the submersible pumps. The Clearwell will be sized to provide approximately five minutes of storage while the pumps are running at full speed without inflow from the AWPF before the water level drops below minimum allowable for submergence. This volume equates to 4,514 gallons. See **Figure** for a graphical representation of this low water level storage band.

The Clearwell will be a buried cast-in-place concrete structure with the top deck slab at grade. Traffic-rated access hatches will be provided over the submersible pumps (see **Section 3.2.6.2** for further discussion on the pumps). The Clearwell will be located along the southern side of the AWPF building; however, this location will be confirmed during 50% design. The top deck slab and access hatches will be traffic-rated to facilitate vehicle access over the structure. The design criteria for the Clearwell are summarized in **Table 3-13**.

Table 3-13: Purified Water Clearwell Design Criteria

Parameter	Units	Value
Minimum Operating Volume	gal	36,111
Normal Operation Storage Band	gal	27,083
High Water Level Storage Band	gal	4,514
Low Water Level Storage Band	gal	4,514
Tank Dimensions (Interior)		
Length	ft	30.0
Width	ft	20.0
Working Depth	ft	8.00
Freeboard Depth	ft	2.00
Minimum Submergence	ft	2.00
Total Depth	ft	12.0
Water Level & Structure Elevations (NAVD88)[1]		
Ground Surface Elevation, average	ft	18.0
Underside of Top Slab	ft	16.5
High-High (Emergency Overflow Invert)	ft	14.5
High	ft	13.5
Typical Operating Level	ft	7.50
Low	ft	6.50
Low-Low	ft	5.50
Floor	ft	4.50
Tank Type	--	Buried Cast-in-Place Concrete

Notes:
1. All elevations to be confirmed during 50% design.

3.2.7.2 Pump Station

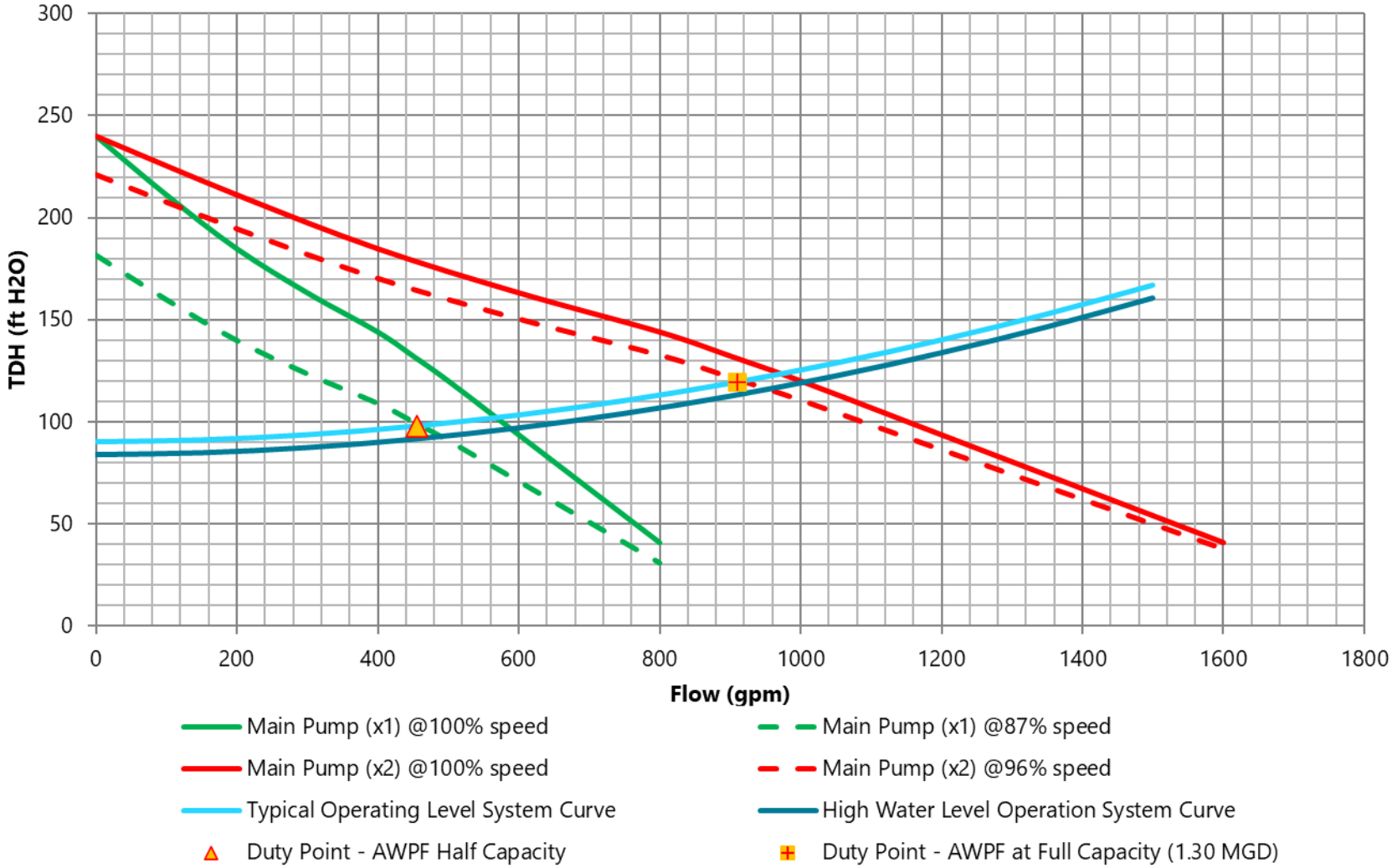
The Purified Water Pump Station will pump purified recycled water from the Clearwell to the two injection wells through the 12-inch conveyance pipeline. The pump station will include three variable-speed submersible pumps that will operate in a two-duty, one-standby operation. The design criteria for the Purified Water Pump Station are summarized in **Table 3-14**. Preliminary pump selections were solicited from Flygt, Mody, and Gorman-Rupp as part of this Basis of Design Validation Memorandum.

Table 3-14: Purified Water Pump Station Design Criteria

Description	Units	Value
Number of Pumps, Total	No.	3
Number of Duty Pumps	No.	2
Number of Standby Pumps	No.	1
Pump Type	--	Submersible
Configuration	--	Parallel
Capacity (per pump)	gpm	630
Total Dynamic Head, each	ft	110
Motor Size, each	hp	35
Drive Type	--	VFD

A system curve for the proposed Purified Water Pump Station and conveyance pipeline to deliver water to the two injection wells was developed based on the preliminary 50% design plans for the Conveyance Pipeline, with modifications based on recent pipeline alignment and injection wellhead piping changes. Variable speed pump curves for the proposed submersible pumps were superimposed onto the system curve to identify the duty points for the operating conditions (see **Figure 3-7**).

Figure 3-7: System Curve and Pump Curves – Purified Water Pump Station



3.2.7.3 Pump Station Electrical Requirements and Controls

Each submersible pump will have a 35 hp, 460 volts, 3 phase, 60 Hz, 3,560 rpm motor with a dedicated VFD. The pump station will be controlled by an ultrasonic level indicator and several float switches (low-low, low, high, high-high) in the Clearwell and signals received from the AWPF and injection wells. Control diagrams, instrumentation details, and a detailed control strategy for the pump station will be developed as part of the final design.

3.2.7.4 Clearwell and Pump Station Structural Requirements

No change from the Preliminary Design Report (2019).

3.2.7.5 Operational Flexibility – Piping and Valving

No change from the Preliminary Design Report (2019).

3.2.7.6 Surge Protection

A surge analysis will be performed during the beginning stages of the 50% design to determine if a surge tank or other surge protection measures are required for the Purified Water Pump Station and conveyance pipeline.

3.2.7.7 Purified Water Pipeline Route within WWTP Site

Each pump will have an individual 6-inch discharge pipe that will penetrate through the Clearwell sidewall and enter a buried valve vault adjacent to the Clearwell. Inside the valve vault, each 6-inch pump discharge line will have an isolation gate valve and check valve, and manifold into a common 12-inch discharge header downstream of the valves. The 12-inch pipeline will exit the valve vault and transverse through the AWPF process building to the north side, then routed below-grade as it exits the north side of the building towards the Central Gallery. A separate flow meter vault will be provided downstream of the valve vault. Alternatively, the flow meter may be located in an above-ground piping segment inside the AWPF building.

The 12-inch conveyance pipeline will traverse north through the Central Gallery and North Gallery, then turn east through the Main Gallery until it exits the WWTP site. Based on site visits and CSD input, there is sufficient space in the galleries for the pipeline. The purified water pipeline route may change based on the final location of the Clearwell; however, it is expected that the pipeline will ultimately traverse through the Central Gallery, North Gallery, and Main Gallery.

3.2.8 Waste Equalization Tank

The Waste Equalization Tank is located inside the process building beneath the UF Trains. This tank serves as a location for strainer backwash waste, UF backwash waste, CIP waste, sample drains, and process diversions to be routed. Submersible pumps located inside this tank will meter the water to the WWTP headworks, minimizing surges from the AWPF and providing a needed air gap between the AWPF and the WWTP headworks. The design criteria for the Water Equalization Tank is provided in **Table 3-15**.

Table 3-15: Waste Equalization Tank Design Criteria

Description	Units	Design
In-Service	No.	1
Reliability	No.	0
Total	No.	1
Required Volume	gal	50,000
Required Volume	ft^3	6,684
Waste EQ Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Type	-	Horizontal Centrifugal
Capacity (per pump)	gpm	229
Total Dynamic Head	ft	90
Motor Size	hp	10
Drive	type	VFD

3.2.9 Chemical Storage and Feed Facilities

The anti-scalant system criteria have been updated in **Table 3-16**.

Table 3-16: Anti-Scalant System Design Criteria

Description	Units	Value
Chemical Usage Location	-	RO Feed
Process Flow	MGD	1.55
Chemical Dose	mg/L	5.0
Solution Strength	lb/gal	10.0
Chemical Usage	lb/day	63
Chemical Feed Rate	gpd	6.58
Chemical Feed Rate	gph	0.3
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	-	Peristaltic
Motor	-	AC w/ VFD
Output at Maximum Motor Speed	gph @ 50 psig	5.6
Bulk Storage Tank		
Number of Tanks	No.	2
Tank Capacity (Each)	gal	150

Description	Units	Value
Tank Capacity (Total)	gal	300
Total Usage	gpd	6.6
Storage Time	days	45.6

The ammonium sulfate system criteria have been updated in **Table 3-17**.

Table 3-17: Ammonium Sulfate System Design Criteria

Description	Units	Value
Chemical Usage Location	--	UF Feed
Process Flow	MGD	1.68
Chemical Dose	mg/L	0.4
Solution Strength	lb/gal	1.06
Chemical Usage	lb/day	5
Chemical Feed Rate	gpd	5
Chemical Feed Rate	gph	0.2
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	--	Peristaltic
Motor	--	AC w/ VFD
Output @ Maximum Motor Speed	gph @ 50 psig	5.6
Chemical Usage Location	--	RO Feed
Process Flow	MGD	1.55
Chemical Dose	mg/L	4.2
Chemical Usage	lb/day	53
Chemical Feed Rate	gpd	50
Chemical Feed Rate	gph	2.1
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	--	Peristaltic
Motor	--	AC w/ VFD
Output @ Maximum Motor Speed	gph @ 50 psig	5.6
Bulk Storage Tank		
Number of Tanks	No.	1
Tank Capacity (Each)	gal	2,000

Description	Units	Value
Tank Capacity (Total)	gal	2,000
Total Usage	gpd	55.0
Storage Time	days	36.4

The calcium chloride system criteria have been updated in **Table 3-18**.

Table 3-18: Calcium Chloride System Design Criteria

Description	Units	Value
Chemical Usage Location	-	Post Treatment
Process Flow	MGD	1.30
Chemical Dose	mg/L	100
Solution Strength	lb/gal	3.67
Chemical Usage	lb/day	1,059
Chemical Feed Rate	gpd	269
Chemical Feed Rate	gph	11.2
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type		Peristaltic
Motor		AC w/ VFD
Output at Maximum Motor Speed	gph @ 50 psig	33.3
Bulk Storage Tank		
Number of Tanks	No.	1
Tank Capacity (Each)	gal	8,000
Tank Capacity (Total)	gal	8,000
Total Usage	gpd	269.2
Storage Time	days	29.7

The caustic soda system design criteria have been updated in **Table 3-19**.

Table 3-19: Caustic Soda System Design Criteria

Description	Units	Value
Chemical Usage Location	-	Post Treatment
Process Flow	MGD	1.30
Chemical Dose	mg/L	50
Solution Strength	lb/gal	3.20
Chemical Usage	lb/day	530
Chemical Feed Rate	gpd	198.8

Description	Units	Value
Chemical Feed Rate	gph	8.3
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type		Peristaltic
Motor		AC w/ VFD
Output at Maximum Motor Speed	gph @ 50 psig	158.5
Chemical Usage Location		Chemical Cleans
Average Chemical Use per Day	gpd	10
Transfer Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type		Peristaltic
Motor		AC w/ VFD
Output at Maximum Motor Speed	gph @ 10 psig	158.5
Bulk Storage Tank		
Number of Tanks	No.	1
Tank Capacity (Each)	gal	8,000
Tank Capacity (Total)	gal	8,000
Total Usage	gpd	209.3
Storage Time	days	38

The High and Low pH Cleaners will be replaced by a Specialty Cleaning Chemical system that allows for the dosing of a designed chemical formula from totes to both the UF and RO CIP Systems. There will be one pair of metering pumps and room for two totes in the chemical area for this purpose. Design criteria are summarized in **Table 3-20**.

Table 3-20: Specialty Cleaning Chemical System Design Criteria

Description	Units	Value
Chemical Usage Location	-	Specialty Cleaning Chemical
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	-	Peristaltic
Motor	-	AC w/ VFD
Output @ Maximum Motor Speed	gph @ 50 psig	534

Description	Units	Value
Bulk Storage Tank		
Number of Tanks	No.	2
Tank Capacity (Each)	gal	275
Tank Capacity (Total)	gal	550

The RO CIP System will have the option to be batched with citric acid as another tool for operators to use when cleaning. Citric acid serves as a chelating agent, helping to remove some types of metal scaling. One pair of metering pumps will serve both tanks using automated valves. Citric acid system design criteria are summarized in **Table 3-21**.

Table 3-21: Citric Acid System Design Criteria

Description	Units	Value
Chemical Usage Location	-	UF and RO CIP
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	-	Peristaltic
Motor	-	AC w/ VFD
Output @ Maximum Motor Speed	gph @ 50 psig	534
Bulk Storage Tank		
Number of Tanks	No.	1
Tank Capacity (Each)	gal	275
Tank Capacity (Total)	gal	275
Total Usage	gpd	7.2
Storage Time	days	38

Typically, UF Systems will include an option for a coagulant to be added before the system to its performance. A small tote system has been included so the operators have another tool to use when operating this system. Coagulant system design criteria are summarized in **Table 3-22**.

Table 3-22: Coagulant System Design Criteria

Description	Units	Value
Chemical Usage Location		UF Feed
Process Flow	MGD	1.68
Chemical Dose	mg/L	5
Solution Strength	lb/gal	4.66
Chemical Usage	lb/day	69
Chemical Feed Rate	gpd	15
Chemical Feed Rate	gph	0.6
Metering Pumps		

Description	Units	Value
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type		Peristaltic
Motor		AC w/ VFD
Output @ Maximum Motor Speed	gph @ 50 psig	33.3
Bulk Storage Tank		
Number of Tanks	No.	2
Tank Capacity, each	gal	275
Tank Capacity, total	gal	550
Total Usage	gpd	14.7
Storage Time	days	37.4

The existing Sodium Bisulfite storage tank will be used to supply the new metering pumps needed for the AWPF. Approximate design criteria for cleaning of UF System and quenching of RO Concentrate are summarized in **Table 3-23**.

Table 3-23: Sodium Bisulfite System Design Criteria

Description	Units	Value
Chemical Usage Location	-	Brine Quenching
Process Flow	MGD	0.24
Chemical Dose	mg/L	5.2
Solution Strength	lb/gal	4.24
Chemical Usage	lb/day	10
Chemical Feed Rate	gpd	2.5
Chemical Feed Rate	gph	0.1
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	-	Peristaltic
Motor	-	AC w/ VFD
Output @ Maximum Motor Speed	gph @ 50 psig	158.5
Cleaning Requirements		
Chemical Dosage Maintenance Clean	mg/l	696
Chemical Dosage Recovery Clean	mg/l	1392
Volume Chemical per MC	gallons	4.58
Volume Chemical per RC	gallons	9.0
Monthly Usage per Rack	gallons	146.7

Description	Units	Value
Number of Racks	each	3
Total Monthly Usage for Membrane Cleaning	gallons	440
Total Annual Usage for Membrane Cleaning	gallons	5,280

The existing Sodium Hypochlorite storage tank will be used to supply the new metering pumps needed for the AWPF. Approximate design criteria for additional hypochlorite usage are listed in **Table 3-24**.

Table 3-24: Sodium Hypochlorite System Design Criteria

Description	Units	Value
Chemical Usage Location	-	EQ Tank Feed
Process Flow	MGD	1.68
Chemical Dose	mg/L	17.0
Solution Strength	lb/gal	1.24
Chemical Usage	lb/day	233
Chemical Feed Rate	gpd	186.6
Chemical Feed Rate	gph	7.8
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	-	
Motor	-	
Output @ Maximum Motor Speed	gph @ 50 psig	158.5
Chemical Usage Location	-	UV/AOP Feed
Process Flow	MGD	1.30
Chemical Dose	mg/L	4.0
Chemical Usage	lb/day	42
Chemical Feed Rate	gpd	33.9
Chemical Feed Rate	gph	1.4
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	-	
Motor	-	
Output @ Maximum Motor Speed	gph @ 50 psig	158.5
Chemical Usage Location	-	Finished Water

Description	Units	Value
Process Flow	MGD	1.30
Chemical Dose	mg/L	3.0
Chemical Usage	lb/day	32
Chemical Feed Rate	gpd	25.4
Chemical Feed Rate	gph	1.1
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	-	
Motor	-	
Output @ Maximum Motor Speed	gph @ 50 psig	158.5
Cleaning Requirements		
Chemical Dosage Maintenance Clean	mg/l	500
Chemical Dosage Recovery Clean	mg/l	1,000
Volume Chemical per MC	gallons	11.18
Volume Chemical per RC	gallons	22
Monthly Usage per Rack	gallons	357.7
Number of Racks	each	3.0
Total Monthly Usage for Membrane Cleaning	gallons	1,073
Total Annual Usage for Membrane Cleaning	gallons	12,879
Total Monthly Usage	gallons	8,451

The UV-AOP System will have a sulfuric acid dose upstream of the system. The AOP chemistry is pH sensitive, and it is desirable to have an additional small dose at that location to fine tune the pH of the RO permeate. The sulfuric acid system design criteria are summarized in **Table 3-25**.

Table 3-25: Sulfuric Acid System Design Criteria

Description	Units	Value
Chemical Usage Location	-	RO Feed
Process Flow	MGD	1.55
Chemical Dose	mg/L	15.0
Solution Strength	lb/gal	14.17
Chemical Usage	lb/day	189
Chemical Feed Rate	gpd	13.3
Chemical Feed Rate	gph	0.6
Metering Pumps		
In-Service	No.	1

Description	Units	Value
Reliability	No.	1
Total	No.	2
Pump Type	-	Diaphragm
Motor	-	AC w/ VFD
Output @ Maximum Motor Speed	gph @ 50 psig	52.6
Chemical Usage Location	-	UV / AOP Feed
Process Flow	MGD	1.30
Chemical Dose	mg/L	5.0
Chemical Usage	lb/day	53
Chemical Feed Rate	gpd	3.7
Chemical Feed Rate	gph	0.2
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	-	Diaphragm
Motor	-	AC w/ VFD
Output @ Maximum Motor Speed	gph @ 50 psig	158.5
Cleaning Requirements		
Volume Chemical per MC	gallons	1.58
Volume Chemical per RC	gallons	1
Monthly Usage per Rack	gallons	7.2
Number of Racks	each	2
Total Monthly Usage for Membrane Cleaning	gallons	14
Total Annual Usage for Membrane Cleaning	gallons	173
Bulk Storage Tank		
Number of Tanks	No.	2
Tank Capacity, each	gal	150
Tank Capacity, total	gal	300
Total Usage	gpd	13.5
Storage Time	days	22.2

3.2.10 Residual Stream Disposal

The RO Concentrate will still have some chloramines present that must be dechlorinated before discharging to the ocean outfall. The RO Concentrate header inside of the AWPF will have a sodium bisulfite injection location to remove any remaining disinfectant before being directed to the existing ocean outfall box on

site. The operators will be able to monitor the ORP at the plant and again before discharging to ensure compliance with all permit requirements.

3.2.11 Chlorine Contact Tank Modifications

No structural modifications are required for the CCB. Modifications to the effluent disinfection system will be focused upon chemical dosing and monitoring, as follows:

- The feed water into the CCB will already be chlorinated in the AWPF EQ Tank, as needed for AWPF pretreatment (membranes need disinfectant to minimize biofouling). The provided level of chloramination may be sufficient to meet effluent discharge requirements. Chlorine dosing into the AWPF EQ Tank will be flow paced.
- The existing CCB chlorination system will be used to provide supplemental chlorination, either flow paced or based upon the measured residual in the effluent of the AWPF EQ Tank and a target dose based upon CSD direction.
- Analyzers will need upgrades as well as methods to keep the sensors wet during periods of no flow periods to the CCB (there will be extended periods where the CCB is dry).

In the 2019 PDR, the RO concentrate was being sent to the CCB, but since the CCB has been repurposed for another use the RO Concentrate will be dechlorinated in the AWPF before being sent to the ocean outfall downstream of the CCB.

The secondary CCB will remain operational as a backup to primary CCB. The CCB operations will be as follows:

- If there is no flow to the CCB for 24 hours, water in CCB will automatically be pumped back through the wastewater plant.
- An additional chlorine dose will be added at the head of CCB. This dose will be flow trigged pump start, and flow paced. Residual dose monitored at the end of the CCB.
- Sodium bisulfite pumps for dechlorination will be started by weir overflow at the end of the CCB, controlled by existing control strategy.
- A method will be devised to keep chlorine residual measurement equipment wet during detailed design and ready to use during periods of no flow in the CCB and outfall surge box.
- All disinfection processes will be monitored and controlled by existing UCP-700 PLC.

3.2.12 Ancillary Facilities

For small UF Systems such as this, it is cost efficient to use a single air system of compressors and receivers to provide the air for valve actuation, membrane integrity tests, and air scour. For large systems it makes more sense to include a dedicated blower system for air scouring, but with spacing being a significant constraint on site it is preferrable to just use the compressors and receivers. Formalized design criteria will come after pilot testing.

The UF CIP System detailed design criteria are subject to small adjustments based on pilot test results but will likely be very similar to the criteria listed in **Table 3-26**.

Table 3-26: UF CIP System Design Criteria

Description	Units	Value
CIP Frequency per Train	per month	1
MC Frequency per Train	per month	30
Cleaning Flux Ratio	-	1.5
Cleaning Flux Rate	gfd	38
Cleaning Flowrate	gpm	1,008
Volume Solution per MC/CIP	gallons	6,693
CIP Solution Tanks		
Number	No.	1
Volume (Each)	gallons	10,200
Diameter	ft	12
Sideshell Height Required	ft	14
CIP Feed Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Type	-	End Suction Centrifugal
Design	gpm	1,033
Total Dynamic Head	ft	70
Motor Size		
Selected	hp	20
Drive	type	VFD

Most UF CIP solutions are very acidic or very basic and can damage pipes if allowed to pool for long durations. To prevent this a drain pump is installed to fully drain all of the CIP solution from the headers. UF drain pump design criteria are summarized in **Table 3-27**.

Table 3-27: UF Drain Pump Design Criteria

Description	Units	Value
In Service	No.	1
Reliability	No.	1
Total	No.	2
Type	-	Vertical Sump Pump
Capacity (per pump)	gpm	150
Total Dynamic Head Required (TDH)	ft	30
Motor Size		
Selected	hp	2.5
Drive	type	CS

The RO CIP system must be able to provide an adequate amount of flow for each of the stages. To allow for more thorough operator control of flow rate both RO CIP Pumps will operate when cleaning the first stage. This allows the pumps to be sized smaller, saving on cost and providing more control for cleaning the third stage that has much lower flow requirements. If an RO CIP pump is out of service, the first stage may still be cleaned with only a single pump, but it should be expected to take extra time due to the lower feed flow. RO CIP system design criteria are summarized in **Table 3-28**.

Table 3-28: RO CIP System Design Criteria

Description	Units	Design
Flow Per Vessel	gpm	50
Maximum Vessels Cleaned Per Cycle	No.	10
Minimum Vessels Cleaned Stage 1	No.	10
Minimum Vessels Cleaned Stage 2	No.	6
Minimum Vessels Cleaned Stage 3	No.	4
Maximum Cleaning Flowrate	gpm	500
Minimum Cleaning Flowrate Stage 1	gpm	500
Minimum Cleaning Flowrate Stage 2	gpm	300
Minimum Cleaning Flowrate Stage 3	gpm	200
CIP Solution Tanks		
Number	No.	1
Volume CIP Solution Required	Gallons	2,900
Volume (Each)	gallons	8,300
Diameter	Ft	10
Sideshell Height Required	ft	14
RO CIP Pumps		
In Service	No.	2
Reliability	No.	0
Total	No.	2
Type	-	End Suction Centrifugal
Capacity	gpm	300
Total Dynamic Head Required (TDH)	ft	162
Motor Size		
Required	hp	16
Selected	hp	25
Drive	type	VFD
Cartridge Filter		
Vessel Orientation	-	Horizontal
Cartridge Filter Type	-	Melt Blown
Cartridge Filter Material	-	Polypropylene

Description	Units	Design
Cartridge Filter End Connection	-	Single Open End, Double O-Ring
Cartridge Filter Rating	micron	5
Cartridge Filter Length	inches	40
Cartridge Filters per Vessel	No.	42
Cartridge Filter Loading Rate		
Maximum Flowrate	gpm/10-inch	2.98
At Minimum Flowrate	gpm/10-inch	2.98
Maximum Pressure Drop		
Clean Filter	psig	3
Dirty Filter	psig	15

Both the UF and the RO CIP Systems require hot water to properly clean the membranes. To save space and cost the RO CIP Tank will function as the hot water tank. All chemicals that are used for the RO CIP may be introduced into the UF CIP with no harm to the system. However, there must be a guarantee that no UF CIP solution can ever travel back to the RO CIP Tank, since sodium hypochlorite is destructive to RO Membrane. More design criteria for this system will be developed during detailed design as a significant portion of the design must come from the hot water system supplier.

3.3 Electrical, Instrumentation and Controls Requirements and Integration

3.3.1 Estimated Power Demand

Load calculations were completed for the existing plant maximum peak demand load and the new AWPF estimated load value. The total expected demand load of the existing plant and new AWPF is approximately 1,096 kVA, which includes a 25% contingency. This data was requested by SCE representative, Thad Gonzales during a site visit on October 18, 2019 to provide input for a power system analysis done by SCE to determine if there would be any issue with the addition of the new AWPF. CVWD requested a response from SCE regarding the load requirements and the possibility of replacing the existing 500 kVA transformer in order to increase capacity requirements for the new AWPF project. This included confirming if a transformer replacement would be required, transformer pad and location, and having a second feed to the new AWPF switchboard. SCE was able to confirm that adding a 1,500 kVA transformer would be possible with a separate meter for the AWPF switchboard.

A diesel engine emergency generator is not anticipated for the AWPF; however, the flush pump system requires power during an outage. During a power outage the RO Feed Pumps will stop, and water will stop flowing across the RO Membranes. If the water on the concentrate side of the RO membranes is not removed by flushing the RO Trains, then chemical scale will develop over time, reducing performance and potentially reducing the lifespan of the membranes. RO Flush Pumps will provide the motive pressure for flushing the RO trains when they go out of service.

Since the load is minimal for the RO Flush Pump (15Hp), it is possible that the existing 1000kW emergency generator at the WWTP could handle the addition of this load, however, requires confirmation with other existing critical loads at the WWTP that require power during an outage. Additionally, there are other

considerations for how the pump will switch from normal power to emergency power. The use of a transfer switch at the flush pump or connecting the flush pump circuit to the existing MCC at the WWTP will need to be further investigated during design.

Backup power for the PLCs, Operator Interface Terminals (OIT), and network equipment will be provided by uninterruptible power supplies (UPS) sized to handle the load requirements of the system hardware for a specific amount of time that is agreed upon during design.

A summary of the AWPF electrical loads is provided in **Table 3-29**.

Table 3-29: Estimated Electrical Loads for the AWPF System

Electrical Load Summary				Output Rating, each	Total Connected Load	Drive
Item	**Duty**	**Standby**	**Total**	**hp**	**kW**	**Type**
UF Feed Pumps	1	1	2	75	55.9	VFD
UF Strainer Backwash Pumps	1	1	2	10	7.5	CS
UF Backwash Pumps	1	1	2	45	33.6	VFD
UF Compressors	1	1	2	10	7.5	-
UF CIP Feed Pumps	1	1	2	20	14.9	VFD
RO Feed Pumps	2	0	2	100	149.2	VFD
RO Interstage Pumps	2	0	2	10	14.9	VFD
RO CIP Pumps	2	0	2	25	37.3	VFD
RO Flush Pumps	1	1	2	15	11.2	VFD
Waste EQ Pumps	1	1	2	10	7.5	VFD
UV Reactors	1	1	2	40.2	30.0	-
Hot Water Transfer Pumps	1	1	2	2	1.5	CS
Immersion Heaters	2	0	2	94	140	-
Purified Water Pump Station	2	1	3	35	52.2	VFD
Control & Lighting Transformer	1	0	1	-	30	-

3.3.2 Instrumentation and Controls

The AWPF system will consist of package system PLCs with local Operator Interface Terminals (OIT) located adjacent to the equipment provided by the equipment manufacturers (Vendor Packaged Systems). Additional balance of plant PLCs will be provided by the system integrator that will monitor and control the systems that are upstream, downstream, and support systems around the Vendor Packaged System. Process instrumentation and controlled mechanical equipment will be wired to the PLCs to achieve automated process control of the AWPF. Operators will be able to monitor the process and will be notified of anomalies that may occur through the WWTP SCADA system alarming subsystem. Operators will also be able to modify setpoint or take manual control of the system. Typical Vendor Packaged Systems limit the level of manual control typically only allow setpoint changes, Start/Stop control of the entire packaged system not individual components of the system, and changes to the mode of operation of the packaged system.

The network will be segmented so that Vendor system networks are isolated from the WWTP SCADA system. However, the network will be configured to collect data from the Vendor PLCs using specific secure protocols. The data collected from the Vendor PLCs and the balance of plant PLCs will be sent to the WWTP SCADA system for use on graphic displays, trending, generation of AWPF specific alarms, and long-term storage in the historian.

A separate network segment and communication path will be established with each of the remote sites outside the WWTP fence, which include the well sites. The communication to and from these facilities will be managed through a network firewall appliance configured to restrict allowable traffic to specific protocols, applications, and network addresses.

Working group sessions will be conducted during the design process to establish what specific data will be shared between agencies. The means of securely sharing that data will also be determined in the working group sessions.

3.4 Staffing Requirements

A staffing plan being used by the City of Morro Bay for their new 1 mgd AWPF was provided to the CSD as a potential starting point/reference. There are differences between Morro Bay (RO and UV AOP, as Morro Bay has an MBR for wastewater treatment versus the CAPP project (UF, RO, UV AOP) and some adjustment of staffing is needed from the Morro Bay estimates. Further, the upcoming UF pilot testing will help inform the CSD staffing requirements.

The Morro Bay AWPF staffing estimates, simplified, are for 3 FTE operators on a 12 hour per day schedule. Other schedules can be developed, such as 8-hours per day. The total number of staff must consider how existing CSD instrumentation and maintenance staff can be used for AWPF support.

The State of California Division of Drinking Water (DDW) has stated that the CPO for IPR projects must be, at a minimum, AWT3 during initial IPR operation. After 3 years, the CPO must be AWT5. DDW also now requires that the Shift Supervisor must also be AWT3 from the start of initial IPR operation and into the future.

3.5 AWPF Siting Constraints

The goal of siting the AWPF were to limit impacts to the existing WWTP facilities and operations. The AWPF structures will be primarily located in the open paved area of the WWTP, adjacent to the Aeration Basins, CCB, and Maintenance Building. The siting constraints and WWTP operational considerations that affected the AWPF layout include:

- Structures cannot be constructed within the 50 foot setback from the southern property line along the creek without City approval.
- Chemical delivery truck access to the sodium bisulfite and sodium hypochlorite bulk storage tanks.
- Access to the dewatered cake truck bay in the Dewatering Building and maintenance access to the building.
- Truck-mounted crane access to the central and northern gallery access hatches.
- 45 feet minimum clearance is required between the existing WWTP Maintenance Building and proposed AWPF Building to facilitate truck access in and out of the Maintenance Building.

3.6 FEMA Flood Protection

No change from Preliminary Design Report (2019)

3.7 Geotechnical Considerations

No change from the Preliminary Design Report (2019).

Note, a geotechnical investigation will be completed during the 50% design phase with geotechnical report.

3.8 Structural Design Criteria

Structural design was not completed as part of this TM. Structural design details for the EQ Tank, AWPF Building, Clearwell, and other miscellaneous structures will be developed during final design.

3.9 CSD WWTP Plant Water System

The existing plant water pumps will need to be repurposed to facilitate draining of the CCB after an overflow event. Further, there will be extended periods of time that the CCB is empty. Accordingly, the plant water must be fed from the AWPF EQ Tank.

New plant water pumps will be installed in the EQ Tank to provide water to the existing facilities. This tank is treated with chloramines and should maintain similar disinfection standards. The specific criteria will follow in the 50% design as detailed hydraulic modeling ensures adequate pressure to all service areas, including the new AWPF.

The existing plant water pumps will maintain their connections to the water system for added redundancy.

3.10 Ocean Outfall Modifications

Improvements to CSD's Ocean Outfall were completed in 2020 in accordance with the Preliminary Design Report (2019) recommendations.

4. AWPF PROCESS BUILDING AND CHEMICAL STORAGE AREA

4.1 AWPF Process Building

The AWPF process building footprint has been increased compared to the 2019 PDR version to include more space for equipment removal and access, and to house the RO Feed Tank, RO Flush Tank, UV Feed Tank, UF and RO CIP systems, and their associated pumps and ancillary equipment. The building also includes an electrical room that has been resized based on the updated loads presented in **Section 3.3**, a storage/maintenance room with additional storage in a second story mezzanine, a control room/lab, a single occupancy restroom, and a shower room with lockers. The total footprint of the AWPF building is approximately 10,700 square feet. A preliminary site plan of the AWPF facilities is shown in **Appendix B**.

The 2019 PDR recommended a pre-engineered metal building. The current recommendation is for a CMU building to match similar buildings on site. It is possible to make either style of construction work on this site.

As shown in the proposed AWPF site plan (**Appendix B**), a vehicle traffic loop was provided around the AWPF building. The AWPF building is aligned along the 50-foot creek setback. The location of the Clearwell and Purified Water Pump Station will be finalized during 50% design. Alternative locations will be presented to locate the Clearwell and Pump Station out of the 50-foot setback. The east side of the AWPF facilities are set back approximately 45 feet from the existing Maintenance and Storage buildings to allow for vehicle access, including CSD's crane truck and vac truck, on a single turn. To provide 45 feet of clearance in front of these existing buildings, the AWPF facilities were shifted west, with approximately 20 feet of clearance from the CCB diversion wetwell to allow for vehicle ingress/egress. There is approximately 18 feet of clearance from the north side of the building to the Central Gallery for vehicle access.

4.2 Chemical Storage Area

Many of the chemicals require very small storage volumes for an AWPF of this size. Wherever possible chemical totes are used for ease of delivery and replacement. Liquid ammonium sulfate, calcium chloride, and caustic soda are stored in permanent tanks due to their demand. For more detailed information on sizing of metering equipment and tanks see **Section 3.2.9**.

The bulk storage tanks are caustic soda, ammonium sulfate, and calcium chloride. To save space, the calcium chloride and ammoniums sulfate will share a secondary containment area. A maintenance walkway divides the bulk storage tanks from the tote systems. These totes are located along the edge of the facility to allow easy delivery via forklift. Chemical fill stations for the bulk storage tanks will be located along the southeastern edge of the building to utilize the space in the offset where structures are not allowed and maintain traffic clearance to the east.

Bulk delivery trucks are intended to drive along the east side of the AWPF, pulling into either the existing or the new chemical delivery areas. After a delivery is complete the driver will use the road west and south of the AWPF to turn around and leave the same way they entered. There is not enough space on site for delivery trucks to travel around the process building in a circular pattern. The access road to the north and west of the AWPF process building is for passenger vehicle access only because it is not wide enough for delivery trucks to travel around in a circular pattern. Solids handling trucks will follow a similar route around the AWPF. The top of the EQ Tank is traffic rated to provide another space to turn around when maneuvering solids storage containers.

5. OFFSITE FACILITIES

5.1 Conveyance Piping

The 2019 PDR recommended widening the existing 20-foot CVWD and CSD easement along the privately owned property between Eugenia Place and Linden Avenue an additional 10 feet to avoid utility congestion within the easement. The easement contains an existing CVWD potable water line, CSD sanitary sewer line and COX telecommunication bank. Supplemental utility mapping was received which indicates a revised alignment which utilizes the existing easement is feasible while avoiding conflict with existing utilities. Potholing of the existing utilities which will occur during the next design phase will help verify feasibility of the revised alignment. A segment of the alignment through the easement will require a waiver from the State Water Resources Control Board Department of Drinking Water for separation from the existing water line being within the waiver zone.

No change to the conveyance pipeline sizing and design criteria presented in the 2019 PDR.

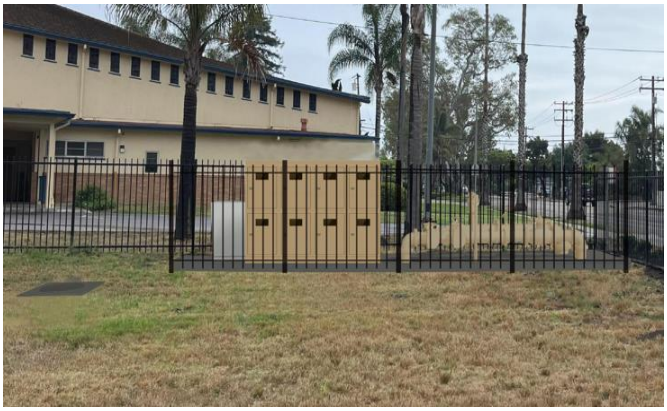
5.2 Injection Wells

The location of the Meadow View Injection Well will be located in the City right-of-way along Meadow View Lane. The conceptual location is shown **Figure 5-1**. The injection well and below-grade wellhead shall be located under the pavement along Meadow View Lane with the above-grade piping, valving, and electrical panels located behind a fenced enclosure on the sidewalk.

The Linden Injection Well location remains at St Joe's Church site. The piping and valving are now proposed to be above-grade located adjacent to the electrical panels in a fenced area, as opposed to inside a below-grade vault per the 2019 PDR. The reason for this change is the site has been fenced in by St Joe's Church and CVWD intends to also fence in the above-grade piping and valving; therefore above-grade facilities can be maintained with secure access and minimal visual impact. The wellhead shall remain located underground. The conceptual layout is shown **Figure 5-2**.

Figure 5-1: Meadow View Injection Well Concept

Figure 5-2: Linden Injection Well Concept



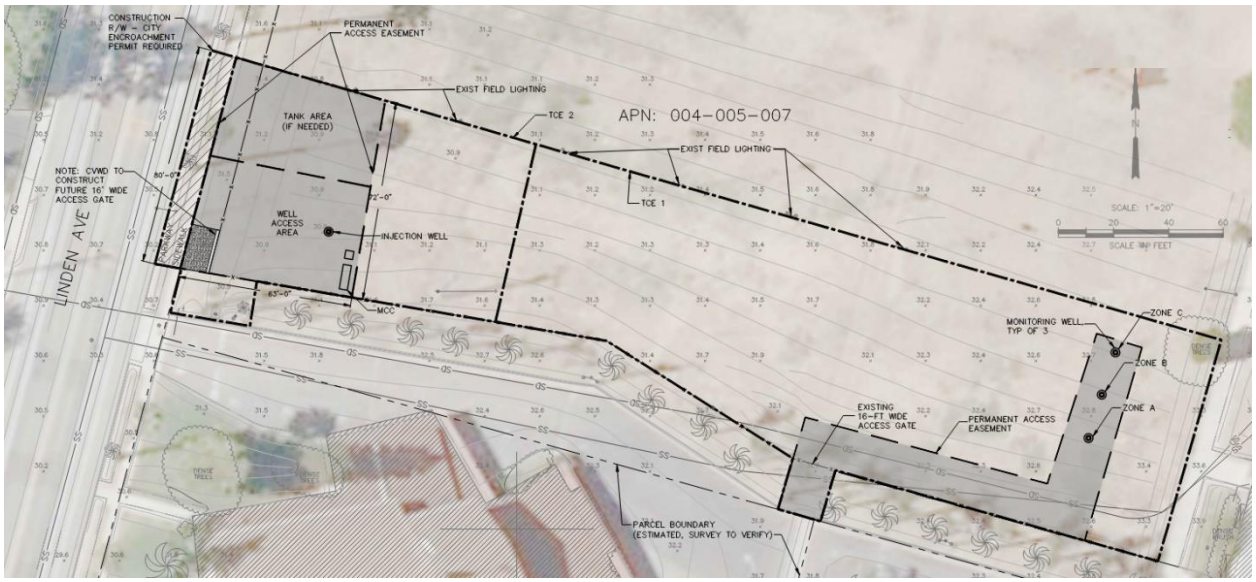
The Meadow View Injection Well previously considered constructing onsite storage for handling of maintenance water. The new well location does not have adequate space for site storage. The revised maintenance water handling approach is detailed in **Section 5.5**.

Injection well flowrates will also be increased to 450 gpm. As discussed in **Section 3.1.1** for the Initial and Ultimate Treatment Capacity, the original design in the PDR produced 1.00 mgd of finished water, while the fully built-out AWPF will allow for 1.30 mgd for product. PDR assumptions noted that injection well flows can be increased for short durations to accommodate increased flows post-backflush of maintenance water. However, this increased flowrate of 450 gpm per well shall be modeled by M&A as part of the design phase and the injection well design criteria shall be confirmed and updated by PWR after modeling.

5.3 Monitoring Wells

Monitoring wells will be located at four (4) locations with three (3) monitoring wells at each location. Locations are El Carro Park, Memorial Park, Franklin Park and St Joe's Church. The locations of the three monitoring wells at St Joe's Church, as shown in **Figure 5-3**, have been revised based on easement discussions with the property owner. Drilling of El Carro Park monitoring wells are currently under construction; layouts for the monitoring wells at the two other Park sites have not been developed at the time of this report. Due to the injection well flowrates being increased from 350-gpm to 450-gpm, as discussed in **Section 3.1.1**, groundwater modeling shall be modeled by M&A as part of the design phase to confirm travel times.

Figure 5-3: St Joseph Church Monitoring Well Locations



5.4 Wellhead Electrical Requirements

A new electrical service is proposed to Linden Injection Well at the St Joe's Church site. This electrical service will include a transformer that is still to be sized. Transformer will service an electrical meter for both wellheads (Linden Injection Well and Meadow View Injection Well) and a separate electrical meter for St. Joe's Church. The existing electrical service to St. Joe's Church will be underground as part of this project. Coordination with SCE has not been initiated for the wellheads at the time of this memorandum.

The electrical meter and switchboard to the wellheads will require underground conduit and wires from the Linden Injection Well to the Meadow View Injection Well. The assumption is the Meadow View Injection Well MCC will be located within 1,000-LF distance from the Linden Injection Well to limit voltage drops.

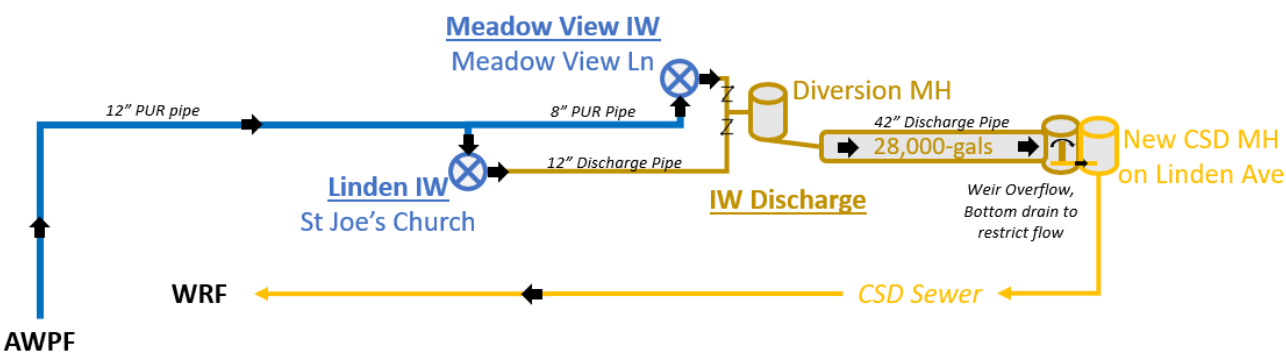
5.5 Maintenance Water Discharge

Injection wells will need to be backflushed periodically and 2x the average injection flow rate (2 x 450-gpm = 900-gpm). This maintenance water discharge will occur 1-to-2 times per week initially for approximately 60-minutes. Over time, the frequency of the backflush may likely be reduced. Each well can be backflushed one at a time limiting the daily maintenance water discharge to approximately 54,000 gallons.

A workshop was conducted with the Regional Water Quality Control Board (RWQCB) on May 2, 2023 to discuss the permitting approach for the maintenance water discharge and applicably for coverage under CVWD's Order WQ 2014-0194-DWQ NPDES Permit For Drinking Water System Discharges To Waters Of The United States. The opinion of the RWQCB is this discharge would need to comply with the Carpinteria Salt Marsh TMDL limits that include Total Nitrogen and Phosphorous limits. To avoid water quality limitations, discharge of the injection well maintenance water to the sanitary sewer is preferred. In addition, discharge of maintenance water back to CSD's sewer system would allow for recapture of that flow into the CAPP project for groundwater recharge.

The design concept is to oversize the injection well backflush line from both wellheads to accommodate retention of the backflush water with a reduced flowrate into CSD's sewer system. This can potentially be accomplished with a 42-inch diameter pipeline by 500-LF long providing approximately 28,000-gallons of retention volume in Meadow View Lane. The 42-inch line would connect to CSD's existing 8-inch sewer via a new manhole with flow restricted by a stop gate pinned part of the way up the frame to allow for flow under the gate into the new manhole. Overflow would overtop the gate into the new manhole. For gravity flow to the sewer, the oversized pipeline will be at a shallow depth at the upstream end. To maintain adequate cover over the pipeline, fusion-welded HDPE or fusible PVC pipe material is recommended due to a smaller outside diameter compared to push-on pipe. The pipeline could also be upsized midway through the alignment once additional cover is available if a smaller diameter is needed to maintain cover at the upstream end. The pipeline alignment includes a crossing of an 8-foot by 3-foot storm drain culvert, the depth of which is unknown. The storm drain will be potholed at the crossing to determine whether there is a conflict with the proposed pipeline.

Figure 5-4: Maintenance Water Discharge Approach



CSD's sewer system has been modeled by Water Systems Consulting (WSC) showing that in the off-hours (12am-5am), discharge into the 8-inch sewer along Linden Avenue at Meadow View Lane can accommodate up to 500-gpm of flow. This flowrate was confirmed by CSD and CVWD through a flow test on July 19, 2023 during daytime operations. CVWD with CSD conducted a flow test of the 8-inch sewer along Linden Avenue.

Potable water was discharged into the sewer at a flowrate up to 400-gpm before surcharging onto the manhole shelf along Linden Ave at Malibu Street. Note, manholes can be surcharged in some cases above top of pipe (d/D>1) while maintaining at least 5 feet of freeboard below manhole rim. For purposes of this design, 450-gpm is the assumed allowable flowrate that will provide a sufficient safety factor in terms of not surcharging manholes along Linden Ave and Malibu St.

6. REFERENCES

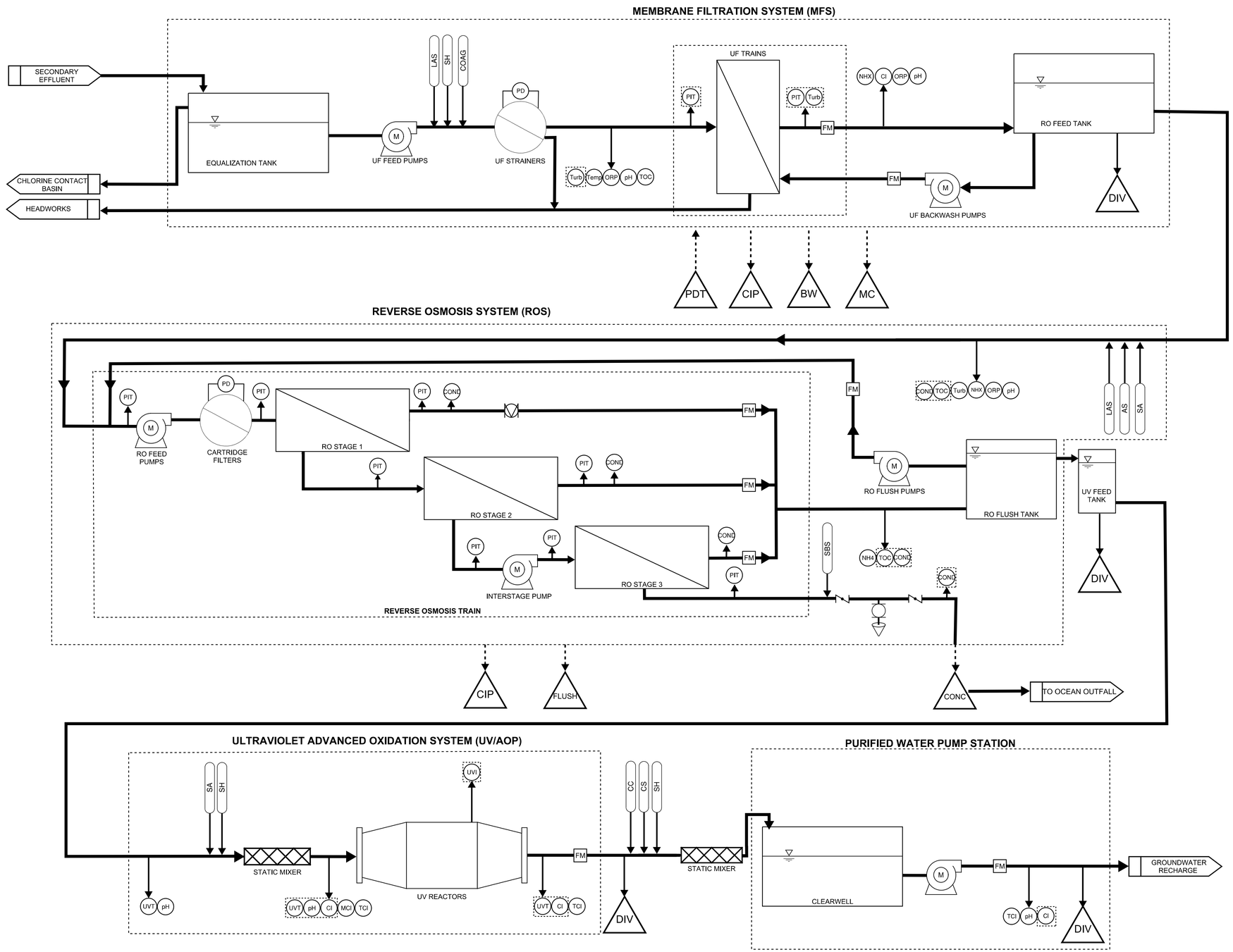
Advanced Water Purification Facility, Preliminary Design Report, Carpinteria Advanced Purification Project (CAPP), FINAL. June 2019 (Woodard & Curran)

Conveyance System, Preliminary Design Report, Carpinteria Advanced Purification Project (CAPP), FINAL. October 2019 (Woodard & Curran)

Environmental Impact Report, Carpinteria Advanced Purification Project (CAPP), SCH# 2019011016, FINAL. November 2019 (Woodard & Curran)

Mitigation Monitoring and Reporting Program, Carpinteria Advanced Purification Project (CAPP), SCH# 2019011016. November 2019 (Woodard & Curran)

APPENDIX A: AWPF PROCESS FLOW DIAGRAM



DIVERSIONS AND WASTE STREAMS

- FLUSH = RO FLUSH FEED AND WASTE
- CIP = CLEAN IN PLACE FEED AND WASTE
- BW = BACKWASH SUPPLY AND WASTE
- MC = MAINTENANCE CLEAN SUPPLY AND WASTE
- DIV = DIVERSION TO BACKWASH WASTE TANK
- PDT = PRESSURE DECAY TEST

INSTRUMENTATION

- Cl = FREE CHLORINE
- COND = CONDUCTIVITY
- NHX = AMMONIA AND MONOCHLORAMINE
- NH4 = AMMONIA
- ORP = OXIDATION REDUCTION POTENTIAL
- MCl = MONOCHLORAMINE
- pH = pH
- TCl = TOTAL CHLORINE
- TOC = TOTAL ORGANIC CARBON
- Turb = TURBIDITY
- UVI = ULTRAVIOLET INTENSITY
- UVT = ULTRAVIOLET TRANSMITTANCE
- = CRITICAL CONTROL POINT (CCP)

CHEMICAL DOSING

- AS = ANTI-SCALANT
- CC = CALCIUM CHLORIDE
- COAG = COAGULANT
- CS = CAUSTIC SODA
- LAS = LIQUID AMMONIUM SULFATE
- SA = SULFURIC ACID
- SBS = SODIUM BISULFITE
- SH = SODIUM HYPOCHLORITE

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CARPINTERIA ADVANCED PURIFICATION PROJECT

ADVANCED WATER PURIFICATION FACILITY

GENERAL PROCESS FLOW DIAGRAM

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IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

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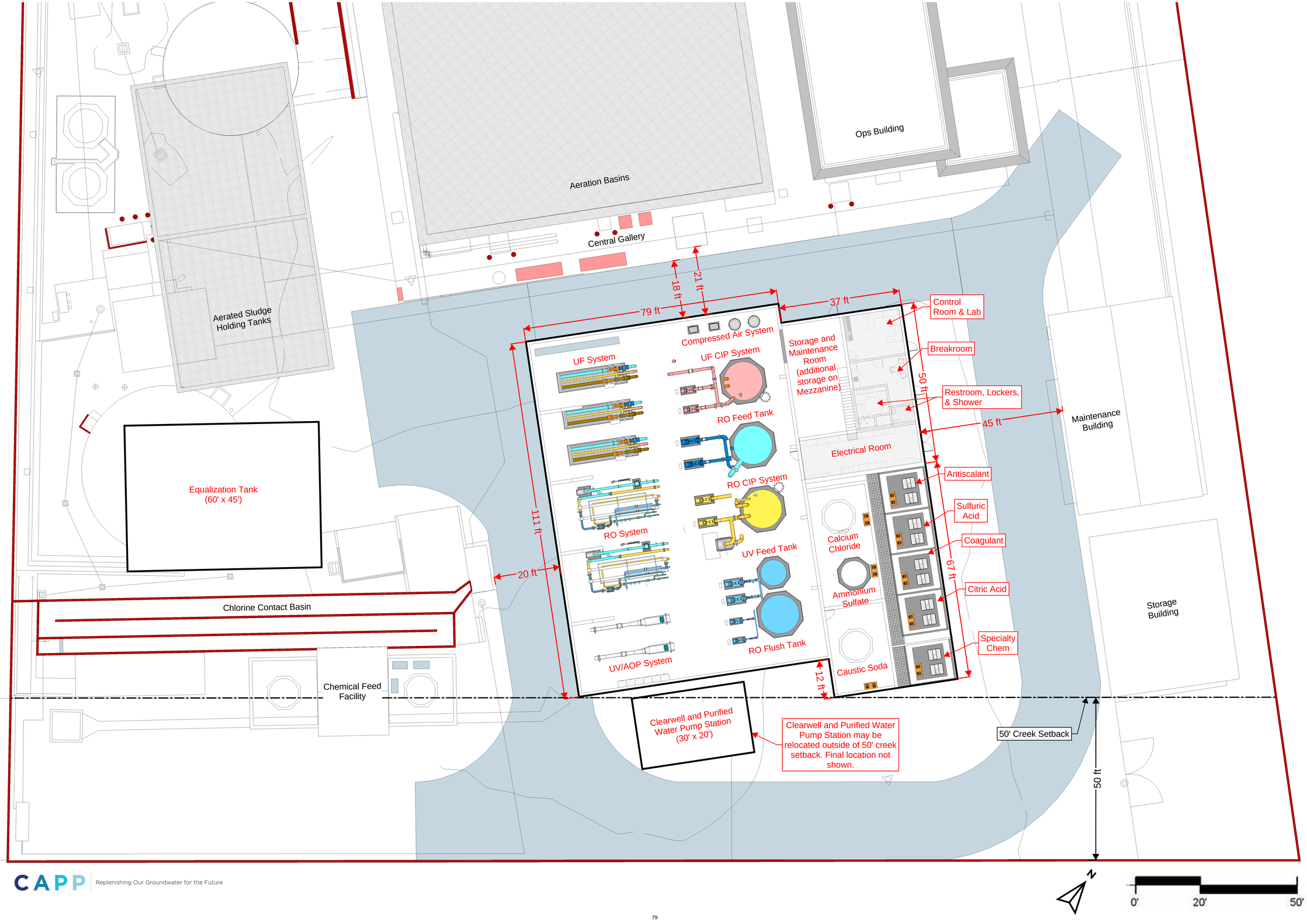
APPENDIX B: PRELIMINARY AWPF SITE PLAN

PRELIMINARY AWPF SITE PLAN



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