CARMICHAEL WATER DISTRICT

REGULAR BOARD MEETING
AGENDA PACKET

SEPTEMBER 15, 2025

This page intentionally left blank.

POSTED: SEPTEMBER 10, 2025

CARMICHAEL WATER DISTRICT

Regular Board Meeting - Monday, September 15, 2025, 6:00 p.m.

Carmichael Water District Board Room
7837 Fair Oaks Boulevard
Carmichael, CA 95608

Join from computer, tablet or smartphone. Click on this URL to join:
https://us02web.zoom.us/j/83596878004?pwd=bOfVj6ch85NMSco2p52u9ox3O33J6v.1
Join by phone: Dial US +1 669 900 6833
Meeting ID: 835 9687 8004 **Passcode:** 564283

AGENDA

The Board will discuss all items on its agenda, and may take action on any of those items, including information items and continued items. The Board will not take action on or discuss any item not appearing on the posted agenda, except: (a) upon a determination by a majority vote of the Board that an emergency situation exists; or (b) upon a determination by a two-thirds vote of the Board members present at the meeting, or, if less than two-thirds of the members of the Board are present, a unanimous vote of those members present, that the need to take immediate action became apparent after the agenda was posted. Agenda packets can be found at our website at carmichaelwd.org.

The Board of Directors welcomes and encourages participation in meetings. Public comment may be given on any agenda item as it is called and limited to three minutes per speaker. Matters not on the posted agenda may be addressed under Public Comment. Please follow Public Comment Guidelines found on the District's website at carmichaelwd.org/public-comment-guidelines/.

In compliance with the Americans with Disabilities Act, if you have a disability and need a disability-related modification or accommodation to participate in this meeting, please contact the General Manager at 483-2452. Requests must be made as early as possible, and at least one full business day before the start of the meeting.

CALL TO ORDER AND STATEMENT REGARDING PUBLIC PARTICIPATION: President Greenwood

ROLL CALL

PRESIDENTS COMMENTS

PUBLIC COMMENT:

1. **Public Comment**
   Any member of the public may address the Board on any item of interest to the public that is within the subject matter jurisdiction of the Board.

PRESENTATION:

2. **Water Forum 2.0 Presentation**

CONSENT CALENDAR:

Consent Calendar items are expected to be routine and non-controversial, to be acted on by the Board in one motion. Should any Board member, staff member, or interested person request discussion on an item, the Board will consider the item separate from the Consent Calendar.

4. **Minutes for the Special Board Meeting – August 18, 2025**
5. **Minutes for the Regular Board Meeting – August 18, 2025**
6. **Minutes for the Special Board Meeting – September 4, 2025**
7. **Monthly Expenditure Report – July 2025**
8. **Directors Expenses and Reimbursements**
9. **WaterSMART Planning and Project Design Grants for Fiscal Year 2023 and Fiscal Year 2024, Funding Opportunity No. R23AS00109**
10. **CalPERS Medical Benefits Resolutions – Contribution Change for 2026**

ACTION CALENDAR:

11. **Charleston Ave Property Authorization to Contract with Real Estate Agent**
    Staff recommends that the Board of Directors approve a 5% commission for real estate fees with a 50/50 split towards seller's and buyer's brokers and agents and authorize the General Manager to sign a standard Residential Listing Agreement by the California Association of Realtors for a duration of 6 months.

12. **Water Meter Replacement Standard: From Mechanical to Ultrasonic Technology**
    Staff recommends that the Board of Directors approve Neptune's ultrasonic metering technology across all meter sizes as the new standard and direct staff to update the Construction Improvement Standards and purchase water meters in accordance with approved FY 25-26 Budget.
13. **Sacramento Regional Water Bank – Starting Balance**
    Staff recommends that the Board of Directors accept the Starting Balance Modeling Analysis conducted by the Regional Water Authority for the Sacramento Regional Water Bank and support full remaining in-basin previously banked water subject to the Water Accounting System safeguards.
14. **Carmichael Water District Standard Specifications and Details Revisions**
    Staff recommends that the Board of Directors approve the proposed changes and edits to the Carmichael Water District's Construction Improvement Standards.
15. **Dugan Management & Engineering, Inc. (DME) Agreement Amendment No. [4] to Claremont Road and Fair Oaks Blvd at El Camino Ave Pipeline Capital Improvement Project (CIP)**
    Staff recommends that the Board of Directors authorize the General Manager to execute an Amendment No. 4 to the professional services agreement with DME for $69,752 providing an amended total agreement cost not to exceed amount of $404,757.
16. **Fair Oaks Blvd. Overlay Project Valve Boxes Adjustments**
    Staff recommends that the Board of Directors approve a contract with Flowline Contractors, Inc. for $177,232 and authorize the General Manager to execute an agreement with a 12.8% contingency of $22,768, for a total not-to-exceed amount of $200,000.
17. **Public Hearing – Compliance with New Legal Obligations on Vacancies and Recruitment and Retention Efforts**
    Staff recommends that the Board of Director receive and address public comment, if any, and hear and file information on District's vacancies during Fiscal Year 2024-2025.

INFORMATIONAL ITEMS:

18. **September Informational Update for the La Vista Tank and Booster Pump Station Project**

COMMITTEE REPORTS:

19. **Regional Water Authority**
    Director Greenwood Reports Out.
20. **Carmichael Chamber of Commerce**
    Director Nelson Reports Out.
21. **Other Committee Reports**
    Directors Report Out.

STAFF REPORTS:

22. **General Manager and District Activity Report – August 2025**
23. **Director's Expense Reimbursement Summary – August 2025**

GENERAL CORRESPONDENCE/INFORMATION:

24. **Director's Written and/or Oral Reports**

The next meeting of the Board of Directors will be a Regular Board Meeting held on:
Monday, October 20, 2025 at 6:00 p.m.

CARMICHAEL WATER DISTRICT

Special Board Meeting
Monday, August 18, 2025, 5:00 p.m.

Carmichael Water District Board Room
7837 Fair Oaks Boulevard
Carmichael, CA 95608

MINUTES

The Carmichael Water District Board of Directors met in Special Session this 18th day of August at 5:00 p.m.

ATTENDANCE:

Directors: Ronald Davis, Mark Emmerson, Paul Selsky, Jeff Nelson, and Ron Greenwood

Staff: Cathy Lee, Gaby Padilla

Public: Zero (0) Members of the Public

CALL TO ORDER: President Greenwood called the meeting to order at: **5:00 p.m.**

PUBLIC COMMENT:

1. **Public Comment**
   No comments.

ANNOUNCED CLOSED SESSION AND ADJOURN OPEN SESSION TO CLOSED SESSION: 5:01 p.m.

CLOSED SESSION

2. **LABOR NEGOTIATION – INVOLVING THE GENERAL MANAGER (Government Code section 54957.6)**

ADJOURNED CLOSED SESSION AND OPENED REGULAR SESSION: 6:00 p.m.

REPORT OUT OF CLOSED SESSION: The Board gave direction to the Ad Hoc committee.

ADJOURNMENT: President Greenwood adjourned the meeting at: **6:01 p.m.**

Ron Greenwood, Board President **Cathy Lee, Board Secretary**

This page intentionally left blank.

CARMICHAEL WATER DISTRICT

Regular Board Meeting
Monday, August 18, 2025, 6:00 p.m.

Carmichael Water District
7837 Fair Oaks Boulevard
Carmichael, CA 95608

MINUTES

The Carmichael Water District Board of Directors met in Regular Session this 18th day of August at 6:00 p.m. in person and via teleconference.

ATTENDANCE:

Directors:	**Ron Davis, Mark Emmerson, Ron Greenwood, Jeff Nelson, Paul Selsky**
Staff:	**Cathy Lee, Gaby Padilla, Debbie Martin, David Biagi, Lucas Campbell, Greg Norris, Aaron Ferguson**
Guest:	**Mark Hildebrand with Hildebrand Consulting**
Public:	**Five (5) Members of the Public**

CALL TO ORDER: President Greenwood called the meeting to order at: **6:01 p.m.**

PRESIDENTS COMMENTS: President Greenwood led the Pledge of Allegiance.

PUBLIC COMMENT

1. **Public Comment**
   No comments.

PRESENTATION

2. **La Vista Tank and PS – Toppel Consulting**
   This item was rescheduled due to the presenter's illness.
3. **Water Rate Study – Hildebrand Consulting**
   Mr. Hildebrand presented the water rate study.

   Director Nelson inquired Mr. Hildebrand what it would look like without a rate increase.
   Mr. Hildebrand informed the Board of Directors that he did not prepare a graph for what it would look like without a rate increase but he explained that a slide with a 3 percent increase showed a $7 million deficit in reserves. He then explained that based off this scenario, if there was no rate increase the reserves would be in the negative by 2032 or close to then.

   Directors inquired how our debt compared to other water agencies in the area.
   Mr. Hildebrand informed the Board of Directors that the best way to measure this is with the debt coverage ratio. He mentioned that some water agencies do not have any debt so it is difficult to compare but when there is debt, he typically sees debt coverage range from 2.0 and the ones that are really struggling is around 1.2 or below. He stated that CWD's debt is 19.2 percent to the operating cost and he typically sees about 25 percent debt. The Districts debt is starting to go down because the District is no longer issuing debt and by 2035 it should be zero if the payment continues.

   Director Nelson inquired that when the debt is paid off will whether the $2.5 million dollars be turned into revenue.
   Mr. Hildebrand informed the Board of Directors that once the debt is paid off, it is going to be a big turning point for the District in terms of the finances. He then mentioned that it is too far out to start changing your financial decisions at the moment for something that could potentially happen in 10 years. He stated that if the debt is paid off by 2035, then he believes that rate increases will not be needed at that time.

   Directors inquired if grant funds are included in the study.
   Mr. Hildebrand informed the Board of Directors that they did include grant funding. He then mentioned that the assumption is that if the District does not receive additional grants then those projects will not proceed.

   Directors commented that as far as revenues go, Mr. Hildebrand has been very conservative. They then mentioned that what has not been projected, nor can it be projected, is what the Districts water sales could be if we did water transfers. These types of sales are like "icing on a cake" that could bring in a significant amount of money considering the last water transfer the District did brought in about one million.

Mr. Hildebrand informed the Board of Directors that the District did make a significant amount of money from those deals in the past, and they could come up again. However, just to be conservative, he did not include any future water transfers because if it does not happen then the District could be in crisis mode.

Directors commented that in the past there was a guideline where the amount of revenue coming from the usage rate needed to be high as a percentage rate to show that water districts were in compliant with conservation guidelines. They then stated that they presume that the Districts percentage is way below that. They mentioned that they wanted to state this fact because some rate payers would say that the District is pulling too much money from the fixed rate and not signaling water conservation benefits to customers very well. They then inquired Mr. Hildebrand on what his thoughts were on this.
Mr. Hildebrand informed the Board of Directors that the guideline the Board was referring to has fallen out of favor. He then mentioned that it was a very powerful guideline where water districts had to meet established Best Management Practices (BMPs) established by water conservation advocacy groups. Then massive droughts hit, and all the utilities that were 70% reliant on variable rates were losing revenue and were being put in very difficult financial positions. There are other ways to structure the water rates that do not have to be the 70/30 ratio, for example. Tiered rates and 50/50 rates which is now the more common practice.

Directors commented that it is very important to describe the rate increase to customers because it is not just a 4 percent increase. It will affect different customers differently depending on the size of the meter.
Mr. Hildebrand informed the Board of Directors that they were correct and the 4 percent increase is just the average of all the customers increase. He then mentioned that the customers who are using less water are getting a lower rate increase.

Director Nelson inquired why Mr. Hildebrand was recommending against AB 2257.
Mr. Hildebrand informed the Board of Directors that it is a relatively new law and there is no clear or established procedures. Water agencies with AB 2257 provisions had to hire a lawyer to establish a template and procedure which is time consuming and costly. He then mentioned that since the proposed rate increase is not a significant amount it is a low risk for a complaint or lawsuit.
Director Nelson commented that it sounds like Mr. Hildebrand is not saying that is 100 percent not necessary to do but the scales are tipped a little bit in favor of not doing it.
Mr. Hildebrand informed the Board of Directors that he provided the information and the recommendation came from the committee, staff, and legal counsel.

The Board thanked Mr. Hildebrand for the excellent presentation.

CONSENT CALENDAR

4. **Minutes for the Special Board Meeting – July 21, 2025**
5. **Minutes for the Regular Board Meeting – July 21, 2025**
6. **Minutes for the Special Board Meeting – July 25, 2025**
7. **Minutes for the Finance Committee Meeting – July 30, 2025**
8. **Minutes for the Special Board Meeting – August 7, 2025**
9. **Minutes for the Special Board Meeting – August 7, 2025**
10. **Monthly Expenditure Report – June 2025**

Directors inquired about the payment made to the Internal Revenue Service for bond arbitrage.
The Finance Manager informed the Board of Directors that the District has to conduct that study every 5 years on the bond proceeds. Since the bonds are tax-exempt bonds, there is a limit to for earned interest. If the District earns more than that amount, the it has to be paid back to the IRS. This payment is for the excess earning which are not allowed based on tax-exempt bonds regulations.
Directors inquired if the interest earns amount a fixed amount or if it could be negotiated.
The Finance Manager informed the Board of Directors that there is no negotiation it is an IRS calculation.
Directors inquired if this payment was anticipated and if it was in the budget that was just approved.
The Finance Manager informed the Board of Directors that it was not anticipated and it is offsetting the interest income that was earned.

M/S Emmerson / Davis to approve the consent calendar.

Mark Emmerson	Aye	✓	Nay		Absent		Abstain		
Jeff Nelson	Aye	✓	Nay		Absent		Abstain		
Ronald Davis	Aye	✓	Nay		Absent		Abstain		
Ron Greenwood	Aye	✓	Nay		Absent		Abstain		
Paul Selsky	Aye	✓	Nay		Absent		Abstain		
Board Totals:	Ayes:	5	Nays:	0	Absent:	0	Abstain:	0	

Passed Unanimously: ✓

ACTION ITEMS

11. Proposed Water Rates and Assembly Bill 2257 Objections Process

Staff recommends that the Board of Directors consider proceeding with the proposed rate adjustment without the AB 2257 provisions and direct staff to move forward accordingly.

Director Nelson inquired if the Board was voting on the rate increase.
The General Manager informed the Board of Directors is not voting on the rate increase. The Board is approving a rate for the District to conduct public outreach as part of the 218 process.
Director Nelson commented that the staff recommendation is asking for the Board to proceed with the proposed rate adjustment and he thinks it should only say to proceed with the Prop 218 process.

Directors commented that they would like to make a motion but they want to confirm that this is for Prop 218.
The General Manager informed the Board of Directors that it is for Prop 218 and to change the recommendation to "proceeding with the Prop 218 process with the recommended proposed rate adjustment of 4 percent per year for the next 5 years without the AB 2257 provisions".
Director Nelson commented that they would want to proceed with the Prop 218 process but not with the proposed rate increase.
The General Manager informed the Board of Directors that a rate recommendation is needed for Prop 218.

Director Nelson inquired Mr. Ferguson to see if the new recommendation sounded correct.
Mr. Ferguson informed the Board of Directors that it did sound correct to include the proposed rate recommendation into the motion. He mentioned that he heard the proposed rate was 4 percent from Mr. Hildebrand's presentation.

Directors inquired if they were approving a 4 percent rate increase.
Mr. Ferguson informed the Board of Directors that they were not approving a 4 percent rate increase, they are just approving the process. He then mentioned that there is a calendar of items that need to get done for the Prop 218 process if they wanted a potential rate increase by January 1st. It would be at the public hearing at the end of the process when the Board would vote to approve a rate increase.

Directors inquired what the cost would include if they did the AB 2257 provisions.
Mr. Hildebrand informed the Board of Directors that the cost would include his time depending on how many objections the District receives which could take a considerable amount of time for each response depending on how many substantive objections there are. Then there are the lawyer fees to make the template and procedure.

Director Nelson commented that by doing the AB 2257 provisions it makes everything more transparent and it creates a timeframe to which a lawsuit could be filed.
Directors commented that they like the idea of utilizing AB 2257.

Directors commented that there initial reaction is typically to do what ACWA recommends but in this particular instance they are concerned about being one of the first districts to implement it and the District would have a short period of time to put the procedure together. They then mentioned that they are hesitant to do this because of those reasons and they agree with staff that there is no real reason to do it this time but the next time it will probably be automatically done.
Directors also commented that this legislation was sponsored by ACWA who lobbied heavily to get it passed because at any point after a rate increase anyone could file a lawsuit. They then mentioned that in this particular case because the severity of the proposed increase is low they do not think it is worth it to do the AB 2257 provisions. They also do not want to be the test case of this brand new procedure.

Mr. Hanscom commented that he was looking at the capital expenditures, in particular the Ranney collectors, and it states that it will cost $30 million to replace the collectors. He then mentioned that he thought the District was getting money to just refurbish them.
The General Manager informed Mr. Hanscom that the replacement is to put in new laterals and the consultant gave an estimate of $6-7 million per collectors. The Distract has 3 collectors and staff included an additional amount for environmental analysis or for any type of contingency.

Mr. Hanscom inquired if the District was not going to be receiving grant funding for this project from Senator Bera.
The General Manager informed Mr. Hanscom that Senator Bera included $3.5 million for funding this year and in the future the District will be asking for additional funding but no guarantees.
Mr. Hanscom commented that when he saw replacement instead of refurbishment it really got his attention.
The General Manager informed Mr. Hanscom that they are only replacing the laterals not the entire Ranney collectors.

M/S Nelson / Selsky to proceed with the Prop 218 process with the recommended proposed rate adjustment of 4 percent per year for the next 5 years with the AB 2257 provisions.

Mark Emmerson	Aye		Nay	✓	Absent		Abstain	
Jeff Nelson	Aye	✓	Nay		Absent		Abstain	
Ronald Davis	Aye		Nay	✓	Absent		Abstain	
Ron Greenwood	Aye		Nay	✓	Absent		Abstain	
Paul Selsky	Aye		Nay	✓	Absent		Abstain	
Board Totals:	Ayes:	1	Nays:	4	Absent:	0	Abstain:	0
Motion Failed:		✓						

M/S Davis / Emmerson to proceed with the Prop 218 process with the recommended proposed rate adjustment of 4 percent per year for the next 5 years without the AB 2257 provisions.

Mark Emmerson	Aye	✓	Nay		Absent		Abstain	
Jeff Nelson	Aye	✓	Nay		Absent		Abstain	
Ronald Davis	Aye	✓	Nay		Absent		Abstain	
Ron Greenwood	Aye	✓	Nay		Absent		Abstain	
Paul Selsky	Aye	✓	Nay		Absent		Abstain	
Board Totals:	Ayes:	5	Nays:	0	Absent:	0	Abstain:	0
Passed Unanimously:		✓						

12. Cross Connection Control Program and Regulation Adoption

Staff recommends that the Board of Directors approve Resolution 08182025-01 - A Resolution of the Carmichael Water District Adopting and Implementing the Carmichael Water District Cross-Connection Control Regulation.

Directors inquired if these updates had to be done because DDW came up with new regulations.
The Production Superintendent informed the Board of Directors that DDW is getting rid of Title 17 and implemented a new cross connection control policy handbook.

Directors inquired how this compares to what the District had before.
The Production Superintendent informed the Board of Directors that the new regulation includes surveying all the District's new and existing backflow devices. The non-testable backflow devices are going to have to be surveyed as well and the customer will have to replace them with the new model.
Directors commented that this will be a big effort for staff. They then inquired as to how many backflow devices there are now.
The Production Superintendent informed the Board of Directors the District currently has about 620 to 630 devices.

Directors commented if there was anything onerous that DDW required the District to include in the regulation.
The Production Superintendent responded that there was nothing too onerous and will result in a robust policy.

Director Nelson commented that the hazard assessments were supposed to be a very onerous additional service that the District is supposed to provide but the language in the policy shows that it is under the discretion of the District.
The Production Superintendent informed the Board of Directors that the District sets the schedule but the workload will be onerous.
Director Nelson commented that they thought there was a 10-year deadline of when they all need to be completed.
The Production Superintendent informed the Board of Directors that the single check non-testable devices have the 10-year deadline. For all the surveys it is 5 to 6 years of when they will be done.

M/S Emmerson / Davis to approve staff's recommendation.

Mark Emmerson	Aye	✓	Nay		Absent		Abstain	
Jeff Nelson	Aye	✓	Nay		Absent		Abstain	
Ronald Davis	Aye	✓	Nay		Absent		Abstain	
Ron Greenwood	Aye	✓	Nay		Absent		Abstain	
Paul Selsky	Aye	✓	Nay		Absent		Abstain	
Board Totals:	Ayes:	5	Nays:	0	Absent:	0	Abstain:	0
Passed Unanimously:		✓						

13. Proposed Rule Change for Turf Replacement Program

Staff recommends that the Board of Directors approve the proposed changes outlined in Attachment 1, which allows removing the one (1) project per property limitation and increase the maximum payment up to $4,000 per property. These proposed changes do not conflict with requirements from the USBR grant.

Directors inquired if staff was proposing a policy to allow a property to do up to two projects.
The Engineering Manager informed the Board of Directors that in the current terms and conditions specifies that each parcel can do one project and can receive a maximum of $2,000. Staff is proposing that the one project per parcel stipulation be removed and increase the maximum amount to $4,000. This will give the opportunity to the people who already completed a turf replacement project to reapply and submit another turf replacement project to receive an additional $2,000. The reason staff is proposing this change is because one of the grants that is funding this program is set to expire at the end of this calendar year and they want to take advantage of those funds as much as possible.

M/S Nelson / Davis to approve staff's recommendation.

Mark Emmerson	Aye	✓	Nay		Absent		Abstain		
Jeff Nelson	Aye	✓	Nay		Absent		Abstain		
Ronald Davis	Aye	✓	Nay		Absent		Abstain		
Ron Greenwood	Aye	✓	Nay		Absent		Abstain		
Paul Selsky	Aye	✓	Nay		Absent		Abstain		
Board Totals:	Ayes:	5	Nays:	0	Absent:	0	Abstain:	0	
Passed Unanimously:		✓							

14. Development Agreement for 8105 Fair Oaks Blvd for Water Service

Staff recommends that the Board of Directors authorize the General Manager to execute the attached Developers Agreement for Water Service to be used at 8105 Fair Oaks Blvd.

No comments.

M/S Davis / Emmerson to approve staff's recommendation.

Mark Emmerson	Aye	✓	Nay		Absent		Abstain		
Jeff Nelson	Aye	✓	Nay		Absent		Abstain		
Ronald Davis	Aye	✓	Nay		Absent		Abstain		
Ron Greenwood	Aye	✓	Nay		Absent		Abstain		
Paul Selsky	Aye	✓	Nay		Absent		Abstain		
Board Totals:	Ayes:	5	Nays:	0	Absent:	0	Abstain:	0	
Passed Unanimously:		✓							

15. Amendment 1 for the Professional Services Agreement with Water Systems Consulting for Progressive Design-Build Professional Assistance for the Ladera and Winding Way Well Site Improvement Project

Staff recommends that the Board of Directors: 1) approve Amendment 1 to the Professional Services Agreement with Water Systems Consulting, Inc. for $537,719, 2) approve a contingency amount of $100,000 to fund District staff approved optional tasks offered by WSC or any unforeseen costs, resulting in a contract not-to-exceed amount of $668,866, and 3) authorize the General manager to approve future amendments up to the approved contingency amount.

Directors Nelson commented that the original contract was for about $30,000 and this amendment is asking for $600,000 which is about 30 times the original amount and this does not feel right to him. He mentioned that he looked at the original contract and it did not reference these additional services and he is concerned that the change order amount is very large without going through a competitive bid process.
The Engineering Manager informed the Board of Directors that the original proposal solicitation included assistance during both the construction and design phases. WSC was selected not for what they have done in the scope so far but also included what is included in this amendment.

Director Nelson commented that none of that is mentioned in the previous award memo and he also looked through the minutes of that meeting and it was not discussed either.
The Engineering Manager informed the Board of Directors that construction management was purposefully excluded because it was uncertain if staff would want to continue with WSC. Staff wanted to see how WSC performed on the

first phase. Since WSC did an excellent job and is imminently familiar with the project, staff is willing to expand their scope of work.

Director Nelson commented that he does not have a problem with WSC but it is this process that concerns him. He then mentioned that there is federal funding associated with project so there should be an open and transparent procurement for services. Based on the information that has been provided it does not appear to him that the open and transparent procurement for services was done with this amendment.
The Engineering Manager informed the Board of Directors that while the request for proposal information was not included in the staff memo, the scope outlined in Amendment 1 was requested in the original RFP process. All proposers explained their approach, what they envisioned happening, and how they could be part of it. In the original selection, staff considered all this.

Director Nelson commented that this is the second time staff has brought an amendment to a contract that was 15 times the original amount. The first being with Mr. Toppel and the Board expressed a lot of concern about that process and now its 20 fold for this amendment that includes federal funding. Staff is putting the Board in a very diffuclt position by asking them to approve this amendment.
The Engineering Manager informed the Board of Directors that the amendment may be 20 fold but the scope has increased 20 fold as well. He mentioned that staff did the proposals methodology for procurement allowed through the federal contracting process originally and this is just an amendment to that.

Directors inquired if the District is not required to put this scope of work through a competitive bid.
The Engineering Manager informed the Board of Directors that the federal procurement methods allow for a competitive bid or the proposal method, which is what they did for this contract.

Director Nelson commented that the federal procurement process calls for a quality based selection. He then mentioned that in the original contract memo there is no reference to construction management so he does not see any evidence that there was a quality-based procurement for this scope of work.
The Engineering Manager informed the Board of Directors that it would not have been included in the original discussion of the contract. He mentioned that it was included in the original RFP, which requested information on the approach to construction management as part of the selection criteria.

Directors commented that it caught their eye that the amendment had a significantly larger amount than the original contract. They mentioned that they were questioning if the everyone understood that the original RFP had this scope as a potential amendment. They then stated that they worry about fairness challenge from the competitors and audit risks. They are comforted to hear that everyone did understand that this was a potential scope of work in the RFP. They then mentioned that there should be a strong justification memo for the file.

Director Nelson commented that they would like to see the original RFP. He then inquired if staff was familiar with 2 CFR 200 and there is very strict procurement requirements that need to be followed. Looking at the information that was presented; he does not feel thee requirements are met. He then mentioned that the materials that have been presented is not enough for him to approve this amendment.

Directors inquired how this could be remedied because they understand what Director Nelson is saying and they agree with him.

Directors commented that if the scope was not in the original RFP then staff would need to do a new RFP for this scope of work. They mentioned that they realize it would probably cost money and time that the District does not have.

Director Nelson inquired what the urgency was to approve this amendment.
The Engineering Manager informed the Board of Directors that pre-construction work has begun and staff is trying to move the project forward as fast as possible so the District could take advantage of grant funding.

Director Nelson commented that he has many concerns with this process and he is also not willing to approve a $100,000 contingency. He then mentioned that he is willing to do a small amount of increase for a construction manager for now. He either needs to see a very convincing justification for additional funds or the service needs to be procured again for him to approve the rest. He then inquired as to what Mr. Ferguson, the District's general counsel, thought on this process.
Mr. Ferguson informed the Board of Directors that he has not been involved in this process nor has he been asked to review the contract or consider any of these issues so he cannot speak to whether there is an issue from a federal regulatory perspective or anything else.
Director Nelson commented that another concern of his is that Mr. Ferguson did not review it.

Directors inquired if they could do a partial approval for certain amount funds.
The Engineering Manager informed the Board of Directors that this could be done but inquired what staff is to do

when they run out of funds.

Directors inquired if they could do a conditional approval based on a selection justification memo that would be approved by the Board.

Mr. Hascom commented that the Board package should have included the RFP. That would provide notification to all proposers about the potential scope of work. Then he mentioned that without that notification, there is nothing to compare and it is conspicuously missing.

Director Nelson commented that in the original staff report it mentioned the selection criteria, which included helping staff put together documents to select the design builder. There was no reference to construction management services in the selection criteria.

M/S Nelson / Selsky to approve $90,000 to engage WSC to provide construction management service for the Ladera and Winding Way wells and direct staff to bring back justification for awarding the rest of the amendment amount or recommend to procure this scope of work again.

Mark Emmerson	Aye	✓	Nay		Absent		Abstain		
Jeff Nelson	Aye	✓	Nay		Absent		Abstain		
Ronald Davis	Aye	✓	Nay		Absent		Abstain		
Ron Greenwood	Aye	✓	Nay		Absent		Abstain		
Paul Selsky	Aye	✓	Nay		Absent		Abstain		
Board Totals:	Ayes:	5	Nays:	0	Absent:	0	Abstain:	0	
Passed Unanimously:		✓							

16. FY 25-26 Salary Adjustment and Salary Schedule

Staff recommends that the Board of Directors approve 1) 3% COLA to all employees, 2) 5% pay parity increase to Finance Manager and Production Superintendent positions, 3) FY 25-26 salary schedule, 4) Resolution 08182025-02, A Resolution Adopting the Carmichael Water District Fiscal Year 2025-2026 Salary Schedule, and 5) Resolution 08182025-03 - A Resolution Amending the Districts' Policy 5030 Vacation and Policy 6000 – Health and Welfare Benefits.

The General Manager informed the Board of Directors that the represented employees received a 3 percent COLA but they also received a 2 percent pay parity so they received a total of 5 percent.
Directors commented if the non-represented employees would receive the same increase.
The General Manager informed the Board of Directors that the non-represented employees are all getting a 3 percent COLA as approved in February and the Finance Manager and the Production Superintendent are also getting a 5 percent pay parity.

Directors inquired what the rational for giving a 2 percent pay parity for one group and not the others.
The General Manager informed the Board of Directors that it was because the non-represented employees do not have a pay parity. They already are at the 62.5 percentile and the only two positions that needed an additional pay parity is the Finance Manager and the Production Superintendent.

Directors inquired if this was based on the base salary or total compensation.
The General Manager informed the Board of Directors that it was based of the total compensation.

M/S Selsky / Greenwood to approve staff's recommendation.

Director Nelson commented that the represented employees seem to be getting more of an increase then the non-represented employees and he does not agree with that. He mentioned that he does not care about the 62.5 percentile because that is more of a guideline.

Directors commented that they have to decide if they are going to add a 2 percent parity to the non-represented staff.
Directors commented that the pay parity is to get staff to the 62.5 percentile and if the Board is looking to put staff over the 62.5 percentile that is okay but the Board needs to state that.
Director Nelson commented that it was not called a parity until this meeting so that is part of what is confusing.
The General Manager informed the Board of Directors that the reason it was called differently this meeting is to be more clear. She then mentioned that on page 92, the 3 percent COLA chart shows the total compensation ranges from -7.59 percent to 8.25 percent. The 62.5 percentile is the standard that the Board has set for compensation. In the 5 percent COLA chart, the total compensation ranges puts everyone closer to the 62.5 percentile or above. As part of the negotiation with the represented employees, there was a perception that if a 3 percent COLA for them would still be lower than the non-represented staff and it is amplified if everyone was to receive a 5 percent.

Ms. Dodge commented that she wanted to clarify a few things. First, the 5 percent that the represented employees received is a part of their MOU and has nothing to do with the salary survey. She also mentioned that the wording about pay parity is new and she does not know where it is coming from. She feels that if the represented employees get a 5 percent increase and the rest of staff only get a 3 percent increase it will be unfair. She mentioned that she understands why the Board is confused with all the wording because it is not true. Secondly, the non-represented staff does not feel like the salary survey was done accurately and are working with the General Manager to hopefully look at that again. She then mentioned that she does not understand why the 3 percent was not given to all employees already since it was approved back in February, to be applied July 1st but somehow it is being tied into the salary survey. The COLA should be separate from the salary survey and Bryce Consulting agreed that it should be separate but it keeps being combined.

Directors commented that the salary survey is important for the represented employees because it shows the Board that with the 5 percent increase puts them where they should be. This confirmed for them that what they approved for the represented employees fits the salary survey.

Directors commented that they are having trouble understanding why the MOU controls what they do with the non-represented employees and it should not be tied together.
Directors commented that the problem with that is that there is one work place and there are optics. The question is if all employees are feeling like they are being equitably treated if one group gets one number and the other gets a different number.

Directors commented that they think they made a mistake in combining the process of the salary survey, COLA, and the union negotiation. They also mentioned that they believe that the salary schedule should be applied 6 months after the COLA to avoid these issues. They also think that the optics are very important and they think this is an unforced error on the apart of the Board creating confusion. They then mentioned that the MOU contract is set and done and it does not matter what the salary increase is called. The non-represented employees expected a 3 percent COLA after it was adopted in February to be effective July 1st. For some reason the 3 percent COLA was not applied July 1st.
The General Manager informed the Board of Directors that the COLA was approved in February based on the previous 12 months, which is the previous calendar year. Staff received the number in January from the Western A Cities Index and presented it to the Board for approval in February. It becomes effective in July because that is when we do the budget with the new salary table.

Directors then commented that another issue is the parity and the survey shows that some people are above the 62.5 percentile and that seems to be an issue. They mentioned that the 62.5 percentile is a goal not an absolute.

Director Emmerson motioned to implement the 3 percent COLA to be retroactive to July 1, 2025 and a 2 percent parity to be implemented on January 1, 2026 for all non-represented employees.
Director Nelson seconded the motion.

Directors commented that they do not think the pay parity is meant to be the same for everyone but this motion pushes them to that. This motion also does not include the additional pay parity for the Finance Manager and the Production Superintendent nor does it include the other items up for approval.

Directors commented that they should deal with those items separately.

Director Nelson inquired as to why the 2 percent was being implemented in January instead.
Directors commented that is for the optics to separate the 3 percent and 2 percent.

Director Nelson withdrew his second.

President Greenwood declared **motion failed** as it was not seconded

M/S Davis / Emmerson to approve and implement the 3 percent COLA retroactive to July 1, 2025 and also implement an additional 2 percent for non-represented employees retroactive to July 1, 2025.

Mr. Ferguson wanted to clarify that this motion was to give the non-represented employees a 5 percent increase retroactive to July 1, 2025.
Directors commented that this was correct.

Mark Emmerson	Aye	✓	Nay		Absent		Abstain	
Jeff Nelson	Aye	✓	Nay		Absent		Abstain	
Ronald Davis	Aye	✓	Nay		Absent		Abstain	

Ron Greenwood	Aye	✓	Nay		Absent		Abstain		
Paul Selsky	Aye	✓	Nay		Absent		Abstain		
Board Totals:	Ayes:	5	Nays:	0	Absent:	0	Abstain:	0	
Passed Unanimously:		✓							

M/S Davis / Nelson to approve a 5 percent pay parity increase to the Finance Manager and Production Superintendent position, FY 25-26 salary schedule subject to modification with the Boards previous motion, Resolution 08182025-02 – A Resolution Adopting the Carmichael Water District Fiscal Year 2025-2026 Salary Schedule, and Resolution 08182025-03 – A Resolution Amending the Districts' Policy 5030 Vacation and Policy 6000 – Health and Welfare Benefits.

Directors commented that it should only be a 3 percent increase for the Finance Manager and the Production Superintendent since there is already an additional 2 percent in the previous motion.

Director Davis updated the motion.

M/S Davis / Nelson to approve a 3 percent pay parity increase to the Finance Manager and Production Superintendent position, FY 25-26 salary schedule subject to modification with the Boards previous motion, Resolution 08182025-02 – A Resolution Adopting the Carmichael Water District Fiscal Year 2025-2026 Salary Schedule, and Resolution 08182025-03 – A Resolution Amending the Districts' Policy 5030 Vacation and Policy 6000 – Health and Welfare Benefits.

Mark Emmerson	Aye	✓	Nay		Absent		Abstain		
Jeff Nelson	Aye	✓	Nay		Absent		Abstain		
Ronald Davis	Aye	✓	Nay		Absent		Abstain		
Ron Greenwood	Aye	✓	Nay		Absent		Abstain		
Paul Selsky	Aye	✓	Nay		Absent		Abstain		
Board Totals:	Ayes:	5	Nays:	0	Absent:	0	Abstain:	0	
Passed Unanimously:		✓							

17. ACWA Committee Appointment Consideration

Staff recommends that the Board of Directors provide 1) direction on the committees in which they would like to join and direct staff to submit the Committee Consideration Form to ACWA by September 19, 2025 and 2) direction to Director Greenwood for the Board Officers' Election for President & Vice President and Region Boards for 2026-'27.

Director Emmerson, Greenwood, Nelson, and Selsky requested to be on the same ACWA committees that they were in last year.

Director Davis stated that he will not be requesting to be on the State Legislative Committee because it is too time consuming.

Director Nelson inquired as to how many ACWA Region 4 Board members they had to select.
The General Manager informed the Board of Directors that they need to choose 6 out of the 7 candidates and Director Greenwood will cast the ballot on behalf of Carmichael Water District.

Directors discussed the candidates.

18. Sponsorship for the 2025 Great American River Clean-Up

Staff recommends that the Board of Directors approve the Parkway Protector sponsorship of $1,000 for the 2025 Great American River Clean-Up event or provide direction to staff as necessary.

No comments.

M/S Nelson / Davis to approve staff's recommendation.

Mark Emmerson	Aye	✓	Nay		Absent		Abstain		
Jeff Nelson	Aye	✓	Nay		Absent		Abstain		
Ronald Davis	Aye	✓	Nay		Absent		Abstain		
Ron Greenwood	Aye	✓	Nay		Absent		Abstain		
Paul Selsky	Aye	✓	Nay		Absent		Abstain		

Board Totals:	Ayes:	5	Nays:	0	Absent:	0	Abstain:	0
Passed Unanimously:		✓						

INFORMATIONAL ITEMS

19. August Informational Update for the La Vista Tank and Booster Pump Station Project

Directors commented that it is good news that the project is on track and thanked staff for the update.

20. Meter Replacement And Meter Accuracy Program

Directors inquired as to which vendor we buy the Neptune meters from.
The Distribution Superintendent informed the Board of Directors that they buy the Neptune meters from Ferguson.

Directors inquired staff's opinion on the Kamsrup meters which has the leak detection capabilities.
The Distribution Superintendent informed the Board of Directors that the Neptune meters also have leak detection capabilities.

Directors commented that if there was a federal grant , there would be a "made in America" clause.

Directors inquired if there was a possibility of receiving any type of grant money for this.
The Distribution Superintendent informed the Board of Directors the only grant he saw was for low income housing but he has not looked into it as this is just a proposal. He then mentioned that with the proposed cost is with compatibility with the Neptune 360 software; and if we were to add another software for a new type of meter, it would be expensive.

Directors commented that they are interested in the leak detection capabilities of the meters and consider whether that might help the District. They suggested that staff should pilot a neighborhood where there are leaky pipelines and see if it helps. They mentioned that staff would get their support on this even if it cost more.

Directors then mentioned that staff should make sure the leak detection is acoustic. They should have some kind of a sensor that listens and then software that triangulates from all the meters where the sound is coming from.

Directors inquired if staff is involved with a cooperative purchasing agreement with other Districts.
The General Manager informed the Board of Directors that Citrus Heights Water District (CHWD) has been looking into doing a cooperative purchasing agreement for meter purchasing but nothing has come from it yet.
Directors suggested that staff conducts an informal survey of other large water agencies in the area to see what meters they use. They mentioned that they have approached a couple of vendors who are favorable to cooperative purchasing agreements because of the large volume sales.
The General Manager informed the Board of Directors that the District does participate in a cooperative purchasing agreement for chemicals used at the water treatment plant. Being in this cooperative purchasing agreement has benefitted the District. CHWD was spearheading the discussion for the region specifically for pipes and meters. One issue is that bigger projects are competitively bid out and the contractors are usually responsible for buying all parts and supplies. She then mentioned that issues like this are still being discussed and they are working to try to resolve it.

Directors inquired if staff would be replacing 500 meters per year.
The General Manager informed the Board of Directors that staff typically buy 500 meters per year and the new meters will be phased in.

21. La Sierra Landscaping Plan and Perimeter Wall Update

The Engineering Manager presented the new landscaping plan with a drawing on the whiteboard. The Board of Directors did not have any comments or recommendations for the wall.

22. Information for Electric Building Sign

Directors commented that most members of the Board are supportive of getting the electric building sign and they requested more information from staff.

Directors inquired if rotating messages and frequency are compatible with these electric signs.
The Engineering Manager informed the Board of Directors that it could cycle through messages.

Directors inquired if we could sell ads to third parties.
The Engineering Manager informed the Board of Directors that he was uncertain and there would be county requirements for code compliance.

Mr. Hanscom commented that there are two of them around this area. One is at Carmichael Park, and that's in a section where there's traffic flows smoothly and there are no commercial businesses. The second is for Fair Oaks Water District, on Fair Oaks Boulevard south of Madison, in front of the library. Another section of the road that has

smooth flowing traffic. Compare that with CWD's location, there are multiple businesses where people are constantly stopping to turn into with a close-by traffic signal. He is concerned if drivers take their eyes off the road then there could be a potential accident. He is concerned about liability issues for the District.

Directors commented that he has talked to staff at Supervisor Desmond's office, and it is really heavily regulated. The County inspect and control signage and will not allow vision impairments.
Mr. Hanscom commented that while vision impairments may not be an issue, people are going to be taking their eyes off what they should be doing, which is driving. He commented that he is concerned and he believes it is a liability issue.
Directors commented that this is a fair concern and they should add this to their list and should be a question to our insurance carrier.

23. Auction sale of surplus vehicles and equipment
No comments.

COMMITTEE REPORTS

24. Regional Water Authority
Director Greenwood Reports Out.

Director Greenwood reported that there was an Executive Committee meeting on July 22nd. He mentioned that one of the biggest action items they had was for the 2030 Strategic Plan and there was a presentation on this matter. He mentioned that they also discussed and reviewed several legislative bills.

25. Sacramento Ground Water Authority
Director Selsky Reports Out.

Director Selsky reported that the SGA meeting was last Tuesday (8/14/2025) and the meetings are held every other month. He mentioned that they approved a task orders for several consultants, West Yost, Woodard Kern and GEI. Staff also had a cost of living adjustment approved of 1.8%. Trevor Joseph also gave a presentation on the Water Bank, similar to the one he gave to CWD. He mentioned that the agenda included and item for his ad hoc committee which he provided an update to the SGA board and the recommendation from the committee was to follow the 53 percent prior banked for the SGA board to consider.

26. Other Committee Report
Directors Report Out.

Director Nelson reported that he attended the Water Forum meeting with a presentation to the CWD Board in September. He wants Mr. Ferguson to review the agreement and mentioned that the City of Sacramento and Sacramento County were pushing back on some of the language that was in the water form and the purveyors.

STAFF REPORTS:

27. General Manager and District Activity Report – July 2025
Discussed with the Board.

Directors asked Mr. Ferguson to review the Water Forum Agreement particularly where CWD is making commitments and make sure that we understand what we are committing to.

28. Director's Expense Reimbursement Summary – July 2025
No comments.

GENERAL CORRESPONDENCE/INFORMATION:

29. Director's Written and/or Oral Reports

ADJOURNMENT: President Greenwood adjourned the meeting at: **9:22 p.m.**

Ron Greenwood, Board President **Cathy Lee, Board Secretary**

This page intentionally left blank.

CARMICHAEL WATER DISTRICT

Special Board Meeting
Thursday, September 4, 2025, 3:00 p.m.

Carmichael Water District Board Room
7837 Fair Oaks Boulevard
Carmichael, CA 95608

MINUTES

The Carmichael Water District Board of Directors met in Special Session this 4th day of September at 3:00 p.m.

ATTENDANCE:

Directors: Ronald Davis, Mark Emmerson, Paul Selsky, Jeff Nelson, and Ron Greenwood

Staff: **Cathy Lee, Gaby Padilla**

Public: **Zero (0) Members of the Public**

CALL TO ORDER: President Greenwood called the meeting to order at: **3:00 p.m.**

PUBLIC COMMENT:

1. **Public Comment**
   No comments.

ANNOUNCED CLOSED SESSION AND ADJOURN OPEN SESSION TO CLOSED SESSION: 3:01 p.m.

CLOSED SESSION

2. **LABOR NEGOTIATION – INVOLVING THE GENERAL MANAGER (Government Code section 54957.6)**

ADJOURNED CLOSED SESSION AND OPENED REGULAR SESSION: 4:35 p.m.

REPORT OUT OF CLOSED SESSION: The Board gave direction to the Ad Hoc committee.

ADJOURNMENT: President Greenwood adjourned the meeting at: **4:35 p.m.**

Ron Greenwood, Board President **Cathy Lee, Board Secretary**

This page intentionally left blank.

CARMICHAEL WATER DISTRICT
MONTHLY EXPENDITURES REPORT
For the period July 1 to July 31, 2025

Check #	Check date	Payee	Description: "Division: Department - Object - detail data"	Amount
77279	7/2/2025	Koch and Koch	CIP - La Vista Tank and pump station	$ 326,446.09
77280	7/3/2025	***VOID***	Printing error	-
77281	7/3/2025	Bay Alarm Company	Production: WTP Ops - Security	430.40
77282	7/3/2025	Best Cleaning Team LLC	Production: WTP Ops, Admin: General Admin - Facility maintenance - Janitorial	1,500.00
77283	7/3/2025	Brower Mechanical Inc	Admin svcs: General admin - Facility expense, Prod: WTP- Systems maint, CIP - District Office	25,882.00
77284	7/3/2025	BSK Associates	Production: WTP Ops, Well Ops - Water quality	2,398.00
77285	7/3/2025	Carbon Health Medical Group of CA	Admin svcs: HR - Exams and screenings	744.00
77286	7/3/2025	Corrpro Companies Inc	Prod: Well Ops - Repairs and maintenance	1,090.00
77287	7/3/2025	Ferguson Waterworks	Inventory	15,828.48
77288	7/3/2025	Fire code Safety Equipment Inc	Admin svcs: General admin - Facility expense	1,603.97
77289	7/3/2025	Fiserv Inc	Admin svcs: Finance: Customer Service - Payment processing fees	157.52
77290	7/3/2025	Gavrilov & Brooks Law	Admin svcs: HR - Legal litigation	14,220.00
77291	7/3/2025	Grainger	Production: WTP - Systems maintenance	130.73
77292	7/3/2025	Harris Industrial Gases	Distribution: Admin - Shop supplies	561.32
77293	7/3/2025	Hildebrand Consulting LLC	Admin svcs: GM - Studies/Contracts - Professional services for Rate study	23,250.00
77294	7/3/2025	Incompli Inc	CIP - La Vista Tank and pump station	2,300.00
77295	7/3/2025	Liebert Cassidy Whitmore	Admin svcs: HR - Personnel legal	6,480.00
77296	7/3/2025	Mid Pacific Engineering Inc	CIP - La Vista Tank and pump station	13,437.10
77297	7/3/2025	**VOID**	Printing error	-
77298	7/3/2025	Network Design Associates Inc	Admin svcs: IT - Contract Services	1,190.00
77299	7/3/2025	Nicholas Installations	Admin svcs: General admin - Facility maintenance	1,090.00
77300	7/3/2025	Olin corp	Production: WTP Ops - Chemicals	14,477.49
77301	7/3/2025	Pitney Bowes Global Financial Services	Admin svcs: General admin - Equipment rental	148.59
77302	7/3/2025	Quest UCCS Synectic Technologies	Admin svcs: IT - Telecommunication	253.35
77303	7/3/2025	Quill.com	Admin svcs: Gen admin - Office supplies	91.65
77304	7/3/2025	Ron Greenwood	Admin svcs: Board- Directors' travel and meetings	323.31
77305	7/3/2025	SMUD	Production: Well Ops and WTP Ops - Power	113,878.89
77306	7/3/2025	Stevenson, Caitlin	Admin: Water Efficiency - Program expenses - Turf replacement	796.00
77307	7/3/2025	Thiele Joseph	Admin: Water Efficiency - Program expenses - Turf replacement	2,000.00
77308	7/3/2025	US Bank	See "Credit card expenses" below	
77309	7/3/2025	Ultra Truck Works Inc	CIP - Vehicles	2,418.40
77310	7/3/2025	Underwood Timothy	Distribution: Admin - Training, Certificate, Travel, Meeting	75.00
77311	7/3/2025	Univar USA Inc	Production: WTP Chemicals	8,711.21
77312	7/3/2025	USA BlueBook	Production: WTP Ops - Systems maintenance, Chemicals	1,744.92
77313	7/3/2025	Water Systems Consulting Inc	CIP - Ladera Well, Winding Way	3,179.40

CARMICHAEL WATER DISTRICT
MONTHLY EXPENDITURES REPORT
For the period July 1 to July 31, 2025

Check #	Check date	Payee	Description: "Division: Department - Object - detail data"	Amount
77314	7/9/2025	Brower Mechanical Inc	CIP - District Office (3 Heat Pumps: 7.5, 4.0, 2.5 ton)	29,895.00
77315	7/10/2025	All Seasons North Rooofing & Weatherproofing	Admin svcs: General admin - Facilties maintenance	9,924.00
77316	7/10/2025	Amazon Capital Services Inc	Admin svcs: Gen admin - Office supplies, Distribution: Admin - Safety	120.20
77317	7/10/2025	Bryce Consulting	Admin svcs: GM - Studies/Contracts - Professional services for Compensation Study	1,805.00
77318	7/10/2025	BSK Associates	Production: WTP Operations - Water quality	210.00
77319	7/10/2025	Buckmaster Office Solutions	Admin svcs: IT - Equipment repairs and maintenance	396.72
77320	7/10/2025	California Surveying and Drafting Supply	Admin svcs: Engineering - Software and licensing - GIS monthly software fees	150.00
77321	7/10/2025	Concrete Equipment Services Inc	Distribution: Capital assets - Field equipment	10,451.75
77322	7/10/2025	Dugan Management and Engineering Inc	CIP - Claremont MLRP	32,511.94
77323	7/10/2025	Employee Relations Inc	Admin svcs: HR - Exams and Screening	328.85
77324	7/10/2025	GEI Consultants Inc	CIP - Ladera Well, Winding Way, Barret Rd Wells, Dewey Well demo	20,435.00
77325	7/10/2025	Grainger	Production: Admin - Safety	56.28
77326	7/10/2025	Lightfoot Mobile Truck Emmissions	Distribution: Admin - Licenses, permits, fees (CARB emission test)	250.00
77327	7/10/2025	Murphy Austin Adams Schoenfeld LLP	CIP - Ladera way well, CIP - Winding Way well	475.00
77328	7/10/2025	Network Design Associates Inc	Admin svcs: IT - Network monitoring, Contract services	595.00
77329	7/10/2025	New Image Landscape Company	Admin svcs: Gen admin, Prod: WTP Ops - Facility maintenance and expense	1,386.00
77330	7/10/2025	Normac Inc	Admin svcs: Water Efficiency - Conservation supplies	773.69
77331	7/10/2025	Pace Supply Corp	Inventory	851.26
77332	7/10/2025	Patron Trucking Inc	Distribution: Transmission and distribution - Road restoration expense	1,937.83
77333	7/10/2025	PG&E	Production: WTP Ops - Power	17.60
77334	7/10/2025	Quill.com	Admin svcs: Gen admin	902.98
77335	7/10/2025	Sacramento County Utilities	Production: WTP Operations - Utilities	89.40
77336	7/10/2025	SMUD	Admin svcs: General admin - Facility expenses - Power	854.62
77337	7/10/2025	Toppel Consulting Inc	CIP - La Vista Tank and pump station	28,352.00
77338	7/10/2025	USA BlueBook	Distribution: Transmission and distribution - Infrastructure repair	278.89
77339	7/10/2025	Westamerica Bank	Petty Cash - Admin svcs: Water Efficiency - Outreach events (Naturefest)	25.07
77340	7/10/2025	WorkSmart Automation Inc	Production: WTP Operations - Contract services - SCADA	450.00
77341	7/22/2025	FedEx	Admin svcs: General Admin-Postage/Delivery Service	103.93
77342	7/22/2025	Ferguson Waterworks	Inventory	19,998.40
77343	7/22/2025	Filmtec Corp. (formerly Evoqua)	Production: WTP Ops - Systems maintentenance	230.59
77344	7/22/2025	Frisch Engineering Inc.	CIP - Garfield generator and electrical improvements	3,420.00
77345	7/22/2025	GEI Consultants, Inc.	CIP - ASR Water Rights Petition	16,514.35
77346	7/22/2025	Home Depot	Admin: General admin - Office supplies, Facility maint, Prod: Admin, Distrib: Admin - Shop supplies	2,244.51
77347	7/22/2025	Koch & Koch, Inc	CIP - La Vista Tank and pump station	147,877.00
77348	7/22/2025	Mid Pacific Engineering, Inc	CIP - La Vista Tank and pump station	6,636.82
77349	7/22/2025	Norcal Power Services	Production: WTP Operations - Systems maintenance	8,800.00
77350	7/22/2025	Pace Supply Corp.	Inventory, Admin: General admin - Facility maintenance	60.49
77351	7/22/2025	Royal Electric Company	CIP - Garfield generator and electrical improvements	105,450.00
77352	7/22/2025	Sierra National Construction	CIP - La Sierra Well	337,250.00
77353	7/22/2025	Verizon Wireless	Admin svcs: Information technology, Production: WTP Operations - Telecommunications	732.92

CARMICHAEL WATER DISTRICT
MONTHLY EXPENDITURES REPORT
For the period July 1 to July 31, 2025

Check #	Check date	Payee	Description: "Division: Department - Object - detail data"	Amount
77354	7/22/2025	Water Systems Consulting, Inc	CIP - Winding Way Well, CIP - Ladera ASR Well	11,850.26
77355	7/22/2025	Well Industries Inc DBA Nort	CIP - Winding Way Well	50,350.00
77356	7/24/2025	ACWA/JPIA (Dental, vision, EAP)	All Depts: Benefits - Dental, vision, EAP - July	2,963.33
77357	7/24/2025	Amazon Capital Services Inc	Admin: General admin - Office supplies, Distribution: Admin - Safety, Tools	637.22
77358	7/24/2025	Bay Alarm Company	Admin svcs: General admin - Facility expense, Production: WTP Ops - Security	1,212.18
77359	7/24/2025	BSK Associates	Production: WTP Operations - Water quality	460.00
77360	7/24/2025	California Surveying and Drafting Supply	Admin svcs: Engineering - Software and licensing - GIS monthly software fees	150.00
77361	7/24/2025	Carmichael Tire & Auto Repair	Distribution: Admin - Vehicle repairs and maintenance	628.76
77362	7/24/2025	Clark Pest Control	Admin svcs: General admin - Facility expense	142.00
77363	7/24/2025	Comcast	Admin svcs: IT, Production: WTP Ops - Telecommunication	1,661.82
77364	7/24/2025	Grainger	Production: Admin - Office supplies	40.63
77365	7/24/2025	Hunt & Sons, Inc.	Distribution: Administration - Fuel	5,209.30
77366	7/24/2025	Idexx Distribution, Inc.	Production: Admin - Lab chemicals and supplies	890.50
77367	7/24/2025	New Answernet Inc	Admin svcs: IT - Telecommunications - Answering services	200.00
77368	7/24/2025	Patricia L Rydelius	Customer Refund	53.88
77369	7/24/2025	Quill.com	Admin svcs: General admin- Office supplies	108.64
77370	7/24/2025	Richardson, Cameron	Production: Admin - Training, certification, travel and meetings	60.00
77371	7/24/2025	Sac Ice	Distribution: Admin- Facilities Maintenance	180.00
77372	7/24/2025	Sacramento County Utilities	Admin: General admin - Facility expense, Production: WTP Operations - Utilities	733.65
77373	7/24/2025	VanGundy, Sivia	Admin: Water Efficiency - Program expenses - Turf replacement	1,670.00
77374	7/24/2025	Waste Management of Sacramento	Admin svcs: General admin, Production: WTP Ops - Facility expenses: Utilities	692.57
77375	7/24/2025	West Coast Energy Systems, LLC	CIP - La Vista Tank and pump station	1,198.00
			EFT	
99999	7/1/2025	CalPERS (Pension contribution)	Pension Contribution (ER and EE) Pay period 5.26.25 to 6.8.25	19,843.94
99999	7/10/2025	CalPERS 457 Plan	457 Payment for the pay period 6.23.25 to 7.6.25	5,448.07
99999	7/10/2025	CalPERS (Pension contribution)	Pension Contribution (ER and EE) Pay period 6.9.25 to 6.22.25	20,040.45
35410	7/15/2025	SMUD	Production: Well Ops - Power	2,360.83
35411	7/15/2025	SMUD	Production: Well Ops and WTP Ops - Power	41,290.31
35412	7/15/2025	SMUD	Production: Well Ops and WTP Ops - Power	39,586.89
99999	7/25/2025	ADP	Implementation/Paychex conversion services	1,828.75
99999	7/29/2025	CalPERS 457 Plan	457 Payment for the pay period 7.7.25 to to 7.20.25	5,545.28
35523	7/31/2025	Pitney Bowes	Admin svcs: Gen admin - Postage	200.00
35524	7/31/2025	Mutual of Omaha	All Depts: Benefits -July LTD and life insurance premiums	1,544.64
35525	7/31/2025	CalPERS (Medical)	All Depts: Benefits - July Medical insurance premium	72,426.63
35526	7/31/2025	CalPERS (Pension contribution)	Pension Contribution (ER and EE) Pay period 6.23.25 to 7.6.25	20,389.54
35527	7/31/2025	CalPERS (Pension contribution)	Pension expense - Fiscal year 2025-26 UAAL Annual contribution	240,677.00
99999	7/31/2025	SMUD	Production: Well Ops - Power	38,336.36

CARMICHAEL WATER DISTRICT
MONTHLY EXPENDITURES REPORT
For the period July 1 to July 31, 2025

Check #	Check date	Payee	Description: "Division: Department - Object - detail data"		Amount
			Credit Card Expenses		
77308	7/3/2025	US Bank		1,714.90	
		Safelite Auto Glass	Production: Admin - Vehicle repairs and maintenance		371.94
		Safelite Auto Glass	Production: Admin - Vehicle maintenance		173.60
		RF Specialties of CA	Production: Well Ops - Repairs and maintenance - Willow Park well		412.35
		Costco	Admin svcs: HR - Employee recognition		15.19
		Safeway	Admin svcs: HR - Employee recognition		33.98
		Noah's New York Bagels	Admin svcs: HR - Employee recognition		37.98
		Target	Admin svcs: General admin - Office supplies		129.29
		Togo's	Admin svcs: HR -Training, Certifications, Travel, Meeting		75.27
		Verizon	Admin svcs: IT - Telecommunication		245.31
		Super Clean Car Wash	Production: Admin - Vehicle repairs and maintenance		20.99
		NeoGov (GovernmentJobs.com)	Admin svcs: HR - Employment advertising		199.00
		Check register total			**1,972,007.24**
		Payroll	Employee and Director pay, payroll taxes, payroll processing fees (Pay dates: 7.9.25, 7.23.25)		239,283.35
		Total cash expenditures			**$ 2,211,290.59**
			*********INFORMATIONAL*********		
			Bond expenditures to be reimbursed to the General Fund from the Bond Proceeds account		
77279	7/2/2025	Koch and Koch	CIP- La Vista Tank and pump station		$ 326,446.09
77294	7/3/2025	Incompli Inc	CIP - La Vista Tank and pump station		2,300.00
77296	7/3/2025	Mid Pacific Engineering Inc	CIP - La Vista Tank and pump station		13,437.10
77337	7/10/2025	Toppel Consulting Inc	CIP - La Vista Tank and pump station		28,352.00
77347	7/22/2025	Koch & Koch, Inc	CIP - La Vista Tank and pump station		147,877.00
77348	7/22/2025	Mid Pacific Engineering, Inc	CIP - La Vista Tank and pump station		6,636.82
77375	7/24/2025	West Coast Energy Systems, L	CIP - La Vista Tank and pump station		1,198.00
		Total Bond expenditures			**$ 526,247.01**

Topic: Directors Expenses and Reimbursements
Date: September 2, 2025
Item For: Consent

Submitted By: Gaby Padilla, Administrative Specialist

BACKGROUND
Section 9060.24 of Directors' Policy 9060 – Directors Compensation and Expense Reimbursement states that "Requests for compensation for attending authorized meetings shall be submitted within 30 days after the occurrence of the meeting". Section 9060.52 also states that "A Director must substantiate all expenses on an expense report with the appropriate documentation attached within 60 days of incurring or paying the expense. An expense report submitted after the 60 days will only be paid if approved by the Board at a regular meeting".

SUMMARY/DISCUSSION
Director Greenwood submitted two meeting compensation requests for meetings that were over 30 days ago as follows:

Date	Meeting
June 18, 2025	CWD Meeting with General Manager to discuss the General Manager's Contract
June 19, 2025	CWD Meeting for signatures

FISCAL IMPACT
None.

RECOMMENDATION
Staff recommends that the Board of Directors approve Director Greenwood's request for the meeting compensation and direct staff to process the requests accordingly.

This page intentionally left blank.

Topic: WaterSMART Planning and Project Design Grants for Fiscal Year 2023 and Fiscal Year 2024, Funding Opportunity No. R23AS00109

Date: September 5, 2025

Item For: Consent

Submitted By: Greg Norris, Engineering Manager

BACKGROUND

The Bureau of Reclamation's (BOR) WaterSMART (Sustain and Manage America's Resources for Tomorrow) Program provides a framework for Federal leadership and assistance to stretch and secure water supplies for future generations. Through WaterSMART, BOR leverages Federal and non-Federal funding to work cooperatively with States, Tribes, and local entities as they plan for and implement actions to increase water supply sustainability through investments in existing infrastructure.

District staff submitted a project proposal with a preliminary application to the WaterSMART Program in March 2024, seeking funds for increased water conservation using distribution system pressure management and replacing old water mains that is prone to leaks and failure.

SUMMARY/DISCUSSION

On December 19, 2024, the District received a letter from BOR that the project proposal submitted under the subject federal program and funding opportunity had been accepted and is being considered for funding in the amount of $335,000. Then in March of 2025, Reclamation began reviewing the District's application information for completeness. In April 2025, Reclamation stopped their review due to Federal staffing changes, but then resumed their review in June 2025.

As such, the Federal agency is now requesting the final necessary forms and documentation to move forward with awarding the funds to the District, which includes a Resolution by the District's Board. A draft Resolution is included as Attachment 1 to this memo.

FISCAL IMPACT

The total estimated cost of the project is $670,000. It is anticipated that the CWD will need to contribute approximately $335,000 to the project and WaterSMART program would pay for 50 percent of the project or about $335,000. There are no funds in the CIP budget allocated to the subject project due to the uncertain timing of the project award by BOR. It is anticipated that no funds will be needed until which time a budget amendment can be approved during a mid-year budget adjustment.

RECOMMENDATION

District staff recommends the Board of Directors approve Resolution 09152025-01 – A Resolution Committing the Carmichael Water District to the Financial and Legal Obligations Associated with the Receipt of a Financial Assistance Award under Bureau of Reclamation Notice of Funding Opportunity No. R23AS00109 to further the application and approval process for the specified Grant.

ATTACHMENT(S)

1. Resolution 09152025-01 – A Resolution Committing the Carmichael Water District to the Financial and Legal Obligations Associated with the Receipt of a Financial Assistance Award Under Bureau of Reclamation Notice of Funding Opportunity No. R23AS00109
2. Reclamation Letter December 19, 2024

CARMICHAEL WATER DISTRICT

RESOLUTION 09152025-01
A RESOLUTION COMMITTING THE CARMICHAEL WATER DISTRICT TO THE FINANCIAL AND LEGAL OBLIGATIONS ASSOCIATED WITH THE RECEIPT OF A FINANCIAL ASSISTANCE AWARD UNDER BUREAU OF RECLAMATION NOTICE OF FUNDING OPPORTUNITY No. R23AS00109

WHEREAS, the District intends to leverage money and resources by cost sharing with Reclamation on Drought Resiliency Projects that will increase the reliability of water supplies; improve water management; and provide benefits for fish, wildlife, and the environment to mitigate impacts caused by drought; and

WHEREAS, the District plans to complete the planning and develop of the preliminary design for new main water lines; and

WHEREAS, the District plans to perform hydraulic analysis to increase water management by collecting data leading to a Pressure Zone Design with updated Operation Plan; and

WHEREAS, the District continues to proactively identify resiliency projects through drought planning, in advance of a crisis, such that the District preemptive drought mitigation efforts are far more cost effective than an emergency response; and

WHEREAS, the District is committed to fulfilling the financial and legal obligations and meeting the established deadlines associated with the receipt of a financial assistance award under Bureau of Reclamation Notice of Funding Opportunity No. R23AS00109.

NOW, THEREFORE, BE IT RESOLVED, by the Carmichael Water District Board of Directors as follows:

1. Cathy Lee, General Manager is hereby authorized the legal authority to enter into an agreement on behalf of Carmichael Water District with the Bureau of Reclamation for the WaterSMART Notification of Funding Opportunity (NOFO) No. R23AS00109.

2. The Board of Directors has reviewed and supports the Carmichael Water District application for submittal.

3. The Carmichael Water District has the capability to provide the amount of funding contributions specified in the funding plan of $670,000.

4. Carmichael Water District will work with Reclamation to meet established deadlines for entering into a grant or cooperative agreement.

PASSED AND ADOPTED by the Board of Directors by the following vote:

Mark Emmerson	Aye	☐	Nay	☐	Absent	☐	Abstain ☐
Jeff Nelson	Aye	☐	Nay	☐	Absent	☐	Abstain ☐
Ron Greenwood	Aye	☐	Nay	☐	Absent	☐	Abstain ☐
Paul Selsky	Aye	☐	Nay	☐	Absent	☐	Abstain ☐
Ronald Davis	Aye	☐	Nay	☐	Absent	☐	Abstain ☐
Board Totals:	**Ayes:**	☐	**Nays:**	☐	**Absent:**	☐	**Abstain:** ☐

Passed Unanimously: ☐
Motion Carried: ☐
Motion Not Carried: ☐

Signed after its passage this 15th day of September 2025:

_____ **ATTEST:** _____

Ron Greenwood, President
Board of Directors

Cathy Lee, Secretary

ATTACHMENT 2

United States Department of the Interior

BUREAU OF RECLAMATION
125 South State Street, Room 8100
Salt Lake City, UT 84138-1102

IN REPLY REFER TO:
UC-825
1.3.11

December 19, 2024

VIA ELECTRONIC MAIL ONLY

Carmichael Water District
Attn: Greg Norris
7837 Fair Oaks Ave
Carmichael, CA 95608

Subject: Funding Opportunity No. R23AS00109 – WaterSMART Planning and Project Design Grants for Fiscal Year 2024 – GRANT14153259 Application Review Status, Your Application Titled, "Mainline Upgrade and Improved Pressure Management" (PDG-018)

Dear Gre Norris:

The Bureau of Reclamation is pleased to inform you that your application was among those receiving the highest ratings and is now being considered for award of a financial assistance agreement. Your application included a request for $335,000 to complete your project titled, "Mainline Upgrade and Improved Pressure Management." Reclamation anticipates awarding Federal funds in the amount of $335,000 for your proposed project.

In working with you to develop your financial assistance agreement, Reclamation will closely review the activities outlined in your proposal to ensure that all activities are eligible for funding and that the proposed costs are allowable under financial assistance regulations and the Notice of Funding Opportunity (NOFO). If some costs or activities are determined to be ineligible or unallowable, Reclamation will work with you to refine the scope of work and budget for the project. Please be advised that revisions to the scope of the project identified in your application can be made only after Reclamation determines that revisions would not impact the overall ranking or the expected benefits of the project. In addition, Reclamation must have sufficient evidence prior to award that non-Federal cost share will be available. The final funding amount may be adjusted if necessary.

All projects being considered for award of funding are required to comply with all Federal environmental and cultural resource requirements, including the National Environmental Policy Act, Endangered Species Act, Clean Water Act, and the National Historic Preservation Act. Ground-disturbing activities of any type, including fieldwork, monitoring or other activities may not occur until Reclamation has determined that all environmental and cultural resource compliance is complete and a Notice to Proceed is issued by a Reclamation Grants Officer.

In addition, please be advised that as stated in Section F.6 of the NOFO, Reclamation intends to post copies of successful Planning and Project Design Grants applications as examples on Reclamation's website. While this generally does not raise any issues, it is prudent to provide successful grant applicants with an opportunity to redact any sensitive information from their proposals prior to posting them on Reclamation's website. As a rule, the SF-424s are removed; however, if there are any other items you would like redacted, please contact Ms. Michelle Wolford, Program Analyst, at mwolford@usbr.gov, by Friday, January 17, 2025. Should we not hear from you by this date we will assume that there are no objections to posting the full application.

A post-selection webinar to discuss the process for development of financial assistance agreements and next steps with you and all other new recipients will be held on January 8, 2025, at 11:00 a.m. MT. Please join the webinar by clicking here to join the Microsoft Live Event. It is anticipated that you will be notified of the grants management specialist assigned to your agreement in the next two weeks and that your agreement should be awarded in May 2025 or earlier. In the meantime, if you have any questions regarding the process or your agreement, please contact Ms. Karen Shubert, Reclamation Grants Officer, at 801-524-3663 or at kshubert@usbr.gov. Thank you for your interest and participation in the WaterSMART Program. We look forward to working with you.

Sincerely,

/s/ Karen Shubert
Grants Officer

ec: gregn@carmichaelwd.org

Topic: CalPERS Medical Benefits Resolutions – Contribution Change for 2026

Date: September 2, 2025

Item For: Consent

Submitted By: Gaby Padilla, Administrative Specialist

BACKGROUND

In August 2025, the Board modified the employer contribution for CalPERS medical benefits based on the salary survey and approved revisions to District Policy 6000 – Health and Welfare Benefits for both represented and non-represented employees. Beginning in December 2025 for premiums applied to January 2026, and in each subsequent year, the District will contribute monthly ninety-five percent (95%) of the average premium costs of an eligible employee's elected medical coverage from the following CalPERS Health Sacramento Area Region plans: Blue Shield Access + HMO, Blue Shield Trio HMO, Kaiser Permanente, PERS Gold, and Western Health Advantage, inclusive of the minimum statutory PEMHCA contribution. The varied annual contributions require the District to notify CalPERS annually via a Board approved resolution to inform and update its records and billing.

SUMMARY/DISCUSSION

With the updated District Policy 6000 – Health and Welfare Benefits and the release of the 2026 CalPERS health premiums, the new District maximum contribution for medical insurance for full-time employees are as follows:

Employee Only	Employee +1	Employee +2 (Family)
$1,089	$2,177	$2,830

These changes necessitate updates into the CalPERS system, which requires resolutions to be approved by the Board at least two months in advance in order to be effective on January 1, 2026. The resolutions cover both current employees and retirees (annuitants) with same contributions for all employees and retirees.

FISCAL IMPACT

The FY 25-26 Budget included sufficient amount for employees benefits.

RECOMMENDATION

Staff recommends that the Board of Directors:

1. Approve Resolution 09152025-02 – A Resolution Fixing The Employer Contribution Under the Public Employees' Medical and Hospital Care Act at an Unequal Amount for Employees and Annuitants With Respect to a Recognized Employee Organization 001 Non-Represented Employees, and
2. Approve Resolution 09152025-03 – A Resolution Fixing The Employer Contribution Under the Public Employees' Medical and Hospital Care Act at an Equal Amount for Employees and Annuitants With Respect to a Recognized Employee Organization 002 Represented and Exempt Employees

ATTACHMENT(S)

1. Resolution 09152025-02 – A Resolution Fixing The Employer Contribution Under the Public Employees' Medical and Hospital Care Act at an Unequal Amount for Employees and Annuitants With Respect to a Recognized Employee Organization 001 Non-Represented Employees.
2. Resolution 09152025-03 – A Resolution Fixing The Employer Contribution Under the Public Employees' Medical and Hospital Care Act at an Equal Amount for Employees and Annuitants With Respect to a Recognized Employee Organization 002 Represented and Exempt Employees.

RESOLUTION NO. 09152025-02
FIXING THE EMPLOYER CONTRIBUTION
UNDER THE PUBLIC EMPLOYEES' MEDICAL AND HOSPITAL CARE ACT
AT AN UNEQUAL AMOUNT FOR EMPLOYEES AND ANNUITANTS
WITH RESPECT TO A RECOGNIZED EMPLOYEE ORGANIZATION
001 NON-REPRESENTED EMPLOYEES

WHEREAS, (1) Carmichael Water District is a contracting agency under Government Code Section 22920 and subject to the Public Employees' Medical and Hospital Care Act (the "Act") for participation by members of Non-Represented Employees; and

WHEREAS, (2) Government Code Section 22892(a) provides that a contracting agency subject to Act shall fix the amount of the employer contribution by resolution; and

WHEREAS, (3) Government Code Section 22892(b) provides that the employer contribution shall be an equal amount for both employees and annuitants, but may not be less than the amount prescribed by Section 22892(b) of the Act; and

WHEREAS, (4) Government Code Section 22892(c) provides that, notwithstanding Section 22892(b), a contracting agency may establish a lesser monthly employer contribution for annuitants than for employees, provided that the monthly employer contribution for annuitants is annually increased to equal an amount not less than the number of years the contracting agency has been subject to this subdivision multiplied by five percent of the current monthly employer contribution for employees, until the time that the employer contribution for annuitants equals the employer contribution paid for employees; now, therefore be it

RESOLVED, (a) That the employer contribution for each employee shall be the amount necessary to pay the full cost of his/her enrollment, including the enrollment of family members in a health benefits plan up to a maximum of $1089 per month with respect to employee enrolled for self alone, $2,177 per month for employee enrolled for self and one family member, and $2,830 per month for employee enrolled for self and two or more family members, plus administrative fees and Contingency Reserve Fund assessments; and be it further

RESOLVED, (b) That the employer contribution for each annuitant shall be the amount necessary to pay the full cost of his/her enrollment, including the enrollment of family members, in a health benefits plan up to a maximum of the amount prescribed by Government Code Section 22892(c), plus administrative fees and Contingency Reserve Fund assessments; and be it further

RESOLVED, (c) That the monthly employer contribution for annuitants is annually increased to

equal an amount not less than the number of years the contracting agency has been subject to this subdivision multiplied by five percent of the current monthly employer contribution for employees, until the time that the employer contribution for annuitants equals the employer contribution paid for employees; and be it further

RESOLVED, (d) That this annual adjustment to the minimum monthly employer contribution for annuitants shall not exceed one hundred dollars ($100.00); and be it further

RESOLVED, (e) Carmichael Water District has fully complied with any and all applicable provisions of Government Code Section 7507 in electing the benefits set forth above; and be it further

RESOLVED, (f) That the participation of the employees and annuitants of Carmichael Water District shall be subject to determination of its status as an "agency or instrumentality of the state or political subdivision of a State" that is eligible to participate in a governmental plan within the meaning of Section 414(d) of the Internal Revenue Code, upon publication of final Regulations pursuant to such Section. If it is determined that Carmichael Water District would not qualify as an agency or instrumentality of the state or political subdivision of a State under such final Regulations, the California Public Employees' Retirement System may be obligated, and reserves the right to terminate the health coverage of all participants of the employer; and be it further

RESOLVED, (g) That the executive body appoint and direct, and it does hereby appoint and direct, Cathy Lee, General Manager to file with the Board a verified copy of this resolution, and to perform on behalf of Carmichael Water District all functions required of it under the Act; and be it further

RESOLVED, (h) That coverage under the Act be effective on January 1, 2026.

Adopted at a regular meeting of the Carmichael Water District Board of Directors at Carmichael, this 15th day of September, 2025.

Signed: _____
Ron Greenwood, President, Board of Directors

Attest: _____
Cathy Lee, Secretary/General Manager

RESOLUTION NO. 09152025-03
FIXING THE EMPLOYER CONTRIBUTION
UNDER THE PUBLIC EMPLOYEES' MEDICAL AND HOSPITAL CARE ACT
AT AN EQUAL AMOUNT FOR EMPLOYEES AND ANNUITANTS
WITH RESPECT TO A RECOGNIZED EMPLOYEE ORGANIZATION
002 REPRESENTED AND EXEMPT EMPLOYEES

WHEREAS, (1) Carmichael Water District is a contracting agency under Government Code Section 22920 and subject to the Public Employees' Medical and Hospital Care Act (the "Act") for participation by members of Represented and Exempt Employees; and

WHEREAS, (2) Government Code Section 22892(a) provides that a contracting agency subject to Act shall fix the amount of the employer contribution by resolution; and

WHEREAS, (3) Government Code Section 22892(b) provides that the employer contribution shall be an equal amount for both employees and annuitants, but may not be less than the amount prescribed by Section 22892(b) of the Act; now, therefore be it

RESOLVED, (a) That the employer contribution for each employee or annuitant shall be the amount necessary to pay the full cost of his/her enrollment, including the enrollment of family members in a health benefits plan up to a maximum of $1,089 per month with respect to employee enrolled for self alone, $2,177 per month for employee enrolled for self and one family member, and $2,830 per month for employee enrolled for self and two or more family members, plus administrative fees and Contingency Reserve Fund assessments; and be it further

RESOLVED, (b) Carmichael Water District has fully complied with any and all applicable provisions of Government Code Section 7507 in electing the benefits set forth above; and be it further

RESOLVED, (c) That the participation of the employees and annuitants of Carmichael Water District shall be subject to determination of its status as an "agency or instrumentality of the state or political subdivision of a State" that is eligible to participate in a governmental plan within the meaning of Section 414(d) of the Internal Revenue Code, upon publication of final Regulations pursuant to such Section. If it is determined that Carmichael Water District would not qualify as an agency or instrumentality of the state or political subdivision of a State under such final Regulations, the California Public Employees' Retirement System may be obligated, and reserves the right to terminate the health coverage of all participants of the employer; and be it further

RESOLVED, (d) That the executive body appoint and direct, and it does hereby appoint and

direct, Cathy Lee, General Manager, to file with the Board a verified copy of this resolution, and to perform on behalf of Carmichael Water District all functions required of it under the Act; and be it further

RESOLVED, (e) That coverage under the Act be effective on January 1, 2026.
Adopted at a regular meeting of the Carmichael Water District Board of Directors at Carmichael, this 15th day of September, 2025.

Signed: _____
Ron Greenwood, President, Board of Directors

Attest: _____
Cathy Lee, Secretary/General Manager

Topic: Charleston Ave Property Authorization to Contract with Real Estate Agent

Date: September 8, 2025

Item For: Action

Submitted By: Cathy Lee, General Manager

BACKGROUND

The District purchased the 4515 Charleston Drive property for $805,000 in 2023 from the District's Facilities Fees to expand the Winding Way Well facility. A Lot Line Adjustment was performed by the District and approved by the County of Sacramento to split the subject residential property from a lot size of approximately 0.49 acres to approximately 0.29 acres. Subsequently, under California Government Code Section 54220 et seq., Surplus Land Act, the District declared the property as being surplus and exempt from the Surplus Land Act via Resolution 04162024-02 with approval from California Department of Housing and Community Development (HCD), Attachment 1.

The new Winding Way Well was completed in January 2025 without any noise complaints from the neighbors. During construction of the well, the District relocated the electrical service underground to ensure future safety and access to the well site, and installed a new fence for the property as part of construction restoration and maintenance. The property is now ready to be sold.

SUMMARY/DISCUSSION

The neighbor behind the property, Mr. Dave Mahrle, is a licensed realtor, Department of Real Estate (DRE) #02037960. Mr. Mahrle has maintained continuous contact with staff to represent the District in selling the property. Mr. Mahrle estimated the value of the property to be approximately $700,000 to $725,000 based on current market condition and he proposed a 5% real estate commission fees, 2.5% towards the buyer's agent and broker and 2.5% towards the seller's agent and broker. The cost to sell the house is about $40,000 depending on the final sell value. Additionally, a partial staging, for kitchen, dining room, family room, den/library, master bedroom, bathrooms, and outdoor patio, is $2,750 for 60 days with 30-day extensions for 20% of cost.

Mr. Mahrle includes in fees the advertisement costs including photos, drone shots, signage, marketing materials, as well as removal of unnecessary books, items in garage, and old patio materials. Mr. Mahrle indicated that a typical listing agreement is for 6 months and he is willing to allow the District to cancel at any time for any reason.

FINANCIAL IMPACT

A 5% commission for real estate transaction is reasonable based on industry standard. Depending on the final sell price, the District would likely receive $650,000 - $680,000 and the proceeds would go back in the Facility Fees account where the original funding to purchase the property came from.

RECOMMENDATION

Staff recommends that the Board of Directors (1) approve a 5% commission for real estate fees with a 50/50 split (2.5% each) towards seller's and buyer's brokers and agents and (2) authorize the General Manager to sign a standard Residential Listing Agreement by the California Association of Realtors for a duration of 6 months.

ATTACHMENT(S)

1. California Department of Housing and Community Development (HCD) Review – Qualification as "exempt surplus land".
2. Estimated Seller Net Sheet
3. California Association of Realtors Residential Listing Agreement

STATE OF CALIFORNIA - BUSINESS, CONSUMER SERVICES AND HOUSING AGENCY GAVIN NEWSOM, *Governor*

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
DIVISION OF HOUSING POLICY DEVELOPMENT
2020 W. El Camino Avenue, Suite 500
Sacramento, CA 95833
(916) 263-2911 / FAX (916) 263-7453
www.hcd.ca.gov

May 17, 2024

Gavin Ralphs, Attorney
Bartkiewicz, Kronick & Shanahan, a Professional Corporation
1600 K Street
Suite 4A
Sacramento, CA 95814

SENT VIA EMAIL: wgr@bkslawfirm.com

Dear Gavin Ralphs:

RE: HCD's Review of Carmichael Water District's Resolution No. 04162024-02 Declaring APN 247-0010-005 as "Exempt Surplus Land"

Thank you for notifying the California Department of Housing and Community Development (HCD) of Carmichael Water District's (District) determination of APN 247-0010-005 (Property) as "exempt surplus land." HCD reviewed Resolution No. 04162024-02 (Resolution) pursuant to Section 400(e) of the Surplus Land Act Guidelines. As explained below, HCD finds that the Property qualifies as "exempt surplus land" under Government Code section 54221, subdivision (f)(1)(N).

Analysis

According to the Resolution, the Property is approximately .29 acres and possesses a single-family residence. The District seeks the option to dispose of the Property to directly further the District's work and operations by generating revenues. Furthermore, on April 18, 2024, the District confirmed that none of the characteristics listed in Government Code section 54221(f)(2) apply to the Property.

Conclusion

HCD finds that the Property qualifies as "exempt surplus land" under Government Code section 54221, subdivision (f)(1)(N).

If you have any questions or need additional technical assistance, please contact Sandra Mukasa, Senior Housing Policy Specialist, at Sandra.Mukasa@hcd.ca.gov.

Sincerely,

Laura Nunn
Senior Manager, Housing Accountability Unit
Housing Policy Development

NET SHEET

ATTACHMENT 2

ESTIMATE FOR
4515 Charleston Drive,
Carmichael, CA 95608

JAMIE RYAN
916-397-4250
jamie.ryan@fnf.com

SELLER'S NET SHEET CONVENTIONAL

ESTIMATED CLOSING DATE	09/26/2025
SALES PRICE:	**$725,000.00**
CLOSING COSTS:	$41,141.00
BALANCE:	$0
PRORATED TAX DEBIT:	$2,160.10
NET AT CLOSE:	**$681,698.90**

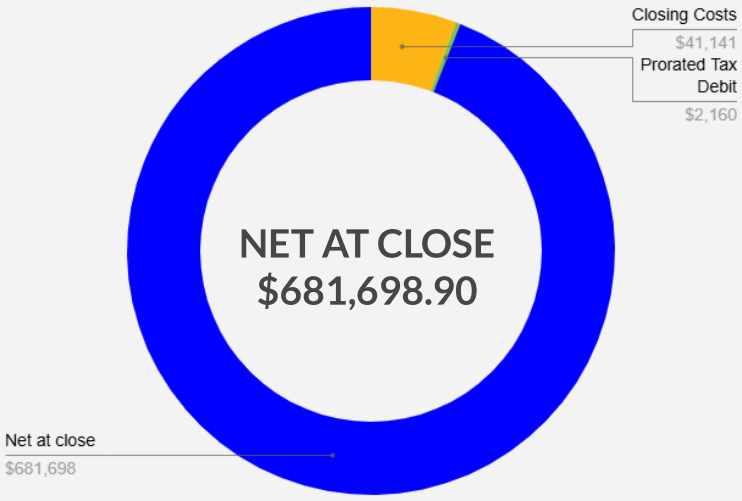
FIXED CLOSING COSTS

TITLE FEES

HOMEOWNER'S TITLE POLICY:	$2,133.00
ESCROW FEE:	$770.50
593 PROCESSING FEE:	$45.00
NOTARY FEE:	$175.00

OTHER FEES

COUNTY TRANSFER TAX:	$797.50
DISCLOSURE REPORT:	$120.00
HOME WARRANTY:	$850.00
BUYER BROKER FEES (EST) (2.5%):	$18,125.00
BROKER FEE (2.5%):	$18,125.00
TOTAL FIXED COSTS:	**$41,141.00**



Notes

Sign(X)_____ Sign(Y)_____ Date:_____

Jamie Ryan

Jamie Ryan
Fidelity
Fidelity
916-397-4250
jamie.ryan@fnf.com

500 Auburn Folsom Blvd ste 300
Auburn, California 95603

EQUAL HOUSING OPPORTUNITY

CALIFORNIA ASSOCIATION OF REALTORS®

RESIDENTIAL LISTING AGREEMENT
(Exclusive Authorization and Right to Sell)
(C.A.R. Form RLA, Revised 7/24)

Date Prepared: _____

1. **EXCLUSIVE RIGHT TO SELL:** _____ ("Seller") hereby employs and grants _____ ("Broker") the exclusive and irrevocable right to sell or exchange the real property described as _____, situated in _____ (City), _____ (County), California, _____ (Zip Code), Assessor's Parcel No. _____ ("Property") for the Listing Period specified in **paragraph 2A(1)**.

2. **TERMS OF LISTING AGREEMENT:** The items in this paragraph are contractual terms of the Agreement. Referenced paragraphs provide further explanation. This form is 7 pages. Seller is advised to read all 7 pages.

	Para #	Paragraph Title or Contract Term	Terms and Conditions	
A	**Representation**			
A(1)	4G	**Listing Period** **(Maximum Length)**	Beginning _____ (date) Ending at 11:59 P.M. on _____ (date) (Not to exceed 24 months if improved with one to four units and not owned by an entity. If Listing Period exceeds 24 months on a residential 1-4, this Agreement is void, unless Seller is a corporation, LLC or partnership.)	
A(2)		**Listing Price**	_____ Dollars ($_____)	
B		**Property Specific Listings**	☐ Manufactured (mobile) home (C.A.R. Form MHLA attached) ☐ Probate, conservatorship or guardianship (C.A.R. Form PLA attached)	
C	**Compensation: NOTICE: The amount or rate of real estate commissions is not fixed by law. They are set by each broker individually and may be negotiable between Seller and Broker.** See attached Broker Compensation Advisory (C.A.R. Form BCA).			
C(1)	4B	**Compensation to Seller's Broker (only Seller's side of transaction)**	_____% of the listing price AND, if any, _____; OR ☐ $ _____; OR ☐ see attached compensation schedule. (% above is based on purchase price if Seller and buyer sign a purchase agreement)	
C(2)	4C	☐ **Additional Compensation to Seller's Broker if buyer is unrepresented**	_____ % of the purchase price AND if any, _____; OR ☐ $ _____; OR ☐ see attached compensation schedule.	
C(3)	4D(2)	**Continuation of Right to Compensation for Broker Identified Prospective Buyers**	The Continuation Period shall be _____ calendar days after the Listing Period or any extension ("Continuation Period").	
C(4)	4F	**Seller Obligation to Pay Previous Brokers**	Previous Listing/Other broker(s): _____ Compensation to above broker(s) owed if Property transferred to: _____	
D	**Items Intended to be Included and Excluded**			
D(1)	5A	**Items Included** ☐ _____;	☐ _____; ☐ _____;	☐ _____; ☐ _____
D(2)	5A	**Excluded Items:** ☐ _____;	☐ _____; ☐ _____;	☐ _____; ☐ _____
D(3)	5B	**Leased Items:** ☐ Propane Tank(s);	☐ Solar Power System(s); ☐ Water Softener;	☐ Alarm System(s); ☐ _____
D(4)	5B	**Liened Items:** ☐ Heating/Ventilation/Air conditioning systems	☐ Solar Power System(s); ☐ _____;	☐ Windows or Doors; ☐ _____
D(5)	5C	**(a) Smart Home Features Seller prefers to Include:** _____ **(b) Smart Home Features Seller prefers to Exclude:** _____		
E	**MLS and Public Marketing**			
E(1)		**Property will be marketed in the following MLS**	Primary _____ Other(s): _____	See C.A.R. Form MLS.
E(2)	11A	☐ **Seller instructs Broker not to take or use photographs in marketing, except as required by MLS rules.**		

F	Broker's and Seller's Duties			
F(1)	7B	**Timing of Presentation of Offers**	Seller instructs Broker to present all offers received as soon as practicable OR ☐ Offers shall be presented on _____ (date) or ☐ _____ days after the Property is listed as active on the MLS.	
F(2)	7C	**Buyer Supplemental Offer Letters (Buyer Letters)**	Seller instructs Broker not to present Buyer Letters, OR ☐ Seller instructs Brokers to present Buyer Letters. If Seller requests or relies on Buyer Letters, Seller is acting against Broker's advice.	
F(3)	7E	**Investigation Reports**	☑ Natural Hazard Disclosure ☐ Structural Pest Control, ☐ General Property Inspection, ☐ Homeowners Association Documents, ☐ Preliminary (Title) Report, ☐ Roof Inspection, ☐ Pool Inspection, ☐ Septic/Sewer Inspection, ☐ Other: _____	Seller shall order and pay for any reports selected within **5 (or _____) days** of the Beginning Date of this Agreement
G	20	**Exceptions to Ownership/Title**	_____	
H		**☐ Seller intends to include a contingency to purchase a replacement property as part of any transaction (see C.A.R. Form SPRP).**		
I	12, 13	**Seller Opt Outs**	☐ Key safe/Lockbox ☐ Signs	
J		**Additional Terms**	_____ _____	

3. ADVISORIES AND ADDENDA:

A. Advisories

☑ Broker Compensation Advisory (C.A.R. Form BCA) ☐ REO Advisory Listing (C.A.R. Form REOL)
☐ Short Sale Information and Advisory (C.A.R. Form SSIA) ☐ Trust Advisory (C.A.R. Form TA)
☐ Other: _____

B. Addenda. The addenda identified below are incorporated into this Agreement
☐ _____ ☐ _____

4. COMPENSATION TO BROKER:

Notice: The amount or rate of real estate commissions is not fixed by law. They are set by each Broker individually and may be negotiable between Seller and Broker.

A. ADVISORY: Real estate commissions include all compensation and fees to Broker and are fully negotiable.

B. COMPENSATION TO BROKER: Seller agrees to pay to Broker as compensation for services under this Agreement, the amount specified in **paragraph 2C(1).**

C. OPTIONAL ADDITIONAL COMPENSATION FOR UNREPRESENTED BUYER: If no other brokerage company is involved in the sale of Seller's property because buyer is not represented by a real estate agent, Seller agrees to pay Broker the additional amount specified in **paragraphs 2C(2)**, if checked, for services rendered.

D. COMPENSATION TERMS: Compensation is earned, and Seller shall pay Broker as follows:

(1) **Completed Transaction or Seller Default:** If during the Listing Period, or any extension, Broker, any other broker, Seller or any other person procures a ready, willing, and able buyer(s) whose offer to purchase the Property on any price and terms is accepted by Seller, provided the buyer completes the transaction or is prevented from doing so by Seller. (Broker is entitled to compensation whether any escrow resulting from such offer closes during or after the expiration of the Listing Period, or any extension.)

OR (2) **Continuation of Right to Compensation for Broker Procured Buyer(s):** If, during the Continuation Period specified in **paragraph 2C(3)**, or the same period of time after any cancellation of this Agreement, unless otherwise agreed, Seller enters into a contract to sell, convey, lease or otherwise transfer the Property to anyone ("Prospective Buyer") or that person's related entity:

- who physically entered and was shown the Property during the Listing Period or any extension by Broker or a any other broker; or
- for whom Broker or any other broker submitted to Seller a signed, written offer to acquire, lease exchange or obtain an option on the Property.

Broker's right to compensation pursuant to this paragraph shall only apply if, prior to expiration of this Agreement or any extension, Broker delivers to Seller a written notice of the names of such Prospective Buyers (C.A.R. Form NPB).

OR (3) **Seller Interference with Listing:** If, without Broker's prior written consent, the Property is withdrawn from sale, conveyed, leased, rented, otherwise transferred, or made unmarketable by a voluntary act of Seller during the Listing Period, or any extension.

E. ADDITIONAL COMPENSATION TERMS:

(1) **Buyer Breach and Seller Recovery of Damages:** If completion of the sale is prevented by a party to the transaction other than Seller, then compensation which otherwise would have been earned under **paragraph 4** shall be payable only if and when Seller collects damages by suit, arbitration, settlement or otherwise, and then in an amount equal to the lesser of one-half of the damages recovered or the above compensation, after first deducting title and escrow expenses and the expenses of collection and suit, if any.

(2) **Escrow Instructions:** Seller hereby irrevocably assigns to Broker the above compensation from Seller's funds and proceeds in escrow. Broker may submit this Agreement, as instructions to compensate Broker pursuant to **paragraph 4**, to any escrow regarding the Property involving Seller and a buyer, Prospective Buyer or other transferee.

F. SELLER COMPENSATION OBLIGATIONS TO OTHER BROKERS:

(1) Seller represents that Seller has not previously entered into a listing agreement with another broker regarding the Property, unless specified in **paragraph 2C(4).**

(2) Seller warrants that Seller has no obligation to pay compensation to any other broker regarding the Property unless the Property is transferred to any of the individuals or entities specified in **paragraph 2C(4).**

(3) If the Property is sold to anyone specified in **paragraph 2C(4)** during the time Seller is obligated to compensate another broker: **(i)** Broker is not entitled to compensation under this Agreement; and **(ii)** Broker is not obligated to represent Seller in such transaction.

G. MAXIMUM LISTING PERIOD: The maximum listing period allowed by law for residential property improved with one to four units is 24 months from the date this Agreement is made. This restriction does not apply if Seller is a corporation, LLC or partnership. It is unlawful to record or file this listing Agreement, or a memorandum or notice thereof, with the county recorder.

5. A. ITEMS EXCLUDED AND INCLUDED: Unless otherwise specified in a real estate purchase agreement, all fixtures and fittings that are attached to the Property are included, and personal property items are excluded, from the purchase price.
Seller intends that the items specified in **paragraph 2D** be included or excluded in offering the Property for sale, but understands that: **(i)** the purchase agreement supersedes any intention expressed above and will ultimately determine which items are excluded and included in the transaction; and **(ii)** Broker is not responsible for and does not guarantee that the above exclusions and/or inclusions will be in the purchase agreement.

B. LEASED OR NOT OWNED ITEMS; LIENED ITEMS: The items specified in **paragraph 2D(3)** are leased or not owned by Seller and the items specified in **paragraph 2D(4)** have been financed and a lien has been placed on the Property to secure payment. Seller will provide to the buyer, as part of the purchase agreement, copies of lease documents, or other documents obligating Seller to pay for any such leased or liened item.

C. SMART HOME FEATURES: The smart home features are intended to be included or excluded as specified in **paragraph 2D(5).**

6. SELLER REPRESENTATIONS: Seller represents that, unless otherwise specified in writing, Seller is unaware of: **(i)** any Notice of Default recorded against the Property; **(ii)** any delinquent amounts due under any loan secured by, or other obligation affecting, the Property; **(iii)** any bankruptcy, insolvency or similar proceeding affecting the Property; **(iv)** any litigation, arbitration, administrative action, government investigation or other pending or threatened action that affects or may affect the Property or Seller's ability to transfer it; and **(v)** any current, pending or proposed special assessments affecting the Property. Seller shall promptly notify Broker in writing if Seller becomes aware of any of these items during the Listing Period or any extension thereof.

7. BROKER'S AND SELLER'S DUTIES:

A. BROKER RESPONSIBILITY, AUTHORITY AND LIMITATIONS: Broker agrees to exercise reasonable effort and due diligence to achieve the purposes of this Agreement. Unless Seller gives Broker written instructions to the contrary, Broker is authorized, but not required, to **(i)** order reports and disclosures including those specified in **paragraph 7E** as necessary, **(ii)** advertise and market the Property by any method and in any medium selected by Broker, including MLS and the internet, and, to the extent permitted by these media, control the dissemination of the information submitted to any medium; and **(iii)** disclose to any real estate licensee making an inquiry the receipt of any offers on the Property and the offering price of such offers.

B. PRESENTATION OF OFFERS:

(1) **Strategies Affecting Delayed Offers and Buyer Broker Compensation:** There are different strategies for obtaining the best offer for Seller. Seller is advised that certain buyers may prefer not to be in a competitive situation and either may not make an offer if there is an instruction that all offers will be presented at a later specified time or may try to make a "preemptive" offer that will expire shortly, hoping that Seller will accept before the presentation date. Additionally, certain buyers may not be able or allowed to pay compensation to a buyer's broker. These buyers may request for seller to pay buyer's broker through a term in the purchase agreement or through a separate compensation agreement. Seller is advised to discuss and consider the best strategy for Seller related to the presentation of offers.

(2) (A) **Seller Instructs Broker to Present Offers:** Broker agrees to present all offers received for Seller's Property, and present them to Seller as soon as possible, unless Seller gives Broker written instructions to the contrary.

OR (B) **Seller Instructs Broker not to Present Offers until a Later Time:** If checked in **paragraph 2F(1)**, Seller has elected to have Broker hold all offers and present them to Seller as specified in **paragraph 2F(1)**. Broker will inform Seller that an offer has come in, but will not submit the offer to Seller, unless specifically instructed otherwise, in writing. Local MLS rules may impact this practice and whether it will provide any benefit to Seller. Broker and Seller may amend this instruction by agreeing in writing.

C. BUYER SUPPLEMENTAL OFFER LETTERS (BUYER LETTERS):

(1) **Advisory Regarding Buyer Letters:** Seller is advised of the practice of many buyers and their agents to include a Buyer Letter with an offer to try to influence a seller to accept the buyer's offer. Buyer Letters may include photos and video. Whether overt or unintentional, Buyer Letters may contain information about a buyer's protected class or characteristics. Deciding whether to accept an offer based upon protected classes or characteristics is unlawful. Broker will not review the content of Buyer Letters. See C.A.R. Form FHDA for further information.

(2) (A) **Seller Instructs Broker not to Present Buyer Letters** whether submitted with an offer or separately at a different time. Seller authorizes Broker to specify in the MLS that Buyer Letters will not be presented to Seller.

OR (B) **Seller Instructs Broker to Present Buyer Letters**: If checked in **paragraph 2F(2)**, Broker advises seller that: **(i)** Buyer Letters may contain information about protected classes or characteristics and such information should not be used in Seller's decision of whether to accept, reject, or counter a Buyer's offer; and **(ii)** if Seller relies on Buyer Letters, Seller is acting against Broker's advice and should seek the advice of counsel before doing so.

D. SELLER GOOD FAITH: Seller agrees to consider offers presented by Broker, and to act in good faith to accomplish the sale of the Property by, among other things, making the Property available for showing at reasonable times and, subject to **paragraph 2C(4)**, referring to Broker all inquiries of any party interested in the Property. Seller is responsible for determining at what price to list and sell the Property.

E. INVESTIGATIONS AND REPORTS: Seller agrees, within the time specified in **paragraph 2F(3)**, to order and, when required by the service provider, pay for all reports specified in **paragraph 2F(3)**. If Property is located in a Common Interest Development or Homeowners Association, Seller is advised that there may be benefits to obtaining any required documents prior to entering into escrow with any buyer. Such benefits may include, but not be limited to, potentially being able to lower costs in obtaining the documents and avoiding any potential delays or complications due to late or slow delivery of such documents.

F. UNDISCLOSED CONDITIONS; INCOMPLETE OR INCORRECT INFORMATION: Seller further agrees to indemnify, defend and hold Broker harmless from all claims, disputes, litigation, judgments, and costs arising from any incorrect or incomplete information supplied by Seller, or from any material facts that Seller knows but fails to disclose including dangerous or hidden conditions on the Property.

8. DEPOSIT: Broker is authorized to accept and hold on Seller's behalf any deposits to be applied toward the purchase price.

9. AGENCY RELATIONSHIP:

A. DISCLOSURE: Seller acknowledges receipt of a ☑"Disclosure Regarding Real Estate Agency Relationship" (C.A.R. Form AD).

B. SELLER REPRESENTATION: Broker shall represent Seller in any resulting transaction, except as specified in **paragraph 4F(3)**.

C. POSSIBLE DUAL AGENCY:

(1) **Disclosure and Consent in a Transaction:** Depending upon the circumstances, it may be necessary or appropriate for Broker to act as an agent for both Seller and buyer, exchange party, or one or more additional parties ("Buyer"). Broker shall, as soon as practicable, disclose to Seller any election to act as a dual agent representing both Seller and Buyer. If a Buyer is procured directly by Broker or an associate-licensee in Broker's firm, Seller hereby consents to Broker acting as a dual agent for Seller and Buyer. In the event of an exchange, Seller hereby consents to Broker collecting compensation from additional parties for services rendered, provided there is disclosure to all parties of such agency and compensation. Seller understands and agrees that: a dual agent may not, without the express permission of the respective party, disclose to the other party confidential information, including, but not limited to, facts relating to either Buyer's or Seller's financial position, motivations, bargaining position, or other personal information that may impact price, including the Seller's willingness to accept a price less than the listing price or Buyer's willingness to pay a price greater than the price offered; and except as set forth above, a dual agent is obligated to disclose known facts materially affecting the value or desirability of the Property to both parties. Compensation is not necessarily determinative of agency.

(2) **Showing Properties:** Seller acknowledges that real estate brokers must have a written agreement in order to work with a buyer before showing properties to that buyer and that some buyers working through Broker may consider or make an offer on Seller's property. Seller consents to Broker entering into a representation agreement with a buyer, and if that buyer makes an offer on Seller's property, Broker will become a dual agent representing both that buyer and Seller.

(3) **Potentially Competing Sellers and Buyers:** Seller understands that Broker may have or obtain listings on other properties, and that potential buyers may consider, make offers on, or purchase through Broker, property the same as or similar to Seller's Property. Seller consents to Broker's representation of sellers and buyers of other properties before, during and after the end of this Agreement. Seller acknowledges receipt of a ☑"Possible Representation of More than One Buyer or Seller – Disclosure and Consent" (C.A.R. Form PRBS).

D. **UNREPRESENTED BUYERS:** If a buyer is interested in viewing Seller's Property is not already represented by a real estate broker, and such buyer refuses to be represented by Broker, Seller authorizes Broker to obtain a signed document from such buyer refusing representation by Broker. Broker shall provide such buyers, at the earliest practicable time, a disclosure of non-representation, such as Buyer Non-Agency (CAR Form BNA) or Open House Visitor Non Agency Disclosure and Sign-In (C.A.R. Form OHNA-SI).

E. **CONFIRMATION:** Broker shall confirm the agency relationship described above, or as modified, in writing, prior to or concurrent with Seller's execution of a purchase agreement.

F. **TERMINATION OF AGENCY RELATIONSHIP:** Seller acknowledges and agrees that the representation duties of, and agency relationship with, Broker terminate at the expiration of this Agreement or, if it occurs first, the completion of any transaction specified in this Agreement.

10. **SECURITY, INSURANCE, SHOWINGS, AUDIO AND VIDEO:** Broker is not responsible for loss of or damage to personal or real property, or injury to person, whether attributable to use of a keysafe/lockbox, a showing of the Property, or otherwise. Third parties, including, but not limited to, appraisers, inspectors, brokers and prospective buyers, may have access to, and take videos and photographs of, the interior of the Property. Seller agrees: **(i)** to take reasonable precautions to safeguard and protect valuables that might be accessible during showings of the Property; and **(ii)** to obtain insurance to protect against these risks. Broker does not maintain insurance to protect Seller. Persons visiting the Property may not be aware that they could be recorded by audio or visual devices installed by Seller (such as "nanny cams" and hidden security cameras). Seller is advised to post a notice disclosing the existence of security devices.

11. **PHOTOGRAPHS AND INTERNET ADVERTISING:**

A. In order to effectively market the Property for sale it is often necessary to provide photographs, virtual tours and other media to buyers. Unless checked in **paragraph 2E(2)**, Seller agrees that Broker or others may photograph or otherwise electronically capture images of the exterior and interior of the Property ("Images") for static and/or virtual tours of the Property by buyers and others for use on Broker's website, the MLS, and other marketing materials and sites. Seller acknowledges that if Broker engages third parties to capture and/or reproduce and display Images, the agreement between Broker and those third parties may provide such third parties with certain rights to those Images. The rights to the Images may impact Broker's control or lack of control of future use of the Images. If Seller is concerned, Seller should request that Broker provide any third parties' agreement impacting the Images. Seller also acknowledges that once Images are placed on the internet neither Broker nor Seller has control over who can view such Images and what use viewers may make of the Images, or how long such Images may remain available on the internet. Seller further assigns any rights in all Images to the Broker/Agent and agrees that such Images are the property of Broker/Agent and that Broker/Agent may use such Images for advertising, including post transaction and for Broker/Agent's business in the future.

B. Seller acknowledges that prospective buyers and/or other persons coming onto the Property may take photographs, videos or other images of the Property. Seller understands that Broker does not have the ability to control or block the taking and use of Images by any such persons. Once Images are taken and/or put into electronic display on the internet or otherwise, neither Broker nor Seller has control over who views such Images nor what use viewers may make of the Images.

12. **KEYSAFE/LOCKBOX:** A keysafe/lockbox is designed to hold a key to the Property to permit access to the Property by Broker, cooperating brokers, MLS participants, their authorized licensees and representatives, authorized inspectors, and accompanied prospective buyers. Seller further agrees that Broker, at Broker's discretion, and without further approval from Seller, shall have the right to grant access to and convey Seller's consent to access the Property to inspectors, appraisers, workers, repair persons, and other persons requiring entry to the Property in order to facilitate the sale of the Property. Broker, cooperating brokers, MLS and Associations/Boards of REALTORS® are not insurers against injury, theft, loss, vandalism or damage attributed to the use of a keysafe/lockbox.

A. Unless checked in **paragraph 2I**, Seller authorizes Broker to install a keysafe/lockbox.

B. **TENANT-OCCUPIED PROPERTY:** If Seller does not occupy the Property, Seller shall be responsible for obtaining occupant(s)' written permission for use of a keysafe/lockbox (C.A.R. Form KLA).

13. **SIGN:** Unless checked in **paragraph 2I**, Seller authorizes Broker to install a FOR SALE/SOLD sign on the Property.

14. **EQUAL HOUSING OPPORTUNITY:** The Property is offered in compliance with federal, state and local anti-discrimination laws.

15. **ATTORNEY FEES**: In any action, proceeding or arbitration between Seller and Broker arising out of this Agreement, Seller and Broker are each responsible for paying their own attorney's fees and costs except as provided in **paragraph 18A**.

16. **MANAGEMENT APPROVAL:** If an associate-licensee in Broker's office (salesperson or broker-associate) enters into this Agreement on Broker's behalf, Broker or Manager has the right to cancel this Agreement, in writing, within **5 days** After its execution.

17. **SUCCESSORS AND ASSIGNS:** This Agreement shall be binding upon Seller and Seller's successors and assigns.

18. DISPUTE RESOLUTION:

A. MEDIATION: (1) Seller and Broker agree to mediate any dispute or claim arising between them under this Agreement, before resorting to arbitration or court action. (2) Mediation fees, if any, shall be divided equally among the parties involved. (3) If, for any dispute or claim to which this paragraph applies, any party (the non-mediating party) **(i)** commences an action without first attempting to resolve the matter through mediation, or **(ii)** before commencement of an action, refuses to mediate after a request has been made, then if the non-mediating party is the losing party in any such action, the prevailing party in such action shall be entitled to recover attorney fees from the non-mediating party, notwithstanding the terms in **paragraph 15**. (4) **Exclusions from this mediation agreement are specified in paragraph 18B.**

B. ADDITIONAL MEDIATION TERMS: The following matters shall be excluded from mediation: (i) a judicial or non-judicial foreclosure or other action or proceeding to enforce a deed of trust, mortgage or installment land sale contract as defined in Civil Code § 2985; (ii) an unlawful detainer action; (iii) the filing or enforcement of a mechanic's lien; and (iv) any matter that is within the jurisdiction of a probate, small claims or bankruptcy court. The filing of a court action to enable the recording of a notice of pending action, for order of attachment, receivership, injunction, or other provisional remedies, shall not constitute a waiver or violation of the mediation provisions.

C. ARBITRATION ADVISORY: If Seller and Broker desire to resolve disputes arising between them through arbitration rather than court, they can document their agreement by attaching and signing an Arbitration Agreement (C.A.R. Form ARB).

19. ENTIRE AGREEMENT: All prior discussions, negotiations and agreements between the parties concerning the subject matter of this Agreement are superseded by this Agreement, which constitutes the entire contract and a complete and exclusive expression of their agreement, and may not be contradicted by evidence of any prior agreement or contemporaneous oral agreement. If any provision of this Agreement is held to be ineffective or invalid, the remaining provisions will nevertheless be given full force and effect. This Agreement and any supplement, addendum or modification, including any photocopy or facsimile, may be executed in counterparts.

20. OWNERSHIP, TITLE AND AUTHORITY: Seller warrants that: **(i)** Seller is the owner of the Property; **(ii)** no other persons or entities have title to the Property; and **(iii)** Seller has the authority to both execute this Agreement and sell the Property. Exceptions to ownership, title and authority are specified in **paragraph 2G**.

21. LEGALLY AUTHORIZED SIGNER: Wherever the signature or initials of the Legally Authorized Signer, identified in the signature block below, appear on this Agreement or any related documents, it shall be deemed to be in a representative capacity for the entity described and not in an individual capacity, unless otherwise indicated. The Legally Authorized Signer **(i)** represents that the entity for which that person is acting already exists and is in good standing to do business in California and **(ii)** shall deliver to Broker, within **3 days** after execution of this Agreement, evidence of authority to act in that capacity (such as but not limited to: applicable portion of the trust or Certification Of Trust (Probate Code § 18100.5), letters testamentary, court order, power of attorney, corporate resolution, or formation documents of the business entity).

REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK

PROCEED TO NEXT PAGE

By signing below, Seller acknowledges that Seller has read, understands, received a copy of and agrees to the terms of this Residential Listing Agreement.

☐ **ENTITY SELLERS:** (Note: If this paragraph is completed, a Representative Capacity Signature Disclosure (C.A.R. Form RCSD) is not required for the Legally Authorized Signers designated below.)
(1) One or more Sellers is a trust, corporation, LLC, probate estate, partnership, other entity or holds a power of attorney.
(2) This Agreement is being Signed by a Legally Authorized Signer in a representative capacity and not in an individual capacity. See **paragraph 21** for additional terms.
(3) The name(s) of the Legally Authorized Signer(s) is: _____, _____.
(4) A. If a trust, identify Seller as trustee(s) of the trust or by simplified trust name (ex. John Doe, co-trustee, Jane Doe, co-trustee or Doe Revocable Family Trust).
B. If Property is sold under the jurisdiction of a probate court, identify Seller as executor or administrator, or by a simplified probate name (John Doe, executor, or Estate (or Conservatorship) of John Doe).
(5) The following is the full name of the entity (if a trust, enter the complete trust name; if under probate, enter full name of the estate, including case #): _____
_____.

SELLER SIGNATURE(S):

(Signature) By, _____ Date: _____
Printed name of SELLER: _____
☐ Printed Name of Legally Authorized Signer: _____ Title, if applicable, _____
Address _____ City _____ State _____ Zip _____
Email _____ Phone # _____
(Signature) By, _____ Date: _____
Printed name of SELLER: _____
☐ Printed Name of Legally Authorized Signer: _____ Title, if applicable, _____
Address _____ City _____ State _____ Zip _____
Email _____ Phone # _____
☐ Additional Signature Addendum attached (C.A.R. Form ASA)

BROKER SIGNATURE(S):

Real Estate Broker (Firm) _____ DRE Lic# _____
Address _____ City _____ State _____ Zip _____
By _____ Tel. _____ E-mail _____ DRE Lic# _____ Date _____
By _____ Tel. _____ E-mail _____ DRE Lic# _____ Date _____
☐ More than one agent from the same firm represents Seller. Additional Agent Acknowledgement (C.A.R. Form AAA) attached.
☐ Two Brokers with different companies are co-listing the Property. Co-listing Broker information is on the attached Additional Broker Acknowledgement (C.A.R. Form ABA).

Topic: Water Meter Replacement Standard: From Mechanical to Ultrasonic Technology
Date: August 26, 2025
Item For: Action

Submitted By: Lucas Campbell- Distribution Superintendent

BACKGROUND

Carmichael Water District (CWD) has historically used mechanical meters for water metering needs. Currently CWD purchases Neptune mechanical meters from Ferguson Water Works, who is the exclusive distributor of Neptune meters.

SUMMARY/DISCUSSION

There are new technologies with water metering capabilities. Ultrasonic meters are now becoming the industry standard for metering accuracy and are increasingly popular industry wide for measuring water consumption in commercial and residential connections due to many factors, such as:

- **No moving parts**: Reduces wear and tear, leading to a longer lifespan and less maintenance.
- **Higher accuracy at low flows**: Great for detecting and billing for small leaks and night-time usage. Superior ultra-low capabilities and eliminates crossover.
- **Bi-directional flow measurements**: Useful in complex plumbing systems. This will help support CWD's Cross Connection Control Policy, the meter will send a notification if a backflow situation were present.
- **Smart integration**: Ultrasonic meters are AMI/AMR-ready enabling remote reads and real-time monitoring.
- **Lower total cost of ownership**: When comparing ultrasonic meters to mechanical meters (in most cases) the ultrasonic meter is cheaper. Additional savings come from reduced labor, fewer replacements, and improved billing accuracy.
- **Warranty**: Ultrasonic meters provide a much more robust warranty, compared to mechanical meters, for both small and large meter sizes. A 20-year prorated warranty for sizes 5/8 – 1-inch and 10-year prorated warranty for meter sizes 3 – 12-inch.
- **Lower Head Loss**: Traditional mechanical meters (like turbine or positive displacement meters) have internal components—such as impellers, gears, or pistons—that physically interact with the water to measure flow. These components create resistance and turbulence, which reduce the pressure of water downstream (i.e., they cause head loss). Ultrasonic meters, on the other hand, use sound waves to measure the velocity of water and calculate flow rate. There are no moving parts inside the flow path, so water can pass through more freely. The pressure at the tap is a closer to actual system pressure.
- **Zero Crossover**: Compound meters contain a mechanical "crossover zone", where flow transitions from the low-flow chamber to the high-flow chamber. This zone can result in unmeasured or inaccurately measured water, leading to non-revenue water and potential revenue loss. In contrast, ultrasonic meters utilize a single measuring path with no internal mechanical switching. As a result, they have no crossover zone, ensuring accurate measurement across the entire flow range — from the lowest trickle to peak demand — and eliminating the losses typically associated with crossover transitions in compound meters.

With the benefits list above, staff recommends the continued annual purchase of 500 1-inch meters, transitioning from mechanical to ultrasonic technology, to meet the current minimum replacement needs for operations. This ongoing effort supports improved system accuracy, reduced maintenance, and long-term cost efficiency.

Staff also recommends that CWD continue using Neptune as the District's sole meter manufacturer, rather than introducing an additional vendor. Adding a second manufacturer would require the purchase of proprietary software, meter reading equipment, additional staff training, and billing system modifications, all of which would result in unnecessary complexity and cost.

Almost all water meters in CWD's service area are 2-inches in diameter or less. Currently, there are 136 meters sized 3 inches and larger installed throughout the system. Implementing a testing program for larger meters will reduce the variability in larger meter usage and billing and likely have a positive financial impact. CWD does not have the capabilities to test large meters and has not historically contracted large meter testing, making this a new initiative. The goal is to establish a baseline of meter performance and determine appropriate future testing intervals. Large meter accuracy results will directly determine replacement decisions. This approach promotes data-driven asset management, improves measurement reliability, and helps avoid unnecessary capital expense.

FISCAL IMPACT

CWD's current cost for a standard 1-inch Neptune T10 mechanical meter costs approximately $470.73, while a 1-inch Neptune MACH 10 ultrasonic meter costs around $420.00, a savings of $50.73 per meter with the ultrasonic option. Based on an annual replacement rate of 500 meters, the mechanical meters would cost approximately $235,365 versus the ultrasonic meters cost of $210,000, a cost saving of $25,365 annually

Furthermore, the cost savings increase with larger meter sizes, where the price gap between mechanical and ultrasonic meters tends to widen. In addition to upfront savings, ultrasonic meters also provide long-term benefits such as improved accuracy, reduced maintenance, and compatibility with advanced metering infrastructure (AMI), further enhancing their value over time. The comparison costs for mechanical and ultrasonic meters are listed in the table below.

Based on pricing provided by M&M Backflow and Meter Maintenance, a local contractor specializing in large meter testing, the cost for large meter testing is approximately $275.00 per meter. To test all 136 large meters to establish a baseline of meter accuracy, the total estimated cost would be approximately $37,400.00. The savings of purchasing the 500 1-inch ultrasonic meters will be applied towards the testing all 136 large meters with negligible impact to the approved budget for a new testing program.

Meter Size (Inches)	Complete Cost of Current Neptune T10/Tru Flow Meter (Mechanical)	Complete Cost of Neptune Mach 10 complete Meter (Ultrasonic)	Complete Cost of UME/Body Mechanical	Complete Cost of UME Ultrasonic
¾	$326.67	$346.67	$173.33	N/A
1	$450.73	$400.00	$273.33	N/A
1 ½	$864.00	$793.33		N/A
2	$920.00	$940.00		N/A
3	$4151.33	12" LL - $3299.33 17" LL - $3371.33	$3370.67	$1820.00
4	$5304.67	14" LL - $4210.67 20" LL - $4342.00	$4370.67	$2370.67
6	$8727.33	18" LL - $7008.00 24" LL - $7112.00	$6370.67	$3470.67
8	$14274.00	$10711.33	Same as 6"	$4570.67
	* $20 adder for 6' antenna, $42 adder for 20' antenna on mechanical and ultrasonic meters. **Tru/Flo meters require two antennas**	* $20 adder for 6' antenna, $42 adder for 20' antenna on mechanical and ultrasonic meters.		Full meter swap on 5/8"-2" meters, UME's on 3"+

RECOMMENDATION

Staff recommends that the Board of Directors approve Neptune's ultrasonic metering technology across all meter sizes as the new standard and direct staff to update the Construction Improvement Standards and purchase water meters in accordance with approved FY 25-26 Budget.

ATTACHMENT(S)

- Neptune Power Point

FERGUSON

Meter and AMI Overview

Carmichael Water District

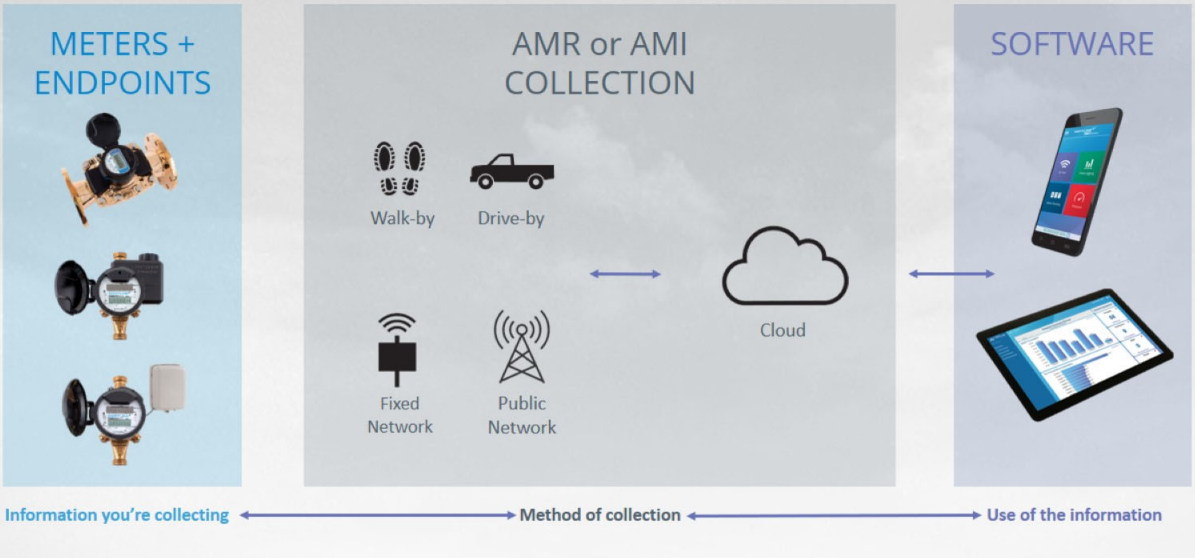
Adam Arevalo – Ferguson Waterworks

9/10/2025

What makes up a metering system?

1. A **meter** to measure the water
2. An **endpoint** to send the reading from the meter
3. A receiver to collect that reading (**collection method**)
4. A **software** to make use of the data and to send it to their software for billing

Metering Network

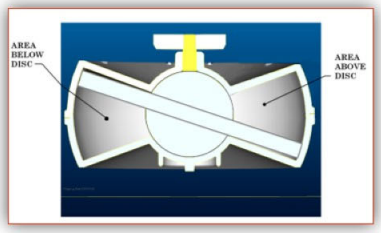


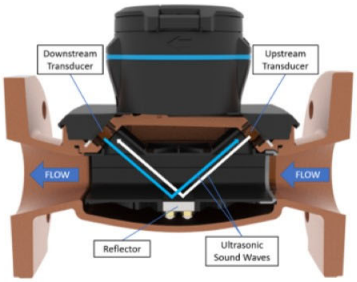
Types of Meters

Metrology, Size and Application

Metrology Types

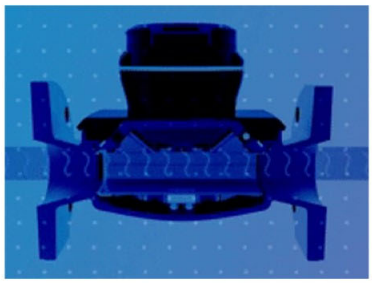
- Volume vs. Velocity
  - **Volume** - meter displaces a certain amount of volume per magnet revolution
    - Positive Displacement (Disc Meters)
  - **Velocity** – meter measures rate of flow and pipe size to calculate consumption
    - Turbines, Electromagnetic, and Ultrasonic Meters





Metrology Types

- Mechanical vs. Electronic
  - **Mechanical** – Meters use moving parts to measure water usage
    - Discs, Turbines are centuries old designs
  - **Electronic** – No moving parts; electronic signals measure water usage
    - Relatively new; electromagnetic came first, but ultrasonic is here…(*white paper*)



T-10®

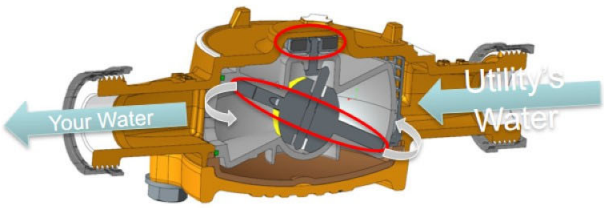
- What is it? Nutating Disc Meter used for residential and "light commercial" applications
- Sizes 5/8" to 2" cover a flow range of 1/8" to 160 GPM
  - Positive Displacement method measures volume of water usage
  - TRU/FLO and HP PROTECTUS III compound meters utilize T-10 design for low flow measurements at commercial sites

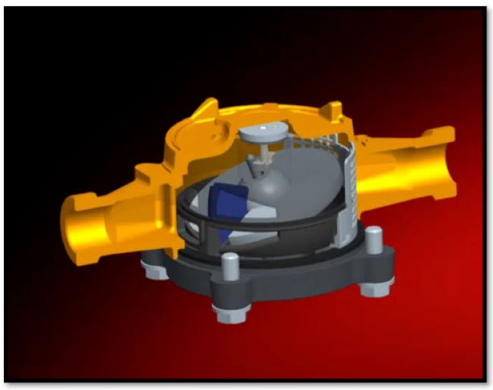
5/8" T-10

2" T-10

Positive Displacement

- Direct **volumetric** measurement
  - Fills, empties a chamber of fixed volume – prevents over registration
- Water displaces the disc and spins the magnet
- Each magnet revolution equals a certain volume of water
  - For this size, 1 magnet rev means approximately 0.02 gallons of water went through the meter





NEPTUNE TECHNOLOGY GROUP

T-10®

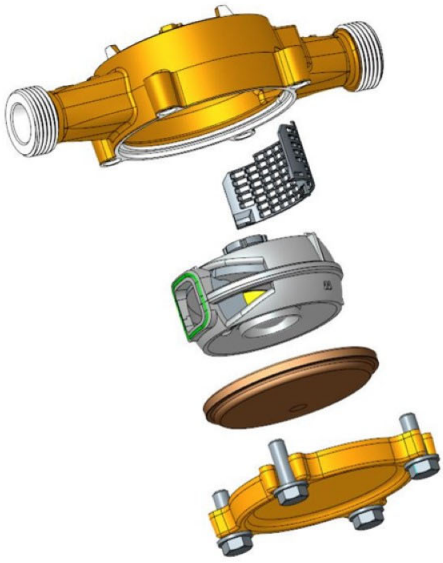
NEPTUNE TECHNOLOGY GROUP

Benefits

- Excellent low flow accuracy
- Not affected by upstream flow disturbances

Considerations

- Limited in high flow rates by pressure losses
- Limited in size by forces on ball and disc



MACH 10®

- What is it? Ultrasonic meter used in residential and commercial applications.
- Initially launched in 2015 in multiple lay lengths
- Sizes 5/8" to 2" (pipe) diameter provide flow range of 0.05 to 160 GPM
- Ultrasonic signals measure the velocity of the water

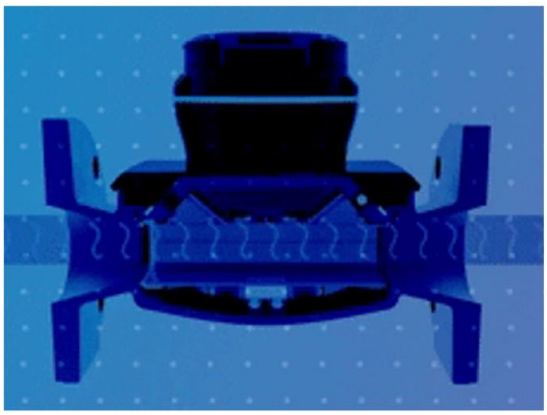
Meter Size	Normal Operating (±1.5%)	Extended Low Flow (±3%)
5/8"	0.10 to 25 gpm	0.05 gpm
3/4"	0.10 to 35 gpm	0.05 gpm
1"	0.40 to 55 gpm	0.25 gpm
1-1/2"	0.80 to 125 gpm	0.30 gpm
2"	1.50 to 160 gpm	0.50 gpm

NEPTUNE TECHNOLOGY GROUP

Ultrasonic Technology

NEPTUNE TECHNOLOGY GROUP

- What is Ultrasonic Technology?
  - Uses transducers to transmit and receive **ultrasonic sound waves** through the water
  - The difference in **transit time** of each sound wave is used to measure the flow rate
  - More later…



MACH 10®

- Benefits
  - Extreme low flow capabilities
  - No moving parts, no maintenance
  - Sustained accuracy
  - 20 year battery life
  - Meter flags such as low battery, reverse flow
  - UL Listed for residential fire service (¾" to 2")

Meter Size	Thread/Flange	Lay Length
5/8"	5/8" 3/4"	7-1/2" 7-1/2"
3/4"	3/4" 1"	7-1/2", 9" 9"
1"	1" 1-1/4"	10-3/4"
1-1/2"	Oval Oval Int or Ext Thread	13" (T-10®) 10" (HP Turbine) 12.63" (T-10®)
2"	Oval Oval Oval Int or Ext Thread	17" (T-10®) 15.25" (TRU/FLO®) 10" (HP Turbine) 15.29" (T-10®)

NEPTUNE TECHNOLOGY GROUP

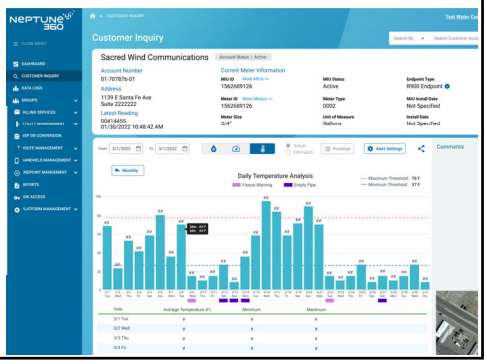
MACH 10®

- Considerations
  - Meter must be replaced at end of life (battery)
  - Ultrasonic metrology can be affected by too much air (bubbles)
  - Electronic display (no old school dials)

NEPTUNE TECHNOLOGY GROUP

T&P Solution

- Temperature & Pressure Solution
  - MACH 10 (Pressure optional)
  - R900 Cellular Endpoint (AMI)
  - Neptune 360



C&I Meters

- Commercial and Industrial
  - At Neptune, includes meter sizes 3” and above
  - Many utilities consider 1.5” and 2” as commercial meters, too
  - Also includes Fire Service meters
- Ideal for “Large water” accounts
  - Lowest in quantity, but highest in volume and revenue
  - Meters used for applications measuring large consumption of water
  - Business parks, malls, colleges, factories, etc.
- Still often require a low flow measurement capabilities, however

C&I + Fire Service Meters

- HP Turbine Meter
  - Formerly "Trident Turbine" (difference)
- TRU/FLO Compound Meter
  - PD + Turbine
- C&I MACH 10 Ultrasonic Meter
  - No Moving Parts
- HP PROTECTUS III Fire Service Assembly
  - Combo Meter

HP Turbine

TRU/FLO

C&I MACH 10

HP PROTECTUS III

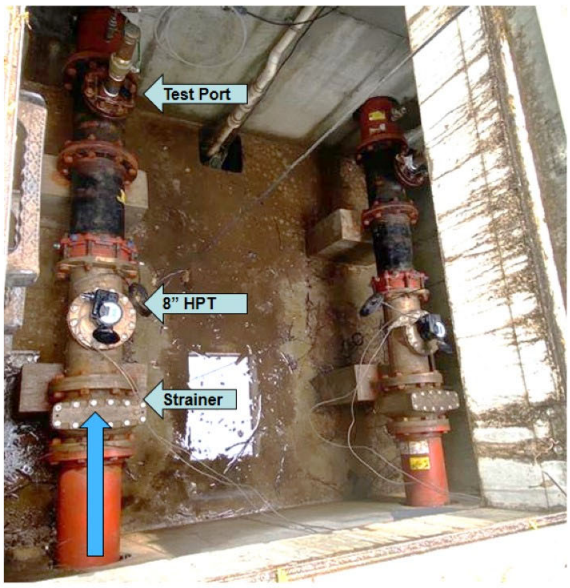
HP Turbine (HPT)

- What is it? Velocity meter with hydrodynamically balanced rotor
- C&I Sizes 3" to 10" cover a flow range of 5 to 6,500 GPM
  - Predecessor was *Trident* Turbine
  - Trident still used on 1.5" and 2" Turbines as well as 3" Fire Hydrant Meter
  - Trident has a square cover whereas HPT has a circular cover
- HPT, TRU/FLO, and HP PROTECTUS III all utilize HPT design

HPT Applications

Moderate to High Flow Rates

- Processing plants
- Manufacturing facilities
- Irrigation lines
- Lawn sprinkler systems
- Wells
- Effluent water in treatment plants
- Office buildings

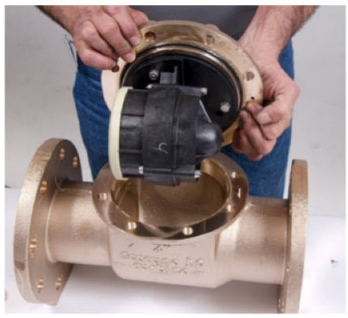


NEPTUNE TECHNOLOGY GROUP

HP Turbine

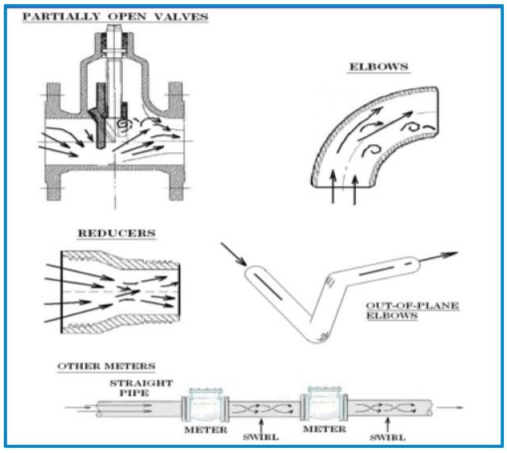
NEPTUNE TECHNOLOGY GROUP

- Benefits
  - Minimal wear on parts
  - Field Replaceable Unitized Measuring Element (UME)



HP Turbine

- Considerations
  - Lack of low flow capabilities
  - Straight pipe requirements to condition flow and protect meter (up to 10x pipe diameters)
    - Irregular flows or jetting caused by plumbing (valves, elbows, etc)
      - Strainers STRONGLY recommended for debris protection and flow conditioning
      - Routine cleanout of strainer



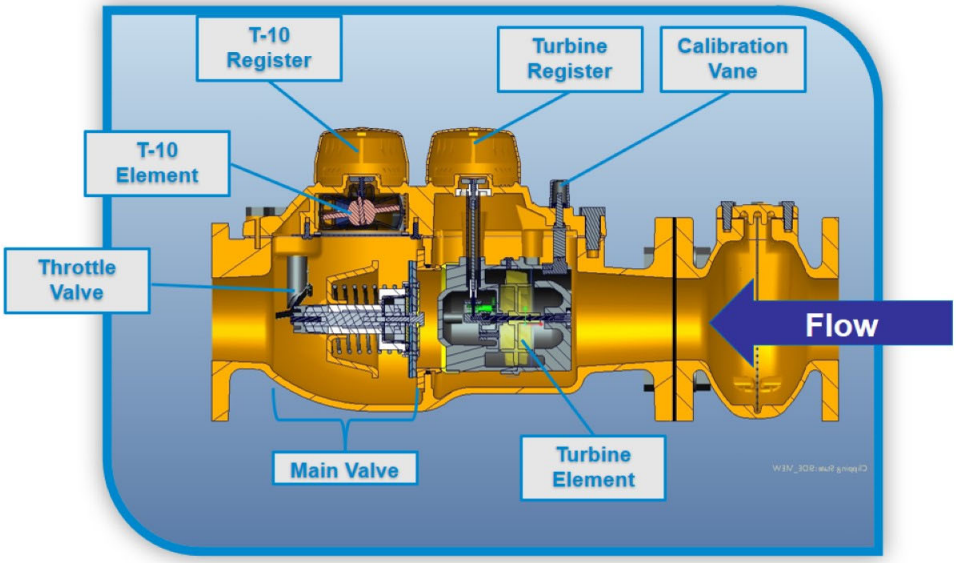
TRU/FLO Applications

- Low to High Continuous Flow Rates
- Apartment buildings
- Motels/Hotels
- Condominiums
- Mobile home parks
- Hospitals/Schools
- Restaurants
- Department Stores

TRU/FLO® Compound Meter

- What is it? Two meters in one maincase
  - Residential T-10 (PD) meter for low flow
  - Turbine meter for moderate to high flows
- Sizes 2" to 6" cover a flow range of 1/8 to 2,000 GPM

TRU/FLO®



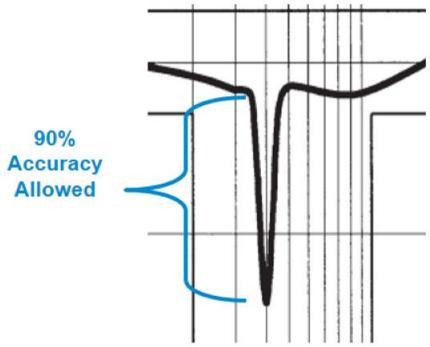
TRU/FLO® Compound Meter

- Benefits
  - Full flow range with excellent low flow (1/8 gpm at 95%)
  - Integrated Test Port
  - Field-replaceable UME

NEPTUNE TECHNOLOGY GROUP

TRU/FLO® Compound Meter

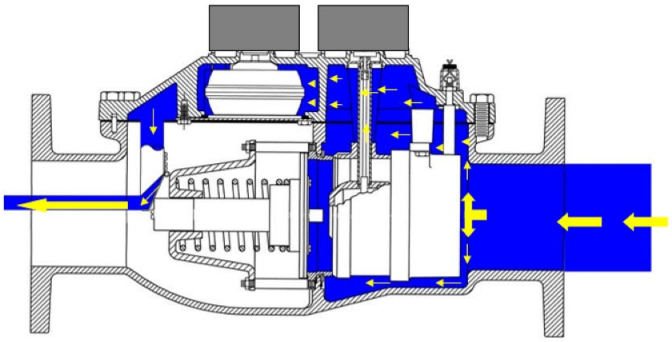
- Considerations
  - Crossover
    - Internal Hydraulic Valve enables transition of flow
    - Potential loss of accuracy (Non-Revenue Water)



NEPTUNE TECHNOLOGY GROUP

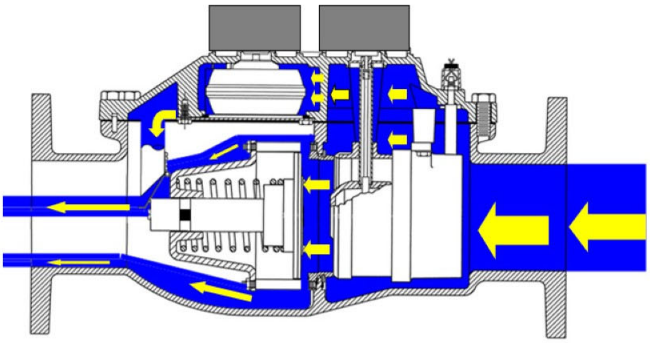
Low Flow

- Water flows through T-10 meter
- Main valve is closed keeping turbine from rotating and registering



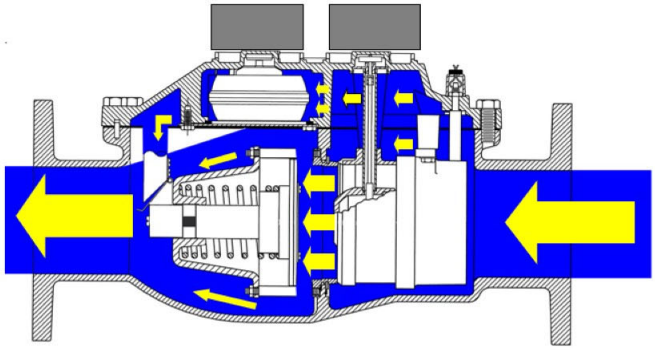
Crossover

- Transition from low flow to moderate/high flows
- Valve begins to open allowing flow to move through the turbine
- Both meters and registers in operation
- Accuracy dips during this time
  - AWWA allows for 90% accuracy



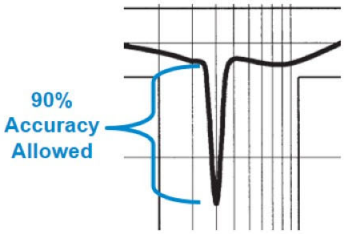
Moderate & High Flow

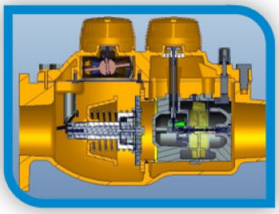
- Valve is fully open
- Flow is moving through both meters and registers and accumulating flow
- Normal accuracy specs apply



TRU/FLO® Compound Meter

- Considerations
  - Crossover
    - Internal Hydraulic Valve enables transition of flow
    - Potential loss of accuracy (Non-Revenue Water)
  - Two-meter reads require consolidation for billing
  - Many moving parts (two meters worth) and thus more maintenance
  - Straight pipe requirements (up to 10x pipe diameters)
    - Strainers STRONGLY recommended for debris protection and flow conditioning
    - Routine cleanout of strainer



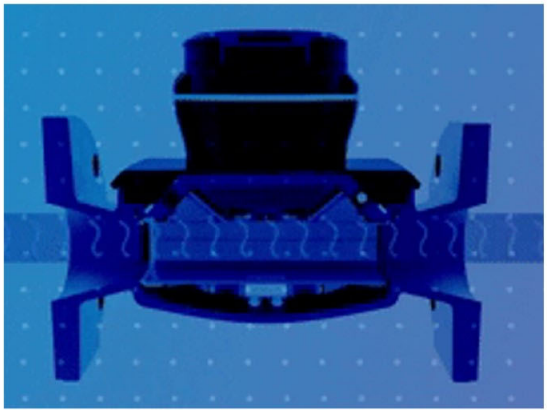


C&I MACH 10

- The **Commercial and Industrial** (C&I) MACH 10 meters are a scaled up version of our residential and intermediate ultrasonic technology
- C&I available in sizes 3", 4", 6", 8", 10" and 12"
  - Flow range of 0.5 to 8000 GPM
  - Compound or turbine lay lengths available
  - 10 Year Useful Battery Life
- A new alternative and viable replacement option for existing Compound, Turbine, and Fire Service mechanical meters.

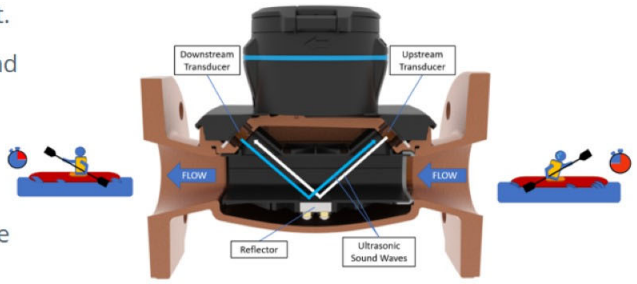
Ultrasonic Technology

- What is Ultrasonic Technology?
  - Uses transducers to transmit and receive **ultrasonic sound waves** through the water
  - The difference in **transit time** of each sound wave is used to measure the flow rate



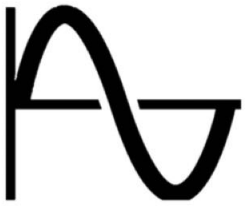
Transit Time

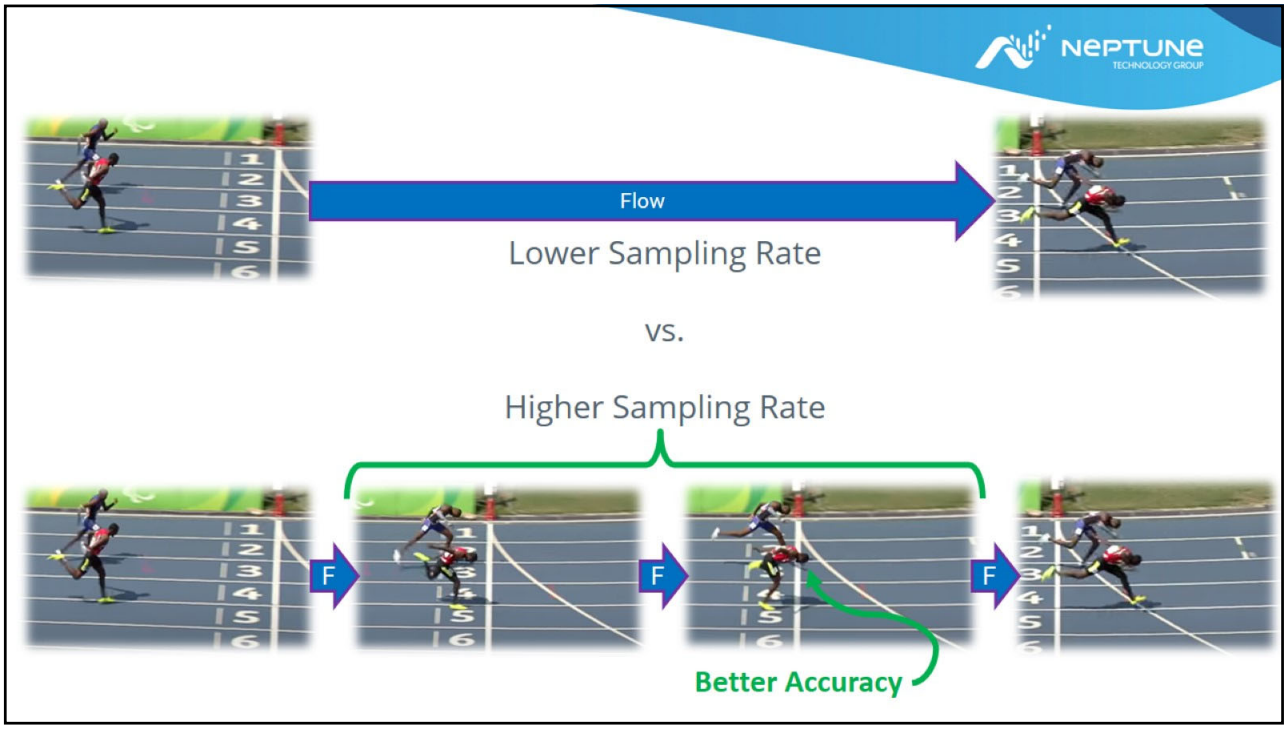
- Transit time is the difference between an upstream and downstream flow measurement.
- Sample data is captured going with the flow and against the flow.
  - Like in kayaking, paddling upstream will take longer than paddling downstream
- Ultrasonic meters use this principle to measure the *velocity* of the water
- Using this measurement, the MACH 10 then calculates the flow rate and consumption



Sampling Rate

- The MACH 10 offers an industry-best sampling rate of 4x per second.
- What is Sampling Rate?
  - How much data the meter's collecting
  - The number of data points collected per second
- Meters with higher sampling rates measure water more frequently
- Higher sampling rates provide more fidelity and are better at measuring variable flow rates
- The MACH 10's sampling rate is the same during testing and field operation.





C&I MACH 10

- Benefits
  - NO moving parts
    - No wear and tear = no maintenance
    - Sustained accuracy (10 Year Accuracy Warranty)
  - Superior flow ranges with extreme low flow capability and No Crossover
  - Lower Pressure Losses

C&I MACH 10

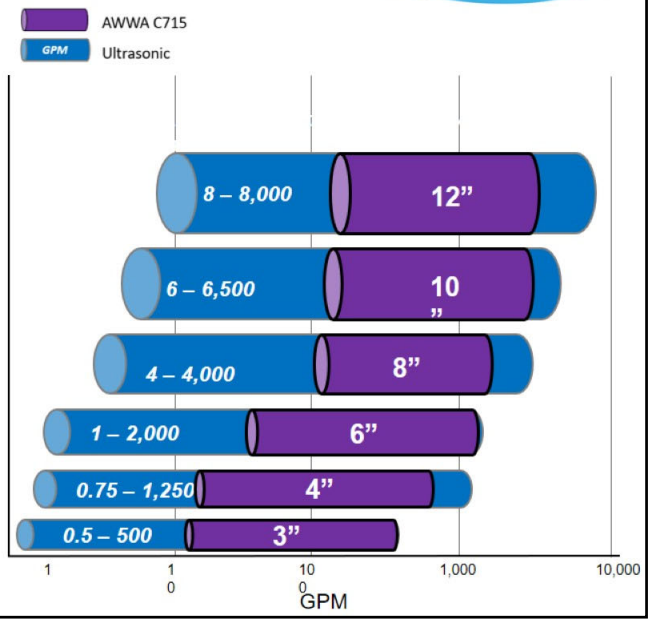
- Benefits
  - Lighter weight than traditional mechanical meters
  - UL/FM Certified for Fire Service
  - Field-replaceable UME
  - Little to no straight pipe requirements
    - Strainer optional

C&I MACH 10

- Considerations
  - Battery Powered
  - Ultrasonic metrology can be affected by too much air (bubbles)
    - Purging required at install (bleed screw provided)
  - Pressure requirements at moderate to high flows
    - Minimum 30 psig at inlet of meter (Avoids cavitation)

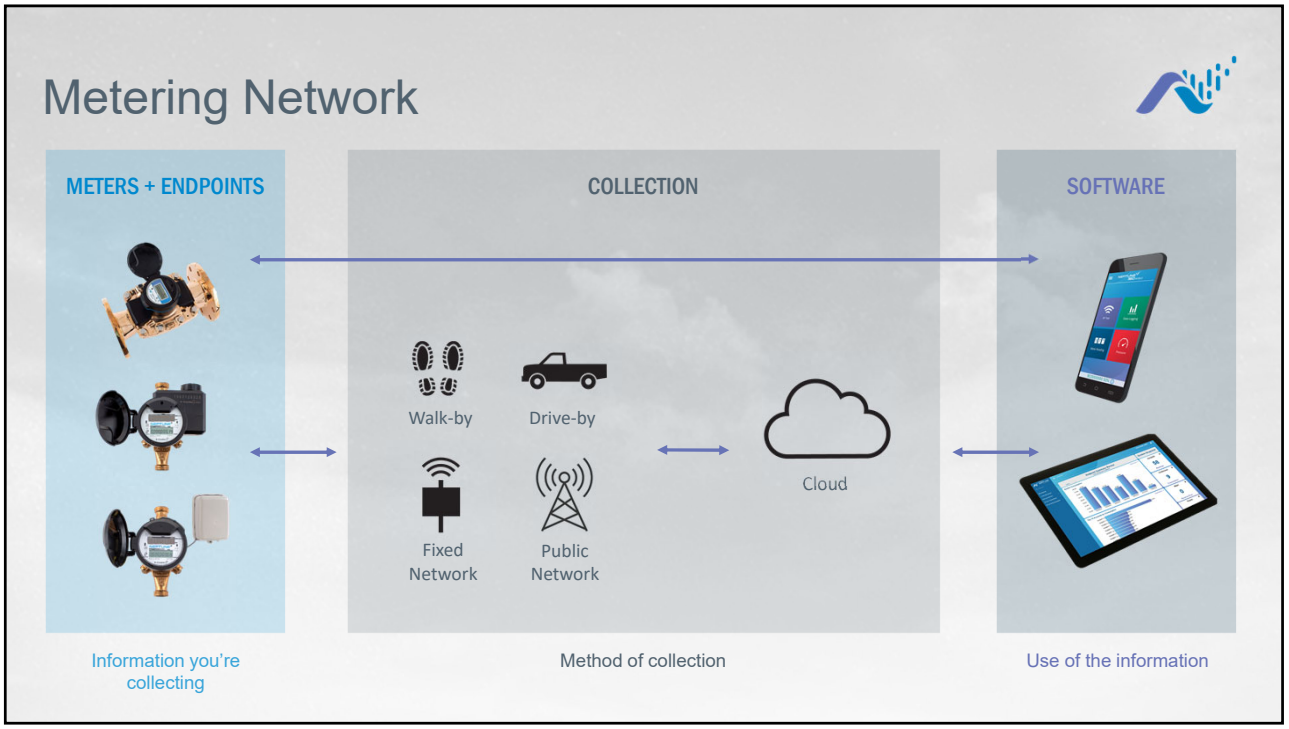
Flow and Sizing

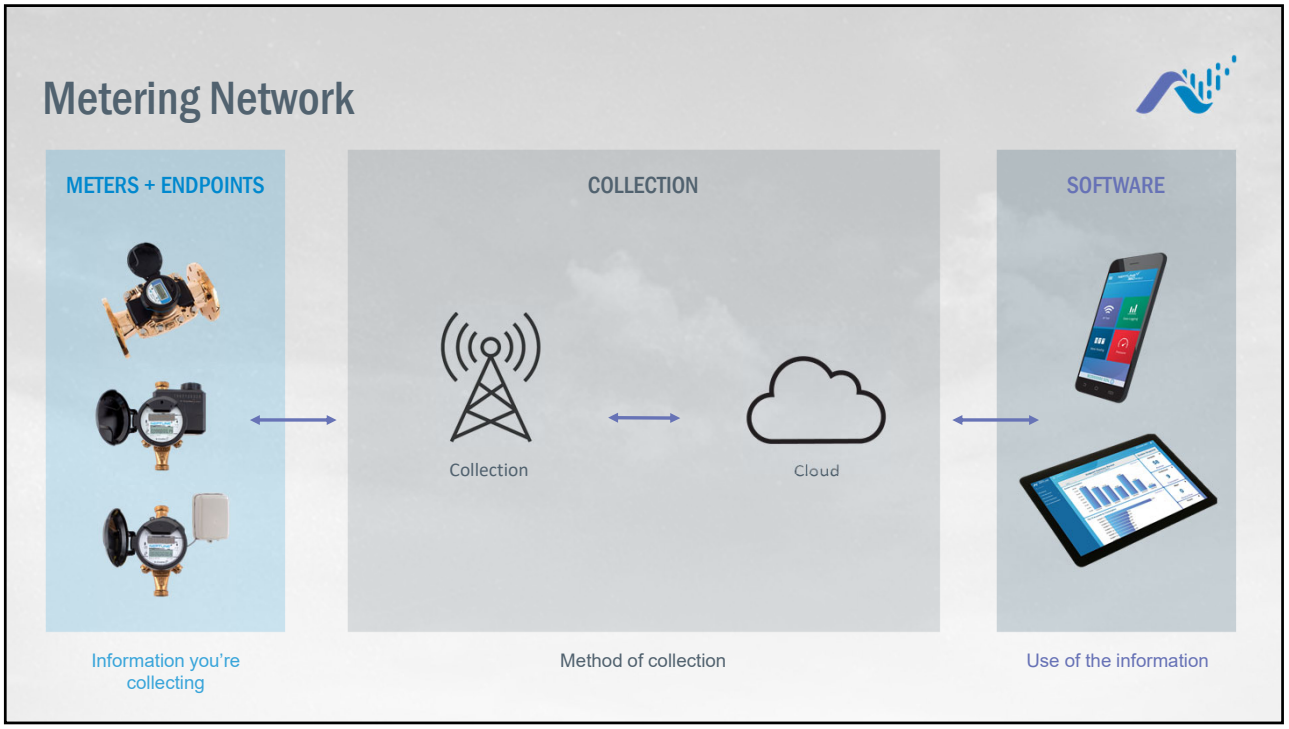
- Widest flow ranges PLUS extreme low flow capability for **better leak detection**
- As low as **0.5 GPM** and as high as **8,000 GPM**
- Extended Low Flow standard of **+/- 3%** accuracy
- More stringent than AWWA Ext Low Flow of +/- 5% accuracy

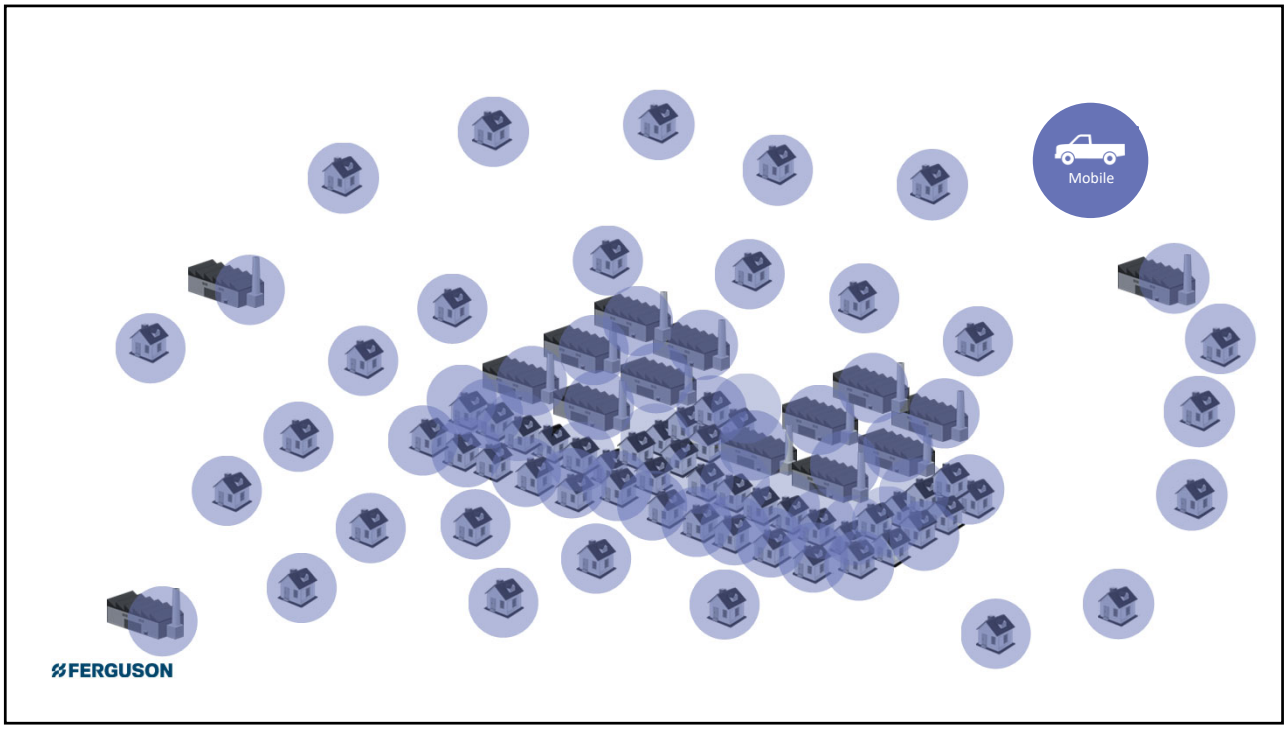


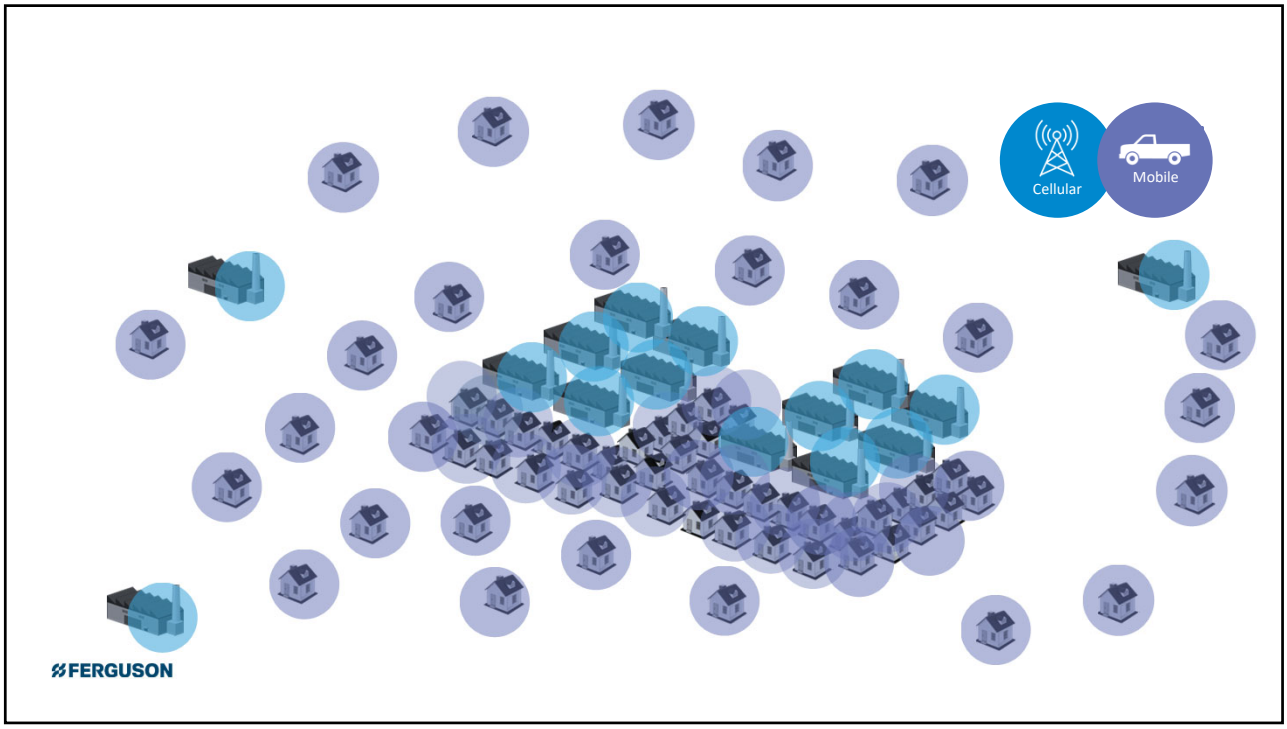
UME

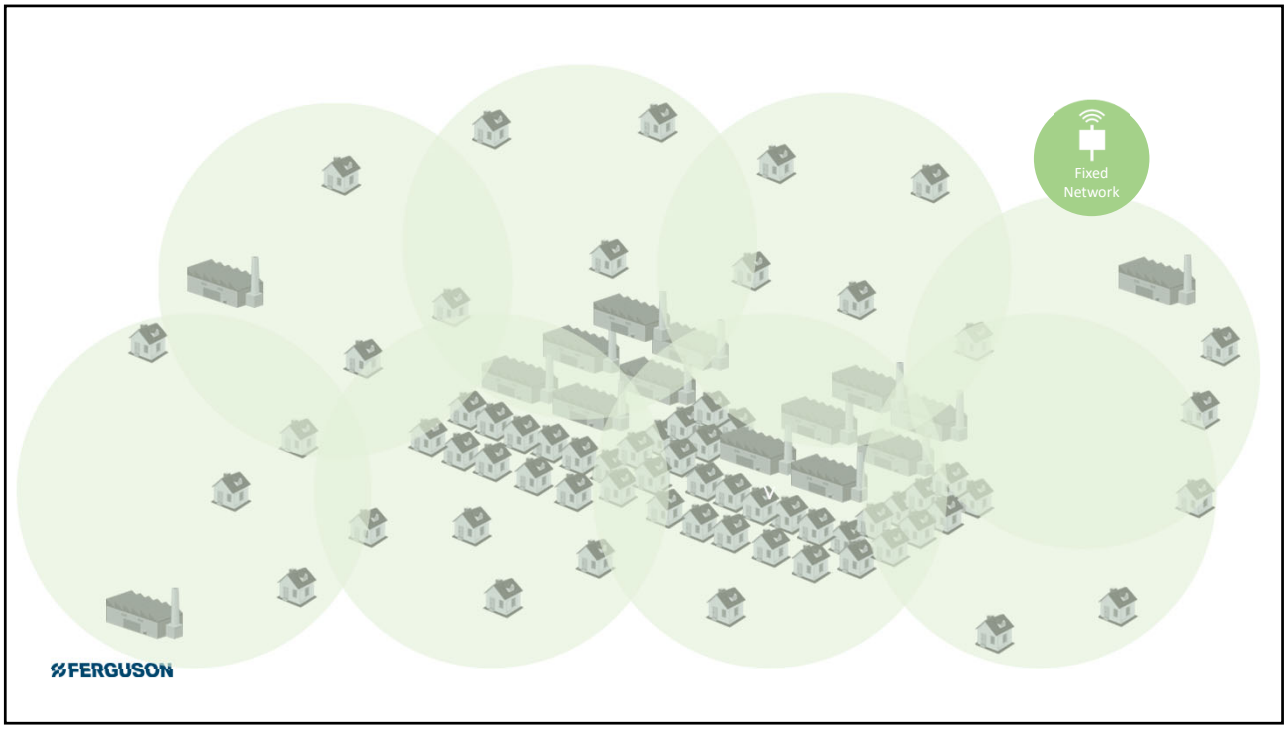
- Unitized Measuring Element (UME)
  - Contains all (potted) electronics including register, battery plus measuring chamber with transducers and mirror
- Industry’s *only* solid-state “UME”
  - Factory-calibrated and field-replaceable
  - No field testing necessary (new revision of M6 Manual under review)
  - No replacement parts – UME assembly only
- C&I MACH 10 battery has a 10-year life capacity
  - Simply replace the UME after its useful life

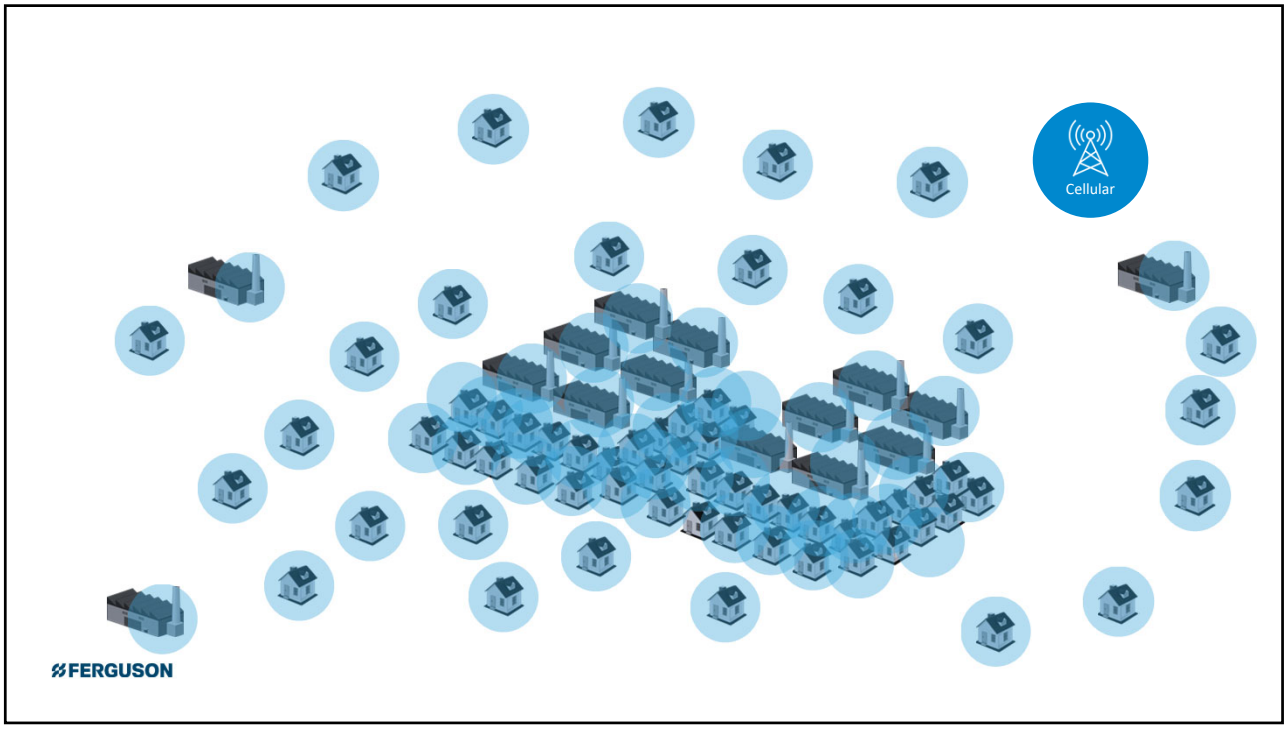

Metering Network
METERS + ENDPOINTS
COLLECTION
SOFTWARE
Walk-by
Drive-by
Fixed Network
Public Network
Cloud
Information you're collecting
Method of collection
Use of the information


Metering Network
METERS + ENDPOINTS
COLLECTION
SOFTWARE
Collection
Cloud
Information you're collecting
Method of collection
Use of the information


Mobile
FERGUSON


Cellular
Mobile
FERGUSON


Fixed
Network
FERGUSON


Cellular
FERGUSON

Predicted Coverage Results:

Total population size: 11,722

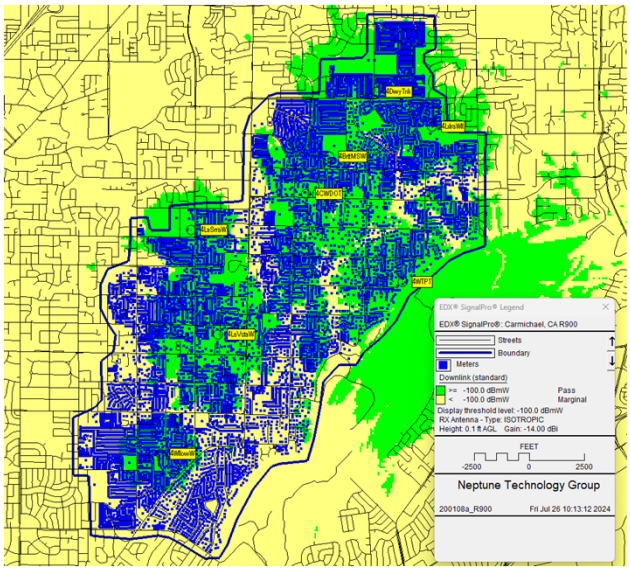
- 71 of 11,722 locations could not be evaluated due to invalid coordinates.
- 100.00% (11,651 of 11,651 locations) are expected to have adequate coverage.
  - 11,424 of the 11,651 support the deployment of Neptune's R900 Enhanced Pit endpoint.
  - 212 of the 11,651 support the deployment of Neptune's FirstNet cellular endpoint.
  - 15 of the 11,651 support the deployment of Neptune's Verizon cellular endpoint.
- 0.00% (0 of 11,651 locations) are inconclusive.

Map	Description	Provided Services		11,722	Geocoded Services	11,651	Area (sq Miles)	8.60
		#Coll	MIU Type	Read Type	Projected	% Projected	Projected	% Projected
2a	Best Provided	8	R900v4 Pit	Daily	7,385	63.38%	5.04	58.62%
2b	Best Provided	8	R900v4 Pit	Billing	8,272	70.99%	5.71	66.35%
3a	>98% Predicted	19	R900v4 Pit	Daily	11,424	98.05%	8.18	95.07%
3b	3a as Billing	19	R900v4 Pit	Billing	11,570	99.30%	8.60	100.00%

47

Confidential Information

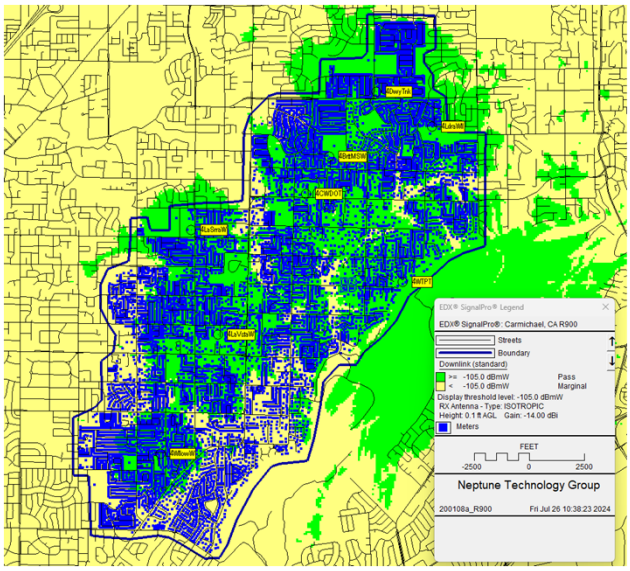
Map 2a: Best Provided – Daily R900 Gateway Coverage



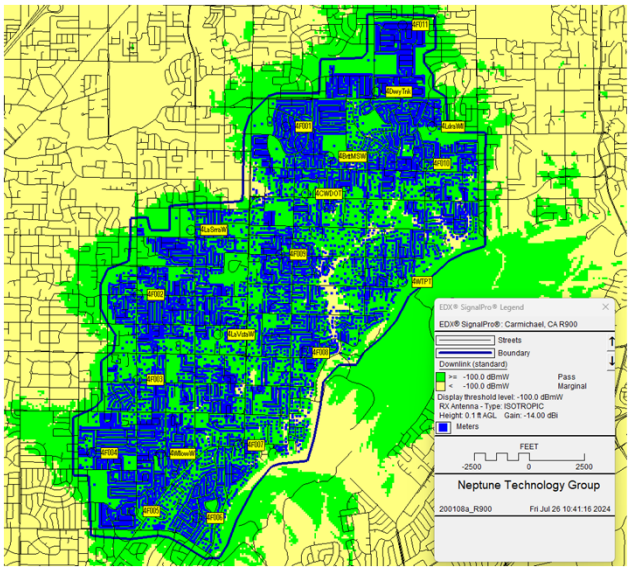
48

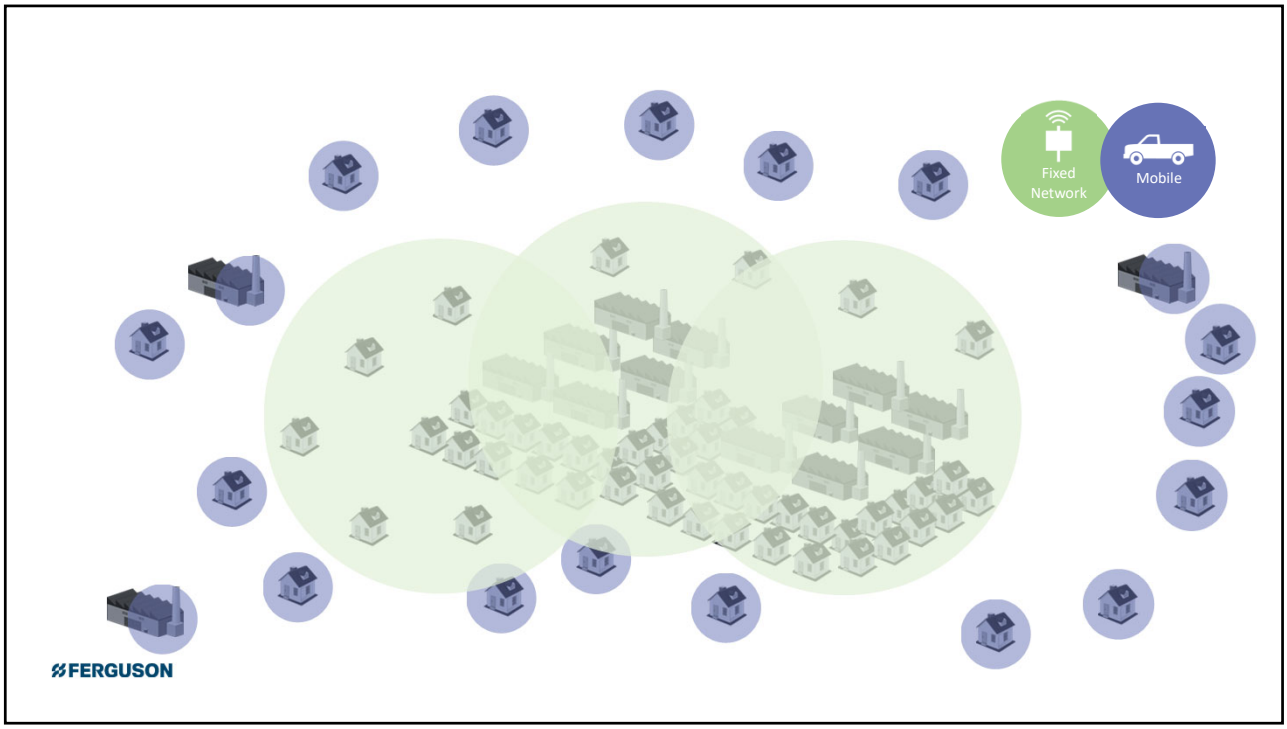
Confidential Information

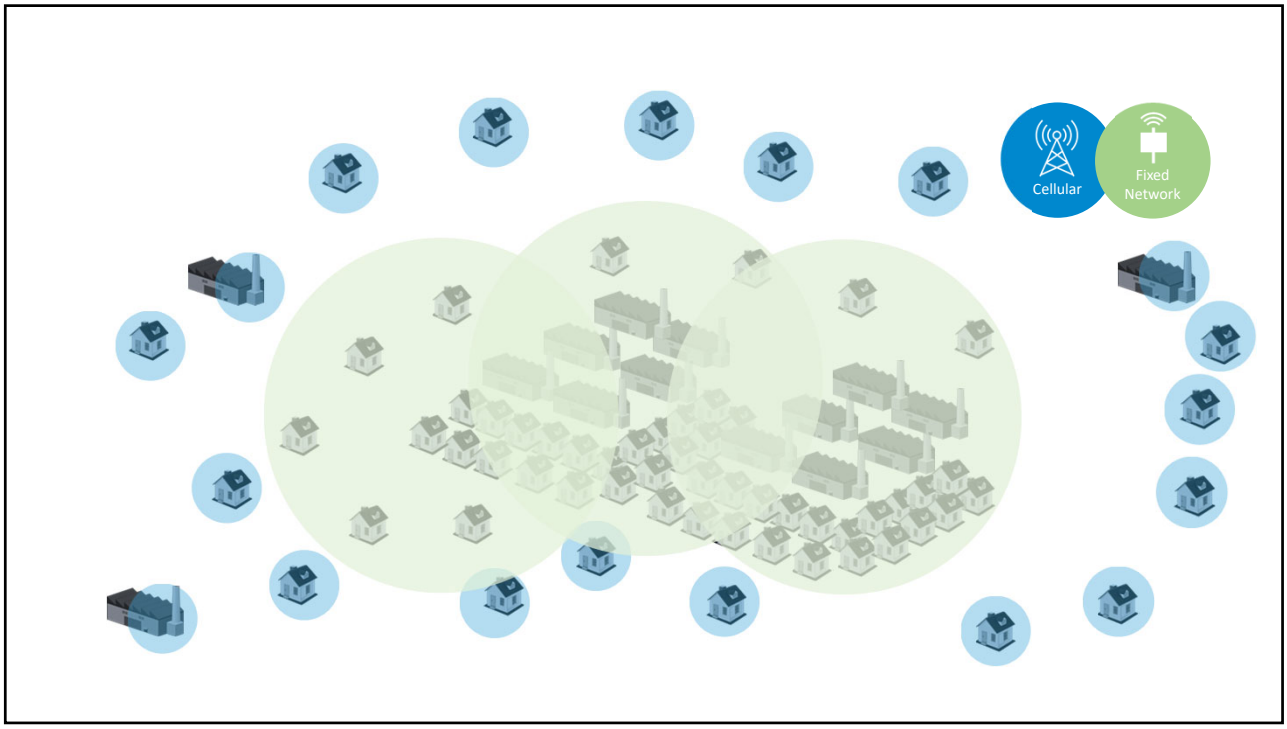
Map 2b: Best Provided – Billing R900 Gateway Coverage



Map 3a: >98% Predicted – Daily R900 Gateway Coverage




Fixed Network
Mobile
FERGUSON


Cellular
Fixed Network

Meter and AMI Overview

Adam Arevalo

Adam.Arevalo@Ferguson.com

FERGUSON.COM

858-335-5392

FERGUSON

Topic: Sacramento Regional Water Bank – Starting Balance

Date: September 8, 2025

Item For: Action

Submitted By: Cathy Lee, General Manager

BACKGROUND

The Sacramento Regional Water Bank (SRWB) is considering a "starting balance" for water that has previously been banked from the conjunctive use practice via in-lieu groundwater recharge. The goal of a "starting balance" is to recognize the amount of previously banked water that is to be determined through a modeling analysis.This will establish a starting balance for any regional conjunctive use participant who may have already performed in-lieu groundwater recharge.

The District held a special Board of Directors meeting on August 7, 2025 and invited Mr. Trevor Joseph, Manager of Technical Services, of the Regional Water Authority (RWA) to discuss the modeling results.

SUMMARY/DISCUSSION

The portion of groundwater basin within the Sacramento Groundwater Authority (SGA) appears to be in good condition due to past conjunctive use efforts allowing water to be "banked" to achieve groundwater level goals. The Starting Balance Modeling Analysis is to address the question:

> *"How much water has been banked (recharged) in the North American and South American subbasins (NASb &SASb) by Water Bank Participating Agencies that is above and beyond what (1) is needed for sustainability under SGMA developed GSPs, (2) has already been transferred, and (3) has been lost from the subbasins?"*

RWA selected Woodard & Curran to conduct the modeling analysis using the region's CoSANA model. The remaining "in-basin" banked water is about 53%, 248,000 acre-feet (248 TAF), of the original in-lieu banked water of 467 TAF. About 47% of the water flowed out of the basin contribution to stream flow and subsurface flow. The Technical Memorandum for the modeling analysis is attached in Attachment 2.

The modeling analysis results indicated that of the 91,887 AF of water previously banked by the Districts, 48,4791 AF (53%) is available for recognition for SRWB's Water Accounting System (WAS) starting balance. WAS incorporates an annual 6% lows for the North American Subbasin (NASb) and the starting balance will be re-evaluated in 5 years.

The previously banked water/starting balance is no different than newly banked water subject to all SRWB provisions, including but not limited to the following crtieria:

- **Recharge before recovery -** Only operating with a positive balance via verified deposits (in-lieu & direct recharge),
- **Banking Losses Tracking -** Periodic calculation of contributions to streams and other basins accurately calculate recoverable balances,

- **Leave Behind Requirements -** Application of leave behind when surface water is transferred,
- **Geographically Balanced Recharge/Recovery -** Recharge and extraction from the same basin and area,
- **Enhanced Monitoring Plan -** Expanded monitoring of groundwater conditions, with use of sentry wells around the banking area to track operations, and
- **Adaptive Management -** Specific provisions that consider hydrological conditions to guide operations and support groundwater sustainability, including annual planning and coordination, groundwater level monitoring and warning, response actions for areas with Minimum Threshold (MT) and Approaching MT Exceedances, and adaptive management review.
- **Dispute Resolution -** Process to advance equitable solutions if issues arise.

RECOMMENDATION

Staff recommends that the Board of Directors accept the Starting Balance Modeling Analysis conducted by the Regional Water Authority for the Sacramento Regional Water Bank and support full remaining in-basin previously banked water subject to the Water Accounting System criteria.

ATTACHMENT(S)

1. Analysis of Previously Banked Water

ATTACHMENT 1

REGIONAL WATER AUTHORITY

SACRAMENTO REGIONAL WATER BANK

ANALYSIS OF PREVIOUSLY BANKED WATER

Version 1

September 10, 2025

Prepared by

Woodard & Curran

Regional Water Authority
BUILDING ALLIANCES IN NORTHERN CALIFORNIA

SACRAMENTO REGIONAL WATER BANK
A Sustainable Storage & Recovery Program

EXECUTIVE SUMMARY

Purpose

The purpose of this memorandum is to document the analysis of specific conjunctive use programs located in the North American subbasin (NASb) and South American Groundwater subbasin (SASb). As a result of these conjunctive use programs, there has been a significant amount of water banked over the past three decades. In the context of Sacramento Regional Water Bank (SRWB) operations, this banked water is referred to as Previously Banked Water (PBW). The analysis performed includes estimates of the amount of PBW that remains in-basin and amount that has left the basin (i.e., out-of-basin contributions). The findings will guide policy decisions that recognize investments made by the local agencies in conjunctive use infrastructure and operations over the past 30 years and the PBW that remains in-basin volume will be used in setting a starting balance for the SRWB operations.

PBW Volumes

Within the NASb, PBW has been accounted for through the SGA's Water Accounting Framework (WAF), and in the SASb, through records of water agencies. The reported banked water volumes were compiled for each agency and upon verification of the amounts, the volumes were recorded on a monthly basis for each entity. Table ES-1 presents the final amount of PBW for each participating agency as of September 30, 2024.

Table ES-1. Initial PBW Balances (as of September 30, 2024)

Agency	PBW (AF)
California American Water Company	17,102
City of Sacramento	90,035
Carmichael Water District	91,887
Sacramento Suburban Water District	268,541
Noth American Subbasins - Subtotal	*467,565*
Golden State Water Company	215,166
Sacramento County Water Agency	216,327
South American Subbasins - Subtotal	*431,493*
TOTAL	899,058

The PBW for each agency is accounted for on a monthly basis and is aggregated to annual values as illustrated in Figure ES-1 for NASb and SASb entities, respectively.

In the Sacramento area, the groundwater aquifers have hydraulic connections with certain reaches of major river courses. Furthermore, the groundwater aquifers in the NASb and SASb are part of the Sacramento Valley hydrologic region and have subsurface interconnection with the neighboring subbasins. As such, changes to the groundwater levels and storage affect the flows between the stream and aquifer system as well as flows with the neighboring subbasins.

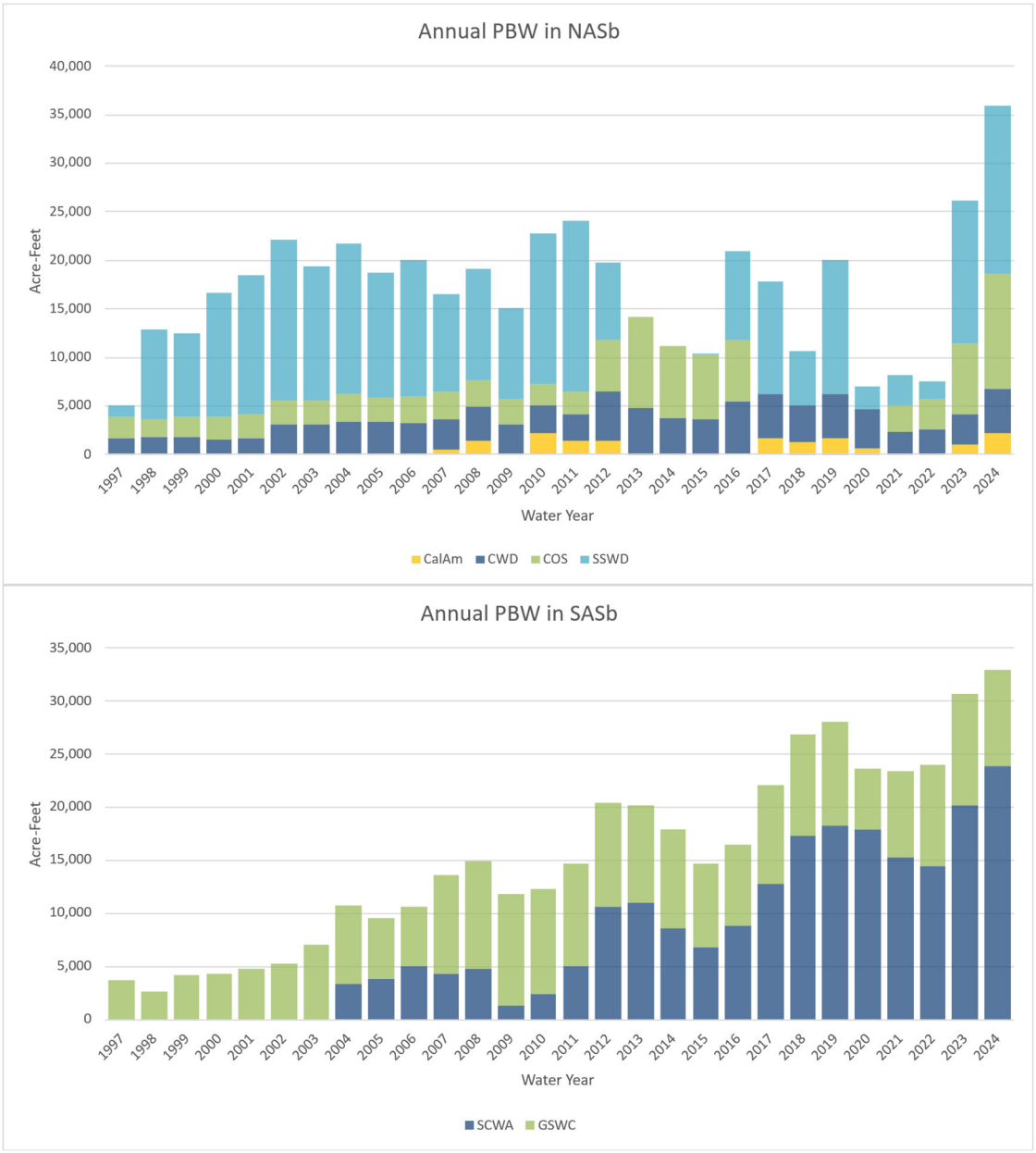
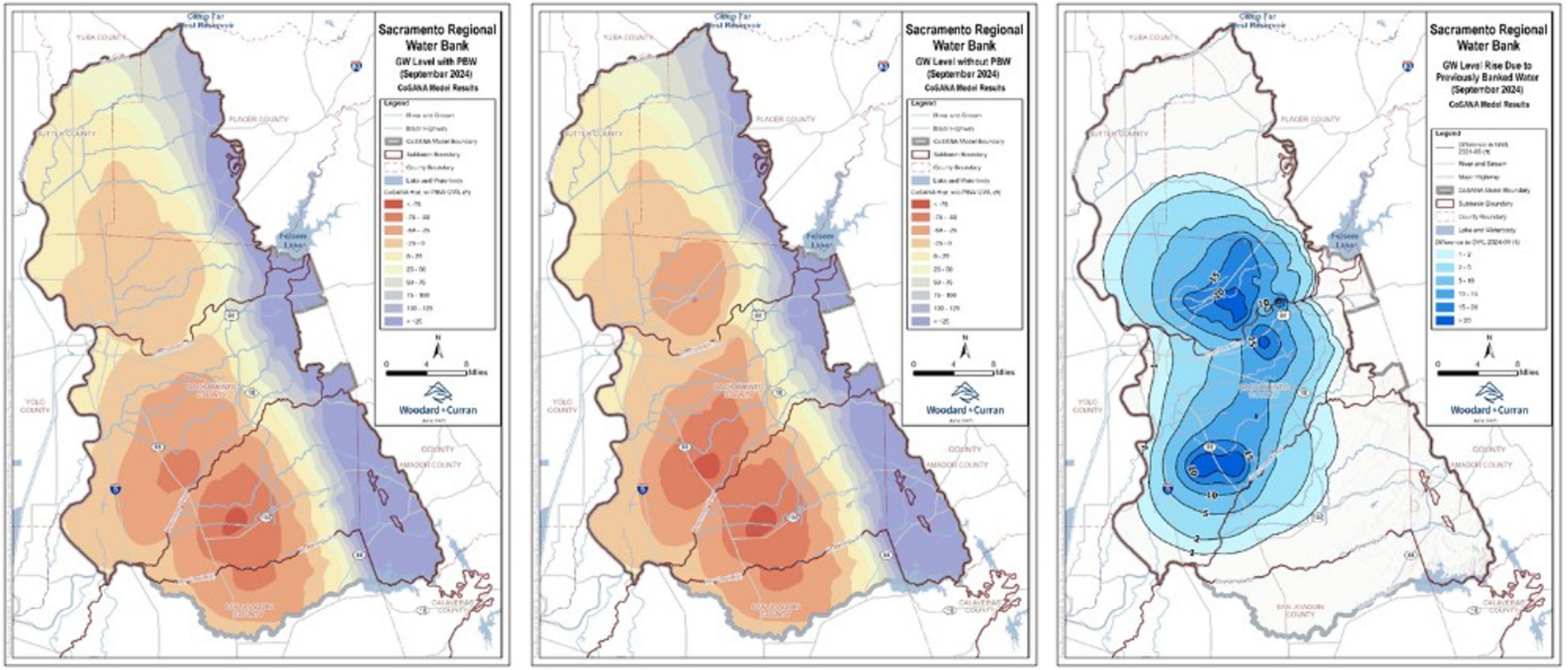


Figure ES-1 – Annual PBW balances for NASb and SASb

Use of Groundwater Model

In order to analyze this integrated system of groundwater, stream, and land surface conditions, the Cosumnes South American North American (CoSANA) model was used. The CoSANA model is an integrated hydrologic and groundwater model that has been developed to evaluate the integrated hydrologic system in the NASb, SASb, and Cosumnes subbasins in support of the Groundwater Sustainability Plan (GSP) for each respective subbasin, as well as other water resources planning and management programs and projects in the region. The CoSANA has a long-term monthly hydrologic period and is calibrated to the observed groundwater levels and streamflows over time. CoSANA model is also used for analysis of the SRWB and the California Environmental Quality Act (CEQA) environmental documents.

Using the CoSANA version that represents the historical land and water use conditions, two scenarios were analyzed: (i) the historical conditions with PBW, and (ii) the historical conditions without PBW. The latter reflects conditions of the subbasins over time in the absence of PBW; conditions where all land and water use and development would have taken place without the conjunctive use program and where groundwater would have been the source of water supply replacing the surface water that was brought into the basin for conjunctive use. Figure ES-2 illustrates the groundwater conditions resulting from these scenarios. Figure a illustrates groundwater levels in September 2024, as depicted by the calibrated model. Figure b illustrates groundwater levels that would have been experienced as of September 2024, had the conjunctive use program not been in place over the past three decades. This figure indicates much lower groundwater levels and more expanded cones of depression. Figure c illustrates the difference between figures a and b, which indicates changes in groundwater levels as a result of implementation of conjunctive use program and PBW.



A- Scenario 1: Historical Conditions **with** PBW

B- Scenario 2: Historical Conditions **without** PBW

C- ΔGWL (Scenario 1 – Scenario 2) **Effects of PBW** on GWL

Figure ES-2 – Groundwater Contours & Difference Maps

Estimating Out-of-Basin Contributions and In-Basin Balance

The implementation of conjunctive use over the past three decades was as a result of the Water Forum Agreement in the SGA area and the NASb, the goals of which was to (1) maintain the long-term sustainable yield of the area of the groundwater basin under its delegated jurisdiction; (2) manage the use of groundwater in the area of the basin under its delegated jurisdiction and facilitate implementation of an appropriate conjunctive use program by the area purveyors; (3) coordinate efforts among all participants in the local groundwater management plan to devise and implement strategies to safeguard groundwater quality and; (4) work collaboratively with the responsible groundwater management entities in other areas to promote coordination of policies and activities throughout the basin. In the SASb area, implementation of conjunctive use was a deliberate decision by the SASb entities to diversify their water supply portfolios to mitigate threats from contamination plumes and increase water supply reliability.

The implementation of conjunctive use program and banked groundwater in both the NASb and SASb resulted in long-term rise of groundwater levels, which in turn contributed flows to the major stream systems in the area (primarily American River) and to the neighboring groundwater subbasins. As a result, the in-basin balance of PBW volume is reduced by approximately 4 to 7 percent a year and 7 to 9 percent a year in NASb and SASb, respectively. Table ES-2 presents the volumes of In-basin remaining balance for each entity (rounded to nearest 100 AF) after accounting for the out-of-basin contributions to the river baseflows and neighboring subbasins.

Table ES-2- Volumes of PBW Remaining

Agency	PBW (AF)	Remaining PBW (AF)
California American Water Company	17,100	9,100
City of Sacramento	90,000	47,800
Carmichael Water District	91,900	48,800
Sacramento Suburban Water District	268,500	142,600
Noth American Subbasins - Subtotal	***467,500***	***248,300***
Golden State Water Company	215,200	110,800
Sacramento County Water Agency	216,300	111,500
South American Subbasins - Subtotal	***431,500***	***222,300***
TOTAL	**899,000**	**470,600**

Banking Operation is a Multi-Benefit Program

As stated, the conjunctive use program has provided multiple water supply, environmental, and ecosystem benefits. Figure ES-3 shows benefits realized from each area of the PBW contribution.

After three decades of conjunctive use operations, the PBW has resulted in higher groundwater levels, which has contributed to the health of the groundwater system in the NASb and SASb and has resulted in reasonably sustainable groundwater conditions. This sustainable groundwater conditions have manifested in the successful approval of the GSPs by the

California Department of Water Resources (DWR) for both the NASb and SASb.

As of September 2024, operation of conjunctive use and PBW has resulted in approximately 382 thousand acre-feet (TAF) contribution to the baseflows of streams in the area, of which 370 TAF has been contributions to American and Sacramento rivers. In specific, the total baseflow contributions to the Lower American River has been approximately 310 TAF.

The 370 TAF increase in American and Sacramento river baseflows has a direct positive flow impact on the Delta Outflow conditions, with 175 TAF during the Delta Balanced conditions and 195 TAF during Delta Excess conditions.

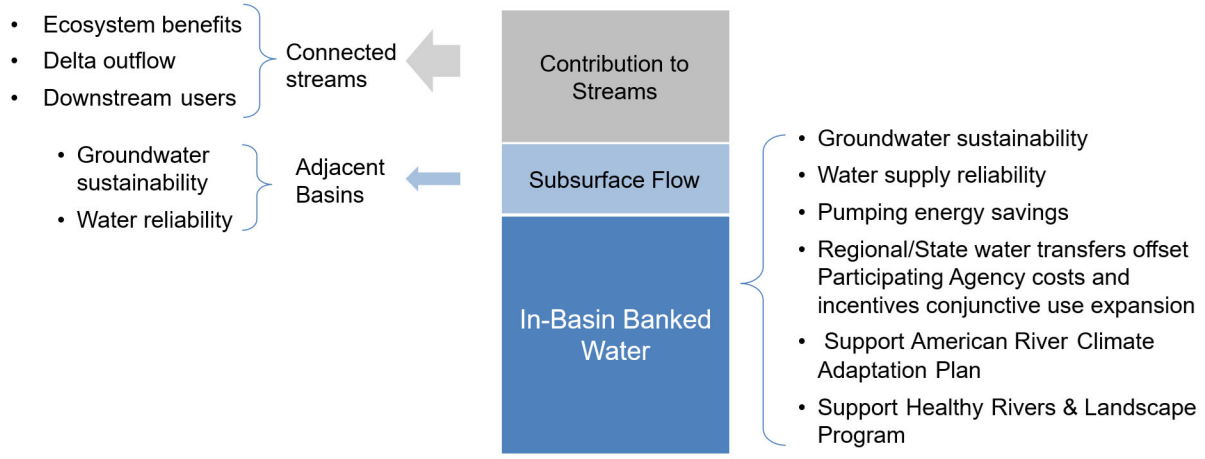


Figure ES-3- Summary of PBW Benefits

Next Steps

The PBW analysis provides the technical foundation to bridge past conjunctive use practices with future management under the SRWB. Establishing a credible starting balance is essential for operational modeling, environmental review, and ensuring that groundwater banking supports long-term sustainability, water supply reliability, and ecological health.

The reconciliation factors that have resulted from analysis of PBW out-of-basin contributions can be used as a starting point for annual reconciliation of future water banked under SRWB. These are 4 to 7 percent a year in NASb and 7 to 9 percent a year in SASb. This contribution percentage is in addition to the 5 percent “leave behind” envisioned for operation of the SRWB banked water, which would be considered to support the health and sustainability of the groundwater and ecosystem systems. The reconciliation factors should be revisited every 5 years to ensure that the long-term operation of the SRWB reflects proper accounting of the water banked and respects the investments and operations of each participating entity.

TABLE OF CONTENTS

FIGURES

TABLES

ABBREVIATIONS AND ACRONYMS

ASR	Aquifer Storage and Recovery
CalAm	California American Water Company
CEQA	California Environmental Quality Act
COS	City of Sacramento
CoSANA	Cosumnes South American North American
CVP	Central Valley Project
CWD	Carmichael Water District
DWR	California Department of Water Resources
GOPC	Goals, Objectives, Principles, Constraints
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GSWC	Golden State Water Company
NASb	North American Subbasin
PBW	Previously Banked Water
PC	RWA Program Committee overseeing development of the SRWB
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
RMCSD	Rancho Murieta Community Services District
RWA	Regional Water Authority
SASb	South American Subbasin
SCGA	Sacramento Central Groundwater Authority
SCWA	Sacramento County Water Agency
SGA	Sacramento Groundwater Authority
SGMA	Sustainable Groundwater Management Act
SMUD	Sacramento Municipal Utility District
SRWB	Sacramento Regional Water Bank
SSWD	Sacramento Suburban Water District
Subbasins	North and South American Subbasins
SWRCB	State Water Resources Control Board
TAF	thousand acre-feet
TAFY	thousand acre-feet per year
WAF	SGA Water Accounting Framework
WAS	RWA Water Accounting System

Glossary of Terms

This concept paper draws upon the following commonly used terms in water management:

- **Adaptive management**: A process of adjusting water management practices to ensure long-term sustainability. This process is based on ongoing monitoring data, evaluation of changing conditions, and stakeholder input to ensure long-term sustainability.
- **Banking action**: An activity within a groundwater banking program involving the recharge (deposit), recovery (withdrawal), and/or transfer of stored (banked) water.
- **Banking losses**: Stored (banked) groundwater that becomes physically unrecoverable due to factors such as migration out of a groundwater basin or seepage into interconnected surface water bodies.
- **Banking participant:** An entity that actively participates in a groundwater banking program. These participants contribute to and utilize the groundwater bank by recharging (depositing) water into the aquifer and recovering (withdrawing) stored water to meet their water supply needs.
- **Conjunctive Use**: The coordinated and planned use and management of the different sources of water in time and space. Conjunctive use involves the efficient use of groundwater and surface water through the planned and managed operation of a groundwater basin and available surface water in the basin (DWR, 2024).
- **Direct recharge**: A recharge method where water is directly added to a groundwater basin using spreading basins, injection wells, dry wells, or similar methods. Direct recharge affects the groundwater budget by increasing inflows to the aquifer; therefore, increasing groundwater storage.
- **Groundwater bank (groundwater banking program, or water bank)**: A system that manages the storage of surplus water in a groundwater basin through recharge methods and allows for its recovery during times of need. A groundwater bank functions as a water savings account with formalized accounting, tracking, management, financial, operational, and ownership agreements. A water groundwater bank typically operates under a water accounting system.
- **Groundwater banking:** The managed aquifer recharge and extraction by a managing entity that facilitates in-lieu or direct recharge or extraction from a groundwater basin (DWR, 2024). Groundwater banking is a specific practice within the broader conjunctive use strategy that typically involves agreements, formalized accounting of stored (or banked) groundwater, and tracking of recharge and recovery.
- **Groundwater storage rights:** Legal entitlements and permissions that allow entities to store water in a groundwater bank. These rights outline the conditions under which water can be stored, the types of water eligible for storage, and the limitations on its recovery and subsequent use.

- **Groundwater substitution transfer**: A practice of transferring surface water to another user or region while replacing the transferred supply by increasing groundwater pumping in the source region. A groundwater substitution transfer is a practice within the broader conjunctive use strategy but typically does not require stored (or banked) groundwater.
- **In-Lieu (indirect) recharge**: A recharge method where surface water or alternative supplies replace groundwater pumping, allowing natural recharge to accumulate in the groundwater basin. In-lieu (or indirect) recharge affects the groundwater budget by reducing outflows from the groundwater basin; therefore, increasing groundwater storage.
- **Leave-behind**: A portion of banked groundwater intentionally left in a groundwater basin to support groundwater sustainability and enhance local water supply reliability.
- **Operational baseline:** A benchmark of an entity's typical surface and groundwater use without banking activities. It enables accurate tracking of recharge and recovery, which are measured as change from the baseline. It is reviewed every five years to reflect changes in water management and ensure alignment with GSP updates.
- **Recharge (deposit)**: The addition of water to a groundwater basin, either directly or indirectly, to increase groundwater storage.
- **Recovery (withdrawal)**: The extraction of stored (banked) groundwater for beneficial use. It Recovery typically involves the transfer of banked groundwater to another user or region through in-lieu transactions, facilitated exchanges, or physical delivery.
- **Subbasin**: A distinct hydrological unit within a groundwater basin used for water resource management. California Department of Water Resources (DWR) Bulletin 118 delineates groundwater subbasins— based on natural features (such as geologic or hydrologic boundaries) and administrative or management considerations, to support localized groundwater management.
- **Water accounting system**: A framework of policies, procedures, and tools to manage and track the deposit, storage, withdrawal, losses, and balances of stored water in a groundwater banking system program.
- **Water budget**: A water budget is a quantitative accounting of all the inflows, outflows, and changes in storage within a specific hydrological system or subbasin over a defined period. A water budget is used to evaluate the balance between water inputs and outputs to assess hydrologic conditions and support sustainable management.

1.0 INTRODUCTION AND BACKGROUND

1.1 Purpose

This report documents the analysis of Previously Banked Water (PBW) in the North American Subbasin (NASb) and South American Subbasin (SASb) to determine the fate of water that was banked as a result of the conjunctive use program over the course of the past three decades. In specific, the analysis presented in this report quantifies the amount of water that remains after reconciliation for hydrologic interactions with interconnected rivers and neighboring groundwater subbasins. The findings will guide policy decisions on setting a starting balance for the Sacramento Regional Water Bank (SRWB) that recognizes the investments made by the water agencies in conjunctive use infrastructure and operations over the past 30 years.

The analysis also provides the technical foundation to bridge past conjunctive use practices with future management under the SRWB. Establishing a credible starting balance is essential for operational modeling, environmental review, and ensuring that groundwater banking supports long-term sustainability, water supply reliability, and ecological health.

1.2 Conjunctive Use in the Region

Conjunctive use in the Greater Sacramento region developed in response to long-term groundwater overdraft. After World War II, rapid urban growth drove heavy reliance on groundwater. By the 1980s, groundwater levels were declining, pumping costs were rising, and contaminant plumes were advancing toward municipal wells. These conditions highlighted the need for a coordinated management strategy.

The Water Forum Agreement initiated in the early 1990s marked a turning point, formally identifying conjunctive use as a regional strategy to stabilize aquifers, protect water quality, and improve ecosystem flows in the Lower American River. The formation of the Sacramento Groundwater Authority (SGA) in 1998 provided a governance structure to manage the North American Subbasin and coordinate actions among local agencies. A few years later, similar governance structure was formed in the South American Subbasin as Sacramento Central Groundwater Authority (SCGA).

Conjunctive use of surface water and groundwater is the coordinated and planned management of both surface water and groundwater resources to maximize efficient use of both resources. It combines operations and use of surface water and available storage facilities with available groundwater resources, and recharge and extraction facilities within a groundwater basin. The available surface water is used in two modes:

Direct Recharge- A recharge method where water is directly added to a groundwater basin using spreading basins, injection wells, dry wells, or similar methods. Direct recharge affects the groundwater budget by increasing inflows to the aquifer; therefore, increasing groundwater storage .

In-Lieu Recharge- A recharge method where surface water or alternative supplies replace groundwater pumping, allowing natural recharge to accumulate in the groundwater basin. In-lieu

(or indirect) recharge affects the groundwater budget by reducing outflows from the groundwater basin; therefore, increasing groundwater storage.

Major infrastructure projects enabled large-scale conjunctive use. In the North American Subbasin, the Cooperative Transmission Pipeline (1997) delivered American River water to groundwater-dependent areas in Sacramento Suburban Water District and partner water purveyors, offsetting more than 300 TAF of pumping since the late 1990s. In the South American Subbasin, starting in mid-1990s, Sacramento County Water Agency used the Franklin Intertie to wheel treated surface water from the City of Sacramento for use in their south service area replacing groundwater that would have been used to meet the demand in that area. Subsequently, starting in 2011, the Freeport Regional Water Project diverted Sacramento River water and delivered water treated at the Vineyard treatment facilities to areas previously reliant on groundwater, improving conditions and reversing historic declines

The results were significant. Groundwater levels stabilized and, in many areas, rose compared to pre-1990s conditions. Cones of depression were reduced, municipal wells became more reliable, and the risk of contaminant plume migration decreased. During the 2014–2015 drought conditions, agencies expanded capacity with new wells, rehabilitated facilities, interconnections, and booster pumps, along with improvements at surface water diversions. These measures increased flexibility to move water between agencies, improved drought response, and helped sustain flows in the Lower American River. Figures 1 and 2 demonstrate improvements to groundwater levels in NASb and SASb as indicated at two indicator wells.

Conservation measures and demand management further supported conjunctive use. Since the early 2000s, regional agencies have reduced per-capita water use through conservation programs, lowering overall demand even as population grew. This resulted in groundwater use reduction . Together, these actions turned the NASb and SASb into a successful and well managed groundwater storage reservoirs, one of the few areas in the Central Valley where groundwater conditions have improved over the past 20 years, as manifested in the twenty-year groundwater level trends chart published by the DWR[1] By the mid-2000s, conjunctive use had become a proven tool for water supply reliability, groundwater sustainability, and ecological health. These successes established the foundation for a basin-wide water bank.

[1] (https://data.cnra.ca.gov/dataset/ae160cf2-51d8-450d-82cc-2708e63ccd95/resource/fe2f982a-cc34-4b11-a6e7-6aef5e5cb8d6/download/may_2025_semi_annual_groundwater_conditions_report_v2.pdf).

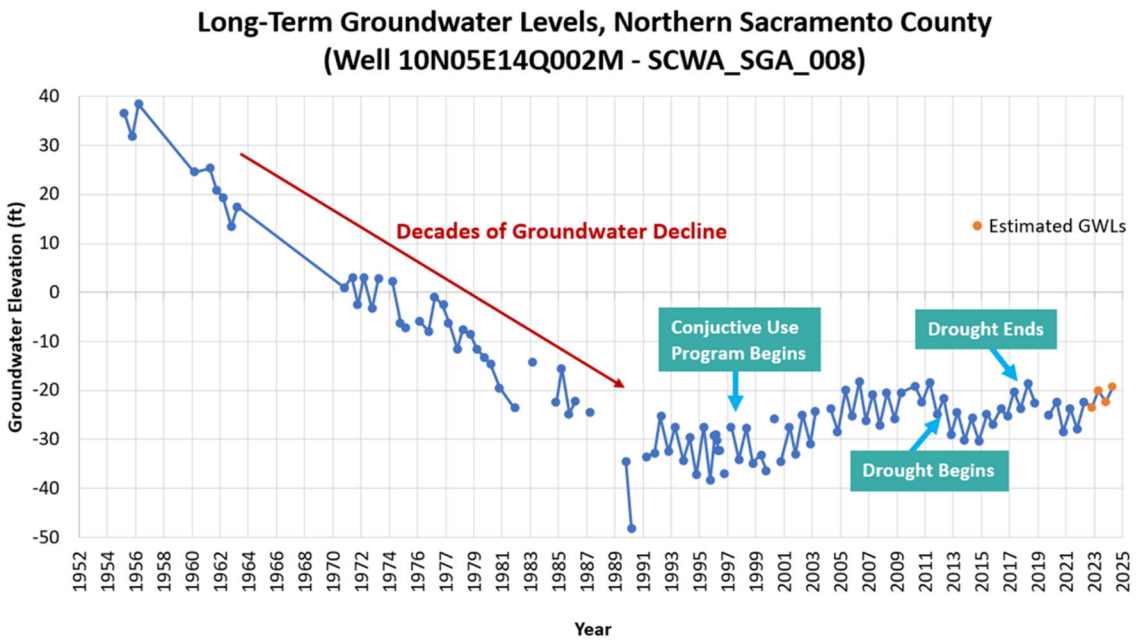


Figure 1 – Results of Past Conjunctive Use practices as Observed at a Representative Well in NASb

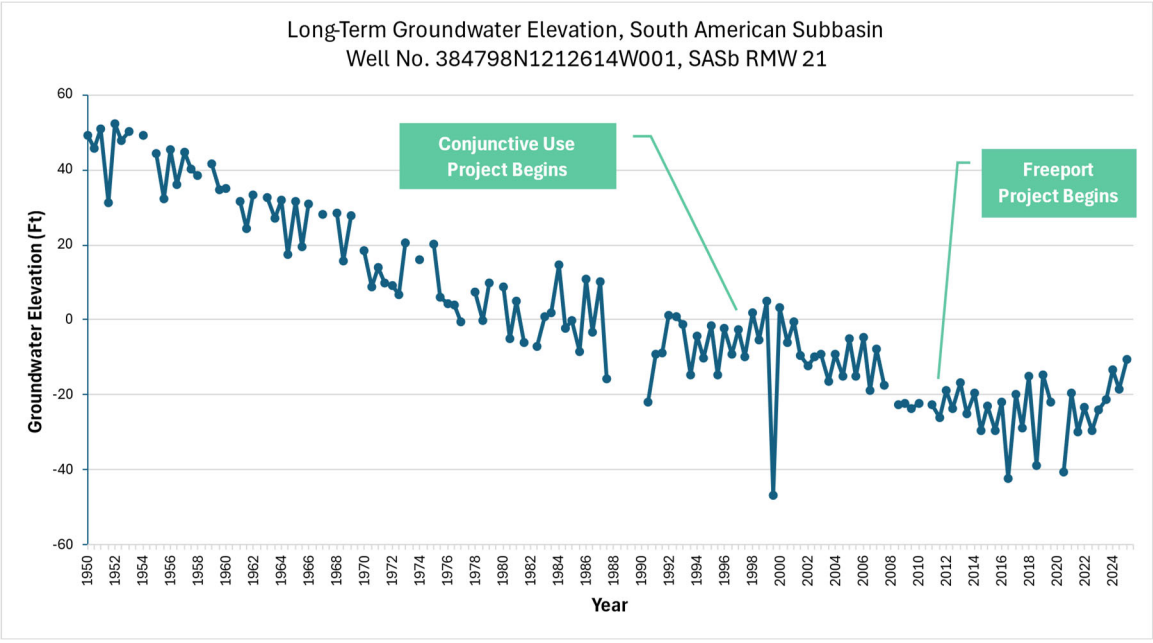


Figure 2 – Results of Past Conjunctive Use practices as Observed at a Representative Well in SASb

1.3 Sacramento Regional Water Bank and the Water Accounting System

While conjunctive use has been practiced successfully by individual agencies, broader regional expansion has been constrained by several barriers. Institutional challenges include fragmented service areas, limits on the place of use for water rights and contracts, and inconsistent accounting methods that make it difficult to recognize agency investments in recharge. Financial challenges include the higher cost of treating and delivering surface water compared to pumping groundwater, the need for capital investment in treatment facilities, interconnections and conveyance, and the absence of sustainable funding mechanisms to support recharge during wet years.

The Sacramento Regional Water Bank (SRWB or the Bank) addresses these barriers by establishing a coordinated framework for governance, accounting, and cost-sharing, as well as joint use of water conveyance facilities. Through the Water Accounting System (WAS), the Bank standardizes how recharge, recovery, and contributions are measured and credited, giving agencies confidence that their participation in the Bank will be transparently tracked and recognized. The WAS standardizes criteria for in-lieu and direct recharge, tracks contributions to rivers and adjacent basins, and requires leave-behind volumes to protect local groundwater sustainability. The Bank operations are aligned with GSP sustainability criteria for both the NASb and SASb, incorporates adaptive management provisions, and establishes dispute resolution processes to build trust among participants and regulators.

The Bank also provides an institutional platform for aligning water rights and contract provisions across agencies, enabling recharge to occur more broadly across the region. The SRWB also creates opportunities for cost-sharing of regional facilities, leverages economies of scale, and provides a mechanism to generate revenue from transfers during wet years that can offset recharge costs. By pooling resources, agencies can expand conjunctive use more affordably and equitably than through isolated efforts.

Expanding groundwater banking provides adaptive capacity by storing more water in wet periods and reducing demands on surface water during dry periods, supporting both reliability and environmental objectives such as maintaining cold-water pools in Folsom Reservoir and flows in the Lower American River.. These functions expand drought resilience, protect groundwater sustainability, and produce operational flexibility that benefits both water users and ecosystems.

1.4 Need to Analyze the PBW

As described above, agencies in the Sacramento region have practiced conjunctive use for decades, banking significant volumes of groundwater through in-lieu recharge. However, stored groundwater also affects and is affected by interconnected rivers and adjacent groundwater subbasins, meaning that volumes of previously banked water must be reconciled to account for these hydrologic interactions before determining what remains recoverable.

An analysis of PBW is needed to quantify the water volume that remains in storage after this reconciliation. The results ensure that past investments in conjunctive use are formally recognized while maintaining groundwater sustainability. They also provide the technical foundation for operational modeling, environmental review, and policy deliberations on the

(SRWB).

This PBW analysis provides a transparent and defensible scientific basis for decision-makers to establish an appropriate starting balance, linking the region's history of conjunctive use with the future implementation of the SRWB.

Figure 3 identifies the agencies engaged in conjunctive use implementation over the past three decades in both NASb and SASb and the respective service areas used for conjunctive use practice in solid color.

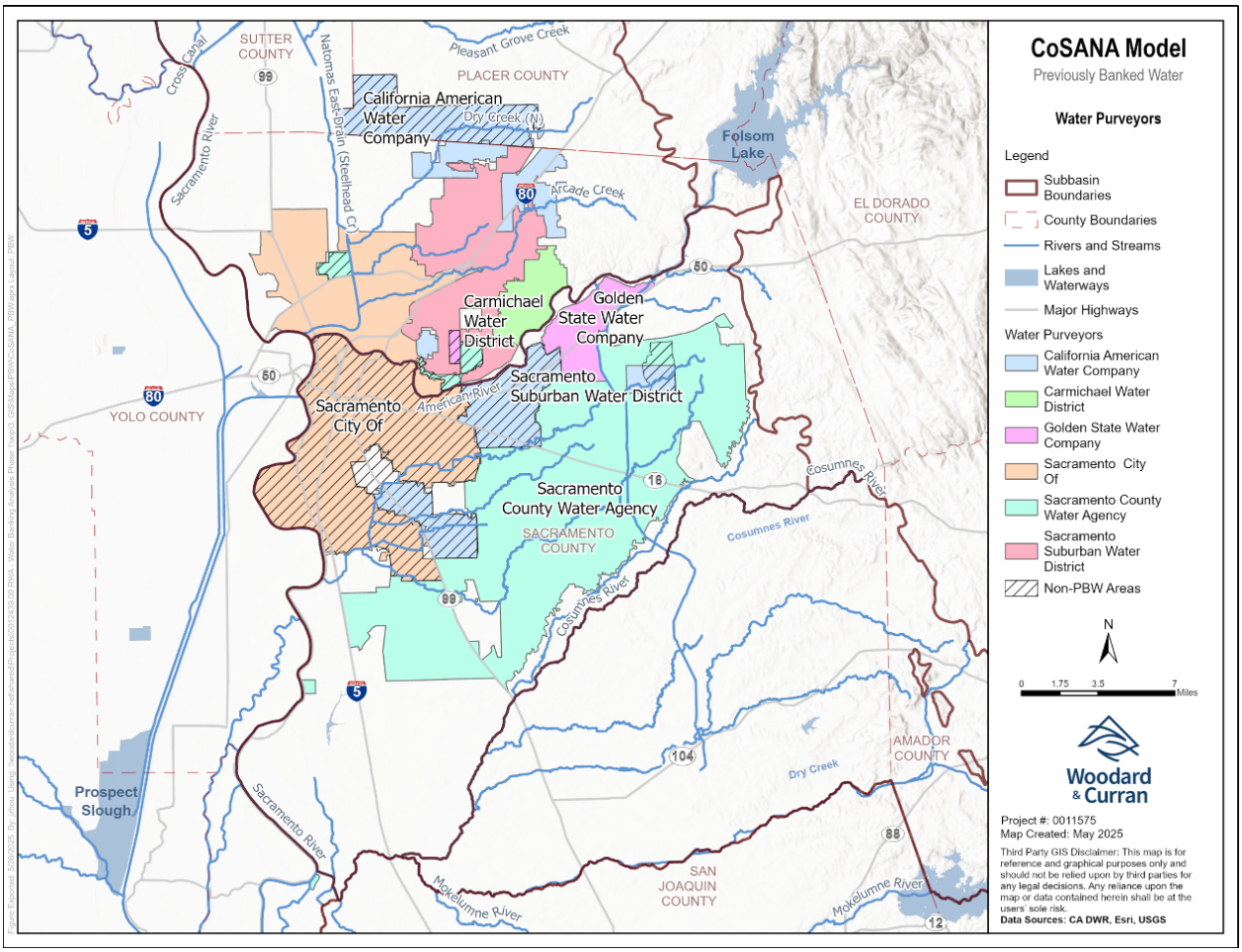


Figure 3 – Groundwater Subbasins and the 5 agencies with PBW balances

2 PBW ACCOUNTING AND VALIDATION

2.1 PBW Definition and Eligibility Requirements

The Regional Water Authority's (RWA) Program Committee (PC), overseeing development of the SRWB, established criteria to ensure that recognition of PBW is consistent with the WAS and supported by verifiable documentation. On September 13, 2024, the Program Committee formally adopted PBW eligibility criteria:

1. Documentation: Agencies must provide consistent records of conjunctive use and banking actions, including SGA's Water Accounting Framework (WAF) or equivalent data.
2. Consistency with WAS: Conjunctive use activities must be consistent with WAS definitions of recharge, and banking losses. Under the WAS, in-lieu recharge is defined as the intentional replacement of groundwater pumping with imported surface water.
3. Adjustment for Transfers: Any groundwater substitution transfer volumes since 2015 must be reported and subtracted from PBW balances.

These requirements ensure that PBW reflects real, verifiable recharge actions aligned with sustainability objectives

2.2 Data Sources and Verification Process

Six agencies provided PBW documentation that met the eligibility criteria established by the Program Committee. In the NASb, four agencies qualified: California American Water (CalAm), Carmichael Water District (CWD), City of Sacramento, and Sacramento Suburban Water District (SSWD). In the SASb, two agencies qualified: Golden State Water Company (GSWC) and Sacramento County Water Agency (SCWA).

The accounting and validation of PBW drew on a combination of records and verification steps:

- **The WAF:** In the NASb, WAF records maintained by SGA for its Central Unit provided the foundation for PBW accounting, formally tracking conjunctive use credits from 2012 onward, when the WAF was initiated, and estimated amounts back to 1997,.
- **Agency Reports and Logs:** In both subbasins, agency reports, and operational logs documented monthly pumping, surface water deliveries, and conveyance operations. These datasets included annual reports maintained by each water purveyor on monthly pumping and surface water deliveries, and monthly pumping records by well provided by each agency.
- **Transfers:** DWR records of substitution transfers that included monthly groundwater pumping by well.

The validation of PBW records included a multi-step process to confirm that agency-reported recharge volumes were consistent with the WAS:

- **Step 1. Review of Agency-Specific Assumptions:** Each agency's PBW accounting approach was reviewed to confirm alignment with WAS principles:
    - **CalAm:** PBW credits were based on WAF records that tracked imported surface water used in place of groundwater pumping. The methodology is straightforward, well documented, and directly aligned with WAS definitions of in-lieu recharge.

Source of surface water for in-lieu recharge is wholesale deliveries from the City of Sacramento within the City's American River Place of Use.

- **CWD:** PBW credits were based on WAF records. source of surface water for in-lieu recharge is American River post-1914 appropriative rights (SWRCB Licenses 7356, 1387, 8731). Note that Aerojet Remediated Water diverted via the American River are not included in the PBW calculations.
- **SSWD:** PBW credits were based on WAF records. Source of surface water for in-lieu recharge is purchased Middle Fork Project wet-year supply (Placer County Water Agency) and occasional Reclamation Section 215 water in its north service area, plus City of Sacramento American River surface water to the south service area (whin the City's Place of Use).
- **City of Sacramento:** The City's accounting also relied on WAF records. Because the City typically uses large volumes of surface water, about 60TAF annually, its WAF banking credits were limited to groundwater pumping below the 20 TAF/year allowance established under the WAF. Only the portion of this allowable pumping that was offset by surface water deliveries was credited as recharge, ensuring accounting reflects actual avoided pumping. The source of surface water for in-lieu recharge is City's Reclamation's Settlement Contract diversions from the Sacramento and American Rivers (the latter is subject to Hodge Flow constraints).
- **SCWA:** PBW was generated through records of imported Sacramento and American River water via the Franklin Intertie with the City of Sacramento and Freeport Regional Water Project, which replaced groundwater pumping in SCWA's service areas. Agency's source of surface water for in-lieu recharge is CVP supplies (SMUD 1, SMUD 2, Fazio) and SWRCB Permit 21209, with supplemental wholesale deliveries from the City of Sacramento within the City's American River Place of Use.
- **GSWC:** PBW was generated through deliveries of imported surface water from the Folsom South Canal, which offset groundwater use. The Aerojet remediated water delivered to GSWC is not included as part of the PBW. Source of surface water for in-lieu recharge is a pre-1914 appropriative water right via the Folsom South Canal from Lake Natoma.

- **Step 2. Cross-Check with Reported Surface and Groundwater Data**
  - PBW volumes reported by agencies were compared against annual surface water and groundwater production data reported by each entity. In the NASb, the SGA summarized and compiled this data in the WAF reporting. In SASb the data was directly provided by the two SASb entities for verification. .
  - To ensure consistency, surface water deliveries and groundwater pumping records were reconciled with SGA's regional datasets in NASb and with data directly reported by the SASb entities.
  - This step confirmed that PBW banking credits for each entity reflected factual in-lieu recharge volumes, with surface water deliveries replacing groundwater pumping in accordance with WAS definitions.
  - Any anomalies prompted follow-up reviews with agency staff to confirm accuracy.
- **Step 3. Verification with DWR Data for Groundwater Substitution Transfers**
  - The groundwater substitution transfer volumes for each entity were checked against records from the Department of Water Resources (DWR).

- Transfers reported since 2012 were identified and deducted from PBW balances, consistent with the Program Committee direction.
- This ensured that groundwater pumped for substitution transfers was not also credited as PBW.

2.3 Initial PBW Balances

Based on the adopted criteria and verification process, initial PBW balances were calculated for each participating agency. Table 1 presents the balances by subbasin as of September 30, 2024. The NASb PBW account balance is estimated at 468 TAF, and that in SASb is estimated at 431 TAF. Taken together, the two subbasins hold nearly 900 TAF of PBW before accounting for any unrecoverable volumes that have been contributed to the neighboring subbasins or to the surface water bodies. These totals provide the foundation for subsequent analysis of recoverable PBW.

Table 1. Initial PBW Balances (as of September 30, 2024)

Agency	PBW (AF)
California American Water Company	17,102
City of Sacramento	90,035
Carmichael Water District	91,887
Sacramento Suburban Water District	268,541
Noth American Subbasins - Subtotal	*467,565*
Golden State Water Company	215,166
Sacramento County Water Agency	216,327
South American Subbasins - Subtotal	*431,493*
TOTAL	899,058

Figures 4a and 4b illustrate the annual groundwater banking volumes over the 27-year period from water years 1997 to 2024 in the NASb and SASb, respectively. Appendix A provides tables of monthly volumes of conjunctive use water that are credited as PBW for each of the entities participating in the WAF in NASb and engaged in conjunctive use operations in the SASb.

In the NASb (Figure 4a), the entities diverted more surface water during wet years and relied on groundwater during dry years, a proper conjunctive use operation. Annual volumes frequently exceeded 15 TAF and peaked above 25 TAF in several wet years, with highest volumes in 2023 and 2024. On the other hand, during dry and drought conditions (2013–2016, 2020–2022), the entities reduced surface water use and relied on groundwater to meet demands.

In the SASb (Figure 4b), although the entities had the infrastructure capacity to meet the growing demands with 100% groundwater, their contractual agreements allowed for a gradual ramp-up in surface water use, with gradual reduction in groundwater use. PBW volumes for both SASb entities started low in the late 1990s and early 2000s, typically below 10 TAF, meeting less than about 10% of the demand. With start of Freeport Regional Water Project in 2011 by SCWA, both entities relied on much more surface water, especially during wet years, evident in 2023 and 2024. However, during drought conditions and with CVP cutbacks, the entities relied more on groundwater to meet their growing demands.

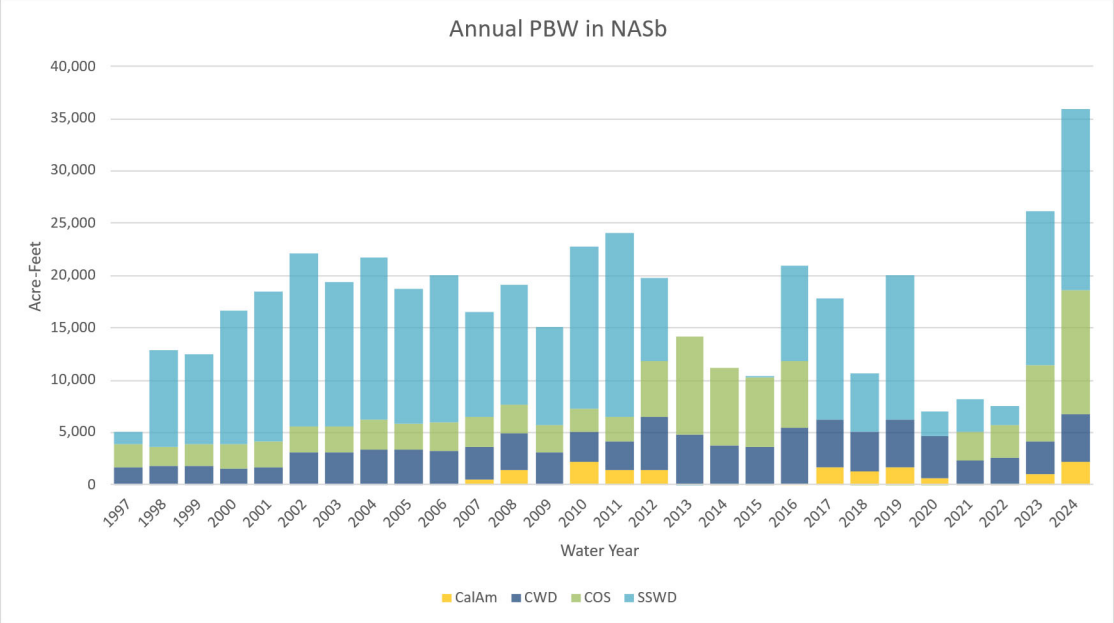


Figure 4a – Annual PBW balances for NASb

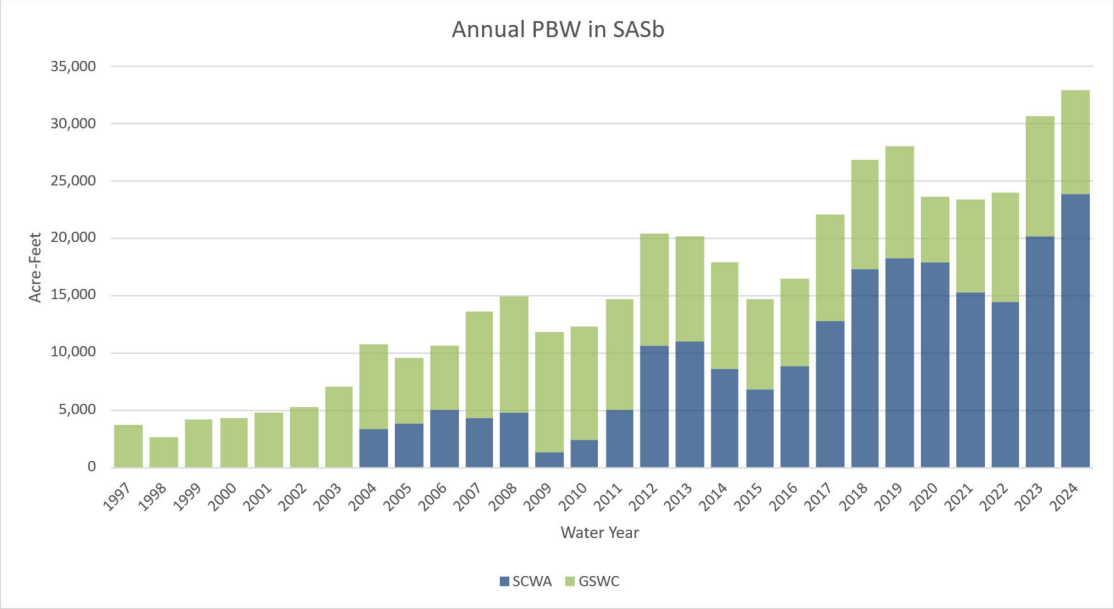


Figure 4b – Annual PBW balances for SASb

3 APPROACH TO PBW REMAINING BALANCE ANALYSIS

3.1 Analysis Approach

The approach to evaluate the recoverable volume of PBW is to use the historical conditions of the basin during the water years 1997-2014 as the basis for analysis. The historical conditions is described and evaluated based on the CoSANA model version that is calibrated for the historically observed groundwater levels and streamflows and was used for the 2022 GSP and updated for the 2024 GSP Annual Report.

Additionally, a scenario is developed for conditions where the PBW is removed from the water supplies for the respective entities. Under this scenario, the respective entities would have potentially relied on groundwater to meet the portion of water supply obligations and demands during the same historical period that was historically met by using the surface water that was specifically imported and/or diverted as part of the conjunctive use operations. Since the conjunctive use program started in 1997 within the SGA, this analysis is performed during the historical period of water year 1997-2024.

Therefore, to perform the PBW analysis, two scenarios are developed:

- **Scenario 1- Historical Conditions with PBW:** This scenario reflects the historical conditions in the basin from all aspects that there are data available for, including hydrology, land use, water use, water supplies and operations. This scenario assumes that conjunctive use program has been implemented, and the previously banked water has been part of the water supply operations. In essence this scenario reflects the historical operations of each subbasin. To complete this scenario, a comprehensive effort was made with each of the entities engaged in the WAF to verify their operations and water supply data and corrections were made to the historical model as needed.

- **Scenario 2- Historical Conditions without PBW**: This scenario is intended to reflect the operations of the NASb and SASb water supply and groundwater conditions absent the conjunctive use program. This assumes all aspects of the water demand and use, as well as development trends and conditions were the same as has occurred over the historical period; except the conjunctive use program would not have been in place. Thus, the source of water supply would have been groundwater for the portion of surface water that was used for conjunctive use program.

The analysis of PBW in-basin balance relied on a comparison of the groundwater and surface water conditions during the historical period between scenario 1 (Historical Conditions with PBW) and scenario 2 (Historical Conditions without PBW). This analysis results in:

1- Identification of extent of areas that the banked water benefited the groundwater system by raising groundwater levels.

2- Assessment and estimation of out-of-basin contributions made to streams and neighboring subbasins, as a result of raised groundwater levels and higher groundwater storage.

3- Estimation of volume of net amount of PBW that remained in the groundwater subbasins for recovery as of September 2024.

The process for this analysis is reflected in the flow chart in Figure 5.

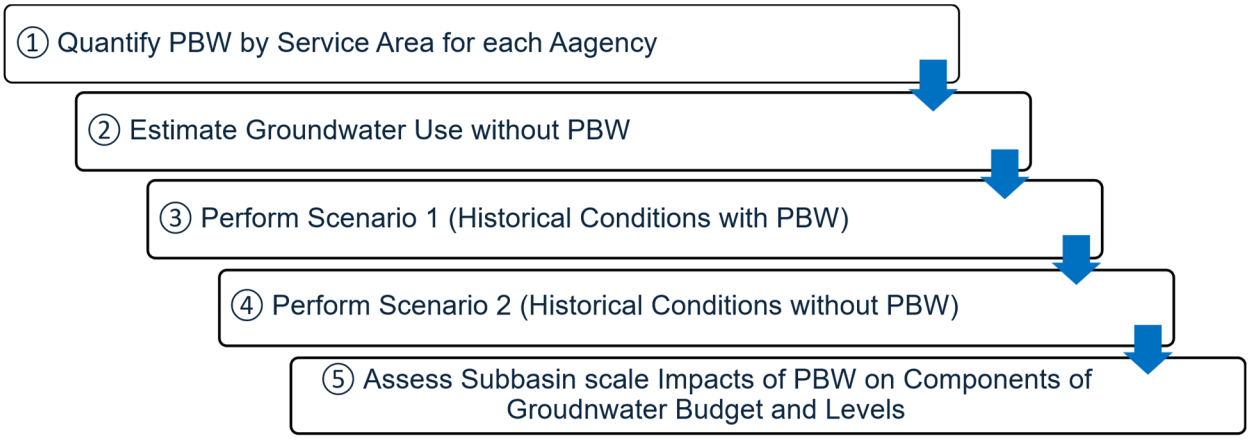


Figure 5 – Summary of PBW Analysis Approach

3.2 Groundwater System Connectivity and Interactions

It is important to recognize that the physical and hydraulic conditions of the NASb and SASb are not closed systems and are an integrated system of surface water features and streams with the groundwater system. In addition to the NASb being connected to the SASb, the NASb is also connected to the neighboring subbasins of Yuba and Yolo subbasins. While the SASb, is also connected to the Yolo, Cosumnes, and Solano subbasins. Therefore, the operation of groundwater system and changes to the groundwater levels and groundwater storage reflect interactions with the river system and the groundwater conditions in the neighboring subbasins.

Figure 6 illustrates the NASb and SASb with neighboring subbaisns with which potential interbasin flows occur. The red arrows indicate general flows across the study area with the neighboring subbasins. Note that depending on the conditions and levels of groundwater on both sides of the boundary, direction of interbasin flows can vary. Additionally, the blue arrows show general flows between the river and aquifer systems. The primary focus of this study is the interaction between the Sacramento and American River, even though there may be changes in the volume of stream-aquifer flow exchanges with some of the other rivers and creeks. Since both the interbasin flows across the subbasin boundaries as well as the stream-aquifer interaction flows can be in both directions, the results presented for this study are presented as net effect of the changes in respective flows.

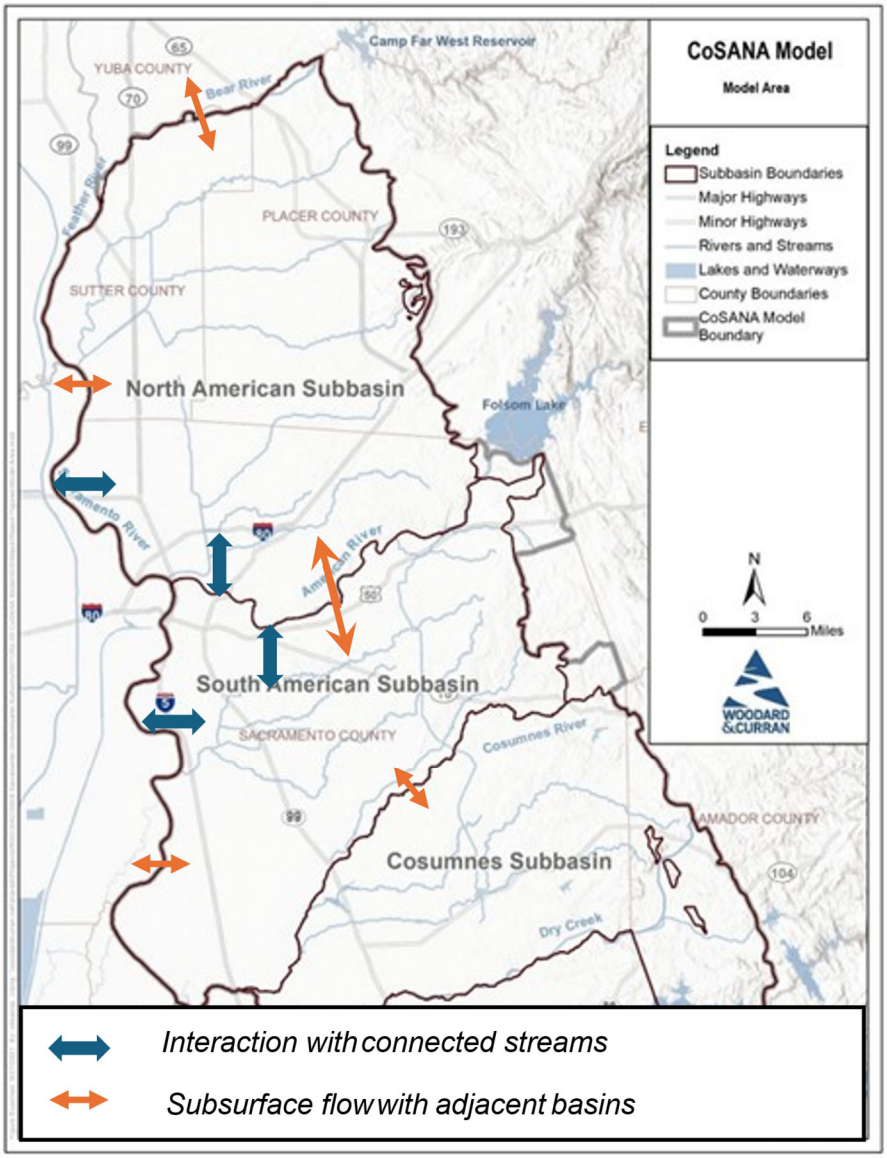


Figure 6- NASb and SASb Interactions with Streams and Neighboring Subbasins

3.3 Stream–Aquifer Dynamics

The hydraulically interconnected physical relationship between streams and the groundwater system in the NASb and SASb is shown at a conceptual level in Figures 7.Note that changes in groundwater levels can affect the stream system.

In a hydraulically connected stream and aquifer system, conditions without PBW result in higher groundwater pumping, which in turn ends up lowering groundwater levels and thus a higher gradient between the river and groundwater system, which results in more seepage from river to the groundwater system.

During the historical operation of the system and implementation of conjunctive use and the presence of PBW, groundwater pumping is relatively less, resulting in higher groundwater levels

and lower gradient between the river and groundwater system. This produced the net effect of decreasing stream seepage losses to the aquifer, and in some locations even reversing the gradient to create net gains to the stream system. This resulted in overall higher baseflows in the stream system, as indicated in the conditions with PBW diagram.

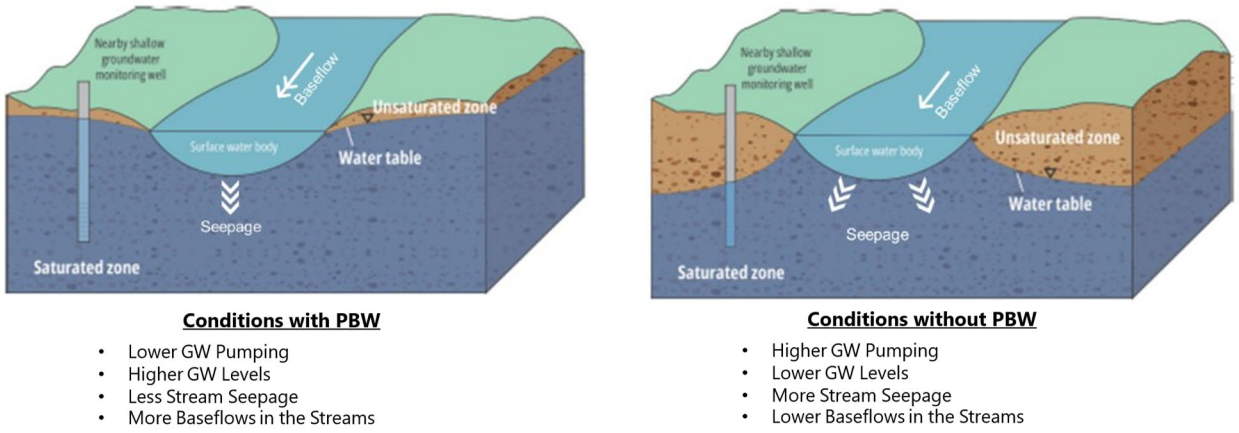


Figure 7- Stream-Aquifer Interaction Conditions for PBW Analysis

3.4 Modeling Assumptions

As described above, the analysis of PBW involved development of two modeling scenarios. Each scenario has detailed assumptions on the land and water use, water supply, and groundwater conditions, which are described briefly in the diagram in Figure 8.

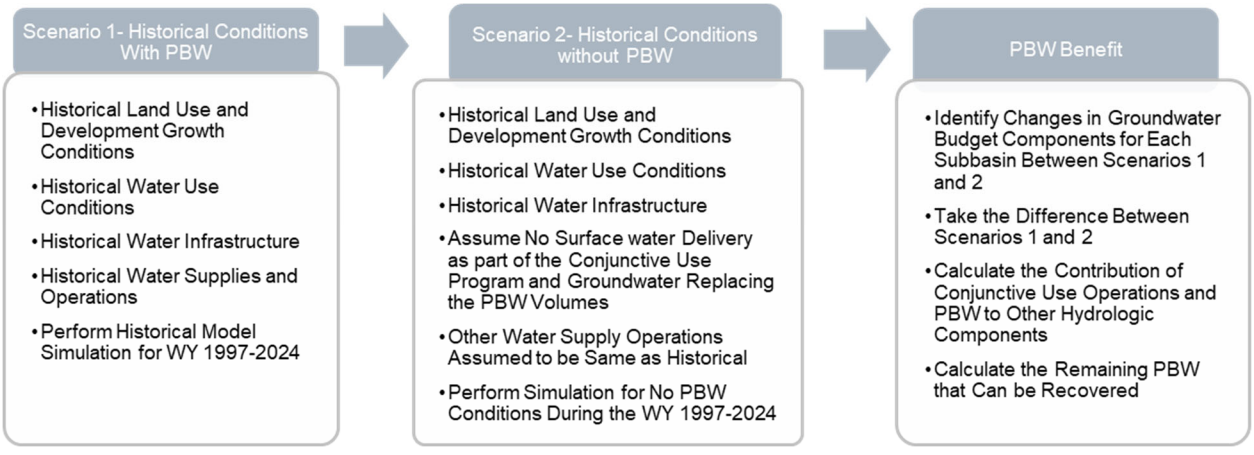


Figure 8- Assumptions in the Analysis of the Volume of PBW Remaining

3.5 Calculation of In-Basin Balance

Once the scenarios are analyzed using the CoSANA model, details of the water budget for each subbasin are evaluated a monthly basis for both scenarios. Monthly net contributions of the conditions with PBW to the stream systems and to the neighboring subbasins are calculated

and tabulated. Then the remaining PBW balance is calculated on a monthly basis, which can then be aggregated at the subbasin scale over time and at annual scale. Diagram in Figure 9 shows the calculation methodology for PBW remaining Balance.

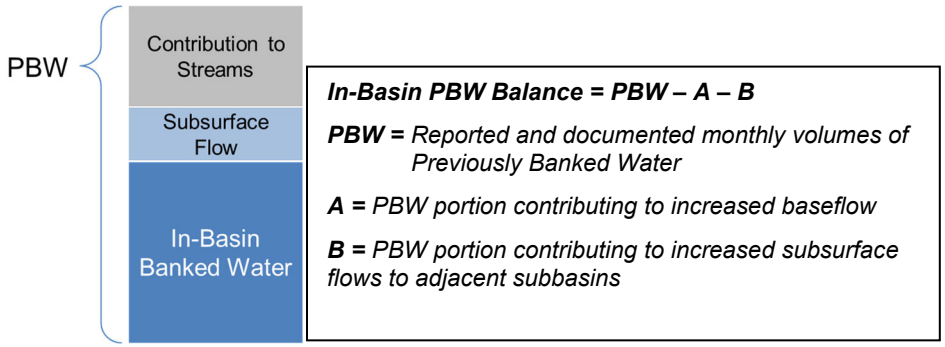


Figure 9- Calculation Methodology for In-Basin PBW Balance

Changes in the seepage flows between surface water bodies (river and stream systems) and the aquifer system occur which are primarily due to higher groundwater levels of PBW. Depending on the relative elevation of river system and the nearby groundwater levels, the seepage changes can be in the form of more seepage gains to the river system or less seepage from streams, both resulting in net increase in streams baseflow. Therefore, PBW is reduced by amount equivalent to the net change in stream seepage (net increase in baseflow).

Changes in subsurface flows to or from adjacent subbasins occur primarily due to higher groundwater levels as a result of conjunctive use implementation and PBW. Depending on the relative levels of groundwater near the subbasin boundaries on both sides of the boundary, the higher groundwater levels can increase subsurface outflow to or reduced inflow from adjacent subbasin. Both would result in a net contribution from PBW implementation to adjacent subbasins. Therefore, PBW is reduced by an amount equivalent to the net increase in outflow to adjacent subbasins.

3.6 Out-of-Basin Contributions and Benefits

Implementation of conjunctive use and the resulting PBW has produced two measurable out-of-basin contributions: (i) net increases in stream baseflow and (ii) net subsurface outflow to adjacent subbasins. While these flows reduce the in-basin PBW balance, they provide subbasin-wide and regional benefits. This reinforces the multi-benefit nature of conjunctive-use operations and underpins the value of PBW beyond local water-supply accounting. Figure 10 illustrates the distribution of these benefits and pathways of PBW contributions.

Contributions to Streams (Out-of-Basin Contribution): Higher groundwater levels have increased baseflows to connected rivers, particularly the American and Sacramento Rivers. Benefits include:

- Ecosystem support – higher baseflows that improve temperature, habitat, and seasonal flow reliability—especially in the Lower American River.
- Enhanced Delta outflow – especially valuable under Delta Balanced conditions when

incremental contributions help meet flow standards.

- Downstream users' benefits – supporting improved supply conditions for downstream users.

Subsurface Flow to Adjacent Basins (Out-of-Basin Contribution): Raised groundwater levels have increased subsurface exchanges with neighboring subbasins (Yolo, Cosumnes, Solano, Yuba).

- Improved sustainability where interbasin inflows help stabilize groundwater levels along shared boundaries.

- Greater water-supply reliability through incremental support to regional aquifers during dry periods.

In-Basin Banked Water: The portion of PBW that remains in storage within NASb and SASb provides additional benefits:

- Groundwater sustainability – Maintains long-term aquifer health and supports GSP objectives.

- Water-supply reliability – Provides a drought buffer and operational flexibility for all groundwater users in the subbasins.

- Pumping energy savings – Reduces reliance on deep groundwater pumping, lowering costs and emissions.

- Opportunities for Transfers and cost offsets – Regional/State water transfers generate revenue to offset agency costs and incentivize expanded conjunctive use.

- Climate adaptation – Supports implementation of the American River Climate Adaptation Plan by enhancing local storage and resilience.

- Future ecosystem benefits – Supports the implementations of the Healthy Rivers & Landscapes Program to further improve flows and habitat conditions in the lower American River and the Delta.

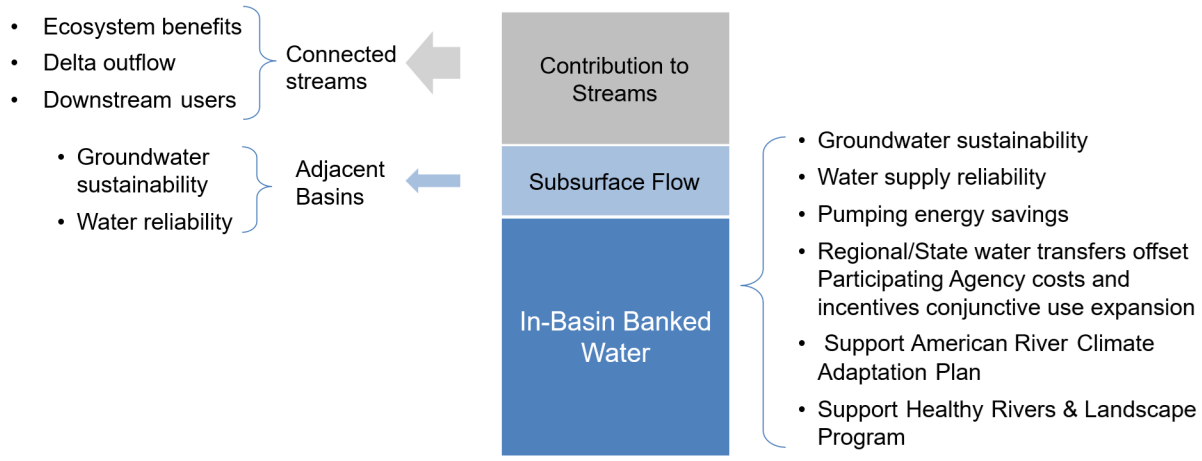


Figure 10- Potential Benefits of PBW Contributions

3.7 Modeling Tool

The **Co**sumnes-**S**outh **A**merican-**N**orth **A**merican Integrated Water Resources Model (CoSANA) was developed in 2020 in a collaborative effort among the GSAs of the three subbasins, municipal water purveyors, agricultural districts, agricultural residential communities, environmental interests, and other stakeholders, to assess surface water and groundwater conditions in the (5-021.64), South American (5-021.65), and Cosumnes (5-022.16) groundwater subbasins. This collaborative approach spanning three subbasins has improved the ability for local water managers and stakeholders to use CoSANA for a range of regional and local planning efforts. The CoSANA model has been used to support the Groundwater Sustainability Plans(GSPs) for the American and Consumnes groundwater subbasins to analyze the historical and projected water budgets and groundwater sustainability conditions. The model is currently being used to support analysis of the Sacramento Regional Water Bank, as well as other local and regional development projects.

The CoSANA model is developed on the Integrated Water Flow Model (IWFM) platform and represents the hydrologic, hydrogeologic, land and water use, as well as operational conditions in the groundwater subbasins within the American River watershed for each of the water purveyors. Figure 11 shows the components of an integrated water resources model represented and simulated in the IWFM platform and the CoSANA application.

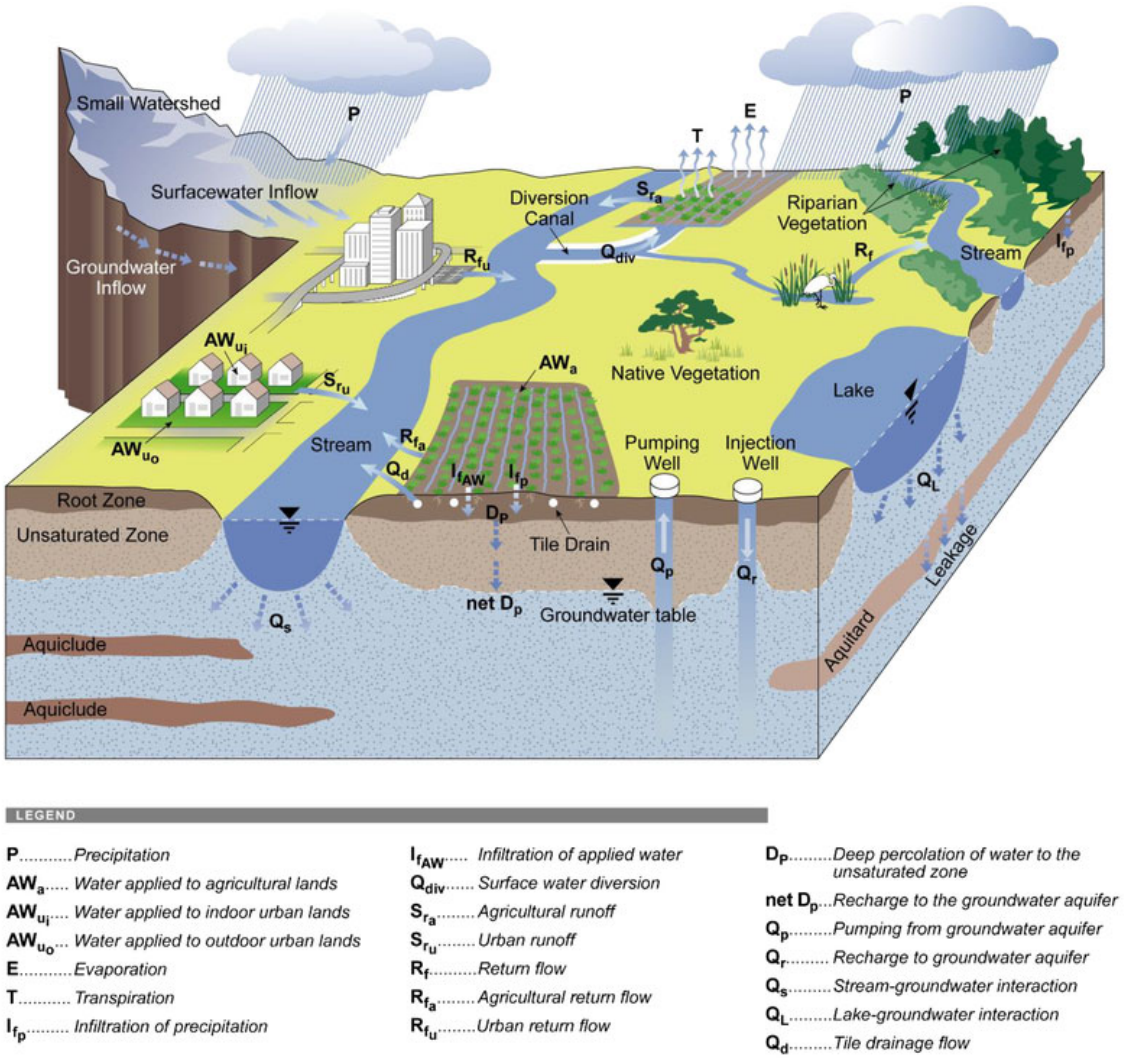


Figure 11- Conceptual Integrated Water Resources Features in CoSANA Model

The model spatial resolution includes a refined finite element grid with all spatially distributed data features, such as hydrologic soil types and land use mapped to the refined grid. Municipal groundwater pumping in the area is included in the model by production well location and depths, which provides a more accurate pumping impact on groundwater levels and flow conditions.

Figure 12 shows the model domain and the boundaries of the associated subbasins. Portions outside of the groundwater subbasins were included in the model area to avoid breaking up larger urban areas, including the City of Folsom and Rancho Murieta Community Services District (RMCSD). The model area includes portions of Amador, Placer, Sacramento, San Joaquin, and Sutter Counties. The model water demand and supply data, as well as water operations information reflects those for each water purveyor and irrigation district in each subbasin.

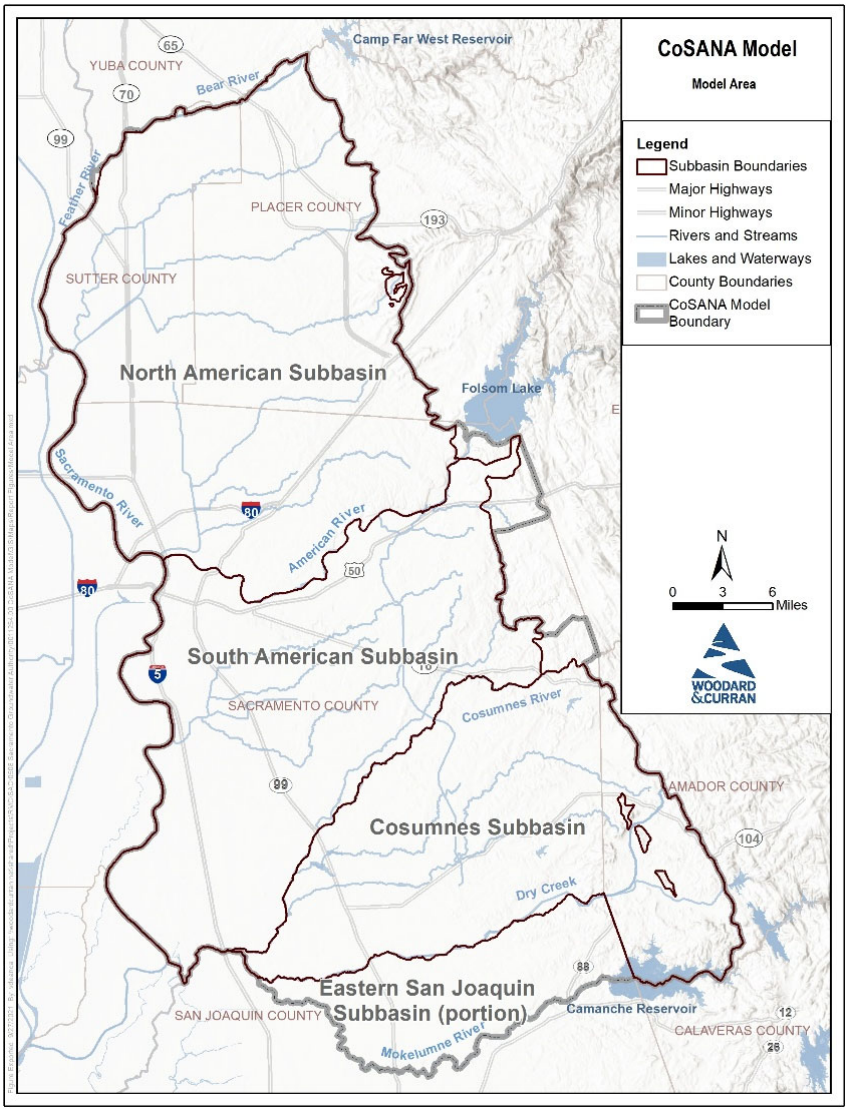


Figure 12- COSANA Model Domain

The CoSANA model hydrologic period covers the historical period of water years 1974 to 2024. This hydrologic period includes the period of record that the WAF has been in place at SGA, as well as that for the Freeport project in the SASb area. The analysis for PBW uses the historical period of the water years 1997 through 2024. Figure 13 shows the annual average precipitation data for the period of record used in the model and the hydrologic variability.

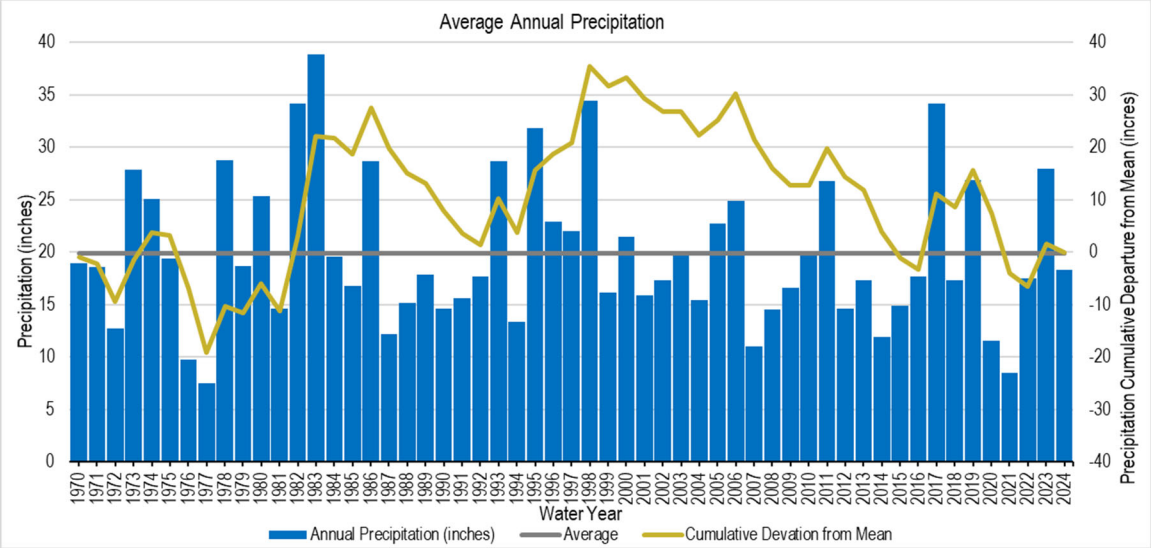


Figure 13- Annual Precipitation in the Study Area

CoSANA model has been calibrated to historical monthly groundwater levels for selected target calibration wells, as well as streamflow rates at select streamflow gaging stations. The process of calibration involves fine tuning the data and information in the model, as well as adjustment and refinement of hydrologic and hydrogeologic parameters that reflect the operation of various parts of the physical land surface, stream, and groundwater system, so that reasonable match is achieved between recorded and reported data and those generated by the model. Once calibrated, the model is put to use for analysis of sustainability conditions over the historical period, as well as projected development conditions, during which project and management actions are evaluated to ensure groundwater sustainability in the subbasins.

Detail description of model construction, data sets, calibration process and results, as well as baseline conditions are documented in “CoSANA, An Integrated Water Resources Model of the Cosumnes, South American, and North American Groundwater Subbasins, November 2021, Woodard & Curran”[2].

In summary, CoSANA is a comprehensive water resources model that is well suited to analyze the effects of the water previously banked in the NASb under the WAF and in the SASb by the SCWA and GSWC over the course of historical period of water year 1997 to-date.

[2] https://nasbgroundwater.org/wp-content/uploads/2025/08/P_Appendix.pdf

4 RESULTS AND FINDINGS

This section provides details of the results of analysis of each of the PBW scenarios. The results are presented for groundwater levels and volumetric amount of PBW remaining for each subbasin.

4.1 Effects of PBW on Groundwater Subbasins

As a result of implementation of conjunctive use program over the past three decades, the groundwater levels have risen in both the SGA area of the NASb as well as the central area of Sacramento County in SASb.

Figure 14 illustrates maps of model generated groundwater levels for both scenarios as of September 2024. Figure 14a portrays the general groundwater levels under the historical conditions with PBW (Scenario 1). This is essentially the conditions of the groundwater as of September 2024 as depicted by the CoSANA model as calibrated to observed groundwater levels and streamflows. This figure illustrates the cones of depression within central portion of each subbasin, and higher groundwater levels in the foothills.

Figure 14b illustrates the regional groundwater levels in absence of PBW (Scenario 2). In essence this scenario reflects what the subbasin conditions would have potentially looked like, had the conjunctive use program not been in place in both the NASb and SASb. In this case, the September 2024 groundwater levels would have been relatively lower than current conditions (Scenario 1). The cones of depression would have generally been deeper and more extensive in area as depicted in Figure 14b.

Figure 14c shows the difference in groundwater levels between the two scenarios, i.e., estimated rise in groundwater levels as a result of establishment of conjunctive use program and implementation of the PBW. This figure indicates that implementation of conjunctive use program and use of PBW has resulted in reasonably extensive portions of the NASb and SASb with as much as 20 feet higher groundwater levels. Higher groundwater levels have in turn resulted in contributions to both baseflow in the surface water bodies and river systems as well as higher subsurface flows to the neighboring subbasins.

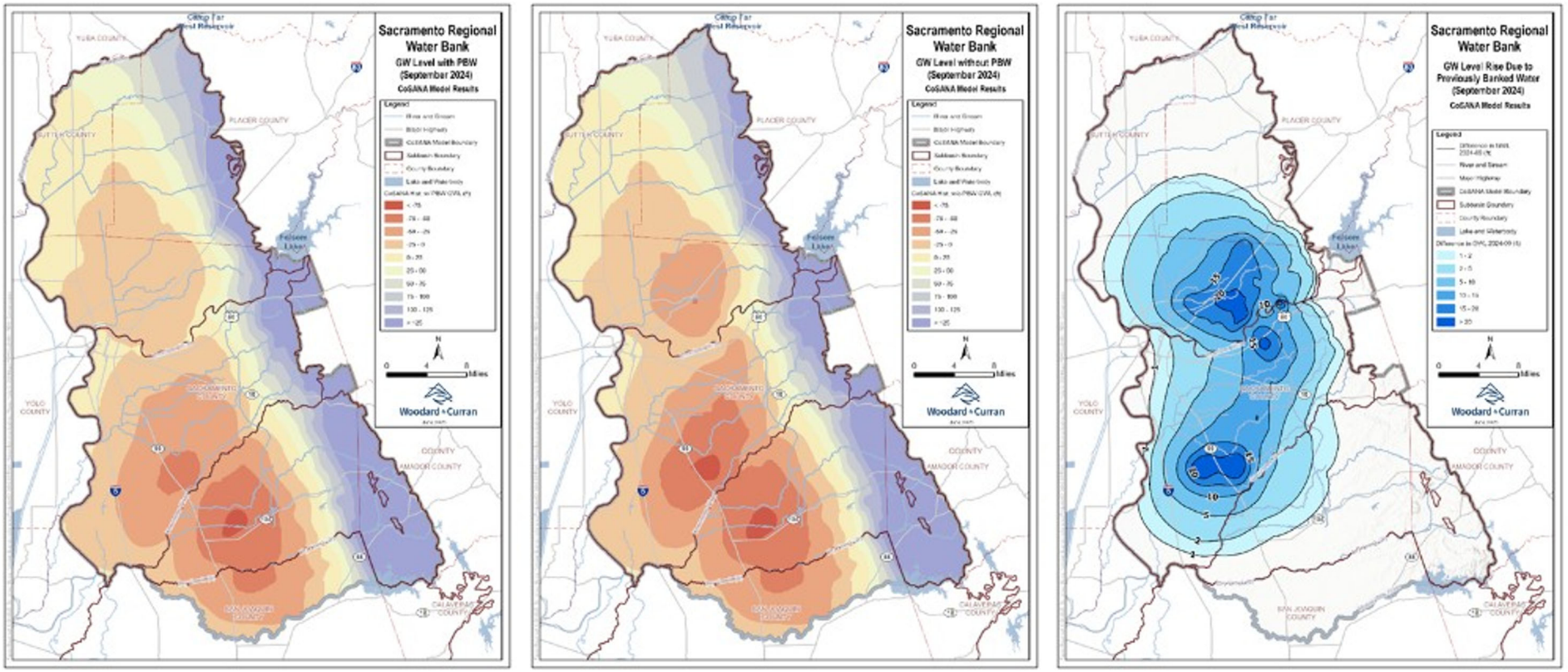


Figure 14 – Groundwater Contours & Difference Maps for the Effect of PBW

The rise in groundwater levels has taken place over time during the historical period of record, which can also be evident in groundwater level hydrographs at two representative wells for each subbasin, as shown in Figures 15 and 16, respectively.

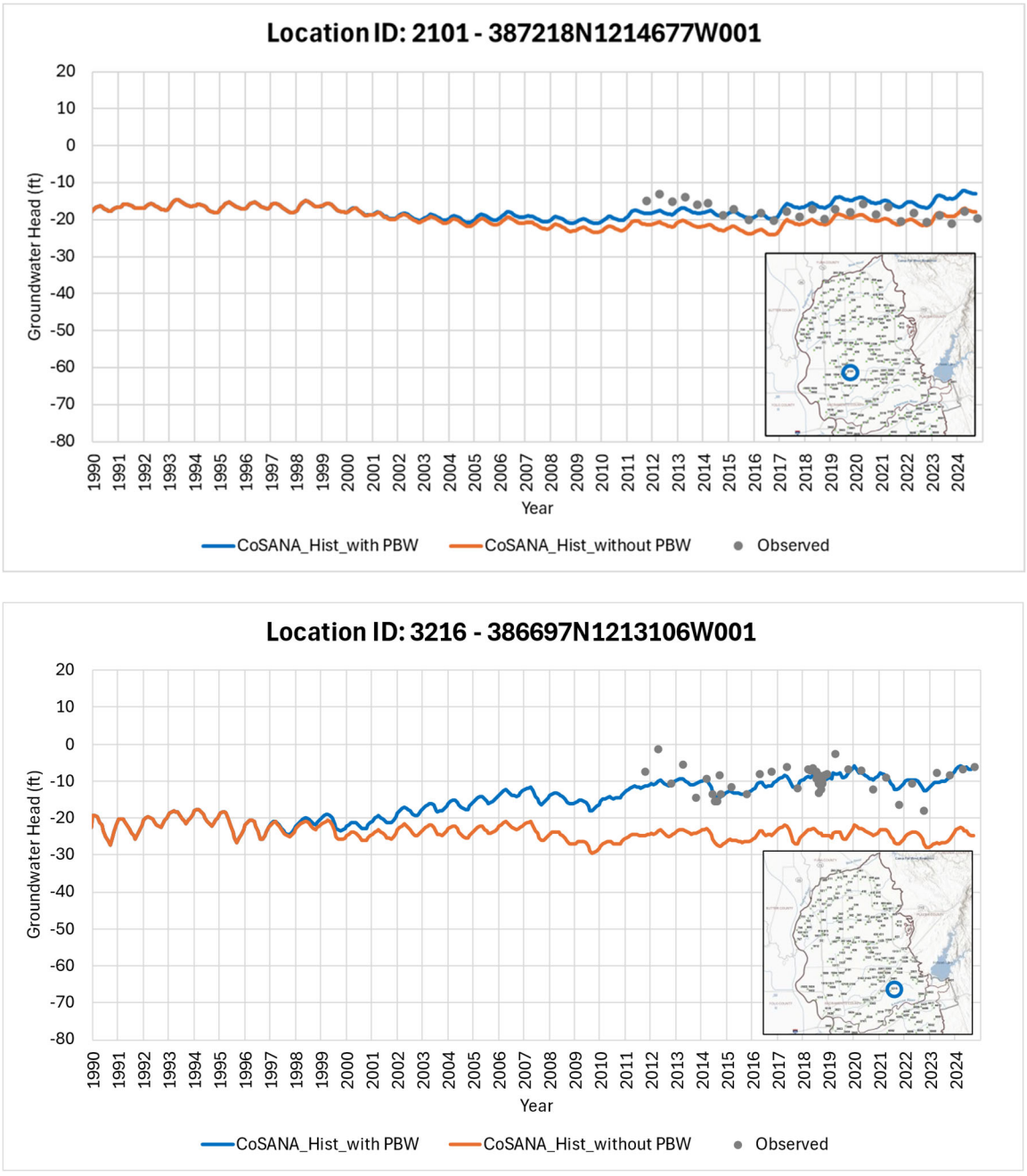


Figure 15- Groundwater level hydrographs for two representative wells in NASb

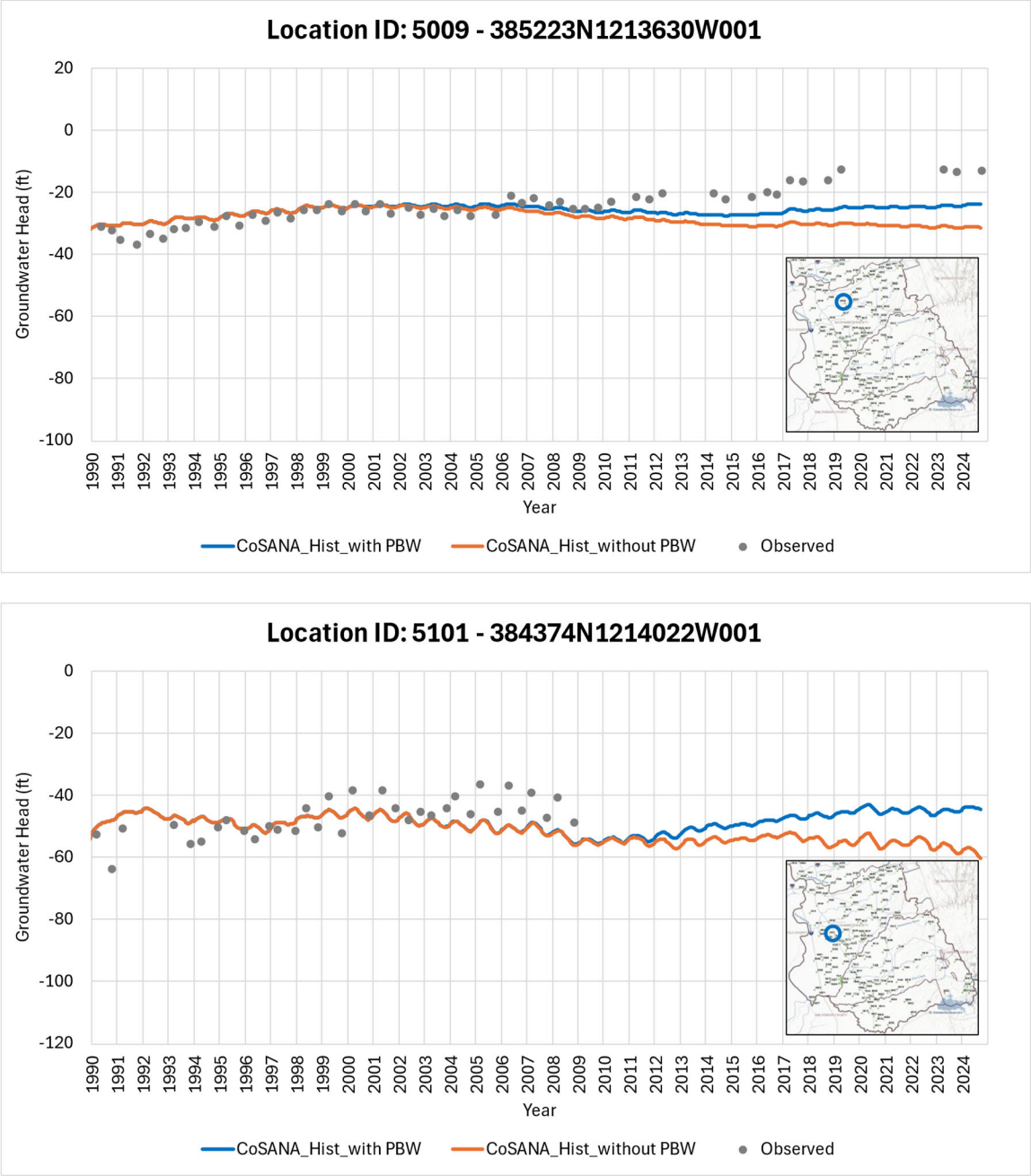


Figure 16- Groundwater level hydrographs for two representative wells in SASb

4.2 In-Basin PBW Volumes

As described in prior sections of this memorandum, the volumes of PBW are subject to interaction with other hydrologic and hydrogeologic features, the major ones are the interconnected surface water bodies and rivers, as well as neighboring subbasins. As such the difference between monthly groundwater budget components from the two model scenarios provide information on the changes in quantity of stream seepage along the major surface water

courses and change in subsurface flows across the model boundaries with the neighboring subbasins. Appendix B provides details of the water budgets aggregated to an annual basis. The PBW volumes are then subject to adjustments for the net contributions to the surface water bodies and the neighboring subbasins. Table 2 presents the amount of adjusted PBW that remains in each respective subbasin and the proportionate breakdown of the PBW and adjusted PBW for each entity.

Table 2- Volumes of PBW Remaining

Agency	PBW (AF)	In-Basin PBW (AF)
California American Water Company	17,100	9,100
City of Sacramento	90,000	47,800
Carmichael Water District	91,900	48,800
Sacramento Suburban Water District	268,500	142,600
Noth American Subbasins - Subtotal	***467,500***	***248,300***
Golden State Water Company	215,200	110,800
Sacramento County Water Agency	216,300	111,500
South American Subbasins - Subtotal	***431,500***	***222,300***
TOTAL	**899,000**	**470,600**

The dynamics of hydrologic processes in the American River watershed is depicted in the model on a monthly time step for the period of record in this study. As such, the stream-aquifer interaction, the subsurface flows across subbasin boundaries, and the change in groundwater storage and effects of implementation of conjunctive use (PBW) during the historical period of record are captured and analyzed by the model on a monthly basis.

Figures 17 and 18 illustrate the annual and cumulative volumes of PBW, net contributions to the stream baseflows and subsurface flows, and the cumulative remaining balance of PBW after the adjustments are made for net contributions. Note that on an annual basis, the average annual percentage of net contribution to the streams baseflows and neighboring basins in NASb area is about 5 percent, ranging from 4 to 7 percent. In the SASb area, while there have been relatively large percentage of out of basin contributions in early years, the net contribution to stream baseflows and subsurface flows to neighboring basins ranges from 7 to 9 percent after the Freeport project has been implemented.

In both NASb and SASb, the percent contribution changes over time due to a few factors including but not limited to hydrologic conditions, water supply and operations, timing of the conjunctive operations and use of PBW, groundwater level conditions at the time of conjunctive use operation, and groundwater pumping volumes and timing.

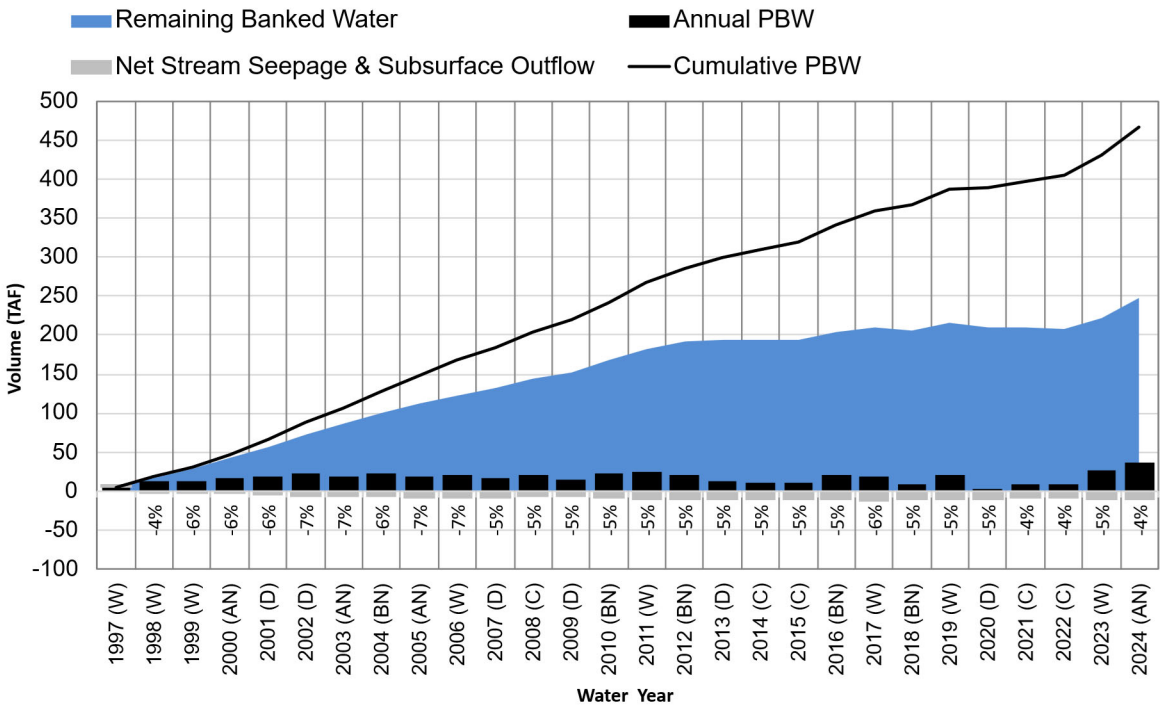


Figure 17- Cumulative PBW and In-Basin PBW Volumes in NASb

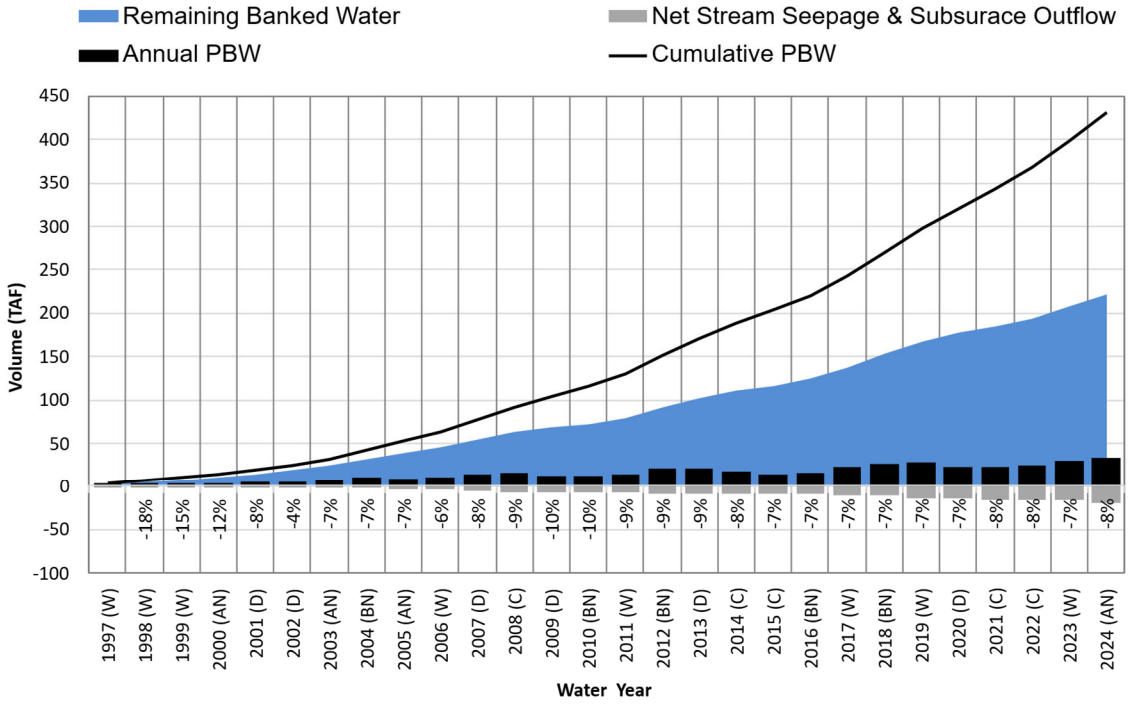


Figure 18- Cumulative PBW and In-Basin PBW Volumes in SASb

4.3 Multi-Benefits Provided by PBW

The genesis of a conjunctive use program in a basin is to optimize the coordinated use of surface water and groundwater in such a way to maximize the efficiency of the overall water supply portfolio to meet the demands in a sustainable manner. The conjunctive use program in the greater Sacramento area, including the NASb and SASb, as described in this document, has been a multi-benefit program, for not only increasing the efficiency and reliability of the water supplies to the water purveyors in the region, but also increasing the reliability of environmental benefits, including increasing the stream baseflows. The conjunctive use program is a foundational process that supports the establishment of the Sacramento Regional Water Bank. Diagram in Figure 19 illustrates the major benefits of conjunctive use and PBW over the past three decades.

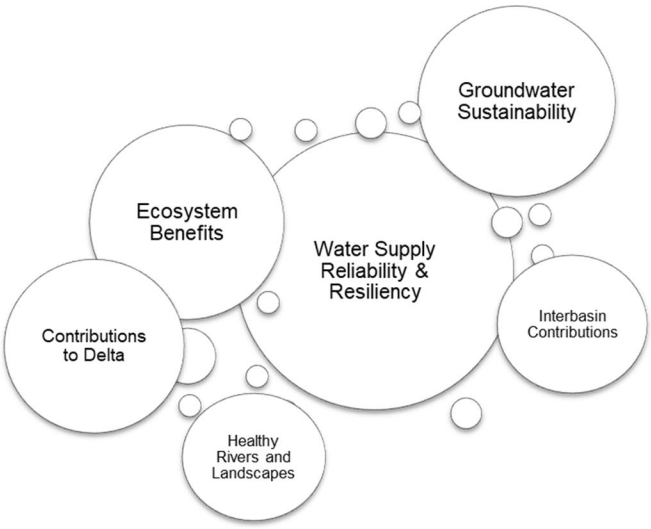


Figure 19- PBW Major Multi-Benefit Components

Figure 20 summarizes the results of the PBW analyses for NASb and SASb, respectively, after 27 years of operation of conjunctive use program, as of September 2024. The analyses indicate that of the 468 and 431 TAF of PBW in NASb and SASb, approximately 248 and 222 TAF remain in the respective subbasins as recoverable. This analysis indicates that the conjunctive use program and the PBW activities in the NASb and SASb has had a total net positive contribution to the stream baseflows of 382 TAF, majority of which has been net contributions to the American River (370 TAF). Sacramento River and other smaller streams have received less benefits from the banked water historically.

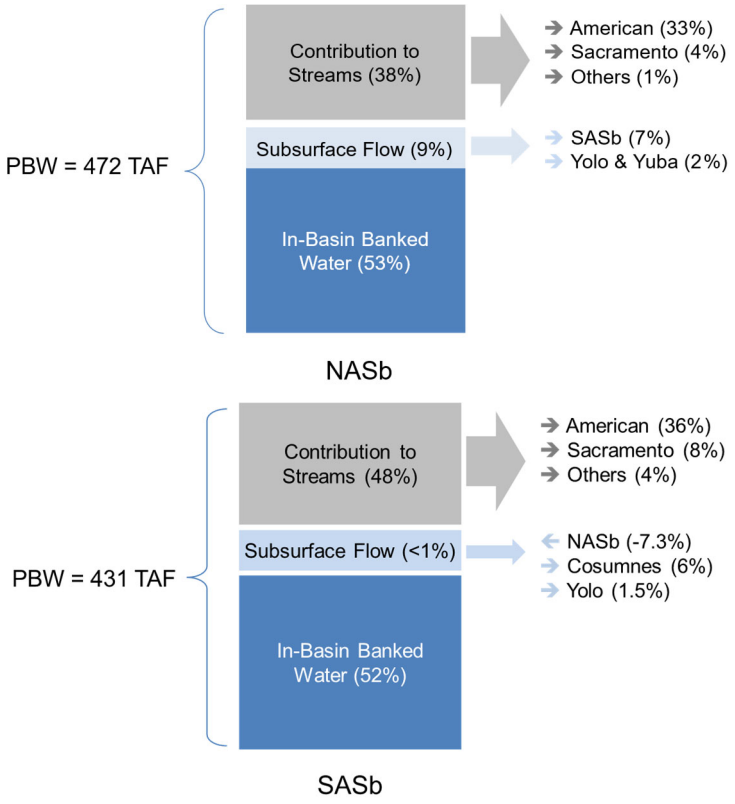


Figure 20- Summary of Cumulative PBW Balance Analysis (after 27 years)

4.3.1 Contributions to Streams

The implementation of conjunctive use over the course of past 27 years has had significant contributions to the health of river systems in the area with an average annual 13.8 TAF/year higher baseflows in all river courses in the area, and a total of more than 386.9 TAF addition to the baseflows over the 27 years.

This is of special interest for the American River where higher baseflow conditions exist in the Lower American River due to the implementation of conjunctive use program. In fact, one of the core principles of the Water Forum was to establish the conjunctive use program to improve the Lower American River Flows. Figure 21 indicates that the PBW has benefited the American River baseflow by approximately 11.4 TAF/year, with a total of more than 318.4 TAF over the past 27 years.

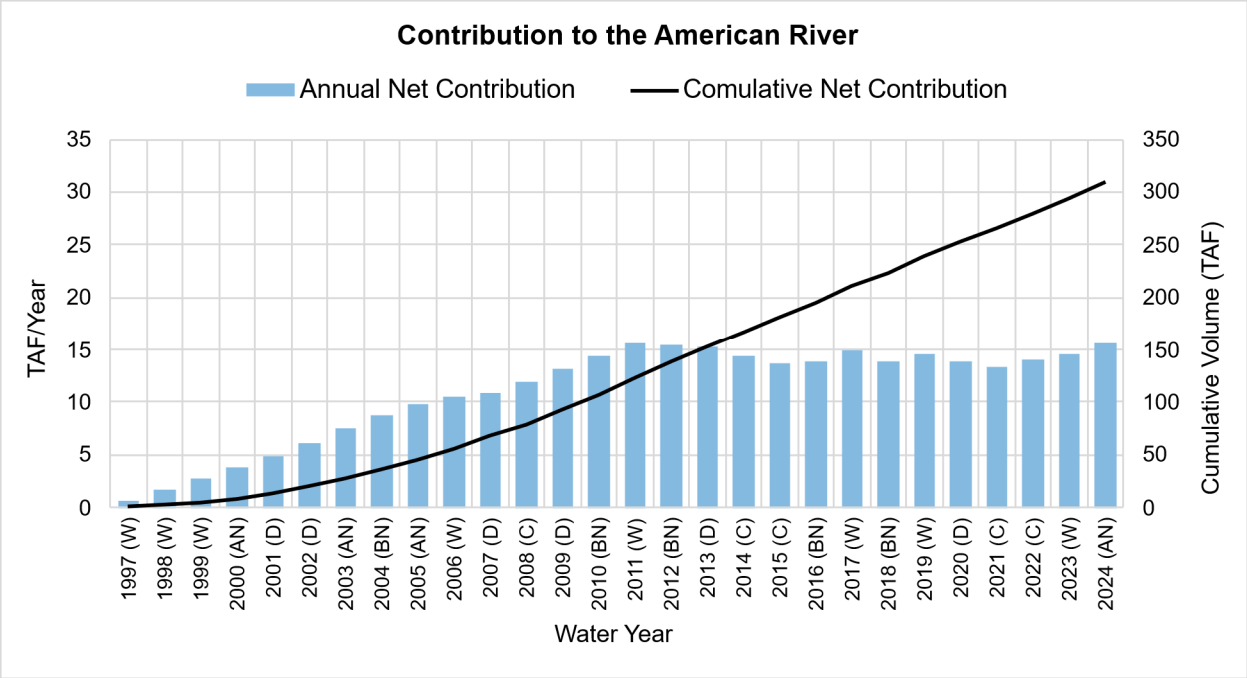


Figure 21- Annual Contribution of PBW to American River

4.3.2 Contributions to Delta Outflow

The conjunctive use program has also made significant net positive contributions to the Delta conditions. An analysis of baseflow changes for major streams over the 27 years of operation of conjunctive use program indicates that the average annual baseflow contributions have been approximately 13.2 TAF, of which about an average annual of 6.2 TAF has been contributions during the dry and critical years and the Delta Balanced conditions, which is primarily due to the nature of conjunctive use operations. This contribution has been as high as 14 TAF in a critical year such as 2014). Figures 22 and 23 illustrate the annual net contributions to the streams and cumulative net contributions during the program implementation through September 30, 2024. Based on these illustrations, a total of 370 TAF has been net contributed to the streams, of which 175 TAF has been during the Delta Balanced Conditions and 195 TAF has been during the Delta Excess Conditions. These contributions have improved the stream baseflow conditions and improved Delta outflow conditions significantly.

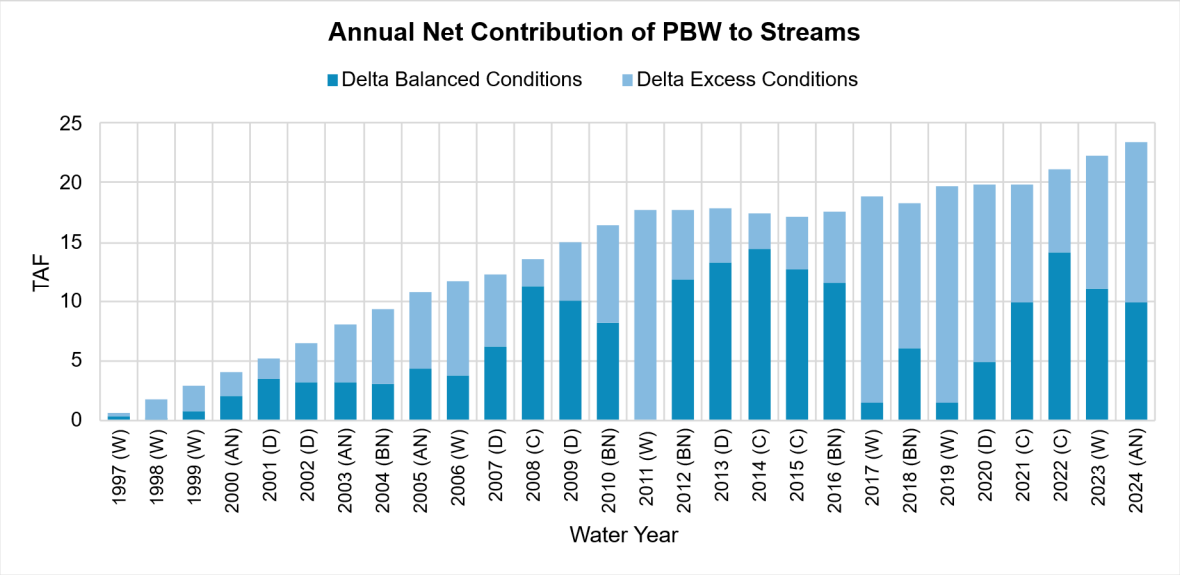


Figure 22- Annual Contribution of PBW in the NASb and SASb to Streams

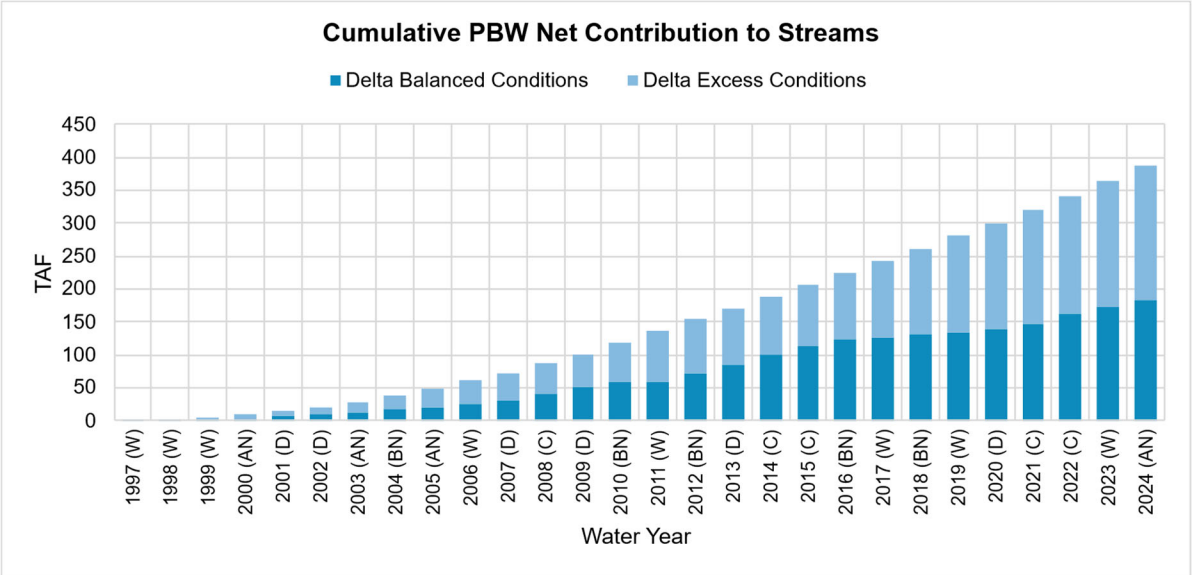


Figure 23- Cumulative Contribution of PBW in NASb and SASb to Streams

4.3.3 Contributions to Interbasin Flows

The operation of conjunctive use is estimated to have resulted in average annual contributions to the interbasin flows across the boundaries with the neighboring subbasins. This is primarily with the Yuba, Yolo, Solano and Cosumnes subbasins. Although these interbasin flow contributions may appear to be relatively small, they are subject to operation of the neighboring subbasins during the same period, which can result in a positive, although potential minor effect in groundwater levels at the boundaries with NASb and SASb.

4.4 Accounting for Uncertainty

The analysis performed for implications and impacts of conjunctive use and PBW operations are subject to some uncertainty. The uncertainties are not directly quantified and/or evaluated in this analysis. However, as part of the development and calibration of the CoSANA model, different areas of uncertainties were identified, evaluated, and reported in the modeling report. This section provides a brief description on the areas of uncertainty in such analysis.

In general, model development and application are subject to uncertainties in data and process. Relying on numerical models for estimation of impacts of PBW involves a level of uncertainty associated with the depiction of the physical process with mathematical formulations, source data quality and consistency, model hydrologic and hydrogeologic parameters, accuracy of observed and measured records, and other sources. Some of these uncertainties are out of the control of the user or analyst, and some others can be managed and controlled using appropriate analysis and modeling practices.

There are four major factors that can contribute to uncertainty for the PBW analysis, as shown in Figure 24. These are described below.

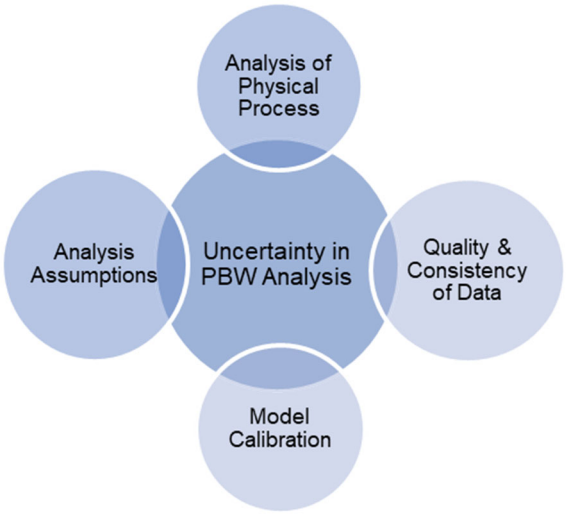


Figure 24- Sources of Uncertainty in Analysis of PBW

4.4.1 Analysis of Physical Process

This type of uncertainty is associated with representation of a highly integrated and complex natural and physical process with mathematical formulae that are intended to break down the physical process into simpler systems that can facilitate conceptualizing them with respective mathematical formulae.

4.4.2 Quality and Consistency of Data

This type of uncertainty is associated with the data that is required to support development and calibration of the model, as well as analysis performed for the PBW impacts. For example, data

uncertainty can originate from the estimates of groundwater pumping by the municipal water purveyors, or the reported monthly data for PBW. The WAF data tables started from the calendar year 2012 and was reported on an annual basis. Part of the effort by this study was to extend the PBW back to 1997 based on all other information available from the entities, as well as disaggregating the PBW data at the monthly scale, to be able to use it in the monthly modeling analysis. Additionally, the spatial distribution of PBW to the wells for each entity was made by proportion of reported groundwater pumping for each well for each entity. However, in practice that may not have been the case and pumping under conjunctive use operations may have had somewhat of a different distribution to each well, which is not reported.

4.4.3 Model Calibration

This type of uncertainty is associated with calibration of numerical models and/or the analytical or statistical methods. Model calibration requires a significant number of parameters that represent the surface and subsurface physical systems, including rainfall/runoff, soil conditions and characteristics, aquifer and aquitard hydraulic parameters, and stream bed characteristics. Additionally, if the model includes surface processes, parameters such as irrigation practices, crop evapotranspiration, and urban water use factors would need to be assessed. Since model calibration requires fine tuning of these parameters in a systematic and optimized way, and a unique solution to calibration may not be attainable, uncertainties in any of these parameters can propagate throughout the model calibration process and model performance.

4.4.4 Analysis Assumptions

This type of uncertainty is associated with the assumptions on planning study and model application for the particular scenario at hand. The application uncertainty typically involves assumptions on data and/or methodologies. In the case of PBW analysis, this can include assumption on the land use and water use conditions, growth and/or development absent the conjunctive use program and PBW. Additionally, there are assumptions on which wells would have been used if the conjunctive use program would not have been in place. Even further, would the groundwater facilities have been the same as what has occurred historically is a question. However, there had to be simplification assumptions made to complete the study with reasonable infrastructure assumptions.

As noted previously, the CoSANA model has been calibrated to water operations for each of the municipal water purveyors as well as the agricultural and irrigation districts, and the agricultural residential water use conditions, using the observed groundwater levels and streamflow gage records. CoSANA is considered a well calibrated model. However, like any other integrated hydrologic and groundwater model, uncertainties in model input and model processes exist which needs to be managed. The model documentation provides description of the accuracy of model calibration observed data on groundwater levels and streamflows, and range of model sensitivity to the uncertainties in data as well as aquifer and streambed parameters used. Accordingly, an uncertainty of 5 to 10 percent is estimated for the analysis of PBW and calculation of PBW remaining balance. This uncertainty is well within the acceptable range for integrated hydrologic modeling studies of a complex system, such as the American River watershed and the American River groundwater subbasins.

It is imperative to consider that application of hydrologic and groundwater modeling to planning studies typically involves assessment of impacts in relative terms. This helps in removing data and modeling uncertainties and associated errors. In a relative assessment the impacts are best evaluated due to changes between scenarios and a base case. The CoSANA model was used appropriately in the PBW analysis by focusing on relative changes in basin conditions rather than attempting to predict absolute values at individual locations. The analysis compared two scenarios, one with PBW depicting the historical operations, and one without PBW reflecting conditions of the subbasins in the absence of conjunctive use program. The goal was to evaluate how historical conjunctive use operations altered groundwater storage, stream-aquifer interactions, and interbasin flows.

This comparative approach aligns with the strengths of the model:

- By contrasting the “with PBW” and “without PBW” cases, the analysis isolated the effects of conjunctive use, providing a clear estimate of how banked water influenced basin conditions over time.
- The model captured basin-wide shifts in groundwater storage, stream seepage, and interbasin flows, where calibration against observed groundwater levels and streamflows provides the most reliable results.
- The analysis focused on long-term reconciliation of PBW, showing how elevated groundwater levels redistributed flows to rivers and neighboring subbasins over a 27-year period.

By using CoSANA to compare scenarios rather than predict absolute values, the PBW analysis applied the model in a way that is both scientifically sound and directly applicable to regional water management

.

5 FINDINGS AND NEXT STEPS

This section provides a brief overview of the findings of this study, as well as some recommendations to consider in stepping forward into analysis of the water bank operations and assumptions.

5.1 Summary of PBW Analysis Approach and Results

Approach to the analysis of PBW in-basin balance and out-of-basin contributions involved the following steps:

a- Confirmed the historical volumes of PBW as a result of conjunctive use operations for each of the entities.

b- Updated the CoSANA model for the historical conditions with the confirmed conjunctive use operations and develop the historical model (Scenario 1).

c- Developed a model scenario with removing the conjunctive use program and assuming that the entities would have relied on groundwater to meet same level of demand as in the historical conditions (Scenario 2).

d- Detail water budgets from the CoSANA model were analyzed for both scenarios and the difference between various components of water budgets are indicative of the impacts of PBW on the groundwater system and its interactions with the streams and neighboring subbasins

Results of this analysis are presented in tabular and graphical forms. In summary, the conjunctive use operations over the 27 years between 1997 to 2024 has had significant benefits including:

1- Approximately 900 TAF has been reported and documented to have been banked since 2004 in the Sacramento Regional Water Bank area, with about 468 TAF by the NASb and 431 TAF by the SASb entities.

2- The PBW banked water has benefited the groundwater system by raising groundwater levels in NASb and SASb areas as much as 20 feet, which is also consistent with the DWR reported 20-year change in statewide groundwater level conditions.

3- As of September 2024, approximately 471 TAF of the total banked water remains in the basin, with about 248 TAF in the NASb and 222 TAF in the SASb area. Due to the hydraulics of the groundwater flow and the integrated nature of the groundwater aquifer with the river courses in the area as well as interconnection with neighboring subbasins, the remainder of the banked water has contributed to stream baseflows and interbasin flows.

4- The PBW has resulted in approximately 13.2 TAF/year higher baseflows in the American and Sacramento Rivers with a total of more than 370 TAF. The average annual baseflow increases during the Delta Balance conditions has been 6.2 TAF/year with a total of 175 TAF.

5- The Lower American River baseflows have increased by approximately 11 TAF/year, with a total of more than 310 TAF. This is consistent and in line with the goals of Sacramento Area Water Forum and has helped meeting the Lower American River Flow standards.

The PBW analysis indicates that banking groundwater in storage for long periods of time in the NASb and SASb areas with little or no regular and frequent operations, i.e., not exercising the banked groundwater can result in increased groundwater flow out of the basin or reduced flows from other areas into the groundwater system. In fact, the analysis for the NASb and SASb indicates that after 27 years of banking, approximately 53–52% of volumes banked over time remain recoverable upon reconciliation for systemwide hydrologic effects. This outcome reflects past operational practices in the area and the Sacramento Area Water Forum objectives, where agencies operated the conjunctive use program for improving health of the basin, recovery of groundwater levels, managing the threats of contamination plumes to the municipal wells, and enhancing the lower American River baseflow conditions. As a result, limited and partial recovery of the banked water took place primarily during the groundwater substitution transfer events. Large volumes of PBW were left in storage for extended periods, elevating groundwater levels resulting in contributions to interconnected streams and adjacent subbasins.

Looking at this on an annual basis though, the PBW out-of-basin contributions were 4 to 7 percent in NASb and 7 to 9 percent in the SASB on an annual basis. These can be considered reconciliation factors that are applicable to the NASb and SASb PBW over the historical period. These out-of-basin contributions would have probably been less if the banked water was exercised on a more frequent basis by the banking entities. The in-basin PBW volume is therefore reconciled for these contributions as of September 2024.

As discussed in the next section, operations of the SRWB can be optimized to achieve the above goals while maximizing the in-basin storage amounts for use by the Bank participants.

5.2 Initial Annual Reconciliation Factors for the WAS

The results of PBW analysis for the NASb and SASb can be used as the basis for initial reconciliation factors for the SRWB operations. This approach provides a defensible and conservative baseline for SRWB operations, reflecting current system behavior and avoiding overstatement of recoverable volumes.

Accordingly, initial reconciliation factors for the WAS can be set at 4 to 7 percent for the NASb and 7to 9 percent for the SASb. These factors represent the long-term balance of conjunctive use operations and the hydrologic adjustments associated with higher groundwater storage. They also ensure that environmental and regional benefits, such as enhanced baseflows and interbasin flows, are properly reflected in the accounting framework as a starting point.

Consistent with Program Committee direction, reconciliation factors should be reassessed every five years alongside GSP updates, and adjustments to the banked balance be made. This will allow new operational data, monitoring results, and model refinements to be incorporated into the WAS.

5.3 Long-term Effects of Annual Reconciliation Factors

Annual reconciliation provides a transparent method for adjusting banked water balances to reflect hydrologic interactions with interconnected streams and neighboring basins. It also allows for annual accounting of credits and helps shape the annual and long-term balance of the Banked water.

While the reconciliation factors derived from the PBW analysis provide a reasonable reference point for setting initial reconciliation factors under the WAS, they should not be interpreted as predictive of future outcomes. The SRWB will operate differently, with more frequent recharge-and-recovery cycles rather than long-term storage with little recovery. Additionally, the SRWB will have a different starting point and may be subject to different hydrologic conditions, as well as different in-basin (more frequent recharge and pumping cycles) and upstream operational conditions.

Therefore, annual reconciliation of bank balance and five-year assessment of reconciliation factors will provide a robust long-term accounting practice in the context of WAS.

5.4 Reconciled PBW Balanced and SGMA Compliance

The PBW analysis was undertaken to reconcile decades of conjunctive use with the new framework of the Water Accounting System. However. it does not imply that the remaining PBW balance should or could be extracted immediately or exported out of the basin. Rather, it recognizes the substantial role agencies have played in stabilizing groundwater levels, advancing sustainability, and providing ecosystem benefits through conjunctive use.

How, when, and whether the remaining PBW is used will be subject to future policy decisions by the Program Committee, the agencies holding PBW balances, and coordination with the relevant Groundwater Sustainability Agencies (GSAs). To aid in providing for subbasin sustainability, the SRWB is designed with multiple layers of safeguards.

Together, the following seven safeguards create a comprehensive protection framework.

1. **Recharge Before Recovery:** The Bank operates only with a positive recharge balance. All withdrawals must be supported by verified deposits, including both in-lieu and direct recharge.

2. **Banking Losses Tracking:** Contributions to streams and adjacent basins are periodically recalculated to determine the recoverable portion of PBW. This ensures that withdrawals reflect true in-basin balances.

3. **Leave Behind Requirements:** A portion of banked water must remain in the basin when surface water is transferred, protecting local storage and avoiding groundwater overdraft and stream depletions.

4. **Geographically Balanced Recharge/Recovery:** Recharge and recovery must occur within the same subbasin to prevent localized drawdown and maintain equity among participants.

5. **Enhanced Monitoring:** Groundwater conditions are closely tracked through expanded monitoring, including the installation of sentry monitoring wells around banking areas. These long-term observation wells provide detailed insight into the cumulative effects of recharge and recovery.

6. **Adaptive Management:** Operational decisions account for hydrologic variability and basin conditions, with explicit provisions to adjust banking activities to maintain long-term groundwater sustainability goals.

7. **Dispute Resolution:** A formal process is in place to resolve conflicts equitably, ensuring transparency and trust among participants and stakeholders.

6 REFERENCES

Department of Water Resources (DWR) (2024). Conjunctive Water Management Resource Management Strategy, California Water Plan Update 2023. https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/California-Water-Plan/Docs/Update2023/PRD/RMS/Draft-Conjunctive-Water-Management-RMS.pdf

RWA (2023). Sacramento Regional Water Bank Goal, Objectives, Principles, and Constraints. https://rwah2o.org/wp-content/uploads/2023/06/SRWB_Goal-Objectives-Principles-Constraints_07Jun2023.pdf

Sacramento Groundwater Authority (2021). North American Subbasin Groundwater Sustainability Plan.

Sacramento Central Groundwater Authority (2021). South American Subbasin Groundwater Sustainability Plan.

Woodard & Curran (2021). CoSANA, An Integrated Water Resources Model of the Cosumnes, South American, and North American Groundwater Subbasins, November 2021. https://nasbgroundwater.org/wp-content/uploads/2025/08/P_Appendix.pdf

APPENDIX A – DETAILED PBW ACCOUNTING

Table A-1- PBW for North American Subbasin (NASb)

Water Year	October	November	December	January	February	March	April	May	June	July	August	September	Annual	Cumulative Annual
1997	485	547	263	289	252	303	321	371	401	588	654	601	**5,076**	**5,076**
1998	500	319	155	119	626	1,022	976	1,313	1,734	2,052	2,016	2,034	**12,866**	**17,942**
1999	1,448	840	967	947	793	923	874	1,938	1,829	649	610	691	**12,511**	**30,452**
2000	1,213	1,093	495	222	857	1,044	1,729	1,706	2,054	2,167	1,965	2,055	**16,600**	**47,052**
2001	1,789	1,147	964	1,099	982	931	1,522	1,901	1,562	2,185	2,128	2,284	**18,495**	**65,547**
2002	2,115	1,358	1,118	1,138	1,044	1,189	1,758	2,402	2,556	2,623	2,301	2,467	**22,069**	**87,616**
2003	2,013	1,042	1,184	1,114	989	1,176	1,251	1,696	2,342	1,387	2,108	3,081	**19,383**	**106,999**
2004	2,357	1,352	1,272	1,014	845	1,359	1,915	2,611	2,685	2,064	1,956	2,246	**21,678**	**128,677**
2005	1,728	1,232	1,122	1,050	923	1,119	1,298	1,996	2,440	2,022	1,746	2,118	**18,794**	**147,471**
2006	2,049	1,510	1,301	959	947	942	1,035	2,425	2,317	1,546	2,386	2,637	**20,054**	**167,525**
2007	1,959	1,160	1,047	1,217	983	1,355	1,795	627	1,431	1,992	1,882	1,113	**16,560**	**184,085**
2008	488	411	324	260	255	1,376	2,106	2,486	3,218	3,607	2,785	1,821	**19,139**	**203,223**
2009	1,156	673	701	698	548	364	2,346	3,068	2,311	1,569	820	889	**15,143**	**218,366**
2010	2,063	1,358	890	1,370	1,254	275	290	980	3,688	4,152	3,682	2,728	**22,730**	**241,096**
2011	2,156	1,360	1,592	1,086	817	724	2,342	1,942	2,206	3,841	3,616	2,356	**24,037**	**265,133**
2012	1,731	1,256	848	1,196	791	575	1,002	2,191	2,031	2,575	3,018	2,587	**19,801**	**284,934**
2013	1,171	767	-456	-226	680	932	1,093	1,472	1,645	1,847	1,705	1,390	**12,019**	**296,953**
2014	1,259	978	752	711	556	649	762	1,053	1,144	1,258	1,128	964	**11,213**	**308,166**
2015	924	657	555	659	593	905	893	880	1,001	1,037	1,049	1,181	**10,334**	**318,500**
2016	983	733	661	645	901	1,379	1,688	2,380	2,597	2,784	3,368	2,780	**20,900**	**339,400**
2017	1,048	1,499	916	977	813	945	1,070	1,456	1,654	2,910	2,877	1,700	**17,864**	**357,264**
2018	962	747	310	125	114	126	209	847	1,207	1,401	1,163	861	**8,073**	**365,338**
2019	1,516	1,071	977	869	869	760	1,178	1,465	1,838	3,279	3,011	2,965	**19,797**	**385,135**
2020	895	823	473	405	214	88	87	-21	-37	-125	10	97	**2,908**	**388,043**
2021	1,207	701	718	514	387	602	1,034	784	558	575	526	573	**8,178**	**396,221**
2022	607	421	516	581	545	620	651	762	827	755	715	592	**7,591**	**403,813**
2023	1,102	728	540	774	799	811	1,284	2,839	4,063	4,740	4,532	3,999	**26,210**	**430,023**
2024	3,650	2,109	1,729	1,690	1,556	1,510	1,789	3,108	3,596	4,970	5,259	4,945	**35,909**	**465,932**
Average	**1,449**	**996**	**783**	**768**	**748**	**857**	**1,225**	**1,667**	**1,961**	**2,159**	**2,108**	**1,920**	16,640	-

Table A-2- PBW for South American Subbasin (SASb)

Water Year	October	November	December	January	February	March	April	May	June	July	August	September	Annual	Cumulative Annual
1997	424	255	0	0	0	4	138	501	600	590	643	535	**3,690**	**3,690**
1998	496	119	0	0	0	0	0	57	434	481	507	525	**2,620**	**6,309**
1999	486	422	90	0	0	0	212	552	544	645	642	612	**4,202**	**10,512**
2000	506	196	0	0	0	0	194	505	557	672	828	830	**4,288**	**14,800**
2001	802	395	0	0	0	0	0	475	731	841	809	792	**4,846**	**19,646**
2002	761	172	0	0	0	127	463	591	786	811	750	780	**5,241**	**24,887**
2003	764	661	451	0	197	668	644	711	730	738	765	759	**7,087**	**31,974**
2004	762	696	429	186	585	474	699	628	776	792	749	693	**7,469**	**39,443**
2005	723	594	0	0	0	236	507	632	638	769	781	735	**5,615**	**45,058**
2006	742	510	251	70	80	93	188	635	698	797	798	715	**5,577**	**50,635**
2007	802	828	157	0	204	524	768	1,035	1,134	1,288	1,252	1,220	**9,212**	**59,847**
2008	1,175	867	496	0	97	373	819	1,156	1,228	1,313	1,334	1,319	**10,177**	**70,024**
2009	1,243	883	369	0	235	573	805	1,069	1,241	1,352	1,350	1,335	**10,455**	**80,479**
2010	1,232	744	0	0	133	593	790	1,133	1,255	1,340	1,307	1,321	**9,848**	**90,327**
2011	317	800	305	313	461	674	876	1,567	1,686	2,399	2,672	2,596	**14,665**	**104,992**
2012	1,850	1,105	916	790	905	1,158	1,358	1,869	2,424	2,789	2,786	2,501	**20,451**	**125,443**
2013	1,861	670	148	356	979	1,476	1,718	2,522	2,585	2,725	2,647	2,524	**20,208**	**145,652**
2014	2,325	1,744	429	19	299	1,071	1,432	2,220	1,975	2,071	2,213	2,105	**17,902**	**163,553**
2015	1,966	1,004	414	314	405	1,058	1,515	1,535	1,555	1,690	1,690	1,547	**14,694**	**178,247**
2016	1,371	730	351	145	296	328	1,080	1,868	2,327	2,769	2,711	2,476	**16,452**	**194,700**
2017	2,023	920	472	408	440	492	961	2,702	3,104	3,702	3,518	3,362	**22,105**	**216,805**
2018	2,710	1,778	1,320	448	707	1,232	1,668	2,644	3,348	3,781	3,747	3,479	**26,861**	**243,666**
2019	2,974	2,002	756	1,155	1,117	1,310	1,572	2,224	3,516	3,876	3,974	3,622	**28,097**	**271,763**
2020	2,794	1,954	1,016	319	652	1,902	1,998	2,644	2,890	2,664	2,671	2,105	**23,609**	**295,372**
2021	2,531	1,933	1,101	404	1,201	2,000	2,560	1,979	2,147	2,691	2,598	2,197	**23,344**	**318,715**
2022	1,800	1,724	1,214	1,269	1,726	2,192	2,156	2,867	2,349	2,275	2,210	2,151	**23,934**	**342,650**
2023	2,214	1,428	1,492	1,614	1,519	1,745	2,106	3,188	3,654	3,940	4,109	3,687	**30,696**	**373,346**
2024	3,310	2,172	1,835	1,783	1,112	1,920	2,272	3,209	3,696	4,125	4,044	3,451	**32,930**	**406,276**
Average	**1,463**	**975**	**500**	**343**	**477**	**794**	**1,054**	**1,526**	**1,736**	**1,926**	**1,932**	**1,785**	**14,510**	**-**

Table A-3- PBW for California American Water (CalAm)

Water Year	October	November	December	January	February	March	April	May	June	July	August	September	Annual	Cumulative Annual
1997	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
1998	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
1999	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
2000	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
2001	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
2002	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
2003	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
2004	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
2005	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
2006	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
2007	0	0	0	0	21	136	228	0	0	0	0	45	**430**	**430**
2008	0	0	0	0	0	144	459	324	480	0	0	0	**1,407**	**1,837**
2009	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**1,837**
2010	123	330	114	325	180	0	0	0	100	402	454	168	**2,194**	**4,031**
2011	0	0	0	221	5	0	249	293	204	157	177	145	**1,451**	**5,482**
2012	135	281	307	296	200	40	0	0	0	7	19	154	**1,439**	**6,921**
2013	0	4	1	0	0	0	0	0	0	0	0	0	**5**	**6,925**
2014	0	0	0	0	20	0	0	0	0	0	0	0	**20**	**6,946**
2015	0	0	0	0	0	0	16	0	0	0	0	0	**16**	**6,961**
2016	0	0	0	0	0	0	0	0	0	0	4	101	**105**	**7,066**
2017	35	23	55	140	85	97	86	104	123	323	300	257	**1,628**	**8,694**
2018	305	148	49	0	0	0	0	0	148	257	210	193	**1,311**	**10,005**
2019	290	156	141	147	123	2	106	142	200	206	74	98	**1,685**	**11,690**
2020	120	128	175	108	42	0	0	0	0	0	1	1	**575**	**12,266**
2021	1	0	0	0	0	0	0	2	4	4	1	0	**12**	**12,278**
2022	0	0	0	0	1	0	0	1	2	2	2	3	**10**	**12,288**
2023	1	0	0	1	0	0	1	1	100	181	349	336	**970**	**13,258**
2024	309	0	0	301	213	18	0	178	276	330	283	303	**2,212**	**15,469**
Average	**47**	**38**	**30**	**55**	**32**	**16**	**41**	**37**	**59**	**67**	**67**	**64**	552	-

Table A-4- PBW for City of Sacrmaneto (COS)														
Water Year	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Annual**	**Cumulative Annual**
1997	194	287	92	79	79	131	170	222	222	263	249	213	**2,200**	**2,200**
1998	163	109	94	95	87	106	122	140	189	271	273	221	**1,868**	**4,069**
1999	166	98	102	107	94	113	145	219	252	312	285	252	**2,148**	**6,216**
2000	212	126	115	110	96	132	175	208	290	307	305	243	**2,321**	**8,537**
2001	181	121	117	117	104	132	162	281	307	318	311	253	**2,405**	**10,942**
2002	214	129	106	112	111	136	183	241	294	341	316	273	**2,455**	**13,397**
2003	225	131	107	104	100	145	147	244	302	362	310	277	**2,453**	**15,850**
2004	238	133	108	127	123	172	233	320	341	357	343	299	**2,794**	**18,645**
2005	206	138	141	135	113	140	167	223	280	377	362	289	**2,571**	**21,215**
2006	243	179	129	122	116	124	131	265	338	402	368	311	**2,727**	**23,942**
2007	236	129	113	152	140	178	205	278	356	400	389	302	**2,879**	**26,821**
2008	211	184	148	110	101	112	228	291	347	373	342	275	**2,723**	**29,544**
2009	221	135	151	131	87	115	190	255	279	335	312	275	**2,487**	**32,031**
2010	194	137	115	101	89	116	126	186	287	336	308	267	**2,264**	**34,295**
2011	208	132	114	111	97	98	162	209	229	316	323	274	**2,273**	**36,568**
2012	371	271	243	242	233	272	298	543	688	769	776	629	**5,337**	**41,905**
2013	792	493	419	434	449	595	729	998	1,105	1,220	1,138	940	**9,312**	**51,217**
2014	795	583	442	425	338	413	491	705	849	883	809	708	**7,443**	**58,660**
2015	644	427	375	358	320	477	519	602	702	772	769	716	**6,680**	**65,340**
2016	584	402	376	382	351	357	454	580	722	798	754	638	**6,398**	**71,738**
2017	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**71,738**
2018	-245	-125	-109	-99	-107	-108	-140	-250	-318	-375	-347	-292	**-2,515**	**69,223**
2019	-27	-19	-13	-12	-11	-12	-17	-26	-32	-43	-43	-36	**-292**	**68,931**
2020	-400	-316	-201	-192	-205	-245	-268	-399	-468	-502	-484	-404	**-4,084**	**64,847**
2021	250	173	139	130	105	142	217	282	316	348	329	297	**2,727**	**67,574**
2022	301	153	152	151	181	238	236	324	387	380	369	319	**3,190**	**70,764**
2023	553	376	305	340	306	331	448	692	899	1,089	1,075	925	**7,340**	**78,104**
2024	1,081	758	639	586	530	590	661	1,070	1,349	1,642	1,604	1,419	**11,931**	**90,035**
Average	**279**	**191**	**161**	**159**	**144**	**179**	**220**	**311**	**375**	**430**	**412**	**353**	**3,216**	-

Table A-5- PBW for Carmichael Water District (CWD)

Water Year	October	November	December	January	February	March	April	May	June	July	August	September	Annual	Cumulative Annual
1997	228	104	9	0	0	0	0	81	167	312	393	374	**1,669**	**1,669**
1998	276	124	6	0	0	0	2	43	192	371	385	346	**1,746**	**3,415**
1999	322	113	30	0	0	0	0	130	279	319	303	276	**1,774**	**5,189**
2000	253	88	74	42	0	0	72	121	221	237	243	227	**1,578**	**6,766**
2001	101	0	0	0	0	0	0	127	270	352	420	400	**1,671**	**8,437**
2002	259	170	151	149	136	176	230	334	405	402	389	359	**3,159**	**11,596**
2003	340	182	147	131	128	174	171	269	412	437	387	364	**3,144**	**14,740**
2004	357	189	145	136	129	188	233	339	371	436	415	430	**3,370**	**18,110**
2005	326	194	169	156	137	172	231	303	384	427	430	367	**3,297**	**21,407**
2006	314	258	195	172	161	176	151	301	348	405	377	373	**3,232**	**24,639**
2007	315	154	138	177	141	206	248	349	377	364	390	322	**3,181**	**27,819**
2008	275	227	176	150	142	228	323	379	430	434	432	366	**3,562**	**31,381**
2009	340	183	157	151	127	166	255	281	336	417	401	339	**3,153**	**34,534**
2010	250	192	152	136	122	155	164	259	337	379	356	315	**2,817**	**37,350**
2011	281	165	141	138	125	131	193	266	271	341	336	311	**2,699**	**40,049**
2012	421	304	298	296	256	263	283	457	561	673	662	593	**5,067**	**45,116**
2013	494	270	223	222	231	336	364	473	540	627	568	450	**4,798**	**49,914**
2014	464	395	310	285	197	236	271	348	295	375	318	256	**3,750**	**53,664**
2015	280	230	180	302	273	428	359	278	283	264	280	402	**3,558**	**57,223**
2016	399	331	285	263	251	273	378	552	558	657	735	599	**5,283**	**62,506**
2017	445	294	276	262	194	259	273	434	477	607	591	477	**4,590**	**67,096**
2018	376	247	237	224	221	235	215	352	419	462	381	314	**3,684**	**70,780**
2019	423	339	269	248	218	248	305	375	486	539	544	492	**4,486**	**75,266**
2020	433	393	259	272	324	332	356	378	427	372	328	248	**4,122**	**79,388**
2021	187	171	181	171	152	187	206	242	221	195	164	239	**2,316**	**81,704**
2022	297	259	235	206	237	220	247	259	241	141	123	99	**2,565**	**84,269**
2023	108	99	28	26	43	57	235	428	527	537	550	474	**3,113**	**87,381**
2024	439	324	260	263	216	266	341	453	454	563	504	423	**4,505**	**91,887**
Average	**322**	**214**	**169**	**163**	**149**	**183**	**218**	**308**	**368**	**416**	**407**	**366**	3,282	-

Table A-6- PBW for Sacramento Suburban Water District (SSWD)

Water Year	October	November	December	January	February	March	April	May	June	July	August	September	Annual	Cumulative Annual
1997	63	157	162	210	173	172	151	68	11	13	12	14	**1,206**	**1,206**
1998	61	87	56	25	539	915	852	1,130	1,353	1,409	1,358	1,467	**9,251**	**10,458**
1999	960	629	835	840	699	810	729	1,589	1,297	18	22	162	**8,589**	**19,047**
2000	747	878	306	70	760	912	1,483	1,377	1,542	1,623	1,418	1,585	**12,702**	**31,749**
2001	1,506	1,027	847	981	878	799	1,360	1,492	985	1,514	1,397	1,631	**14,419**	**46,168**
2002	1,643	1,059	862	877	796	877	1,345	1,828	1,857	1,881	1,597	1,834	**16,454**	**62,622**
2003	1,449	728	930	879	760	856	932	1,183	1,628	588	1,411	2,441	**13,786**	**76,408**
2004	1,762	1,030	1,018	751	593	999	1,449	1,952	1,973	1,271	1,198	1,518	**15,515**	**91,923**
2005	1,196	900	812	759	673	807	899	1,470	1,776	1,217	955	1,462	**12,926**	**104,848**
2006	1,492	1,073	977	664	670	642	753	1,859	1,630	739	1,642	1,953	**14,095**	**118,944**
2007	1,408	877	797	888	680	835	1,114	0	698	1,228	1,102	444	**10,071**	**129,015**
2008	2	0	0	0	12	892	1,096	1,492	1,961	2,801	2,012	1,180	**11,447**	**140,462**
2009	595	355	393	416	334	82	1,902	2,532	1,696	816	107	276	**9,503**	**149,965**
2010	1,496	698	510	807	863	4	0	535	2,964	3,035	2,564	1,979	**15,455**	**165,420**
2011	1,667	1,063	1,338	615	590	495	1,738	1,174	1,502	3,026	2,780	1,626	**17,614**	**183,034**
2012	803	400	0	362	102	0	421	1,191	782	1,125	1,561	1,210	**7,958**	**190,992**
2013	-115	0	-1,100	-882	0	0	0	0	0	0	0	0	**-2,096**	**188,896**
2014	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**188,896**
2015	0	0	0	0	0	0	0	0	16	1	0	63	**80**	**188,976**
2016	0	0	0	0	298	749	855	1,248	1,317	1,328	1,875	1,443	**9,114**	**198,090**
2017	567	1,182	585	575	535	589	711	918	1,053	1,980	1,985	965	**11,646**	**209,736**
2018	526	476	133	0	0	0	134	745	957	1,058	919	645	**5,594**	**215,330**
2019	830	595	579	486	539	523	783	974	1,183	2,577	2,436	2,411	**13,918**	**229,248**
2020	741	618	240	217	53	0	0	0	3	4	165	252	**2,294**	**231,542**
2021	770	357	398	213	130	273	612	258	17	28	31	37	**3,123**	**234,665**
2022	9	8	129	223	127	162	168	179	197	233	221	171	**1,827**	**236,492**
2023	441	252	208	407	449	422	600	1,718	2,537	2,933	2,558	2,264	**14,788**	**251,280**
2024	1,821	1,027	829	540	597	636	787	1,406	1,517	2,435	2,867	2,799	**17,262**	**268,541**
Average	**801**	**553**	**423**	**390**	**423**	**480**	**746**	**1,011**	**1,159**	**1,246**	**1,221**	**1,137**	**9,591**	-

Table A-7- PBW for Golden State Water Company (GSWC)

Water Year	October	November	December	January	February	March	April	May	June	July	August	September	Annual	Cumulative Annual
1997	424	255	0	0	0	4	138	501	600	590	643	535	**3,690**	**3,690**
1998	496	119	0	0	0	0	0	57	434	481	507	525	**2,620**	**6,309**
1999	486	422	90	0	0	0	212	552	544	645	642	612	**4,202**	**10,512**
2000	506	196	0	0	0	0	194	505	557	672	828	830	**4,288**	**14,800**
2001	802	395	0	0	0	0	0	475	731	841	809	792	**4,846**	**19,646**
2002	761	172	0	0	0	127	463	591	786	811	750	780	**5,241**	**24,887**
2003	764	661	451	0	197	668	644	711	730	738	765	759	**7,087**	**31,974**
2004	762	696	429	186	585	474	699	628	776	792	749	693	**7,469**	**39,443**
2005	723	594	0	0	0	236	507	632	638	769	781	735	**5,615**	**45,058**
2006	742	510	251	70	80	93	188	635	698	797	798	715	**5,577**	**50,635**
2007	802	828	157	0	204	524	768	1,035	1,134	1,288	1,252	1,220	**9,212**	**59,847**
2008	1,175	867	496	0	97	373	819	1,156	1,228	1,313	1,334	1,319	**10,177**	**70,024**
2009	1,243	883	369	0	235	573	805	1,069	1,241	1,352	1,350	1,335	**10,455**	**80,479**
2010	1,232	744	0	0	133	593	790	1,133	1,255	1,340	1,307	1,321	**9,848**	**90,327**
2011	317	800	305	294	449	648	741	944	1,246	1,314	1,349	1,249	**9,656**	**99,983**
2012	799	398	295	286	449	649	843	999	1,234	1,331	1,344	1,244	**9,871**	**109,854**
2013	799	398	142	72	360	620	676	1,098	1,245	1,249	1,246	1,249	**9,154**	**119,008**
2014	1,068	592	0	0	292	634	754	1,083	1,158	1,249	1,237	1,228	**9,294**	**128,303**
2015	1,099	504	0	196	399	550	723	833	856	882	916	897	**7,854**	**136,156**
2016	889	417	0	139	291	312	259	699	934	1,254	1,221	1,195	**7,611**	**143,767**
2017	986	286	0	389	388	428	415	1,025	1,244	1,397	1,394	1,317	**9,269**	**153,037**
2018	765	415	429	428	386	427	415	929	1,315	1,354	1,351	1,340	**9,552**	**162,589**
2019	1,099	558	426	420	383	425	412	560	1,320	1,419	1,399	1,369	**9,790**	**172,379**
2020	806	305	316	318	297	317	308	608	910	561	612	401	**5,760**	**178,139**
2021	601	571	401	399	361	401	387	505	975	1,185	1,114	1,128	**8,027**	**186,166**
2022	1,094	508	424	427	386	427	413	676	1,203	1,329	1,357	1,201	**9,446**	**195,612**
2023	1,411	720	437	420	411	462	607	996	1,144	1,281	1,365	1,220	**10,473**	**206,085**
2024	1,114	349	174	423	434	477	633	881	1,106	1,263	1,288	939	**9,081**	**215,166**
Average	**849**	**506**	**200**	**160**	**244**	**373**	**493**	**768**	**973**	**1,053**	**1,061**	**1,005**	7,684	-

Table A-8- PBW for Sacramento County Water Agency (SCWA)

Water Year	October	November	December	January	February	March	April	May	June	July	August	September	Annual	Cumulative Annual
1997	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
1998	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
1999	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
2000	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
2001	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
2002	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
2003	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
2004	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
2005	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
2006	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
2007	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
2008	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
2009	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
2010	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
2011	0	0	0	19	12	26	135	623	440	1,085	1,323	1,347	**5,009**	**5,009**
2012	1,051	707	621	504	456	509	515	870	1,190	1,458	1,442	1,257	**10,581**	**15,589**
2013	1,062	272	6	284	618	856	1,041	1,424	1,340	1,476	1,400	1,275	**11,054**	**26,643**
2014	1,257	1,152	429	19	7	437	678	1,137	817	823	975	877	**8,607**	**35,251**
2015	867	500	414	118	6	508	792	703	699	808	774	650	**6,840**	**42,091**
2016	482	313	351	6	5	16	821	1,169	1,393	1,515	1,491	1,280	**8,841**	**50,932**
2017	1,037	634	472	19	53	64	546	1,677	1,860	2,305	2,124	2,046	**12,836**	**63,768**
2018	1,945	1,364	891	20	321	804	1,253	1,715	2,033	2,428	2,396	2,139	**17,309**	**81,077**
2019	1,875	1,444	330	735	734	885	1,160	1,664	2,195	2,456	2,575	2,252	**18,306**	**99,383**
2020	1,988	1,649	700	2	355	1,584	1,690	2,035	1,980	2,103	2,059	1,703	**17,849**	**117,233**
2021	1,930	1,363	701	5	840	1,599	2,173	1,474	1,172	1,507	1,483	1,069	**15,316**	**132,549**
2022	706	1,216	790	842	1,340	1,765	1,743	2,192	1,146	946	853	950	**14,489**	**147,038**
2023	803	708	1,055	1,194	1,109	1,284	1,499	2,192	2,510	2,659	2,744	2,467	**20,224**	**167,261**
2024	2,197	1,823	1,660	1,359	678	1,443	1,640	2,327	2,590	2,863	2,756	2,513	**23,849**	**191,110**
Average	**614**	**469**	**301**	**183**	**233**	**421**	**560**	**757**	**763**	**872**	**871**	**779**	**6,825**	**-**

APPENDIX B – GROUNDWATER BUDGETS

Table B-1- Groundwater Budget for Historical Scenario with PBW in North American Subbasin (NASb)

Water Year	Total GW Pumping (-)	Deep Percolation (+)	Stream Seepage (+)	Recharge (+)	Inflow from Foothills (+)	Boundary Flow (+)	Subsurface Flow to Adjacent Areas (+)	Change in Storage
1997	-329,406	199,205	64,783	23,111	11,877	15,560	18,502	3,632
1998	-283,062	251,901	98,991	20,409	19,409	18,675	18,227	144,549
1999	-305,315	195,192	33,733	24,245	13,098	18,836	19,118	-1,091
2000	-311,656	192,670	62,469	23,538	12,782	17,420	18,947	16,170
2001	-376,827	180,753	37,728	15,824	12,212	16,079	20,308	-93,924
2002	-316,443	193,898	74,388	22,197	12,753	16,948	22,429	26,171
2003	-324,826	194,943	94,160	19,453	12,224	19,579	22,570	38,103
2004	-344,134	183,390	78,108	20,482	10,848	19,105	21,570	-10,631
2005	-285,075	213,212	88,008	20,777	16,146	17,919	19,955	90,943
2006	-301,683	209,381	115,097	21,312	15,040	18,226	20,621	97,993
2007	-360,547	153,294	38,992	16,864	9,077	17,115	20,801	-104,404
2008	-355,846	175,140	53,466	16,831	10,246	16,721	21,409	-62,035
2009	-308,520	175,997	74,468	20,190	11,009	16,078	21,014	10,234
2010	-267,684	191,484	78,559	21,139	13,029	17,419	20,482	74,428
2011	-247,891	217,832	103,691	20,060	16,603	20,513	20,136	150,943
2012	-295,783	163,259	51,891	18,162	11,496	18,684	17,454	-14,837
2013	-332,732	173,450	50,690	14,044	9,754	18,123	16,496	-50,175
2014	-322,208	148,265	67,813	11,959	9,359	16,033	16,808	-51,972
2015	-360,168	153,972	81,424	11,903	8,811	16,587	16,043	-71,428
2016	-275,174	168,330	106,048	20,962	10,911	15,186	14,251	60,514
2017	-277,442	224,834	162,003	18,720	17,378	8,483	13,649	167,625
2018	-304,595	164,800	69,629	19,241	12,194	12,575	15,944	-10,212
2019	-247,877	202,915	90,909	19,392	15,890	20,498	15,415	117,143
2020	-342,512	147,743	50,647	18,345	8,676	16,968	14,268	-85,865
2021	-380,255	132,838	51,257	9,925	6,988	29,727	15,778	-133,741
2022	-290,562	153,848	92,823	14,817	9,597	12,696	18,447	11,665
2023	-239,568	204,817	142,724	18,193	14,064	5,659	17,623	163,512
2024	-240,279	180,784	90,618	15,532	13,227	11,702	11,867	83,451
Average	**-308,145**	**183,862**	**78,754**	**18,487**	**12,311**	**16,754**	**18,219**	**20,241**

Table B-2- Groundwater Budget for Historical Scenario without PBW in North American Subbasin (NASb)

Water Year	Total GW Pumping (-)	Deep Percolation (+)	Stream Seepage (+)	Recharge (+)	Inflow from Foothills (+)	Boundary Flow (+)	Subsurface Flow to Adjacent Areas (+)	Change in Storage
1997	-334,381	199,153	65,120	23,111	11,877	15,562	18,039	-1,519
1998	-295,926	252,064	99,834	20,409	19,409	18,687	18,137	132,613
1999	-317,826	195,103	35,124	24,245	13,098	18,864	19,347	-12,044
2000	-328,256	192,669	64,437	23,538	12,782	17,463	19,571	2,205
2001	-395,321	180,901	40,160	15,824	12,212	16,144	21,726	-108,355
2002	-338,512	194,463	77,454	22,197	12,753	17,038	24,986	10,379
2003	-344,208	195,257	98,167	19,453	12,224	19,696	24,767	25,355
2004	-365,812	183,689	82,641	20,482	10,848	19,247	23,879	-25,026
2005	-303,868	213,950	93,290	20,777	16,146	18,087	22,347	80,729
2006	-321,737	210,169	120,956	21,312	15,040	18,418	23,502	87,659
2007	-377,107	153,474	44,913	16,864	9,077	17,334	22,217	-113,228
2008	-374,985	175,775	59,992	16,831	10,246	16,964	21,492	-73,685
2009	-323,664	176,124	81,769	20,190	11,009	16,349	20,780	2,557
2010	-290,414	192,064	86,368	21,139	13,029	17,715	20,857	60,757
2011	-271,927	218,353	112,497	20,060	16,603	20,832	21,371	137,788
2012	-315,584	163,456	60,631	18,162	11,496	19,028	18,277	-24,534
2013	-344,751	173,541	59,452	14,044	9,754	18,504	17,132	-52,324
2014	-333,422	148,269	76,210	11,959	9,359	16,468	18,228	-52,929
2015	-370,502	154,013	89,526	11,903	8,811	17,068	18,169	-71,012
2016	-296,074	168,400	114,373	20,962	10,911	15,698	16,429	50,698
2017	-295,307	224,698	171,638	18,720	17,378	9,009	15,784	161,920
2018	-312,668	164,815	78,221	19,241	12,194	13,093	17,773	-7,332
2019	-267,675	203,061	99,924	19,392	15,890	20,995	16,220	107,807
2020	-345,420	147,720	58,993	18,345	8,676	17,446	15,436	-78,805
2021	-388,433	132,941	59,199	9,925	6,988	30,188	15,668	-133,524
2022	-298,154	153,875	101,316	14,817	9,597	13,159	18,310	12,920
2023	-265,777	205,551	152,079	18,193	14,064	6,133	19,155	149,398
2024	-276,188	180,796	100,318	15,532	13,227	12,193	12,076	57,954
Average	**-324,782**	**184,084**	**85,164**	**18,487**	**12,311**	**17,049**	**19,345**	**11,658**

Table B-3- Groundwater Budget Difference in North American Subbasin (NASb)

Water Year	Total GW Pumping (-)	Deep Percolation* (+)	Stream Seepage (+)	Recharge (+)	Inflow from Foothills (+)	Boundary Flow (+)	Subsurface Flow to Adjacent Areas (+)	Change in Storage
1997	-4,975	-53	337	0	0	3	-462	-5,150
1998	-12,864	163	843	0	0	12	-90	-11,936
1999	-12,511	-89	1,390	0	0	28	229	-10,953
2000	-16,600	-1	1,969	0	0	44	624	-13,965
2001	-18,494	148	2,432	0	0	65	1,418	-14,431
2002	-22,069	565	3,065	0	0	90	2,557	-15,792
2003	-19,382	314	4,007	0	0	117	2,197	-12,748
2004	-21,678	299	4,533	0	0	142	2,309	-14,394
2005	-18,794	738	5,282	0	0	168	2,392	-10,214
2006	-20,054	788	5,858	0	0	192	2,881	-10,334
2007	-16,559	179	5,921	0	0	219	1,416	-8,824
2008	-19,139	635	6,526	0	0	243	84	-11,651
2009	-15,143	127	7,301	0	0	272	-234	-7,677
2010	-22,730	580	7,808	0	0	296	375	-13,671
2011	-24,036	520	8,807	0	0	320	1,235	-13,155
2012	-19,801	197	8,740	0	0	344	822	-9,697
2013	-12,019	91	8,762	0	0	382	636	-2,149
2014	-11,213	4	8,397	0	0	435	1,420	-957
2015	-10,334	41	8,102	0	0	481	2,126	416
2016	-20,900	70	8,325	0	0	512	2,178	-9,816
2017	-17,864	-136	9,635	0	0	526	2,135	-5,705
2018	-8,073	15	8,592	0	0	517	1,829	2,880
2019	-19,797	146	9,015	0	0	496	805	-9,336
2020	-2,908	-23	8,346	0	0	478	1,168	7,060
2021	-8,178	103	7,942	0	0	460	-110	217
2022	-7,591	27	8,493	0	0	463	-137	1,255
2023	-26,210	735	9,356	0	0	474	1,532	-14,114
2024	-35,909	11	9,700	0	0	492	209	-25,497
Average	**-16,637**	**221**	**6,410**	**0**	**0**	**295**	**1,127**	**-8,583**

* Note: Spatial variability of groundwater pumping and groundwater use results in some minor differences in deep percolation of applied water between the two scenarios.

Table B-4- Groundwater Budget for Historical Scenario with PBW in South American Subbasin (SASb)

Water Year	Total GW Pumping (-)	Deep Percolation (+)	Stream Seepage (+)	Recharge (+)	Inflow from Foothills (+)	Boundary Flow (+)	Subsurface Flow from Adjacent Area (+)	Change in Storage
1997	-242,803	140,543	112,919	0	3,802	-4,266	-11,213	-1,019
1998	-201,081	176,505	116,282	0	7,971	30	-12,150	87,556
1999	-225,713	134,437	90,012	0	4,112	1,509	-13,106	-8,749
2000	-229,771	134,747	98,597	0	4,146	-866	-11,994	-5,141
2001	-236,082	127,635	90,954	0	3,455	-2,983	-12,453	-29,474
2002	-237,694	132,965	97,909	0	3,900	-1,492	-12,747	-17,159
2003	-225,688	133,311	98,017	0	3,468	2,452	-13,021	-1,460
2004	-249,538	125,501	96,823	0	3,012	2,295	-11,158	-33,065
2005	-218,519	154,075	110,373	0	6,246	1,686	-10,883	42,978
2006	-231,880	146,342	126,548	0	6,267	244	-10,712	36,809
2007	-246,893	107,154	89,228	0	2,525	-416	-9,902	-58,303
2008	-252,566	119,415	98,653	0	2,626	-1,344	-8,709	-41,925
2009	-226,540	122,524	104,258	0	3,189	-1,912	-8,798	-7,278
2010	-210,015	138,234	101,582	0	4,529	283	-10,519	24,095
2011	-200,007	151,182	111,528	0	6,934	3,915	-12,438	61,115
2012	-209,158	109,585	84,239	0	3,654	1,685	-10,142	-20,136
2013	-208,671	116,783	87,475	0	2,749	951	-7,228	-7,941
2014	-207,530	94,797	88,210	0	2,922	-2,452	-6,035	-30,088
2015	-199,810	98,535	90,218	0	2,756	-1,871	-5,248	-15,420
2016	-206,987	107,902	101,456	0	3,941	-965	-4,183	1,163
2017	-191,034	155,733	132,251	0	8,788	-7,032	-5,741	92,964
2018	-207,670	103,732	87,889	50	4,361	-2,039	-8,708	-22,386
2019	-179,034	131,838	100,494	314	6,284	2,415	-8,966	53,344
2020	-215,819	93,029	84,678	396	2,434	1,265	-7,646	-41,663
2021	-226,693	85,144	82,901	306	1,603	7,712	-6,957	-55,984
2022	-206,622	105,178	106,362	309	3,547	-959	-10,742	-2,927
2023	-182,888	134,957	113,795	0	5,499	-3,892	-10,878	56,593
2024	-177,476	120,774	88,863	318	4,213	940	-6,620	31,013
Average	**-216,221**	**125,091**	**99,733**	**60**	**4,248**	**-182**	**-9,604**	**3,125**

Table B-5- Groundwater Budget for Historical Scenario without PBW in South American Subbasin (SASb)

Water Year	Total GW Pumping (-)	Deep Percolation (+)	Stream Seepage (+)	Recharge (+)	Inflow from Foothills (+)	Boundary Flow (+)	Subsurface Flow from Adjacent Area (+)	Change in Storage
1997	-246,593	140,398	113,256	0	3,802	-4,265	-10,751	-4,154
1998	-203,702	176,404	117,203	0	7,971	36	-12,060	85,851
1999	-229,916	134,277	91,504	0	4,112	1,522	-13,334	-11,835
2000	-234,059	134,572	100,608	0	4,146	-846	-12,617	-8,196
2001	-240,928	127,375	93,519	0	3,455	-2,956	-13,867	-33,402
2002	-242,935	132,749	101,124	0	3,900	-1,454	-15,298	-21,915
2003	-232,775	133,150	102,050	0	3,468	2,502	-15,208	-6,812
2004	-257,007	125,582	101,461	0	3,012	2,353	-13,451	-38,050
2005	-224,134	153,831	115,651	0	6,246	1,753	-13,251	40,095
2006	-237,457	146,212	132,249	0	6,267	323	-13,560	34,035
2007	-256,213	106,831	95,162	0	2,525	-332	-11,255	-63,281
2008	-262,681	118,941	105,192	0	2,626	-1,252	-8,725	-45,900
2009	-236,995	122,093	111,498	0	3,189	-1,810	-8,505	-10,531
2010	-219,863	137,628	109,489	0	4,529	392	-10,819	21,356
2011	-214,672	151,020	120,133	0	6,934	4,042	-13,510	53,947
2012	-229,610	109,330	93,044	0	3,654	1,845	-10,475	-32,212
2013	-228,879	116,625	96,605	0	2,749	1,160	-7,011	-18,751
2014	-225,432	94,206	97,345	0	2,922	-2,187	-6,417	-39,563
2015	-214,504	98,269	99,388	0	2,756	-1,564	-6,268	-21,924
2016	-223,440	107,774	111,041	0	3,941	-629	-5,195	-6,507
2017	-213,140	155,532	142,836	0	8,788	-6,669	-6,475	80,873
2018	-234,530	103,410	98,166	50	4,361	-1,634	-8,624	-38,802
2019	-207,131	131,688	111,918	314	6,284	2,897	-7,350	38,619
2020	-239,428	92,722	96,243	396	2,434	1,783	-6,189	-52,039
2021	-250,044	84,912	94,668	306	1,603	8,292	-4,187	-64,449
2022	-230,557	105,082	119,150	309	3,547	-347	-8,036	-10,852
2023	-213,584	134,938	127,497	0	5,499	-3,221	-9,543	41,586
2024	-210,406	120,163	103,369	318	4,213	1,674	-3,085	16,246
Average	**-230,736**	**124,847**	**107,192**	**60**	**4,248**	**50**	**-9,824**	**-4,163**

Table B-6- Groundwater Budget Difference in South American Subbasin (SASb)

Water Year	Total GW Pumping (-)	Deep Percolation * (+)	Stream Seepage (+)	Recharge (+)	Inflow from Foothills (+)	Boundary Flow (+)	Subsurface Flow from Adjacent Area (+)	Change in Storage
1997	-3,790	-145	337	0	0	1	462	-3,135
1998	-2,622	-100	921	0	0	6	90	-1,705
1999	-4,203	-160	1,492	0	0	13	-228	-3,086
2000	-4,288	-175	2,011	0	0	20	-623	-3,055
2001	-4,846	-260	2,565	0	0	27	-1,415	-3,928
2002	-5,241	-217	3,215	0	0	38	-2,551	-4,755
2003	-7,087	-161	4,034	0	0	50	-2,186	-5,351
2004	-7,469	81	4,638	0	0	58	-2,293	-4,985
2005	-5,615	-245	5,278	0	0	67	-2,368	-2,883
2006	-5,577	-130	5,701	0	0	79	-2,848	-2,774
2007	-9,320	-323	5,934	0	0	84	-1,353	-4,977
2008	-10,116	-474	6,538	0	0	92	-16	-3,974
2009	-10,455	-432	7,240	0	0	102	293	-3,253
2010	-9,848	-606	7,907	0	0	109	-300	-2,739
2011	-14,665	-162	8,604	0	0	128	-1,072	-7,167
2012	-20,452	-255	8,805	0	0	159	-333	-12,076
2013	-20,208	-157	9,131	0	0	209	216	-10,810
2014	-17,902	-592	9,135	0	0	265	-382	-9,475
2015	-14,694	-266	9,169	0	0	307	-1,020	-6,504
2016	-16,452	-128	9,585	0	0	336	-1,011	-7,671
2017	-22,105	-201	10,585	0	0	363	-734	-12,092
2018	-26,861	-322	10,278	0	0	405	84	-16,416
2019	-28,097	-150	11,424	0	0	482	1,616	-14,725
2020	-23,609	-307	11,565	0	0	518	1,457	-10,376
2021	-23,351	-232	11,767	0	0	580	2,770	-8,466
2022	-23,934	-96	12,788	0	0	612	2,705	-7,925
2023	-30,696	-19	13,701	0	0	671	1,335	-15,007
2024	-32,930	-611	14,505	0	0	734	3,535	-14,766
Average	**-14,515**	**-244**	**7,459**	**0**	**0**	**233**	**-220**	**-7,288**

* Note: Spatial variability of groundwater pumping and groundwater use results in some minor differences in deep percolation of applied water between the two scenarios.

This page intentionally left blank.

Topic: Carmichael Water District Standard Specifications and Details Revisions

Date: September 5, 2025

Item For: Information

Submitted By: Greg Norris, Engineering Manager

BACKGROUND

Carmichael Water District (CWD) has standards and specifications (specs) that are provided to the public through our website or upon request from consultants, contractors, and customers. The standards, specs are written descriptions and drawings of District requirements, and can be applied to any construction project in which District facilities are included or impacted, such as water mainlines, control valves, or service lines. This item was presented to the Board first time at the July 2025 Board meeting.

SUMMARY/DISCUSSION

CWD specs are continuously updated to reflect operational changes or new processes and material types that are preferred or used by the District. Also, minor grammatical corrections throughout the text and revisions to a few of the drawing details are required for clarity.

The proposed changes or edits are itemized in the Revision Log (Attachment 1) and are shown in Attachment 2 and 3.

These proposed revisions were presented to the Board at the July Regular Board meeting. Since that meeting, the District has not received any comments. The only changes that are presented in this final Memo that were not included in the Informational Memo in July is that staff noticed that they had made edits to the valve box types without specifying the appropriate manufacturer or equivalent. Therefore, to be consistent with the proposed revision, the Christy manufacturer's name was replaced by the name Hubbell. It should be noted that by doing this the District does not endorse or require any specific manufacturer as the standards always allow for an "equivalent".

FINANCIAL IMPACT

There are no financial impacts for this item.

RECOMMENDATION

Staff recommends that the Board of Directors approve the proposed changes and edits to the Carmichael Water District's Construction Improvement Standards.

ATTACHMENT(S)

1. Revisions Log
2. Revised CWD Standard Specifications
3. Revised CWD Standard Details.

ATTACHMENT 1

CWD Construction Improvement Standards Revisions Log

Changes made to version: v.4.2024

v.7.2025

Changes to CWD Construction Standards 7/3/2025

- Remove mentioning of ¾" and 1-1/2" service laterals specs from the standards as we will only offer 1" (residential) and 2" or greater (commercial).
- Section 2.2 title changed from "Contractor's Responsibility" to "Approved Contractors for Constructing Public Water Assets". Subsections of this section also changed to list out specific requirements that the contractor must meet in order to perform construction on CWD facilities.
- All remaining Sections in Section 2 increased by 0.1 (shifted due to new Section 2.2).
- Section 2.6 "Contractor" shall guarantee and warrant all work, not "Developer"
- Section 2.7 title changed from "Dedicated Easement" to "District Water Line Easements" – section revised to widen the District easement on private property from 10 feet to 20 feet and further delineate where the CWD easement shall be located within the property.
- Updated the water meter box and lid types table in section 3.10.C.1. For meter boxes in landscaped areas we specify a standard concrete box and lid, and for driveways, sidewalks and commercial parking lot locations we specify a polymer concrete tier 22 (traffic rated) box and lid.
- Section 3.10.K revised to redefine service connection requirements for backflow prevention based on lot size.
- Section 3.11 revised to require abandoned services lines to be removed from within 3 feet of the water main.
- Section 3.12.D Fire hydrants located on private property shall be painted yellow.
- Section 3.12.E Permanent dead-end lines shall have a blow-off hydrant at the end.
- Section 3.13 Testing Procedures revised.
- Section 4.17 requirements for Restraints revised.
- Fixed grammatical errors that were found.
- Valve box material type and manufacturer has changed to polymer concrete and Hubbell, respectively.

Changes to CWD Standard Details

- Detail W-12: The hydrant bury is extended 2" maximum passed the concrete pad, and the check valve has been further specified to be Hydrant Guard (or equal). Materials note 4 revised to call out Hydrant Guard. Materials note 5 revised to call out breakaway bolts. Materials note 10 revised to remove the term "hold bury" from concrete pad description.
- Detail W-21: Before this update was for Typical Service Saddle Installation for 2" or greater service connection, 1" service connection, or ARV tap into the water main. District staff has

decided that the service saddle detail can be combined with the service line or ARV assembly (utility box) detail.

- Detail W-21: Detail W-22 for service/meter box was combined with the service saddle detail (for 1" tap) to now be a 1" SERVICE CONNECTION detail, showing the service saddle and meter box installation requirements in one detail.
- Detail W-22: Is now going to be 2" SERVICE CONNECTION detail, which has a different tap configuration into the water main. The tap is made at a 90-degree angle rather than 45 degree (1" tap) and a 2" gate valve, riser, and valve box is installed at the main (in street) for shutoff access.
- New Detail W-21 and W-22 changes to the meter box requirements include a gate valve on the customer side of the meter, and a brass nipple going out of the box on the customer side for the connection of the customer side water line.
- Detail W-23: Removed Materials note 7 for the concrete support pad under the backflow device lateral piping. Added a callout note indicating brass elbow and a callout indicating brass pipe connecting the meter to the backflow device piping. Removed "3/4" and 1-1/2" Service Line (sizes) from the detail title.
- Detail W-16 ARV Assembly: Detail revised to include the saddle tap into the water main. Added a structural channel support to assembly detail for the ARV, adjusted the fittings and connections for brass to copper and copper to brass configurations. Added a 2" gate valve, riser, and valve box for shut off access at the main. Removed ball valve shutoff that was inside the ARV box before.
- Detail W-11 Valve Box Detail: Rebar added to the concrete collar, notes and material revised to show the rebar and material change to polymer concrete Hubbell G5 box and lid.

Changes made to version: v.5.2021

v.4.2024

Changes to CWD Construction Standards 4/16/2024

- Table of Contents: Standard Details: Removed Dry Barrel (Fire Hydrant) from Detail W-12 name.
- Table of Contents: Standard Details: Removed Detail W-6b (no longer used) and changed Detail W-6a name to W-6.
- Table of Contents: Added Section 2.4 Performance of Work and Character of Worker.
- Section 2.2 C.: Changed plan sheet size to "full-sized sheets (ANSI D – 22" X 34")."
- Section 2.3 B.: Deleted "Mylar Record Drawings" (no longer required).
- Added Section 2.4 Performance of Work and Character of Worker to Section 2: Contractor's and Developer's Responsibilities.
- Section 3.4 H. 1. a.: Changed "pneumatic" type "(Wacker)" to "jumping jack rammer."
- Section 3.7: G. 1. & Section 4.4: Changed Ductile Iron Pipe specification from "Class 52" to "Pressure Class 350" (current AWWA standard).
- Section 3.7 I.: Removed reference to Detail W-6b for thrust blocks and revised to refer "to specification 4.17."

- Section 3.7 N.: Removed “service lines” from location wire requirement.
- Section 3.8 2.: Changed minimum soil cover from 48 inches to 42 inches and added that boring log is to be submitted “to County.”
- Section 3.10 A. Water Meters: Updated ¾” to 2” meter type to Neptune T-10 meter CF R900i E-CODER register. Updated 3” and larger meter type to Neptune Tru-Flo meter CF R900i E-CODER register. Updated Irrigation meters type to Neptune High Performance Turbine CF R900i E-CODER register. Updated Fire Service Rated meter type to Neptune Protectus III Fire Service meter CF R900i E-CODER register
- Section 3.10 C. 1.: Removed concrete polymer lid as an option for water meter box lid type (all lids must be steel going forward).
- Section 3.10 F. & Section 4.21: Added “copper pipe” as another option besides brass, for acceptable water service line material types. Added “MIP x FIP” (male iron pipe thread by female iron pipe thread) to 1” and 2” corporation stop type.
- Section 3.10 J.: Removed residential service connections from specification. Added a new specification (K.) for Residential service connection fire sprinkler system requirements.
- Section 3.12 C.: Removed this section, which was a dry barrel fire hydrant specification.
- Edited Sections 4.8 and 4.10 to remove “dry barrel”. Changed Section 4.10 to include instruction on installation of hydrant bury extensions to wet barrel fire hydrants.
- Section 4.8 Hydrants: Changed the hydrant material from “bronze” to “Clow 960 or equal.”
- Changed Section 4.11 B. Nuts and Bolts to remove “breakaway bolts” which are only used with dry barrel fire hydrants.
- Section 4.17 Restraints: Changed the diameter requirements for Field Lock Gaskets from 12 to 24 inches. Added restraint requirement of three (3) pipe lengths prior to a Tee, 90° elbow, and 45° elbow fitting. Revised thrust block requirements to be required at all Tees, 90° elbows, and Dead-ends.
- Section 4.19 Riser Stock: Changed riser stock diameter from 6 to 8 inches.
- Section 4.21 C. Corporation Stops: Changed corporation stop description from “compression” to “male iron pipe by female iron pipe thread (MIP x FIP).”
- Section 4.21 F. Service Saddles: Changed saddle size from 12 to 24 inches.
- Combined Section 4.26 Location Wire Connectors into Section 4.25 Location Wire.
- Section 4.27 A. Butterfly Valves: Changed Butterfly Valve minimum diameter from 14 to 10 inches.
- Section 4.27 B. Gate Valves: Changed “sizes 3” to 12”” to “sizes 3” to 8””.
- Corrected grammatical errors and made small changes in verbiage throughout the specifications.

Changes to CWD Standard Details

- Detail W-4: Redrew the mechanical joints on the pipe fittings. Revised Note 1. to reference the CWD Construction Improvement Standards.
- Detail W-6a: Changed detail name to W-6 (since W-6b has been archived). Removed “Case ‘C’” as it is no longer used. Changed Note 7. from referencing Detail W-6b to refer to the Construction Improvement Standards instead.
- Detail W-6b: Has been archived as it is out of date and no longer useful.

- Detail W-9: Revised note referencing Detail W-6b. Added note (9.) for exception to thrust block requirement for service laterals tapping into mainlines.
- Detail W-12: Fire Hydrant Assembly Wet Barrel: Removed “Dry Barrel” from detail name and edited Note 3 regarding valve placement. Added “Clow 960 or Equal – yellow” to fire hydrant material type. Added Note 6. to advise that bollards are only required per District discretion.
- Detail W-15: 2” Blow-off Assembly: Edited detail notes regarding material types to be used. Changed utility box size from B12 to B16 in the detail note. Changed detail note for thrust block to refer to Detail W-6 “for Dead-end.”
- Detail W-16: 1” & 2” Air Release Valve Assembly: Redrew the utility box to match Placer Water Works Inc. utility box type which includes an air vent enclosure. Edited detail notes regarding material types to match new standards.
- Detail W-21: Typical Service Saddle Installation: Changed material 1. from “Class 52” to “Pressure Class 350” Ductile Iron Pipe. Removed “Services with continuous copper pipe” from Note 2.
- Detail W-22: 3/4”, 1”, 1-1/2”, & 2” Service Line: Changed detail notes regarding utility box locations and material types. Removed location wire from detail.
- Detail W-23: 3/4", 1”, 1-1/2”, & 2” Service Line with RP Style Backflow: Changed detail notes for utility box location and backfill material type.

- Detail W-2a: There is a note in this detail for a Sacramento County requirement for grinding pavement at the trench edge down 1 ½”, and the County plans on changing the requirement to 2” in the near future. At the time when the requirement is changed CWD will update this detail to read 2” per the requirement.

- Future Detail: Abandonment of Service Lines – we have a detail for abandonment of main lines but not one for service lines.

ATTACHMENT 2

CARMICHAEL WATER DISTRICT

Construction Improvement Standards

Revised:

21 July 2025

Revision History

Revision Date	Details & Descriptions
21 January 2003 Resolution 01212003-2	Adopted
1 January 2010	Amended
18 May 2021	Amended
16 April 2024	Amended
21 July 2025	Finalized Draft by Staff and Adopted by the Board of Directors at regular board meeting on September 15, 2025.

Table of Contents

Table of Contents (cont'd)

Standard Details

Section 1: Purpose and Definitions

1.1 Purpose

The purpose of these Construction Improvement Standards is to provide minimum standards to guide the design and construction of water system improvements within Carmichael Water District that are to be dedicated to the public and accepted by Carmichael Water District (District) for maintenance or operation. These Construction Improvement Standards shall apply to regulate and guide construction of water supply facilities and related public improvements within the jurisdiction of the District.

1.2 Order of Precedence

These Construction Improvement Standards do not prescribe methods or means; these are the responsibility of the project proponent. All work shall comply with these Construction Improvement Standards and as directed by the District through the plan check and approval process. The following order of precedence shall apply should conflicts arise between these Construction Improvement Standards and other project documents:

> Project Specific Conditions of Approval by the Carmichael Water District shall take precedence over these Construction Improvement Standards. These Construction Improvement Standards shall take precedence over all other documents for materials, installation, testing and approval of facilities to be dedicated to the Carmichael Water District. All other public works shall comply with the standards of the local permitting jurisdiction.

1.3 Periodic Updates and Modifications

The District will periodically review and make amendments and changes to these standards to produce an updated Construction Improvement Standard document superseding the prior document for all work approved by the District subsequent to the date of the updated standards. The District will review the standards for possible updating at least once every five (5) years.

The District may from time to time update or otherwise modify these standards to address specific changes not resulting from the periodic review process and at that time shall make available a supplemental standards sheet describing all such updates and modifications.

It is the user's responsibility to confirm with the District that they are using the current standards subject to all updates and modifications prior to proceeding with a design submittal or application to the District for plan check and review. Failure to obtain and use the current standards may result in the rejection of a submittal and necessitate resubmittal at additional cost to the applicant.

1.4 Definitions

Whenever the following terms or titles are used in these specifications, or in any document or instrument where these specifications govern, the intent and meaning shall be as herein defined:

A. Acceptance – Formal action through District Policy accepting dedication of completed facilities.

B. Applicant – Shall mean the same as the Developer or their consulting engineer working on their behalf.

C. Approved Plans – Shall mean all plans prepared for construction of improvements, reviewed, approved, and signed by the Carmichael Water District.

D. AWWA – Shall mean the American Water Works Association. All references to the specifications of the AWWA are understood to refer to the current specifications as revised or amended at the date of construction.

E. Board – The Board of Directors of the Carmichael Water District.

F. Cal/OSHA – Shall mean the California Occupational Safety and Health Regulations. All references to the regulations of the Cal/OSHA are understood to refer to the current regulations as revised or amended at the date of construction.

G. Connection Fee – Shall mean the fees as described in the latest adopted District resolution or resolutions establishing, amending, or setting forth the required District construction charges, connection fees, tap fees, facilities fees, and other costs for establishing water service for new development and/or reconnection of existing developed parcels.

H. Construction Standard Details – Shall mean the standard construction drawings as set forth in these Construction Improvement Standards and included herein, approved by the District Representative and as amended.

I. Consulting Engineer – Shall mean any person or persons, firm, partnerships or corporation legally authorized to practice civil, mechanical, geotechnical, electrical engineering, or other engineering discipline in the State of California who prepares or submits improvement plans and specifications to the Carmichael Water District for approval.

J. Contractor – Shall mean any person or persons, firm, partnerships, corporation or combination thereof, licensed to perform the type of work involved, who has entered into a contract with any person, corporation or company, or their legal representatives, for the construction of any improvements, or portions of any improvements, within the Carmichael Water District.

K. County – Shall mean the County of Sacramento, State of California.

L. Developer – Shall mean any persons, firm, partnership, corporation, or combination thereof, financially responsible for the work involved.

M. Development – Shall mean the act or process of any construction or improvements to public or private properties.

N. District – Shall mean the Carmichael Water District, its officers, authorized employees and agents.

O. District Representative – Shall mean the District's General Manager or authorized representative acting as Carmichael Water District Representative.

P. Improvement Plans – Shall mean all engineered plans depicting the proposed facilities submitted for Carmichael Water District review.

Q. Laboratory – Shall mean any testing agency or testing firm, which has been approved by the District.

R. Notice of Completion – Shall mean the District executed formal acceptance of the constructed improvements by the Carmichael Water District after which time the District assumes the duty of maintenance and operation, except for the Contractor's obligations under the maintenance warranty period.

S. Potable Water – Shall mean water suitable for human consumption and complying with the requirements of the State of California's State Drinking Water Standards.

T. Record Drawings – A clean set of project drawings used only to show the final as-built facilities, including all revisions to the original plans, depth of all utilities crossed, all field modifications, and other pertinent information as directed by the District.

U. Relative Compaction –The in place compacted soil density as measured by accepted field or laboratory practices divided by the theoretical maximum dry density, as determined by accepted laboratory practices, expressed as a percentage.

V. Soils Report – Shall mean a report as prepared by any person or persons, firm, partnership, or corporation legally licensed to prepare "Soils Reports" in the State of California.

W. State – As used in State of California Department of Transportation Standard Specifications, shall mean the Carmichael Water District.

Section 2: Contractor's and Developer's Responsibilities

2.1 General

All improvements for acceptance by the Carmichael Water District (District) shall be installed in accordance with the approved improvement plans and specifications, the Carmichael Water District Construction Improvement Standards, and the Sacramento County Improvement Standards. The Contractor shall follow all applicable City, County, State and Federal laws and regulations relating to construction of the improvements.

2.2 Approved Contractors for Constructing Public Water Assets

Any Contractor that modifies, repairs, or installs public or District-owned water assets must be approved by the District before construction may begin. Work performed by a non-approved Contractor which modified, repaired, or installed public water assets may be required to remove or replace those assets at the Developer's expense. Contractor may apply for approval by the District by submitting a "letter of request for approval" to the District with the following information:

A. Name(s) of Contractor and Owner(s) of Contractor

B. Contact Information and Mailing Address of Contractor

C. Expected Work to Perform – Contractors should outline the work they expect to be performing and requesting approval for.

D. Licenses, General Liability, Insurance Information – Contractors may be required to demonstrate an adequate contractor or plumbing license, property and personal injury insurance coverage, and other insurance requires as necessary for the work expected to be performed.

E. Year(s) in Business – Contractors may be required to demonstrate at least 5 years of active business.

F. List of Employed Drinking Water Treatment and Distribution System Operators – Operators must be certified by the California State Water Resources Control Board (SWRCB) Operator Certification Program and be in good standing with the program. Depending on the expected work to perform, Contractors may be required to employ a minimum of one person with at least a D2-grade drinking water distribution operator.

Address the letter to Carmichael Water District at 7837 Fair Oaks Blvd., Carmichael CA 95608, ATTN: General Manager. District staff may request additional information during their processing and review. District staff will approve or deny the "letter of request for approval" within 60 days of receipt of the request.

2.3 Contractor's Responsibility

It shall be the Contractor's responsibility for:

A. Plan Check & Review Schedule and Fee Schedule – Read and conform to the necessary submittal requirements and approval conditions per the District's specification and schedules.

B. Plans – Perform construction per the signed and approved plans by Carmichael Water District. Any additions, deletions, or changes to the approved plans shall be submitted to the District for review and approval prior to construction. Failure to obtain approval may result in delay or rejection of a District Notice of Completion.

C. Plan Sheet Scale Requirements – The initial submittal to the District shall be prepared on full-sized sheets (ANSI D - 22" x 34"). Scales permitted are: 1" = 20', 40', or 50', and vertical 1" = 2', 4', or 5'.

D. Permits – Obtain and comply with all required permits for the conduct of the work. This shall include, but not be limited to, the following

1. Sacramento County permits and approvals for encroachment, traffic control, and use of County facilities during the conduct of the work.
2. Cal/OSHA trenching, tunneling, safety and special permits
3. State of California Agency Permits
   a) Regional Water Quality Control Board,
   b) NPDES permits
   c) Department of Fish and Game
   d) State Lands
   e) Department of Water Resources
   f) Reclamation Board
4. Sacramento Metropolitan Air Resources Control Board permits
5. American River Flood Control District
6. Army Corp of Engineers

E. Notification – the Contractor shall schedule a preconstruction meeting with the District. The meeting shall take place a minimum of 48 hours prior to the start of construction. The Contractor shall provide a minimum 2 working day advance notice to the District as the proposed time and date of the preconstruction meeting. Fees and plans must be paid and approved prior to scheduling a preconstruction meeting.

F. Notification Prior to Digging – Contractor shall call Underground Service Alert (USA) a minimum of 48 hours prior to starting any excavation. Contractor shall identify the proposed work using white paint to indicate areas for utility pre-marking by USA. Any areas not clearly identified for USA pre-marking shall not be excavated until additional pre-marking is completed. The Contractor will be responsible for any damage resulting from excavation in unmarked areas. The Contractor or Applicant who requested the USA markings shall be responsible for the removal of the USA markings upon completion of the work.

G. Testing – Contractor is responsible for all testing unless specifically identified otherwise in these Construction Improvement Standards or the conditions of approval of the plans. Constructed utilities shall be tested in accordance with these Construction Improvement Standards. Testing shall be witnessed and reviewed by the District. Testing of backflow assembly shall be conducted by Carmichael Water District.

H. Hazardous Materials – Should construction operations uncover hazardous materials, or materials which the Contractor believes may be hazardous waste, as defined in Section 25117 of the Health and Safety Code that is required to be removed to a Class 1, Class II, or Class III disposal site in accordance with provisions of existing law, the Sacramento Metro Fire Department should be contacted immediately, the Owner Notified, and Carmichael Water District provided a description of the materials discovered. No water facilities shall be installed in any location suspected to include a hazardous material or waste.

I. Working Hours – Working Hours shall be in accordance with applicable County of Sacramento noise ordinances.

   Normal working hours for services to be provided by the District are 8:00 a.m. to 4:00 p.m. on Monday through Friday (Subject to seasonal changes). Inspections or other services made by the District, requested by or made necessary as a result of the actions of the Developer, or Contractor, outside of these hours, or on Saturdays, Sundays, or holidays must be scheduled and approved by the District, and paid for by the Applicant in advance, at the District Fee Schedule.

   There may be additional limitations placed on working hours specified in the project's approved plans, conditions of approval, special provisions, or encroachment permit.

J. Traffic Control – A traffic control plan shall be submitted whenever required by the County of Sacramento Public Works Agency, Division of Transportation (Department of Transportation). The County of Sacramento has jurisdiction regarding traffic control. Permits and Traffic Control Plans must be approved by the County of Sacramento prior to any work being performed.

K. Preservation of Existing District Facilities – The Contractor shall take extreme care to protect existing District facilities at the site and adjacent improvements from damage. The Contractor shall be responsible for all damage resulting from the construction and shall repair or make replacement at the Contractor’s own expense to the satisfaction of the District.

L. Personnel – Only personnel competent in the particular trade undertaken shall be employed for the construction work.

M. Weather – Construction work shall not commence or progress when the weather jeopardizes a safe working environment or the quality of the project in any manner.

N. Trenching – Contractor shall comply with all Cal/OSHA safety orders. Copies of Cal/OSHA specifications shall be made available at the job-site.

O. Street Cleaning – Where dirt or mud is tracked onto public street pavement, the Contractor shall clean the streets daily, or as directed by the County Inspector.

P. Interruption of Parking Areas – Parking interruption within public right-of-ways shall be approved by the County of Sacramento.

Q. Construction Safety – Construction safety within the District shall be governed by the Construction Safety Orders of the Occupational Safety and Health Standards of Title 8 of the California Code of Regulations and any amendments. It is the Contractor's responsibility to enforce and maintain a safe working environment.

2.4 Developer's Responsibility

It shall be the Developer's responsibility for:

A. Inspection Costs – Developer shall pay the District inspection costs.

B. Record Drawings – One hard copy set of drawings, and one electronic copy of the design documents are to be submitted to District within two weeks of completion of the improvements and are required prior to scheduling for Notice of Completion proceedings.

C. Recorded Easement(s) – Provide copies of recorded easements to the District. Receipt of recorded easement documents shall be required prior to signing of plans and shall be a condition of filing a Notice of Completion accepting the work.

2.5 Performance of Work and Character of Worker

If any Contractor or subcontractor, or person employed by Developer fails or refuses to carry out the directions and requirements of the Carmichael Water District standards or appears to the District to be incompetent or to act in a disorderly or improper manner, such person or persons shall be removed from the Project immediately on the request of the District, and such person or persons shall not again be employed on the work. Such removal shall not be the basis for any claim for compensation or damages against the District.

2.6 Guarantee and Warranty

The Developer shall guarantee and warrant all materials supplied as being fit for the purposes intended. The Contractor shall guarantee and warrant all work performed as having been accomplished in a proper and workmanlike manner.

Should any failure of work occur within the warranty period, the Contractor shall promptly make the needed repairs at the Contractor's own expense. Should such failure of work result in excessive maintenance by the District, or in the opinion of the District, the failure is best left

unrepaired, the Contractor shall incur the additional maintenance cost. The cost shall be equal to the annual maintenance cost divided by the current prime rate.

Should the Contractor not make or undertake the necessary repairs within 30 days of having received written notification from the District Representative, the District may make the repairs and the Contractor shall pay the entire cost thereof. In emergency cases, where in the opinion of the District Representative (provided a reasonable attempt has been made to notify the Contractor) delay would cause serious loss or damages, or a serious hazard to the public, the repairs may be made without prior notice to the Contractor and the Contractor shall pay the entire cost thereof.

The procedures for review, repair and release of guarantee and warranty obligations shall be as follows:

A. Improvements – The guarantee and warranty shall continue for a period of one year from the date on the signed Letter of Acceptance. The following procedures shall be followed for completion of the guarantee and warranty requirements for Improvements:

    1. The District shall complete a guarantee and warranty inspection approximately 30 days prior to the expiration of the guarantee and warranty period. The District will then prepare and deliver a final punch list to the Contractor.

    2. Within 30 days of receipt of the final punch list (during the eleventh month of the warranty period), the Contractor shall repair or address all deficiencies indicated. The District shall be notified for re-inspection of repairs during this period. Within 30 days of notifying the Contractor (by the end of the eleventh month), the District shall re-inspect the repaired improvements. Upon the District's approval of the repairs, the maintenance bond will be allowed to expire, at the conclusion of one year following the Certificate of Completion. If the Contractor does not complete the required work by the end of the eleventh month, the list of repairs will be referred to the District Attorney's office for further management.

2.7 District Water Line Easements

Water lines constructed by or for the District shall be constructed within public utility, road or street right-of-ways, except where the District has expressly authorized the construction to be made within a permanent right-of-way easement granted by a private property owner. Developer shall grant to the District a dedicated utility easement not less than 20 feet wide covering the pipeline and water facilities to be maintained by the District. In exceptional cases, the General Manager may accept a permanent easement less than 20 feet in width on condition that the landowner grants to the District an adequate temporary easement for construction purposes and a right of access to the permanent easement for purposes of maintenance and repair of the water line to be installed. In specific cases, an easement greater than 20 feet in width may be necessary in the sole discretion of the District. The center of the easement shall be aligned with the water facility centerline whenever possible unless otherwise shown in the Standard Details. If other utility lines are allowed in the easement, the water pipeline shall be located no less than 5 feet from the edge of the easement.

All easements granted to the District shall be recorded with the County of Sacramento and a copy of the recorded documents provided to the District as described in these standards. The District will not issue a Letter of Acceptance for projects that require granting a dedicated utility easement to the District until the dedicated utility easement is filed with the County of Sacramento and approved by the Sacramento County Clerk/Recorder Office.

2.8 Surveying Standards and Electronic Document Submittal

Developer shall submit as a condition of Final Acceptance a complete set of Record Drawings in electronic format. Drawings shall be in AutoCAD .dwg format and shall be geo-referenced based on the North American Datum (NAD) 83 Horizontal Datum and North American Vertical Datum (NAVD) 88 Vertical Datum. The Developer is advised that the NAD 83, and NAVD 88 monumentation is limited in the District and its use may require additional surveying effort to import the control for existing monuments not adjacent to the proposed project site.

Developer shall provide a minimum of two survey control points including, but not limited to, the following:

A. One (1) at the centerline intersection of existing and newly constructed roads created by the project.

B. One (1) at end of any cul-de-sac or dead-end road constructed as part of the project.

Survey control shall be clearly labeled on the Record Drawings and shall be permanently installed in the field to allow future control recovery by the District.

All surveying work shall be conducted by a California Licensed Land Surveyor and shall be completed to the minimum standards prescribed by law.

2.9 Record Drawings

Record Drawings shall depict the final improvement conditions, including depth of cover, with regard to all utilities including, but not limited to, the following:

A. Water Mains, services, hydrants, valves, tees, elbows, and limits of restraint

B. Electrical transmission, service, transformers, and appurtenances

C. Natural gas mains, services, meters, regulators, and cathodic testing stations within the right of way.

D. Sanitary sewer mains, manholes, cleanouts, and service lines including depths services at the property line

E. Storm drain mains, manholes, drop inlet laterals, and other lines including depths

F. Communications lines, cable television lines, and any other buried utility or service in the right of way

G. Survey control using NAD 83 and NAVD 88 reference. Record Drawings shall be prepared using georeferenced coordinate data based on NAD 83, NAVD 88, and the California Coordinate System suitable for insertion into the District Geographic Information System mapping at the true and accurate location.

Section 3: Water Supply System Construction

3.1 General

All water pipe, fittings, gate valves, fire hydrants, blow offs, and other appurtenances shall be installed in accordance with the requirements of the American Water Works Association (AWWA), these Construction Improvement Standards and as recommended by the manufacturer. The manufacturer's guidelines shall be present at the construction site at all times. The following are the minimal general specifications. The details are subject to change based on the plan/check and review process as well as the on-site inspection.

3.2 Construction Staking

The water main shall be staked prior to installation. Staking shall provide the station and the offset to the water main, as well as the cut to the nearest tenth of a foot, 0.1 foot. Stakes shall be provided at a minimum of every 50 feet in tangent sections, every 25 feet in curved sections, and every 10 feet in approved vertical curve sections.

3.3 Earthwork

Earthwork required to construct water facilities and appurtenances shall be performed to the lines and grades shown on the approved project plans and as specified below:

A. Excavations – Pipeline excavations shall be open-cut trenches, unless otherwise specified on the approved improvement plans, with vertical sides to the pipe crown, as specified on Construction Standard Detail W-2a and W-2b. Excavations shall conform to all applicable Federal and State safety requirements.

B. Trench Width – The trench bottom width to 6 inches above top of pipe shall comply with Construction Standard Detail W-2a and W-2b, or as approved by District.

C. Compaction – Compaction of the trench shall conform to Construction Standard Detail W-2a and W-2b. Compaction test results shall be supplied to District. **Jetting of trenches is not allowed.**

D. Weather – During inclement weather, trenches shall be excavated only as far as pipe can be laid and backfilled during the course of the day.

E. Existing Roadways – Trenching in existing roadways shall be limited to the length of pipe that can be laid that day. No open trenches shall be left overnight. Exposed trenches shall be plated or backfilled as approved by the County of Sacramento Public Works Agency, Department of Transportation.

F. Excess Material – Excess material and materials determined unsuitable for backfill by the District Inspector shall be removed from the project site.

All earthwork shall be performed in strict accordance with applicable law, including local ordinances, applicable OSHA, Cal/OSHA, California Civil Code, and California Department of Industrial Safety requirements.

3.4 Trenches and Backfill

A. General – All trench backfill shall be mechanically compacted native soil, mechanically compacted imported fill, mechanically compacted aggregate base, or slurry material, as required by these Construction Improvement Standards, the Construction Standard Details, and by the County of Sacramento Department of Public Works Standard Construction Specifications (County Specifications).

B. Trench Backfill – Trench backfill within the County street rights-of-way shall conform to Construction Standard Details W-2a and W-2b. Moisture content shall be controlled to obtain the optimum density for the native soil type encountered. All compaction testing and reference shall be based on the maximum dry density as determined using ASTM D1557 (modified proctor test) and measured in place in accordance with ASTM D1556 (sand code method) or ASTM D6938 (nuclear method). Trench backfill compaction shall be tested and certified by the Developer's licensed geotechnical engineer. Certification shall be provided to the District Representative prior to the construction of surface improvements.

C. Existing and Proposed Streets – Trench backfill in existing and proposed streets shall conform to County Specification SS20-02 for 3/4" AB.

D. Jetting – Compaction of trench backfill by jetting methods is NOT allowed in Carmichael Water District right-of-way areas or over dedicated reclaimed water, storm, sewer, or water easements and mains.

E. Pipe Bedding – Pipe bedding shall conform to Detail W-2b and the following:

1. Imported bedding material shall be clean washed sand free from organic material, suitable for purposes intended, and of such size that 100% passing a No. 4 sieve and not more than 10% passing a No. 200 sieve. **Pea gravel shall not be used.**

2. Bedding shall provide uniform and continuous support along the barrel of the pipe. The minimum depth of bedding material shall be provided under the bell. Blocking of the pipe is not permitted.

3. Loose material shall be removed from the trench bottom and replaced with imported material.

4. Where rocky, unyielding, or unsuitable foundation material is encountered, the subgrade shall be excavated a minimum of 12 inches below the pipe, and the trench width shall be increased a minimum of 12 inches. The over-excavation shall be replaced with imported material.

5. Where the trench bottom is soft, yielding, or unstable the trench bottom shall be over-excavated. Three-quarter inch crushed rock shall be placed in the trench to provide a stable foundation. The rock is in addition to the required pipe bedding used in the pipe zone.

6. Bell holes shall be excavated per manufacturer's recommendations. The minimum depth of bedding material shall be provided under the bell. Care shall be taken to ensure that the bell hole is no larger than necessary to accomplish proper joint assembly.

F. Native Material – Material for backfilled trenches shall contain no rocks, organic material, or soil lumps exceeding 4 inches in diameter. Controlled Density Fill (CDF) may be used on a case-by-case basis. The Contractor shall submit proposed CDF specifications to the District for review and approval prior to placement.

G. Placement of Material – Equipment shall be of a size and type satisfactory to the onsite District Inspector. Impact-type pavement breakers or compactors (hydrohammers) shall not be used within 5 feet from the top of any type pipe. Material for mechanically compacted backfill shall be placed in horizontal lifts which, prior to compaction, shall not exceed the depths specified below for the type of equipment employed. Actual maximum lift depth will vary with soil conditions and compaction equipment. The Contractor shall consult with a geotechnical engineer to determine the appropriate maximum depths. The Contractor shall be responsible for verifying compaction requirements in each lift.

H. Type of Compaction Equipment and Maximum Lift Depths

1. Maximum lift depth of four (4) inches, equipment type:

   a) Portable, engine driven-type Jumping Jack Rammer
   b) Portable vibratory plate

2. Maximum lift depth of twelve (12) inches, equipment type:

   a) Backhoe mounted sheepsfoot
   b) Vibratory smooth wheeled roller
   c) Vibratory smooth wheel roller with pneumatic tires

3. Maximum lift depth of eighteen (18) inches, equipment type:

   a) Excavator boom-mounted sheepsfoot
   b) Walk behind, vibratory roller, "Rammax" or "Bomag" Backhoe/excavator boom-mounted vibratory plate “hoe-pack

3.5 Dewatering

Dewatering for structures and pipelines shall commence when groundwater is first encountered and shall be continuous until the excavation is backfilled. All dewatering activities shall be in accordance with the NPDES General Permit, any specific Storm Water Pollution Prevention

Plan, and the Regional Water Quality Control Board, Central Valley – Region 5 requirements in effect. All water discharged shall be free of chlorine.

3.6 Concrete Cradles, Arches & Encasements

Concrete cradles, arches, and encasements shall conform to Construction Standard Detail W-3 and the following:

A. The pipe shall be placed in proper position on temporary supports consisting of concrete block or bricks. When necessary, the pipe shall be rigidly anchored or weighted to prevent flotation when the concrete is placed.

B. Concrete for cradles, arches, or encasements shall be placed uniformly along the pipe. Concrete placed beneath the pipe shall be sufficiently workable to fill the voids without excessive vibration. The concrete shall be allowed to cure and remain undisturbed for a minimum of 24 hours prior to backfill and compaction of the trench.

C. Water shall not be permitted to enter, seep, or run onto the concrete while curing.

3.7 Water Main Installation

A. All installations shall follow AWWA requirements unless otherwise noted on the approved plans. The manufacturer's installation guide shall be on the job site at all times.

B. Wherever possible, new water main(s) shall be installed to loop the existing system and to avoid dead-end water main(s). The size(s) of the new water main(s) shall be determined during the plan check and review process, and assisted by the fire flow analysis and any new service line requirements of the project.

C. All work performed during the water main installation shall be subject to inspection by the District. The Contractor shall provide the District at least 72 hours notice prior to beginning any portion of work requiring inspection, and work will be scheduled at the District's convenience. The Contractor shall provide, at no cost to the District, access to the work for inspection, including but not limited to removal of temporary plating or backfill, and re-excavation. The Contractor shall not proceed with any subsequent phase of work until the previous phase has been inspected and approved by the District. Inspection and approval by the District shall be obtained during and/or at the completion of the following portions of work, as determined by the District:

    1. Trench excavation and pipe bedding installation.

    2. Placing pipe, fittings, and structures, including identification tape, on all water main and service lines.

    3. Placing of all restraints.

    4. Placing and compacting the pipe zone backfill.

5. Backfilling balance of trench to grade. Copies of compaction test results shall be given to the District by the Applicant before final acceptance of the work.

6. Pressure testing of all mains and services.

7. Disinfecting and flushing of pipelines.

D. Improvements installed without proper inspection shall be exposed and inspected as required by the District Inspector. Cost associated with such inspections will be the responsibility of the Contractor.

E. Trenches shall be in a reasonably dry condition when pipe is laid.

F. Water Main - Unless noted on the approved plans, all water mains shall be Ductile Iron Pipe (DIP).

G. Ductile Iron Pipe (DIP) - DIP shall be installed in accordance with the standard for "Installation of Ductile Iron Water Mains and Their Appurtenances" (ANSI/AWWA C-600) and the manufacturer's recommendations, and as provided herein:

1. DIP shall be of Pressure Class 350 meeting AWWA C150 and C151 standards and specifications.

2. DIP shall be polyethylene encased in accordance with these Construction Improvement Standards and the standard for "Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids" (ANSI/AWWA C-105/A21.5). Polyethylene encased pipe shall be bedded and backfilled with sand 6" in all directions above the crown of pipe.

3. At the direction of the Carmichael Water District, the Contractor shall repair damages to the polyethylene encasement as described within ANSI/AWWA C-105/A21.5, or shall replace all damaged polyethylene film sections.

H. DIP cuts shall be ground smooth and beveled to prevent damage to the gasket upon insertion into the bell.

I. Pipes shall be mechanically restrained to the length specified in the approved plans, using materials specified herein. Thrust blocks shall only be used where specifically shown on the plan/profile sheets and/or standard detail sheets. All fittings and appurtenances shall maintain the minimum length of restrained pipe in accordance to Specification 4.17 of these Construction Improvement Standards.

J. Care shall be taken when lowering pipe into the trench to protect the pipe from damage. Chains are not permitted. The pipe shall be laid carefully to the lines and grades shown without grade breaks, unless designed with such, or to minimum depths shown on the approved plans. If field conditions exist such that the pipe may not be laid to the specified grade, the approved plans will require revisions prior to proceeding with construction.

K. Pipe sections shall be closely jointed to form a smooth flowline. Care shall be taken in placing the pipe and making field joints.

L. All underground metal (ductile iron, valves, fittings, copper, brass, etc.) shall be wrapped in 10 mils minimum thickness polyethylene encasement.

M. Extreme care shall be taken when consolidating the backfill around the pipe zone. For pipe 12 inches in diameter and smaller, no more than one-half of the pipe shall be covered prior to shovel slicing the haunches of the pipe. For pipe greater than 12 inches in diameter, no more than the lesser of 6 inches or one-third of the pipe shall be covered prior to shovel slicing. Sufficient care shall be taken to prevent movement of the pipe during shovel slicing. Shovel slicing shall be witnessed by the District inspector prior to shading the pipe. Sufficient care not to damage poly wrap.

N. A continuous number 10 gauge insulated location wire shall be attached to mains and appurtenances per the Construction Standard Details W-7 and W-8 and the following:

1. Location wire shall be continuous between main line valve boxes and fire hydrants.

2. Location wires through valve boxes shall be placed outside of riser, but inside the box.

3. Location wire in manholes and vaults shall be attached inside the facility within one foot of the rim.

4. Splices in location wire shall be made as shown on Construction Standard Detail W-8 and as follows:

    a) Twist the wire together with a minimum of five twists.
    b) Install a copper split bolt connector on the splice.
    c) Cover the splice with mastic tape and wrap with vinyl tape.

O. A 12-inch wide, blue plastic non-detectable water pipe marking tape, marked "Buried Water Main Below", shall be placed in all mainline trenches, on top of the trench “bedding zone” as shown on Construction Standard Detail W-2b.

3.8 Borings for Installation of Water Lines

A. Borings for installation of water lines shall be made as follows:

1. The equipment, method and sequence of operation and conductor pipe grades shall be approved by the District. A minimum of 72 hours notice shall be given prior to the start of work. The work will be scheduled at the District’s convenience.

2. Contractor shall maintain a minimum cover of 42 inches and will be recorded on a boring log. The boring log is required to be submitted within 72 hours following the boring operations to County.

3. Excavation for the boring operation shall be the minimum necessary to satisfactorily complete the work. Bracing and shoring shall be adequate to protect workers and any adjacent structure or roadbed.

4. The conductor shall closely follow the boring operation. The bored hole shall not be more than 0.10 foot larger in diameter than the outside diameter of the conductor. Guide rails shall be accurately set to line and grade to insure installation of the conductor within allowable limits. The conductor diameter shall be sufficient to allow adjustment of line and grade of the conducted pipe to meet allowable tolerances and to allow sand to be placed between the conductor and the conducted pipe.

5. The inside diameter of the conductor shall be a minimum of 10 inches larger than the outside diameter of the conducted bell pipe or joint, as approved by the District. A minimum of 4 inches of clearance shall be required between the conducted pipe and the casing, taking the skids into consideration.

6. Conducted pipe shall be supported by a minimum of three sets of synthetic skids per stick of pipe, or as required by the District. Pipe sections shall be joined outside of the conductor. The skids and casing entrance shall be lubricated prior to sliding the conducted pipe into place. The height of the skids may be adjusted to meet specified grades.

7. The space between the conducted pipe and conductor shall be completely filled with clean, dry silica sand, blown into place. The method of placing sand in the void shall be approved by the District. Both ends of the casing shall be plugged with non-shrink grout a minimum of 12 inches into the casing.

8. Whenever, in the opinion of the Developer's design or District Representative, the nature of the soil indicates the likelihood of ground loss which would result in a greater space between the outer surface of the conductor than allowed, the Contractor shall take immediate steps to prevent such occurrences by installing a jacking head extending at least 18 inches from the leading edge of the conductor.

9. The jacking head shall cover the upper two-thirds of the conductor and project not more than 1/2 inch beyond the conductor outer surface. Excavation shall not be made in advance of the jacking head. Voids greater than allowable shall be filled with sand, soil cement, grout, or as approved by the District. Where voids are suspected, the design or District Representative may direct the Contractor to drill the conductor, to pressure inject grout to refusal and repair the drilled hole. Grouting pressure shall not exceed 50 pounds per square inch at the nozzle.

3.9 Connection to Existing Facilities

Connection to existing District water facilities may be made upon approval of The District Inspector.

A. The District has the option of making a system tap as required on the plans. Should the District elect to perform the tap, the Contractor shall pay for such work on a time and

materials reimbursement basis. If the District performs work, payment must be made prior to final acceptance of the facilities. The Contractor shall be responsible for the following tasks associated with the tap as determined by the District:

1. Coordinating the work requested with the District and the District Inspector. This shall include discussions on provisions for materials and equipment required to complete the work.

2. Providing traffic control per County of Sacramento Public Works Agency, Department of Transportation requirements.

3. Excavating the work area, as agreed upon by the District Inspector.

4. Providing sheeting/shoring as required.

5. Backfilling and compacting the excavation(s) upon tap completion.

B. Connection to existing District water facilities will be detailed during the plan review stage. If it is discovered in the field that connection details or existing facilities differ from the original designed plans, the District will revise the connection details, and the Owner/Developer is responsible for acquiring, constructing, and installing the revised connection.

C. The Contractor shall tie-in the new system to an existing stub under the following conditions:

1. Care shall be taken to provide a clean, sanitary tie-in site.

2. Dewatering of both the new and existing water mains shall take place in a way that will prevent contamination by trench water. Contractor shall obtain any required permit for discharge of water to the sewer or storm drain as required by the County of Sacramento, the Regional Water Quality Control Board, and other entities having jurisdiction. All water taken from the system shall be de-chlorinated and tested prior to discharge to the storm drain system.

3. All material used in the tie-in shall be clean and swabbed with chlorine.

4. All tie-ins shall take place in the presence of the District Inspector.

5. Tie-ins may take place only after the newly constructed water system has successfully passed pressure testing and bacteriological testing and has been approved for service by the District.

6. Under no circumstances shall anyone other than a representative of the District open or close valves in a District operated system.

D. Transitions between DIP and PVC shall be made as follows:

1. A PVC pipe spigot may be inserted into a DIP bell by cutting off the PVC bevel on the spigot, and leaving no more than a 1/2-inch taper.

2. Transitions may be made by the use of a DIP repair sleeve with mega lug type restraint.

3. AC pipeline shall only be cut using snap cutters. Hand or power tools that have the possibility of producing dust shall not be used. Only approved OSHA methods shall be used.

4. Certified contractor is responsible for the removal and disposal of AC pipe.

3.10 Service and Meter Installation

All new and replacement water services shall include a water meter and be installed in accordance with manufacturer's recommendations, Construction Standard Details W-21 through W-24, and with the following provisions:

A. Water Meters – Water meters approved by the District are listed below and are equipped with factory potted Star Hexagram MTUs. Approved meters are as follows:
   1. ¾" to 1" Meters – Neptune Mach-10 ultrasonic meter R900i E-Coder register
   2. 1.5" to 2" Meters – Neptune Mach-10 ultrasonic meter R900i E-Coder register
   3. 3" and larger Meters – Neptune Mach-10 ultrasonic meter R900i E-Coder register
   4. Irrigation-only Services – 1 ½" and Larger (only with District approval) Neptune High Performance Turbine CF R900i E-Coder register
   5. Fire Service Rated Meters – Neptune Protectus III Fire Service meter CF R900i E-Coder register

B. Water services, service lines and appurtenant piping are to be installed by the Developer and Contractor, and shall be continuous from the main line to the meter box. Installation shall include a jumper in the place typically occupied by the meter, with care taken to ensure the length of the jumper is exactly equal to the lay length of the meter. All bends in copper tubing shall be made in a manner that does not crimp or flatten the tubing.

C. Water Meter Boxes

   1. Meter boxes shall be as described below and shall be equipped with a non-skid steel lid.

Meter Size	Area Type or Location	Box Type	Lid Type	Size	MFG or Equal
¾" to 1"	Landscape	B30 Polymer Concrete Tier 8	B30 Polymer Concrete Tier 8 w/ Neptune Probe Hole	13" x 24"	Hubbell
¾" to 1"	Residential: Concrete or Paved Driveway/Sidewalk	B30 Polymer Concrete Tier 22	B30 Polymer Concrete Tier 22 w/ Neptune Probe Hole	13" x 24"	Hubbell

Meter Size	Area Type or Location	Box Type	Lid Type	Size	MFG or Equal
¾" to 1"	Commercial: Concrete/ Paved Driveway or Roadway	B30 Polymer Concrete Tier 22	B30 Polymer Concrete Tier 22 w/ Neptune Probe Hole	13" x 24"	Hubbell
1 ½" to 2"	Landscape	B36 Polymer Concrete Tier 8	B36 Polymer Concrete Tier 8 w/ Neptune Probe Hole	17" x 30"	Hubbell
1 ½" to 2"	Residential: Concrete or Paved Driveway/Sidewalk	B36 Polymer Concrete Tier 22	B36 Polymer Concrete Tier 22 w/ Neptune Probe Hole	17" x 30"	Hubbell
1 ½" to 2"	Commercial: Concrete/ Paved Driveway or Roadway	B36 Polymer Concrete Tier 22	B36 Polymer Concrete Tier 22 w/ Neptune Probe Hole	17" x 30"	Hubbell

Consult with the District for water meter vaults 3" and larger meters.

2. Water meters boxes shall be cleaned out, centered, set true, plumb, and to grade and comply with the District standards prior to requesting District to provide a water meter.

D. The District will provide and install water meters less than 3" in diameter. Installation shall require a written request from the Developer or property owner and payment of all costs and fees. Meters 3" and larger will be provided by the District and installed by the qualified contractor for the Developer or property owner.

E. Taps, service saddles, and fittings attached to mains shall be separated by a minimum of 24 inches.

F. Water service line installation standard elements

1. Water Service Line Standard for a single 1" water service on a one-inch service line

   Water service line installation for a typical 1" water meter shall consist of: a water service saddle, a 1" corporation stop "MIP x FIP", sufficient 1" blue coated type K soft copper tubing from the water main to the meter box, a ball curb valve, brass 90 and brass pipe extending up into 1" angle meter valve, an idler for where the meter will be installed, another 1" angle meter valve on the customer side of the meter, and continuous brass or copper pipe extending out the back side of the meter box to facilitate connection by the plumber.

2. Water Service Line Standard for a 2" water service from a 2" service line

   Water service line installation for a typical 2" water meter shall consist of: a service saddle with a 2" tap, a 2" corporation stop "MIP x FIP", sufficient 2" type K hard copper service line extending from the mainline to the water meter box. Service line shall be wrapped with 10 mils minimum thickness polyethylene. At the meter box a

ball curb valve shall be installed, a brass 90 and brass or copper pipe extending up into 2” angle meter valve, an idler for where the meter will be installed, another 2” angle meter valve on the customer side of the meter, and continuous brass or copper pipe extending out the back side of the meter box to facilitate connection by the plumber

3. Water Service Line Standard for services 3” and larger

   Installation requirements and configuration for meters 3” and larger vary widely. Contact the District to determine installation requirements. Lead time of six (6) weeks is required for ordering meters. To avoid construction delays Contractor/Developer must contact the District in advance to order meters 3” and larger.

G. Service saddles shall be wrapped in 10 mils minimum thickness polyethylene, taped securely to the pipe, sealed and secured with 10-mil tape, and backfilled with sand.

H. Service lines shall be encased in 10 mils minimum thickness poly tubing, sealed and secured with 10-mil tape, and backfilled with sand.

I. Service manifolds shall be constructed per the following criteria:

   1. Where a service line is extended a distance greater than 40 feet, a construction jumper shall be installed. The new service line and manifold shall be pressure and bacteriologically tested in accordance with these Construction Improvement Standards.

   2. Where a service line is extended a distance less than 40 feet, the extension shall be cleaned, swabbed with chlorine, and flushed in the presence of the District Inspector. The new service line and manifold shall be pressure tested in accordance with these Construction Improvement Standards. In both cases, the installation shall be fully restrained by an approved restraint system, starting at the main, and as required by the approved Improvement plans.

   3. Services 3-inches and larger shall be ductile iron.

   4. No water shall be drawn through a service prior to installation of the water meter. In addition, no water shall be drawn through a service and meter installation where a backflow device is installed, until the backflow device has been successfully tested by the District.

J. A reduced pressure principle type backflow assembly shall be required for all non-residential service connections and/or a private well.

K. All residential service connections servicing properties 0.25 acre and larger shall have a reduced pressure principle type backflow assembly. All residential service connections equipped with a fire sprinkler system that is not a continuous loop or passive-purge system shall have a reduced pressure principle type backflow assembly.

L. Reduced pressure backflow assemblies shall be covered with a freeze protection insulated bag per these Construction Improvement Standards.

M. The curb in front of residential water services shall be stamped with a "W" at the location of the water source line crossing the curb.

3.11 Services Abandonment

All water services requiring abandonment shall be disconnected from the main line and the pipe repaired with a full circle repair band. If the project requires new service lines, as noted on the plans, it is the Developer/Contractor's responsibility to abandon all of the old, existing service lines to the property, as part of the project. It is up to the District's discretion that in lieu of abandonment, it may be acceptable to upgrade existing saddles/service lines/etc., as noted on the plans. Service lines that are being abandoned must be removed from within 3 feet of any remaining active or planned water mains or service lines.

3.12 Appurtenances Installation

All appurtenances, including fire protection, blow-offs, sample stations, air release valves, and fire hydrants shall be installed in accordance with manufacturer's recommendations, these Construction Improvement Standards and the following provisions:

A. All valves, fittings, DIP, copper, and underground brass shall be installed with a 10 mils minimum thickness polyethylene encasement. Damaged or scratched surfaces on epoxy coated valves and appurtenances shall be repaired with an epoxy kit per manufacturer recommendations and to the satisfaction of the District inspector prior to wrapping. Service lines are to be blue coated type K soft or hard copper with 10 mils minimum thickness polyethylene encasement.

B. Gate valves shall be centered in a one-piece riser stock. An operator nut extension adaptor (American Flow Control Trench Adaptor or equal) shall be installed on valves where the operating nut exceeds 48 inches in depth from final grade, as shown in Construction Standard Detail W-11.

C. Fire hydrants shall be marked with a blue reflector placed 1 foot off street centerline on the fire hydrant side of the street. Fire hydrants located at intersections shall be marked on both streets.

D. Fire hydrants shall be painted with two coats safety yellow. When used as blow-offs, the tops shall be painted white and marked with an "X" with black enamel paint. Private hydrants shall be painted red.

E. Permanent dead-end lines shall have a blow-off hydrant constructed per Construction Standard Detail W-12. Temporary dead-end lines shall have a blow-off constructed per Construction Standard Detail W-16.

F. Insulating kits shall be installed at transitions between dissimilar metal pipe per the Construction Standard Details and as required by the District.

3.13 Testing Procedures

Testing of the water system may proceed only after all utility crossings have been completed, sewer mains and services have been pressure tested, and subgrade elevations have been reached. Testing prior to subgrade placement may be subject to additional pressure tests at the discretion of the District Inspector.

A. Pressure Test:

1. The District Inspector will be present during the duration of the test.

2. Contractor shall verify with the District Inspector that all system valves are open prior to testing.

3. Pressure testing shall be conducted for two hours at 150 pounds per square inch, or at one- and one-half times the operating pressure, whichever is higher, as measured from the system high point. The test gauge shall be liquid filled and capable of testing up to 300 psi.

4. No detectable leakage is allowed.

B. Chlorine Disinfection – Chlorine disinfection shall comply with the American Water Works Association Standard for Disinfecting Water Mains (C651) and as specified below:

1. Disinfection inspections shall begin only after passing the pressure test.

2. Prior to chlorination, pre-flush water mains and services. Pre-flushing is not permitted if using the Tablet Method for chlorination.

3. Chlorine shall be drawn through all mains, hydrant runs, and services. The District Inspector shall verify that a minimum chlorine residual of 50 parts per million (ppm) has been achieved.

4. After a 24-hour holding period, the District Inspector will verify that a minimum chlorine content of 25 ppm remains in the system.

5. Upon approval by the District Inspector, the water system shall be flushed to remove concentrated chlorine. Flushing shall be continued until the remaining water has a chlorine residual below 1 ppm and a turbidity equal to or less than one NTU. Chlorinated water shall be neutralized to 1 ppm chlorine residual or less prior to discharge. Discharge location and neutralization methods shall be coordinated with and approved by the District Inspector.

6. Chlorinated water resulting from flushing newly installed water lines may not be discharged into the sewer system. Permission to discharge chlorinated water into the sewer system may be granted by permit from the County of Sacramento Department of Public Works, Water Quality Division on a case-by-case basis. Contractor/Developer is responsible for obtaining any approvals or permits for discharge of spent water.

7. Prior to discharging into the sewer system, the Contractor shall sign a form authorizing the District to bill for the amount of water discharged into the system. At the end of each flushing exercise, and prior to tying into the District water system, the District Inspector(s) shall prepare a bill for water usage based on the meter reading or estimate of water used. This bill must be paid before the written letter of acceptance will be issued by the District. All volumes of water used for construction shall be metered.

8. Chlorinated water shall not be discharged under any conditions. Disposal of spent water shall not be into environmentally sensitive areas (i.e., under oak trees, vernal pools, manmade or natural streams, drainage systems, etc.). No water may be disposed of under oak trees during any time of the year.

C. Water Quality Testing – Prior to collecting water quality samples, the water system shall be held at District line pressure for a minimum of 24 hours. Water may not be drawn during this time period. After the 24-hour holding period has elapsed, water quality samples shall be collected by the District Inspector for testing. The District will require 48 hours to complete total coliform and total plate count tests. If the initial samples fail, the waterline will be retested until an acceptable water quality is achieved, at the expense of the Contractor. Bacteriological samples will be taken following chlorination and flushing activities. Additional bacteriological samples will be taken after tie-in activities if the pipe has been cut and the inner barrel has been exposed.

D. Tying into the District System – The water system may be tied into the District System upon completing and passing all the testing procedures. Tie-ins shall be conducted as shown in the Standard Details W-9 and W-10 of these Construction Improvement Standards, or as shown on District approved plans for specific case by case connections. After the tie-in has been made, the Contractor shall flush the segment tied-in, to the approval of the District Inspector.

E. Continuity Testing – The District will test continuity of the location wire with District standard locating equipment upon request for testing by the Contractor. Discontinuity in the location wire shall be repaired. It is recommended that the Contractor request continuity testing after subgrade is made, but before asphalt is placed. Final continuity testing will take place after asphalt is placed and all valve boxes are raised. Costs for said inspection shall be borne by the Contractor/Developer. Preliminary inspections may be performed by outside Contractors, but shall not be accepted by District as an official record.

3.14 Repairing Installed Improvements

All DIP water mains shall be repaired by the following procedures:

A. Damaged or failed pipe sections shall be removed and replaced with new pipe in the presence of the District Inspector. All repaired joints shall be restrained with mega lug type restraint and shall be polyethylene wrapped and taped.

B. After the repair has been completed, the excavation shall be backfilled and compacted to grade as specified. The repairs shall then be re-tested per these Construction Improvement Standards.

C. At the direction of the District, the Contractor shall repair damage to the polyethylene encasement as described within ANSI/AWWA C- 105/A21.5, or shall replace all damaged polyethylene film sections.

3.15 Punchlist Process

When the Contractor feels all improvements are substantially complete, a punchlist of final outstanding items may be requested. The punchlist shall be generated by the District and will require a final inspection of all work, including but not necessarily limited to the following:

A. Installation of service lines, meter boxes, and water meter (or idler) shall be complete and in accordance with these Construction Improvement Standards.

B. That all valve boxes are raised to finish grade, centered, and cleaned out.

C. That the District has been given and has approved all valve reference measurements.

D. That all meter setters and meters are properly positioned, and that all meter boxes are positioned and raised to proper grade.

E. That fire hydrants are raised to proper grade, in a vertical position, painted in accordance with Section 3.12.D, and that the concrete pad and bollards are placed properly.

F. That backfill has passed all compaction requirements and the District has written records.

G. That all system valves are open (except those specifically required to be normally closed), and that the turns required for complete open/close cycle are recorded on the record drawings.

H. That all waterlines have been chlorinated, disinfected, and tested for bacteriological contamination.

I. That all line pressure testing and flushing has been completed.

J. That the jobsite is clean and that all of the Contractor's equipment and materials are removed.

K. That all service lateral locations have been marked on curb.

L. That all paving, seal coating, striping, and surface restoration are completed.

Any deficiencies found during the punchlist process shall be corrected to District satisfaction prior to final acceptance.

When all items have been completed and corrected to the full satisfaction of the District, the District shall issue to the Contractor a written letter of acceptance. After the written letter of acceptance is issued the completed water system and main extensions with all appurtenances, apparatuses, fittings, and equipment shall become and forever remain the property of the District. The Contractor shall maintain all new water pipeline systems for a period of one year after the date of the letter of acceptance as outlined in Section 2.4.

Section 4: Materials

4.1 Equal

The words "or equal" shall mean any material deemed by the District to be acceptable for use within the District's water system, as compared to products of specified manufacturers. Contractors proposing to use materials, which are not specifically named, shall submit all necessary documentation to allow review of said material for use as an equal. The submittal shall include a letter with:

A. Product – A description of the product and the appropriate materials specification section number.

B. Contact – The name and telephone number of the contact person for the proposed product.

C. References – A list of other agencies who are using the proposed product (include names and telephone numbers).

Address the letter to Carmichael Water District at 7837 Fair Oaks Blvd., Carmichael CA 95608, ATTN: General Manager. District staff may request a sample of the product for review.

The Contractor shall submit all material for review 35 days prior to contract award. All submittals shall include documentation verifying contract award date. Contractors shall allow 2 to 4 weeks review time by the District.

4.2 Unapproved Materials

Materials not approved for use on the project shall be removed from the site within 24 hours if requested by the District Inspector.

4.3 Appurtenances

A. Air Release Valves – Air release valves shall be epoxy coated vacuum break type. A listing of approved manufacturers includes: Crispin, Valmatic, or equal.

B. Backflow Assembly – Shall be from the latest University of Southern California List of Approved Backflow Assemblies.

C. Blow Off – Manufacturers and products include: Kupferle, Eclipse # 78 (2-inch) or equal.

D. Cadweld – A listing of materials includes:

   #4 jumper cable, CP cable, 18" long with I" bare end #4 Cadweld copper sleeve #4 Cadweld shot with thermite mastic weld cap-t-cap.

4.4 Ductile Iron Pipe

DIP shall be Pressure Class 350 manufactured in accordance with AWWA standard “Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids" (ANSI/AWWA C151/A21.51) and shall include the following:

A. All DIP shall be cement mortar lined in accordance with the standard for "Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water" (ANSI/AWWA C104/A21.4). The cement mortar lining shall be as specified in C104/A21.4 Section 4.7.2 and shall not be less than 1/8 (one eighth) inch for 4 through 12-inch diameter pipe; and 3/16 (three-sixteenth) inch for 16 through 24-inch diameter pipe.

B. Mortar lining shall be provided with an asphaltic seal coat meeting the requirements of AWWA C104.

C. DIP manufacturers include: Pacific States, Tyler, US Pipe, or equal.

4.5 Fittings

A. All fittings for buried water mains shall be ductile iron. All other cast iron and steel fittings will not be accepted as equal and will be rejected if installed, with removal and replacement at the Developer’s expense.

B. Unless otherwise specified or shown on the approved plans, all fittings to be used with DIP shall employ either mechanical joints or restrained joints conforming to the standard for "Ductile-Iron Compact Fittings for Water and Other Liquids" (ANSI/AWWA C153/A21.53). Fitting manufacturers include Tyler, US Pipe, or equal.

C. All ductile iron fittings shall be mortar lined in accordance with the standard for "Cement Mortar Lining for Ductile Iron Pipe and Fittings for Water" (ANSI/AWWA C104/A21.4).

D. All fittings shall be wrapped in polyethylene encasement in accordance with these Construction Improvement Standards.

4.6 Freeze Protection for Backflow Assemblies

A. The backflow assembly freeze protection shall be a fabricated insulating bag designed specifically to protect above ground water facilities to a 12-hour minimum temperature of 20°F. The materials of construction shall be as follows:

   Laminated fabric conforming to Herculite #10 by Herculite Products (fabric shall be a minimum of 10.6 oz/sq. yd.), or equal. Brass Rolled Rim Grommet and spur washer by Astrup, or equal. Polyester thread with a minimum strength of 14.2 pounds, Coats American's Star Ultra product line, or equal. Fiberglass insulation R-19 rated 6-inch minimum thickness. Two-inch minimum width Velcro, or equal.

4.7 Gaskets – Insulating Type

A. Insulating Flange Gaskets – Insulating flange gaskets shall be USSO Standard B.16.21 insulation flange kits, Type E Full Face Gasket with two-side insulation as manufactured by Calpico, US Pipe Gaskets, or equal.

4.8 Hydrants

Hydrants shall be wet barrel type Clow 960 or equal. Exterior shall be painted with one coat of primer and painted in accordance with Section 3.12.D.

4.9 Hydrant Bury

Hydrant buries shall be ductile iron mechanical jointed cross flange, cement-mortar lined per AWWA C 104.

4.10 Hydrant Bury Extensions

Hydrant bury extensions shall be cement-mortar lined per AWWA C 104, and placed below the break off check valve.

4.11 Nuts and Bolts

A. Flange Bolts and Nuts – Flange bolts and nuts to be minimum Grade 4, conforming to ASTM #A307 Grade Bd.

B. Hydrant Bolts – Hydrant bolts are to be Solid, 5/8" x 3.5", conforming to ASTMA307 Grade A & B Low Carbon Steel.

C. Tee Bolts – Steel bolts are to be 3/4" high strength, low alloy steel with a heavy nut, conforming to AWWA Standard C-1 11-90.

4.12 Nylon Bushings

Nylon bushings shall be 76-76R, 2 1/2" NST x 2" Pipe.

4.13 Patching Material

A listing of manufacturers and part reference numbers for patching of DIP include: Cop-Coat Carboline Company (Bitumastic No. 50, Coal Tar), or equal.

4.14 Polyethylene Encasement

Polyethylene film for encasement shall have a minimum thickness of ten (10) mils. The minus tolerance on thickness shall not exceed ten percent of the nominal thickness. The encasement of pipe in polyethylene shall be in either tape or sheet form. Polyethylene film shall be

manufactured from a Type 1, Class C raw polyethylene material conforming to "Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids" (ANSI/AWWA C-105/A21.5). Manufacturers include: Fee Spec's-LP378D Northtown, Fulton Enterprise Inc., Global Polymer Tech, Unisource, or equal.

4.15 Polyvinyl Chloride (PVC) Pressure Pipe

Polyvinyl Chloride Pressure Pipe for water system mains 3 inches and larger is not allowed. All water mains shall be ductile iron pipe.

Polyvinyl Chloride (PVC) Pressure Pipe Installation – PVC shall be installed in accordance with the AWWA Manual M23 and the manufacturer's recommendations, except as otherwise provided herein:

A. PVC shall only be permitted after service meters two inches in diameter or smaller, when approved by the District Inspector.

B. All PVC Pipe and fittings shall have been manufactured within the 18-month period prior to installation.

C. Pipe and gaskets shall be kept clean and protected against sunlight and heat damage.

D. Pipe showing signs of physical damage or excessive ultraviolet exposure will be rejected and shall be immediately removed from the job site.

4.16 Pressure Regulators

Not Used

4.17 Restraints

Restraint systems for DIP shall include: Field Lock Gaskets (3-inches through 24-inches diameter only), HDSS, Mega Lug, TR Flex, or equal. Restraint systems shall be required for all pipe joints if the diameter is less than or equal to 12-inches. For diameters larger than 12-inches, restraint systems shall be installed at all pipe joints within a minimum of three (3) pipe lengths before or after a Tee, 90° elbow, or 45° elbow fitting. Thrust blocks shall be installed at all Tees, 90° elbows, and Dead-ends.

4.18 Riser Aligners

Riser aligners shall be installed for all valves where the valve nut is at a depth exceeding the depths shown in the Standard Details. Riser aligner shall be as shown in the Standard Details.

4.19 Riser Stock

Riser stock shall be 8-inch diameter PVC SDR35 for all main line valves.

4.20 Sampling Stations

Sampling stations shall be purchased through the District and shall be installed by the Contractor.

4.21 Services

Water services shall be constructed of brass or copper piping as shown in the Standard Details. Water services shall not be constructed of lead bearing materials and shall be compliant with AB 1953 as lead free.

A. Brass Material (shall be constructed lead free)

   1. Brass pipe – Brass pipe shall conform to ASTM B-43 standards. A listing of pipes includes: Hallstead Y4" through 2" Red Brass, Cambridge-Lee, Federal WW-3 5 1, or equal.

   2. Brass fittings – Brass fittings shall conform to ANSI Standard B 16.15, B 16.24, B2. 1, T-94-1, and be a minimum of Class 125. A listing of manufacturers includes: Lee Brass, Merritt Brass, or equal.

   3. Brass fittings for Copper Tubing – A listing for brass fittings for copper tube includes: Jones, Mueller Streamline, or equal.

   4. All nuts and bolts for service sizes 2” and greater shall be brass.

B. Blue Poly Coated Copper Tubing – Copper tubing shall be seamless, annealed copper tube, shall conform to ASTM B88 "Standard Specification for Seamless Copper Water Tube", and shall be Type K. Copper shall be grade UNS-C 122200. For 1” diameter, use Type K Roll Soft Copper. Tubing manufacturers includes: Cambridge-Lee, Mueller Streamline, or equal.

C. Corporation Stops

   1. Corporation stops shall be male iron pipe thread by female iron pipe thread (MIP x FIP) and full throat ball valve design. A Corporation stop shall be installed at the water main for all service laterals two inches and smaller. Manufacturers of corporation stops include: Jones, Mueller, or Insulated Corps Mueller.

D. Curb Stops

   1. Curb stop manufacturers include: Jones, Mueller, or equal with locking device.

E. Dielectric Tape – Manufacturers for dielectric tape include Polyken #932 Hi-Tack joint wrap tape or approved equivalent flexible dielectric tape.

F. Service Saddles – Jones, Mueller, Ford 4-inch through 24-inch saddles with 1-inch or 2-inch tap.

4.22 Service Boxes and Lids

Service boxes shall be as listed in the Service Meters Installation section and shown on the Standard Details. All box lids are to be permanently marked with the appropriate label (i.e., Water, ARV, Blow-Off, CPT, etc.).

4.23 Meter Setter

Meter setter shall not be used.

4.24 Water Meter

Water meters shall be purchased from the District.

4.25 Location Wire

Location wire shall be 10-gauge minimum UF rated solid copper with plastic insulation.

Location Wire Connectors - Location wire connectors shall be split-bolt type connectors. A listing of products includes: Perma-Seal Wire Connectors or equal.

4.26 Location Wire Mastic Tape Seal

Location wire mastic tape shall be 3M Mastic Tape #2229 or equal.

4.27 Valves

A. Butterfly Valves – Butterfly valves are to be used on diameters ranging from 10" to 72" and shall meet the requirements of AWWA C504. Valves shall be cast iron body with cast or ductile iron disk. Disk shall have Ni-Chrome or Type 316 stainless steel edge. Shaft shall be stainless steel, connected to the disk with a stainless steel pin or torque plug, and shall be scribed on both ends to indicate valve position. Valve seat shall be Buna-N.

   Butterfly valves shall be Pratt Ground Hog (Holiday free epoxy, interior lining and standard black asphalt varnish exterior), Mueller Lineseal III (Holiday free epoxy, interior lining and standard black asphalt varnish exterior), or equal. Certification shall be provided by the valve manufacturer stating that the epoxy lining is Holiday free.

B. Gate Valves – Gate valves shall meet the requirements of AWWA C509 for sizes 3" to 8". Gate valve shall be resilient seat, fusion bonded epoxy lined and coated, and be equipped with a 2-inch operating nut. Valves shall be no rising stem type valve. Gate valves shall be as manufactured by American Flow Control, Mueller, Clow, or equal

C. Service Gate Valves – Gate valves for 2" services shall be NIBCOT - 113 Bronze, or equal.

D. All valve coatings shall be repaired if damaged prior to or during installation.

E. Buried valves shall be installed with the operating nut in a vertical alignment to allow ease of operation once buried. Failure to install the valve-operating nut in a plumb alignment will require re-installation of the valve until it is plumb.

F. Above ground valves at pump stations may be rising stem valves.

G. Operating wheels shall be provided where shown in the Standard Drawings and where valves one above grade at mechanical facilities such as pump stations, wells, fire service, and back-flow devices. Handwheels shall be equipped with a tamper proof locking device acceptable to the District.

4.28 Valve Boxes

All valve boxes in street and other traffic areas shall be designed to H-20 loading conditions. Valve boxes shall be polymer concrete boxes, with G5 polymer concrete lids, and shall be as manufactured by Hubbell (or equal). Valve boxes shall be equipped with riser pipes securely installed directly over the center of the valve-operating nut. Valve riser and box shall be installed true and plumb over the valve to allow unrestricted valve operation from the surface. Valve box shall be placed in a 6” x 6” concrete collar with a #4 rebar in the center of the section.

Valve box and riser shall be cleaned of any rocks, gravel, dirt of other materials possibly obstructing the valve operation. Tracer wire shall be accessible and clear of operating nut.

4.29 Water Pipe Marking Tape

Water pipe marking tape shall be as shown in the Standard Drawings, and marked “W/M Below”. Manufacturers and materials include: Calpico Inc. (Tracer Tape-Non-Detectable 12" width), Reef Industries Inc., Terra Tape Extra Stretch 450 Material, or equal.

WATER SYSTEM GENERAL NOTES

NOTES:

1. CONTRACTOR SHALL NOT OPERATE EXISTING DISTRICT VALVES. ONLY DISTRICT STAFF SHALL CONDUCT PLANNED WATER SYSTEM SHUTDOWNS.

2. CONTRACTOR SHALL PROVIDE A MINIMUM OF 48 HOURS ADVANCE NOTICE OF A PLANNED WATER SHUTDOWN AND IS RESPONSIBLE TO REQUEST THE VALVE BE REOPENED FOLLOWING THE WORK. PLANNED SHUTDOWNS ARE TO SCHEDULED AT THE DISTRICT'S CONVENIENCE.

3. PROVIDE THRUST RESTRAINT AT ALL BENDS, TEES, AND ENDS FOR BURIED PRESSURE PIPE, AS NOTED ON PLANS.

4. DEVELOPER SHALL LOCATE AND STAKE ALL PROPERTY CORNERS WHERE WATER SERVICES ARE TO BE INSTALLED.

5. DEVELOPER SHALL PROVIDE ALL TESTING AND PAY FOR ALL DISTRICT INSPECTION COSTS.

6. EXISTING WATER LINES AND FACILITIES LOCATIONS PROVIDED BY THE DISTRICT ARE APPROXIMATE. DEVELOPER/CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXACT FIELD LOCATIONS AND MAINTAINING THE FOLLOWING SEPARATIONS BETWEEN UTILITIES.

   a. MINIMUM VERTICAL CLEARANCE BETWEEN A SEWER SERVICE AND A WATER SERVICE SHALL BE 12 INCHES AND THE WATER SERVICE SHALL BE ABOVE THE SEWER SERVICE.

   b. MINIMUM VERTICAL CLEARANCE BETWEEN ALL NON-SEWER UTILITY CROSSINGS SHALL BE 12 INCHES.

   c. MINIMUM HORIZONTAL CLEARANCE BETWEEN SANITARY AND STORM SEWER PIPELINES AND DISTRICT WATER LINES SHALL BE 10 FEET.

   d. MINIMUM HORIZONTAL CLEARANCE SHALL BE 36 INCHES BETWEEN ALL NON-SEWER UTILITIES AND WATER.

   e. MINIMUM COVER OVER WATER MAINS SHALL BE 36 INCHES UNLESS OTHERWISE DIRECTED BY THE DISTRICT AND/OR SHOWN ON PLANS.

7. WATER PIPELINES SHALL BE INSTALLED ON UNIFORM GRADES TO MINIMIZE HIGH SPOTS AND LOW SPOTS IN THE PIPE. THE DISTRICT MAY REQUIRE ADDITIONAL BURIAL DEPTH TO REDUCE THE USE OF AIR RELEASE VALVES AND BLOW-OFF ASSEMBLIES.

8. THE CONTRACTOR IS RESPONSIBLE FOR ALL TRAFFIC CONTROL. TRAFFIC CONTROL AND PAVEMENT CUTTING AND RESTORATION ARE UNDER THE JURISDICTION OF SACRAMENTO COUNTY.

9. THE CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICES ALERT A MINIMUM OF 48 HOURS PRIOR TO START OF ANY EXCAVATION.

10. THE CONTRACTOR SHALL NOTIFY THE SACRAMENTO METRO FIRE DEPARTMENT A MINIMUM OF 48 HOURS PRIOR TO ANY WATER SYSTEM SHUTDOWN THAT WILL SHUT OFF AN EXISTING FIRE HYDRANT.

11. NO SHUT DOWNS ARE TO BE SCHEDULED ON MONDAYS, WEEKENDS, OR HOLIDAYS.

12. BACTERIOLOGICAL TESTS SHALL ONLY BE PERFORMED ON MONDAYS, TUESDAYS, WEDNESDAYS, AND THURSDAYS (BEFORE 12:00 PM).

CARMICHAEL WATER DISTRICT

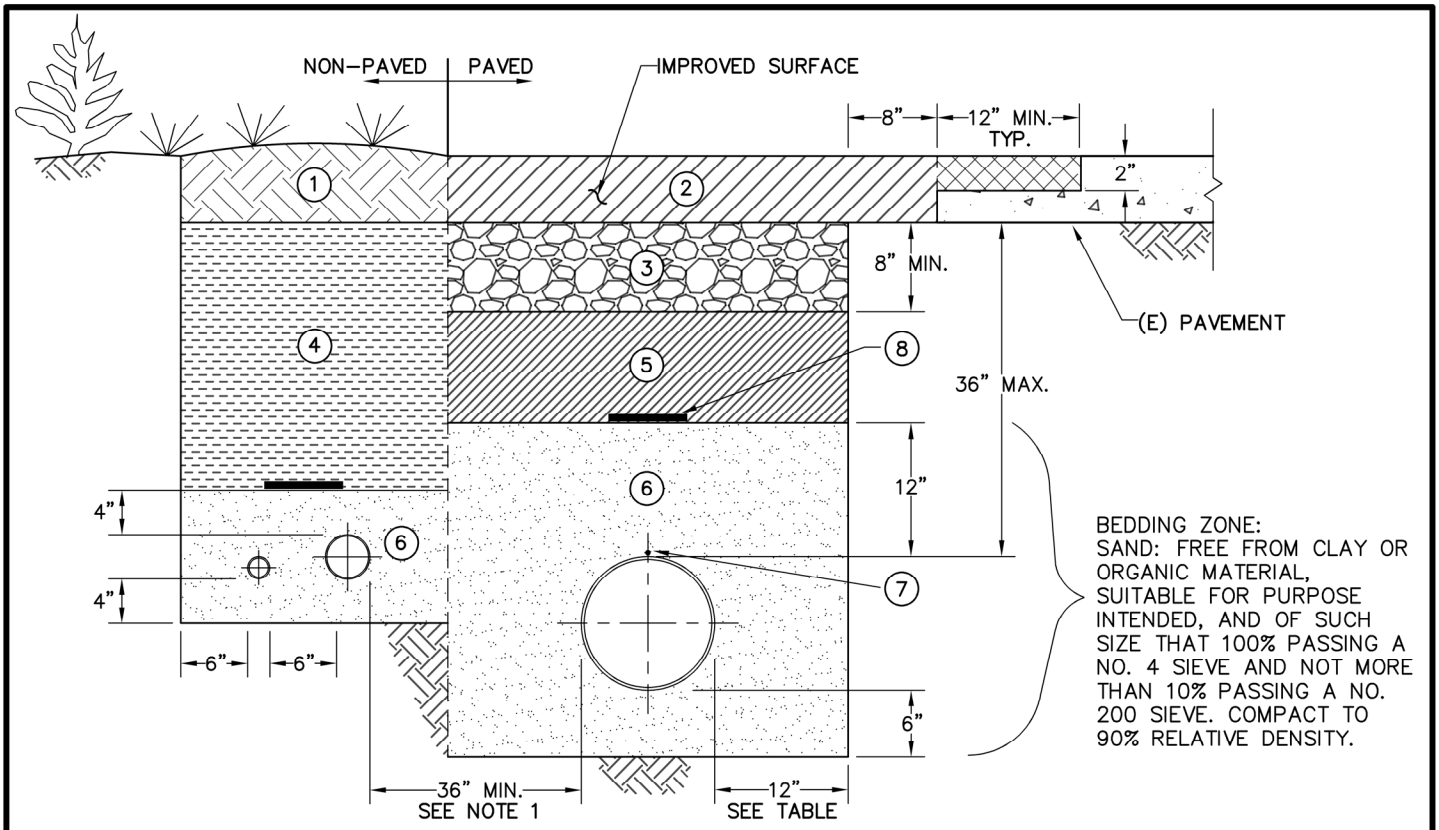
7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 – 6400

GENERAL NOTES

SCALE: NONE	APPROVED BY: MM
DATE: APRIL 2021	DRAWN BY: JC

W-1

W-01GEN-NOTES_JC.DWG – 4/2/2021



18" MIN. TRENCH – SIDEWALL CLEARANCES

PIPE DIAMETER (IN.)	MIN. SIDEWALL (IN.)
1.5 – 8	6
12, 16, 18	12
24	18
≥30	PER PLANS

MATERIALS:

1. 6" MINIMUM TOPSOIL, RESTORE LANDSCAPE TO ORIGINAL CONDITION
2. 4" TO 6" THICK ASPHALT CONCRETE TO MATCH EXISTING
3. 8" MINIMUM 3/4 " AGGREGATE BASE AT 95% COMPACTION
4. FINAL BACKFILL SHALL BE 1.5" MINUS AT 90% MIN. COMPACTION
5. INTERMEDIATE NATIVE BACKFILL AT 95% COMPACTION SEE SACRAMENTO COUNTY SPECIFICATIONS (MUST MEET OR EXCEED)
6. SAND BEDDING – 4" MIN. DEPTH BELOW PIPE FOR DIA. ≤ 4" AND 6" MIN. DEPTH BELOW PIPE FOR DIA. > 4"
   – 4" MIN. FILL ABOVE PIPE FOR DIA. ≤ 4" AND 12" MIN. FILL ABOVE PIPE FOR DIA. > 4"
7. #10 AWG, SINGLE STRAND SOFT DRAWN COPPER WIRE W/ $\frac{1}{16}$" PVC INSULATION; TAPE TO TOP OF PIPE AT 10' INTERVALS
8. PLASTIC WARNING TAPE LOCATED ON TOP OF BEDDING ZONE

NOTES:

1. MINIMUM 36" BETWEEN MAINLINES OR LATERALS W/ DIA. ≥4", AND MINIMUM 6" BETWEEN LATERALS W/ DIA. < 4" AND/OR MAINLINES W/ DIA. ≥ 4".
2. COMPLY FULLY WITH 29 CFR PART 1926 OSHA SUBPART P EXCAVATIONS AND TRENCHES REQUIREMENTS.
3. CONTRACTOR TO SECURE TRENCH FOR SAFE ACCESS PER OSHA REQUIREMENTS FOR INSPECTIONS AND TESTING.
4. BACKFILL MATERIALS, AGGREGATE BASE, PAVEMENT MATERIALS AND CONCRETE FOR CURBS, GUTTERS AND SIDEWALKS SHALL COMPLY WITH THE COUNTY OF SACRAMENTO DEPARTMENT OF PUBLIC WORKS STANDARD CONSTRUCTION SPECIFICATIONS AND STANDARD COUNTY DRAWINGS.
5. BACKFILL SHALL BE MECHANICALLY CONSOLIDATED AND SHOVEL SLICED UNDER THE HAUNCHES OF THE PIPE.
6. IN ROCKY OR UNYIELDING SOIL, THE TRENCH SHALL BE EXCAVATED A MINIMUM OF 12" BELOW THE PIPE AND THE TRENCH WIDTH SHALL BE INCREASED BY 12".
7. ONE 12" STRIP OF BACKFILL TAPE SHALL BE USED FOR ALL PIPES 12" AND SMALLER. FOR PIPES LARGER THAN 12", INSTALL ONE ADDITIONAL STRIP PER 12" ADDITIONAL DIAMETER OR FRACTION THEREOF.
8. ALL SOIL COMPACTION PERCENTAGES ARE TO BE BASED ON ASTM D1557.

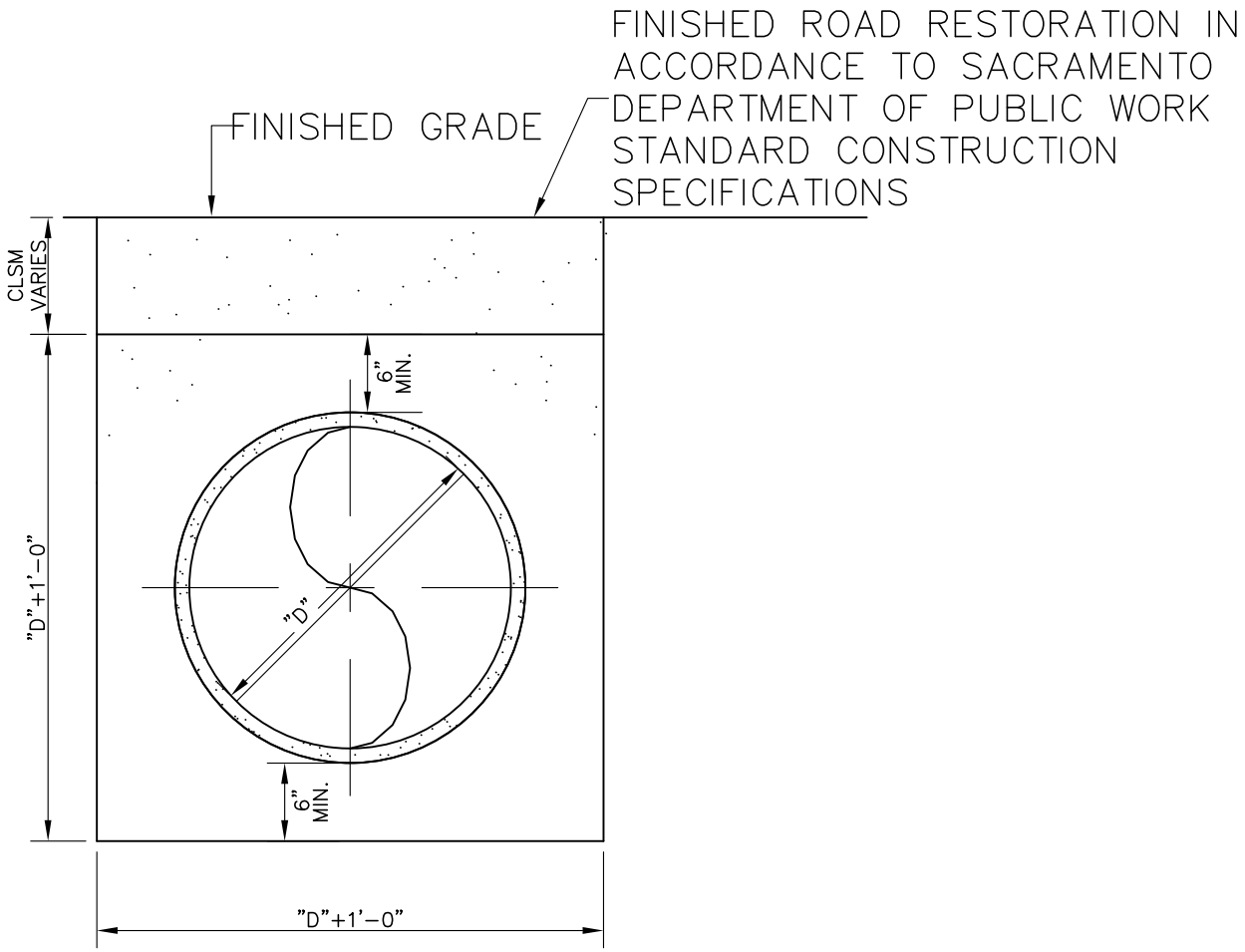
CARMICHAEL WATER DISTRICT

7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 – 6400

TRENCH SECTIONS, BACKFILL, AND NOTES

SCALE: NONE	APPROVED BY: GN	**W-2**
DATE: JULY 2025	DRAWN BY: SR	

W-02TRENCH-BKFILL_SR.DWG – 7/15/2025



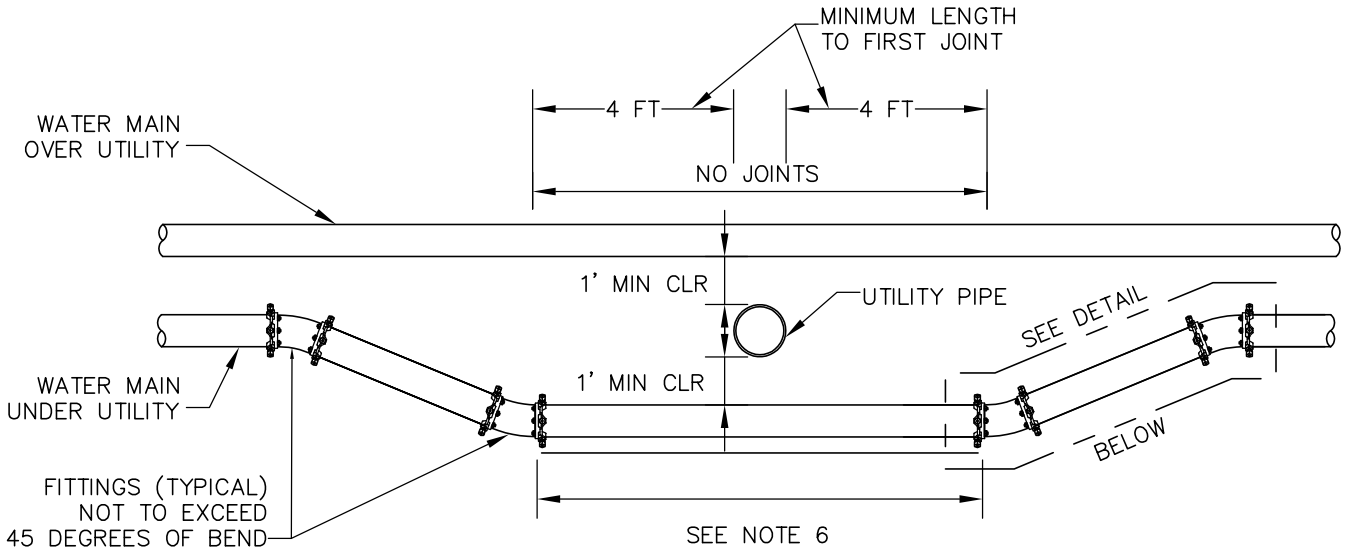
NOTES:

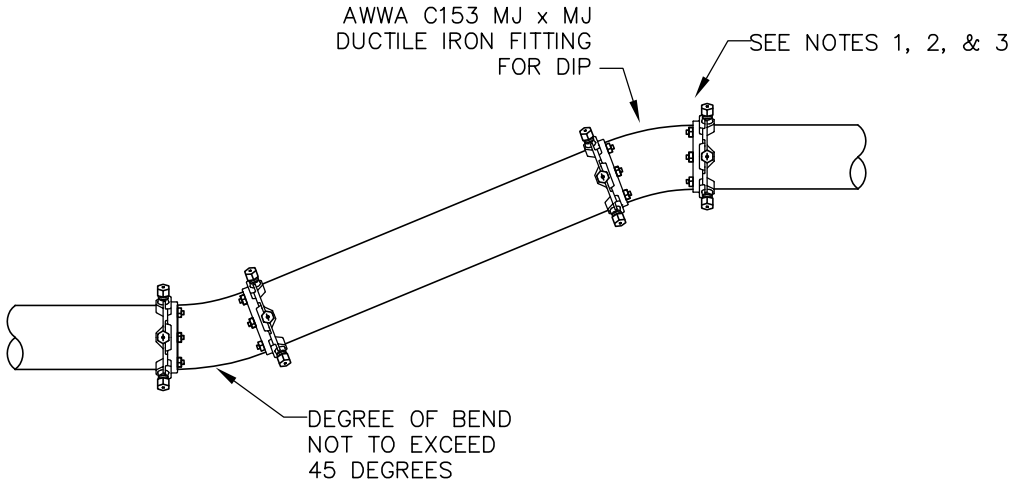
CLSM ONLY USED FOR PIPE INSTALLATION WHERE COVER IS LESS THAN 24" TO FINISHED GRADE

6" OF COMPACTED SAND FULLY SURROUNDING PIPE.

CARMICHAEL WATER DISTRICT	CONTROLLED LOW-STRENGTH MATERIAL FOR SPECIAL CONDITIONS		
7837 FAIR OAKS BOULEVARD CARMICHAEL, CALIFORNIA, 95608 – 6400	SCALE: NONE	APPROVED BY: MM	**W-3**
	DATE: APRIL 2021	DRAWN BY: JC	

W-03CONC-ENCSMNT_JC.DWG – 4/7/2021



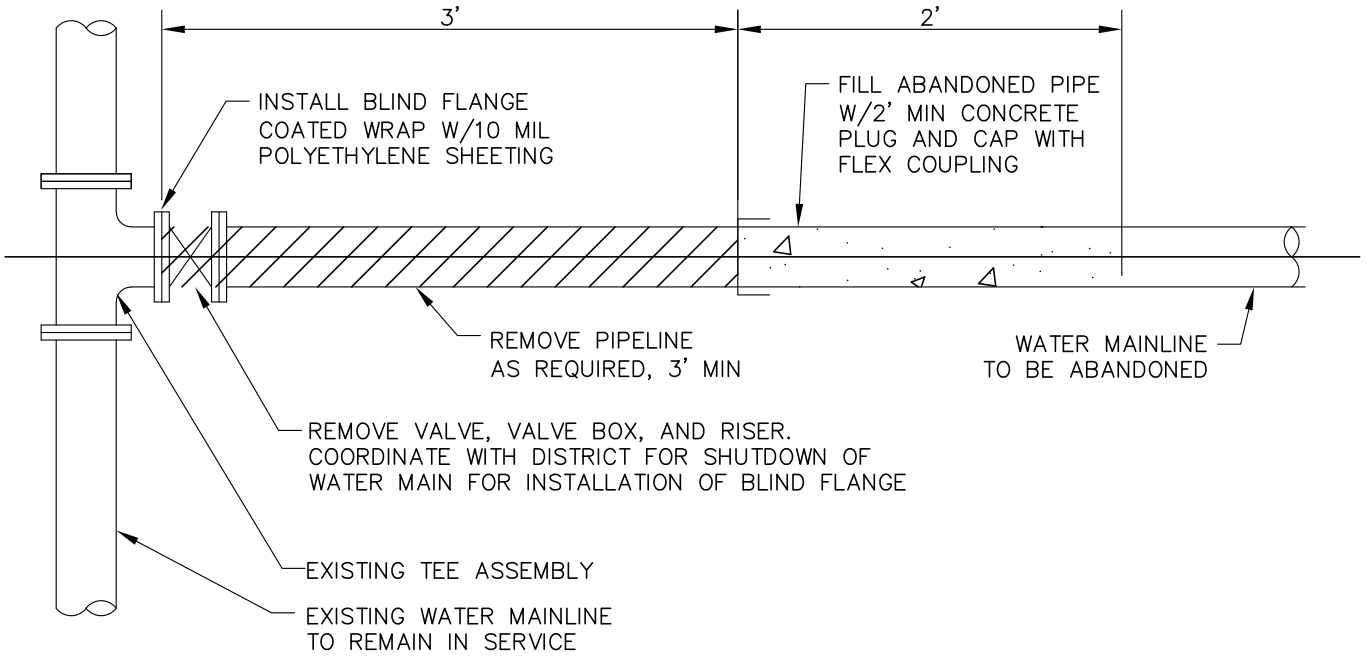


NOTE:

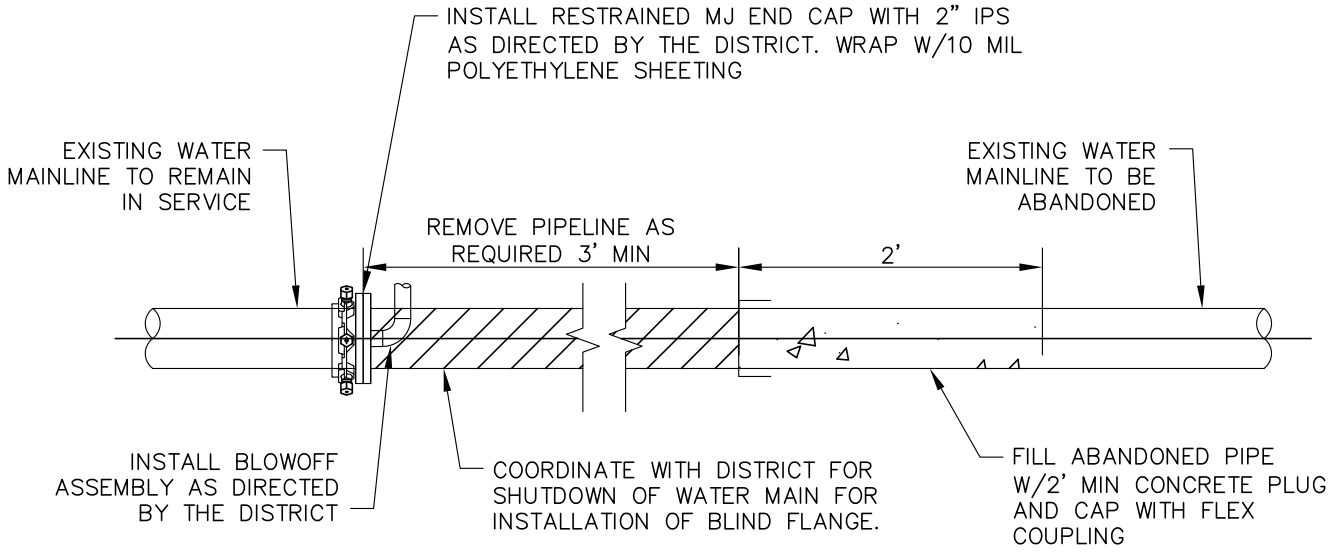
1. RESTRAIN ALL JOINTS PER CARMICHAEL WATER DISTRICT CONSTRUCTION IMPROVEMENT STANDARDS.
2. IF BEND IS TO EXCEED 45 DEGREES, THE BEND AND THE RESTRAINED LENGTH MUST BE REVIEWED BY THE DISTRICT.
3. WRAP ALL DIP AND FITTINGS WITH 10 MIL. POLYETHYLENE ENCASEMENT IN ACCORDANCE WITH AWWA C105.
4. RESTRAINING DEVICE FOR PUSH ON JOINTS, USE U.S. PIPE FIELD LOK GASKETS OR EQUAL: FOR MECHANICAL JOINT JOINTS USE WEDGE ACTION RESTRAINT DEVICE EBAA MEGALUG 2000 SERIES, OR EQUAL.
5. THIS DETAIL IS FOR PIPES 12" DIA. AND SMALLER ONLY.
6. CENTER A FULL LENGTH DIP SPOOL BELOW UTILITY. IF TOTAL LENGTH IS GREATER THAN 18 FEET ALL JOINTS BETWEEN FITTINGS SHOWN MUST BE FULLY RESTRAINED.
7. FLANGED FITTINGS ARE ALLOWED ONLY WITH DISTRICT APPROVAL.
8. ALL ELBOWS AND BENDS REQUIRE IN ACCORDANCE TO DETAIL W–6, OR AS OTHERWISE NOTED BY THE DISTRICT

CARMICHAEL WATER DISTRICT	UTILITY CROSSING		
7837 FAIR OAKS BOULEVARD CARMICHAEL, CALIFORNIA, 95608 – 6400	SCALE: NONE	APPROVED BY: GN	**W-4**
	DATE: APRIL 2024	DRAWN BY: SR	

W–04UTIL–XING_SR – 4/9/2024



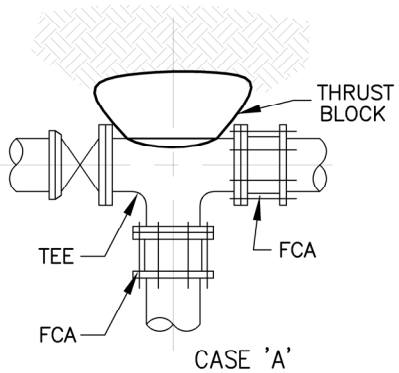
WATER MAIN ABANDONMENT AT EXISTING VALVE



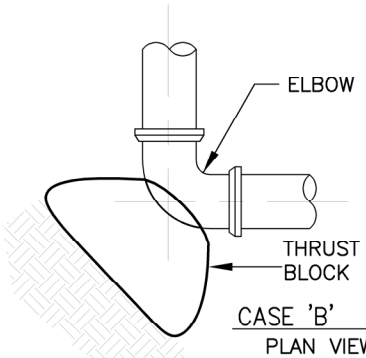
WATER MAIN ABANDONMENT

CARMICHAEL WATER DISTRICT	TYPICAL WATER MAIN ABANDONMENT		
7837 FAIR OAKS BOULEVARD CARMICHAEL, CALIFORNIA, 95608 – 6400	SCALE: NONE	APPROVED BY: MM	**W-5**
	DATE: APRIL 2021	DRAWN BY: JC	

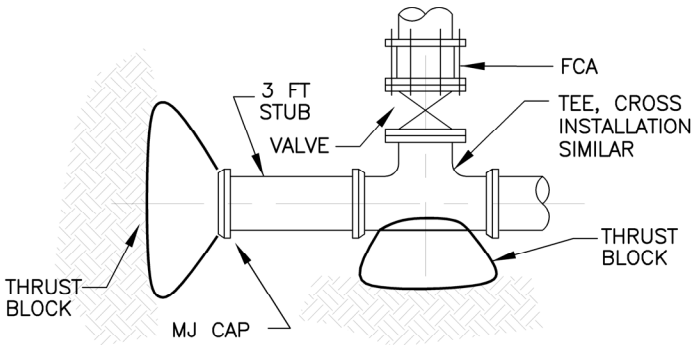
W-05ABAN-WTR_JC.DWG – 4/7/2021



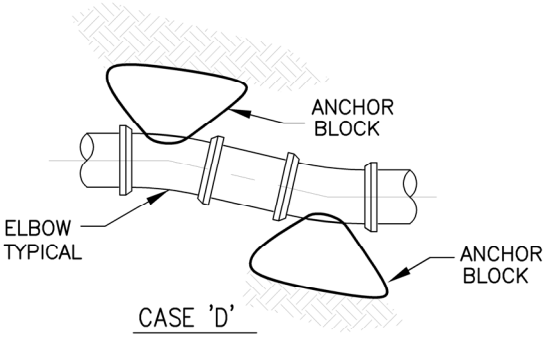
CASE 'A'
PLAN VIEW



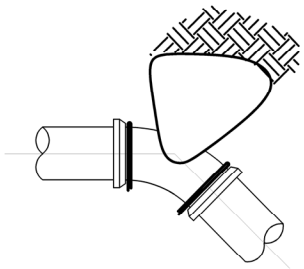
CASE 'B'
PLAN VIEW



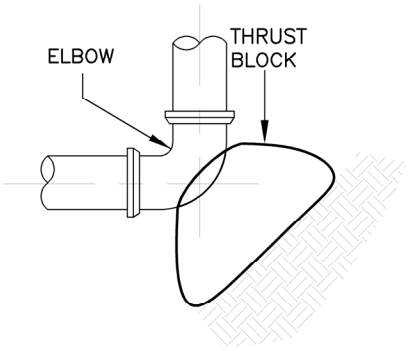
CASE 'C' TYPICAL DEAD END
ALLOWING FOR FUTURE EXTENSION
PLAN VIEW



CASE 'D'
PLAN VIEW



CASE 'E'
PROFILE VIEW
ANCHOR BLOCK
(TO PREVENT UPLIFT)



CASE 'F'
PROFILE VIEW

NOTES:

1. THRUST BLOCKS SHALL BE INSTALLED AT ALL TEES, 90° ELBOWS, AND DEAD–ENDS.
2. EACH TYPE OF THRUST OR ANCHOR BLOCK SHALL BE DESIGNED FOR EACH SPECIFIC APPLICATION AND SHALL BE SUBMITTED WITH CALCULATIONS BY AN ENGINEER LICENSED BY THE STATE OF CALIFORNIA.
3. THRUST BLOCKS SHALL BE CONSTRUCTED SO THAT MAJOR BEARING SURFACE IS IN DIRECT LINE WITH THE MAJOR FORCE CREATED BY THE PIPE OR FITTINGS.
4. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2500 PSI AT 28 DAYS.
5. A DOUBLE LAYER OF 6 MIL POLYETHYLENE FILM SHALL BE PLACED BETWEEN CONCRETE AND METAL FITTING.
6. CONCRETE SHALL BE KEPT BEHIND THE BELL OF THE FITTING.
7. SEE CARMICHAEL WATER DISTRICT CONSTRUCTION IMPROVEMENT STANDARDS RESTRAINT SYSTEM REQUIREMENTS FOR PIPE JOINTS.
8. OTHER THRUST BLOCK AND ANCHOR DETAILS WILL BE WORKED ON A CASE BY CASE BASIS WITH THE DISTRICT.

CARMICHAEL WATER DISTRICT

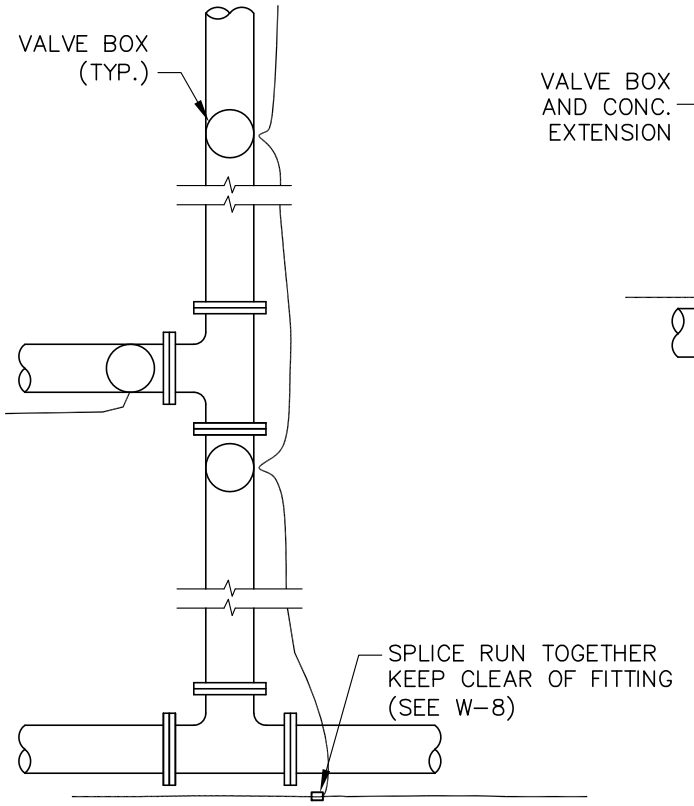
7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 – 6400

THRUST BLOCK AND ANCHOR DETAILS

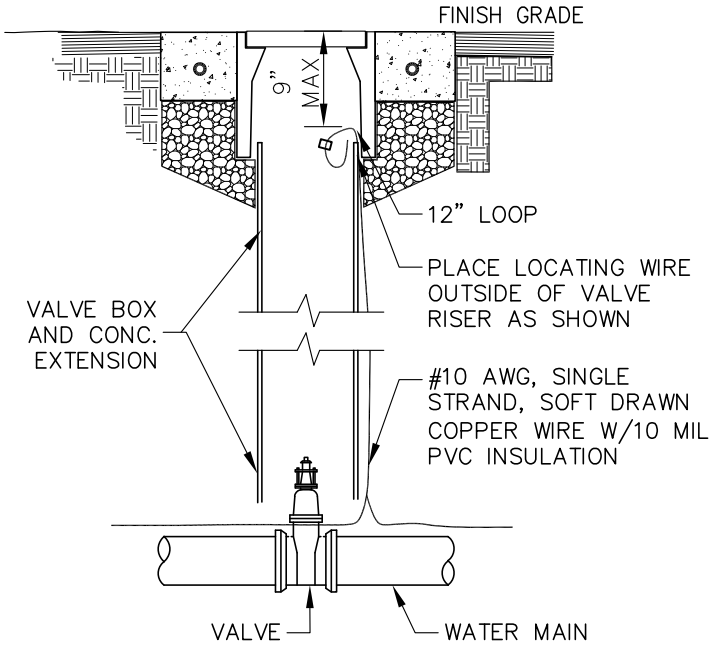
SCALE: NONE	APPROVED BY: GN
DATE: APRIL 2024	DRAWN BY: SR

W-6

W-06THRUST-BLOCK_SR - 4/9/2024



TYPICAL LAYOUT



VALVE DETAIL

NOTE:

1. WIRE SHALL BE CONTINUOUS BETWEEN VALVE BOXES, EXCEPT AS NOTED.
2. LOCATING WIRE SHALL BE LAID ON TOP OF THE WATER MAIN, AND SHALL BE TAPED TO IT OR THE POLYETHYLENE ENCASEMENT (IF THE PIPE IS DUCTILE IRON) AT 10' INTERVALS AND TAPED AT ALL FITTINGS. TAPE SHALL BE 10 MIL POLYETHYLENE.
3. CONTRACTOR SHALL CONDUCT A CONTINUITY TEST ON ALL LOCATING WIRE SPLICES.

CARMICHAEL WATER DISTRICT

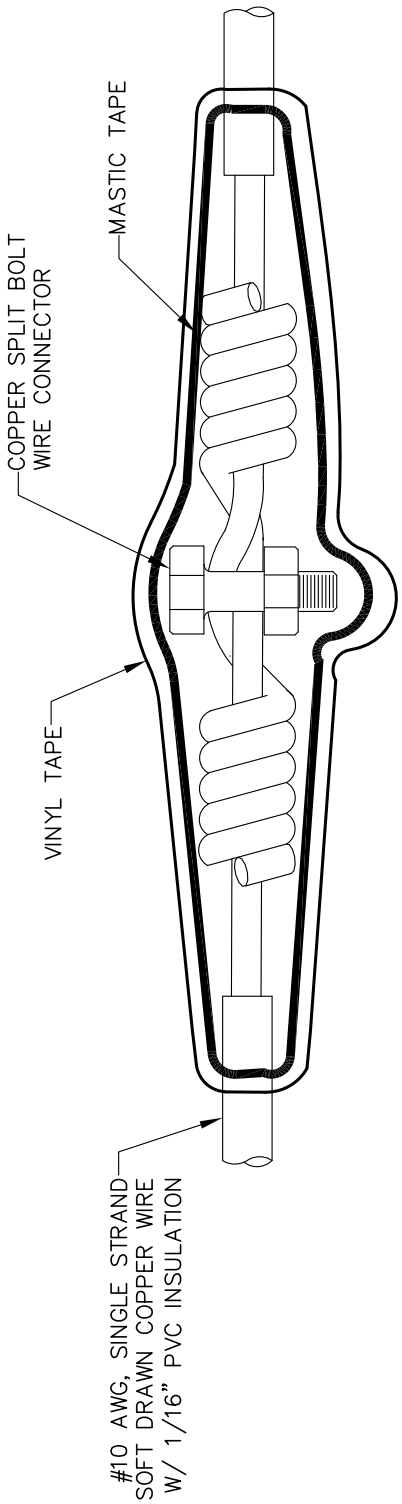
7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 – 6400

LOCATING WIRE TYPICAL LAYOUT

SCALE: NONE	APPROVED BY: SN
DATE: SEPT 2009	DRAWN BY: RN

W-7

J:\2001\012522.00\Carm-WD_std\W-07Wire-lyout.dwg, 10/27/2009 4:27pm



NOTES:

1. TWIST THE WIRE A MINIMUM OF (5) TIMES ON EACH END.
2. INSTALL SPLIT BOLT CONNECTOR.
3. COVER THE ENTIRE SPLICE WITH MASTIC TAPE WRAP
4. WRAP MASTIC WITH VINYL TAPE.

* SOLDERING MAY BE INCLUDED IN ADDITION TO THE ABOVE.

CARMICHAEL WATER DISTRICT

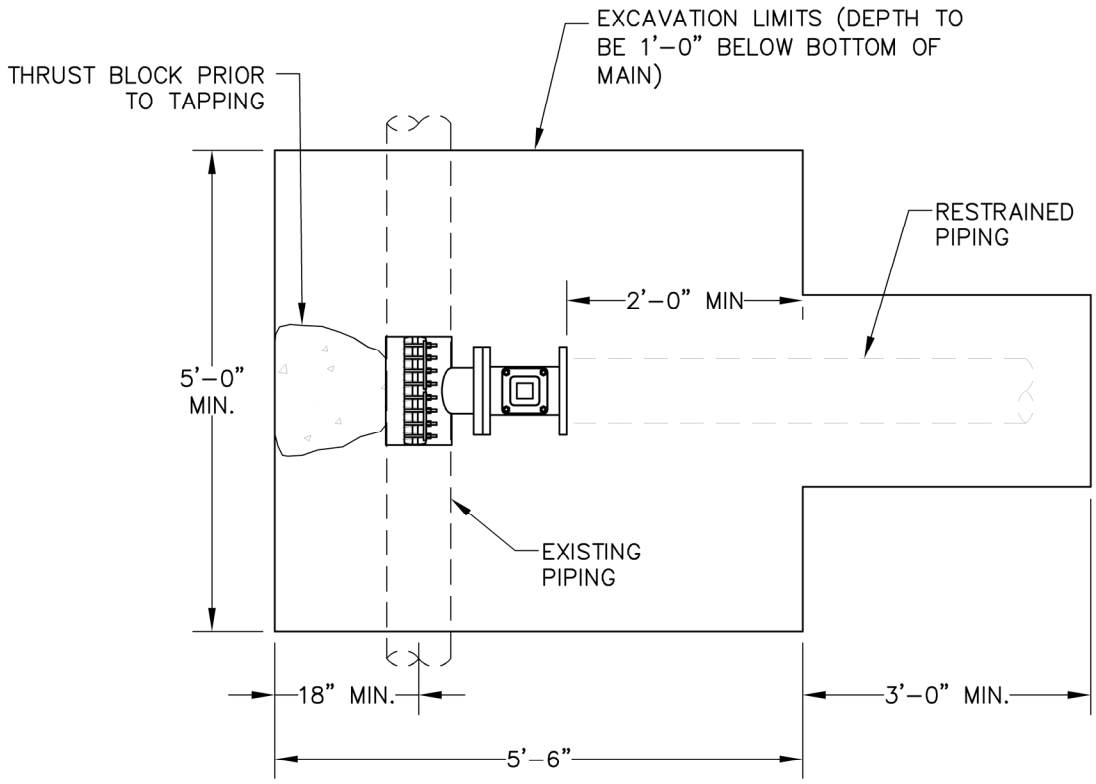
7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 – 6400

LOCATING WIRE SPLICE

SCALE: NONE	APPROVED BY: SN
DATE: SEPT 2009	DRAWN BY: RN

W-8

J:\2001\012522.00\Carm-WD_std\W-08Wire-splice.dwg, 10/27/2009 4:27pm

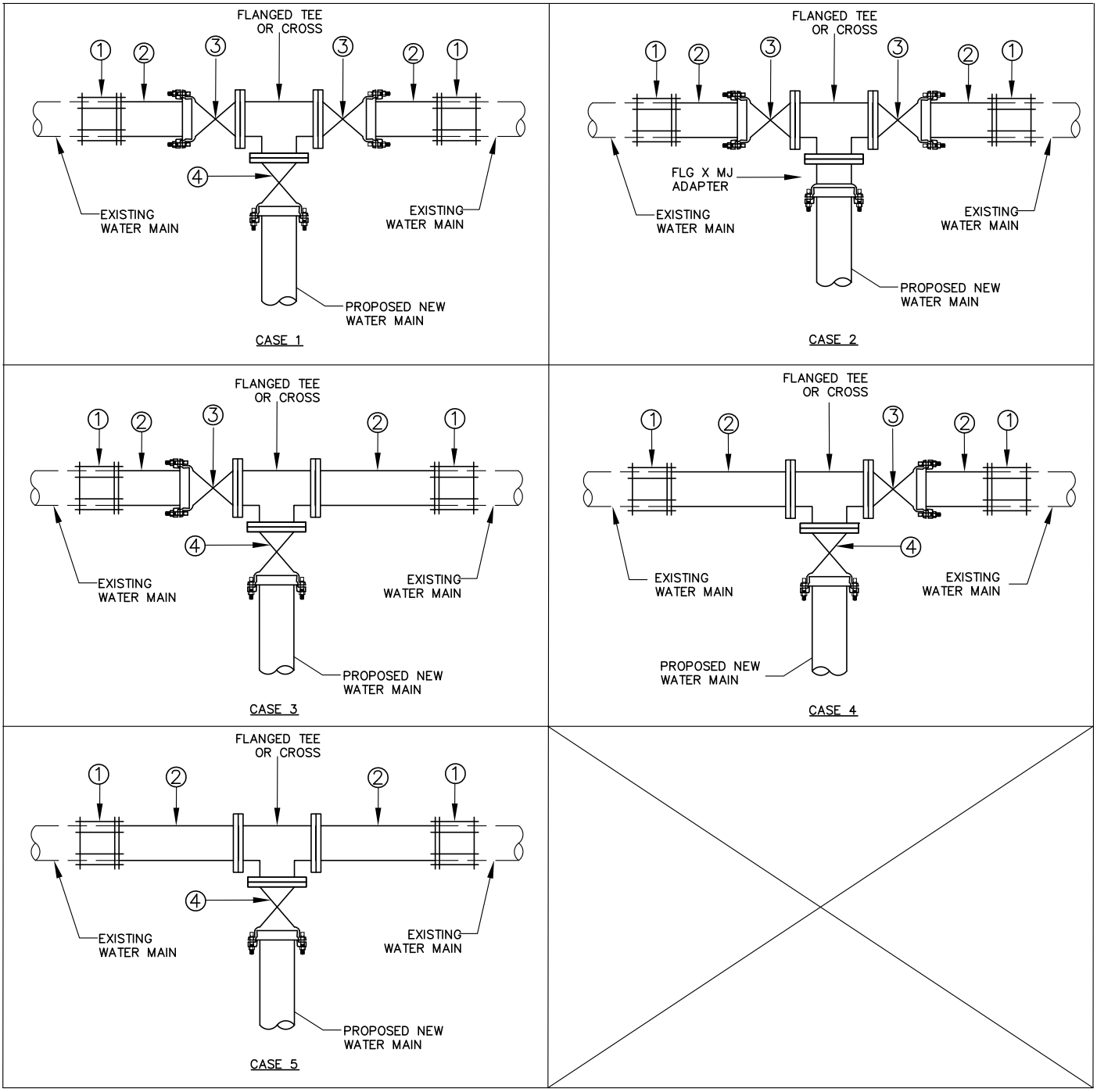


NOTE:

1. TAPPING SADDLE FOR USE WITH MAXIMUM TAP SIZE BEING ONE PIPE DIAMETER LESS THAN EXISTING PIPE DIAMETER.
2. SADDLE, COUPLINGS GATE VALVES, AND ALL NEW OR EXPOSED PIPING SHALL BE WRAPPED WITH 10 MIL. MIN POLYETHYLENE ENCASEMENT.
3. DO NOT ALLOW ANY WATER TO ENTER EXISTING PIPE. ADHERE CHLORINE TABLETS TO TEE OR CROSS, THE NUMBER OF TABLETS SHALL BE AS DIRECTED BY THE DISTRICT. SPRAY EXISTING PIPE, ALL FITTINGS AND VALVES WITH A SOLUTION OF SUPER CHLORINATED WATER JUST PRIOR TO INSTALLATION.
4. PROVIDE RESTRAINED PIPE JOINTS AS REQUIRED TO PREVENT MOVEMENT.
5. NO TAP TO BE MADE WITHIN 30 INCHES OF A JOINT OR FITTING ON CIP OF DIP.
6. TAP ON AC AND PVC PIPE SHALL BE MADE 3' MINIMUM FROM ANY COUPLING OR FITTING.
7. CONTRACTOR TO INSTALL THRUST BLOCK BEHIND AND UNDER TAPPING SLEEVE.
8. TAPPING SLEEVES SHALL BE ALL 316L STAINLESS STEEL BY SMITH BLAIR MODEL 663–316LSS OR APPROVED EQUAL; AND TAPPING VALVES SHALL BE MUELLER FLGxMJ OR APPROVED EQUAL.
9. EXCEPTION FOR THE THRUST BLOCK GIVEN TO LATERALS 2" OR LESS AND MAINS 4" OR GREATER.

CARMICHAEL WATER DISTRICT	TAPPING SADDLE TIE-IN CONNECTIONS TO EXISTING FACILITIES		
7837 FAIR OAKS BOULEVARD CARMICHAEL, CALIFORNIA, 95608 – 6400	SCALE: NONE	APPROVED BY: GN	**W-9**
	DATE: APRIL 2024	DRAWN BY: SR	

W-09SADDLETIE-IN_SR – 4/9/2024



NOTE:

1. TEE, COUPLINGS GATE VALVES, AND ALL NEW OR EXPOSED PIPING SHALL BE WRAPPED WITH 10 MIL. MIN POLYETHYLENE ENCASEMENT.
2. DO NOT ALLOW ANY WATER TO ENTER EXISTING PIPE. ADHERE CHLORINE TABLETS TO TEE OR CROSS, THE NUMBER OF TABLETS SHALL BE AS DIRECTED BY THE DISTRICT. SPRAY EXISTING PIPE, ALL FITTINGS AND VALVES WITH A SOLUTION OF SUPER CHLORINATED WATER JUST PRIOR TO INSTALLATION.
3. PROVIDE THRUST BLOCKS AND RESTRAINED PIPE JOINTS AS REQUIRED TO PREVENT MOVEMENT.

LEGEND:

(1) FLEX COUPLING (AC OR OD STEEL) OR DUCTILE IRON MJ SLEEVE (DIP OR C900)

(2) CLASS 52 DIP PUP OR FLG X PE SPOOL, 24" MIN. LENGTH

(3) FLG X MJ VALVE (FLG X FLG VALVE ACCEPTABLE WITH DISTRICT APPROVAL)

(4) FLG X MJ VALVE

CARMICHAEL WATER DISTRICT

7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 – 6400

TIE-IN CONNECTIONS TO EXISTING FACILITIES WITH TEE CONNECTION

SCALE: NONE	APPROVED BY: MM
DATE: APRIL 2021	DRAWN BY: JC

W-10

W-10TEE TIE-IN_JC.DWG – 4/7/2021

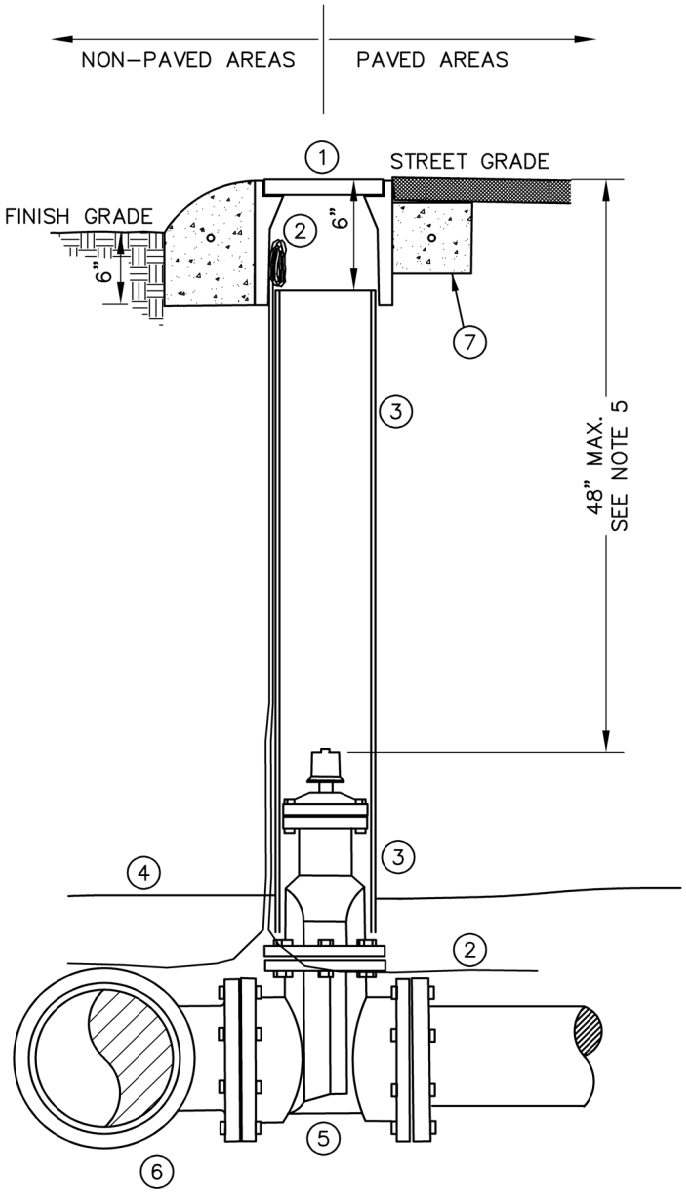
CARMICHAEL WATER DISTRICT

7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 - 6400

TYPICAL GATE VALVE & BOX INSTALLATION

DATE:	SCALE:	APPROVED BY:
SEPT 2025	NONE	GN
DRAWN BY:		
SR		

W-11



GATE VALVE BOX

NOTES:

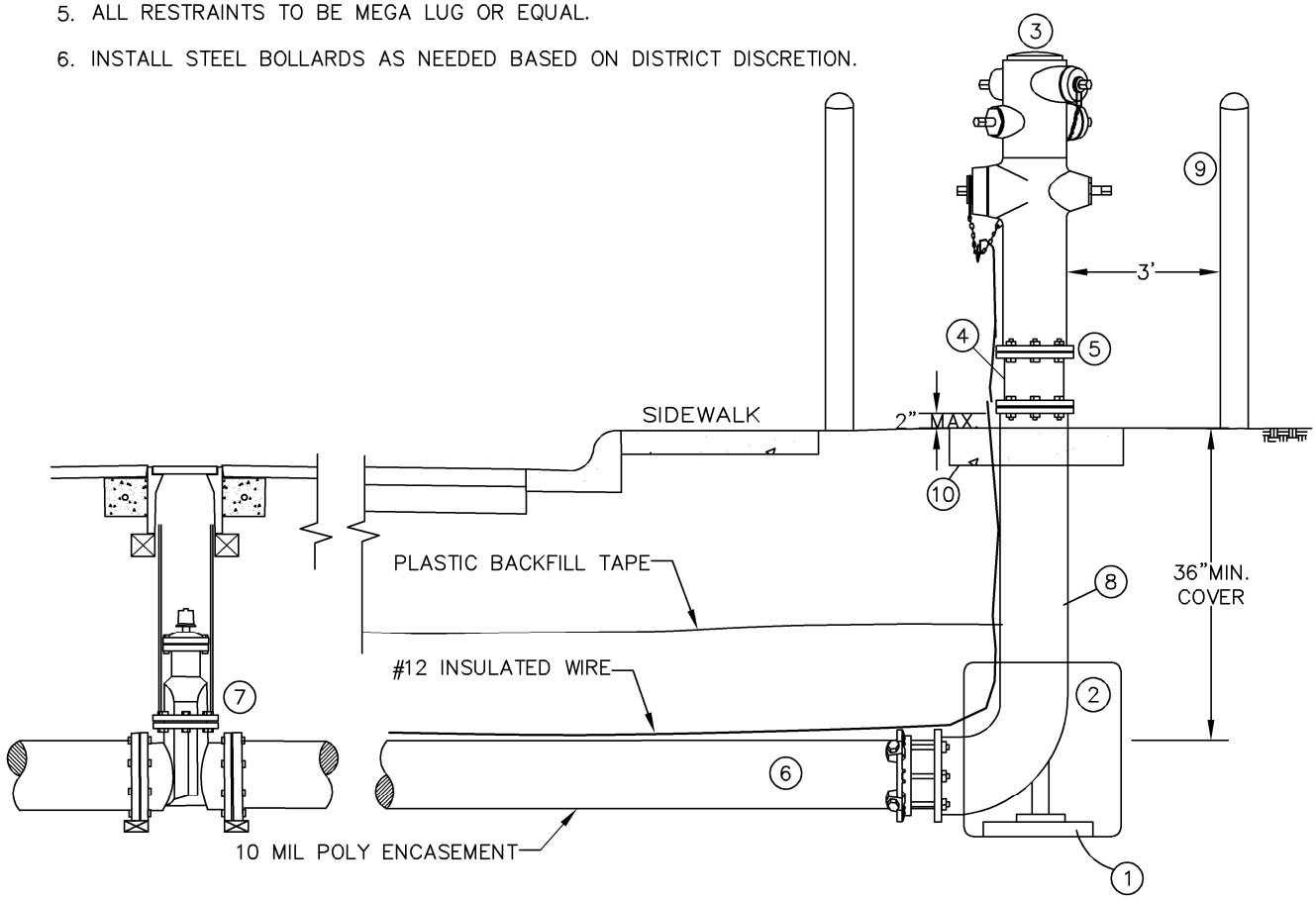
1. TRACING WIRE THROUGH VALVE BOXES SHALL BE PLACED OUTSIDE OF RISER BUT INSIDE OF VALVE BOX. TRACING WIRE SHALL BE SPLICED INSIDE THE VALVE BOX PER (W-8) AND SHALL LOOP WITHIN THE VALVE BOX WITH 18" OF SLACK WIRE.
2. ALL GATE VALVES SHALL BE CENTERED AND PLUMB IN A CONTINUOUS PIECE OF 8" PVC SDR RISER STOCK.
3. VALVE BOXES LOCATED IN A PAVED AREA SHALL BE PLACED IN A 6" X 6" CONCRETE COLLAR WITH #4 CENTERED IN SECTION. VALVE BOX AND COLLAR SHALL BE SET TO FINAL FINISH GRADE IN PAVED AREAS AND 2" ABOVE FINISHED GRADE IN NON-PAVED AREAS.
4. VALVES AND FITTINGS SHALL BE WRAPPED IN 10 MIL POLYETHYLENE.
5. INSTALL OPERATING NUT EXTENSION FOR ALL INSTALLATIONS GREATER THAN 60" FROM FINISHED GRADE.

MATERIALS

1. POLYMER CONCRETE G5 VALVE BOX & LID HUBBELL (OR EQUAL)
2. #10 INSULATED LOCATING WIRE OUTSIDE RISER
3. 8" RISER STOCK
4. PLASTIC BACKFILL TAPE
5. GATE VALVE
6. DUCTILE IRON TEE
7. CONCRETE COLLAR (SEE NOTES)

NOTES:

1. FITTINGS SHALL BE DUCTILE IRON
2. VALVES AND FITTINGS SHALL BE WRAPPED IN 10 MIL. OR THICKER POLYETHYLENE.
3. VALVE SHALL BE A MINIMUM OF 12' FROM HYDRANT OR AT DISTRICT'S DISCRETION. USE APPROVED RESTRAINING JOINTS FROM VALVE TO HYDRANT BURY.
4. A MINIMUM 3 FOOT CLEAR AREA SHALL BE MAINTAINED AROUND THE FIRE HYDRANT.
5. ALL RESTRAINTS TO BE MEGA LUG OR EQUAL.
6. INSTALL STEEL BOLLARDS AS NEEDED BASED ON DISTRICT DISCRETION.



MATERIALS:

1. BLOCKING
2. CONCRETE SUPPORT AGAINST UNDISTURBED SOIL
3. CLOW 960 OR EQUAL – YELLOW
4. BREAK OFF CHECK VALVE (HYDRANT GUARD OR EQUAL)
5. BREAKAWAY BOLTS (BREAK POINT) PER CHECK VALVE MANUFACTURER
6. 6" DUCTILE IRON PIPE WITH MEGALUG OR EQUAL
7. 6" GATE VALVE PER (W–11)
8. FLANGE x MJ BURY
9. SCH. 40 STEEL BOLLARDS PER (W–14)
10. 3' SQUARE x 4" THICK CONCRETE HOLD BURY OR AT THE DISTRICT'S DISCRETION

CARMICHAEL WATER DISTRICT

7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 – 6400

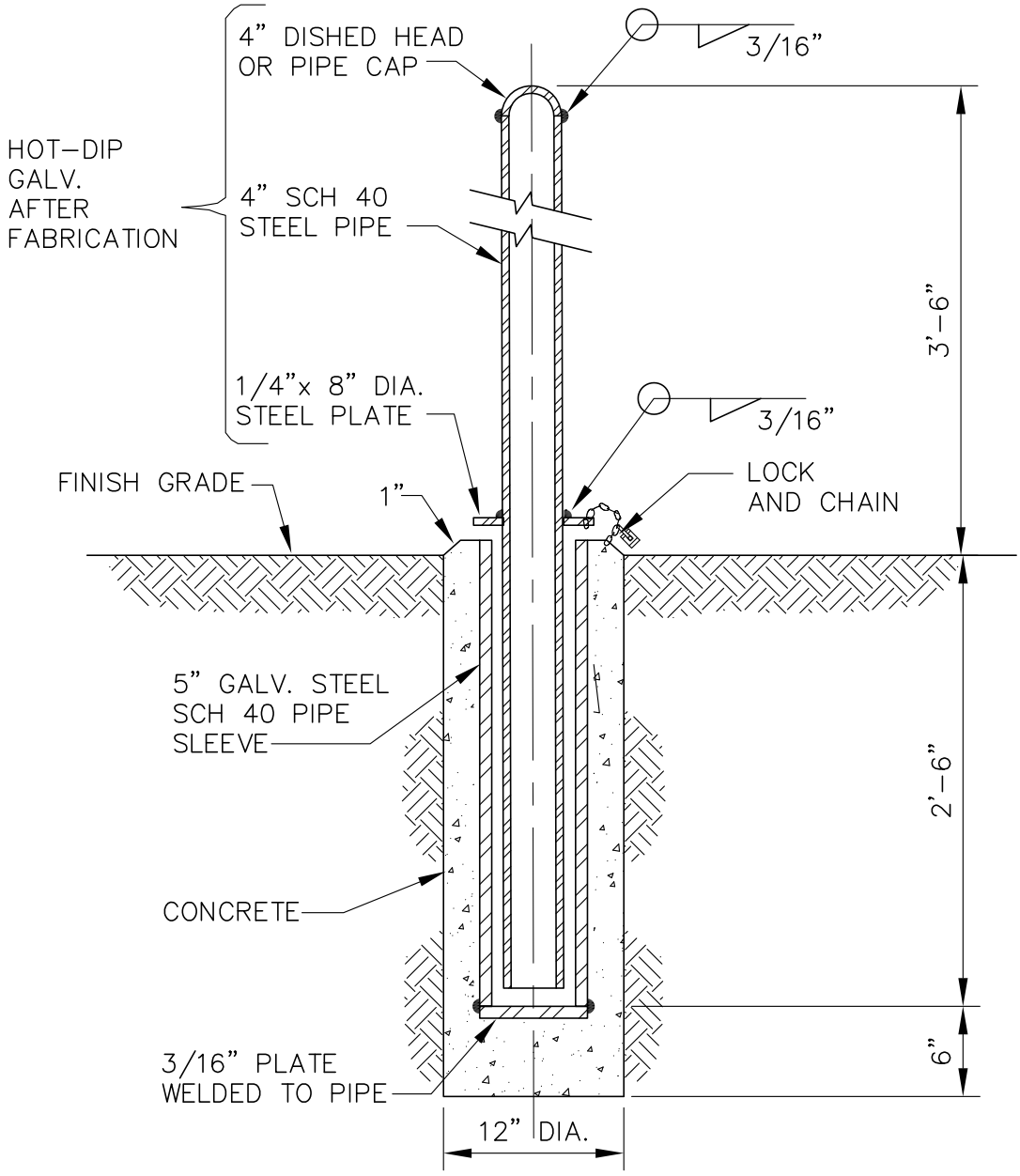
FIRE HYDRANT ASSEMBLY

WET BARREL

SCALE: NONE	APPROVED BY: GN
DATE: APRIL 2025	DRAWN BY: SR

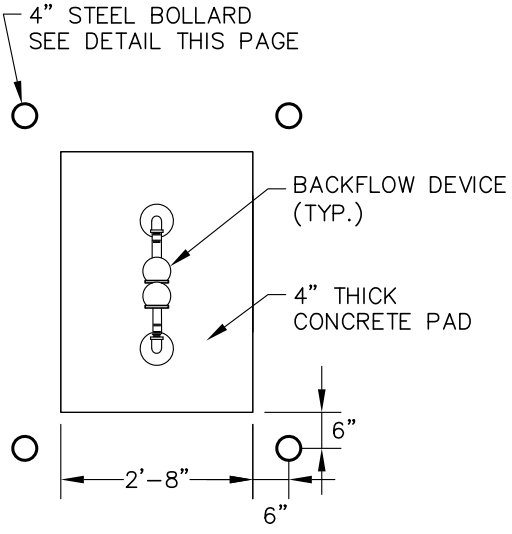
W-12

W-12FH-WBASSEMBLY_SR – 4/15/2025

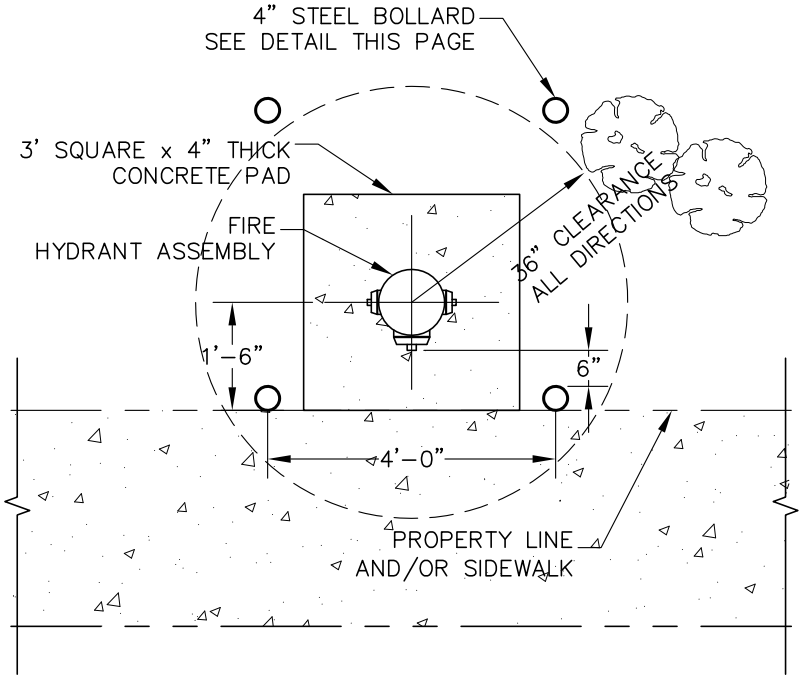


CARMICHAEL WATER DISTRICT	4" DIAMETER STEEL BOLLARD REMOVABLE		
7837 FAIR OAKS BOULEVARD CARMICHAEL, CALIFORNIA, 95608 – 6400	SCALE: NONE	APPROVED BY: MM	**W-13**
	DATE: APRIL 2021	DRAWN BY: JC	

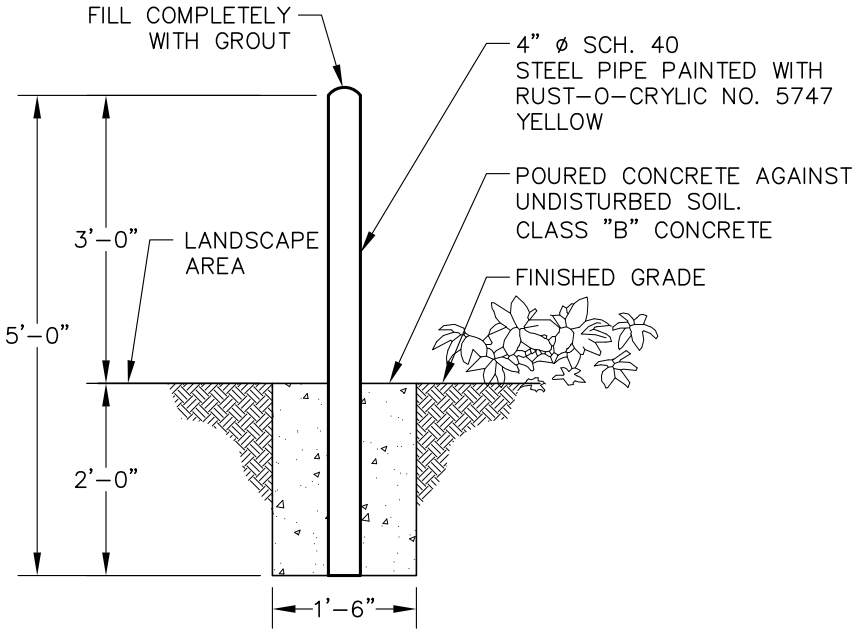
W-13RMVBBOLLARD_JC.DWG – 4/5/2021



TYPICAL BOLLARD INSTALLATION
AT BACKFLOW PREVENTION DEVICE



TYPICAL BOLLARD INSTALLATION
AT FIRE HYDRANT



4" STEEL BOLLARD TYPICAL

CARMICHAEL WATER DISTRICT 7837 FAIR OAKS BOULEVARD CARMICHAEL, CALIFORNIA, 95608 – 6400	4" DIAMETER STEEL BOLLARD (AS NEEDED BASED ON DISTRICT DISCRETION)	
	SCALE: NONE	APPROVED BY: MM
	DATE: APRIL 2021	DRAWN BY: JC

W-14

W-14BOLLARD_JC.DWG – 4/5/2021

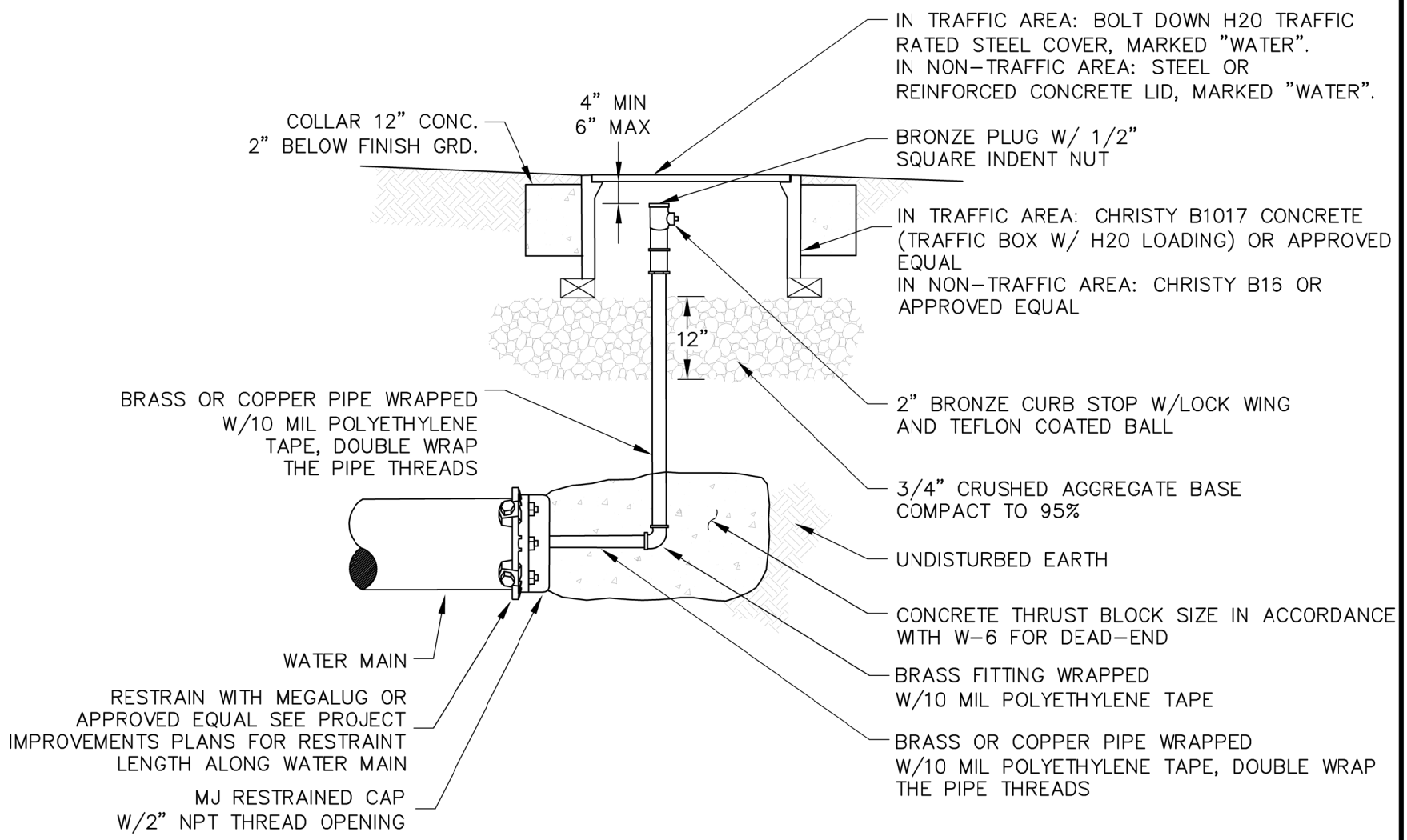
CARMICHAEL WATER DISTRICT

7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 – 6400

2" BLOW-OFF ASSEMBLY

DATE:	SCALE:	APPROVED BY:
MARCH 2024	NONE	GN
DRAWN BY:		
SR		

W-15

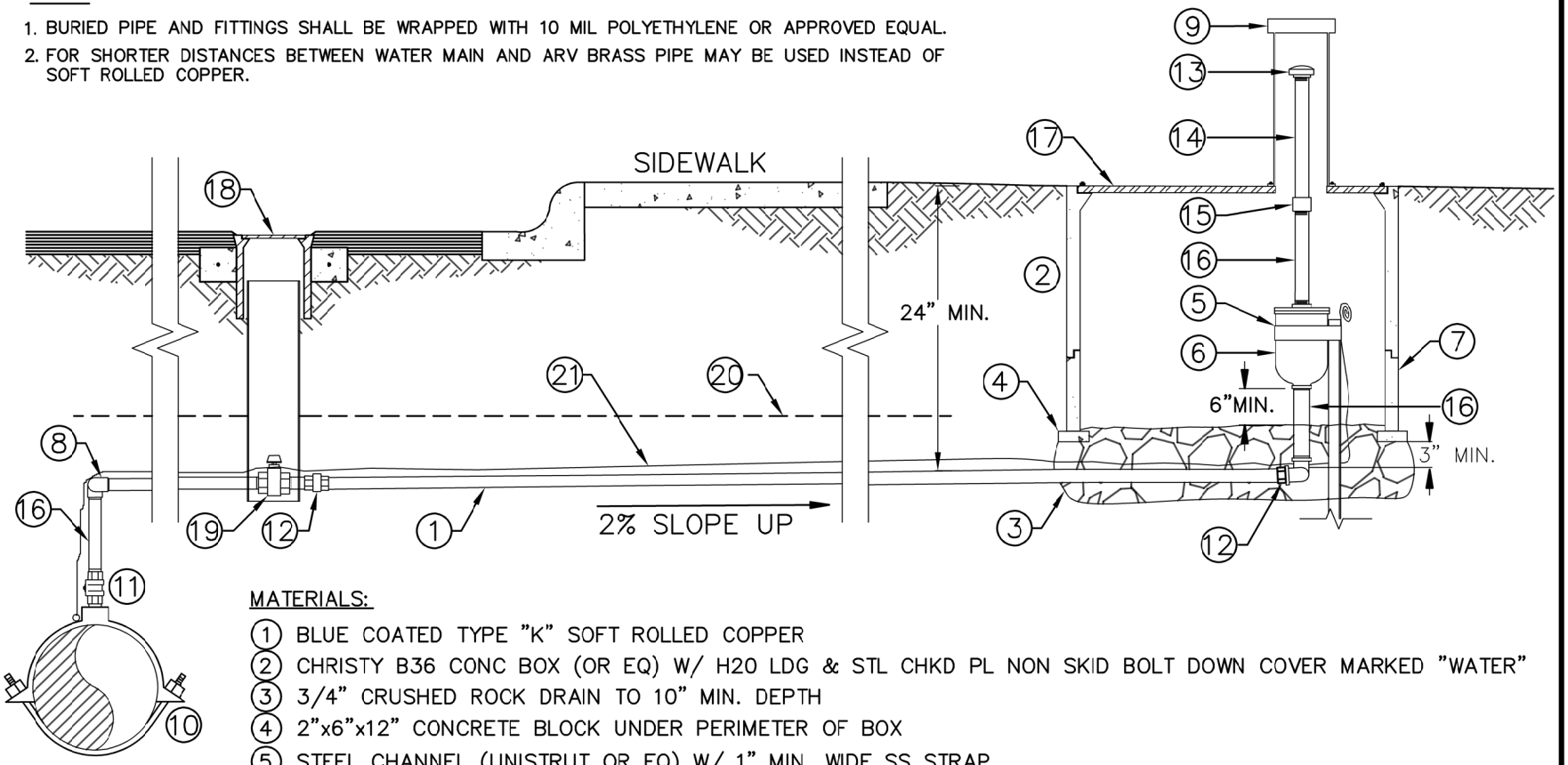


NOTE:

1. BACKFILL WITH 3/4" CRUSHED AGGREGATE BASE COMPACT TO 95%.

NOTES:

1. BURIED PIPE AND FITTINGS SHALL BE WRAPPED WITH 10 MIL POLYETHYLENE OR APPROVED EQUAL.
2. FOR SHORTER DISTANCES BETWEEN WATER MAIN AND ARV BRASS PIPE MAY BE USED INSTEAD OF SOFT ROLLED COPPER.



MATERIALS:

1. BLUE COATED TYPE "K" SOFT ROLLED COPPER
2. CHRISTY B36 CONC BOX (OR EQ) W/ H20 LDG & STL CHKD PL NON SKID BOLT DOWN COVER MARKED "WATER"
3. 3/4" CRUSHED ROCK DRAIN TO 10" MIN. DEPTH
4. 2"x6"x12" CONCRETE BLOCK UNDER PERIMETER OF BOX
5. STEEL CHANNEL (UNISTRUT OR EQ) W/ 1" MIN. WIDE SS STRAP
6. CRISPIN COMBINATION AIR/VACUUM VALVE OR APPROVED EQUAL
7. CHRISTY EXTENSION SPOOL (IF NECESSARY) OR EQUAL
8. SWING JOINT (2 – 90° FITTINGS)
9. PLACER WATERWORKS AV18–M (OR EQ) AIR VENT ENCL. BOLTED DOWN
10. BRONZE DOUBLE STRAP SERVICE SADDLE WITH ZINC COATED NUTS AND WASHERS FOR CATHODIC PROTECTION
11. CORPORATION STOP (SEE NOTE 7) SIZED PER ARV OUTLET
12. COMPRESSION JOINT
13. NPT MUSHROOM VENT CAP W/ SS SCREEN. BOTTOM VENTING (SIZED PER ARV OUTLET)
14. NPT SCH 80 PVC PIPE (SIZED PER ARV OUTLET)
15. NPT PVC COUPLING PLACED 1/2" BELOW BOX LID
16. BRASS NIPPLE (SIZE PER ARV OUTLET)
17. PLACER WATERWORKS ARV COVER PW/218 – B36 (OR EQUAL) BOLTED DOWN
18. VALVE BOX W/ 6" X 6" CONC COLLAR WITH #4 REBAR AND 8" SDR RISER PIPE
19. NPT GATE VALVE (1" OR 2" TO MATCH ARV INLET SIZE)
20. 12" WIDE WARNING TAPE
21. #10 AWG LOCATING WIRE

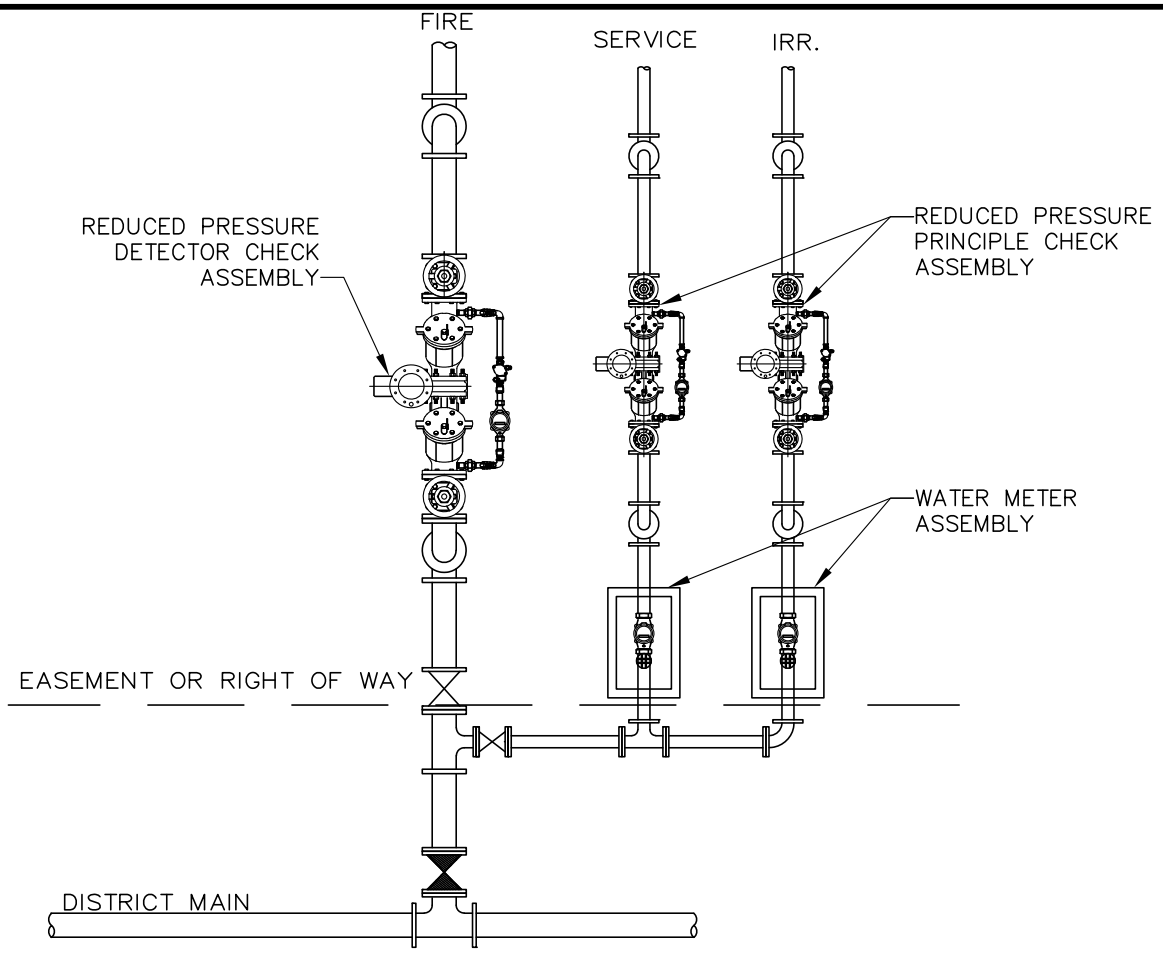
1" & 2" AIR RELEASE VALVE ASSEMBLY

W-16

SCALE: NONE	APPROVED BY: GN
DATE: JULY 2025	DRAWN BY: SR

CARMICHAEL WATER DISTRICT

7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 – 6400



NOTES:

1. BACKFLOW ASSEMBLY SHALL BE TESTED AND ACCEPTED, PRIOR TO PERMITTING SERVICE. METERS WILL BE INSTALLED BY DISTRICT CREWS. WATER MAY NOT BE DRAWN PRIOR TO TESTING OF THE BACKFLOW DEVICE BY THE DISTRICT.
2. PROVIDE A MINIMUM 3 FOOT SEPARATION BETWEEN BACKFLOW DEVICES IN PARALLEL.
3. RESTRAIN ENTIRE MANIFOLD WITH APPROVED RESTRAINT SYSTEMS.
4. TAPS SHALL BE MADE SUCH THAT NO DEAD END LINES RESULT.
5. ALL LINES 3" AND LARGER SHALL BE DIP.
6. PROVIDE A CONCRETE PAD WITHIN THE LIMITS OF THE BACKFLOW MANIFOLD WITH POSITIVE DRAINAGE AND A 2% MAX. SLOPE PER DRAWING W–19 AND W–20 AND INSTALL PIPE BOLLARDS PER DRAWING W–14.
7. IN A BACKFLOW MANIFOLD CONFIGURATION THAT INCLUDES DOMESTIC AND IRRIGATION SERVICES, THE IRRIGATION SERVICE TAP SHALL BE DOWNSTREAM OF THE DOMESTIC SERVICE TAP.
8. ALL NON RESIDENTIAL SERVICES AND RESIDENTIAL SERVICES WITH FIRE SPRINKLERS REQUIRE REDUCED PRESSURE BACKFLOW PROTECTION DEVICES.
9. PROVIDE A 3' MINIMUM CLEARANCE FROM TOE OR TOP OF ANY SLOPE. NO SLOPES GREATER THAN 2:1 ADJACENT TO BACKFLOW MANIFOLD. IF THE ABOVE CRITERIA CAN NOT BE MET, A RETAINING WALL IS REQUIRED. THE RETAINING WALL SHALL BE CONSTRUCTED OF CONCRETE OR MASONRY ONLY.
10. PROVIDE CURB STOPS AS REQUIRED PER THESE STANDARDS.
11. METER LID SHALL BE STENCILED WITH THE NUMBER ADDRESS IT SERVICES. USE WHITE ENAMEL PAINT AND 2" TALL STENCILING.
12. A METER BYPASS WITH A LOCKING CURB STOP OR LOCKING VALVE SHALL BE REQUIRED FOR MULTI–FAMILY DOMESTIC SERVICES OR WHERE REQUIRED.

CARMICHAEL WATER DISTRICT

7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 – 6400

BACKFLOW MANIFOLD SCHEMATIC & BACKFLOW DEVICE GENERAL NOTES

SCALE: NONE	APPROVED BY: MM
DATE: APRIL 2021	DRAWN BY: JC

W-17

W-17BK-FLO-SCHM_JC.DWG – 4/5/2021

CARMICHAEL WATER DISTRICT

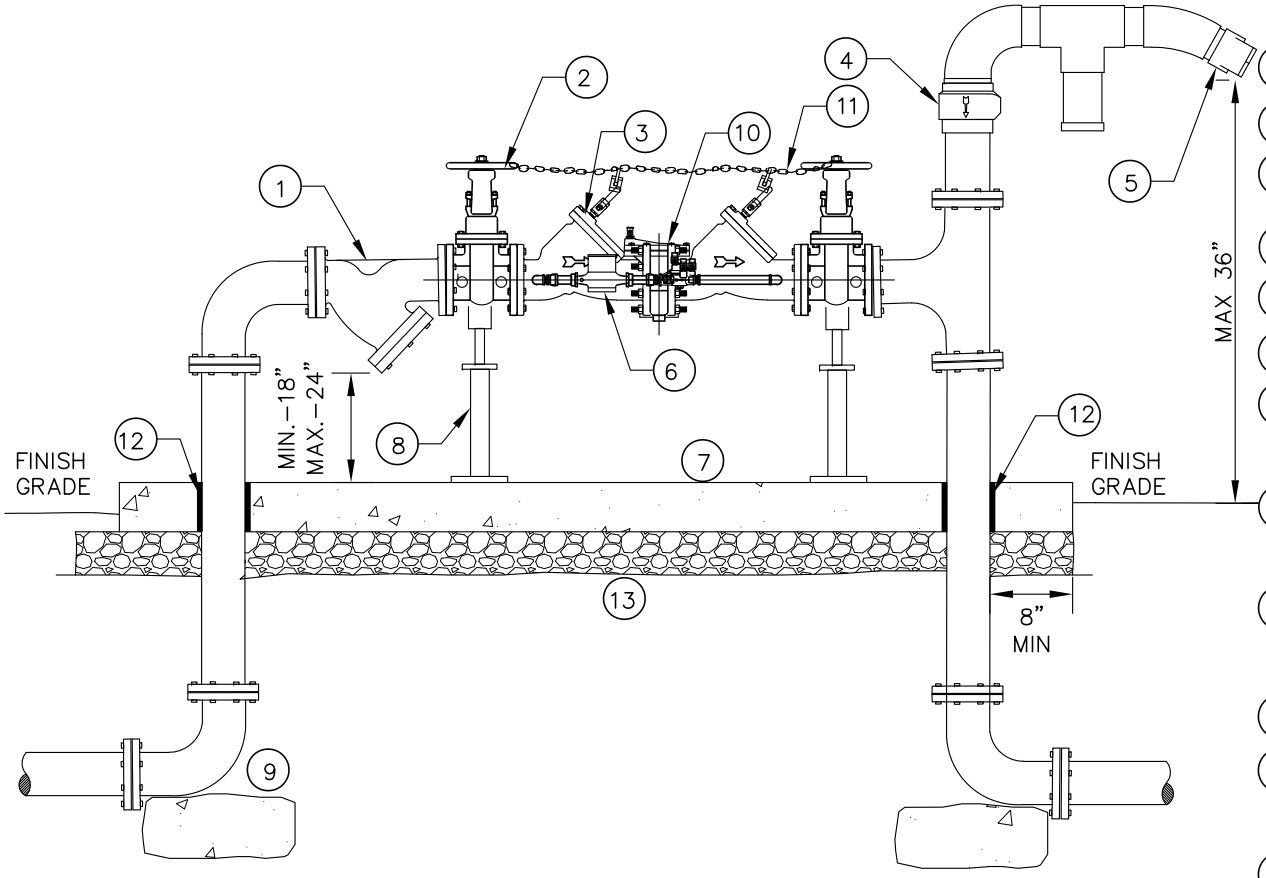
7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 - 6400

FIRE PROTECTION ASSEMBLY

(REDUCED PRESSURE DETECTOR CHECK)

DATE: APRIL 2021	SCALE: NONE	APPROVED BY: MM
DRAWN BY: JC		

W-18



1. FLANGED "Y" TYPE STRAINER
2. OS & Y GATE VALVE (TYP.)
3. REDUCED PRESSURE DETECTOR ASSEMBLY
4. CHECK VALVE
5. SIAMESE 45° FDC
6. WATER METER
7. 36" WIDE x 4" THICK REINFORCED CONCRETE SLAB OF VARIABLE LENGTH
8. SUPPORTS 2-TYP. SHALL BE BOLTED DOWN WITH A MINIMUM OF TWO BOLTS EACH
9. PRECAST CONCRETE SUPPORT PAD (14" SQUARE x 6" THICK)
10. PRESSURE RELIEF VALVE
11. 1/4" NON-CASE HARDENED CHAIN WITH LOCK BETWEEN VALVES
12. EXPANSION FILLER
13. 4" THICK, 3/4" AB

NOTES:

1. NO WATER SHALL BE DRAWN THROUGH THE BACKFLOW DEVICE UNTIL IT HAS BEEN TESTED AND APPROVED BY THE DISTRICT.
2. THE BACKFLOW DEVICE SHALL BE INSULATED WITH A DISTRICT APPROVED FREEZE PROTECTION BAG.
3. FITTINGS SHALL BE FLANGE BY FLANGE OR RESTRAINED.
4. PIPE AND FITTINGS SHALL BE DUCTILE IRON.
5. BURIED PIPE AND FITTINGS SHALL BE WRAPPED AND SEALED WITH 10 MIL POLYETHYLENE AND VINYL TAPE.
6. A MINIMUM OF FOUR (4) 4" BOLLARDS PER DRAWING W-14 SHALL BE LOCATED AT EACH BACKFLOW ASSEMBLY.

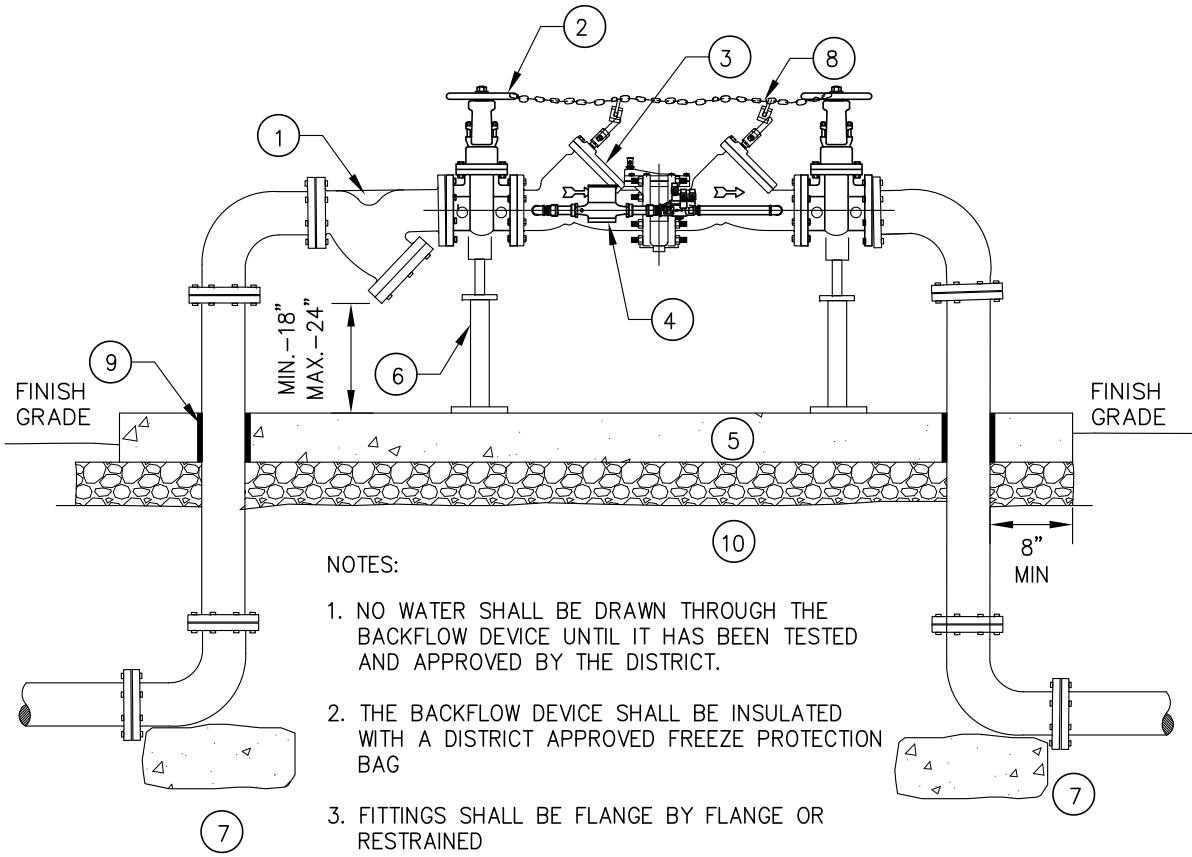
CARMICHAEL WATER DISTRICT

7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 - 6400

ON-SITE FIRE PROTECTION

DATE: APRIL 2021	SCALE: NONE	APPROVED BY: MM
DRAWN BY: JC		

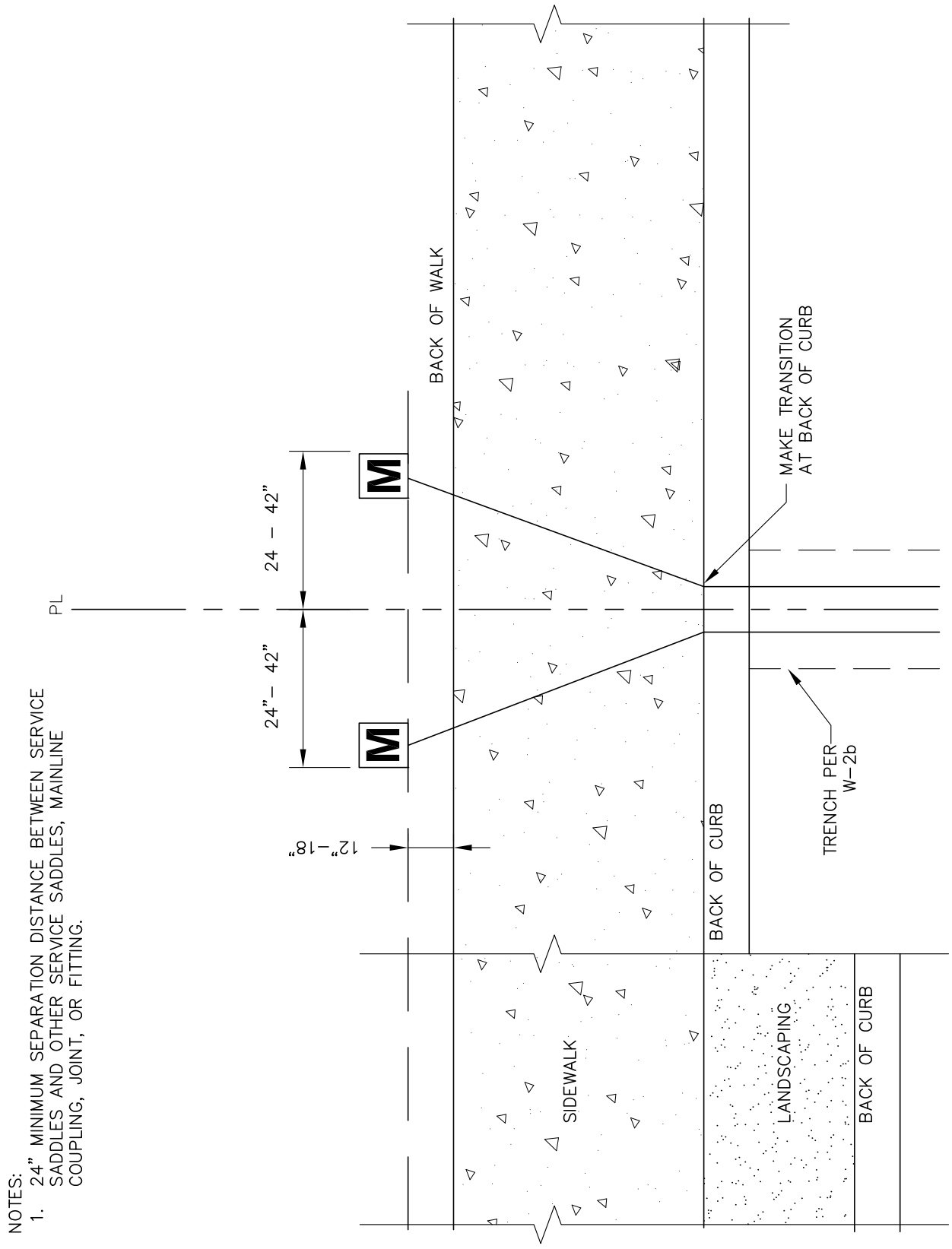
W-19



1. FLANGED "Y" TYPE STRAINER
2. OS & Y GATE VALVE (TYP.)
3. REDUCED PRESSURE DETECTOR CHECK ASSEMBLY
4. WATER METER
5. 36" WIDE x 4" THICK REINFORCED CONCRETE SLAB. VARIABLE LENGTH
6. SUPPORTS 2-TYP. SHALL BE BOLTED DOWN WITH A MINIMUM OF TWO BOLTS EACH
7. PRECAST CONCRETE SUPPORT PAD (14" SQUARE x 6" THICK)
8. 1/4" NON-CASE HARDENED CHAIN WITH LOCK BETWEEN VALVES
9. EXPANSION FILLER
10. 4" THICK, 3/4" AB

NOTES:

1. NO WATER SHALL BE DRAWN THROUGH THE BACKFLOW DEVICE UNTIL IT HAS BEEN TESTED AND APPROVED BY THE DISTRICT.
2. THE BACKFLOW DEVICE SHALL BE INSULATED WITH A DISTRICT APPROVED FREEZE PROTECTION BAG
3. FITTINGS SHALL BE FLANGE BY FLANGE OR RESTRAINED
4. PIPE AND FITTINGS SHALL BE DUCTILE IRON
5. PIPE AND FITTINGS SHALL BE WRAPPED AND SEALED WITH 10 MIL POLYETHYLENE AND VINYL TAPE
6. A MINIMUM OF FOUR (4) 4" BOLLARDS PER W-14 SHALL BE LOCATED AT EACH BACKFLOW ASSEMBLY



NOTES:
1. 24" MINIMUM SEPARATION DISTANCE BETWEEN SERVICE SADDLES AND OTHER SERVICE SADDLES, MAINLINE COUPLING, JOINT, OR FITTING.

CARMICHAEL WATER DISTRICT

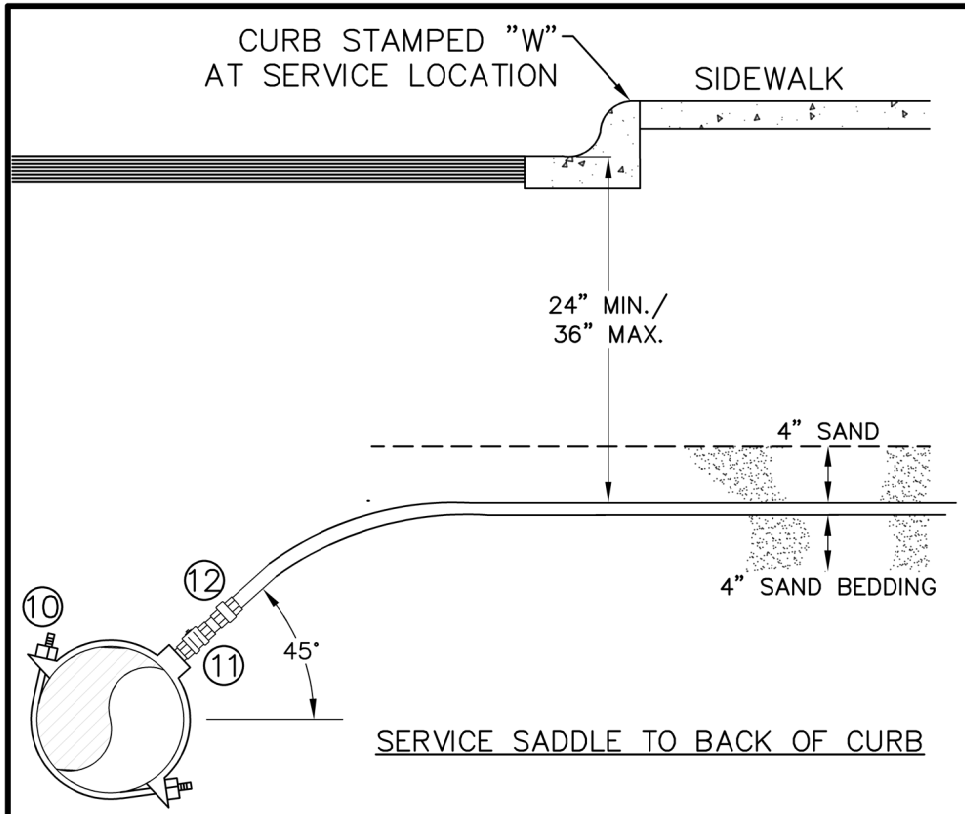
7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 – 6400

WATER SERVICE BOX LOCATION

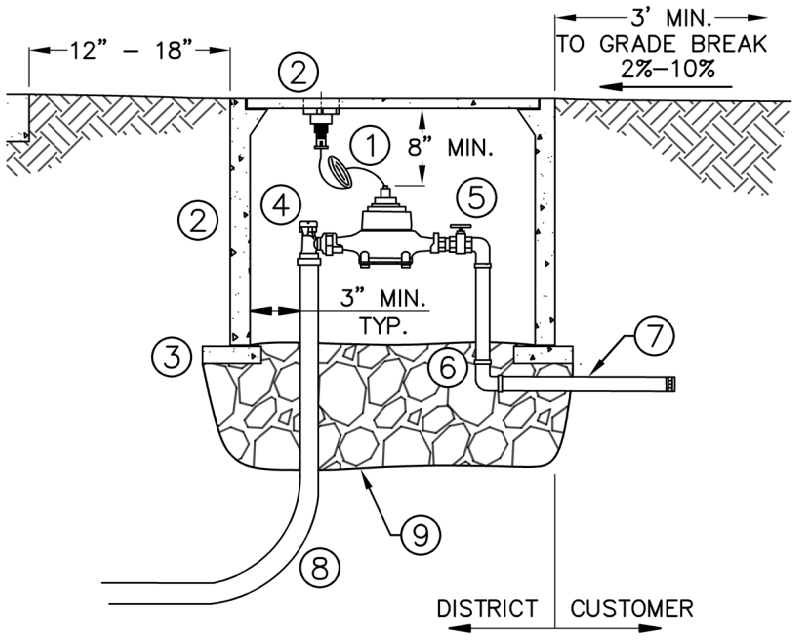
SCALE: NONE	APPROVED BY: MM
DATE: APRIL 2021	DRAWN BY: JC

W-20

W-20SRVC-BX-LOC_JC.DWG – 4/6/2021



SERVICE SADDLE TO BACK OF CURB



BACK OF WALK TO METER BOX

MATERIALS:

1. METER (PURCHASED THROUGH DISTRICT)
2. B30 METER BOX WITH B30 LID WITH 2" NEPTUNE PROBE HOLE (SEE NOTES 4 AND 5)
3. 2"x6"x12" CONCRETE BLOCKS AT PERIMETER OF BOX
4. ANGLE CURB STOP W/ LOCK WING (FIP X METER SWIVEL NUT)
5. METER SPUD WITH (WHEEL) GATE VALVE AND STREET 90 ELL
6. BRASS NIPPLE AND 90 ELBOW
7. BRASS NIPPLE TO 8" MIN. OUT OF BOX TO CUSTOMER
8. AGENCY COPPER LATERAL SWEEP INTO BOX
9. 3/4" CRUSHED ROCK DRAIN TO 12" DEPTH
10. BRONZE DOUBLE STRAP SERVICE SADDLE WITH ZINC COATED NUTS AND WASHERS FOR CATHODIC PROTECTION
11. CORPORATION STOP (SEE NOTE 7)
12. COMPRESSION JOINT

NOTES:

1. WATER METERS AND TOUCH READ DEVICES SHALL BE PURCHASED THROUGH THE DISTRICT. PURCHASE INCLUDES INSTALLATION.
2. ALL BURIED PIPE AND FITTINGS SHALL BE WRAPPED WITH 10 MIL POLYETHYLENE OR APPROVED EQUAL.
3. SERVICE LINES TO BE BLUE COATED TYPE "K" SOFT ROLLED COPPER.
4. FOR BOX LOCATED IN ROADWAY, DRIVEWAY OR SIDEWALK THE BOX AND LID MUST BE POLYMER CONCRETE TIER 22 (HUBBELL OR EQ.). FOR BOX LOCATED IN LANDSCAPE THE BOX AND LID SHALL BE POLY CONC TIER 8 (HUBBELL OR EQ.).
5. NEPTUNE ERT HOLE SHALL BE RECESSED.
6. PACK JOINTS MAY NOT BE USED.
7. FOR TAPS MADE ON DUCTILE IRON PIPE ALL CORPORATION STOPS AND GATE VALVES SHALL BE DIELECTRIC.
8. FOR TAPS MADE ON OD STEEL PIPE USE FULL CIRCLE REPAIR CLAMP.
9. TAPS, SERVICE SADDLES, AND FITTINGS SHALL BE SEPARATED BY A MINIMUM OF 24 INCHES.
10. AT TAP TAPE AND POLYETHYLENE WRAP ALL EXPOSED FITTINGS.

STANDARD 1" SERVICE CONNECTION

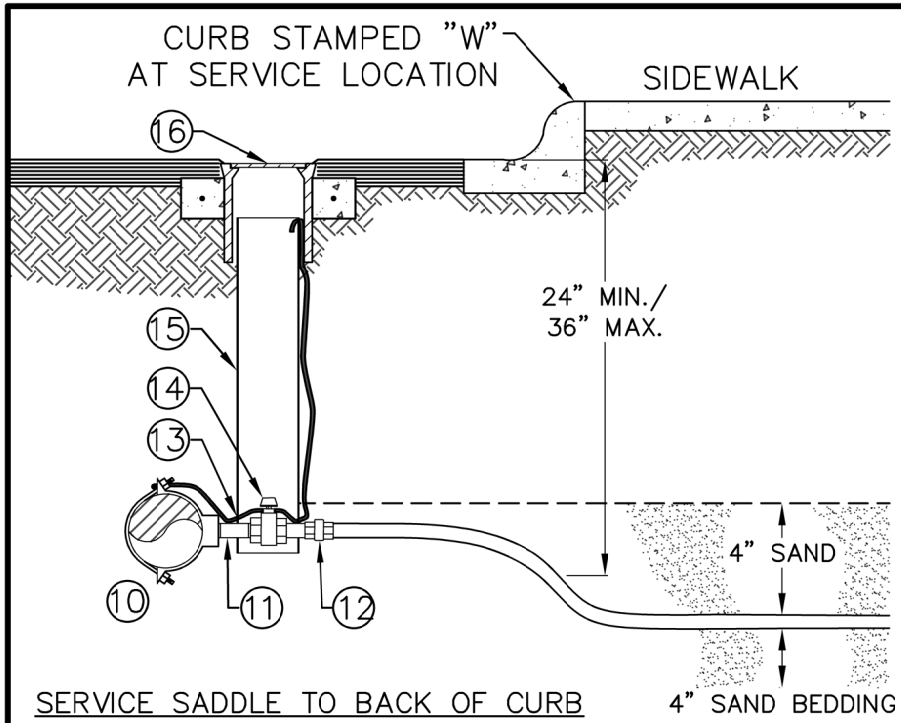
W-21

SCALE: NONE | APPROVED BY: GN

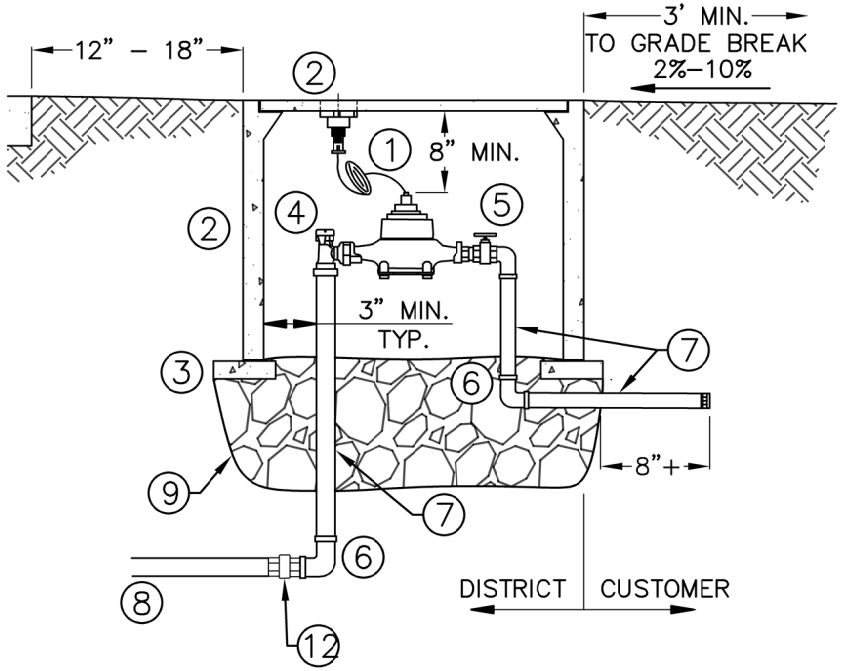
DATE: JULY 2025 | DRAWN BY: SR

CARMICHAEL WATER DISTRICT

7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 – 6400



SERVICE SADDLE TO BACK OF CURB



BACK OF WALK TO METER BOX

MATERIALS:

1. METER (PURCHASED THROUGH DISTRICT)
2. B36 METER BOX WITH B36 LID WITH 2" NEPTUNE PROBE HOLE (SEE NOTES 4 AND 5)
3. 2"x6"x12" CONCRETE BLOCKS AT PERIMETER OF BOX
4. ANGLE CURB STOP W/ LOCK WING (FIP X METER SWIVEL NUT)
5. METER SPUD WITH (WHEEL) GATE VALVE AND STREET 90 ELL
6. BRASS 90 ELBOW
7. BRASS NIPPLE
8. AGENCY COPPER LATERAL
9. 3/4" CRUSHED ROCK DRAIN TO 12" DEPTH
10. BRONZE DOUBLE STRAP SERVICE SADDLE WITH ZINC COATED NUTS AND WASHERS FOR CATHODIC PROTECTION
11. 2"x6" NPT BRASS NIPPLE
12. 2" MIPxCOMP COUPLING
13. #10 AWG LOCATING WIRE
14. 2" NPT GATE VALVE W/ 2" SQ. OPERATING NUT (SEE NOTE 7)
15. 8" SDR RISER PIPE
16. G5 VALVE BOX WITH 6"x6" CONC COLLAR W/ #4 REBAR

NOTES:

1. WATER METERS AND TOUCH READ DEVICES SHALL BE PURCHASED THROUGH THE DISTRICT. PURCHASE INCLUDES INSTALLATION.
2. ALL BURIED PIPE AND FITTINGS SHALL BE WRAPPED WITH 10 MIL POLYETHYLENE OR APPROVED EQUAL.
3. SERVICE LINES TO BE BLUE COATED TYPE "K" SOFT ROLLED COPPER.
4. FOR BOX LOCATED IN ROADWAY, DRIVEWAY OR SIDEWALK THE BOX AND LID MUST BE POLYMER CONCRETE TIER 22 (HUBBELL OR EQ.). FOR BOX LOCATED IN LANDSCAPE THE BOX AND LID SHALL BE POLY CONC TIER 8 (HUBBELL OR EQ.).
5. NEPTUNE ERT HOLE SHALL BE RECESSED.
6. PACK JOINTS MAY NOT BE USED.
7. FOR TAPS MADE ON DUCTILE IRON PIPE ALL CORPORATION STOPS AND GATE VALVES SHALL BE DIELECTRIC.
8. FOR TAPS MADE ON OD STEEL PIPE USE FULL CIRCLE REPAIR CLAMP.
9. TAPS, SERVICE SADDLES, AND FITTINGS SHALL BE SEPARATED BY A MINIMUM OF 24 INCHES.
10. AT TAP TAPE AND POLYETHYLENE WRAP ALL EXPOSED FITTINGS.

STANDARD 2" SERVICE CONNECTION

W-22

SCALE: NONE | APPROVED BY: GN

DATE: JULY 2025 | DRAWN BY: SR

CARMICHAEL WATER DISTRICT

7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 – 6400

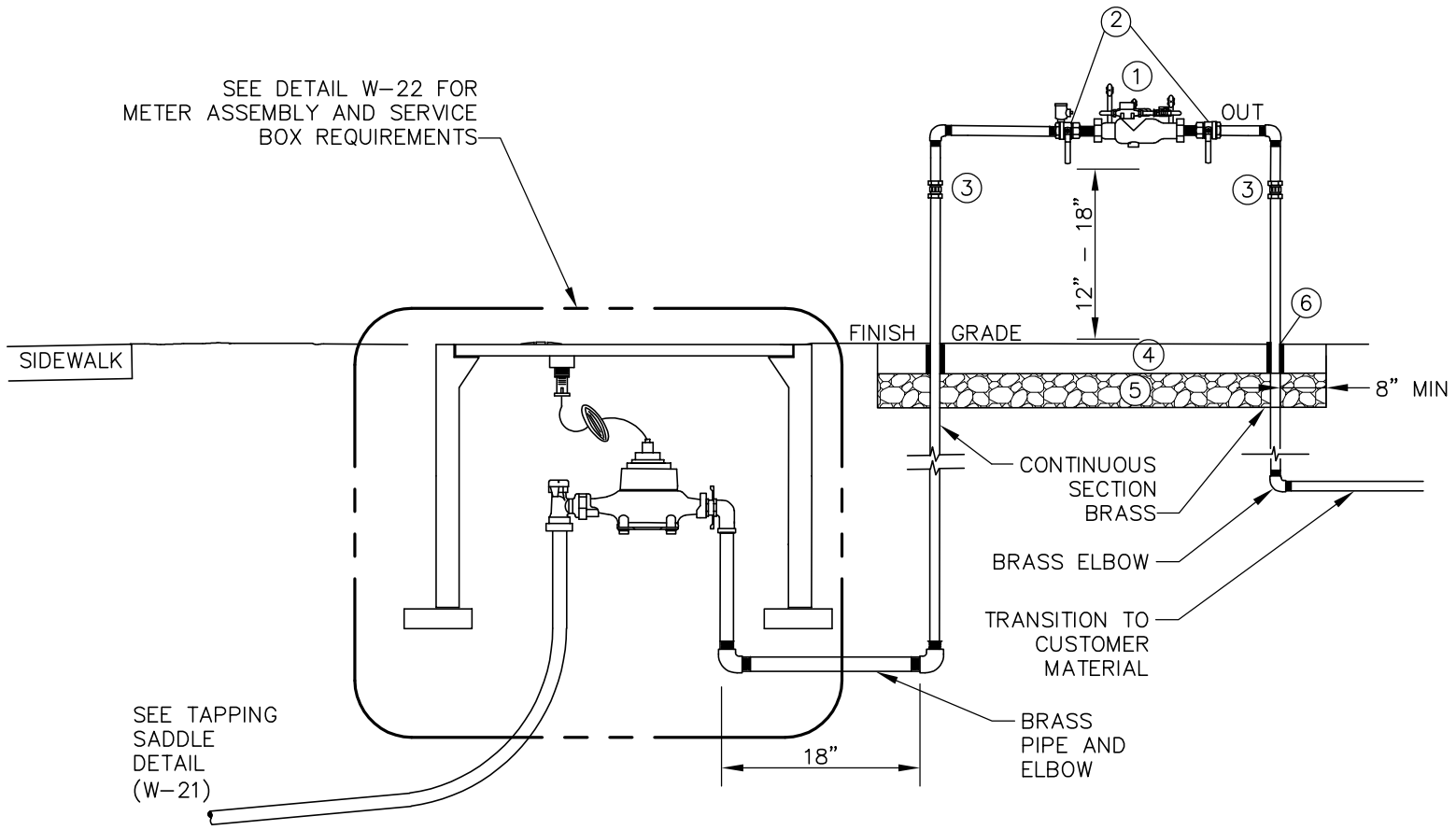
CARMICHAEL WATER DISTRICT

7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 - 6400

1" & 2" SERVICE LINE
WITH RP STYLE BACKFLOW

DATE:	SCALE:	APPROVED BY:
JUNE 2025	NONE	GN
DRAWN BY:		
SR		

W-23



MATERIALS:

1. REDUCED PRESSURE PRINCIPLE TYPE BACKFLOW DEVICE
2. BALL VALVES
3. INSTALL (2) UNIONS
4. 36" WIDE x 4" THICK CONCRETE PAD OF VARIABLE LENGTH (12" NATIVE SOIL FOR LANDSCAPE AREA)
5. 3/4" AB, 4" THICK (3/4" AB, 12" THICK FOR LANDSCAPE AREA)
6. EXPANSION FILLER

NOTES:

1. NO WATER SHALL BE DRAWN THROUGH THE BACKFLOW DEVICE UNTIL IT HAS BEEN TESTED AND APPROVED BY THE DISTRICT.
2. ALL FITTINGS SHALL BE LEAD FREE, ALL PIPE SHALL BE BRASS OR RIGID COPPER.
3. WATER METERS SHALL BE PURCHASED THROUGH THE DISTRICT. PURCHASE INCLUDES INSTALLATION.
4. THE BACKFLOW DEVICE SHALL BE INSULATED WITH A DISTRICT APPROVED FREEZE PROTECTION BAG OR CAGE.
5. BURIED PIPE AND FITTINGS SHALL BE WRAPPED WITH 10 MIL POLYETHYLENE OR APPROVED EQUAL.

CARMICHAEL WATER DISTRICT

7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 - 6400

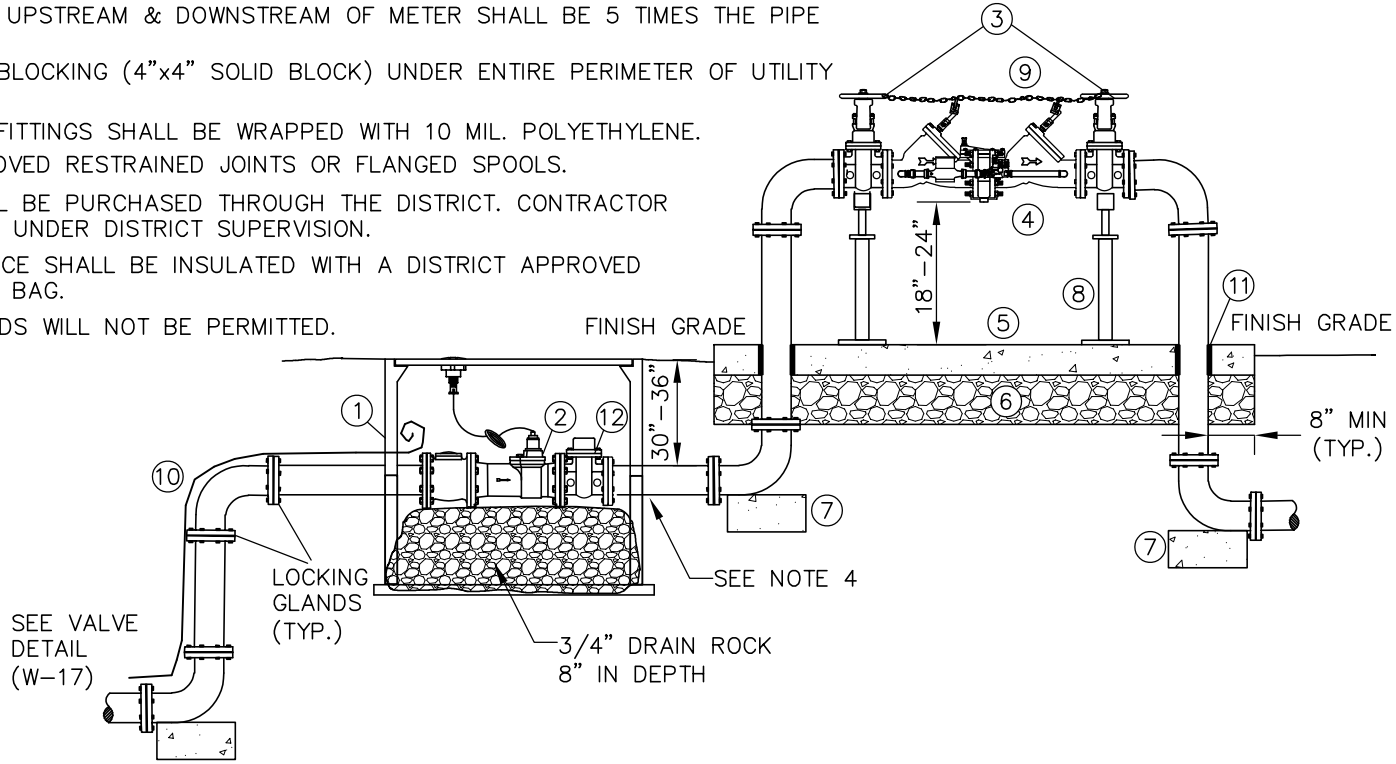
SERVICE LINE
3" AND LARGER

DATE: APRIL 2021	SCALE: NONE	APPROVED BY: MM
DRAWN BY: JC		

W-24

NOTES:

1. NO WATER IS TO BE DRAWN THROUGH THE REDUCED PRESSURE PRINCIPLE BACKFLOW DEVICE UNTIL IT HAS BEEN TESTED AND APPROVED BY THE DISTRICT.
2. PIPE SHALL BE DUCTILE IRON.
3. GATE VALVES SHALL BE RESILIENT SEAT.
4. LENGTH OF SPOOLS UPSTREAM & DOWNSTREAM OF METER SHALL BE 5 TIMES THE PIPE DIAMETER.
5. INSTALL CONCRETE BLOCKING (4"x4" SOLID BLOCK) UNDER ENTIRE PERIMETER OF UTILITY BOX.
6. BURRIED PIPE AND FITTINGS SHALL BE WRAPPED WITH 10 MIL. POLYETHYLENE.
7. USE DISTRICT APPROVED RESTRAINED JOINTS OR FLANGED SPOOLS.
8. WATER METER SHALL BE PURCHASED THROUGH THE DISTRICT. CONTRACTOR WILL INSTALL METER UNDER DISTRICT SUPERVISION.
9. THE BACKFLOW DEVICE SHALL BE INSULATED WITH A DISTRICT APPROVED FREEZE PROTECTION BAG.
10. CONCRETE METER LIDS WILL NOT BE PERMITTED.

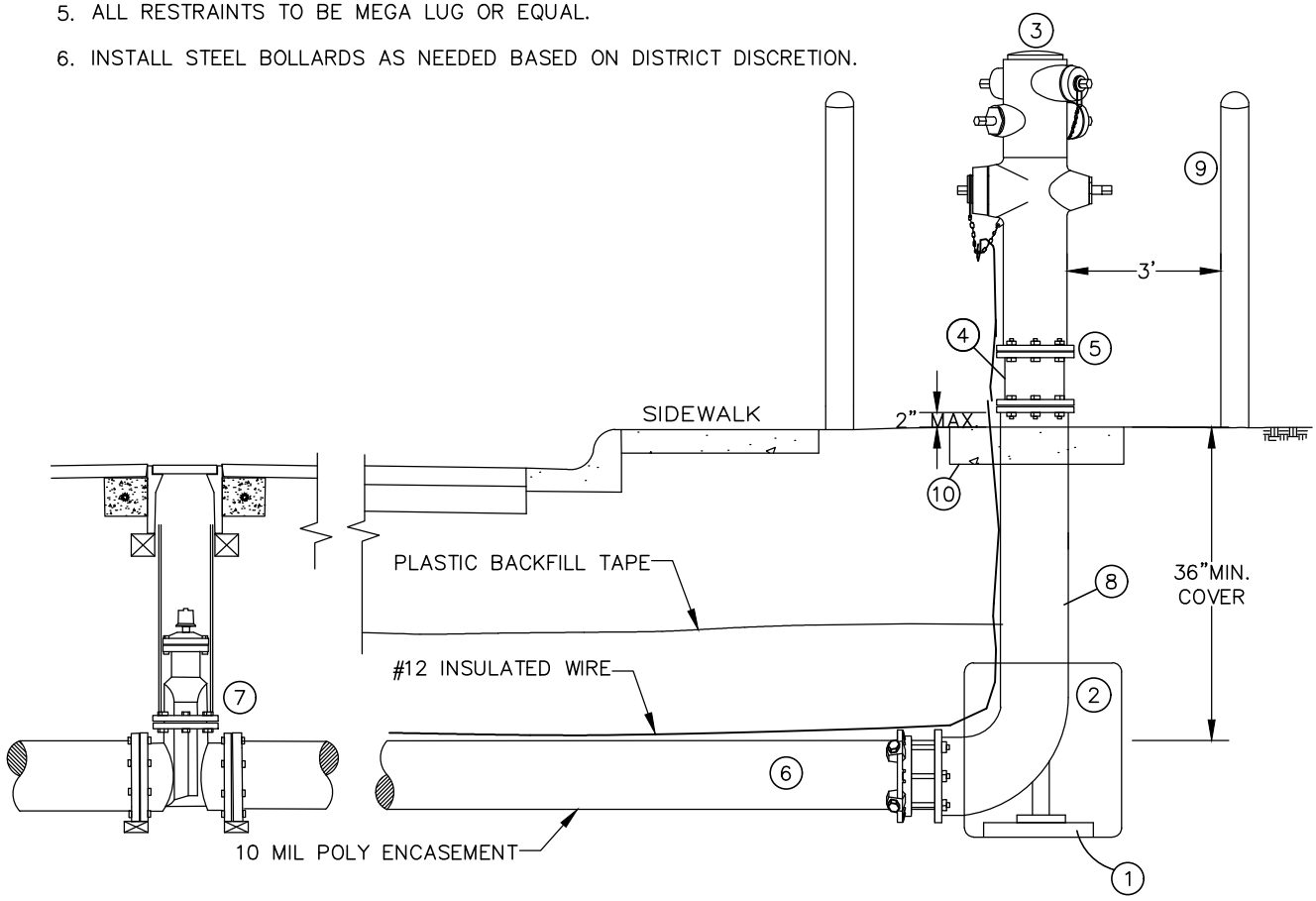


MATERIALS:

1. H20 RATED UTILITY BOX AND H20 STEEL LID. UTILITY BOX SHALL BE SIZED TO MAINTAIN 4" CLEARANCE FROM METER ASSEMBLY ON ALL SIDES
2. METER SHALL BE PURCHASED THROUGH THE DISTRICT
3. RESILIENT SEAT GATE VALVES
4. REDUCED PRESSURE PRINCIPLE ASSEMBLY TYPE BACKFLOW DEVICE
5. 32" WIDE x 4" THICK REINFORCED CONCRETE SLAB OF VARIABLE LENGTH
6. 3/4" AB 6" THICK
7. 14" SQUARE x 6" THICK CONCRETE SUPPORT PAD
8. SUPPORT STANDS BOLTED INTO CONCRETE (TWO BOLTS MINIMUM)
9. 1/4" NON-CASE HARDENED CHAIN WITH BREAKAWAY LOCK
10. #10 AWG COPPER LOCATING WIRE (SEE W-7)
11. EXPANSION FILLER
12. GATE VALVE

NOTES:

1. FITTINGS SHALL BE DUCTILE IRON
2. VALVES AND FITTINGS SHALL BE WRAPPED IN 10 MIL. OR THICKER POLYETHYLENE.
3. VALVE SHALL BE A MINIMUM OF 12' FROM HYDRANT OR AT DISTRICT'S DISCRETION. USE APPROVED RESTRAINING JOINTS FROM VALVE TO HYDRANT BURY.
4. A MINIMUM 3 FOOT CLEAR AREA SHALL BE MAINTAINED AROUND THE FIRE HYDRANT.
5. ALL RESTRAINTS TO BE MEGA LUG OR EQUAL.
6. INSTALL STEEL BOLLARDS AS NEEDED BASED ON DISTRICT DISCRETION.



MATERIALS:

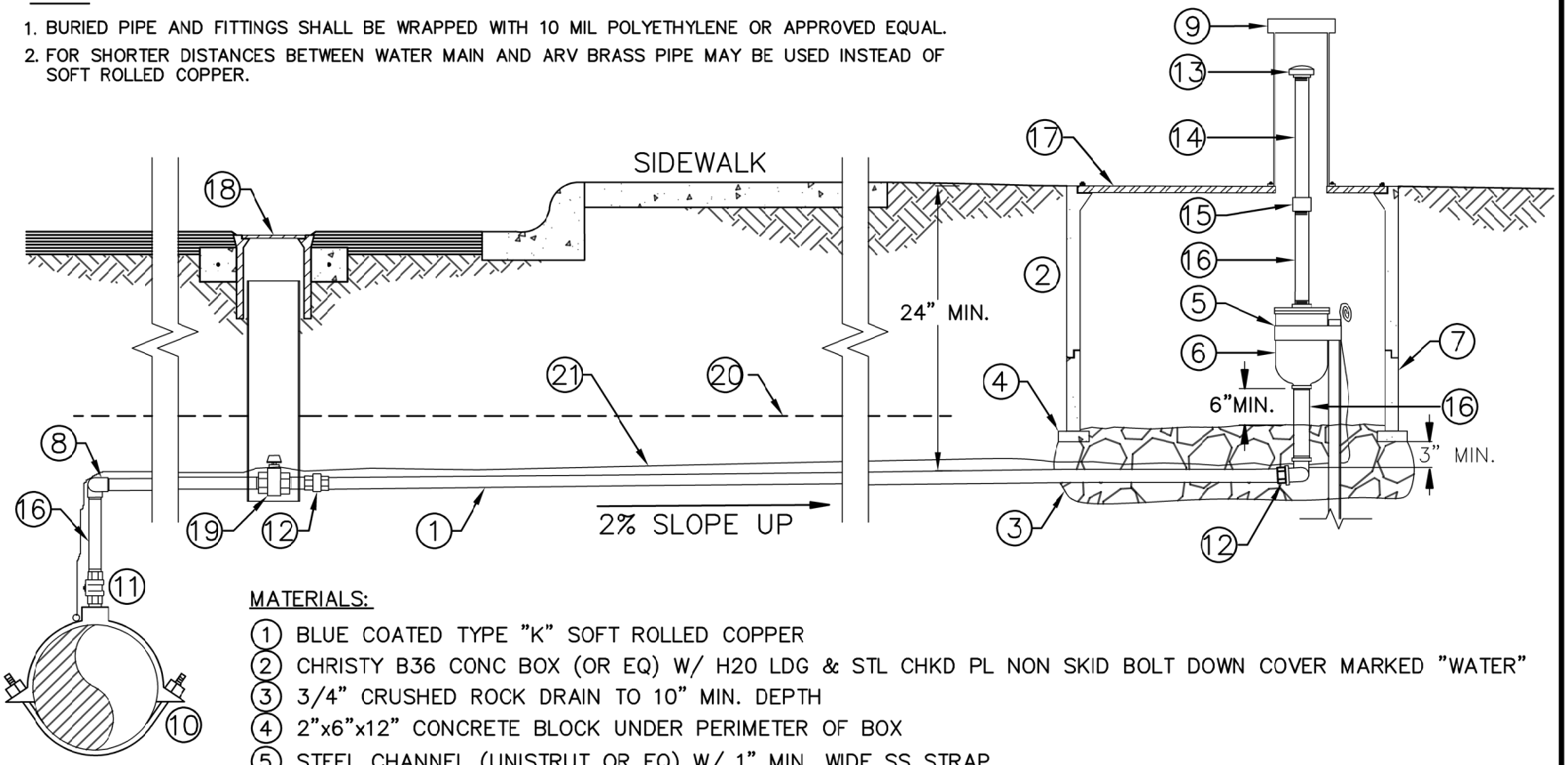
1. BLOCKING
2. CONCRETE SUPPORT AGAINST UNDISTURBED SOIL
3. CLOW 960 OR EQUAL – YELLOW
4. BREAK OFF CHECK VALVE (HYDRANT GUARD OR EQUAL)
5. BREAKAWAY BOLTS (BREAK POINT) PER CHECK VALVE MANUFACTURER
6. 6" DUCTILE IRON PIPE WITH MEGALUG OR EQUAL
7. 6" GATE VALVE PER (W–11)
8. FLANGE x MJ BURY
9. SCH. 40 STEEL BOLLARDS PER (W–14)
10. 3' SQUARE x 4" THICK CONCRETE HOLD BURY OR AT THE DISTRICT'S DISCRETION

CARMICHAEL WATER DISTRICT 7837 FAIR OAKS BOULEVARD CARMICHAEL, CALIFORNIA, 95608 – 6400	FIRE HYDRANT ASSEMBLY WET BARREL		
	SCALE: NONE	APPROVED BY: GN	**W-12**
	DATE: APRIL 2025	DRAWN BY: SR	

W-12FH-WBASSEMBLY_SR – 4/15/2025

NOTES:

1. BURIED PIPE AND FITTINGS SHALL BE WRAPPED WITH 10 MIL POLYETHYLENE OR APPROVED EQUAL.
2. FOR SHORTER DISTANCES BETWEEN WATER MAIN AND ARV BRASS PIPE MAY BE USED INSTEAD OF SOFT ROLLED COPPER.



MATERIALS:

1. BLUE COATED TYPE "K" SOFT ROLLED COPPER
2. CHRISTY B36 CONC BOX (OR EQ) W/ H20 LDG & STL CHKD PL NON SKID BOLT DOWN COVER MARKED "WATER"
3. 3/4" CRUSHED ROCK DRAIN TO 10" MIN. DEPTH
4. 2"x6"x12" CONCRETE BLOCK UNDER PERIMETER OF BOX
5. STEEL CHANNEL (UNISTRUT OR EQ) W/ 1" MIN. WIDE SS STRAP
6. CRISPIN COMBINATION AIR/VACUUM VALVE OR APPROVED EQUAL
7. CHRISTY EXTENSION SPOOL (IF NECESSARY) OR EQUAL
8. SWING JOINT (2 – 90° FITTINGS)
9. PLACER WATERWORKS AV18–M (OR EQ) AIR VENT ENCL. BOLTED DOWN
10. BRONZE DOUBLE STRAP SERVICE SADDLE WITH ZINC COATED NUTS AND WASHERS FOR CATHODIC PROTECTION
11. CORPORATION STOP (SEE NOTE 7) SIZED PER ARV OUTLET
12. COMPRESSION JOINT
13. NPT MUSHROOM VENT CAP W/ SS SCREEN. BOTTOM VENTING (SIZED PER ARV OUTLET)
14. NPT SCH 80 PVC PIPE (SIZED PER ARV OUTLET)
15. NPT PVC COUPLING PLACED 1/2" BELOW BOX LID
16. BRASS NIPPLE (SIZE PER ARV OUTLET)
17. PLACER WATERWORKS ARV COVER PW/218 – B36 (OR EQUAL) BOLTED DOWN
18. VALVE BOX W/ 6" X 6" CONC COLLAR WITH #4 REBAR AND 8" SDR RISER PIPE
19. NPT GATE VALVE (1" OR 2" TO MATCH ARV INLET SIZE)
20. 12" WIDE WARNING TAPE
21. #10 AWG LOCATING WIRE

1" & 2" AIR RELEASE VALVE ASSEMBLY

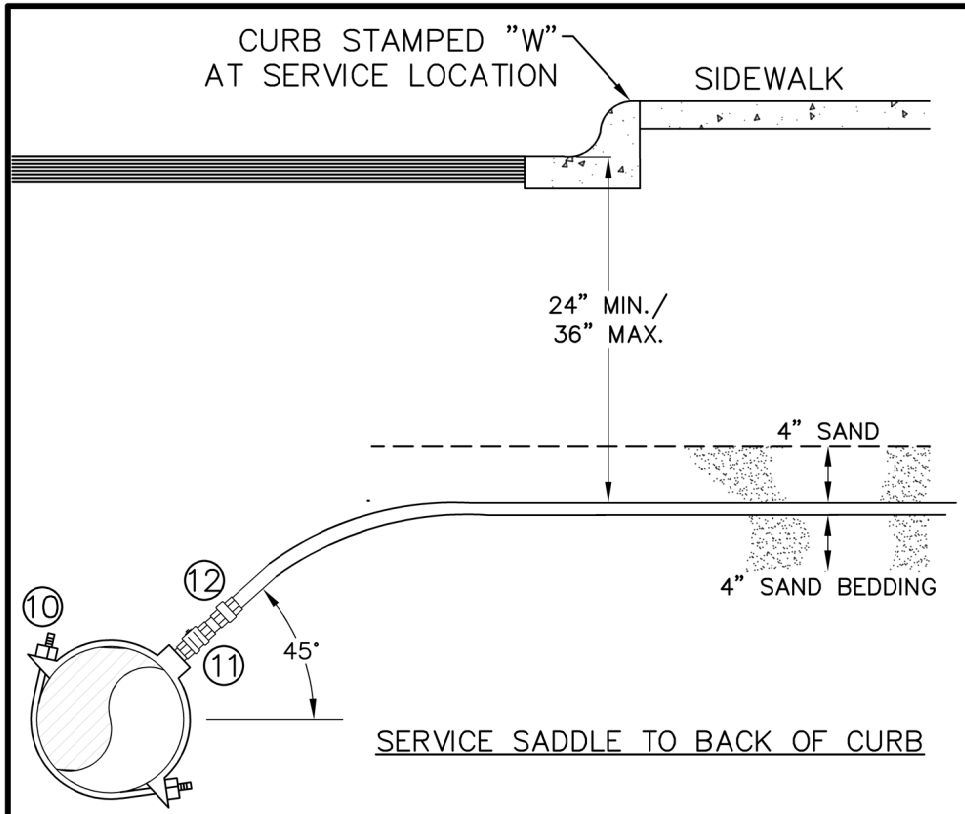
W-16

CARMICHAEL WATER DISTRICT

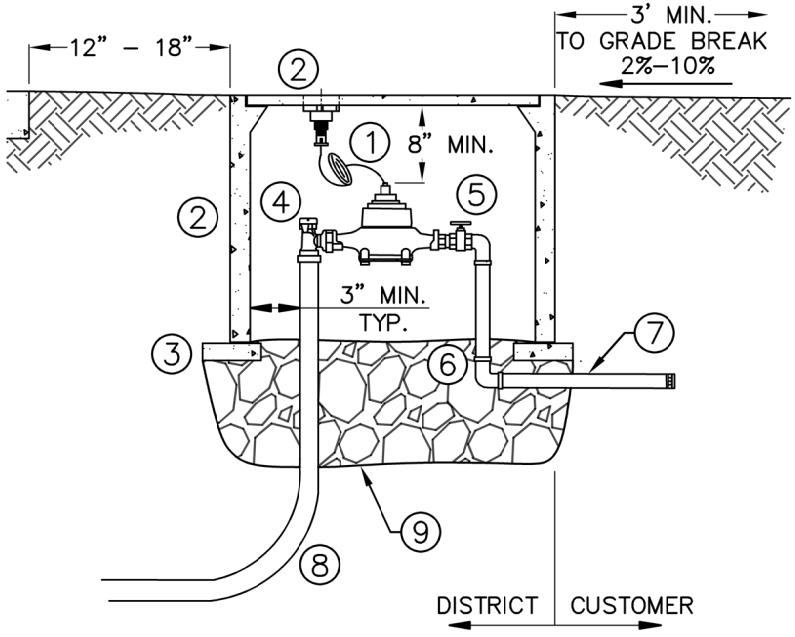
7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 – 6400

SCALE: NONE | APPROVED BY: GN

DATE: JULY 2025 | DRAWN BY: SR



SERVICE SADDLE TO BACK OF CURB



BACK OF WALK TO METER BOX

MATERIALS:

1. METER (PURCHASED THROUGH DISTRICT)
2. B30 METER BOX WITH B30 LID WITH 2" NEPTUNE PROBE HOLE (SEE NOTES 4 AND 5)
3. 2"x6"x12" CONCRETE BLOCKS AT PERIMETER OF BOX
4. ANGLE CURB STOP W/ LOCK WING (FIP X METER SWIVEL NUT)
5. METER SPUD WITH (WHEEL) GATE VALVE AND STREET 90 ELL
6. BRASS NIPPLE AND 90 ELBOW
7. BRASS NIPPLE TO 8" MIN. OUT OF BOX TO CUSTOMER
8. AGENCY COPPER LATERAL SWEEP INTO BOX
9. 3/4" CRUSHED ROCK DRAIN TO 12" DEPTH
10. BRONZE DOUBLE STRAP SERVICE SADDLE WITH ZINC COATED NUTS AND WASHERS FOR CATHODIC PROTECTION
11. CORPORATION STOP (SEE NOTE 7)
12. COMPRESSION JOINT

NOTES:

1. WATER METERS AND TOUCH READ DEVICES SHALL BE PURCHASED THROUGH THE DISTRICT. PURCHASE INCLUDES INSTALLATION.
2. ALL BURIED PIPE AND FITTINGS SHALL BE WRAPPED WITH 10 MIL POLYETHYLENE OR APPROVED EQUAL.
3. SERVICE LINES TO BE BLUE COATED TYPE "K" SOFT ROLLED COPPER.
4. FOR BOX LOCATED IN ROADWAY, DRIVEWAY OR SIDEWALK THE BOX AND LID MUST BE POLYMER CONCRETE TIER 22 (HUBBELL OR EQ.). FOR BOX LOCATED IN LANDSCAPE THE BOX AND LID SHALL BE POLY CONC TIER 8 (HUBBELL OR EQ.).
5. NEPTUNE ERT HOLE SHALL BE RECESSED.
6. PACK JOINTS MAY NOT BE USED.
7. FOR TAPS MADE ON DUCTILE IRON PIPE ALL CORPORATION STOPS AND GATE VALVES SHALL BE DIELECTRIC.
8. FOR TAPS MADE ON OD STEEL PIPE USE FULL CIRCLE REPAIR CLAMP.
9. TAPS, SERVICE SADDLES, AND FITTINGS SHALL BE SEPARATED BY A MINIMUM OF 24 INCHES.
10. AT TAP TAPE AND POLYETHYLENE WRAP ALL EXPOSED FITTINGS.

STANDARD 1" SERVICE CONNECTION

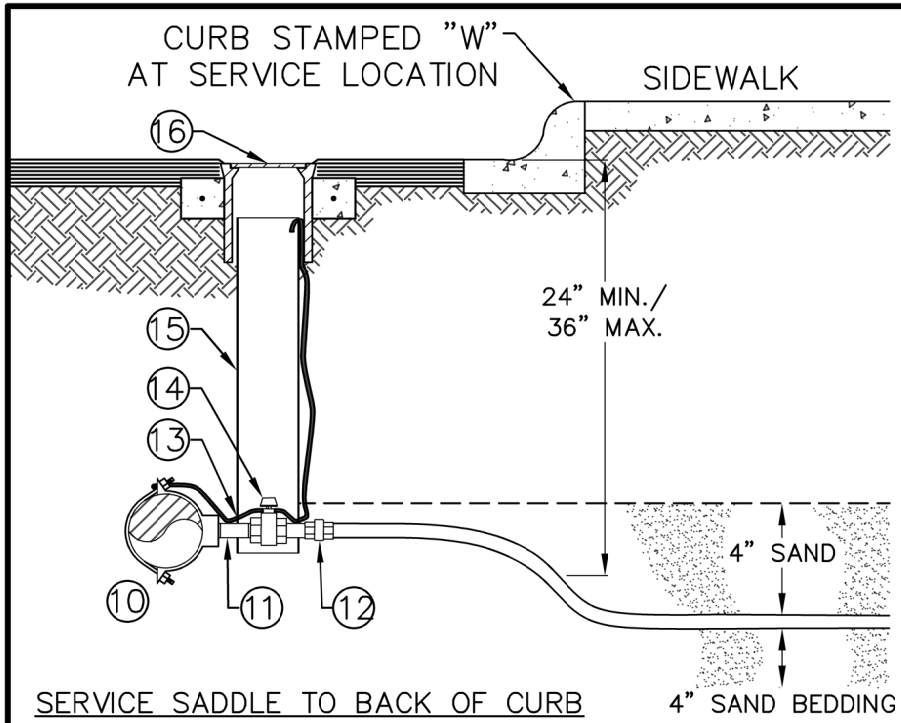
W-21

SCALE: NONE | APPROVED BY: GN

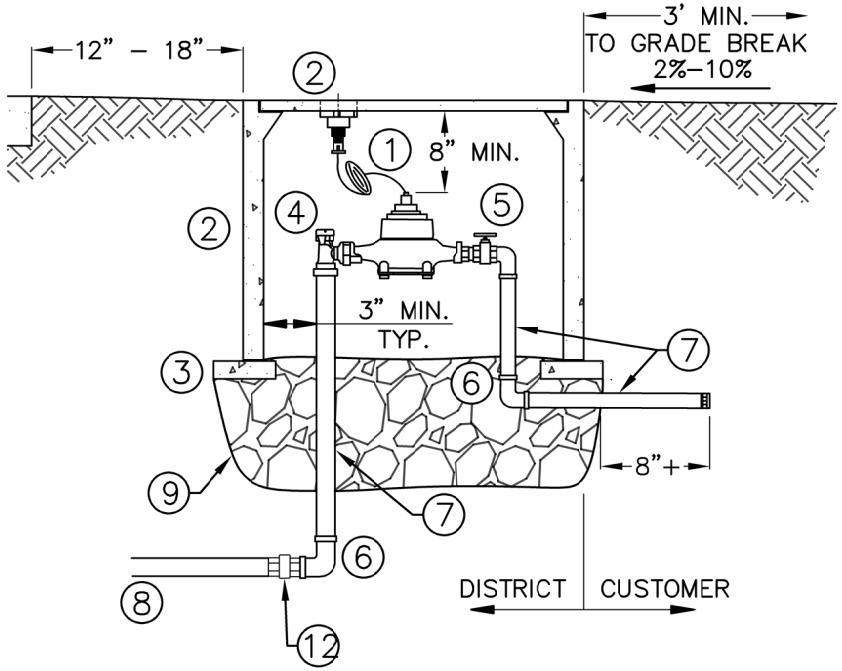
DATE: JULY 2025 | DRAWN BY: SR

CARMICHAEL WATER DISTRICT

7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 – 6400



SERVICE SADDLE TO BACK OF CURB



BACK OF WALK TO METER BOX

MATERIALS:

1. METER (PURCHASED THROUGH DISTRICT)
2. B36 METER BOX WITH B36 LID WITH 2" NEPTUNE PROBE HOLE (SEE NOTES 4 AND 5)
3. 2"x6"x12" CONCRETE BLOCKS AT PERIMETER OF BOX
4. ANGLE CURB STOP W/ LOCK WING (FIP X METER SWIVEL NUT)
5. METER SPUD WITH (WHEEL) GATE VALVE AND STREET 90 ELL
6. BRASS 90 ELBOW
7. BRASS NIPPLE
8. AGENCY COPPER LATERAL
9. 3/4" CRUSHED ROCK DRAIN TO 12" DEPTH
10. BRONZE DOUBLE STRAP SERVICE SADDLE WITH ZINC COATED NUTS AND WASHERS FOR CATHODIC PROTECTION
11. 2"x6" NPT BRASS NIPPLE
12. 2" MIPxCOMP COUPLING
13. #10 AWG LOCATING WIRE
14. 2" NPT GATE VALVE W/ 2" SQ. OPERATING NUT (SEE NOTE 7)
15. 8" SDR RISER PIPE
16. G5 VALVE BOX WITH 6"x6" CONC COLLAR W/ #4 REBAR

NOTES:

1. WATER METERS AND TOUCH READ DEVICES SHALL BE PURCHASED THROUGH THE DISTRICT. PURCHASE INCLUDES INSTALLATION.
2. ALL BURIED PIPE AND FITTINGS SHALL BE WRAPPED WITH 10 MIL POLYETHYLENE OR APPROVED EQUAL.
3. SERVICE LINES TO BE BLUE COATED TYPE "K" SOFT ROLLED COPPER.
4. FOR BOX LOCATED IN ROADWAY, DRIVEWAY OR SIDEWALK THE BOX AND LID MUST BE POLYMER CONCRETE TIER 22 (HUBBELL OR EQ.). FOR BOX LOCATED IN LANDSCAPE THE BOX AND LID SHALL BE POLY CONC TIER 8 (HUBBELL OR EQ.).
5. NEPTUNE ERT HOLE SHALL BE RECESSED.
6. PACK JOINTS MAY NOT BE USED.
7. FOR TAPS MADE ON DUCTILE IRON PIPE ALL CORPORATION STOPS AND GATE VALVES SHALL BE DIELECTRIC.
8. FOR TAPS MADE ON OD STEEL PIPE USE FULL CIRCLE REPAIR CLAMP.
9. TAPS, SERVICE SADDLES, AND FITTINGS SHALL BE SEPARATED BY A MINIMUM OF 24 INCHES.
10. AT TAP TAPE AND POLYETHYLENE WRAP ALL EXPOSED FITTINGS.

STANDARD 2" SERVICE CONNECTION

W-22

SCALE: NONE | APPROVED BY: GN

DATE: JULY 2025 | DRAWN BY: SR

CARMICHAEL WATER DISTRICT

7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 – 6400

W-22_SVC-2-INCH_SR.DWG – 9/5/2025

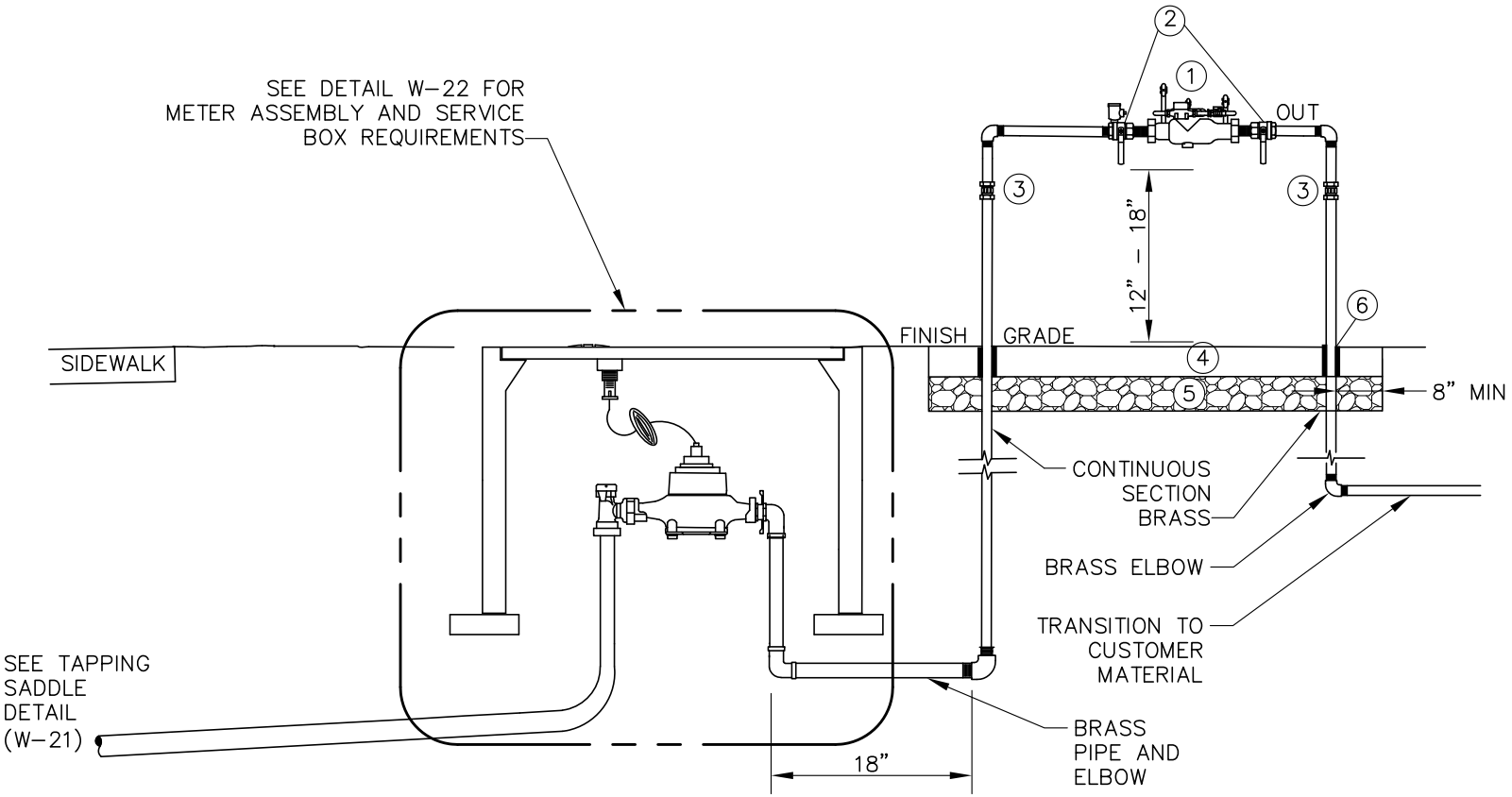
CARMICHAEL WATER DISTRICT

7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 - 6400

1" & 2" SERVICE LINE WITH RP STYLE BACKFLOW

DATE:	SCALE:	APPROVED BY:
JUNE 2025	NONE	GN
DRAWN BY:		
SR		

W-23

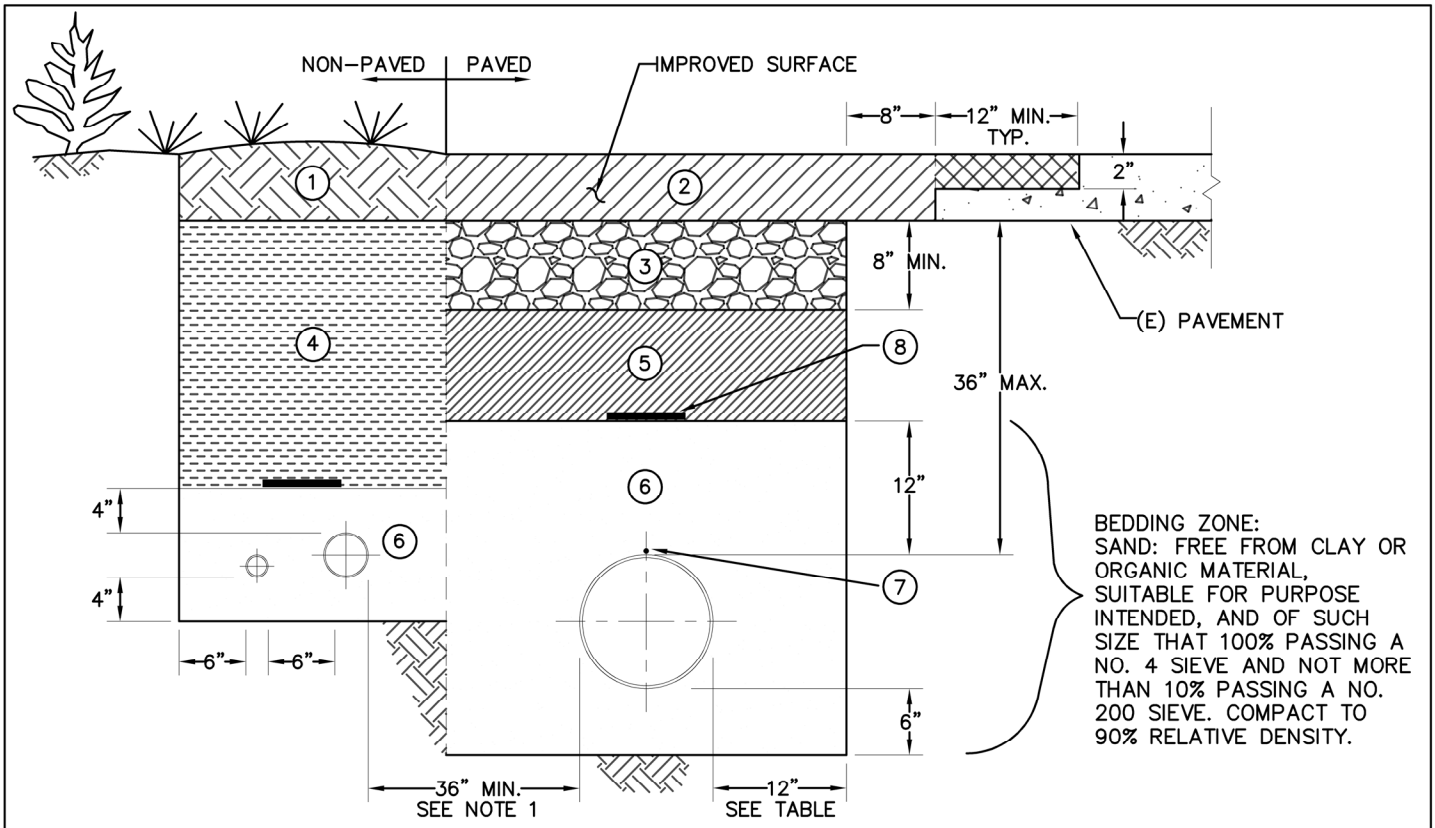


MATERIALS:

1. REDUCED PRESSURE PRINCIPLE TYPE BACKFLOW DEVICE
2. BALL VALVES
3. INSTALL (2) UNIONS
4. 36" WIDE x 4" THICK CONCRETE PAD OF VARIABLE LENGTH (12" NATIVE SOIL FOR LANDSCAPE AREA)
5. 3/4" AB, 4" THICK (3/4" AB, 12" THICK FOR LANDSCAPE AREA)
6. EXPANSION FILLER

NOTES:

1. NO WATER SHALL BE DRAWN THROUGH THE BACKFLOW DEVICE UNTIL IT HAS BEEN TESTED AND APPROVED BY THE DISTRICT.
2. ALL FITTINGS SHALL BE LEAD FREE, ALL PIPE SHALL BE BRASS OR RIGID COPPER.
3. WATER METERS SHALL BE PURCHASED THROUGH THE DISTRICT. PURCHASE INCLUDES INSTALLATION.
4. THE BACKFLOW DEVICE SHALL BE INSULATED WITH A DISTRICT APPROVED FREEZE PROTECTION BAG OR CAGE.
5. BURIED PIPE AND FITTINGS SHALL BE WRAPPED WITH 10 MIL POLYETHYLENE OR APPROVED EQUAL.



18" MIN. TRENCH – SIDEWALL CLEARANCES

PIPE DIAMETER (IN.)	MIN. SIDEWALL (IN.)
1.5 – 8	6
12, 16, 18	12
24	18
≥30	PER PLANS

MATERIALS:

(1) 6" MINIMUM TOPSOIL, RESTORE LANDSCAPE TO ORIGINAL CONDITION

(2) 4" TO 6" THICK ASPHALT CONCRETE TO MATCH EXISTING

(3) 8" MINIMUM 3/4 " AGGREGATE BASE AT 95% COMPACTION

(4) FINAL BACKFILL SHALL BE 1.5" MINUS AT 90% MIN. COMPACTION

(5) INTERMEDIATE NATIVE BACKFILL AT 95% COMPACTION SEE SACRAMENTO COUNTY SPECIFICATIONS (MUST MEET OR EXCEED)

(6) SAND BEDDING – 4" MIN. DEPTH BELOW PIPE FOR DIA. ≤ 4" AND 6" MIN. DEPTH BELOW PIPE FOR DIA. > 4"
– 4" MIN. FILL ABOVE PIPE FOR DIA. ≤ 4" AND 12" MIN. FILL ABOVE PIPE FOR DIA. > 4"

(7) #10 AWG, SINGLE STRAND SOFT DRAWN COPPER WIRE W/ $\frac{1}{16}$" PVC INSULATION; TAPE TO TOP OF PIPE AT 10' INTERVALS

(8) PLASTIC WARNING TAPE LOCATED ON TOP OF BEDDING ZONE

NOTES:

1. MINIMUM 36" BETWEEN MAINLINES OR LATERALS W/ DIA. ≥4", AND MINIMUM 6" BETWEEN LATERALS W/ DIA. < 4" AND/OR MAINLINES W/ DIA. ≥ 4".
2. COMPLY FULLY WITH 29 CFR PART 1926 OSHA SUBPART P EXCAVATIONS AND TRENCHES REQUIREMENTS.
3. CONTRACTOR TO SECURE TRENCH FOR SAFE ACCESS PER OSHA REQUIREMENTS FOR INSPECTIONS AND TESTING.
4. BACKFILL MATERIALS, AGGREGATE BASE, PAVEMENT MATERIALS AND CONCRETE FOR CURBS, GUTTERS AND SIDEWALKS SHALL COMPLY WITH THE COUNTY OF SACRAMENTO DEPARTMENT OF PUBLIC WORKS STANDARD CONSTRUCTION SPECIFICATIONS AND STANDARD COUNTY DRAWINGS.
5. BACKFILL SHALL BE MECHANICALLY CONSOLIDATED AND SHOVEL SLICED UNDER THE HAUNCHES OF THE PIPE.
6. IN ROCKY OR UNYIELDING SOIL, THE TRENCH SHALL BE EXCAVATED A MINIMUM OF 12" BELOW THE PIPE AND THE TRENCH WIDTH SHALL BE INCREASED BY 12".
7. ONE 12" STRIP OF BACKFILL TAPE SHALL BE USED FOR ALL PIPES 12" AND SMALLER. FOR PIPES LARGER THAN 12", INSTALL ONE ADDITIONAL STRIP PER 12" ADDITIONAL DIAMETER OR FRACTION THEREOF.
8. ALL SOIL COMPACTION PERCENTAGES ARE TO BE BASED ON ASTM D1557.

CARMICHAEL WATER DISTRICT

7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 – 6400

TRENCH SECTIONS, BACKFILL, AND NOTES

SCALE: NONE	APPROVED BY: GN	**W-2**
DATE: JULY 2025	DRAWN BY: SR	

W-02TRENCH-BKFILL.DWG – 7/15/2025

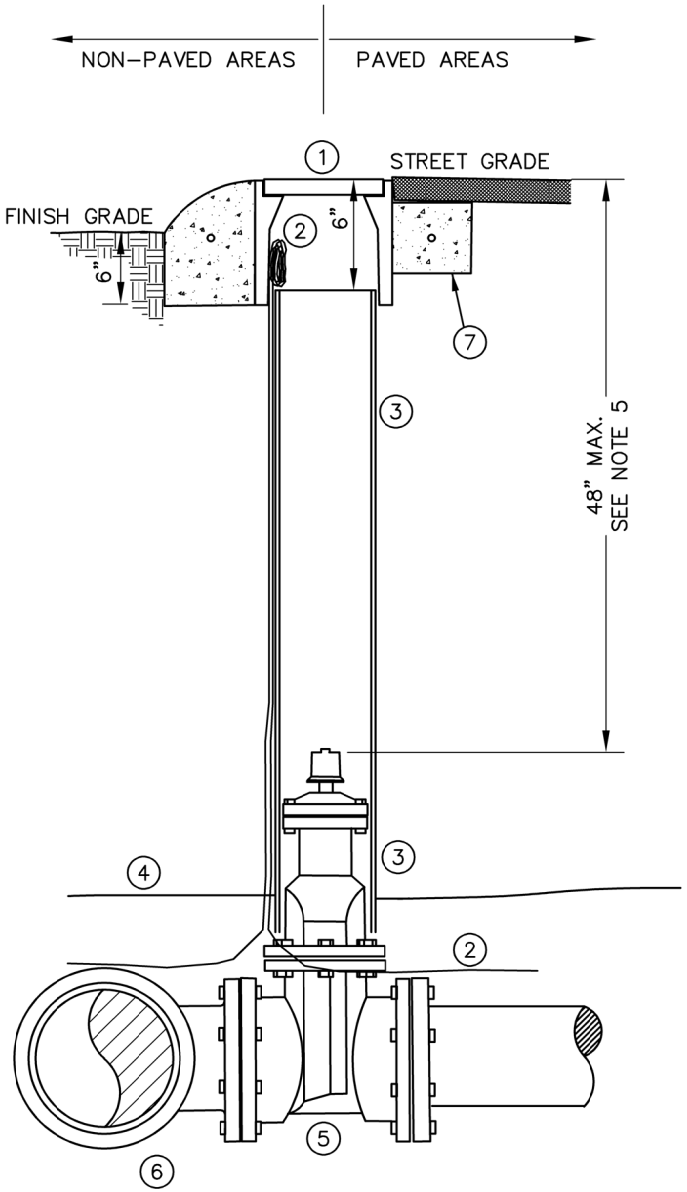
CARMICHAEL WATER DISTRICT

7837 FAIR OAKS BOULEVARD
CARMICHAEL, CALIFORNIA, 95608 - 6400

TYPICAL GATE VALVE & BOX INSTALLATION

DATE:	SCALE:	APPROVED BY:
SEPT 2025	NONE	GN
DRAWN BY:		
SR		

W-11



GATE VALVE BOX

NOTES:

1. TRACING WIRE THROUGH VALVE BOXES SHALL BE PLACED OUTSIDE OF RISER BUT INSIDE OF VALVE BOX. TRACING WIRE SHALL BE SPLICED INSIDE THE VALVE BOX PER (W-8) AND SHALL LOOP WITHIN THE VALVE BOX WITH 18" OF SLACK WIRE.
2. ALL GATE VALVES SHALL BE CENTERED AND PLUMB IN A CONTINUOUS PIECE OF 8" PVC SDR RISER STOCK.
3. VALVE BOXES LOCATED IN A PAVED AREA SHALL BE PLACED IN A 6" X 6" CONCRETE COLLAR WITH #4 CENTERED IN SECTION. VALVE BOX AND COLLAR SHALL BE SET TO FINAL FINISH GRADE IN PAVED AREAS AND 2" ABOVE FINISHED GRADE IN NON-PAVED AREAS.
4. VALVES AND FITTINGS SHALL BE WRAPPED IN 10 MIL POLYETHYLENE.
5. INSTALL OPERATING NUT EXTENSION FOR ALL INSTALLATIONS GREATER THAN 60" FROM FINISHED GRADE.

MATERIALS

1. POLYMER CONCRETE G5 VALVE BOX & LID HUBBELL (OR EQUAL)
2. #10 INSULATED LOCATING WIRE OUTSIDE RISER
3. 8" RISER STOCK
4. PLASTIC BACKFILL TAPE
5. GATE VALVE
6. DUCTILE IRON TEE
7. CONCRETE COLLAR (SEE NOTES)

Topic: Dugan Management & Engineering, Inc. (DME) Agreement Amendment No. [4] to Claremont Road and Fair Oaks Blvd at El Camino Ave Pipeline Capital Improvement Project (CIP)

Date: September 8, 2025

Item For: Action

Submitted By: Greg Norris, Engineering Manager

BACKGROUND

Sacramento County Department of Transportation will be performing an asphalt concrete (AC) overlay construction project this year on Fair Oaks Blvd (FOB) between Manzanita Ave and Marshall Road beginning in early October. The District has approximately 670 linear feet (LF) of 80-year old 14-inch diameter steel water main underneath this section of FOB, starting from California Avenue and extending east. Similarly, there is about 140 LF of old 6-inch steel water main running north of FOB at Leos Lane and Miles Lane needing to be replaced (280 LF total), to bring the new water main out of the overlay project area. The steel pipes are beyond the end of its useful life and could possibly be damaged during construction on the road above it. Once the new AC overlay construction is complete there will be a 5-year moratorium prohibiting construction on the newly paved road.

As previously report to the Board, to avoid an emergency repair of a leak under the AC overlay project area, the District is taking quick action to replace the existing 14-inch steel pipe before the AC overlay construction on FOB begins. The District solicited bids from qualified contractors in accordance with the Public Contract Code and the lowest responsive responsible bidder was Flowline Contractors Inc. (Flowline).

SUMMARY/DISCUSSION

As part of their contractual responsibilities, Flowline submitted to the County of Sacramento proposed Traffic Control Plans for the project. The plans were approved with the requirement that any work on FOB must be performed from 9PM to 6AM. Due to the expedited timeline and complexity of working along FOB, the District has requested the specialized CM services of DME to perform CM duties during the night work periods for the project. DME is currently working with the District on this project under an agreement to perform duties associated as Project Engineer. DME has developed a proposal for construction management since they are intimately familiar with the project allowing the District to expedite the acquisition of special CM services for this project, before the construction of the AC overlay by the County begins in early October.

FISCAL IMPACTS

The proposed Amendment No. 4 to the Professional Services Agreement with DME for Engineering Services is anticipated to cost $69,752 (See Attachment 1). The District has sufficient funds ($1,700,000) in the 25-26 budget under GL# 10-011106-22 Fair Oaks Blvd MLRP for this professional services agreement amendment.

RECOMMENDATION(s)

Staff recommends that the Board of Directors authorize the General Manager to execute an Amendment No. 4 to the professional services agreement with DME for $69,752 providing an amended total agreement cost not to exceed amount of $404,757.

ATTACHMENT(s)

1. Draft Amendment No. 4 with proposal from DME attached as Exhibit A.

ATTACHMENT 1

AMENDMENT NO. [4]
TO AGREEMENT FOR CLAREMONT PIPELINE DESIGN SERVICES BETWEEN CARMICHAEL WATER DISTRICT
AND DUGAN ENGINEERING AND MANAGEMENT, INC.

This Amendment No. [4] to the February 26, 2024 agreement between CARMICHAEL WATER DISTRICT ("District") and DUGAN ENGINEERING AND MANAGEMENT, INC. ("Contractor") concerning pipeline design services is made effective as of the date of the District's signature, in Carmichael, California.

RECITALS:

A. On February 26, 2024, District and Contractor entered into an agreement for pipeline design services in connection with Claremont Pipeline Project ("Agreement"); further, the District and Contractor approved (3) other amendments to the original agreement;

B. District desires to extend the services provided by Contractor;

C. Contractor is willing to perform the extended services; and

D. The parties desire to amend the Agreement on the terms and conditions set forth below to provide for the extension of services by Contractor to include: (1) Task 6 - General Construction Inspection Services for on-site inspection during construction nightwork for the project.

AGREEMENT:

1. Description of Extended Services.

   a) Provide on-site nightwork construction inspection of construction related activities such as: trenching, installation of water distribution facilities, backfilling, pavement restoration.
   b) Provide engineering services required during nightwork construction for all work that is required by the "Engineer", as defined and called out in the contract documents.
   c) Provide engineering services as described in the attached Exhibit A – Design Service for Claremont Road Mainline Replacement Project.

2. Compensation.

a) The total compensation for the additional pipeline design services described in this Amendment No. 3 shall not exceed $69,752 (Sixty-Nine Thousand Seven Hundred Fifty-Two Dollars). Compensation shall be based on Contractor's scope of work dated August 29, 2025, which is attached hereto and incorporated herein as Exhibit A to this Amendment No. [4].

b) The not-to-exceed amounts of compensation described in subdivision (a) of this Section 2 is in addition to the not-to-exceed amount set forth in Section 2 and Exhibit A of the Agreement plus the previous amendments. With this Amendment No. [4], Contractor's total not-to-exceed compensation is $404,757 (Four Hundred Four Thousand Seven Hundred Fifty-Seven Dollars).

3. Term of Agreement.

This Amendment shall become effective on the date signed by the District. The Agreement and previous amendments, together with this Amendment No. [4], shall expire on September 1, 2026, unless terminated earlier pursuant to Section 3.2 of the Agreement.

4. Effect on Agreement.

Except as specifically provided herein, the Agreement, and each of its terms and conditions, shall remain in full force and effect, are incorporated herein by this reference, and apply to the work described in section 1 hereof.

CARMICHAEL WATER DISTRICT

Dated: _____

By: _____
Cathy Lee, General Manager

DUGAN ENGINEERING AND MANAGEMENT, INC.

Dated: _____

By: _____
Tom Dugan, PE, President

August 29, 2025

Greg Norris
Engineering Manager
7837 Fair Oaks Blvd
Carmichael, CA 95608

Re: Amendment No. 04 – Design Service for Claremont Road Mainline Replacement Project

Dear Mr. Norris,

At Carmichael Water District's (District) request, Dugan Management & Engineering (DME) is presenting Contract Amendment No. 4 to add Task 6 – *General Construction Inspection Services* to DME's overall project scope for the Claremont Road and Fair Oaks Blvd at El Camino Ave Mainline Replacement Project. DME has retained the professional services of JLR Environmental Consultants to provide general inspection services.

Inspection Scope:

- Provide on-site inspection of trenching, pipe installation, backfilling, pavement restoration, and related construction activities during construction nightwork only.
- Record field measurements necessary to comply with Division of Drinking Water (DDW) requirements.
- Monitor contractor's work for compliance with contract documents, safety standards, and environmental requirements.
- Observe construction activities performed at night, as required by the project schedule.
- Prepare daily inspection reports documenting progress, field conditions, workforce, equipment, and any deviations from approved requirements.
- Provide photographic documentation of field activities and site conditions.
- Notify DME immediately of any non-conformance, safety concerns, or construction issues.
- Support coordination among DME, the construction contractor, District representatives, and regulatory agencies as needed.
- Prepare a summary report at project completion identifying observations, issues, and resolutions

Deliverables:

- Daily inspection reports (electronic format).
- Field measurement records for DDW compliance.
- Photographic documentation of construction activities.
- Final summary report at project closeout.
- Maintain field records required of the District Division of Drinking Water waiver

Assumptions:

- JLR's role is limited to inspection and documentation; responsibility for construction means and methods remains with the contractor.
- All inspection services will be provided under DME's direction in coordination with JLR and the District.
- Inspection services will only cover nightwork as determined by the construction schedule.

Compensation:
Inspection services will be provided on a time-and-materials basis, not to exceed $69,752 without prior written authorization from the District. The budget below reflects consistent nightwork over the next two months (Sept & Oct) on major road (Fair Oaks Blvd, California Ave, El Camino Ave/Van Alstine). Should the construction schedule change, DME will coordinate with the District to amend the inspection budget.

Tasks	Labor			Outside Services		Total
	Tom Dugan PIC/PM/PE $195	Total Hours	Total Labor Costs (1)	JLR Enviro Consultants Inspection	Sub Consultant Total Cost (2)	Total Fee
Task 6: Constr. Inspection Services						
4.1 Constr. Inspection Services	40	40	$ 7,800	$ 56,320	$ 61,952	$ 69,752
Subtotal Task 4:	40	40	$ 7,800	$ 56,320	$ 61,952	$ 69,752

1. Includes overhead and profit
2. Includes a 10% markup

DME welcomes the opportunity to meet and to discuss Amendment No. 4. Please feel free to contact me at any time.

Sincerely,

Thomas Dugan, PE
President, Dugan Management & Engineering, Inc.

3250 19th Street Sacramento, CA 95818 (916) 837-7978 TomD@DMEPacific.net

2110 K Street, Sacramento, CA 95816
Tel: (916) 803-9803
Jeremy@JLREnviro.com

September 5, 2025

Tom Dugan
Dugan Management and Engineering (DME)
3250 19th Street
Sacramento, CA 95818

RE: CONSTRUCTION INSPECTION SERVICES FOR CWD – CLAREMONT ROAD AND FAIR OAKS BLVD AT EL CAMINO MAINLINE REPLACEMENT PROJECT

Dear Tom,

JLR Environmental Consultants (JLR) is pleased to submit the attached Proposal to provide construction inspection services for the Carmicheal Water District (CWD) Claremont Road and Fair Oaks Blvd at El Camino Mainline Replacement Project. The project will include night-time inspection starting approximately September 15, 2025. The duration of the work is expected to be two months with twenty-two (22) working days estimated per month. See the following level of effort estimation for our proposed fee. Our point of contact will be myself, Jeremy Rogers, President at Jeremy@JLREnviro.com

We understand that the project is subject to the State of California Department of Industrial Relations (DIR) registration requirements. Our DIR number is 1000410573.

Our address and phone numbers are:

Office:
2210 K Street, Suite 18
Sacramento, CA 95816
Phone: (916) 803-9803

We propose using Paul Munoz to provide the inspection work. Paul's resume is attached for reference.

Thank you for the opportunity to provide a proposal for construction inspection services on the District's project. We look forward to continuing to build a strong working relationship with the District. If you have any questions or require additional information, please do not hesitate to contact me.

Sincerely – Jeremy Rogers – President

Level of Effort Estimation

The estimated level of effort for inspection services is based on providing inspection services 8-hours each night for 22-nights over tow months. Our hourly rate for this work will be $160 per hour. See table below for total fee estimate.

Inspection Duration	
2-months (Sept – Oct 2025)	2
Assume 22 working days/month	22
Work shirt (8hrs., excluding overtime	8
Total Hours (estimated)	352
Approximate Hours per Month	117.3
Hourly Rate (Prevailing wage)	$160.00
Budget (NTE)	**$56,320.00**

PAUL MUÑOZ III

PROFILE

Mr. Muñoz has over 15 years of experience in the operation, maintenance, and construction of water distribution and treatment systems. He has supervised field crews and managed utility construction projects for public agencies, with extensive knowledge of regulatory compliance, utility locating, and system troubleshooting. His responsibilities have included pipeline installation and repair, water sampling, leak detection, and contractor coordination on capital improvement projects. His background includes oversight of operations, crew training, and professional experience of infrastructure. Mr. Muñoz brings strong technical and field knowledge to support utility operations and capital project delivery.

PROFESSIONAL ENDEAVORS

City of Sacramento – Utilities – April 2024 to Present

City of Sacramento – Maintenance – February 2015 to March 2020

Florin County Water District. February 2005 to November 2013

SPECIALIZED TRAINING

SWRCB Grade D4 Water Distribution Operator

SWRCB Grade D5 Water Distribution Operator (Certification Pending)

SWRCB Grade T2 Water Treatment Operator

Class A Commercial Driver's License

Certified Utility Locator

First Aid & CPR Certified

RELEVANT EXPERIENCE

City of Sacramento – Department of Utilities | ***Utilities Operations***
Paul currently serves in a lead field operations role, supporting a wide range of construction, maintenance, and emergency response activities for the City's potable water distribution system. His responsibilities include managing pipeline installation and replacement, coordinating traffic control, and performing advanced system troubleshooting. Paul frequently performs hot taps for new connections, installs and replaces meters, and collects water samples in accordance with regulatory requirements. He operates heavy construction equipment such as excavators, backhoes, Vac-Cons, and dump trucks, and ensures safety compliance through regular tailgate meetings and jobsite hazard assessments. Utilizing Cityworks CMMS, he maintains accurate digital records of work activities, material usage, and system performance data. His work also involves direct coordination with capital improvement project teams, where he assists in the inspection of contractor work and enforces compliance with city standards and specifications.

City of Sacramento – Department of Utilities | ***Maintenance Service worker***
In his earlier tenure with the City, Paul was instrumental in executing both scheduled and emergency repair work across a large municipal water network. He supervised small field crews and led utility locating efforts using USA marking protocols. His technical capabilities included leak detection using acoustic and electronic systems, meter troubleshooting and replacement, and heavy equipment operation for mainline excavations and site restoration. Paul was also responsible for customer service calls related to leaks, low pressure, and service outages—resolving field issues promptly and professionally. His deep familiarity with construction blueprints and standard plans allowed him to read and interpret design documents accurately, and he consistently ensured safe and efficient execution of field tasks.

Florin County Water District | ***Field Superintendent***
At Florin County Water District, Paul held a senior leadership role overseeing the daily operation and maintenance of the entire water system. He managed 10 groundwater wells, directed chlorination operations using sodium hypochlorite, and supervised new mainline installations as well as emergency repairs. Paul reviewed development plans for compliance with district standards, coordinated utility locates, and scheduled daily activities for field staff. His duties also included preparing annual operations budgets, presenting financial and operational updates to the Board of Directors, and managing inventory and procurement of equipment and parts. His hands-on knowledge of utility construction, leak detection, water quality sampling, and pipeline operations provided the foundation for reliable service delivery across the district

Topic: Fair Oaks Blvd. Overlay Project Valve Boxes Adjustments
Date: September 5, 2025
Item For: Action

Submitted By: Lucas Campbell- Distribution Superintendent

BACKGROUND

Sacramento County is preparing to upgrade Fair Oaks Boulevard between Manzanita Avenue and Marshall Avenue as part of an upcoming roadway improvement project. The planned improvements will include a pavement overlay, which entails grinding the existing roadway surface down by 2 to 4 inches to accommodate the new layer of asphalt.

As part of this process, all utility providers with infrastructure located within the project limits must lower their utility boxes to allow the County's contractor to complete the grinding and overlay work. Timely coordination and compliance are essential to avoid project delays.

SUMMARY/DISCUSSION

Based on GIS mapping, the District has approximately 72 valve boxes located within the overlay limits of the upcoming Fair Oaks Boulevard roadway improvement project, between Manzanita Avenue and Marshall Avenue. As required, these valve boxes must be lowered prior to the roadway grinding and subsequently raised following the final paving.

Per Sacramento County's policy, all financial responsibilities for utility adjustments fall on the utility agencies, including the District.

The District solicited quotes from three different companies to perform the work of lowering and then raising the valve boxes. Granite Construction, who will be working for the County to perform the overlay quoted a cost of $215,600 and Flowline who will be performing the pipe replacement for the District quoted a cost of $177,232. Planet Paving, who has the current on-call contract with the District for typical paving work, was not responsive to staff's request on specific items for the valve adjustments and, as such, deemed unresponsive. Of the three contractors, the lowest responsive quote was from Flowline.

- Other considerations District staff evaluated include the logistics and risk related to one contractor working near another contractor as follows: **Timing Uncertainty**: If the County delays its roadway paving after the District has already lowered the valves, these valves become inaccessible, remaining below the roadway surface for an extended period.
- **Emergency Access**: In the event of an emergency requiring immediate valve access, District crews would need to jackhammer and vacuum-excavate the valve boxes. This significantly delays emergency response times, especially if multiple valves are affected.
- **Risk Amplification**: A delayed response in such emergencies can lead to more severe service disruptions and compounded infrastructure or property damage.

These consideration were adequately addressed in the quote from Flowline.

FISCAL IMPACT

The cost of the valve box lowering and raising is an annual funding of $200,000 within the CIP budget for Sacramento County road work related projects per District's Reserve Policy. There is enough funding in the line item to cover Flowline's quote of $177,232 plus $22,768, 12.8%, for contingency, for a total of $200,000. It is important to emphasize that this project does not directly benefit CWD's infrastructure or improve District service delivery. Nevertheless, the District is required to bear the full financial burden for adjusting its facilities to accommodate the County's roadway work.

RECOMMENDATION

Staff recommends the Board of Directors approve a contract with Flowline Contractors, Inc. for $177,232 and authorize the General Manager to execute an agreement with a 12.8% contingency of $22,768, for a total not-to-exceed amount of $200,000.

ATTACHMENT(S)

- Quotes from Flowline Contractors, Inc. and Granite Construction

ATTACHMENT 1

Proposal
FLOWLINE CONTRACTORS, INC.
Job Code: CWDRAISELOWERIRON
Description: BID - CWD - Lowering and Raising Iron

Job Code	CWDRAISELOWERIRON
Job Description	BID - CWD - Lowering and Raising Iron
Job Location	Fair Oaks
Job City	Carmichael
Job County	Sacramento
Job State	CA
Job Country	USA

Proposal

Line No.	Pay Item No.	Description Subtotal Description	Quantity	Unit of Measure	Unit Price	Total Price
05	1	Traffic Control	1.00	LS	36,040.00	36,040.00
10	2	Lower Existing Water Valve Boxes	72.00	Each	598.00	43,056.00
15	3	Supply and Install New Valve Boxes and Lids to Finish Grade – – Major Road & Minor Road	72.00	Each	1,303.00	93,816.00
20	4	GPS Valves	72.00	Each	60.00	4,320.00
					Subtotal:	177,232.00
					Running Total:	177,232.00
					GRAND TOTAL:	177,232.00

Proposal Certification

Signed: _____

Date: _____

GRANITE™

QUOTATION & CONTRACT

Granite Construction Company ("Provider") offers to furnish the equipment, labor, materials, and/or services described below to **Carmichael Water District** ("Company") in connection with construction of improvements at the following project: **Sacramento County AC Overlay Contract 4649** ("Project"). The Project is being performed on property owned by The County of Sacramento.

Description of Work and Price

Item No.	Cost Code	Description	Approximate Quantity	UM	Unit Price	Approximate Total
1		Lower Water Valve Facilities	72	EA	$1,000.00	$72,000.00
2		Raise Water Valve Facilities	72	EA	$1,300.00	$93,600.00
3		Traffic Control (per 8-hour shift)	10	EA	$5,000.00	$50,000.00
					APPROXIMATE TOTAL:	**$215,600.00**

Inclusions:

1) **Work performed on Fair Oaks Blvd from Manzanita Ave to Marshall Abe, Lower and Raise of company facilities**
2) **Locating water facilities**
3) **Company to provide new valve boxes if existing are damaged.**
4) **Raise/Lower 10-12 valves per shift.**

PRICING IS BASED ON THE QUANTITIES SPECIFIED ABOVE AND IS SUBJECT TO ESCALATION AFTER 10.31.2025, OR IF THE ACTUAL QUANTITIES VARY FROM THE ESTIMATED QUANTITIES BY MORE THAN 10%. Pricing is subject to equitable adjustment to account for any change in the price of steel if there is no applicable steel index.

Unless the words "Lump Sum" appear next to an item at work, is understood and agreed that the quantities referred to above are estimates only and that payment shall be made at the stated unit prices for actual quantities of work performed by Provider. This Quotation expires thirty (30) days from its issuance.

The person signing below represents that he/she is authorized to enter into this Quotation & Contract ("Contract") on behalf of the Company and has received the Provider's Standard Terms & Conditions, which are incorporated by reference herein. This Contract, including the Standard Terms & Conditions, are accepted by the following:

COMPANY

By: _____
Printed Name: _____
Its: __Fair Oaks Water District
Date: _____

PROVIDER:

By: _____
Printed Name: _____
Its: __Granite Construction Company
Date: _____
License No.:_____

The following applies to work in California: Contractors are required by law to be licensed and regulated by the Contractors' State License Board which has jurisdiction to investigate complaints against contractors if a complaint regarding a patent act or omission is filed within four years of the date of the alleged violation. A complaint regarding a latent act or omission pertaining to structural defects must be filed within 10 years of the date of the alleged violation. Any questions concerning a contractor may be referred to the Registrar, Contractors' State License Board, P.O. Box 26000, Sacramento, CA 95826.

Provider _____
Company _____

STANDARD TERMS & CONDITIONS – QUOTATION & CONTRACT

1. Applicability. These terms and conditions are incorporated into Provider's Quotation & Contract (collectively, the "Contract"). The Contract comprises the entire agreement between the parties, and supersedes all prior or contemporaneous communications, understandings, agreements, negotiations, representations and warranties. The Contract prevails over any of Company's general terms and conditions of purchase regardless whether or when Company may have submitted a purchase order or contract.

2. Payment. Provider's agreement to perform any work hereunder is conditioned upon Company's satisfaction of Provider's credit terms, as determined in Provider's sole discretion. Payment terms are net 30 days from date of Provider's invoice or sooner as may be required by applicable law. Late payments shall accrue a finance charge of one and one-half percent (1½%) per month or the highest rate allowable by law, whichever is less. Provider shall be entitled to stop work and recover all costs and expenses, including reasonable attorneys' fees, arising out of Company's failure to make all payments due under this Contract in a timely manner.

3. Taxes. Company is responsible for payment of all taxes and duties not specifically assumed in writing by Provider in the Contract. Company agrees to defend, indemnify and hold Provider harmless from any damages and expenses related to any levy or attempted levy of any other taxes on Provider.

4. Suspension; Termination. In addition to any other remedies available to Provider, Provider may suspend or terminate this Contract with immediate effect upon written notice to Company, if Company: (i) fails to pay any amount when due under this Contract (or any other agreement Company has with Provider); (ii) has not otherwise performed or complied with any of these terms (or complied with the terms of any other agreement Company has with Provider); (iii) becomes insolvent, files a petition for bankruptcy or commences or has commenced against it proceedings relating to bankruptcy, receivership, reorganization or assignment for the benefit of creditors; or (iv) exhibits other adverse credit conditions that are unsatisfactory to Provider, as determined by Provider in its sole discretion.

5. Shipment; Delivery. Unless otherwise agreed in writing, all materials purchased by Company shall be FOB Provider's plant sourcing the Contract. If FOB Destination, the Company agrees to provide suitable roadways or approaches to points of delivery. Provider reserves the right to cease deliveries if Provider concludes, in its sole opinion, that the roadways or approaches are unsatisfactory. In the event Company Contracts delivery beyond curb line, Company assumes liability for damages to sidewalks, driveways or other property, loss and expense incurred as a result of such deliveries to the maximum extent allowed by law. Prices quoted herein are based on prompt unloading of trucks. Delays of more than 20 minutes are subject to an additional charge. Company also agrees to provide a safe, suitable work area for Provider and its employees.

6. Title and Risk of Loss. Title and risk of loss passes to Company at the time any materials are loaded into Company's, or Company's agents', vehicles, barges or other modes of transport, in the case of FOB Plant sales, or in the case of Provider's delivery, upon delivery of the Materials.

7. Warranty. Provider warrants that the goods and services herein will conform to the specifications and shop drawings issued by Provider prior to manufacture of the goods and/or Provider's performance of the services. PROVIDER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSES. Company shall verify that Provider's materials comply with the plans and specifications prior to installation. Changes to the plans and specifications shall be made by written change order and Provider shall be entitled to an equitable price adjustment for such changes. The express limited warranty set forth herein shall be void if Company fails to pay Provider in full for the materials provided by Provider pursuant to this Contract.

8. Time. Provider shall make reasonable efforts to provide the equipment, labor, materials and/or services by the specified delivery date and provide notice to Company of any expected delays. Provider is not responsible for any delays including, but not limited to, labor disputes, repairs to machinery, fire, flood, inclement weather, inability to obtain transportation, fuel, electric power, or operating materials or machinery at reasonable cost; or by reason of any other cause beyond its control, including the inability to produce materials meeting any applicable specification or requirement. Company shall equitably compensate Provider for additional costs incurred as a result of delays outside Provider's control. In the event any such contingency should occur, Provider reserves the right to determine the order of priority of delivering to its purchasers.

9. Modification. No amendment or modification of this Contract shall be valid or enforceable unless in writing and signed by the party sought to be charged, and no prior or current course of dealing between the parties, or any usage of trade or custom of the industry shall modify or supplement the terms and conditions of this Contract.

10. No Waiver. The failure of Provider to exercise any right granted hereunder shall not impair or waive Provider's privilege of exercising such right to any subsequent time or times.

11. Damages. Provider's liability for any damages related to this Contract shall be limited to, at Provider's option, (i) replacement of defective materials and work or, at Provider's option and (ii) a refund of any payments made by Company. **IN NO EVENT SHALL PROVIDER BE LIABLE FOR ANY CONSEQUENTIAL, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR PUNITIVE DAMAGES WITH REGARD TO ANY CLAIM ARISING OUT OF OR RELATING TO THIS CONTRACT.** It is further understood that Provider shall not be responsible for any damage to or deterioration of any of its work, whether completed or in process, resulting from any cause or causes beyond its reasonable control, including but not limited to design, failure of subgrade or other subsurface conditions, or failure or inadequacy of any labor or materials not furnished and installed by Provider, whether or not such failure or inadequacy was or could have been known at the time its work was undertaken, or for any work performed under adverse weather conditions

12. Indemnity. To the maximum extent permitted by applicable law, Company shall defend, indemnify and hold Provider, its officers, employees, agents, insurers, sureties, and affiliates, harmless from any and all losses, damages, expenses (including attorneys' fees), claims, suits, liabilities, fines and remedial or clean-up costs arising out of: (i) Company's breach of this Contract or (ii) any act or omission by or on behalf of Company, its employees, contractors and/or agents.

13. Applicable Law. This Contract, and the rights, duties, obligations and remedies of the parties shall be governed by or construed in accordance with the laws of the state where the Project is located.

14. Work Conditions. Provider shall have no responsibility for any site condition unless it was ascertainable through a visual pre-bid examination of the project site or disclosed in writing to Provider prior to the execution of the Contract. Provider shall be entitled to rely on the design documents and specifications as being accurate and complete and shall not be responsible for error or deficiencies in such documents. If Provider's work is dependent upon or must be undertaken in conjunction with the work of others, such work shall be so performed and completed as to permit Provider to perform its work in a normal uninterrupted single shift operation. Unless a time for the performance of Provider's work is specified, Provider shall undertake the work in the course of its normal operating schedule. Provider shall not be liable for any failure to undertake or complete the work for causes beyond its control, and Provider may suspend the work for causes beyond its control, including but not limited to fire, flood or other casualty; the presence on or beneath the work site of utilities, facilities, substances, or objects, including but not limited to any substance that in Provider's opinion is hazardous or toxic or the reporting, remediation, or clean-up of which is required by any law or regulation; labor disputes or other disagreements; and accidents or other mishaps, whether affecting this work or other operations in which Provider is involved, directly or indirectly. If for causes beyond Provider's control, Provider's work is not completed within twelve (12) months after the date of Company's acceptance of the Contract, Provider may cancel this Contract. In such event: (i) Provider shall be relieved of any further obligation with respect to the balance of the work and (ii) Provider shall be entitled to receive final and complete payment for all work performed by us to the date of cancellation within fifteen (15) days thereafter.

15. Miscellaneous. Unless otherwise specified in writing, Company shall be responsible for testing the materials and confirming that the materials comply with the applicable specifications at Provider's facility prior to directing shipment. All funds paid to Company from a third party for Provider's labor, services, materials, and equipment shall be deemed in trust for the payment of Provider. Safety Data Sheets and product label information are available at Provider's office or Provider's website. Company agrees to draw to the attention of any persons handling or using the materials or having access to the materials while in Company's possession or to whom Company sells the materials or any part thereof any warning, information of suggestions which are contained or referred to in the Safety Data Sheets or label information, or any other literature or packaging relating to the materials.

16. MANDATORY BINDING ARBITRATION. ALL CLAIMS OR CONTROVERSIES ARISING OUT OF OR RELATED TO THIS ORDER SHALL BE SUBMITTED TO AND RESOLVED BY BINDING ARBITRATION BY A SINGLE ARBITRATOR IN THE COUNTY AND STATE WHERE THE PROJECT IS LOCATED; PROVIDED, HOWEVER, A PANEL OF THREE ARBITRATORS SHALL RESOLVE ALL DISPUTES WHERE THE AMOUNT IN CONTROVERSY EXCEEDS $5 MILLION ("LARGE DISPUTES"). THE AMERICAN ARBITRATION ASSOCIATION (AAA) SHALL CONDUCT THE ARBITRATION PURSUANT TO AAA'S CONSTRUCTION INDUSTRY ARBITRATION RULES. THE COSTS OF THE ARBITRATION SHALL BE BORNE EQUALLY BY THE PARTIES. NOTWITHSTANDING ANY LANGUAGE TO THE CONTRARY IN THE ORDER, THE PARTIES AGREE: THAT THE UNDERLYING AWARD MAY BE APPEALED PURSUANT TO THE AAA'S OPTIONAL APPELLATE ARBITRATION RULES ("APPELLATE RULES"); THAT THE UNDERLYING AWARD RENDERED BY THE ARBITRATOR(S) SHALL, AT A MINIMUM, BE A REASONED AWARD; AND THAT THE UNDERLYING AWARD SHALL NOT BE CONSIDERED FINAL UNTIL AFTER THE TIME FOR FILING THE NOTICE OF APPEAL PURSUANT TO THE APPELLATE RULES HAS EXPIRED. EACH PARTY AFFIRMATIVELY AGREES TO THE ARBITRATION PROVISION SET FORTH HEREIN AND INTENDS THAT THIS PARAGRAPH SATISFY THE ARBITRATION REQUIREMENTS OF ANY APPLICABLE LAW.

Provider _____

Company _____

This page intentionally left blank.

Topic: Public Hearing – Compliance with New Legal Obligations on Vacancies and Recruitment and Retention Efforts

Date: September 10, 2025

Item For: Action

Submitted By: Cathy Lee, General Manager

BACKGROUND

Assembly Bill 2561 (AB 2561) was introduced to address the issue of job vacancies in local government, which adversely affects the delivery of public services and employee workload. The bill was enacted into law and is codified at Government Code section 3502.3. The new law is effective January 1, 2025. The bill was introduced based on a statewide concern for persistent vacancies in public agencies, service delivery, and concerns with workload, burnout, and morale with the intent to identify any necessary changes to policies procedures, and recruitment activities that may lead to obstacles in the hiring process, if any.

SUMMARY/DISCUSSION

The new law requires public agencies to present the status of job position vacancies and recruitment and retention efforts at a Public Hearing before the agency's governing Board at least once per fiscal year. If the agency's governing Board adopts an annual or multi-year budget during the fiscal year, the required presentation must be made before the budget's adoption. During the Public Hearing, the public agency is required to identify any necessary changes to policies, procedures, and recruitment activities that may lead to obstacles in the hiring process, if any.

In FY 24-25, the District had 27.5 authorized full-time positions, of which 14 positions are represented. Vacancy and recruitment information for FY 24-25 is listed in the table below:

Reason for Vacancy	Reason for Vacancy	Start of Vacancy	Date of Recruitment	Date Vacancy Filled	Days to Fill Vacancy
Represented Employees					
Treatment Operator	Voluntary Separation	11/21/2024	11/27/2024	3/10/2025	103
Distribution Operator	New Position/ Reclassification	7/1/2024	11/27/2024	3/3/2025	96
Distribution Operator	Involuntary Separation	3/20/2025	4/11/2025	6/25/2025	75
Non-Represented Employees					
Business Operations Specialist	Position Reclassification	8/22/2024	9/27/2024	3/3/2025	157 (two recruitments)
Distribution Superintendent	Retirement	11/23/2024	8/26/2024	11/18/2024	84
GIS Specialist/ Water Efficiency Specialist	Voluntary Separation	2/12/2025	3/19/2025	6/2/2025	75

The law specifies that if the number of job vacancies within a bargaining unit meets or exceed 20 percent of the total number of authorized full-time positions, the public agency shall, upon request of the recognized employee organization provide additional data including: the total number of job vacancies, number of applicants, and number of days to complete the hiring process including opportunities to improve compensation and other working conditions. The two concurrent vacancies in the represented group in FY 24-25 represent a 14% vacancy rate. There is currently 1 vacancy in the represented group for the entire District. Recruitment for this position is on-going.

It should be noted that AB 2561 provides for a Public Hearing but does not specify any particular form of notice or process. To fulfill this requirement, the Board President may simply ask for public comment after the staff presentation.

FINANCIAL IMPACT
There is no fiscal impact related to this agenda item.

RECOMMENDATION
Staff recommends that the Board of Director receive and address public comment, if any, and file information on District's vacancies during Fiscal Year 2024-2025.

ATTACHMENT(S)
None.

Topic: September Informational Update for the La Vista Tank and Booster Pump Station Project

Date: September 10, 2025

Item For: Information

Submitted By: Greg Norris, Engineering Manager

BACKGROUND

The La Vista Tank and Booster Pump Project began construction in June 2021. The contractor was selected to be Koch and Koch Inc. (KKI) through a competitive bidding process. Project work progressed through March 2023, at which time PCB was found on site. The PCB had originated from the existing tank's lining and been spread on site during demolition. Construction stopped while the project site was remediated and did not start back until December 2023. KKI continued construction into April of 2024 at which time they stopped work due to a dispute with the contract.

After many months of negotiations, KKI and the District were able to agree to terms for KKI to return to work and complete the project. A Reinstatement Agreement was executed by the District on February 19, 2025 specifying that the contractor has 458 days to complete the work from that date. In anticipation to KKI returning to work, the District hired Toppel Consulting (Toppel) in January 2025 to perform construction management duties and re-initiated the existing agreement with Kennedy-Jenks (KJ) to perform engineering duties.

SUMMARY/DISCUSSION

Since last month's report, KKI has focused primarily on finishing construction of the new pump building. Booster pumps have been mounted on the pedestals and switchgear/controller cabinets are in-place.

Toppel consulting coordinated four weekly meetings since last month's report, processed RFIs, scheduled special inspections, and tracked progress. See Attachment 1.

No change orders for this month.

Work progress is consistent with the Critical Path Method (CPM) schedule shown in Attachment 2.

In addition, a claim was received from a neighbor on August 11, 2025 for property damage related to their fencing and for ground disturbance that was caused during construction of the perimeter wall. District staff are currently working with the neighbor to address the issues identified in the claim. If the cost of the work necessary to address the claim exceeds $10,000, staff will seek Board's approval for the necessary work or compensation at next month's meeting per Regulation 1010 – Claims Procedure.
.

ATTACHMENT(S)

1. Toppel Consulting Monthly Report for August.
2. Toppel Consulting CPM Analysis Report
3. Claim from neighbor for fencing.

Sub: 162 August 2025 CPM Update

Kennedy/Jenks Consultants

From: KOCH & KOCH

Page: 1 of 2
Submittal Date: 9/3/25
K/J Job No.: 1970010*00
Project Name: LA VISTA TANK AND BPS

Specification Section: 01311

Prior Submittal: _____

Submittal

A. Certification of Completeness and Accuracy

We certify that we have reviewed this submittal in detail and that the submittal is:

1. Complete and accurate and in complete compliance with the Contract Documents.
2. Compliant with the requirements of "Material and Equipment" in Section 01040, especially the subparagraph titled "Compatibility of Equipment and Material".
3. Compliant with the paragraph titled "Performance Specifications and Contractor Designed Items" in Section 01040.
4. Without any deviations from the Contract Drawings, except the following (describe deviation) which have the following advantages and disadvantages:

Signed by Subcontractor: _____ Title: _____ Date: _____

Signed by Contractor: _____ Title: _____ Date: _____

Response Date: 09/04/25 **K/J Job No.:** 1970010*00
Specification Section: **Project Name:** La Vista Tank & BPS
Page: 2 of 2

Response

Item	TC Action	Refer to Comment	Manufacturer or Supplier	Title of Submittal / Drawing
	NET	1-2	Koch & Koch, Inc	August 2025 CPM Update

A. The action(s) noted above have been taken on the enclosed document(s).

NET = No Exceptions Taken
MCN-N = Make Corrections Noted, No Resubmital Required
MCN-R = Make Corrections Noted, Partial Resubmital Required
A&R = Amend and Resubmit
NR = Not Reviewed
RR = Rejected, Resubmit
RA = Receipt Acknowledged

Comment(s):

1. 1. Critical path and overall project sequencing remain consistent with the July update
2. Project is currently on schedule

B. Corrections or comments made on the shop drawings during this review do not relieve the Contractor from compliance with the requirements of the Drawings and Specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. The Contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

Adam Boje
Responder: Adam Boje- sign above

Distribution	Submittal	Encl.	Response
Owner			
Engineer			
Contractor			
File			

August 2025

CPM Schedule Project Narrative

Carmichael Water District

La Vista Tank & Booster Pump Station

Koch & Koch, Inc.
PREPARED BY: SOREN DARR

Contents

Milestones and Key Dates

- Reinstatement Agreement/NTP – 02/19/25
- Pre-Construction Meeting – 02/27/25
- First Working Day – 02/28/25
- Expected Completion Date – 5/23/26

1. Work Completed During This Period

- Trusses and Metal Decking Complete.
- Elect Room Furred Walls & Ceiling Installed & Painted.
- Doors and Frames with Locksets Installed.
- Hatches & Skylights Installed.
- Chem Room Floor Coating Completed.
- Electrical Panels Installed.

2. Identification of Unusual Conditions or Restrictions

- No unusual conditions or restrictions were encountered during this period.

3. Description of the Current Critical Path

- The critical path starts with the disconnection and removal of the existing well pump and then moves through demolition of the existing BPS, installation of the new well pump and associated piping, finish grading, final walkthrough and punchlist.
- Task 87 Shutdown/disconnect well pump has a start no earlier than constraint so that the work falls within the unrestricted shutdown period of Dec-Feb.

4. Changes to Critical Path, Logic and Completion Since Last Update

- Critical path and completion date are the same as the last update.
- Logic, duration or task changes have been made as needed to allow the schedule to reflect the actual course of construction.

5. Current and Anticipated Delays

- None.

6. Pending Items and Status of Permits, Change Orders, Time Adjustments and Noncompliance notices

- None

7. Reasons for Early or Late Scheduled Completion

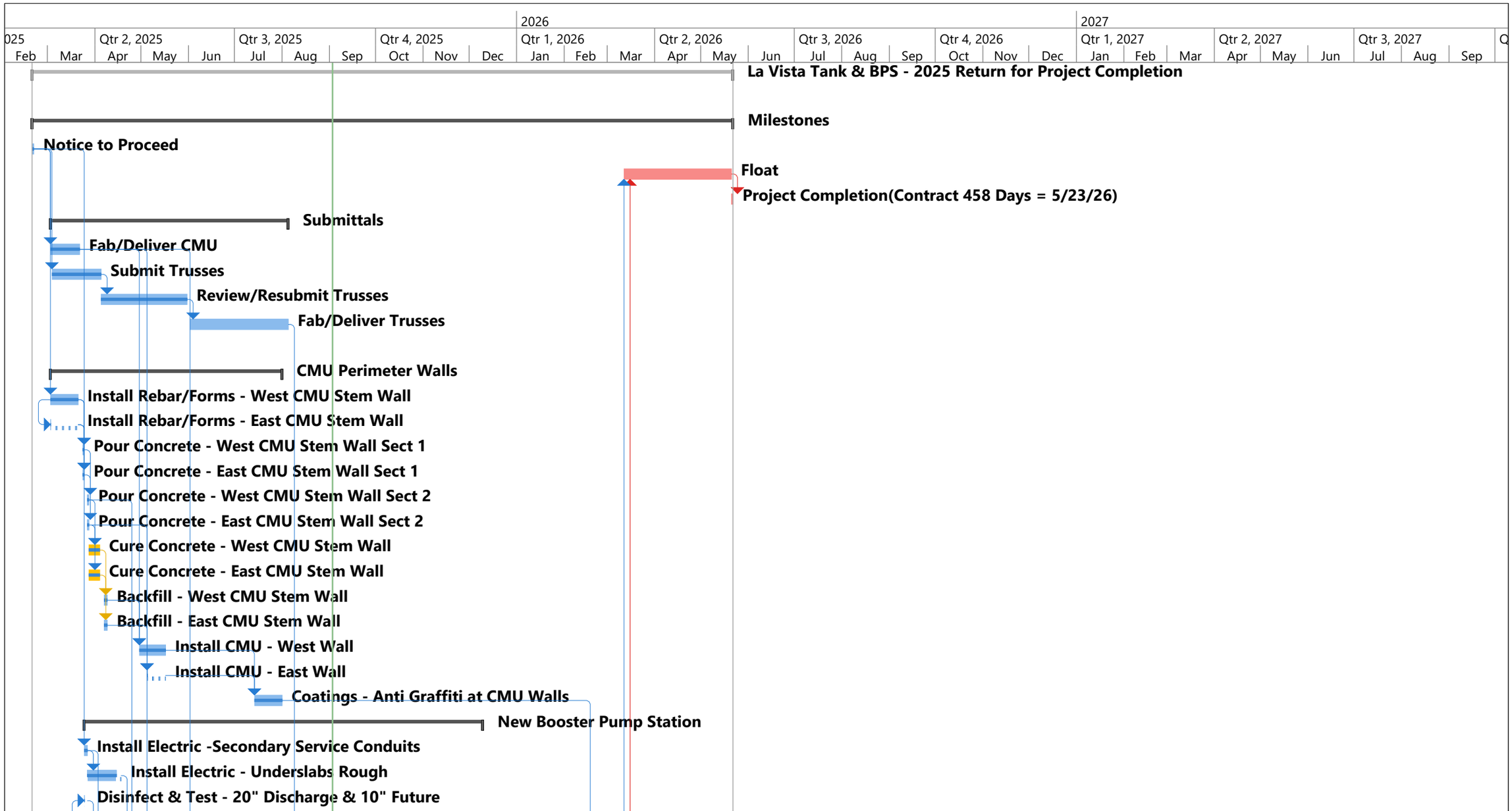
- Project is currently on schedule.

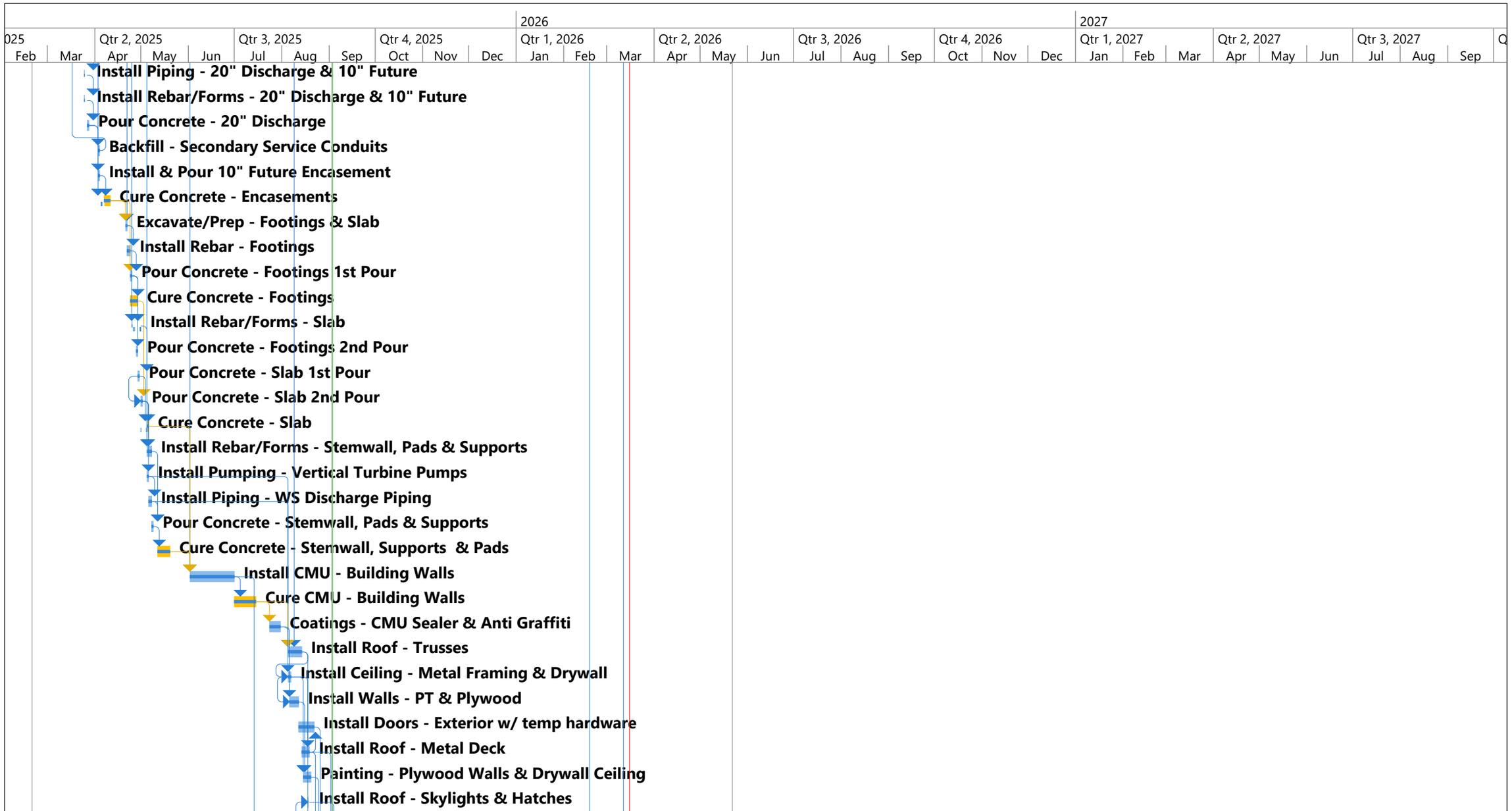
ID	Task Mode	Task Name	Duration	Start	Finish	Actual Start	Actual Finish	Late Start	Late Finish	Free Slack	Total Slack	Predecessors	Successors	% Complete	202 Qtr Ja
0		**La Vista Tank & BPS - 2025 Return for Project Completion**	**254 d**	**2/19/25**	**5/21/26**	**2/19/25**	**NA**	**2/19/25**	**5/21/26**	**0 d**	**0 d**			**54%**	
1		**Milestones**	**254 d**	**2/19/25**	**5/21/26**	**2/19/25**	**NA**	**2/19/25**	**5/21/26**	**0 d**	**0 d**			**2%**	
2		Notice to Proceed	1 d	2/19/25	2/19/25	2/19/25	2/19/25	2/19/25	2/19/25	0 d	0 d		6,9,11,64	100%	
3		Float	40 d	3/12/26	5/20/26	NA	NA	3/12/26	5/20/26	0 d	0 d	103,104	4	0%	
4		Project Completion(Contract 458 Days = 5/23/26)	1 d	5/21/26	5/21/26	NA	NA	5/21/26	5/21/26	0 d	0 d	3		0%	
5		**Submittals**	**88 d**	**3/3/25**	**8/4/25**	**3/3/25**	**NA**	**3/3/25**	**5/21/26**	**160 d**	**160 d**			**63%**	
9		Fab/Deliver CMU	12 d	3/3/25	3/21/25	3/3/25	3/21/25	3/3/25	3/21/25	0 d	0 d	2	32,70,75	100%	
6		Submit Trusses	19 d	3/4/25	4/4/25	3/4/25	4/4/25	3/4/25	4/4/25	0 d	0 d	2	7	100%	
7		Review/Resubmit Trusses	31 d	4/5/25	5/30/25	4/5/25	5/30/25	4/5/25	5/30/25	0 d	0 d	6	8	100%	
8		Fab/Deliver Trusses	37 d	6/2/25	8/4/25	6/2/25	NA	6/2/25	5/21/26	160 d	160 d	7	36	0%	
62															
63		**CMU Perimeter Walls**	**87 d**	**3/3/25**	**7/31/25**	**3/3/25**	**7/31/25**	**3/3/25**	**7/31/25**	**0 d**	**0 d**			**100%**	
64		Install Rebar/Forms - West CMU Stem Wall	12 d	3/3/25	3/20/25	3/3/25	3/20/25	3/3/25	3/20/25	0 d	0 d	2	69SS,71,65	100%	
69		Install Rebar/Forms - East CMU Stem Wall	12 d	3/3/25	3/20/25	3/3/25	3/20/25	3/3/25	3/20/25	0 d	0 d	64SS	71,65	100%	
65		Pour Concrete - West CMU Stem Wall Sect 1	1 d	3/24/25	3/24/25	3/24/25	3/24/25	3/24/25	3/24/25	0 d	0 d	69,64	66FS+2 ed	100%	
71		Pour Concrete - East CMU Stem Wall Sect 1	1 d	3/24/25	3/24/25	3/24/25	3/24/25	3/24/25	3/24/25	0 d	0 d	69,64	72FS+2 ed	100%	
66		Pour Concrete - West CMU Stem Wall Sect 2	1 d	3/27/25	3/27/25	3/27/25	3/27/25	3/27/25	3/27/25	0 d	0 d	65FS+2 ed	25,67	100%	
72		Pour Concrete - East CMU Stem Wall Sect 2	1 d	3/27/25	3/27/25	3/27/25	3/27/25	3/27/25	3/27/25	0 d	0 d	71FS+2 ed	29,73	100%	
67		Cure Concrete - West CMU Stem Wall	4 d	3/28/25	4/3/25	3/28/25	4/3/25	3/28/25	4/3/25	0 d	0 d	66	68	100%	
73		Cure Concrete - East CMU Stem Wall	4 d	3/28/25	4/3/25	3/28/25	4/3/25	3/28/25	4/3/25	0 d	0 d	72	74	100%	
68		Backfill - West CMU Stem Wall	2 d	4/7/25	4/8/25	4/7/25	4/8/25	4/7/25	4/8/25	0 d	0 d	67	70	100%	
74		Backfill - East CMU Stem Wall	2 d	4/7/25	4/8/25	4/7/25	4/8/25	4/7/25	4/8/25	0 d	0 d	73	75	100%	
70		Install CMU - West Wall	10 d	4/30/25	5/16/25	4/30/25	5/16/25	4/30/25	5/16/25	0 d	0 d	68,9	76FS+28 ed	100%	
75		Install CMU - East Wall	8 d	5/5/25	5/16/25	5/5/25	5/16/25	5/5/25	5/16/25	0 d	0 d	74,9	76FS+28 ed	100%	
76		Coatings - Anti Graffiti at CMU Walls	12 d	7/14/25	7/31/25	7/14/25	7/31/25	7/14/25	7/31/25	0 d	0 d	75FS+28 ed,7	102	100%	
10		**New Booster Pump Station**	**145 d**	**3/25/25**	**12/9/25**	**3/25/25**	**NA**	**3/25/25**	**2/25/26**	**41 d**	**41 d**			**62%**	
11		Install Electric -Secondary Service Conduits	2 d	3/25/25	3/26/25	3/25/25	3/26/25	3/25/25	3/26/25	0 d	0 d	2	13,12	100%	
13		Install Electric - Underslabs Rough	15 d	3/25/25	4/17/25	3/25/25	4/17/25	3/25/25	4/17/25	0 d	0 d	11	20	100%	
14		Disinfect & Test - 20" Discharge & 10" Future	2 d	3/25/25	3/26/25	3/25/25	3/26/25	3/25/25	3/26/25	0 d	0 d	12	15	100%	

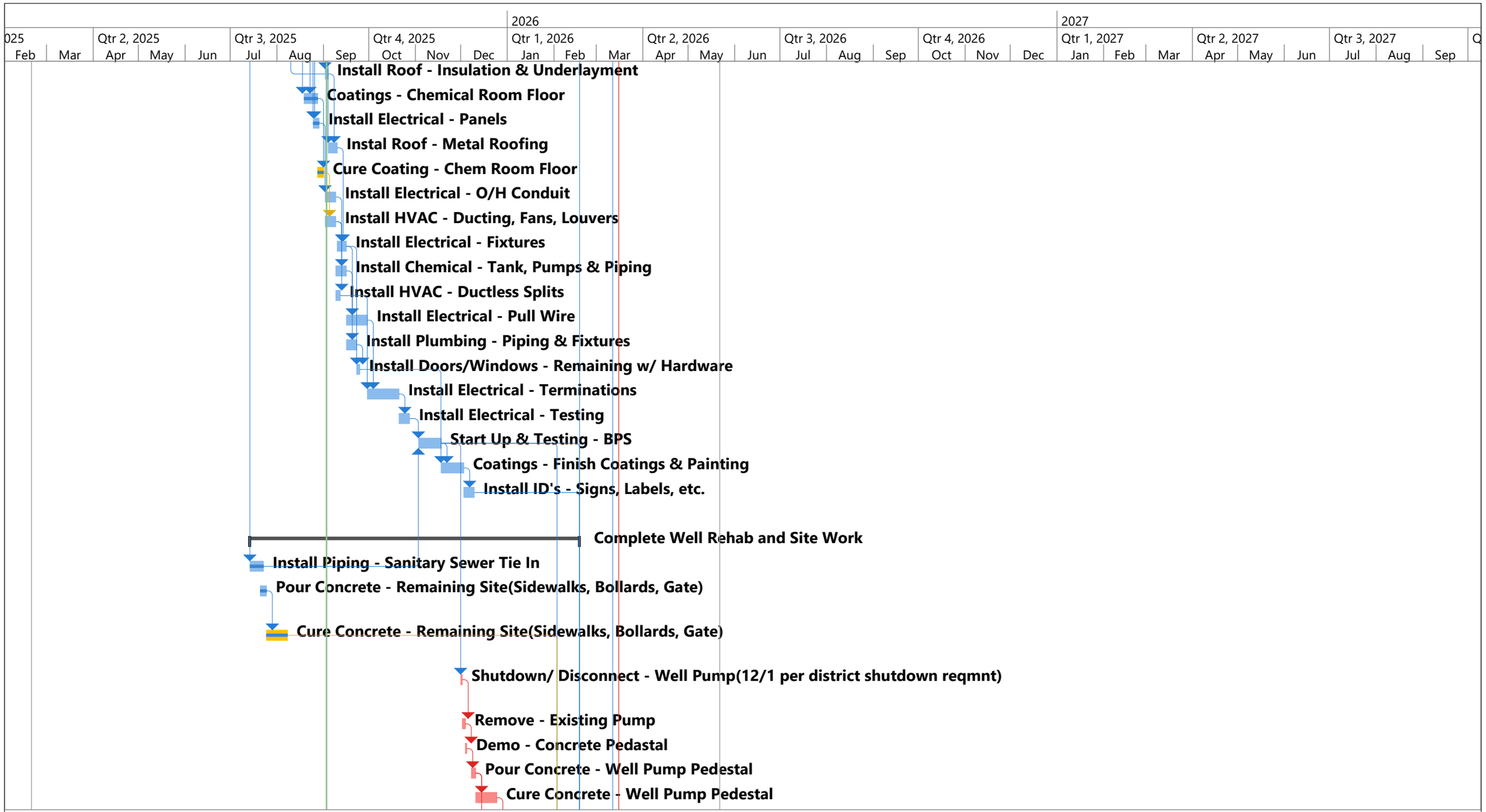
ID	Task Mode	Task Name	Duration	Start	Finish	Actual Start	Actual Finish	Late Start	Late Finish	Free Slack	Total Slack	Predecessors	Successors	% Complete	202 Qtr Ja
15		Install Piping - 20" Discharge & 10" Future	2 d	3/25/25	3/26/25	3/25/25	3/26/25	3/25/25	3/26/25	0 d	0 d	14	16	100%	
16		Install Rebar/Forms - 20" Discharge & 10" Future	2 d	3/25/25	3/26/25	3/25/25	3/26/25	3/25/25	3/26/25	0 d	0 d	15	17	100%	
17		Pour Concrete - 20" Discharge	1 d	3/27/25	3/27/25	3/27/25	3/27/25	3/27/25	3/27/25	0 d	0 d	16	19,18	100%	
12		Backfill - Secondary Service Conduits	1 d	4/3/25	4/3/25	4/3/25	4/3/25	4/3/25	4/3/25	0 d	0 d	11	14	100%	
18		Install & Pour 10" Future Encasement	1 d	4/3/25	4/3/25	4/3/25	4/3/25	4/3/25	4/3/25	0 d	0 d	17	19	100%	
19		Cure Concrete - Encasements	5 d	4/3/25	4/10/25	4/3/25	4/10/25	4/3/25	4/10/25	0 d	0 d	17,18	22,20	100%	
20		Excavate/Prep - Footings & Slab	1 d	4/21/25	4/21/25	4/21/25	4/21/25	4/21/25	4/21/25	0 d	0 d	13,19	21	100%	
21		Install Rebar - Footings	2 d	4/22/25	4/23/25	4/22/25	4/23/25	4/22/25	4/23/25	0 d	0 d	20	22	100%	
22		Pour Concrete - Footings 1st Pour	1 d	4/24/25	4/24/25	4/24/25	4/24/25	4/24/25	4/24/25	0 d	0 d	21,19	23FS+2 e...	100%	
24		Cure Concrete - Footings	2 d	4/24/25	4/28/25	4/24/25	4/28/25	4/24/25	4/28/25	0 d	0 d	22	27	100%	
25		Install Rebar/Forms - Slab	3 d	4/25/25	4/30/25	4/25/25	4/30/25	4/25/25	4/30/25	0 d	0 d	66,22	26	100%	
23		Pour Concrete - Footings 2nd Pour	1 d	4/28/25	4/28/25	4/28/25	4/28/25	4/28/25	4/28/25	0 d	0 d	22FS+2 ed		100%	
26		Pour Concrete - Slab 1st Pour	1 d	4/29/25	4/29/25	4/29/25	4/29/25	4/29/25	4/29/25	0 d	0 d	25	27SS+2 e...	100%	
27		Pour Concrete - Slab 2nd Pour	1 d	5/1/25	5/1/25	5/1/25	5/1/25	5/1/25	5/1/25	0 d	0 d	26SS+2 ed,24	28,29,34	100%	
28		Cure Concrete - Slab	2 d	5/1/25	5/5/25	5/1/25	5/5/25	5/1/25	5/5/25	0 d	0 d	26,27	32	100%	
29		Install Rebar/Forms - Stemwall, Pads & Supports	3 d	5/5/25	5/7/25	5/5/25	5/7/25	5/5/25	5/7/25	0 d	0 d	72,27	30	100%	
34		Install Pumping - Vertical Turbine Pumps	1 d	5/5/25	5/5/25	5/5/25	5/5/25	5/5/25	5/5/25	0 d	0 d	27	35,36	100%	
35		Install Piping - WS Discharge Piping	2 d	5/6/25	5/7/25	5/6/25	5/7/25	5/6/25	5/7/25	0 d	0 d	34	36,30	100%	
30		Pour Concrete - Stemwall, Pads & Supports	1 d	5/8/25	5/8/25	5/8/25	5/8/25	5/8/25	5/8/25	0 d	0 d	29,35	31	100%	
31		Cure Concrete - Stemwall, Supports & Pads	5 d	5/12/25	5/19/25	5/12/25	5/19/25	5/12/25	5/19/25	0 d	0 d	30	32	100%	
32		Install CMU - Building Walls	17 d	6/2/25	6/30/25	6/2/25	6/30/25	6/2/25	6/30/25	0 d	0 d	31,9,28	33,86	100%	
33		Cure CMU - Building Walls	8 d	7/1/25	7/14/25	7/1/25	7/14/25	7/1/25	7/14/25	0 d	0 d	32	36,44	100%	
44		Coatings - CMU Sealer & Anti Graffiti	4 d	7/24/25	7/30/25	7/24/25	7/30/25	7/24/25	7/30/25	0 d	0 d	33	41,43	100%	
36		Install Roof - Trusses	6 d	8/5/25	8/13/25	8/5/25	8/13/25	8/5/25	8/13/25	0 d	0 d	33,34,35,8	37,43	100%	
43		Install Ceiling - Metal Framing & Drywall	2 d	8/5/25	8/6/25	8/5/25	8/6/25	8/5/25	8/6/25	0 d	0 d	44,36	46,45,41S...	100%	
41		Install Walls - PT & Plywood	3 d	8/6/25	8/11/25	8/6/25	8/11/25	8/6/25	8/11/25	0 d	0 d	43SS+1 d,44	46	100%	
40		Install Doors - Exterior w/ temp hardware	7 d	8/12/25	8/21/25	8/12/25	8/21/25	8/12/25	8/21/25	0 d	0 d	37	48	100%	
37		Install Roof - Metal Deck	2 d	8/14/25	8/18/25	8/14/25	8/18/25	8/14/25	8/18/25	0 d	0 d	36	39,40,45	100%	
46		Painting - Plywood Walls & Drywall Ceiling	2 d	8/15/25	8/19/25	8/15/25	8/19/25	8/15/25	8/19/25	0 d	0 d	43,41	48	100%	
38		Install Roof - Skylights & Hatches	1 d	8/18/25	8/18/25	8/18/25	8/18/25	8/18/25	8/18/25	0 d	0 d	39SS	42	100%	

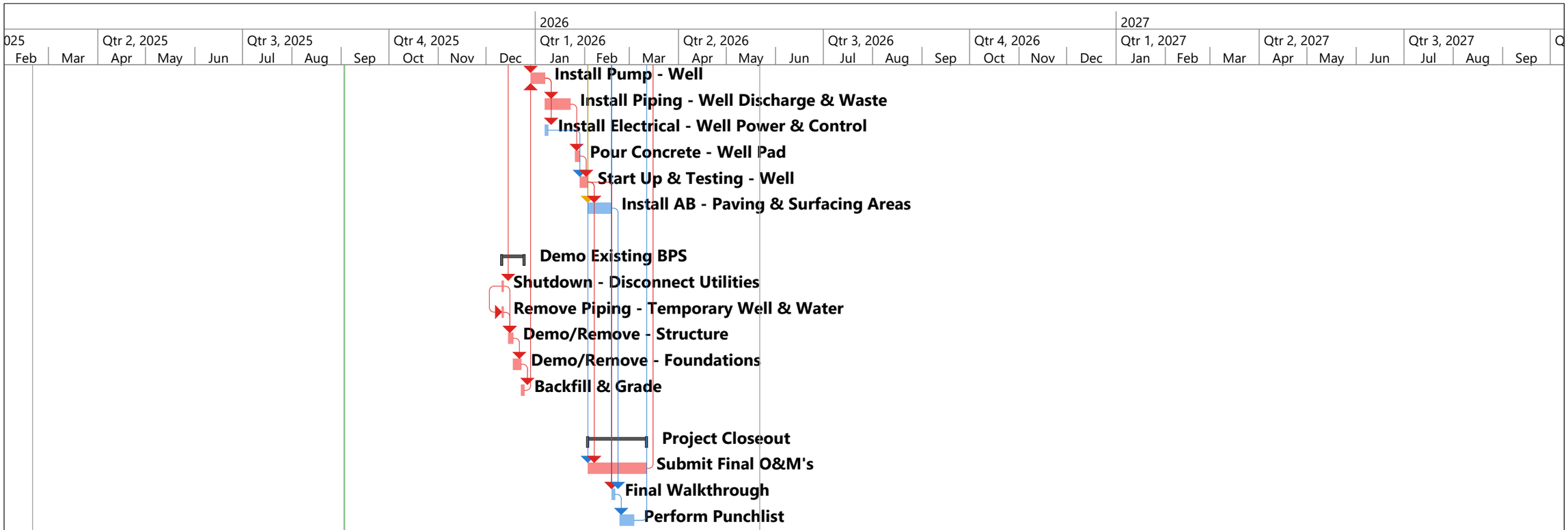
ID	Task Mode	Task Name	Duration	Start	Finish	Actual Start	Actual Finish	Late Start	Late Finish	Free Slack	Total Slack	Predecessors	Successors	% Complete
39		Install Roof - Insulation & Underlayment	2 d	9/2/25	9/3/25	NA	NA	9/17/25	9/18/25	0 d	9 d	37	42,38SS	0%
45		Coatings - Chemical Room Floor	7 d	8/18/25	8/27/25	8/18/25	8/27/25	8/18/25	8/27/25	0 d	0 d	43,37	47	100%
48		Install Electrical - Panels	4 d	8/25/25	8/28/25	8/25/25	8/28/25	8/25/25	8/28/25	0 d	0 d	46,40	49	100%
42		Instal Roof - Metal Roofing	3 d	9/4/25	9/9/25	NA	NA	9/22/25	9/24/25	0 d	9 d	39,38	51	0%
47		Cure Coating - Chem Room Floor	1 d	8/28/25	8/31/25	8/28/25	8/31/25	8/28/25	8/31/25	0 d	0 d	45	50	100%
49		Install Electrical - O/H Conduit	4 d	9/2/25	9/8/25	NA	NA	9/18/25	9/24/25	1 d	10 d	48	51	0%
50		Install HVAC - Ducting, Fans, Louvers	4 d	9/2/25	9/8/25	NA	NA	10/2/25	10/8/25	0 d	18 d	47	53,52	0%
51		Install Electrical - Fixtures	3 d	9/10/25	9/15/25	NA	NA	9/25/25	9/30/25	0 d	9 d	49,42	56,54	0%
52		Install Chemical - Tank, Pumps & Piping	4 d	9/9/25	9/15/25	NA	NA	1/19/26	1/22/26	0 d	70 d	50	55	0%
53		Install HVAC - Ductless Splits	3 d	9/9/25	9/11/25	NA	NA	10/9/25	10/14/25	9 d	18 d	50	57	0%
54		Install Electrical - Pull Wire	8 d	9/16/25	9/29/25	NA	NA	10/1/25	10/14/25	0 d	9 d	51	57	0%
55		Install Plumbing - Piping & Fixtures	4 d	9/16/25	9/22/25	NA	NA	1/26/26	1/29/26	0 d	70 d	52	56	0%
56		Install Doors/Windows - Remaining w/ Hardware	2 d	9/23/25	9/24/25	NA	NA	2/2/26	2/3/26	29 d	70 d	51,55	60	0%
57		Install Electrical - Terminations	12 d	9/30/25	10/20/25	NA	NA	10/15/25	11/4/25	0 d	9 d	54,53	58	0%
58		Install Electrical - Testing	4 d	10/21/25	10/27/25	NA	NA	11/5/25	11/12/25	3 d	9 d	57	59	0%
59		Start Up & Testing - BPS	8 d	11/3/25	11/17/25	NA	NA	11/13/25	11/26/25	0 d	6 d	58,86	60,102,10...	0%
60		Coatings - Finish Coatings & Painting	8 d	11/18/25	12/2/25	NA	NA	2/4/26	2/18/26	0 d	41 d	59,56	61	0%
61		Install ID's - Signs, Labels, etc.	4 d	12/3/25	12/9/25	NA	NA	2/19/26	2/25/26	36 d	41 d	60	102	0%
84														
85		**Complete Well Rehab and Site Work**	**119 d**	**7/14/25**	**2/17/26**	**7/14/25**	**NA**	**7/14/25**	**2/25/26**	**5 d**	**5 d**			**29%**
86		Install Piping - Sanitary Sewer Tie In	6 d	7/14/25	7/22/25	7/14/25	7/22/25	7/14/25	7/22/25	0 d	0 d	32	59	100%
97		Pour Concrete - Remaining Site(Sidewalks, Bollards, Gate)	4 d	7/21/25	7/24/25	7/21/25	7/24/25	7/21/25	7/24/25	0 d	0 d		98	100%
98		Cure Concrete - Remaining Site(Sidewalks, Bollards, Gate)	8 d	7/25/25	8/7/25	7/25/25	8/7/25	7/25/25	8/7/25	0 d	0 d	97	99	100%
87		Shutdown/ Disconnect - Well Pump(12/1 per district shutdown reqmnt)	1 d	12/1/25	12/1/25	NA	NA	12/1/25	12/1/25	0 d	0 d	59	88	0%
88		Remove - Existing Pump	2 d	12/2/25	12/3/25	NA	NA	12/2/25	12/3/25	0 d	0 d	87	89	0%
89		Demo - Concrete Pedastal	1 d	12/4/25	12/4/25	NA	NA	12/4/25	12/4/25	0 d	0 d	88	90	0%
90		Pour Concrete - Well Pump Pedestal	3 d	12/8/25	12/10/25	NA	NA	12/8/25	12/10/25	0 d	0 d	89	91,79	0%
91		Cure Concrete - Well Pump Pedestal	8 d	12/11/25	12/24/25	NA	NA	12/11/25	12/24/25	0 d	0 d	90	92	0%

ID	Task Mode	Task Name	Duration	Start	Finish	Actual Start	Actual Finish	Late Start	Late Finish	Free Slack	Total Slack	Predecessors	Successors	% Complete	202 Qtr Ja
92		Install Pump - Well	4 d	12/29/25	1/6/26	NA	NA	12/29/25	1/6/26	0 d	0 d	91,83	93,94	0%	
93		Install Piping - Well Discharge & Waste	10 d	1/7/26	1/22/26	NA	NA	1/7/26	1/22/26	0 d	0 d	92	95	0%	
94		Install Electrical - Well Power & Control	2 d	1/7/26	1/8/26	NA	NA	1/27/26	1/28/26	11 d	11 d	92	96	0%	
95		Pour Concrete - Well Pad	3 d	1/26/26	1/28/26	NA	NA	1/26/26	1/28/26	0 d	0 d	93	96	0%	
96		Start Up & Testing - Well	2 d	1/29/26	2/2/26	NA	NA	1/29/26	2/2/26	0 d	0 d	94,95	102,104,99	0%	
99		Install AB - Paving & Surfacing Areas	8 d	2/3/26	2/17/26	NA	NA	2/11/26	2/25/26	0 d	5 d	96,98	102	0%	
77															
78		**Demo Existing BPS**	**8 d**	**12/11/25**	**12/24/25**	**NA**	**NA**	**12/11/25**	**12/24/25**	**0 d**	**0 d**			**0%**	
79		Shutdown - Disconnect Utilities	1 d	12/11/25	12/11/25	NA	NA	12/11/25	12/11/25	0 d	0 d	90	81,80SS	0%	
80		Remove Piping - Temporary Well & Water	1 d	12/11/25	12/11/25	NA	NA	12/11/25	12/11/25	0 d	0 d	79SS	81	0%	
81		Demo/Remove - Structure	3 d	12/15/25	12/17/25	NA	NA	12/15/25	12/17/25	0 d	0 d	79,80	82	0%	
82		Demo/Remove - Foundations	2 d	12/18/25	12/22/25	NA	NA	12/18/25	12/22/25	0 d	0 d	81	83	0%	
83		Backfill & Grade	2 d	12/23/25	12/24/25	NA	NA	12/23/25	12/24/25	0 d	0 d	82	92	0%	
100															
101		**Project Closeout**	**21 d**	**2/3/26**	**3/11/26**	**NA**	**NA**	**2/3/26**	**3/11/26**	**0 d**	**0 d**			**0%**	
104		Submit Final O&M's	21 d	2/3/26	3/11/26	NA	NA	2/3/26	3/11/26	0 d	0 d	59,96	3	0%	
102		Final Walkthrough	2 d	2/18/26	2/19/26	NA	NA	2/26/26	3/2/26	0 d	5 d	61,59,96,76,9	103	0%	
103		Perform Punchlist	6 d	2/23/26	3/3/26	NA	NA	3/3/26	3/11/26	5 d	5 d	102	3	0%	


2026
2027
025
Feb
Mar
Qtr 2, 2025
Apr
May
Jun
Qtr 3, 2025
Jul
Aug
Sep
Qtr 4, 2025
Oct
Nov
Dec
Qtr 1, 2026
Jan
Feb
Mar
Qtr 2, 2026
Apr
May
Jun
Qtr 3, 2026
Jul
Aug
Sep
Qtr 4, 2026
Oct
Nov
Dec
Qtr 1, 2027
Jan
Feb
Mar
Qtr 2, 2027
Apr
May
Jun
Qtr 3, 2027
Jul
Aug
Sep
La Vista Tank & BPS - 2025 Return for Project Completion
Milestones
Notice to Proceed
Float
Project Completion(Contract 458 Days = 5/23/26)
Submittals
Fab/Deliver CMU
Submit Trusses
Review/Resubmit Trusses
Fab/Deliver Trusses
CMU Perimeter Walls
Install Rebar/Forms - West CMU Stem Wall
Install Rebar/Forms - East CMU Stem Wall
Pour Concrete - West CMU Stem Wall Sect 1
Pour Concrete - East CMU Stem Wall Sect 1
Pour Concrete - West CMU Stem Wall Sect 2
Pour Concrete - East CMU Stem Wall Sect 2
Cure Concrete - West CMU Stem Wall
Cure Concrete - East CMU Stem Wall
Backfill - West CMU Stem Wall
Backfill - East CMU Stem Wall
Install CMU - West Wall
Install CMU - East Wall
Coatings - Anti Graffiti at CMU Walls
New Booster Pump Station
Install Electric -Secondary Service Conduits
Install Electric - Underslabs Rough
Disinfect & Test - 20" Discharge & 10" Future


2026
2027
025
Qtr 2, 2025
Qtr 3, 2025
Qtr 4, 2025
Qtr 1, 2026
Qtr 2, 2026
Qtr 3, 2026
Qtr 4, 2026
Qtr 1, 2027
Qtr 2, 2027
Qtr 3, 2027
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Install Piping - 20" Discharge & 10" Future
Install Rebar/Forms - 20" Discharge & 10" Future
Pour Concrete - 20" Discharge
Backfill - Secondary Service Conduits
Install & Pour 10" Future Encasement
Cure Concrete - Encasements
Excavate/Prep - Footings & Slab
Install Rebar - Footings
Pour Concrete - Footings 1st Pour
Cure Concrete - Footings
Install Rebar/Forms - Slab
Pour Concrete - Footings 2nd Pour
Pour Concrete - Slab 1st Pour
Pour Concrete - Slab 2nd Pour
Cure Concrete - Slab
Install Rebar/Forms - Stemwall, Pads & Supports
Install Pumping - Vertical Turbine Pumps
Install Piping - WS Discharge Piping
Pour Concrete - Stemwall, Pads & Supports
Cure Concrete - Stemwall, Supports & Pads
Install CMU - Building Walls
Cure CMU - Building Walls
Coatings - CMU Sealer & Anti Graffiti
Install Roof - Trusses
Install Ceiling - Metal Framing & Drywall
Install Walls - PT & Plywood
Install Doors - Exterior w/ temp hardware
Install Roof - Metal Deck
Painting - Plywood Walls & Drywall Ceiling
Install Roof - Skylights & Hatches


2026
2027
025
Feb
Mar
Qtr 2, 2025
Apr
May
Jun
Qtr 3, 2025
Jul
Aug
Sep
Qtr 4, 2025
Oct
Nov
Dec
Qtr 1, 2026
Jan
Feb
Mar
Qtr 2, 2026
Apr
May
Jun
Qtr 3, 2026
Jul
Aug
Sep
Qtr 4, 2026
Oct
Nov
Dec
Qtr 1, 2027
Jan
Feb
Mar
Qtr 2, 2027
Apr
May
Jun
Qtr 3, 2027
Jul
Aug
Sep
Q
Install Roof - Insulation & Underlayment
Coatings - Chemical Room Floor
Install Electrical - Panels
Instal Roof - Metal Roofing
Cure Coating - Chem Room Floor
Install Electrical - O/H Conduit
Install HVAC - Ducting, Fans, Louvers
Install Electrical - Fixtures
Install Chemical - Tank, Pumps & Piping
Install HVAC - Ductless Splits
Install Electrical - Pull Wire
Install Plumbing - Piping & Fixtures
Install Doors/Windows - Remaining w/ Hardware
Install Electrical - Terminations
Install Electrical - Testing
Start Up & Testing - BPS
Coatings - Finish Coatings & Painting
Install ID's - Signs, Labels, etc.
Complete Well Rehab and Site Work
Install Piping - Sanitary Sewer Tie In
Pour Concrete - Remaining Site(Sidewalks, Bollards, Gate)
Cure Concrete - Remaining Site(Sidewalks, Bollards, Gate)
Shutdown/ Disconnect - Well Pump(12/1 per district shutdown reqmnt)
Remove - Existing Pump
Demo - Concrete Pedastal
Pour Concrete - Well Pump Pedestal
Cure Concrete - Well Pump Pedestal


2026
2027
025
Feb
Mar
Qtr 2, 2025
Apr
May
Jun
Qtr 3, 2025
Jul
Aug
Sep
Qtr 4, 2025
Oct
Nov
Dec
Qtr 1, 2026
Jan
Feb
Mar
Qtr 2, 2026
Apr
May
Jun
Qtr 3, 2026
Jul
Aug
Sep
Qtr 4, 2026
Oct
Nov
Dec
Qtr 1, 2027
Jan
Feb
Mar
Qtr 2, 2027
Apr
May
Jun
Qtr 3, 2027
Jul
Aug
Sep
Q
Install Pump - Well
Install Piping - Well Discharge & Waste
Install Electrical - Well Power & Control
Pour Concrete - Well Pad
Start Up & Testing - Well
Install AB - Paving & Surfacing Areas
Demo Existing BPS
Shutdown - Disconnect Utilities
Remove Piping - Temporary Well & Water
Demo/Remove - Structure
Demo/Remove - Foundations
Backfill & Grade
Project Closeout
Submit Final O&M's
Final Walkthrough
Perform Punchlist

Sub: 162 August 2025 CPM Update

Kennedy/Jenks Consultants

From: KOCH & KOCH

Page: 1 of 2
Submittal Date: 9/3/25
K/J Job No.: 1970010*00
Project Name: LA VISTA TANK AND BPS

Specification Section: 01311

Prior Submittal: _____

Submittal

A. Certification of Completeness and Accuracy

We certify that we have reviewed this submittal in detail and that the submittal is:

1. Complete and accurate and in complete compliance with the Contract Documents.
2. Compliant with the requirements of "Material and Equipment" in Section 01040, especially the subparagraph titled "Compatibility of Equipment and Material".
3. Compliant with the paragraph titled "Performance Specifications and Contractor Designed Items" in Section 01040.
4. Without any deviations from the Contract Drawings, except the following (describe deviation) which have the following advantages and disadvantages:

Signed by Subcontractor: _____ Title: _____ Date: _____

Signed by Contractor: _____ Title: _____ Date: _____

Response Date: 09/04/25 **K/J Job No.:** 1970010*00
Specification Section: **Project Name:** La Vista Tank & BPS
Page: 2 of 2

Response

Item	TC Action	Refer to Comment	Manufacturer or Supplier	Title of Submittal / Drawing
	NET	1-2	Koch & Koch, Inc	August 2025 CPM Update

A. The action(s) noted above have been taken on the enclosed document(s).

NET = No Exceptions Taken
MCN-N = Make Corrections Noted, No Resubmital Required
MCN-R = Make Corrections Noted, Partial Resubmital Required
A&R = Amend and Resubmit
NR = Not Reviewed
RR = Rejected, Resubmit
RA = Receipt Acknowledged

Comment(s):

1. 1. Critical path and overall project sequencing remain consistent with the July update
2. Project is currently on schedule

B. Corrections or comments made on the shop drawings during this review do not relieve the Contractor from compliance with the requirements of the Drawings and Specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. The Contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

Adam Boje
Responder: Adam Boje- sign above

Distribution	Submittal	Encl.	Response
Owner			
Engineer			
Contractor			
File			

August 2025

CPM Schedule Project Narrative

Carmichael Water District

La Vista Tank & Booster Pump Station

Koch & Koch, Inc.
PREPARED BY: SOREN DARR

Contents

Milestones and Key Dates

- Reinstatement Agreement/NTP – 02/19/25
- Pre-Construction Meeting – 02/27/25
- First Working Day – 02/28/25
- Expected Completion Date – 5/23/26

1. Work Completed During This Period

- Trusses and Metal Decking Complete.
- Elect Room Furred Walls & Ceiling Installed & Painted.
- Doors and Frames with Locksets Installed.
- Hatches & Skylights Installed.
- Chem Room Floor Coating Completed.
- Electrical Panels Installed.

2. Identification of Unusual Conditions or Restrictions

- No unusual conditions or restrictions were encountered during this period.

3. Description of the Current Critical Path

- The critical path starts with the disconnection and removal of the existing well pump and then moves through demolition of the existing BPS, installation of the new well pump and associated piping, finish grading, final walkthrough and punchlist.
- Task 87 Shutdown/disconnect well pump has a start no earlier than constraint so that the work falls within the unrestricted shutdown period of Dec-Feb.

4. Changes to Critical Path, Logic and Completion Since Last Update

- Critical path and completion date are the same as the last update.
- Logic, duration or task changes have been made as needed to allow the schedule to reflect the actual course of construction.

5. Current and Anticipated Delays

- None.

6. Pending Items and Status of Permits, Change Orders, Time Adjustments and Noncompliance notices

- None

7. Reasons for Early or Late Scheduled Completion

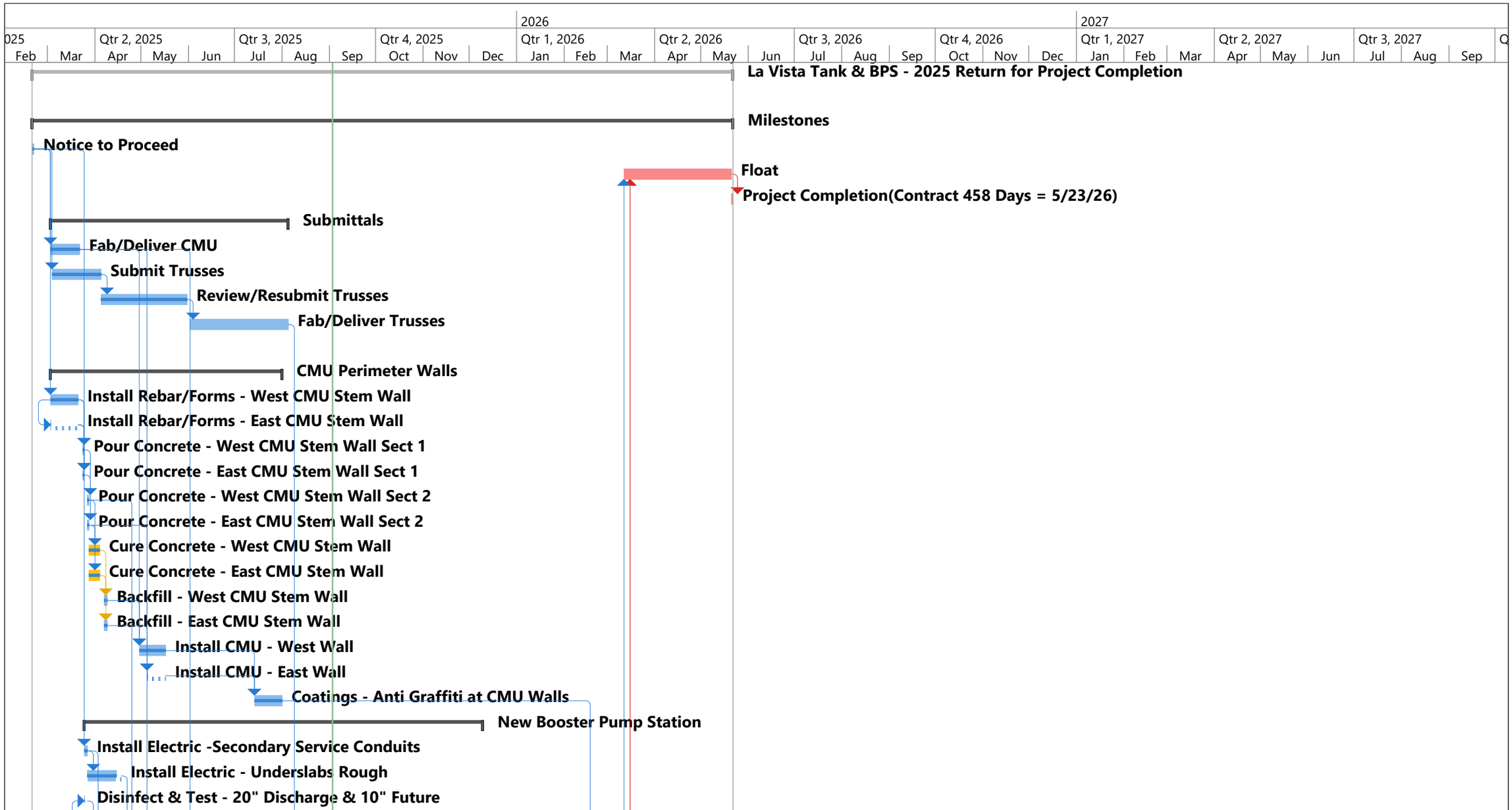
- Project is currently on schedule.

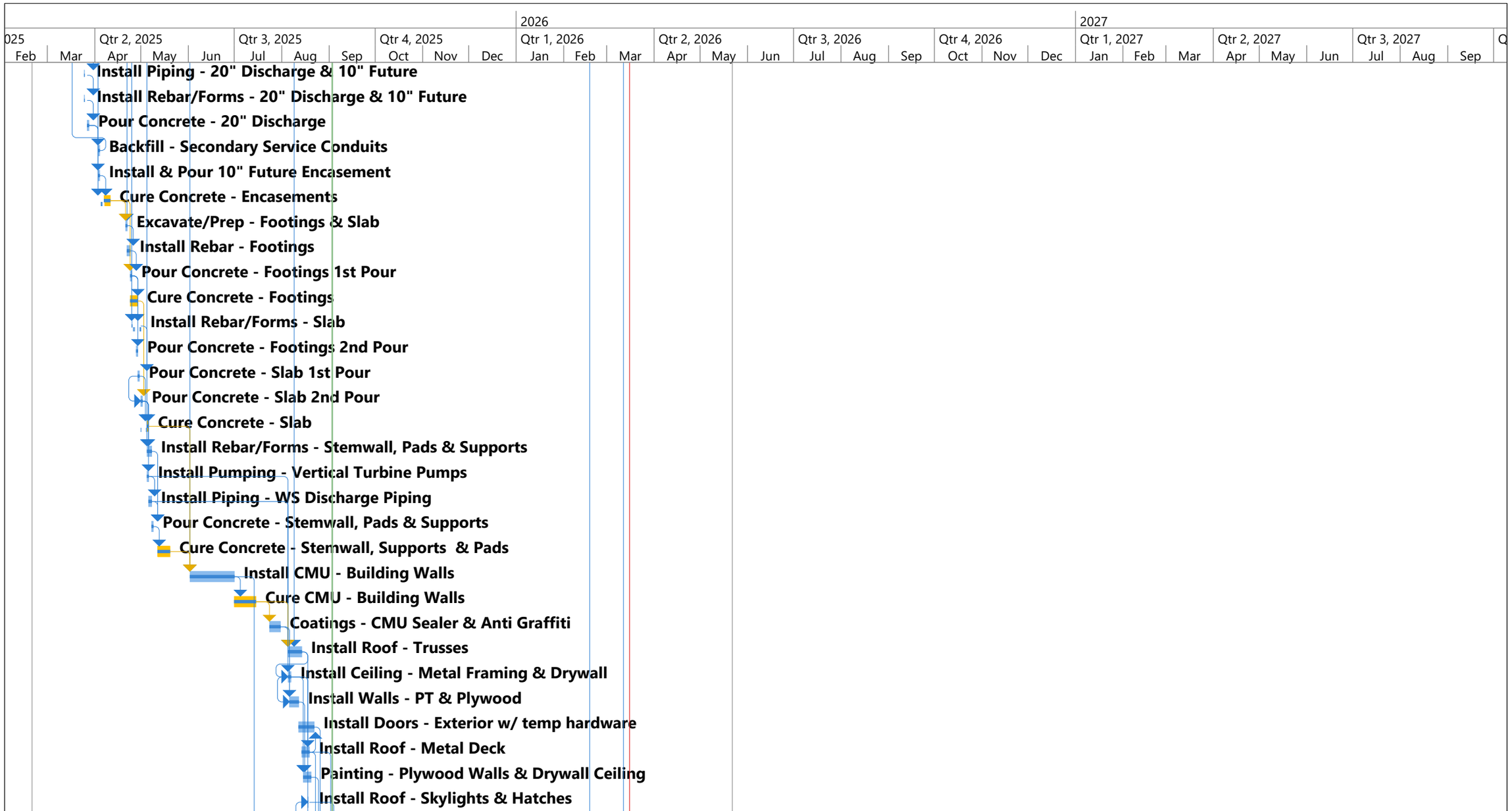
ID	Task Mode	Task Name	Duration	Start	Finish	Actual Start	Actual Finish	Late Start	Late Finish	Free Slack	Total Slack	Predecessors	Successors	% Complete	202 Qtr Ja
0		**La Vista Tank & BPS - 2025 Return for Project Completion**	**254 d**	**2/19/25**	**5/21/26**	**2/19/25**	**NA**	**2/19/25**	**5/21/26**	**0 d**	**0 d**			**54%**	
1		**Milestones**	**254 d**	**2/19/25**	**5/21/26**	**2/19/25**	**NA**	**2/19/25**	**5/21/26**	**0 d**	**0 d**			**2%**	
2		Notice to Proceed	1 d	2/19/25	2/19/25	2/19/25	2/19/25	2/19/25	2/19/25	0 d	0 d		6,9,11,64	100%	
3		Float	40 d	3/12/26	5/20/26	NA	NA	3/12/26	5/20/26	0 d	0 d	103,104	4	0%	
4		Project Completion(Contract 458 Days = 5/23/26)	1 d	5/21/26	5/21/26	NA	NA	5/21/26	5/21/26	0 d	0 d	3		0%	
5		**Submittals**	**88 d**	**3/3/25**	**8/4/25**	**3/3/25**	**NA**	**3/3/25**	**5/21/26**	**160 d**	**160 d**			**63%**	
9		Fab/Deliver CMU	12 d	3/3/25	3/21/25	3/3/25	3/21/25	3/3/25	3/21/25	0 d	0 d	2	32,70,75	100%	
6		Submit Trusses	19 d	3/4/25	4/4/25	3/4/25	4/4/25	3/4/25	4/4/25	0 d	0 d	2	7	100%	
7		Review/Resubmit Trusses	31 d	4/5/25	5/30/25	4/5/25	5/30/25	4/5/25	5/30/25	0 d	0 d	6	8	100%	
8		Fab/Deliver Trusses	37 d	6/2/25	8/4/25	6/2/25	NA	6/2/25	5/21/26	160 d	160 d	7	36	0%	
62															
63		**CMU Perimeter Walls**	**87 d**	**3/3/25**	**7/31/25**	**3/3/25**	**7/31/25**	**3/3/25**	**7/31/25**	**0 d**	**0 d**			**100%**	
64		Install Rebar/Forms - West CMU Stem Wall	12 d	3/3/25	3/20/25	3/3/25	3/20/25	3/3/25	3/20/25	0 d	0 d	2	69SS,71,65	100%	
69		Install Rebar/Forms - East CMU Stem Wall	12 d	3/3/25	3/20/25	3/3/25	3/20/25	3/3/25	3/20/25	0 d	0 d	64SS	71,65	100%	
65		Pour Concrete - West CMU Stem Wall Sect 1	1 d	3/24/25	3/24/25	3/24/25	3/24/25	3/24/25	3/24/25	0 d	0 d	69,64	66FS+2 ed	100%	
71		Pour Concrete - East CMU Stem Wall Sect 1	1 d	3/24/25	3/24/25	3/24/25	3/24/25	3/24/25	3/24/25	0 d	0 d	69,64	72FS+2 ed	100%	
66		Pour Concrete - West CMU Stem Wall Sect 2	1 d	3/27/25	3/27/25	3/27/25	3/27/25	3/27/25	3/27/25	0 d	0 d	65FS+2 ed	25,67	100%	
72		Pour Concrete - East CMU Stem Wall Sect 2	1 d	3/27/25	3/27/25	3/27/25	3/27/25	3/27/25	3/27/25	0 d	0 d	71FS+2 ed	29,73	100%	
67		Cure Concrete - West CMU Stem Wall	4 d	3/28/25	4/3/25	3/28/25	4/3/25	3/28/25	4/3/25	0 d	0 d	66	68	100%	
73		Cure Concrete - East CMU Stem Wall	4 d	3/28/25	4/3/25	3/28/25	4/3/25	3/28/25	4/3/25	0 d	0 d	72	74	100%	
68		Backfill - West CMU Stem Wall	2 d	4/7/25	4/8/25	4/7/25	4/8/25	4/7/25	4/8/25	0 d	0 d	67	70	100%	
74		Backfill - East CMU Stem Wall	2 d	4/7/25	4/8/25	4/7/25	4/8/25	4/7/25	4/8/25	0 d	0 d	73	75	100%	
70		Install CMU - West Wall	10 d	4/30/25	5/16/25	4/30/25	5/16/25	4/30/25	5/16/25	0 d	0 d	68,9	76FS+28 ed	100%	
75		Install CMU - East Wall	8 d	5/5/25	5/16/25	5/5/25	5/16/25	5/5/25	5/16/25	0 d	0 d	74,9	76FS+28 ed	100%	
76		Coatings - Anti Graffiti at CMU Walls	12 d	7/14/25	7/31/25	7/14/25	7/31/25	7/14/25	7/31/25	0 d	0 d	75FS+28 ed,7	102	100%	
10		**New Booster Pump Station**	**145 d**	**3/25/25**	**12/9/25**	**3/25/25**	**NA**	**3/25/25**	**2/25/26**	**41 d**	**41 d**			**62%**	
11		Install Electric -Secondary Service Conduits	2 d	3/25/25	3/26/25	3/25/25	3/26/25	3/25/25	3/26/25	0 d	0 d	2	13,12	100%	
13		Install Electric - Underslabs Rough	15 d	3/25/25	4/17/25	3/25/25	4/17/25	3/25/25	4/17/25	0 d	0 d	11	20	100%	
14		Disinfect & Test - 20" Discharge & 10" Future	2 d	3/25/25	3/26/25	3/25/25	3/26/25	3/25/25	3/26/25	0 d	0 d	12	15	100%	

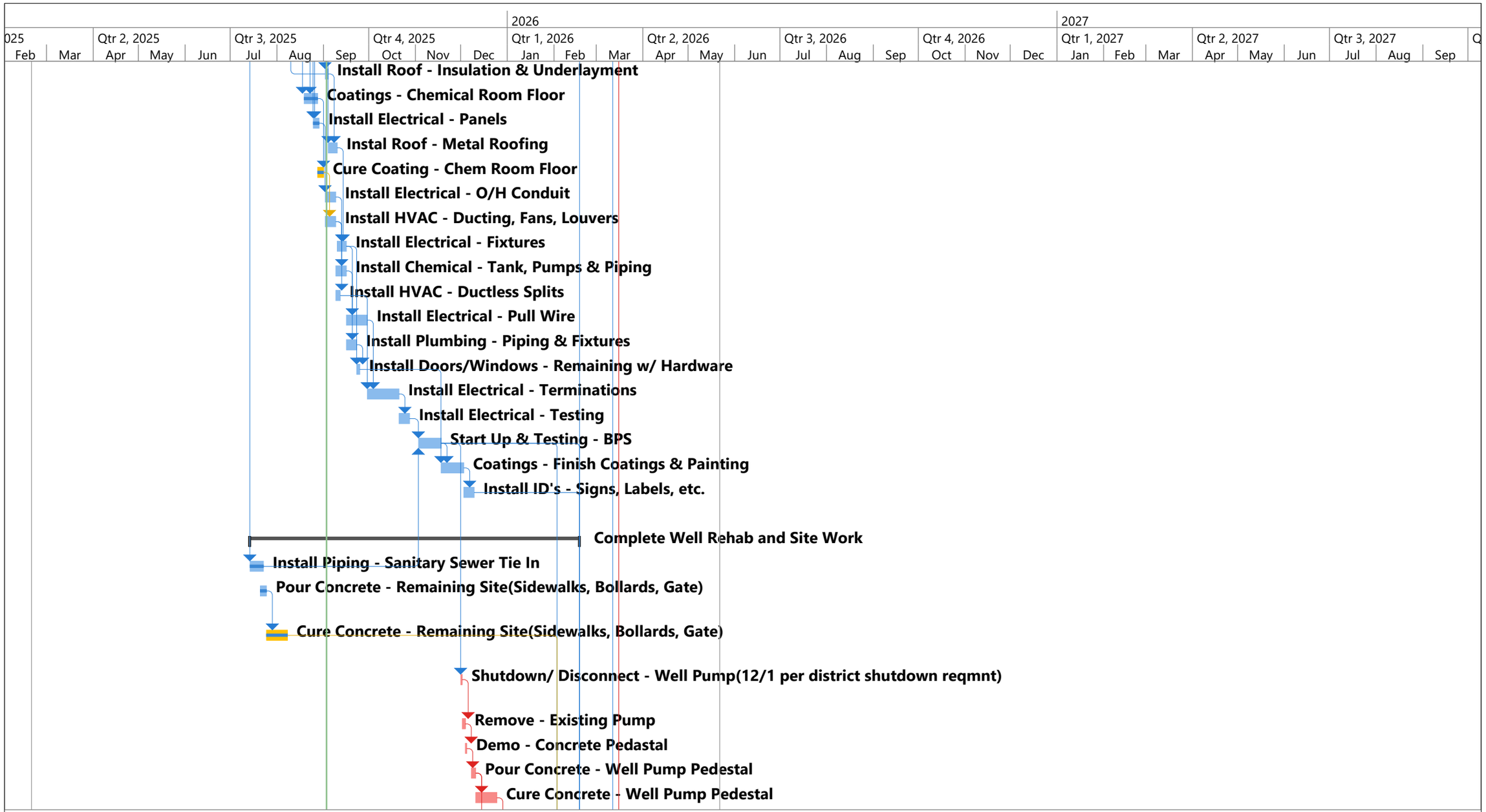
ID	Task Mode	Task Name	Duration	Start	Finish	Actual Start	Actual Finish	Late Start	Late Finish	Free Slack	Total Slack	Predecessors	Successors	% Complete	202 Qtr Ja
15		Install Piping - 20" Discharge & 10" Future	2 d	3/25/25	3/26/25	3/25/25	3/26/25	3/25/25	3/26/25	0 d	0 d	14	16	100%	
16		Install Rebar/Forms - 20" Discharge & 10" Future	2 d	3/25/25	3/26/25	3/25/25	3/26/25	3/25/25	3/26/25	0 d	0 d	15	17	100%	
17		Pour Concrete - 20" Discharge	1 d	3/27/25	3/27/25	3/27/25	3/27/25	3/27/25	3/27/25	0 d	0 d	16	19,18	100%	
12		Backfill - Secondary Service Conduits	1 d	4/3/25	4/3/25	4/3/25	4/3/25	4/3/25	4/3/25	0 d	0 d	11	14	100%	
18		Install & Pour 10" Future Encasement	1 d	4/3/25	4/3/25	4/3/25	4/3/25	4/3/25	4/3/25	0 d	0 d	17	19	100%	
19		Cure Concrete - Encasements	5 d	4/3/25	4/10/25	4/3/25	4/10/25	4/3/25	4/10/25	0 d	0 d	17,18	22,20	100%	
20		Excavate/Prep - Footings & Slab	1 d	4/21/25	4/21/25	4/21/25	4/21/25	4/21/25	4/21/25	0 d	0 d	13,19	21	100%	
21		Install Rebar - Footings	2 d	4/22/25	4/23/25	4/22/25	4/23/25	4/22/25	4/23/25	0 d	0 d	20	22	100%	
22		Pour Concrete - Footings 1st Pour	1 d	4/24/25	4/24/25	4/24/25	4/24/25	4/24/25	4/24/25	0 d	0 d	21,19	23FS+2 e...	100%	
24		Cure Concrete - Footings	2 d	4/24/25	4/28/25	4/24/25	4/28/25	4/24/25	4/28/25	0 d	0 d	22	27	100%	
25		Install Rebar/Forms - Slab	3 d	4/25/25	4/30/25	4/25/25	4/30/25	4/25/25	4/30/25	0 d	0 d	66,22	26	100%	
23		Pour Concrete - Footings 2nd Pour	1 d	4/28/25	4/28/25	4/28/25	4/28/25	4/28/25	4/28/25	0 d	0 d	22FS+2 ed		100%	
26		Pour Concrete - Slab 1st Pour	1 d	4/29/25	4/29/25	4/29/25	4/29/25	4/29/25	4/29/25	0 d	0 d	25	27SS+2 e...	100%	
27		Pour Concrete - Slab 2nd Pour	1 d	5/1/25	5/1/25	5/1/25	5/1/25	5/1/25	5/1/25	0 d	0 d	26SS+2 ed,24	28,29,34	100%	
28		Cure Concrete - Slab	2 d	5/1/25	5/5/25	5/1/25	5/5/25	5/1/25	5/5/25	0 d	0 d	26,27	32	100%	
29		Install Rebar/Forms - Stemwall, Pads & Supports	3 d	5/5/25	5/7/25	5/5/25	5/7/25	5/5/25	5/7/25	0 d	0 d	72,27	30	100%	
34		Install Pumping - Vertical Turbine Pumps	1 d	5/5/25	5/5/25	5/5/25	5/5/25	5/5/25	5/5/25	0 d	0 d	27	35,36	100%	
35		Install Piping - WS Discharge Piping	2 d	5/6/25	5/7/25	5/6/25	5/7/25	5/6/25	5/7/25	0 d	0 d	34	36,30	100%	
30		Pour Concrete - Stemwall, Pads & Supports	1 d	5/8/25	5/8/25	5/8/25	5/8/25	5/8/25	5/8/25	0 d	0 d	29,35	31	100%	
31		Cure Concrete - Stemwall, Supports & Pads	5 d	5/12/25	5/19/25	5/12/25	5/19/25	5/12/25	5/19/25	0 d	0 d	30	32	100%	
32		Install CMU - Building Walls	17 d	6/2/25	6/30/25	6/2/25	6/30/25	6/2/25	6/30/25	0 d	0 d	31,9,28	33,86	100%	
33		Cure CMU - Building Walls	8 d	7/1/25	7/14/25	7/1/25	7/14/25	7/1/25	7/14/25	0 d	0 d	32	36,44	100%	
44		Coatings - CMU Sealer & Anti Graffiti	4 d	7/24/25	7/30/25	7/24/25	7/30/25	7/24/25	7/30/25	0 d	0 d	33	41,43	100%	
36		Install Roof - Trusses	6 d	8/5/25	8/13/25	8/5/25	8/13/25	8/5/25	8/13/25	0 d	0 d	33,34,35,8	37,43	100%	
43		Install Ceiling - Metal Framing & Drywall	2 d	8/5/25	8/6/25	8/5/25	8/6/25	8/5/25	8/6/25	0 d	0 d	44,36	46,45,41S...	100%	
41		Install Walls - PT & Plywood	3 d	8/6/25	8/11/25	8/6/25	8/11/25	8/6/25	8/11/25	0 d	0 d	43SS+1 d,44	46	100%	
40		Install Doors - Exterior w/ temp hardware	7 d	8/12/25	8/21/25	8/12/25	8/21/25	8/12/25	8/21/25	0 d	0 d	37	48	100%	
37		Install Roof - Metal Deck	2 d	8/14/25	8/18/25	8/14/25	8/18/25	8/14/25	8/18/25	0 d	0 d	36	39,40,45	100%	
46		Painting - Plywood Walls & Drywall Ceiling	2 d	8/15/25	8/19/25	8/15/25	8/19/25	8/15/25	8/19/25	0 d	0 d	43,41	48	100%	
38		Install Roof - Skylights & Hatches	1 d	8/18/25	8/18/25	8/18/25	8/18/25	8/18/25	8/18/25	0 d	0 d	39SS	42	100%	

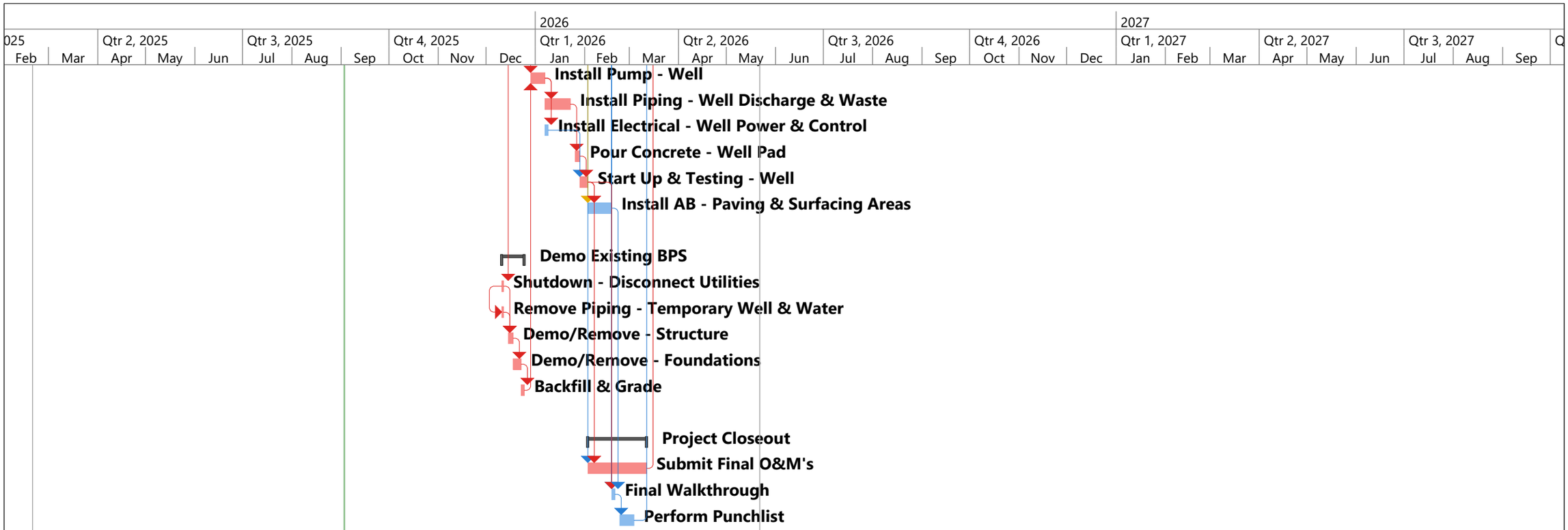
ID	Task Mode	Task Name	Duration	Start	Finish	Actual Start	Actual Finish	Late Start	Late Finish	Free Slack	Total Slack	Predecessors	Successors	% Complete
39		Install Roof - Insulation & Underlayment	2 d	9/2/25	9/3/25	NA	NA	9/17/25	9/18/25	0 d	9 d	37	42,38SS	0%
45		Coatings - Chemical Room Floor	7 d	8/18/25	8/27/25	8/18/25	8/27/25	8/18/25	8/27/25	0 d	0 d	43,37	47	100%
48		Install Electrical - Panels	4 d	8/25/25	8/28/25	8/25/25	8/28/25	8/25/25	8/28/25	0 d	0 d	46,40	49	100%
42		Instal Roof - Metal Roofing	3 d	9/4/25	9/9/25	NA	NA	9/22/25	9/24/25	0 d	9 d	39,38	51	0%
47		Cure Coating - Chem Room Floor	1 d	8/28/25	8/31/25	8/28/25	8/31/25	8/28/25	8/31/25	0 d	0 d	45	50	100%
49		Install Electrical - O/H Conduit	4 d	9/2/25	9/8/25	NA	NA	9/18/25	9/24/25	1 d	10 d	48	51	0%
50		Install HVAC - Ducting, Fans, Louvers	4 d	9/2/25	9/8/25	NA	NA	10/2/25	10/8/25	0 d	18 d	47	53,52	0%
51		Install Electrical - Fixtures	3 d	9/10/25	9/15/25	NA	NA	9/25/25	9/30/25	0 d	9 d	49,42	56,54	0%
52		Install Chemical - Tank, Pumps & Piping	4 d	9/9/25	9/15/25	NA	NA	1/19/26	1/22/26	0 d	70 d	50	55	0%
53		Install HVAC - Ductless Splits	3 d	9/9/25	9/11/25	NA	NA	10/9/25	10/14/25	9 d	18 d	50	57	0%
54		Install Electrical - Pull Wire	8 d	9/16/25	9/29/25	NA	NA	10/1/25	10/14/25	0 d	9 d	51	57	0%
55		Install Plumbing - Piping & Fixtures	4 d	9/16/25	9/22/25	NA	NA	1/26/26	1/29/26	0 d	70 d	52	56	0%
56		Install Doors/Windows - Remaining w/ Hardware	2 d	9/23/25	9/24/25	NA	NA	2/2/26	2/3/26	29 d	70 d	51,55	60	0%
57		Install Electrical - Terminations	12 d	9/30/25	10/20/25	NA	NA	10/15/25	11/4/25	0 d	9 d	54,53	58	0%
58		Install Electrical - Testing	4 d	10/21/25	10/27/25	NA	NA	11/5/25	11/12/25	3 d	9 d	57	59	0%
59		Start Up & Testing - BPS	8 d	11/3/25	11/17/25	NA	NA	11/13/25	11/26/25	0 d	6 d	58,86	60,102,10...	0%
60		Coatings - Finish Coatings & Painting	8 d	11/18/25	12/2/25	NA	NA	2/4/26	2/18/26	0 d	41 d	59,56	61	0%
61		Install ID's - Signs, Labels, etc.	4 d	12/3/25	12/9/25	NA	NA	2/19/26	2/25/26	36 d	41 d	60	102	0%
84														
85		**Complete Well Rehab and Site Work**	**119 d**	**7/14/25**	**2/17/26**	**7/14/25**	**NA**	**7/14/25**	**2/25/26**	**5 d**	**5 d**			**29%**
86		Install Piping - Sanitary Sewer Tie In	6 d	7/14/25	7/22/25	7/14/25	7/22/25	7/14/25	7/22/25	0 d	0 d	32	59	100%
97		Pour Concrete - Remaining Site(Sidewalks, Bollards, Gate)	4 d	7/21/25	7/24/25	7/21/25	7/24/25	7/21/25	7/24/25	0 d	0 d		98	100%
98		Cure Concrete - Remaining Site(Sidewalks, Bollards, Gate)	8 d	7/25/25	8/7/25	7/25/25	8/7/25	7/25/25	8/7/25	0 d	0 d	97	99	100%
87		Shutdown/ Disconnect - Well Pump(12/1 per district shutdown reqmnt)	1 d	12/1/25	12/1/25	NA	NA	12/1/25	12/1/25	0 d	0 d	59	88	0%
88		Remove - Existing Pump	2 d	12/2/25	12/3/25	NA	NA	12/2/25	12/3/25	0 d	0 d	87	89	0%
89		Demo - Concrete Pedastal	1 d	12/4/25	12/4/25	NA	NA	12/4/25	12/4/25	0 d	0 d	88	90	0%
90		Pour Concrete - Well Pump Pedestal	3 d	12/8/25	12/10/25	NA	NA	12/8/25	12/10/25	0 d	0 d	89	91,79	0%
91		Cure Concrete - Well Pump Pedestal	8 d	12/11/25	12/24/25	NA	NA	12/11/25	12/24/25	0 d	0 d	90	92	0%

ID	Task Mode	Task Name	Duration	Start	Finish	Actual Start	Actual Finish	Late Start	Late Finish	Free Slack	Total Slack	Predecessors	Successors	% Complete	202 Qtr Ja
92		Install Pump - Well	4 d	12/29/25	1/6/26	NA	NA	12/29/25	1/6/26	0 d	0 d	91,83	93,94	0%	
93		Install Piping - Well Discharge & Waste	10 d	1/7/26	1/22/26	NA	NA	1/7/26	1/22/26	0 d	0 d	92	95	0%	
94		Install Electrical - Well Power & Control	2 d	1/7/26	1/8/26	NA	NA	1/27/26	1/28/26	11 d	11 d	92	96	0%	
95		Pour Concrete - Well Pad	3 d	1/26/26	1/28/26	NA	NA	1/26/26	1/28/26	0 d	0 d	93	96	0%	
96		Start Up & Testing - Well	2 d	1/29/26	2/2/26	NA	NA	1/29/26	2/2/26	0 d	0 d	94,95	102,104,99	0%	
99		Install AB - Paving & Surfacing Areas	8 d	2/3/26	2/17/26	NA	NA	2/11/26	2/25/26	0 d	5 d	96,98	102	0%	
77															
78		**Demo Existing BPS**	**8 d**	**12/11/25**	**12/24/25**	**NA**	**NA**	**12/11/25**	**12/24/25**	**0 d**	**0 d**			**0%**	
79		Shutdown - Disconnect Utilities	1 d	12/11/25	12/11/25	NA	NA	12/11/25	12/11/25	0 d	0 d	90	81,80SS	0%	
80		Remove Piping - Temporary Well & Water	1 d	12/11/25	12/11/25	NA	NA	12/11/25	12/11/25	0 d	0 d	79SS	81	0%	
81		Demo/Remove - Structure	3 d	12/15/25	12/17/25	NA	NA	12/15/25	12/17/25	0 d	0 d	79,80	82	0%	
82		Demo/Remove - Foundations	2 d	12/18/25	12/22/25	NA	NA	12/18/25	12/22/25	0 d	0 d	81	83	0%	
83		Backfill & Grade	2 d	12/23/25	12/24/25	NA	NA	12/23/25	12/24/25	0 d	0 d	82	92	0%	
100															
101		**Project Closeout**	**21 d**	**2/3/26**	**3/11/26**	**NA**	**NA**	**2/3/26**	**3/11/26**	**0 d**	**0 d**			**0%**	
104		Submit Final O&M's	21 d	2/3/26	3/11/26	NA	NA	2/3/26	3/11/26	0 d	0 d	59,96	3	0%	
102		Final Walkthrough	2 d	2/18/26	2/19/26	NA	NA	2/26/26	3/2/26	0 d	5 d	61,59,96,76,9	103	0%	
103		Perform Punchlist	6 d	2/23/26	3/3/26	NA	NA	3/3/26	3/11/26	5 d	5 d	102	3	0%	


2026
2027
025
Feb
Mar
Qtr 2, 2025
Apr
May
Jun
Qtr 3, 2025
Jul
Aug
Sep
Qtr 4, 2025
Oct
Nov
Dec
Qtr 1, 2026
Jan
Feb
Mar
Qtr 2, 2026
Apr
May
Jun
Qtr 3, 2026
Jul
Aug
Sep
Qtr 4, 2026
Oct
Nov
Dec
Qtr 1, 2027
Jan
Feb
Mar
Qtr 2, 2027
Apr
May
Jun
Qtr 3, 2027
Jul
Aug
Sep
La Vista Tank & BPS - 2025 Return for Project Completion
Milestones
Notice to Proceed
Float
Project Completion(Contract 458 Days = 5/23/26)
Submittals
Fab/Deliver CMU
Submit Trusses
Review/Resubmit Trusses
Fab/Deliver Trusses
CMU Perimeter Walls
Install Rebar/Forms - West CMU Stem Wall
Install Rebar/Forms - East CMU Stem Wall
Pour Concrete - West CMU Stem Wall Sect 1
Pour Concrete - East CMU Stem Wall Sect 1
Pour Concrete - West CMU Stem Wall Sect 2
Pour Concrete - East CMU Stem Wall Sect 2
Cure Concrete - West CMU Stem Wall
Cure Concrete - East CMU Stem Wall
Backfill - West CMU Stem Wall
Backfill - East CMU Stem Wall
Install CMU - West Wall
Install CMU - East Wall
Coatings - Anti Graffiti at CMU Walls
New Booster Pump Station
Install Electric -Secondary Service Conduits
Install Electric - Underslabs Rough
Disinfect & Test - 20" Discharge & 10" Future


2026
2027
025
Qtr 2, 2025
Qtr 3, 2025
Qtr 4, 2025
Qtr 1, 2026
Qtr 2, 2026
Qtr 3, 2026
Qtr 4, 2026
Qtr 1, 2027
Qtr 2, 2027
Qtr 3, 2027
Q
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Install Piping - 20" Discharge & 10" Future
Install Rebar/Forms - 20" Discharge & 10" Future
Pour Concrete - 20" Discharge
Backfill - Secondary Service Conduits
Install & Pour 10" Future Encasement
Cure Concrete - Encasements
Excavate/Prep - Footings & Slab
Install Rebar - Footings
Pour Concrete - Footings 1st Pour
Cure Concrete - Footings
Install Rebar/Forms - Slab
Pour Concrete - Footings 2nd Pour
Pour Concrete - Slab 1st Pour
Pour Concrete - Slab 2nd Pour
Cure Concrete - Slab
Install Rebar/Forms - Stemwall, Pads & Supports
Install Pumping - Vertical Turbine Pumps
Install Piping - WS Discharge Piping
Pour Concrete - Stemwall, Pads & Supports
Cure Concrete - Stemwall, Supports & Pads
Install CMU - Building Walls
Cure CMU - Building Walls
Coatings - CMU Sealer & Anti Graffiti
Install Roof - Trusses
Install Ceiling - Metal Framing & Drywall
Install Walls - PT & Plywood
Install Doors - Exterior w/ temp hardware
Install Roof - Metal Deck
Painting - Plywood Walls & Drywall Ceiling
Install Roof - Skylights & Hatches


2026
2027
025
Feb
Mar
Qtr 2, 2025
Apr
May
Jun
Qtr 3, 2025
Jul
Aug
Sep
Qtr 4, 2025
Oct
Nov
Dec
Qtr 1, 2026
Jan
Feb
Mar
Qtr 2, 2026
Apr
May
Jun
Qtr 3, 2026
Jul
Aug
Sep
Qtr 4, 2026
Oct
Nov
Dec
Qtr 1, 2027
Jan
Feb
Mar
Qtr 2, 2027
Apr
May
Jun
Qtr 3, 2027
Jul
Aug
Sep
Q
Install Roof - Insulation & Underlayment
Coatings - Chemical Room Floor
Install Electrical - Panels
Instal Roof - Metal Roofing
Cure Coating - Chem Room Floor
Install Electrical - O/H Conduit
Install HVAC - Ducting, Fans, Louvers
Install Electrical - Fixtures
Install Chemical - Tank, Pumps & Piping
Install HVAC - Ductless Splits
Install Electrical - Pull Wire
Install Plumbing - Piping & Fixtures
Install Doors/Windows - Remaining w/ Hardware
Install Electrical - Terminations
Install Electrical - Testing
Start Up & Testing - BPS
Coatings - Finish Coatings & Painting
Install ID's - Signs, Labels, etc.
Complete Well Rehab and Site Work
Install Piping - Sanitary Sewer Tie In
Pour Concrete - Remaining Site(Sidewalks, Bollards, Gate)
Cure Concrete - Remaining Site(Sidewalks, Bollards, Gate)
Shutdown/ Disconnect - Well Pump(12/1 per district shutdown reqmnt)
Remove - Existing Pump
Demo - Concrete Pedastal
Pour Concrete - Well Pump Pedestal
Cure Concrete - Well Pump Pedestal


2026
2027
025
Feb
Mar
Qtr 2, 2025
Apr
May
Jun
Qtr 3, 2025
Jul
Aug
Sep
Qtr 4, 2025
Oct
Nov
Dec
Qtr 1, 2026
Jan
Feb
Mar
Qtr 2, 2026
Apr
May
Jun
Qtr 3, 2026
Jul
Aug
Sep
Qtr 4, 2026
Oct
Nov
Dec
Qtr 1, 2027
Jan
Feb
Mar
Qtr 2, 2027
Apr
May
Jun
Qtr 3, 2027
Jul
Aug
Sep
Q
Install Pump - Well
Install Piping - Well Discharge & Waste
Install Electrical - Well Power & Control
Pour Concrete - Well Pad
Start Up & Testing - Well
Install AB - Paving & Surfacing Areas
Demo Existing BPS
Shutdown - Disconnect Utilities
Remove Piping - Temporary Well & Water
Demo/Remove - Structure
Demo/Remove - Foundations
Backfill & Grade
Project Closeout
Submit Final O&M's
Final Walkthrough
Perform Punchlist

ATTACHMENT 3

CARMICHAEL WATER DISTRICT
7837 Fair Oaks Blvd
Carmichael, CA 95608
916-483-2452
mail@carmichaelwd.org

CLAIM FORM

(A claim shall be presented by the claimant or by a person acting on his behalf)

1	***Effective January 1, 2010 the Medicare Secondary Payer Act (Federal Law) requires the District/Agency to report all claims involving payments for bodily injury and/or medical treatments to Medicare. As such, if you are seeking medical damages we must have both your Social Security Number and your date of birth.***
	CLAIMANT INFORMATION
	NAME: **Carolyn McMillen**
	ADDRESS: **2941 Myrtle Lane, Carmichael CA 95608**
	PHONE #: **916-243-8050** EMAIL: **kathiecaballero@gmail.com**
	FOR MEDICAL CLAIMS ONLY INCLUDE SOCIAL SECURITY AND DATE OF BIRTH BELOW:
	SOCIAL SECURITY #: DATE OF BIRTH:
2	**WITNESS INFORMATION**
	NAME: **Jo McMillen** PHONE #: **916-826-8893**
	ADDRESS: **2941 Myrtle Lane, Carmichael CA 95608**
3	**INCIDENT DETAILS (description of occurrence, use back of form if necessary)**
	DATE: **2022 thru 2025** TIME: PLACE:
	TELL WHAT HAPPENED: (give complete information)
	A wall was built adjacent to my property and crew members removed a portion of my fence in order to construct the wall. As construction took years to complete, the fence was left unbraced and leaning against a portion of the new wall. The wall is completed now and there are residual issues being worked out. The water district first refused to replace or repair the fence. An offer was made that we get bids and submit them; however, this is not our doing. It is up Carmichael Water District to repair or replace what they have damaged to the original condition or better.
	NOTE: Attach any photographs you may have regarding this claim.
4	**CLAIM DETAILS** *(description of the indebtedness, obligation, injury, damage, or loss incurred so far as know at this time)*
	Repair or replace this damaged fence. Building this wall has caused my family great hardship and safety concerns. From animals escaping the property, homeless entering an unsecured area left open by the Water District's agents, to our children not being free to play safely in my yard. I would think the Water District would be accommodating to fulfill our needs as we have waited four longs years and have had over forty documented calls inquiring about the completion and safety concerns and at least five site visits discussing the problems. We are not asking for anything unreasonable, just to be made whole.
	NOTE: Attach receipts.
5	**EMPLOYEE(S) NAMES** *(list the public employees causing the injury, damage, or loss, if known).*
	Contract worker building the fence.
6	The amount claimed if it totals less than ten thousand dollars ($10,000) as of the date of presentation of the claim, including the estimated amount of any prospective injury, damage or loss, insofar as it may be known at the time of the presentation of the claim, together with the basis of computation of the amount claimed. If the amount claimed exceeds ten thousand ($10,000), no dollar amount shall be included in the claim. However, it shall indicate whether the claim would be a limited civil case.
	TBD
Date: 08/08/2025	Time: 10am Signature: Carolyn McMillen
	ANSWER ALL QUESTIONS. OMITTING INFORMATION COULD MAKE YOUR CLAIM LEGALLY INSUFFICIENT!

FOR OFFICE USE ONLY:	Release Form Sent:
Approved By:	Check Request Sent:
Denied By:	Check Mailed Date:
Date:	Claim to JPIA Date:
Claim Check from JPIA date:	Adm check from JPIA date:

Carolyn McMillen
2941 Myrtle Lane
Carmichael, Ca 95608

August 8, 2025

Carmichael Water District
Attn Greg Norris
7837 Fair Oaks Boulevard
Carmichael, CA 95608

RE: Authorization to access property

Dear Mr. Norris,

I, Carolyn McMillen, property owner of 2941 Myrtle Lane, hereby authorize Carmichael Water District and its agents access said property to make all necessary repairs in relation to the construction of the wall, specifically:

1. Gap between wall and the County's fence on the Southwest corner of our wall.
   Here the excess fence was to also be removed.

2. Small holes or divots in the ground along the center portion of wall where the temporary fence used to be.
   Here, the 'temporary' fence was actually my fence that was removed and previously agreed that said fencing would be removed once the wall was in place. Hence, the current fencing in item #1 is an extension of said agreement.

3. My section of fence which separates the back area from the ATT vault on the Northeast part of your property needs securing.
   We are currently in discussion as to the remedy.

I look forward to the expeditious repairs of items #1 and #2 and to an amicable remedy to item #3.

Please note that Carmichael Water District has been in construction for many years on this site and my property. My home and my family have been patient and displaced in safety and concern. We have had numerous site visits from various water district employees, even Ron Greenwood, our board member. This request for authorization to enter my property is the first after many years.

Sincerely,

Carolyn McMillen

Carolyn McMillen

This page intentionally left blank.

General Manager's Report
September 2025

1. Sacramento Regional Water Bank

Regional Water Authority (RWA) staff provided an overview of the modeling results for the previously banked water or starting balance for Sacramento Regional Water Bank. Staff attended meetings on the modeling results discussion as well as the potential future use of the water. Discussions continue and staff will report the information as appropriate.

2. Water Forum (WF)

The Water Forum is soliciting last round of comments to the draft Water Forum 2050 Agreement (WFA 2050). Staff provided the comments on the District's Purveyor Specific Agreement (PSA) and revised the PSA accordingly in Attachment 1. The revisions removed the section for Water Forum's support for the development of additional water supplies as there are no discussions, analysis, or approved Board actions for additional water supplies.

3. Proposed Water Rate Adjustment – draft Prop 218 Notice

The proposed water rate adjustment requires a notification, Prop 218 Notice, to notify all District's customers when the District proposes new or increased water charges. A draft copy of the Prop 218 Notice is attached and if there are no comments from the Board, staff will publish and distribute the notice via US mail, District's website, and Nextdoor.com social media page.

Attachments

1. Water Forum Purveyor Specific Agreement
2. Draft Prop 218 Notice for Water Rate Increase

NOTICE OF PUBLIC HEARING ON PROPOSED WATER RATE INCREASES

Why am I Receiving this Notice?

You are receiving this notice because our records indicate that you are an account holder and/or the owner of a parcel receiving water service from the Carmichael Water District (District). The purpose of this notice is to give you information about proposed changes to water rates and how you can participate in the rate-setting process.

Questions?
Please contact the District at
(916) 483-2452
Monday through Friday from
8:00 a.m. to 4:30 p.m.

Need for Increase in Water Rate Revenue

The District is committed to ensuring that our customers receive clean, safe, and reliable water supplies, and that the water system is maintained to high standards that protect our community's health and safety, as well as the environment. The District last increased water rates in January 2025. In order to adequately and responsibly support the District's operation and maintenance, improve water system facilities, meet debt service requirements, and maintain financial stability, the District is proposing an increase in water rates. With the proposed rate increases, the District is proactively seeking adequate funding for critical system maintenance, and for the maintenance of reserves that are used to when major water collection and treatment components need to be rehabilitated. The use of these reserves allows the District to cash-finance these major projects rather than issuing debt and incurring unnecessary interest costs. The District's current and estimated future revenue needs are outlined in the *Carmichael Water District – 2025 Water Rate Study*, which is available at www.carmichaelwd.org, or by calling the District office at (916) 483-2452 and requesting a copy.

Proposed Water Rates

To meet projected revenue needs, as documented in the Report, the District is proposing scheduled rate increases over a five-year period. The initial increase will occur on January 1, 2026, and will increase the overall level of water rate revenue by 4 percent. The rate proposal also includes updates to the allocation of costs to each of the rate structure components in 2026. Subsequent rate increases will occur each January 1 as shown in Table 1. These rate increases are needed to ensure the District's ability to meet financial and service obligations related to water system rehabilitation and upgrades, as well as existing debt service payments.

Water Rate Structure Methodology

The updated water rate cost of service analysis equitably ensures that each ratepayer is paying a proportionate share of the costs of the service provided to them. The existing rate structure includes a fixed bimonthly service charge based on the size of the water meter ("Monthly Service Charge") and a uniform water usage rate based on actual water consumption ("Water Usage Rate"), as measured in one-hundred cubic feet ("CCF"), which is equal to 748 gallons.

The update to the water rates was performed by a water rate consultant with the assistance of the Board's Finance Committee. The proposed water rates meet legal requirements for cost of service and proportionality and retain the existing basic rate structure.

Details of the District's current and estimated future revenue needs as well as the methodology for updating the water rates can be found in the *Carmichael Water District – 2025 Water Rate Study.* The complete proposed water rate schedule for the next five years is shown on Table 1 (next page). Due to minor changes to the rate structure, the exact change in customer bills will depend on a customer's meter size and water usage characteristics.

Table 1 - Proposed Water Rate Schedule

		Jan 1, 2026	Jan 1, 2027	Jan 1, 2028	Jan 1, 2029	Jan 1, 2030
	Overall Revenue Increases:	4.0%	4.0%	4.0%	4.0%	4.0%
Water Usage Rates	Current Rates	Proposed Rates				
All Customer Types (per CCF)	**$2.47**	$2.82	$2.93	$3.05	$3.17	$3.30
Monthly Service Charge						
3/4" meter	**$42.03**	$39.96	$41.56	$43.22	$44.95	$46.75
1" meter	**$65.83**	$65.15	$67.76	$70.47	$73.29	$76.22
1 1/2" meter	**$125.33**	$128.11	$133.23	$138.56	$144.10	$149.86
2" meter	**$196.73**	$203.67	$211.82	$220.29	$229.10	$238.26
3" meter	**$363.33**	$379.97	$395.17	$410.98	$427.42	$444.52
4" meter	**$601.33**	$631.82	$657.09	$683.37	$710.70	$739.13
6" meter	**$1,196.32**	$1,261.45	$1,311.91	$1,364.39	$1,418.97	$1,475.73
8" meter	**$1,910.32**	$2,017.01	$2,097.69	$2,181.60	$2,268.86	$2,359.61
Condominium Living Units	**$42.03**	$39.96	$41.56	$43.22	$44.95	$46.75
Multi-Family Living Units w/ Separate Meter	**$42.03**	$39.96	$41.56	$43.22	$44.95	$46.75
			$0.00	$0.00	$0.00	$0.00
Monthly Private Fire Service Charges (per inch of diameter)	**$32.91**	$34.22	$35.59	$37.01	$38.49	$40.03

How Much Will My Water Bill Be?

A typical (median) home served by the District has a 1" water meter and uses about 11 CCF during a one-month billing cycle (or about 275 gallons per day). The bi-monthly water bill for this median usage would increase from $93.00 to $96.17, or an increase of $3.17 (3.4 percent). You can find information about your water service and water usage patterns from your past bills. If you would like assistance in determining how the proposed water rates may affect your water bill, please contact the District at (916) 483-2452 Monday through Friday from 8:00 a.m. to 4:30 pm.

Information Resources

Stay up-to-date by visiting Carmichael Water District's website (www.carmichaelwd.org) and by following our Nextdoor and YouTube pages. These resources provide valuable information regarding projects, programs, and outreach activities.

Protesting the Proposed Water Rates

Any property owner of record of a parcel that would be subject to the proposed rates or any tenant directly liable for payment of water service fees (i.e., a customer of record), may protest the proposed water rate changes. To be counted, all protests must:

1. Be in writing with an original signature from the property owner of record or tenant directly liable for the payment of the water bill.
2. Identify the parcel for which the protest is filed, by street address or Assessor's Parcel Number (APN).
3. State that the signer opposes the proposed water rates.
4. Be received by Carmichael Water District at any time prior to the close of the public hearing that will begin at 6:00 p.m. on Monday, November 17, 2025. A protest may be mailed to the Carmichael Water District or deposited in our utility bill drop off box located at 7837 Fair Oaks Blvd., Carmichael, California 95608, or delivered to the same address during regular business hours. Please include the following notation on the front of the envelope for any written protest: "ATTN: Public Information Office, Chris Nelson, Protest of Proposed Water Rates."

If the District receives written protests from more than 50 percent of the parcels receiving water service from the District, the Board may not adopt the proposed rates. Only one protest will be counted for each parcel. Email, fax, telephone, or oral protests of any kind will not be counted. Mailed protests received after the close of the public hearing will not be counted, even if they were postmarked earlier.

Please be advised that pursuant to Government Code Section 53759(d) there is a 120-day statute of limitation for any challenge to the new, increased or extended fee or charge.

CARMICHAEL WATER DISTRICT
7837 Fair Oaks Boulevard
Carmichael, CA 95608
(916) 483-2452

Presorted
First-Class Mail
U.S. Postage
PAID
MMS

Notice of Public Hearing on Proposed Water Rates

When is the Hearing?

Monday, November 17th, 2025 at 6:00 p.m.

The Carmichael Water District Board of Directors will hold a public hearing (meeting details to be provided, please go to www.carmichaelwd.org, or call the District office) to consider the proposed water rates. During the public hearing, the Board of Directors will accept oral and written testimony, as well as written protests, regarding the water rates. Oral comments at the Public Hearing will not qualify as formal protests.

Carmichael Water District
DRAFT Purveyor Specific Agreement

Purveyor Background

Carmichael Water District (CWD or District), formerly Carmichael Irrigation District, was formed in 1916 to serve water for irrigation and a small but growing township called “Carmichael Colonies”. The District was formed under the California Irrigation District laws but has changed its name to Carmichael Water District in the 1980s to reflect its transformation from a primarily irrigation supplier to an urban water supplier. Today, CWD serves about 11,900 connections with a population of about 40,000 people. With a history of over 100 years, the District is built out with 90% residential services and a steady decrease in water demands from effective water efficiency campaigns and education.

The District’s water supply portfolio has provided over 100 years of water supply reliability to the District’s customers. The District’s transition from its exclusive use of surface water diversions from the American River to groundwater use and then to a sophisticated conjunctive use program, including a state-of-the-art water treatment facility, epitomizes the flexibility and adaptability that the District has displayed throughout its history. Renewed flexibility and adaptability will allow the District to handle climate change, regulatory change, and legislated conservation and water quality protection.

CWD has three main sources of water supplies in its portfolio: surface water rights to divert the natural flows of the American River, groundwater supplies derived from its well system including stored water supplies from its long-term conjunctive use activities, and remediated groundwater supplies from its contractual relationship with Aerojet Corporation. All of these water supplies are collectively managed to meet the District’s demands.

Surface Water Supplies

CWD’s surface water supplies consist of three appropriative water rights derived from the natural flow of the American River where water would normally be available on the river system under natural conditions subject to more senior appropriators. The supply is based upon water availability that is tied to the priority dates of these water rights. The State Water Resources Control Board (State Board) determines when there is insufficient water supply in the American River watershed to satisfy CWD’s diversion rates under each water right.

The three appropriate water rights consist of two licensed and one permitted water right providing up to 32,600 acre-feet (AF) per year with a maximum diversion rate of 50 cubic feet per second, depending on the season of use. CWD’s water rights have priority dates after 1914 and are subject to curtailment by the State Board.

Water Right	Priority Date	Diversion Rate	Volume (AFY)	Diversion Period
License 1387	1915	15 cfs	10,859	Jan – Dec
License 8731	1925	10 cfs	3,669	May - Oct
Permit 7356	1948	25 cfs	18,099	Jan - Dec

The District diverts surface water right through three Ranney collector wells in the American River and treats water at the Bajamont Water Treatment Plant (BWTP). The Ranney collectors use a series of laterals extending to the riverbed to gather water and utilize the natural sands and gravel for riverbank filtration. Water flows from the collectors by gravity to a central collector and then the District conveys it to the District's BWTP through a 48" pipeline.

Groundwater Supplies

Groundwater supplies constitute a major component of the District's water supply portfolio. The District conjunctively manages its surface water and groundwater supplies to optimize the uses of these water assets.

The District currently operates 4 groundwater wells and is in the process of replacing 2 old wells while constructing a new well. These projects are in various stages of construction and are projected to be completed in 2026. The projected capacity for the wells will be about 8,000 to 10,000 gallons per minute (11.5 million gallons per day (MGD) to 14.4 MGD).

The District plans to further its conjunctive use program by utilizing Aquifer Storage and Recovery (ASR) technology to inject drinking water from the BWTP when surface water is plentiful to maintain the sustainability and groundwater levels in the groundwater basin. The estimated annual capacity for storage is about 1,500 AFY to 3,000 AFY during normal and wet years. The District plans to invest additional resources in conjunctive use and water banking and will continue to implement additional ASR wells when replacing old wells that have reached the end of their useful life

Alternative Supplies

The District also has access to remediated groundwater supplies from the Aerojet-Rocketdyne (Aerojet) Groundwater Extraction and Treatment (GET) LA and LB facilities located within the District's service area. These water supplies are extracted and treated by Aerojet and then discharged into the American River. The District has exercised the option in curtailment conditions.

Distribution System of Note

The District's water delivery system consists of both a distributed supply from groundwater wells and a centralized supply from the BWTP. The supply capacity is aided by two ground level water storage tanks, the La Vista Tank and the Dewey Tank, with a combined available storage capacity of 4 million gallons. The network of distribution pipelines consists of water supply mains ranging in size from 4-inch to 18-inch pipes to larger water mains of 24-inch and 30-inch pipes.

The District also maintains an intertie with Fair Oaks Water District and Citrus Heights Water District and four interties with Sacramento Suburban Water District.

Surface Water and Groundwater Management

The table below summarizes the demand for each water source from 2006 through 2024. Purchased Water column indicates additional water acquired and used during curtailment periods via short term temporary contracts with Aerojet for additional remediated groundwater, when available, and with San Juan Water District. These contracts were single year contracts and are not currently in place.

Year	Surface Water	Groundwater	Purchased Water	Total
2006	8,971	3,519	0	12,490
2007	9,509	2,867	0	12,376
2008	10,422	1,581	0	12,003
2009	8,965	1,609	0	10,574
2010	8,217	1,518	0	9,735
2011	7,849	1,469	0	9,318
2012	8,315	1,570	0	9,894
2013	8,369	2,030	0	10,399
2014	2,441	3,417	2,501	8,359
2015	2,429	2,543	2,169	7,142
2016	6,254	1,189	0	7,443
2017	5,897	2,384	0	8,280
2018	5,633	2,718	0	8,352
2019	6,051	2,165	0	8,216
2020	4,342	4,172	0	8,514
2021	4,023	3,779	865	8,667
2022	3,264	5,176	159	8,599
2023	5,656	2,481	0	8,138
2024	6,479	2,151	0	8,630

The District's total demands (or supply) have decreased significantly since 2006. As the District is built out, the future projected demands are expected to be similar to current conditions. Future in-fill projects will most likely reduce current irrigated areas and comply with new water conservation standards. Future water efficiency measures will also limit additional diversions from the American River.

Current Diversions

CWD's diversions from the American River are listed in the table below.

Year	Total (AFY)	Note
2014	2,441	curtailment year
2015	2,430	curtailment year
2016	6,254	
2017	5,897	
2018	5,633	
2019	6,051	
2020	4,342	groundwater substitution transfer year
2021	4,023	curtailment year
2022	3,264	curtailment year and groundwater substitution transfer year
2023	5,656	
2024	6,479	

Future Projected Diversions

As the District is built out, the future projected diversions are expected to be similar to current conditions. Future in-fill projects will most likely reduce current irrigated areas and comply with regulatory water conservation standards. Future water efficiency measures will also limit additional diversions from the American River.

Future diversions from the American River may increase during normal and wet years by 1,500 to 3,000 AFY for storage of surface water into the groundwater basin via ASR operations.

Wet Conditions Management

Wet conditions occur when the Unimpaired Inflow Folsom Reservoir (UIFR) is greater than 1.6 MAF. This threshold is not considered a formal definition of what constitutes a “wet year” or “wet conditions” on the American River but was utilized in the original Water Forum agreement as a basis for surface water commitments. It is expected that additional analysis and discussions will be conducted as part of the American River Climate Adaptation Program (ARCAP) to explore and define what other potential criteria could be used to guide regional operations in wet times. Where possible, the District will expand its conjunctive use operations and maximize its groundwater storage by 1,500 to 3,000 AFY through its ASR wells.

Drier Conditions Management

In drier conditions when the UIFR is between 950 TAF and 400 TAF, the District will implement water conservation measures to reduce demands by 10% from normal demands or as required by the District’s Water Shortage Contingency Plan. Where possible, the District will prioritize groundwater use to ensure sufficient flows in the LAR.

Driest Conditions Management

In driest conditions when the UIFR is less than 400 TAF, the District will implement water conservation measure to reduce demands by 10 – 20% or as required by the District’s Water Shortage Contingency Plan. Further, the District will comply with State Water Resources Control Board’s water rights orders for diversion limitations or curtailments. Where possible, the District will prioritize groundwater use to ensure sufficient flows in the LAR.

Critically Low Storage Conditions

In critically low storage conditions, the District would most likely be required to cease water diversions from the Lower American River per curtailment orders issued by the State Board and/or terms and conditions obligated in the Healthy River and Landscape Agreements. If curtailed, the District would use its groundwater resources to meet demands and, if necessary, acquire additional water to supply demand. The District would also have to implement its Water Shortage Contingency Plan that aligns with a potential water supply shortage and would have to comply with any applicable mandates issued by the State of California.

Demand Management

CWD is committed to abide by the relevant conservation and water use efficiency regulations. At the time of signing, key requirements are associated with the 2024 "Making Conservation a California Way of Life" regulations, Assembly Bill (AB) 1572 related to irrigation of non-functional turf with potable water, and the Model Water Efficient Landscape Ordinance (MWELO), which encourages low-water use and native landscaping for new development.

CWD has participated and will continue to participate in the Regional Water Authority's (RWA's) Water Efficiency Program, especially for regional compliance with the CII best management practices and regional non-functional turf outreach, along with regional messaging. CWD also offers water efficiency surveys and rebates for turf replacement, smart sprinkler controllers, and Flume Water's Smart Home Water Monitor and Leak Detector. Continuation of the rebate program is subject to CWD's Board approval.

Potential demand management actions could include:

- Developing programs to assist in the conversion of publicly owned, commercial and institutional landscaping to low water use native landscaping.
- Expand and strengthen regional conservation messaging about plant watering needs.
- Provide additional water use efficiency rebates to customers.
- Track customer water use and develop targeted outreach opportunities for high water use customers.
- Maintain and implement water waste prevention programs.
- Maintain customer outreach and communication programs to educate and inform customers of state water use efficiency requirements
- Maintain customer programs to support the implementation of Best Management Practices (BMPs) for the Commercial, Industrial, and Institutional (CII) sectors

Project List

Structural

- Rehabilitation, modernization, or replacement of ***existing*** infrastructure as outlined below:
  - Rehabilitation and replacement of Ranney collector laterals to maintain capacity and infrastructure integrity.
  - Replacement of existing wells at the end of their useful life and modernize with ASR capabilities.
  - Replacement of existing pipelines due to poor conditions for water transmission reliability.
  - Distribution pressure zone modifications for efficient water use and energy management.
- New groundwater facilities consistent with adopted groundwater sustainability plans.

- Projects and programs to ensure success of the Healthy Rivers and Landscape Program (i.e Voluntary Agreement) or a similar tributary-specific program that improves the ecosystem, protects local water entitlements, and maintains better cold water pool conditions in Folsom and the Lower American River.

Non-Structural

- Water transfers when available consistent with the Groundwater Sustainability Plan and the Water Code.
- Additional groundwater storage opportunities in the Sacramento Regional Water Bank.
- Support and participate in regional partnership opportunities with other water purveyors that provide reliability to regional water supply systems and benefits to the LAR.
- Agreements with neighboring purveyors for conjunctive use opportunities.
- Extension and/or license of water entitlements.
- Regional water efficiency/conservation campaigns.

Caveats and Assurances

1. CWD was established over 100 years ago and is mostly built out. Structural projects listed above for rehabilitation, modernization, or replacement of existing infrastructure are key for water supply reliability to its customers. CWD seeks support in implementation of rehabilitation, modernization, and replacement of old infrastructure for supply reliability, operational efficiency, and water conservation objectives.

2. The District uses surface water supplies when possible to protect its groundwater supplies and prevent migration of contaminant plumes associated with the Aerojet facilities in Sacramento County. The District will continue to practice conjunctive use to meet existing and future needs and manage dry and critically dry conditions as they arise in the future.

3. Support protection of regional surface water entitlements to ensure local control of water to benefit the coequal objective.

4. Acknowledge that the duty of a water purveyor is to simultaneously provide an affordable, reliable and high-quality water supply to its customers. Proposals that favor one of these goals over another could threaten a water purveyors' ability to achieve all of these goals simultaneously.

CARMICHAEL WATER DISTRICT

September 2025 Engineering Department Report

Engineering Manager, Greg Norris P.E.

CAPITAL IMPROVEMENT PROJECTS

La Sierra ASR Well Project: Project is awaiting final installation and testing of the switchgear and electrical controls. The equipment has arrived and is being tested. These components are estimated to be installed in September 2025. Change Order #2 for $38,212 has been approved for the additional landscaping, which will be along the west and east walls. This CO is within the contingency amount approved by the Board at the January 2024 meeting.

Winding Way and Ladera ASR Wells Project: The contractor is moving forward with a Basis of Design Report (BODR) which is planned to be presented to District staff on September 5, 2025. No additional funding is needed for construction management work at this time and will be further evaluated to determine the needs.

La VistaTank and Booster Well Project: See monthly Informational Board Memo.

SCADA Project: Two proposals were received in response to the RFP that the District released on July 02, 2025 to integrate software and to develop the SCADA system with new controllers through a Progressive Design Build method. The contractors who submitted proposals were Advanced Integration and Controls (AIC) and Enterprise Automation (EA, a Tetra Tech Co.). District staff along with the District's consultant (EMA) are reviewing the proposals. District staff plan to recommend a contract to the Board for approval at its October Regular Meetings.

Garfield Well Generator/Electrical Upgrade Project: The Garfield Well generator project is ongoing. Site construction activity has been limited based on operational needs of the well but submittal review for equipment approval and ordering are nearly complete. The well cannot be taken offline for final installations until October at the earliest because it is needed for water supply now that the Winding Way Well is no longer available. Early construction work will include concrete flatwork for equipment pads and installation of a new SMUD transformer. Once the well can be taken offline, old electrical equipment will be cleared and new gear will be installed to incorporate the generator. The generator has been manufactured and is being held temporarily at the supplier's storage facility until the contractor is ready to have it shipped onsite.

Claremont/FOB Pipeline: A Notice to Proceed was issued to Flowline Contractors on June 27, 2025. The Traffic Control Plans were received and approved specifying that only night work from 9PM to 5AM will be allowed on Fair Oaks Blvd. Potholing along Fair Oaks Blvd. is complete and construction is scheduled to begin in Mid-September.

MISCELLANEOUS

Turf Replacement: After the Board approved the rule change at the August 2025 meeting, 5 repeat customers have requested assistance to perform additional turf replacement on their properties. District staff is in the process of evaluating the proposed projects.

OUTREACH

District staff are planning to attend and hand out water conservation information at the Maddox Park neighborhood party on September 20, 2025 and Founder's Day on October 11, 2025.

CARMICHAEL WATER DISTRICT
AUGUST 2025 BILLING DEPARTMENT REPORT
Billing Supervisor, Cecilia D.

In comparison to July's Billing, there was a decrease of 8% in Billing Units and Total Billing was down 4%. Year to date Billing Units were 12% lower overall than last year and Total Billing was 1% higher.

BILLING ACTIVITY				FY 25-26		FY 24-25		
Billing Period	Billing Units*	Usage Charges	Service Charges	Billing Totals		Billing Totals	Billing Units*	Previous Year Billing Totals % Difference
July	482,073	$ 1,190,720	$ 898,603	$ 2,089,322		$ 2,110,104	570,814	-1%
August	444,720	$ 1,098,458	$ 899,837	$ 1,998,295		$ 1,921,979	487,443	4%
YTD Totals	**926,793**	**$ 2,289,178**	**$ 1,798,440**	**$ 4,087,617**		**$ 4,032,083**	**1,058,257**	**1%**

* 1 Unit = 100 CCF (Centum Cubic Feet) = 748 Gallons.
Billing Units are based on current meter reading period, i.e., Current Billing Period =7/24/25 – 8/22/25, and may differ from Production reported numbers due to the meter read billing cutoff dates.

COLLECTIONS: Processed & Total Outstanding A/R Amounts

The Total 61-90 Days column displays the delinquent amounts targeted for September's final notice and collections processes. The Outstanding A/R amounts reflect amounts still owing at month end, this is 19% of the amount billed, or approximately 2,126 customers.

The Total Outstanding A/R balances in July and August are significantly greater than June's balance primarily due to the customers delaying payments for longer periods than was experienced in June. Upon further review of the account balances, many of the larger, commercial accounts had not yet paid their "Current" balance due at July 31, and instead paid in the following month in August. In August, however, a reversal occurred where the larger accounts paid their "Current" balances due, but a significant amount of smaller to mid-sized accounts had not yet paid their "Current" balance due, with many accounts falling into the "2 to 30-day" aging period.

Date	Total on APS*	Total Off	Total # Liened	Total $ Liened	Total 61 - 90 Days	Total Outstanding A/R **
June 2025	1	9	7	$ 3,211	$ 13,268	$ 175,930
FY 25-26						
July	1	9	7	$ 3,236	$ 13,395	$ 358,273
August	0	9	7	$ 3,763	$ 17,471	$ 389,815

* APS = Alternative Payment Schedule
** Includes Total Liened and 61-120 Days Amounts

This page intentionally left blank.

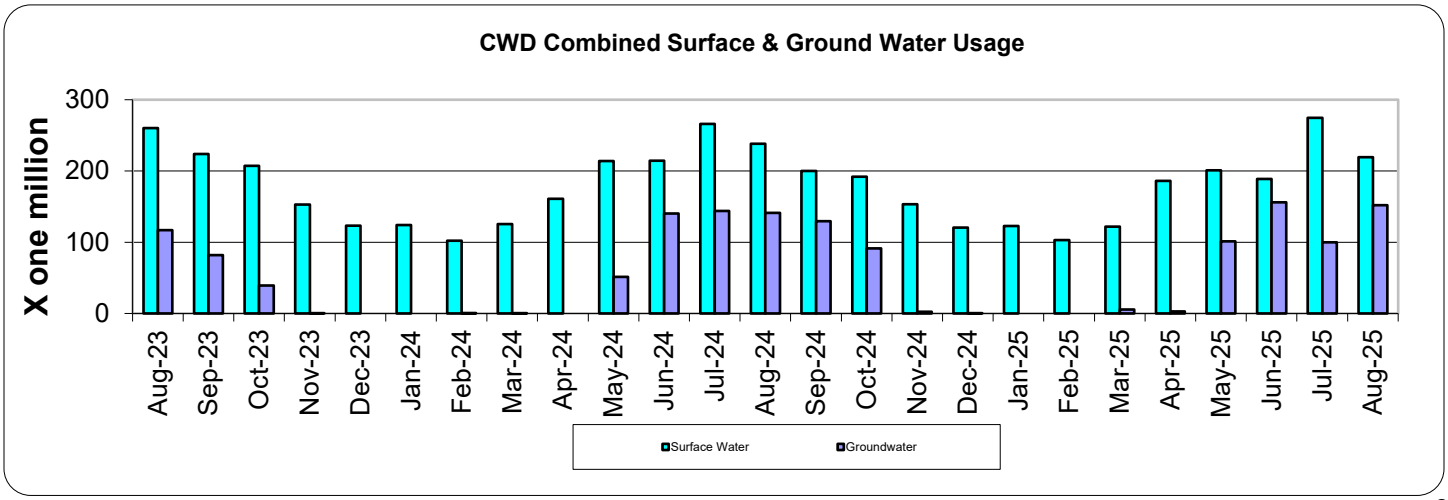
CARMICHAEL WATER DISTRICT

Production Superintendent, DAVID BIAGI

August 2025 Water Production Board Report

Ace Vibration Analysis

CWD Monthly Water Production 2015-2025														
FY	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	MGD Totals	Acre/Ft
2025-26	**374.27**	**371.54**											**746**	**2289**
2024-25	409.91	379.28	329.43	283.13	155.68	117.11	122.95	103.10	127.03	188.90	302.12	344.62	**2863**	**8787**
2023-24	381.87	376.96	305.79	246.50	153.18	123.06	114.25	102.90	125.55	160.99	265.26	354.84	**2712**	**8322**
2022-23	371.77	358.96	299.37	267.16	149.16	124.91	115.19	107.14	109.89	165.79	255.81	310.23	**2635**	**8088**
2021-22	381.78	354.31	318.00	232.62	127.07	114.90	116.95	138.86	181.17	183.76	282.17	327.46	**2759**	**8467**
2020-21	408.04	402.05	335.66	294.53	188.58	140.24	125.19	110.64	145.91	237.20	332.59	371.58	**3092**	**9490**
2019-20	378.84	381.60	314.85	259.58	201.55	122.39	113.09	135.71	153.23	181.81	281.40	360.18	**2884**	**8851**
2018-19	387.57	361.56	314.04	259.22	187.67	121.80	111.84	96.07	109.20	158.03	226.19	317.21	**2650**	**8134**
2017-18	399.61	383.76	323.74	270.59	140.87	129.07	113.92	117.16	115.88	148.80	258.57	335.23	**2737**	**8400**
2016-17	357.82	353.35	299.41	193.38	123.16	115.61	113.47	96.26	116.84	123.76	268.14	332.52	**2494**	**7653**
Avg.	**385.15**	**372.34**	**315.59**	**256.30**	**158.55**	**123.29**	**116.32**	**111.99**	**131.63**	**172.12**	**274.69**	**339.33**	2759	8426
Daily	**12.42**	**12.01**	**10.52**	**8.27**	**5.28**	**3.98**	**3.75**	**4.00**	**4.25**	**5.74**	**8.86**	**11.31**		



August CWD Total Production		MG
Surface Water	59%	219.492
Groundwater	41%	152.049

Production	Up/ Down	Month	Up/ Down	10-Year Running Average
Production from same month last year	Down	2%	N/C	0%
August 2025 Average Daily Production		12.61 MG		
Peak Day – Aug 12th		11.99 MG		

GSWC Delivery: CWD delivered 139.45 MG or 427.96 Acre/Ft to GSWC in August.

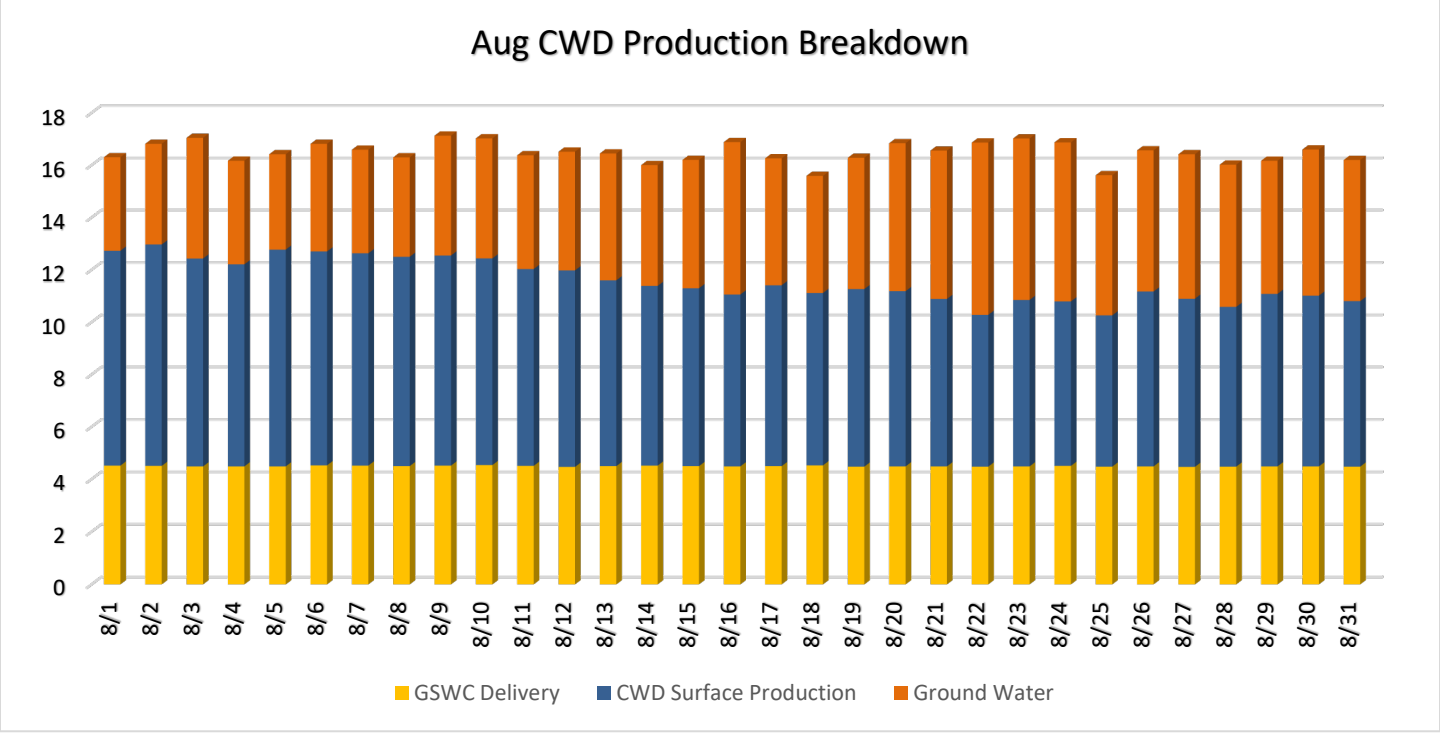
There were six (6) water quality complaints in August. Each complaint was promptly investigated, and the area was thoroughly flushed when necessary.

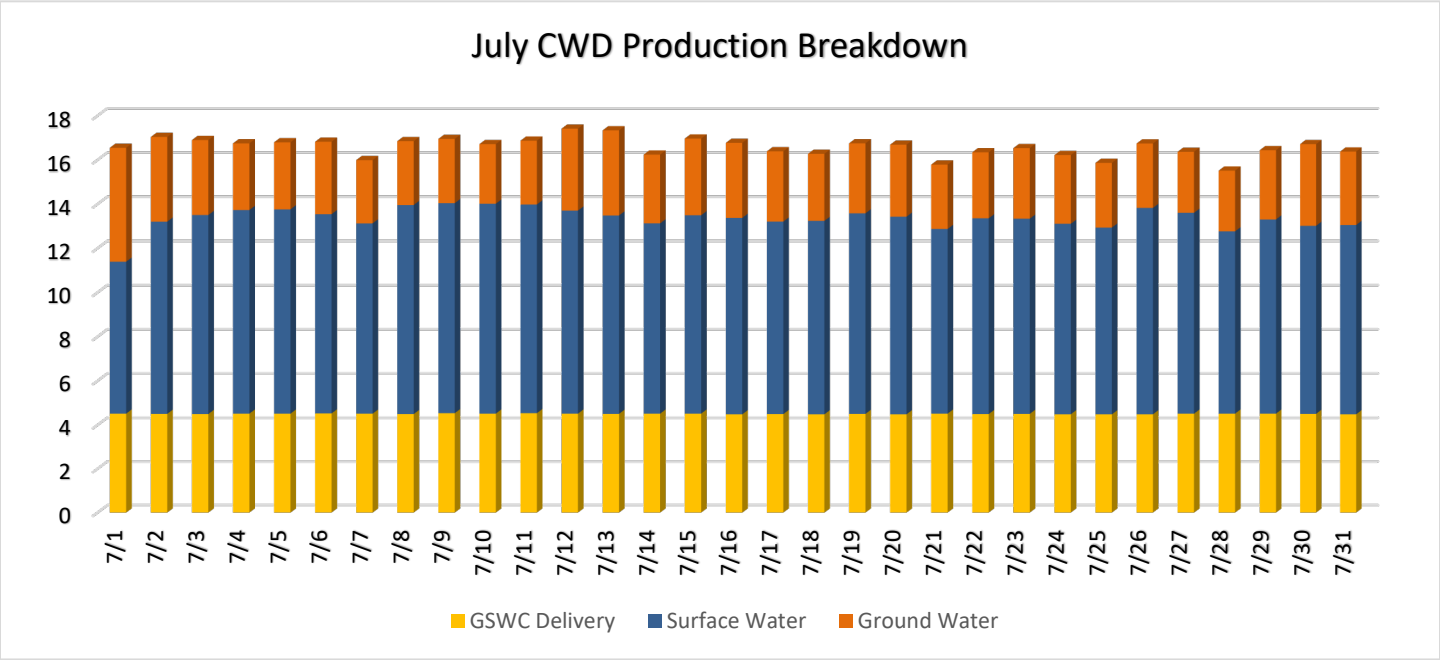
Water Quality Activity
- ✓ Taste & Odor: 1
- ✓ Color: 0
- ✓ Turbidity (Air): 1
- ✓ Suspended Solids: 1
- ✓ Low Pressure: 3

Backflow Devices Tested
- ✓ Tested: 73
- ✓ New Devices: 0
- ✓ Failed Tests: 1

Maintenance Activity
- ✓ Secondary Cl2 CIP: 2
- ✓ Primary NaOH CIP: 11
- ✓ Instrument Calibrations: 6
- ✓ Module Repair: 57
- ✓ RWP+GET_LA Oil Change: 6

American River Flows: Releases from Folsom Dam decreased in August. Flows started the month at 4,000 CFS and were then reduced throughout the month until landing at 1,700 CFS on August 22nd, remaining steady for the rest of the month. The average temperature for August was 95 degrees, and demand was down by 2% compared to last year. **Surface water production was reduced to 59% of the total CWD production for the month.** The average total diversion from the Bajamont Water Treatment Plant was 11.579 million gallons a Day (MGD), down from 13.363 MGD in July. Each day, 4.5 million gallons were delivered to GSWC, with the remaining amount sent to CWD customers. The production staff worked diligently to boost surface water production this month, strategically utilizing groundwater and storage to optimize output. Reduced river flows made this very difficult. I have included the Production Breakdowns for July and August below.





Total Coliform Rule monitoring Violation: Under the Revised Total Coliform Rule (rTCR), public water systems are required to conduct routine monitoring for total coliform bacteria to ensure water safety. Total coliforms are indicator organisms used to assess the potential presence of harmful pathogens in the water supply. Our water system is required to collect 50 samples per month from designated sites across our distribution system.

On July 30, 2025, only 9 of the 10 routine samples were collected due to construction at one of the sample sites. The sample was not collected and went unnoticed until the following week, on August 5, 2025, which was too late to collect the final sample needed to complete the 50 required samples.

Follow-up samples were collected in the first week of August. No positive total coliform or E. coli results were detected in the samples collected during this period, indicating no immediate public health risk. However, the failure to meet the minimum sampling requirements constitutes a Tier 3 violation under the rTCR, requiring public notification and corrective action.

On August 20, 2025, the SWRCB Division of Drinking Water issued a violation notification to CWD. This violation does not indicate contamination in the water supply but reflects a procedural lapse in monitoring compliance. Issuance of a public notice to customers within 12 months as required by the rTCR

To address the violation and prevent recurrence, the following actions are underway:

Staff Training: All CWD personnel involved in water quality monitoring have been retrained on rTCR requirements, including sample collection schedules and documentation procedures.

Additional Sampling Stations: With three new wells under construction in the District, staff is considering adding three more sampling sites to better represent the expanding groundwater sources and to collect additional samples each month.

Public Notification: A Tier 3 public notice will be issued to customers via the 2025 Consumer Confidence Report as required by the RTCR.

Regulatory Coordination: We have notified the Division of Drinking Water of the violation and submitted a corrective action plan, which has been acknowledged. Follow-up reporting and an updated Bacteriological Sampling Site Plan will be completed by October 1,2025

Motor Vibration Analysis: In August, Ace Electric and Motor Company, after completing the installation of two raw water pump VFDs, returned to the treatment plant to perform vibration analysis on the eight 300 HP motors. Vibration analysis on electric motors is a valuable diagnostic tool used in predictive maintenance to evaluate the health and performance of motors. By monitoring and analyzing the vibration patterns of a motor, technicians can identify potential issues before they result in costly failures or downtime. This visit aimed to establish a baseline for all the motors and input all necessary motor and bearing data into the system. Ace will now conduct quarterly vibration analysis to monitor the health of our large production motors.

CARMICHAEL WATER DISTRICT
DISTRIBUTION SUPERINTENDENT, Lucas Campbell
August 2025 Water Distribution Board Report

August CIP/ O&M Repair Work

Capital Improvements/Replacements

- Service Line:4
- Fire Hydrant: 1
- Main Line Valve: 0
- New Construction Meters: 11
- New Hydrant Valve: 1
- Air Relief Valves – 0
- Meter Body Change Out: 14

O and M Repair Work

- Service Line: 2
- Fire Hydrant: 1
- Main Line: 2
- Meter Boxes: 1
- Main Line Valve Boxes: 0
- Registers Change Out: 10
- Hydrant Inspections: 6
- Valves Exercised: 4
- Antenna: 3
- Large Meter UME: 0

Customer Assist

- Call Outs: 35
- Private Repairs: 9
- Water Waste: 17
- Lock/Unlock: 7
- High/Low Pressure: 0
- USA: 130

Infrastructure Accessibility and Easement Awareness

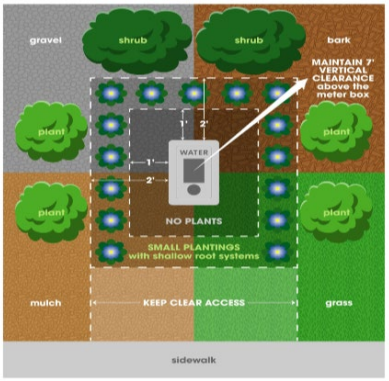
Carmichael Water District (CWD) maintains an extensive network of infrastructure critical to delivering safe and reliable water service to the community. Similar to many water agencies serving older neighborhoods, CWD has a significant amount of **"**backyard infrastructure" referring to water mains, service lines, valves, and other vital assets that are located within private property boundaries — often in backyards, side yards or sometimes front yards. These areas may fall within legally recorded utility easements but are frequently obstructed over time as property owners make improvements to their land and impeding CWD staff from accessing the infrastructure.

Timely access to water infrastructure is crucial, especially during emergencies such as water main breaks or service line leaks. Obstructions can delay emergency response, increase repair costs, result in avoidable property damage, and compromise water service to neighboring properties, etc.

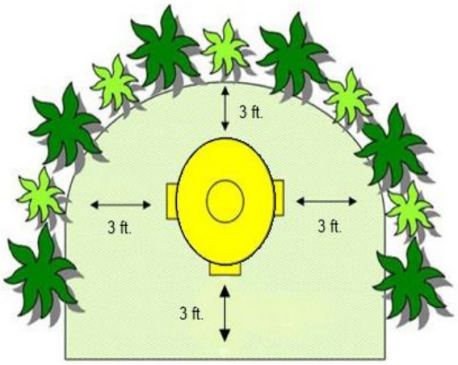
To ensure reliable service and protect our infrastructure, staff is actively:

- **Educating ratepayers** about the importance of maintaining clear access to water assets.
- **Updating Easement Regulations** to better reflect the unique challenges of maintaining backyard infrastructure.
- **Working collaboratively with homeowners** to resolve accessibility concerns before emergencies occur.
- **Providing visual guidelines** on CWD's website regarding required clearances around meter boxes and fire hydrants as shown below:

Water meter boxes



Fire hydrants



Fire Hydrant Obstruction Resolved at 7201 Fair Oaks Blvd.

Staff recently addressed a critical safety issue involving a fire hydrant that had become non-operational due to an obstruction.

During a routine fire inspection, Sacramento Metropolitan Fire District identified a palm tree obstructing a hydrant located at 7201 Fair Oaks Blvd**.** The obstruction significantly limited access to the hydrant, rendering it unusable in the event of an emergency. The issue was brought to the attention of both the property owner and CWD.

Despite being notified by Sacramento Metro Fire, the property owner did not take action to remove the obstruction. Given the public safety risk, staff notified the property owner (Burger King) that District crews would proceed with the removal of the palm tree to restore full access to the fire hydrant and ensure fire suppression capabilities for the surrounding area.

Obstruction to Fire Hydrant

Cleared Fire Hydrant

The Distribution team worked diligently and professionally, carefully removing the palm tree while minimizing disruption to the property's landscaping. Once the hydrant was cleared, it was tested for operational readiness, and Sacramento Metro Fire District was promptly informed of the completed work.

The Fire District expressed sincere appreciation for CWD's response and collaborative efforts, noting the importance of maintaining accessible and functional fire hydrants for community safety.

Current Projects (Continued)

- **Claremont/Fair Oaks Blvd Water main/AC Overlay Project:** Flowline has started potholing for surrounding utilities and mainline/service line alignment. There are 72 valve boxes that will have to be lowered and raised on Fair Oaks Blvd. (Manzanita Ave to Marshall Ave) as part of the Sacramento County Overlay Project to prevent the valve boxes from permanently covered up.

- **Ancil Hoffman and River Bend Park Overlay Project (Continued)**: The overlay has been completed and Planet paving has been tasked to raise the five boxes that were within the overlay limits.

- **Sacramento County AC Overlay Phase D (Continued**): The District has received "A" plans for an additional overlay project in the areas of Kenneth Ave, west of Walnut Ave continuing south to El Camino Ave. Upon completion of the overlay project, there will be a three (3) year utility trench cut moratorium. In anticipation of this project and the three year moratorium, District staff will be upgrading many water service laterals and saddles at the main. Making these upgrades will help ensure CWD from having to perform construction in the roadway. Staff will GPS all facilities within the limits of the project and update the District map as needed.

This page intentionally left blank.

BOARD OF DIRECTORS

AUGUST 2025
MEETING ATTENDANCE

		MEETINGS ATTENDED	DIRECTORS			
DATE	**DESCRIPTION**	**DAVIS**	**EMMERSON**	**NELSON**	**GREENWOOD**	**SELSKY**
8/15 8/29	CWD - Training/Meeting				2	
8/18	CWD - Regular Board Meeting	1	1	1	1	1
8/7 8/18	CWD - Special Board Meeting	2	2	2	2	2
8/1	CWD - Event/Public Outreach				1	
8/26	RWA - Executive Committee				1	
8/28	RWA - Meeting				1	
8/14	SGA - Regular Board Meeting					1
8/12	SGA - Meeting					1
8/6	Water Forum			1		
8/21	Carmichael Chamber			1		
TOTAL MEETINGS ATTENDED		**3**	**3**	**5**	**8**	**5**

AUGUST 2025
EXPENSE COMPENSATION/REIMBURSEMENT

		MEETINGS COMPENSATED				
DATE	**DESCRIPTION**	**DAVIS**	**EMMERSON**	**NELSON**	**GREENWOOD**	**SELSKY**
6/25 7/8 7/17	CWD - Training/Meeting				3	
7/21	CWD - Regular Board Meeting	1	1	1	1	1
7/4	CWD - Event/Public Outreach				1	
7/10	RWA - Meeting				1	
6/12	SGA - Regular Board Meeting			1		
TOTAL # COMPENSATED		**1**	**1**	**2**	**6**	**1**
TOTAL $ COMPENSATED		**$152.00**	**$152.00**	**$304.00**	**$912.00**	**$152.00**
***TOTAL REIMBURSEMENTS**		**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**

FISCAL YEAR 2024-2025
SUMMARY

	DAVIS	**EMMERSON**	**NELSON**	**GREENWOOD**	**SELSKY**
FYTD # MEETINGS ATTENDED	**5**	**5**	**7**	**15**	**7**
FYTD # MEETINGS COMPENSATED	**1**	**1**	**2**	**6**	**1**
FYTD $ MEETINGS COMPENSATED	**$152.00**	**$152.00**	**$304.00**	**$912.00**	**$152.00**
FYTD EXPENSE REIMBURSEMENTS	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**