RESOLUTION NO. 2018-52
RESOLUTION NO. PFA-03
ORDINANCE NO. 2018–02

AGENDA

MISSION STATEMENT

"Our team is dedicated to protecting, enhancing, and developing our rich water resources to the highest beneficial use for Calaveras County, while maintaining cost-conscious, reliable service, and our quality of life, through responsible management."

Regular Board Meeting
Wednesday, October 10, 2018
1:00 p.m.

Calaveras County Water District
120 Toma Court, (PO Box 846)
San Andreas, California 95249

In compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting, please contact the Administration Office at 209-754-3028. Notification in advance of the meeting will enable CCWD to make reasonable arrangements to ensure accessibility to this meeting. Any documents that are made available to the Board before or at the meeting, not privileged or otherwise protected from disclosure, and related to agenda items, will be made available at CCWD for review by the public.

ORDER OF BUSINESS

CALL TO ORDER / PLEDGE OF ALLEGIANCE

1. ROLL CALL

2. CLOSED SESSION

2a Public Employee Appointment Government Code § 54957 (b)(1)
Title: General Manager

2b Conference with Legal Counsel – Potential Litigation Government Code § 54956.9

2c Conference with legal counsel – anticipated litigation. Significant exposure to litigation pursuant to subdivision (d)(2) of Government Code section 54956.9. One potential case.

3. PUBLIC COMMENT

At this time, members of the public may address the Board on any non-agendized item. The public is encouraged to work through staff to place items on the agenda for Board consideration. No action can be taken on matters not listed on the agenda. Comments are limited to three minutes per person.

4. REPORTABLE ACTION FROM CLOSED SESSION

5. CONSENT AGENDA

The following items are expected to be routine / non-controversial. Items will be acted upon by the Board at one time without discussion. Any Board member may request that any item be removed for later discussion.

5a Approval of Minutes for the Board Meeting of August 22, 2018

5b Review Board of Directors Monthly Time Sheets for September 2018

5c Approval of Board Meeting Schedule in November and December, 2018
(Dave Eggerton, General Manager)

5d Ratify Claim Summary #559 Secretarial Fund in the Amount of
$1,435,506.50 for September 2018.
(Jeffrey Meyer, Director of Administrative Services) **RES 2018-______**

5e Information / Quarterly Projects Report, (July-Sept 2018)
(Charles Palmer, District Engineer)

5f Approve request for Water Leak Adjustment for APN 025-016-068 (Stacey Lollar, Director of Human Resources and Customer Service) **RES 2018-______**

6. NEW BUSINESS

6a Accept and File the GASB 45 – Actuarial Valuation of Other Post-Employment Benefits and Actuarially Determined Contributions Report
(Jeffrey Meyer, Director of Administrative Services)

6b Discussion/Direction regarding PERS Annual Valuation Reports as of June 30, 2017
(Jeffrey Meyer, Director of Administrative Services)

6c Discussion / Direction IT Service Review
(Jeffrey Meyer, Director of Administrative Services)

6d Adoption of the Final Copper Cove Water System Master Plan, CIP 11064C-120
(Bob Godwin, Sr. Civil Engineer) **RES 2018-______**

6e Update on the Draft Calaveras River Habitat Conservation Plan
(Peter Martin, Manager of Water Resources)

6f Discussion/Action regarding an Approval of an Exception to District Policy Regarding Termination of Services for One (1) of the Two (2) wastewater services at 1141 Sequoia Street in Arnold **RES 2018-______**

6g Discussion / Action Authorizing Contract Amendment for Archaeological Services Jenny Lind Water Plant Pretreatment Project, CIP #11092 (Charles Palmer, District Engineer)
RES 2018-______

*No information included in packet

7. OLD BUSINESS

Nothing to Report.

8.* GENERAL MANAGER REPORT

9.* BOARD REPORTS / INFORMATION / FUTURE AGENDA ITEMS

10. NEXT BOARD MEETINGS

- Wednesday, October 24, 2018, 1:00 p.m., Workshop
- Wednesday, November 14, 2018, 1:00 p.m., Regular Board Meeting

11. ADJOURNMENT

*No information included in packet

RESOLUTION NO. 2018-46
RESOLUTION NO. PFA-03
ORDINANCE NO. 2018–02

MINUTES

CALAVERAS COUNTY WATER DISTRICT
REGULAR BOARD MEETING

AUGUST 22, 2018

Directors Present:	Scott Ratterman, President Russ Thomas, Vice President Terry Strange, Director Bertha Underhill, Director Jeff Davidson, Director
Staff Present:	Dave Eggerton, General Manager Rebecca Hitchcock, Clerk to the Board Jeffrey Meyer, Director of Administrative Services Charles Palmer, District Engineer Peter Martin, Manager of Water Resources Stacey Lollar, Director of Human Resources and Customer Service Robert Creamer, Engineering Analyst Bob Godwin, Sr. Civil Engineer
Others Present:	Georg Krammer, Koff & Associates Karl Brustad, Peterson-Brustad, Inc. Jack Scroggs, KASL Engineering Elaine St. John

ORDER OF BUSINESS

CALL TO ORDER / PLEDGE OF ALLEGIANCE

1. ROLL CALL

President Ratterman called the Regular Board Meeting to order at approximately 1:00 p.m. and led the pledge of allegiance.

2. PUBLIC COMMENT

There was no public comment.

3. CONSENT AGENDA

3a Approval of Minutes for the Board Meeting of July 25, 2018

MOTION: **Directors Thomas / Underhill – Approved Consent Agenda Items: 3a, Board of Directors Monthly Time Sheets for July 2018**

PUBLIC COMMENT: There was no public comment.

AYES: **Directors Thomas, Underhill, Strange, Davidson, and Ratterman**
NOES: **None**
ABSTAIN: **None**
ABSENT: **None**

4. NEW BUSINESS

4a Discussion / Direction regarding Comparator Agencies for Compensation Study by Koff & Associates (Stacey Lollar, Director of HR and Customer Service / Georg Krammer, Koff & Associates)

DISCUSSION: Mr. Georg Krammer, CEO of Koff & Associates presented the details of the total compensation study and discussed in detail the benchmarking process for the survey. These benchmarks would then be compared to the comparator agencies based on a variety of factors such as organizational structure, job descriptions, cost of living, among other factors. There was considerable discussion between the Directors, staff, and Mr. Krammer regarding the cost of living of the various comparator agencies and whether that would be a consideration in the final report. Direction was given by the Board to proceed with the current list of comparator agencies with the understanding that cost of living factors should be disclosed.

PUBLIC COMMENT: There was no public comment.

4b Discussion / Action regarding KASL Consulting Engineers Contract Amendment for Engineering and Design Services for the Ebbetts Pass Reach 1 Water Pipeline Replacement Project, CIP# 11085
(Charles Palmer, District Engineer) **RES 2018-46**

MOTION: **Directors Davidson / Underhill – Approved the Contract Amendment for Engineering and Design Services for the Ebbetts Pass Reach 1 Water Pipeline Replacement Project, CIP# 11085, with the agreement to bring this item to the Engineering Committee to review the process.**

DISCUSSION: Mr. Eggerton, and Jack Scroggs from KASL Engineering discussed the factors that led up to the contract amendment on the Ebbetts Pass Reach 1 Water Pipeline Replacement Project. There was additional surveying and cultural resources required since the initial contract. There was extensive discussion from the Board on the additional costs and how to avoid them in the future. Director Davidson would like to see this contract process reviewed during the upcoming Engineering Committee meeting.

PUBLIC COMMENT: There was no public comment.

AYES: **Directors Davidson, Underhill, and Thomas**
NOES: **Directors Strange and Ratterman**
ABSTAIN: **None**
ABSENT: **None**

RECESS was called at 2:43 p.m. **SESSION RESUMED** at 2:48 p.m.

4c Presentation of the Draft Copper Cove Water System Master Plan, CIP 11064C
(Bob Godwin, Sr. Civil Engineer)

DISCUSSION: Mr. Godwin introduced Karl Brustad of Peterson-Brustad, Inc. who prepared the Draft Copper Cove Water System Master Plan. Mr. Brustad reviewed the service areas and facilities, system design criteria, evaluations of facilities with key findings, and the capital improvement plans. He responded to questions from the Board. Mr. Godwin commented that the master plan is currently posted for public comment and a final version of the master plan will be brought to the Board with comments included.

This item was for information only; no action was taken.

PUBLIC COMMENT: There was no public comment.

4d Discussion Regarding Implementation of Phase 1 of State Water Resources Control Board's Bay-Delta Water Quality Control Plan Update
(Peter Martin, Manager of Water Resources)

This item was postponed to a future meeting.

4e Discussion / Action regarding Approval of Agreement with the Management and Confidential Employees Bargaining Unit
(Dave Eggerton, General Manager) **RES 2018-47**

MOTION: **Directors Thomas / Underhill – Approved Agreement with the Management and Confidential Employees Bargaining Unit**

DISCUSSION: Mr. Eggerton reported that the Board has been in negotiations with the Management / Confidential Unit (MCU) and the current MCU contract expired June 30th. The Board considered a proposed two (2) year agreement between the District and the MCU, term of agreement is July 1, 2018 - June 30, 2020. Director Strange commented that he wanted to see the results from the salary survey before agreeing to any new contracts.

PUBLIC COMMENT: There was no public comment.

AYES: **Directors Thomas, Underhill, Davidson, and Ratterman**
NOES: **Directors Strange**
ABSTAIN: **None**
ABSENT: **None**

5. OLD BUSINESS

Nothing to Report

6. GENERAL MANAGER REPORT

Mr. Eggerton reported on the following activities: 1) The State Water Board is meeting to consider adoption of Supplemental Environmental Document (SED) for Phase 1 of the Bay-Delta Water Quality Control Plan Update, which CCWD has worked to influence adoption. 2) CCWD had a theft of a service vehicle at one of our facilities and staff is evaluating options to further protect our assets.

7. BOARD REPORTS / INFORMATION / FUTURE AGENDA ITEMS

Director Underhill reported that she is running unopposed this year for District 2.

Director Thomas is happy to report that the 2x2 meetings with Utica Water & Power Authority and the County are progressing well and seem to be having a positive impact on the organizations. In addition, CCTV will televise an Eastern San Joaquin Groundwater Basin meeting on August 29th.

Director Davidson would like to see an update on forest management and the work of CCWD that that people might not be aware of.

Director Strange is looking forward to an upcoming Calaveras River Habitat Conservation Plan (HCP) workshop. He also talked briefly about the potential water flow requirements and as a Director for CCWD he cannot support 55% unimpaired water flows. He attended the CPUD rate hearing last week and mentioned that it was very contentious with a proposed 60-65% increase in rates. He was very grateful of how CCWD's rate hearing was handled by staff.

Director Ratterman - nothing to report

8. NEXT BOARD MEETINGS

- Wednesday, September 12, 2018, 1:00 p.m., Regular Board Meeting
- Wednesday, September 26, 2018, 1:00 p.m., Regular Board Meeting

The Open Session ended at 3:57 p.m.

The meeting adjourned into Closed Session at approximately 4:00 p.m. Those present were Board Members: Russ Thomas, Bertha Underhill, Jeff Davidson, Scott Ratterman and Terry Strange, staff members Dave Eggerton, General Manager, Stacey Lollar, Director of Human Resources and Customer Service (for item 9b), and Matt Weber, General Counsel (by teleconference).

9. CLOSED SESSION

9a Conference with Legal Counsel – Existing Litigation
Government Code § 54956.9(a) La Contenta Investors, LTD vs. CCWD (Calaveras County Superior Court #11CV37713)

9b Conference with legal counsel – anticipated litigation. Significant exposure to litigation pursuant to subdivision (d)(2) Government Code section §54956.9, one potential case.

10. REPORTABLE ACTION FROM CLOSED SESSION

The Board reconvened into Open Session at approximately 4:21 p.m. There was no reportable action.

11. ADJOURNMENT

With no further business, the meeting adjourned at approximately 4:25 p.m.

By:	ATTEST:
____________________________	____________________________
Dave Eggerton General Manager	Rebecca Hitchcock Clerk to the Board

Agenda Item

DATE: October 10, 2018

TO: Dave Eggerton, General Manager

FROM: Rebecca Hitchcock, Clerk to the Board

SUBJECT: Review Board of Directors Time Sheets for September, 2018

RECOMMENDED ACTION:

For information only.

SUMMARY:

Pursuant to direction from the Board of Directors, copies of the Board's monthly time sheets from which the Board is compensated from, are included in the monthly agenda package for information. Attached are copies of the Board's time sheets for the month of September, 2018.

Board Members can be reimbursed for mileage cost to travel to meetings/conferences and are paid at the current IRS rate.

FINANCIAL CONSIDERATIONS:

Monthly compensation and mileage reimbursement costs are included in the FY 18-19 budget.

Attachments: Board of Directors Time Sheets for September, 2018

CALAVERAS COUNTY WATER DISTRICT
DIRECTOR REIMBURSEMENT FORM

For Admin Use	
Payroll	☑
Expense	☐

Month/Yr Sept 2018
Name S. Ratterman

Activity Date	Meeting or Other Expense Description	Designated Rep.		Association List		Prior Approval		Cost		Total Miles
		Yes	No	Yes	No	Yes	No	Meeting	Expense	
9-12	CCWD Reg Mtg							$120.-		7
9-18	Finance Comm Mtg - CCWD							120.-		7
9-19	CCWD Special Mtg							120.-		7
9-19	Legal Affairs Comm mtg - CCWD							—		—
	For Totals line, multiply miles by the IRS rate:	1/1/18	$0.545							21
	Pursuant to Board Policy 4030, receipts required; report /materials required.			Totals (use IRS mileage rate)				$ 360	$	$ 11.45

COPY

The undersigned, under penalty of perjury states: This claim and the items set forth herein are true and correct; that expenses incurred, meetings attended and business conducted are necessary to District affairs; that this claim is proper and within the scope of California Water Code Section 20200 et seq, and District Ordinance 2015-02; that the service was actually rendered; and that the amount(s) herein are justly true.

Signature of Claimant:

Administrative Review:

Date: 9/26/18

Orig to Finance Dept.

CALAVERAS COUNTY WATER DISTRICT
DIRECTOR REIMBURSEMENT FORM

For Admin Use	
Payroll	☑
Expense	☐

Month/Yr September/2018
Name Terry Strange

Activity Date	Meeting or Other Expense Description	Designated Rep.		Association List		Prior Approval		Cost		Total Miles
		Yes	No	Yes	No	Yes	No	Meeting	Expense	
9/12	CCWD Board meeting							120		54
9/19	TSTAN JPA							120		114
								240		168
	For Totals line, multiply miles by the IRS rate:	1/1/15	$0.5~~7~~45							
Pursuant to Board Policy 4030, receipts required; report /materials required.				Totals (use IRS mileage rate)				$ 240	$	$ 91.56

COPY

The undersigned, under penalty of perjury states: This claim and the items set forth herein are true and correct; that expenses incurred, meetings attended and business conducted are necessary to District affairs; that this claim is proper and within the scope of California Water Code Section 20200 et seq, and District Ordinance 2010-01; that the service was actually rendered; and that the amount(s) herein are justly true.

Signature of Claimant:

Administrative Review: ______

Date: 10/2/18

Orig to Finance Dept.

Director Expense Form (Jan. 1, 2015)

CALAVERAS COUNTY WATER DISTRICT
DIRECTOR REIMBURSEMENT FORM

For Admin Use: Payroll ☑ Expense ☐

Month/Yr SEPTEMBER 2018
Name BERTHA E UNDERHILL

Activity Date	Meeting or Other Expense Description	Designated Rep. Yes	Designated Rep. No	Association List Yes	Association List No	Prior Approval Yes	Prior Approval No	Cost Meeting	Cost Expense	Total Miles
8-29-18	SGMA OPEN HOUSE							120		83
9-5-18	EPPOC – ARNOLD							—		—
9-12-18	BOARD MEETING							120		84
9-18-18	FINANCE MEETING							120		84
9-19-18	SPECIAL MEETING							120		84
9-21-18	MEETING W/ SNOWSHOE SPRINGS BOARD PRESIDENT							—		8
	For Totals line, multiply miles by the IRS rate:	1/1/18	$0.545							343
Pursuant to Board Policy 4030, receipts required; report /materials required.				Totals (use IRS mileage rate)				$ 480	$	$ 186.94

The undersigned, under penalty of perjury states: This claim and the items set forth herein are true and correct; that expenses incurred, meetings attended and business conducted are necessary to District affairs; that this claim is proper and within the scope of California Water Code Section 20200 et seq, and District Ordinance 2015-02; that the service was actually rendered; and that the amount(s) herein are justly true.

Signature of Claimant: Bertha E Underhill

COPY

Administrative Review: [signature] Date: 9/26/18

Orig to Finance Dept.

Director Expense Form (Jan. 1, 2018)

CALAVERAS COUNTY WATER DISTRICT
DIRECTOR REIMBURSEMENT FORM

For Admin Use — Payroll ☑ Expense ☐

Month/Yr September, 2018

Name Russ Thomas

Activity Date	Meeting or Other Expense Description	Designated Rep.		Association List		Prior Approval		Cost		Total Miles
		Yes	No	Yes	No	Yes	No	Meeting	Expense	
28-Aug	UWPA Board Meeting							120		40
29-Aug	East San Joaquin Ground Water Town hall Meeting							120		90
4-Sep	Angels Camp City Council Meeting							120		40
5-Sep	EPPOC in Arnold							120		76
10-Sep	2x2 UWPA Tour - Angels Camp							120		40
12-Sep	ESJGA in Stockton							0		0
12-Sep	CCWD Board Meeting							120		44
	For Totals line, multiply miles by the IRS rate:	1/1/18	$0.545							330
Pursuant to Board Policy 4030, receipts required; report/materials required.				*Totals (use IRS mileage rate)*				$ 720	$0.00	$179.85

The undersigned, under penalty of perjury states: This claim and the items set forth herein are true and correct; that expenses incurred, meetings attended and business conducted are necessary to District affairs; that this claim is proper and within the scope of California Water Code Section 20200 et seq, and District Ordinance 2015-02; that the service was actually rendered; and the amount(s) herein are justified and true.

Signature of Claimant: Russ Thomas

Administrative Review: [signature]

Date: 9/26/18

Original to Finance Dept.

COPY

CALAVERAS COUNTY WATER DISTRICT
DIRECTOR REIMBURSEMENT FORM

For Admin Use		
	Payroll	⊘
	Expense	☐

Month/Yr Sep-18
Name Jeff Davison

Activity Date	Meeting or Other Expense Description	Designated Rep.		Association List		Prior Approval		Cost		Total Miles
		Yes	No	Yes	No	Yes	No	Meeting	Expense	
12-Sep	CCWD Board Meeting							120		28
19-Sep	CCWD Legal Affairs Committee							120		28
19-Sep	CCWD Special Board Meeting							—		—
Total	*For Totals line, multiply miles by the IRS rate:*	1/1/18	$0.545					$ 240.00		56
	Pursuant to Board Policy 4030, receipts required; report /materials required.			Totals *(use IRS mileage rate)*						$30.52

COPY

The undersigned, under penalty of perjury states: This claim and the items set forth herein are true and correct; that expenses incurred, meetings attended and business conducted are necessary to District affairs; that this claim is proper and within the scope of California Water Code Section 20200 et seq, and District Ordinance 2015-02; that the service was actually rendered; and that the amount(s) herein are justly true.

Signature of Claimant: Jeff A. Davison

Administrative Review: [signature]

Date: 9/26/18

Orig to Finance Dept.

Agenda Item

DATE: October 10, 2018

TO: Board of Directors

FROM: Dave Eggerton, General Manager

SUBJECT: Cancellation of Board Meetings of November 21 and December 26, 2018

RECOMMENDED ACTION:

Motion:____________/____________ by Minute Entry to approve cancellation of the Regular Board Meeting dates of November 21 and December 26, 2018.

SUMMARY:

Due to the holidays in November and December, staff proposes to cancel the second monthly Board Meeting dates in November and December (scheduled for November 21st and December 28th). If a matter arises, a second Board meeting can be scheduled as needed.

FINANCIAL CONSIDERATIONS:

Board meeting costs.

Calaveras County Water District
Claim Summary # 559

Certificate of Administrative Officer

The services listed on the within schedules were actually rendered by the close of the current month. The articles listed on the schedules within and the supporting invoices were actually delivered, or payment therefore is properly due prior to delivery. To the best of my knowledge all claims made are in accordance with adopted Board policies and/or other Board actions and are in compliance with all applicable laws. The claimants named on the within schedules are each entitled to the amount set opposite their respective names.

Jeffrey Meyer
Director of Administrative Services

1. September 2018 payroll checks issued on 09/14/2018	166,468.81
2. September 2018 payroll checks issued on 09/28/2018	166,791.20
3. September 2018 compensation to Directors	1,348.22
4. Vendor payments for September 1 through 30, 2018	831,840.85
5. Other payroll related costs	269,057.42

Claim Summary Total **$1,435,506.50**

Calaveras County Water District
AP Disbursement Summary
September 1-30, 2018

CCWD Operating Expenditures		$ 413,909.76
Expenditures to be reimbursed from other agencies	(A)	-
Expenditures to be reimbursed from grant agreements	(B)	173,237.48
Fiduciary Payments (funds collected prior to expenditure)	(C)	5,804.04
Partial Reimbursement	(D)	144,701.40
Capital R&R Projects	(E)	94,188.17
Capital Outlay	(F)	-
Total Payments		$ 831,840.85

Check No.	Vendor/Employee	Transaction Description	Date	Amount	
130634	A T & T	Leased Lines 09/18	09/14/2018	66.07	
130761	A T & T	Internet Service 09/18 - LC Complex	09/27/2018	99.25	
130762	A T & T	Phone 09/18 - SA Shop	09/27/2018	3.42	
130636	A T & T CALNET2	District Radio Tower 08/18 - Camp Connell	09/14/2018	375.20	
130707	A T & T CALNET3	Phone 09/18 - Dorrington P/S	09/21/2018	20.59	
130708	A T & T CALNET3	Phone 09/18 - District Wide	09/21/2018	1,250.16	
130709	A T & T CALNET3	Phone 09/18 - OP HQ Back Up	09/21/2018	189.97	
130710	A T & T CALNET3	T-Line 09/18	09/21/2018	164.68	
130764	A T & T CALNET3	Phone 09/18 - Long Distance	09/27/2018	438.79	
130765	A T & T CALNET3	Phone 09/18 - Hunter's	09/27/2018	20.59	
130766	A T & T CALNET3	Phone 09/18 - Azalea L/S	09/27/2018	18.94	
130767	A T & T CALNET3	Phone 09/18 - CCWHSE	09/27/2018	8.80	
130768	A T & T CALNET3	Phone/Fax 09/18 - JLTC	09/27/2018	126.23	
130637	A TEEM ELECTRICAL ENG INC	Consulting Services - JLWTP Pre-Treatment Facility Project	09/14/2018	2,950.00	(B)
130638	ACWA/JPIA	Dental Insurance, Employees 10/18	09/14/2018	6,529.48	(D)
130638	ACWA/JPIA	Vision Insurance, Employees 10/18	09/14/2018	1,317.76	
130638	ACWA/JPIA	EAP 10/18	09/14/2018	145.70	
130638	ACWA/JPIA	Dental Insurance, Retirees 10/18	09/14/2018	2,426.32	
130638	ACWA/JPIA	Vision Insurance, Retirees 10/18	09/14/2018	723.84	
130639	ADP INC	Payroll Processing 08/18	09/14/2018	331.14	
130769	ADP INC	Payroll Processing 09/18	09/27/2018	750.01	
130640	ADVANCED AUTOMOTIVE & TIRE	Replace Front Brake Pads/Rotors - Vehicle #529	09/14/2018	343.22	
130595	AFLAC	Aflac 08/18	09/06/2018	2,018.70	(C)
130596	AIRESERVE HEATING & AIR	A/C Service/Capacitor Replacement - OP HQ	09/06/2018	1,256.23	
130770	ALCAL GLASS AND SUPPLY	Paint/Primer/Pest Control Supplies/Pipe - EP Barn	09/27/2018	213.91	
130642	ALHAMBRA DRINKING WATER	Water Cooler Service 08/18 - LCWWTP	09/14/2018	155.10	
130643	ALHAMBRA DRINKING WATER	Water Cooler Service 08/18 - JLWTP	09/14/2018	147.97	
130641	AL'S TIRE SERVICE	Flat Repair - Vehicle #523	09/14/2018	20.00	
130641	AL'S TIRE SERVICE	Flat Repair - Vehicle #621	09/14/2018	51.00	
130597	AMERIPRIDE SERVICES,INC	Uniform Laundry Service 08/18	09/06/2018	275.89	
130644	AMERIPRIDE SERVICES,INC	Uniform Laundry Service 09/18	09/14/2018	2,643.51	
130645	ANGELS HEATING AND AIR CONDITIONING	West Point Heating/AC Unit Contract	09/14/2018	290.00	
130645	ANGELS HEATING AND AIR CONDITIONING	Replace PTAC Unit - CC Main L/S	09/14/2018	1,885.00	
130645	ANGELS HEATING AND AIR CONDITIONING	Heating/AC Unit Repair - DF/VCTO WWTP	09/14/2018	117.97	
130712	ANGELS HEATING AND AIR CONDITIONING	AC Refrigerant - CC Upper XC L/S Unit	09/21/2018	22.61	
EFT	ANTHEM-BLUE CROSS	Health Insurance, Employees 09/18	09/06/2018	105,440.00	(D)
EFT	ANTHEM-BLUE CROSS	Health Insurance, Retirees 09/18	09/06/2018	37,713.26	
130646	AQUA TECH COMPANY	Tank Leak Repairs - Tanks BT 3 & 8/MM	09/14/2018	8,722.00	
130713	AQUA TECH COMPANY	Leak Repair-Timber Trails/Inspection-BT 4 & 5	09/21/2018	6,150.00	
130647	AQUIONICS, INC	Sensor - DF/VCTO WWTP	09/14/2018	628.13	
130714	ARNOLD AUTO SUPPLY	Battery - Vehicle #131	09/21/2018	298.91	
130714	ARNOLD AUTO SUPPLY	Grease Fittings/Wrenches/Oil/Filter - Vehicle #143	09/21/2018	187.20	
130714	ARNOLD AUTO SUPPLY	Oil/Filter - Vehicle #303	09/21/2018	34.82	
130714	ARNOLD AUTO SUPPLY	Cleaner/Oil/Fuel/Filters/Gloves - Vehicle #592	09/21/2018	224.54	
130714	ARNOLD AUTO SUPPLY	Impact Socket/35 Ton Service Jack - SA Shop	09/21/2018	667.07	
130772	ARNOLD AUTO SUPPLY	Diesel Engine Fluid - Vehicle #135	09/27/2018	30.01	
130772	ARNOLD AUTO SUPPLY	Sockets - Vehicle #522	09/27/2018	22.51	
130772	ARNOLD AUTO SUPPLY	Oil/Filter/Battery Charger/Wiper Fluid/Transfer Case Fluid - Vehicle #529	09/27/2018	110.92	

Check No.	Vendor/Employee	Transaction Description	Date	Amount	
130772	ARNOLD AUTO SUPPLY	Oil/Filter - Vehicle #554	09/27/2018	42.84	
130772	ARNOLD AUTO SUPPLY	Antifreeze - Vehicle #713	09/27/2018	52.51	
130772	ARNOLD AUTO SUPPLY	Blaster/Battery Cleaner/Gasket Sealer/Lubricant - Vehicle #722	09/27/2018	78.20	
130772	ARNOLD AUTO SUPPLY	Air Hose/Coupler/Fittings/Chuck/Air Compressor - FMWWTP	09/27/2018	644.48	
130772	ARNOLD AUTO SUPPLY	Batteries - EP Barn	09/27/2018	5.09	
130772	ARNOLD AUTO SUPPLY	Batteries - AT 104	09/27/2018	107.17	
130772	ARNOLD AUTO SUPPLY	Stainless Tubing - LCWWTP	09/27/2018	364.64	
130772	ARNOLD AUTO SUPPLY	Soap - Hunter's WTP	09/27/2018	6.98	
130648	ARNOLD TIRE AND AUTO CARE	Tires (4) - Vehicle #529	09/14/2018	726.58	
130773	ARNOLD TIRE AND AUTO CARE	Flat Repair - Vehicle #713	09/27/2018	15.00	
130715	AUTOSMITH AUTO BODY	Damage Repair - Vehicle #131	09/21/2018	5,988.57	(D)
130775	BHI MANAGEMENT CONSULTING	Director of Operations Recruitment Services	09/27/2018	15,800.00	
130776	BIG VALLEY FORD LINCOLN MERCURY	Suspension Rods/Front Bumper - Vehicle #127	09/27/2018	608.60	
130776	BIG VALLEY FORD LINCOLN MERCURY	Front End Alignment/Water Separator Element - Vehicle #132	09/27/2018	554.43	
130776	BIG VALLEY FORD LINCOLN MERCURY	Repair Broken Turbo Pipe - Vehicle #134	09/27/2018	2,149.46	
130776	BIG VALLEY FORD LINCOLN MERCURY	Dip Stick - Vehicle #523	09/27/2018	24.82	
130776	BIG VALLEY FORD LINCOLN MERCURY	Steering Column Housing/Re-Key - Vehicle #527	09/27/2018	419.04	
130776	BIG VALLEY FORD LINCOLN MERCURY	Belts/Tensioners/Radiator/Fan Assembly/Clutch/Shroud - Vehicle #531	09/27/2018	1,899.27	
130776	BIG VALLEY FORD LINCOLN MERCURY	Radiator/Hoses/Thermostat - Vehicle #606	09/27/2018	527.19	
130776	BIG VALLEY FORD LINCOLN MERCURY	Pump Assembly/V-Belt/Tensioner/Sensor/Thermostat Housing - Vehicle #613	09/27/2018	454.79	
130649	BNN, LLC	Utilities Reimbursement 08/18 - SA Shop	09/14/2018	244.56	
130716	BNN, LLC	Rent 10/18 - SA Shop	09/21/2018	3,000.00	
130777	BURKE, WILLIAMS, & SORENSON, LLP	AD604 Foreclosure Services 09/18	09/27/2018	15.95	(C)
130599	BURKEY, TIFFANY	Post Office Travel Reimbursement 08/18	09/06/2018	26.16	
130633	BUSINESS RADIO LICENSING	FCC Business Radio Licensing 10/24/2018-10/23/2019	09/07/2018	95.00	
130650	CABRAL	Trailer Brake Controller - Vehicle #721	09/14/2018	258.93	
130650	CABRAL	Bevel Housing - Vehicle #723	09/14/2018	144.36	
130778	CALAVERAS AUTO SUPPLY	Batteries/Alternator - Vehicle #129	09/27/2018	251.12	
130778	CALAVERAS AUTO SUPPLY	Work Lights - Vehicle #131	09/27/2018	1,515.44	
130778	CALAVERAS AUTO SUPPLY	Work Lights - Vehicle #144	09/27/2018	321.70	
130778	CALAVERAS AUTO SUPPLY	Filters/Oil/Antifreeze - Vehicle #145	09/27/2018	366.78	
130778	CALAVERAS AUTO SUPPLY	Hub Oil/Rear Lights - Vehicle #509	09/27/2018	55.30	
130778	CALAVERAS AUTO SUPPLY	Lights - Vehicle #527	09/27/2018	17.78	
130778	CALAVERAS AUTO SUPPLY	Lights/Brake Pads/Rotors - Vehicle #531	09/27/2018	393.83	
130778	CALAVERAS AUTO SUPPLY	Antifreeze/Fuel Line - Vehicle #613	09/27/2018	119.66	
130778	CALAVERAS AUTO SUPPLY	Grommet/Plugs/Lights/Battery - Vehicle #621	09/27/2018	423.42	
130778	CALAVERAS AUTO SUPPLY	Oil/Filters/Drainpans - Vehicle #716	09/27/2018	115.32	
130778	CALAVERAS AUTO SUPPLY	Coupler/Adapter/Compound/Remover/Wrench Set/Grease Tubes - SA Shop	09/27/2018	211.77	
130778	CALAVERAS AUTO SUPPLY	Battery - EP L/S #3	09/27/2018	118.17	
130600	CALAVERAS COUNTY ENVIRONMENTAL HEALTH	Haz Mat Repsonse Plan/CUPA - Arnold/Avery/CC	09/06/2018	908.00	
130651	CALAVERAS LUMBER CO INC	Rebar/Tie Wire/Blades/Lumber - FMWWTP Pads	09/14/2018	406.57	
130651	CALAVERAS LUMBER CO INC	Hoses/Nozzles/Trash Can/Cable Booster/Cultivator - DF/VCTO WWTP	09/14/2018	200.21	
130651	CALAVERAS LUMBER CO INC	Ratchet Straps - Construction Crew	09/14/2018	32.17	
130651	CALAVERAS LUMBER CO INC	Nozzle/Bits/Tape Ruler/Hammer/Utility Knife - Vehicle #531	09/14/2018	108.33	
130651	CALAVERAS LUMBER CO INC	Gas Can/Nozzle/Hose Mender/Plug/Towels - Hunter's WTP	09/14/2018	52.04	
130652	CALIFORNIA TEES	T-Shirts/Sweatshirts/Hats - District Staff Uniforms	09/14/2018	638.20	
130653	CALIFORNIA WASTE RECOVERY SYSTEMS	Refuse Disposal 09/18 - District Wide	09/14/2018	1,261.56	
130654	CALTEL	Phone Lines 08/18	09/14/2018	1,404.05	

Check No.	Vendor/Employee	Transaction Description	Date	Amount	
130718	CAMPORA	Propane 08/18 - Wallace	09/21/2018	19.32	
130655	CARBON COPY INC	Copies/Copier Maintenance 08/18	09/14/2018	97.95	
130655	CARBON COPY INC	Toner	09/14/2018	169.01	
EFT	CARD SERVICES	ACWA Conference Region 8 Tour - Thomas	09/11/2018	40.00	
EFT	CARD SERVICES	ACWA Board of Directors Travel Reimbursement - Eggerton	09/11/2018	76.50	
EFT	CARD SERVICES	ACWA Fall Conference Travel - Metzger	09/11/2018	692.96	
EFT	CARD SERVICES	Distribution Certification Review Course - DeAmicis	09/11/2018	250.00	
EFT	CARD SERVICES	Distribution Certification Review Course - Hutson	09/11/2018	250.00	
EFT	CARD SERVICES	Internet Service 08/18 - Hunter's	09/11/2018	76.87	
EFT	CARD SERVICES	Internet E-Mail Back Up - OP HQ	09/11/2018	29.90	
EFT	CARD SERVICES	Rackspace Hosted E-Mail 08/18	09/11/2018	487.45	
EFT	CARD SERVICES	Conference Call Service - Martin	09/11/2018	4.21	
EFT	CARD SERVICES	Boat Rental Refund - Ewell Tour Cancelled	09/11/2018	(630.70)	
EFT	CARD SERVICES	Overtime Meal - 8 Employees	09/11/2018	117.96	
EFT	CARD SERVICES	Mediator Lunch	09/11/2018	14.05	
EFT	CARD SERVICES	Impound Fees/Tow Service - Recovered Stolen Vehicle #621	09/11/2018	965.00	(D)
EFT	CARD SERVICES	Vacuum Belt/Phone Case/Screen Protectors	09/11/2018	138.37	
130656	CARSON HILL ROCK PRODUCTS	Concrete - FMWWTP Pads	09/14/2018	806.46	
130719	CARSON HILL ROCK PRODUCTS	3/4 Class II AB - EP Barn Stock	09/21/2018	325.64	
130779	CDK SUPPLY	Covers/Tape/Breakers/Plugs/Connectors - SA Shop	09/27/2018	268.87	
130657	CED CREDIT	GE Motor Starters (2) - CC Azalea L/S	09/14/2018	880.32	
130658	CHASE CHEVROLET CO. INC	Head Liner/Blower Motor/Harness - Vehicle #131	09/14/2018	1,094.25	
130601	CLARK PEST CONTROL	Pest Control 08/18 - Southworth	09/06/2018	84.00	
130720	CLARK PEST CONTROL	Pest Control 07/18 - WPWTP	09/21/2018	91.00	
130720	CLARK PEST CONTROL	Pest Control July/Sept - WPWWTP	09/21/2018	230.00	
130780	CLARK PEST CONTROL	Pest Control 09/18 - AWWTP	09/27/2018	87.00	
130659	COLUMBIA COMMUNICATIONS	Vehicle Cloud Service 09/18	09/14/2018	700.00	
130602	COMCAST	Internet Service 09/18 - DF VCTO	09/06/2018	80.93	
130603	COMCAST	Internet Service 09/18 - OP HQ	09/06/2018	85.93	
130721	COMCAST	Internet Service 10/18 - JLTC	09/21/2018	85.93	
130781	COMCAST	Internet Service 10/18 - JLWTP	09/27/2018	171.86	
130660	CONDOR EARTH TECHNOLOGIES INC	CalTrans Encroachment Permit Reimb - EP Reach 1 Water Pipeline Project	09/14/2018	920.00	(E)
130723	CONDOR EARTH TECHNOLOGIES INC	Materials Testing/Inspection Services - JLWTP Pre-Treatment Facility Project	09/21/2018	7,185.00	(B)
130782	CONDOR EARTH TECHNOLOGIES INC	Sustainable Groundwater Management Act (SGMA) Support	09/27/2018	2,291.25	
130782	CONDOR EARTH TECHNOLOGIES INC	Groundwater Monitoring/Reporting	09/27/2018	1,325.00	
130661	CONETH SOLUTIONS INC	IT Infrastructure Support Services 09/18	09/14/2018	1,325.00	
130783	COPPER AUTO & MARINE	Transmission Fluid/Gauge - Vehicle #124	09/27/2018	21.43	
130783	COPPER AUTO & MARINE	Trailer Adapter/Diesel Exhaust Fluid - Vehicle #538	09/27/2018	46.11	
130783	COPPER AUTO & MARINE	Car Wash/Diesel Engine Fluid - Vehicle #551	09/27/2018	18.55	
130783	COPPER AUTO & MARINE	Diesel Exhaust Fluid - Vehicle #723	09/27/2018	27.87	
130783	COPPER AUTO & MARINE	Battery Charger/Towels/Antifreeze - SA Shop	09/27/2018	101.29	
130783	COPPER AUTO & MARINE	Battery - CC Hunt Rd Repeater Station	09/27/2018	151.22	
130783	COPPER AUTO & MARINE	Spare Tire Cover - Electricians Trailer	09/27/2018	24.12	
130783	COPPER AUTO & MARINE	Extension Bar/Socket/Ratchet/Towels/Cleaner/Gas Can/Oil - CCWHSE	09/27/2018	289.17	
130662	CPPA	Power 08/18	09/14/2018	89,509.40	
130724	CRANK, MICHAEL	Distribution Review Class/Exam Travel Reimbursement	09/21/2018	210.95	
130724	CRANK, MICHAEL	Safety Boot Reimbursement	09/21/2018	199.95	
130663	CRWA	Water Sampling Techniques Class - Atnip	09/14/2018	125.00	

Check No.	Vendor/Employee	Transaction Description	Date	Amount	
130725	CWEA	Collection System Maintenance, Grade 1 Certification Application Fee	09/21/2018	358.00	
130784	D & S SALES, INC.	Crane - Vehicle #621 Replacement Tools	09/27/2018	1,998.45	(D)
130604	DANNER, ALESIA	Post Office Travel Reimbursement 07/18 & 08/18	09/06/2018	9.81	
130664	DATAPROSE	UB Statement Processing 08/18	09/14/2018	4,981.25	(D)
130785	DAVIDSON, JEFF	Travel 09/18	09/27/2018	30.52	
130726	DEAMICIS, GABRIEL	Distribution Exam Travel Reimbursement	09/21/2018	107.91	
130605	DOWNEY BRAND ATTORNEYS LLP	Legal Services 07/18	09/06/2018	14,316.28	
130665	EBBETTS PASS GAS SERVICE	Fuel 08/18	09/14/2018	4,940.40	
130666	EBBETTS PASS LUMBER	Dust/Pollen Masks - FMWWTP	09/14/2018	36.79	
130666	EBBETTS PASS LUMBER	Lumber/Rebar/Spacers/Bungee Cords - FMWWTP Pads	09/14/2018	185.12	
130666	EBBETTS PASS LUMBER	Loppers/Hammer/Hose Valve/Rope/Wire/Batteries - Hunter's WTP	09/14/2018	173.54	
130666	EBBETTS PASS LUMBER	Lumber - EP Meadowmont P/S	09/14/2018	5.41	
130727	ECORP CONSULTING, INC	White Pines Gaging Project 08/18	09/21/2018	1,640.88	
130668	FASTENAL	Safety Glasses/Gloves/Cleaner/Paint/Bits/Sealant/Copy Paper - JL	09/14/2018	667.77	
130728	FASTENAL	Pipe Wrap/Saw Blades/Shovels - JL	09/21/2018	468.60	
130669	FERGUSON ENTERPRISES, INC 1423	Flanges/Gaskets/Bolts/Nipples - AWWTP	09/14/2018	150.26	
130729	FERGUSON ENTERPRISES, INC 1423	Tuff Tube/Adapters/Hose - LCWHSE	09/21/2018	185.23	
130788	FERGUSON ENTERPRISES, INC 1423	Tuff Tube/Clamps/Meter Gaskets/Inserts/Curb Stops - LCWHSE	09/27/2018	5,709.98	
130788	FERGUSON ENTERPRISES, INC 1423	Couplers - West Point	09/27/2018	61.04	
130606	FGL ENVIRONMENTAL	Waste Water Testing 08/18	09/06/2018	2,287.50	
130606	FGL ENVIRONMENTAL	Water Testing 08/18	09/06/2018	4,066.00	
130730	FGL ENVIRONMENTAL	Waste Water Testing 09/18	09/21/2018	2,656.00	
130730	FGL ENVIRONMENTAL	Water Testing 09/18	09/21/2018	4,720.50	
130731	FOOTHILL PORTABLE TOILETS	Portable Toilet Rental Aug/Sept	09/21/2018	280.50	
130789	FROGGY'S AUTO WASH & LUBE	Oil/Lube/Wash - Vehicle #139	09/27/2018	53.51	
130732	GARCIA AND ASSOCIATES	Archaelogical Investigation - JLWTP Pre-Treatment Facility Project	09/21/2018	59,755.63	(B)
130672	GENERAL PLUMBING SUPPLY CO INC	Copper Pipe/Fittings - SA Shop Air Compressor	09/14/2018	912.08	
130790	GENERAL PLUMBING SUPPLY CO INC	Torch/Welding Gas Tank/Strap - SA Shop	09/27/2018	227.76	
130733	GEORGE REED INC	3/8 Cutback - CCWHSE Stock	09/21/2018	899.29	
130734	GERKENSMEYER, KELLY	Overtime Meal Reimbursement	09/21/2018	12.42	
130608	GOVCONNECTION, INC	Surface Pro Laptops (3)/Software/Covers - Collections Crew	09/06/2018	3,734.27	
130791	GOVCONNECTION, INC	Cisco Switch - CCWD/County Access	09/27/2018	941.60	
130673	GRAINGER	Adhesive Spray - JLWTP	09/14/2018	25.55	
130792	GRAINGER	Coupling Flange - CCWTP	09/27/2018	20.71	
130674	HACH COMPANY	Reagent Set - WP	09/14/2018	205.02	
130674	HACH COMPANY	Cotton Swabs/Ozone Accuvac/Reagent Set/Solution - JLWTP	09/14/2018	1,196.26	
130674	HACH COMPANY	Reagent Set - Hunter's/SR WTP	09/14/2018	622.90	
130793	HD SUPPLY CONSTRUCTION & INDUSTRIAL	Concrete Pouring Tools/Safety Vests - Construction Crew	09/27/2018	467.89	
130794	HERD'S MACHINE & WELD SHOP	Flat Bar/Helmet/Tubing/Gloves/Hot Roll Plate - SA Shop	09/27/2018	1,002.29	
130794	HERD'S MACHINE & WELD SHOP	Oxygen Tank/Nozzle - Vehicle #143	09/27/2018	88.97	
130794	HERD'S MACHINE & WELD SHOP	SS Pipe - LCWWTP	09/27/2018	42.26	
130736	HIBBARD, RICHARD	Safety Boot/Winter Weather Gear Reimbursement	09/21/2018	400.00	
130737	HOBGOODS CLEANING	Janitorial Service 09/18	09/21/2018	1,985.00	
130676	HOLT OF CALIFORNIA	O-Ring Kit - Vehicle #126	09/14/2018	811.98	
130795	HOLT OF CALIFORNIA	Filter/Muffler/Exhaust Pipe/Hoses/O-Rings - B 04	09/27/2018	943.79	
130612	HUGHESNET	Internet Service 09/18 - FMWWTP	09/06/2018	82.23	
130677	HUGHESNET	Internet Service 09/18 - AWWTP	09/14/2018	80.94	
130738	HUNT & SONS, INC	Fuel - West Point	09/21/2018	566.96	

Check No.	Vendor/Employee	Transaction Description	Date	Amount	
130796	HUNT & SONS, INC	Fuel - CC	09/27/2018	1,788.68	
130679	INNOVYZE	Annual Software Renewal - InfoWater Floating	09/14/2018	1,800.00	
130680	IRON MOUNTAIN	Document Destruction 08/18	09/14/2018	65.02	
130739	KASL CONSULTING ENGINEERS	Engineering/Environmental Pemitting/Design Services - EP Reach 1 Project	09/21/2018	19,999.55	(E)
130797	KELLER ASSOCIATES	Design/Engineering Services - Title 22 Reuse	09/27/2018	551.50	(E)
130681	KENNEDY/JENKS CONSULTANTS	Hazardous Materials Business Plan Information Update	09/14/2018	5,437.50	
130682	KIRSCHMAN, NATHANIEL	Class A School Fee Reimbursement	09/14/2018	375.00	
130740	KIRSCHMAN, NATHANIEL	On Call/Overtime Meal Reimbursement	09/21/2018	71.27	
130740	KIRSCHMAN, NATHANIEL	Safety Boot Reimbursement	09/21/2018	179.99	
130741	KOFF & ASSOCIATES, INC	Comprehensive Salary/Benefits Review and Analysis	09/21/2018	2,560.00	
130742	LIEBERT CASSIDY WHITMORE	Legal Services 08/18	09/21/2018	10,262.00	
130613	LOLLAR, STACEY	CalPERS Health Benefits Contract Meeting Travel Reimbursement	09/06/2018	135.06	
130684	LUNSFORD, SCOTT	Safety Boot Reimbursement	09/14/2018	200.00	
130798	MANTECA TRUCK ACCESSORIES	Tool Boxes/Headache Rack - Vehicle #144	09/27/2018	3,580.91	
130743	MARK TWAIN MEDICAL CENTER	Pre-Hiring Physical Exam - Utility Dept.	09/21/2018	365.00	
130685	MILLWORKZ	Cedar Timbers - WP Moke River P/S	09/14/2018	782.60	
130686	MODESTO AIRCO GAS & GEAR	Cylinder Rental 09/18	09/14/2018	85.80	
130799	MODESTO STEEL	Custom Sheet Metal - LCWHSE	09/27/2018	957.52	
130799	MODESTO STEEL	Metal Pipe - DF/VCTO WWTP	09/27/2018	110.63	
130614	MOTHER LODE ANSWERING SERVICE	Answering Service 09/18	09/06/2018	550.16	
130687	MOUNTAIN OASIS PURIFIED WATER	Water Cooler Service/Supplies 08/18 - District Wide	09/14/2018	182.75	
130688	MUTUAL OF OMAHA	Life/AD&D/LTD Insurance 09/18	09/14/2018	6,568.09	
130744	NEOPOST USA INC	Maintenance Agreement Folder/Sorter Sept/Oct	09/21/2018	815.22	
130615	NHU DESIGN	Website Update Services	09/06/2018	52.85	
130690	NORTHSTAR CHEMICAL	Sodium Hypochlorite - CCWTP	09/14/2018	1,355.77	
130690	NORTHSTAR CHEMICAL	Sodium Hypochlorite - WPWTP	09/14/2018	622.35	
130690	NORTHSTAR CHEMICAL	Sodium Hypochlorite - WPWWTP	09/14/2018	382.99	
130800	NORTHSTAR CHEMICAL	Sodium Hydroxide - AWWTP	09/27/2018	4,118.40	
130800	NORTHSTAR CHEMICAL	Sodium Hydroxide - FMWWTP	09/27/2018	1,921.92	
130800	NORTHSTAR CHEMICAL	Sodium Hypochlorite - JLWTP	09/27/2018	2,403.25	
130745	O'CONNELL & DEMPSEY, LLC	Federal Legislative Advocacy Consulting Services 08/18	09/21/2018	4,000.00	
130801	O'REILLY AUTO PARTS	Wiper Blades/Fluid - Vehicle #606/613/711	09/27/2018	28.99	
130801	O'REILLY AUTO PARTS	Batteries - CCWWTP Generator	09/27/2018	208.33	
130801	O'REILLY AUTO PARTS	Grease Gun/Grease/Couplers - LCWHSE	09/27/2018	56.26	
130801	O'REILLY AUTO PARTS	Batteries - EP Meadowmont P/S	09/27/2018	457.17	
130801	O'REILLY AUTO PARTS	Bits/Drive Kit/Puller - SA Shop	09/27/2018	58.95	
130801	O'REILLY AUTO PARTS	Shop Towels/Paper - JLWTP	09/27/2018	38.58	
130616	P G & E	Power 08/18 - District Wide	09/06/2018	1,945.64	
130617	P G & E	Power 08/18 - JLTC	09/06/2018	290.58	
130618	P G & E	Power 08/18 - Warmwood L/S	09/06/2018	19.54	
130619	P G & E	Power 08/18 - Woodgate L/S	09/06/2018	24.78	
130620	P G & E	Power 08/18 - OP HQ	09/06/2018	16.67	
130691	P G & E	Power 08/18 - CC Water Tank	09/14/2018	37.63	
130746	P G & E	Power 09/18 - Hwy 26	09/21/2018	9.92	
130747	P G & E	Power 08/18 - SA Shop	09/21/2018	436.71	
130802	P G & E	Power 09/18 - District Wide	09/27/2018	1,810.86	
130803	P G & E	Power 09/18 - Wallace Spray Fields	09/27/2018	21.52	
130692	PAPE KENWORTH	Starter - Vehicle #128	09/14/2018	334.70	

Check No.	Vendor/Employee	Transaction Description	Date	Amount	
130622	PAYMENTUS GROUP INC	Electronic Bills API Setup	09/06/2018	5,000.00	
130748	PAYMENTUS GROUP INC	Payment Processing 08/18	09/21/2018	5,434.00	
130749	POLLARDWATER	Wrench Set/Tube Rounder/Pipe Locator - Vehicle #621 Replacement Tools	09/21/2018	3,675.12	(D)
130804	POTRERO HILLS LANDFILL	Bio-Solids Disposal - AWWTP	09/27/2018	313.50	
130804	POTRERO HILLS LANDFILL	Bio-Solids Disposal - FMWWTP	09/27/2018	225.00	
130750	R.E. SMITH CONTRACTORS, INC.	Construction Contract - JLWTP Pre-Treatment Facility Project	09/21/2018	103,346.85	(B)
130805	RATTERMAN, SCOTT	Travel 09/18	09/27/2018	11.45	
130806	RIVERA, RICHARD	Safety Boot Reimbursement	09/27/2018	200.00	
130807	SAFE T LITE	Asbestos Signs/Decals - EP Barn	09/27/2018	213.60	
130808	SAM BERRI TOWING	Tow Service - Vehicle #523	09/27/2018	150.00	
130808	SAM BERRI TOWING	Tow Service - Vehicle #527	09/27/2018	187.50	
130808	SAM BERRI TOWING	Tow Service - Vehicle #531	09/27/2018	218.75	
130751	SCHEIDT, RANDY	Class A DMV Renewal Reimbursement	09/21/2018	45.00	
130623	SEIU LOCAL 1021	Union Dues 08/18	09/06/2018	2,749.39	(C)
130809	SENDERS MARKET INC	Lumber/Siding/Screws/Roofing Materials/Fasteners - JLTC	09/27/2018	6,695.47	
130809	SENDERS MARKET INC	Conduit/Straps/Fasteners/Pipe/Fittings - JLWTP	09/27/2018	208.76	
130809	SENDERS MARKET INC	Pipe/Fittings/PVC Primer/Cement - LCWWTP	09/27/2018	48.89	
130809	SENDERS MARKET INC	Cleaner/Spray Bottle/Fasteners - LCWHSE	09/27/2018	33.87	
130809	SENDERS MARKET INC	Ratchet Extensions - Vehicle #723	09/27/2018	28.55	
130809	SENDERS MARKET INC	Air Compressor Fittings - Southworth WWTP	09/27/2018	99.80	
130809	SENDERS MARKET INC	Hammer/Staples - Vehicle #121	09/27/2018	32.78	
130809	SENDERS MARKET INC	Torque Wrench/Camlock - Collections Crew	09/27/2018	82.99	
130809	SENDERS MARKET INC	Contactors/Relays - Electricians Stock	09/27/2018	338.22	
130809	SENDERS MARKET INC	Ladder/Tape - SA Shop	09/27/2018	219.37	
130693	SIERRA JANITORIAL SUPPLY	Paper Towels/Restroom Towels	09/14/2018	227.85	
130810	SIGNAL SERVICE	Facilities Alarm Monitoring Oct-Dec - District Wide	09/27/2018	2,283.36	
130811	SLAKEY BROS - JACKSON	Clamps/Fittings/Flanges/Gate Valves/Gaskets/Tap Saddle - EP Barn	09/27/2018	5,591.47	
130625	SPRINGBROOK NATIONAL USER GROUP	FY 18-19 Membership	09/06/2018	100.00	
130695	STAPLES CREDIT PLAN	Office Supplies	09/14/2018	1,516.22	
130812	THE CAR DOCTOR	Oil/Lube/Fuel System Service - Vehicle #132	09/27/2018	401.78	
130813	THOMAS, RUSS	Travel 09/18	09/27/2018	179.85	
130814	TIFCO INDUSTRIES	Wrench/Batteries/Panels/Relays/Pigtails/Relays/Discs/Gloves/Swtiches - SA Shop	09/27/2018	3,415.90	
130814	TIFCO INDUSTRIES	Soldering Iron/Clamp - Vehicle #723	09/27/2018	168.41	
130696	TIRE RACK	Tires (4) - Trailer #11	09/14/2018	739.56	
130696	TIRE RACK	Tires (2) - Vehicle #131	09/14/2018	384.76	
130696	TIRE RACK	Tires (6) - Vehicle #527	09/14/2018	2,309.28	
130696	TIRE RACK	Tires (4) - Vehicle #621	09/14/2018	830.96	
130628	TREATS GENERAL STORE INC	Meeting Supplies	09/06/2018	21.82	
130628	TREATS GENERAL STORE INC	Tape/Strainers/Towels/Caulk - JLTC	09/06/2018	51.17	
130628	TREATS GENERAL STORE INC	Crimper - Vehicle #121	09/06/2018	39.67	
130628	TREATS GENERAL STORE INC	Hardware/Gatorade - Electricians	09/06/2018	69.19	
130752	TUOLUMNE STANISLAUS INTEGRATED	IRWMA Membership FY 18-19	09/21/2018	12,000.00	
130815	UNDERHILL, BERTHA	Travel 09/18	09/27/2018	186.94	
130697	UNION PUBLIC UTILITY DISTRICT	Water Service 08/18 - Six Mile Village	09/14/2018	159.00	
130630	UNITED PARCEL SERVICE	Shipping 08/18	09/06/2018	125.24	
130816	UNITED PARCEL SERVICE	Shipping 09/18	09/27/2018	141.92	
130754	UNITED RENTALS NORTHWEST, INC	Asphalt Cutter/Hose/Rammer - Vehicle #621 Replacement Tools	09/21/2018	3,324.38	(D)
130817	UNITED RENTALS NORTHWEST, INC	Paving Breaker/Tamper/Chisel/Moil Point - CCWHSE	09/27/2018	1,625.98	

CCWD
AP Disbursements
September 1-30, 2018

Check No.	Vendor/Employee	Transaction Description	Date	Amount	
130817	UNITED RENTALS NORTHWEST, INC	Tamper/Paving Breaker - Vehicle #621 Replacment Tools	09/27/2018	1,869.37	(D)
130755	UNIVAR USA INC	SLS 45 - CC Thompson L/S	09/21/2018	3,181.90	
130756	US BANK CORP TRUST SVCS	AD 604 Fiscal Admin Fee	09/21/2018	1,020.00	(C)
130700	US SAWS, INC	Valve Exerciser - CCWHSE	09/14/2018	5,357.14	
130701	USA BLUE BOOK	pH Electrodes - CCWTP	09/14/2018	461.79	
130757	USA BLUE BOOK	Hand Tools/Shovels/Generator/Pump/Work Light - Vehicle #621 Replacement Tools	09/21/2018	9,929.78	(D)
130757	USA BLUE BOOK	Dipper - CCWWTP	09/21/2018	136.27	
130818	USA BLUE BOOK	Cold Climate Sampling Station (3)/Colorimeter/Dechlorination Tablets - EP Barn	09/27/2018	4,493.28	
EFT	USDA RURAL DEVELOPMENT	EP Reach 3A Project Principal and Interest Loan Payment	09/01/2018	72,717.12	(E)
130702	VERIFIED FIRST, LLC	Pre-Employment Backround Investigation - Utility Dept.	09/14/2018	73.00	
130758	VERIZON WIRELESS	Cell Phone Service 08/18	09/21/2018	2,582.18	
130631	VOLCANO TELEPHONE COMPANY	Phone 08/18 - WPWWTP	09/06/2018	156.91	
130631	VOLCANO TELEPHONE COMPANY	Phone 08/18 - WPWTP	09/06/2018	364.19	
130819	WAGEWORKS	FSA Admin 08/18	09/27/2018	215.00	
130820	WEAVER, TOM	Oil/Lube - Vehicle #717	09/27/2018	79.32	
130703	WEST POINT LUMBER INC	Bottled Water/Marking Paint - WP	09/14/2018	16.06	
130704	WESTECH ENGINEERING, INC	Gaskets - JLWTP	09/14/2018	1,226.03	
EFT	WEX BANK	Fuel 08/18	09/11/2018	12,260.70	
130705	WILLE ELECTRIC SUPPLY CO INC	Splices/Ethernet Crimp Tool Kit - Vehicle #720	09/14/2018	202.14	
130759	WOOD ENVIRON & INFRASTRUCTURE SOLUTIONS	Local Hazard Mitigation Plan (LHMP) Services 08/18	09/21/2018	839.45	
130706	YOUNG'S COPPER ACE HARDWARE	Sprayer/Concrete/Trash Bags/Fittings/Ball Valve/Nozzle - CC	09/14/2018	116.51	
130706	YOUNG'S COPPER ACE HARDWARE	Tape Measures/Saw/Saw Horses/Shovels/Ladder - CCWHSE	09/14/2018	264.83	
130760	ZOOM SMOG & AUTOMOTIVE	Troubleshoot Noise - Vehicle #134	09/21/2018	148.32	
	Employee Medical Reimbursements (5)			1,622.37	
	Retiree Health Reimbursements (3)			780.17	
	Customer Refunds (6)			711.98	
		Total September 2018 AP Disbursements		831,840.85	

RESOLUTION NO. 2018 – ___

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE CALAVERAS COUNTY WATER DISTRICT

RATIFYING CLAIM SUMMARY NO. 559

WHEREAS, the Board of Directors of the CALAVERAS COUNTY WATER DISTRICT has reviewed and considered Claim Summary Number 559 at the Regular Meeting held on October 10, 2018; and

WHEREAS, Board Members have resolved questions, issues, or concerns by consultation with District staff during said meeting.

NOW, THEREFORE, BE IT RESOLVED that the CALAVERAS COUNTY WATER DISTRICT Board of Directors hereby ratifies Claim Summary Number 559 in the amount of $1,435,506.50 for the month of September, 2018.

PASSED AND ADOPTED this 10th day of October, 2018 by the following vote:

AYES:
NOES:
ABSTAIN:
ABSENT:

CALAVERAS COUNTY WATER DISTRICT

____
Scott Ratterman
President, Board of Directors

ATTEST:

____
Rebecca Hitchcock
Clerk to the Board

Agenda Item

DATE: October 10, 2018

TO: Dave Eggerton, General Manager

FROM: Charles Palmer, P.E., District Engineer

RE: Informational / Engineering Department / Quarterly Projects Report for July through September 2018

RECOMMENDED ACTION:

None

SUMMARY:

For informational purposes, Staff is transmitting to the Board of Directors the Engineering Department's current quarterly projects report for each of Divisions 1 through 5.

FINANCIAL CONSIDERATIONS:

None

Attachments: *Project Reports for Division 1 through 5*

DIVISION 1 - SCOTT RATTERMAN

QUARTERLY PROJECTS SUMMARY / SEPTEMBER 2018

AD604 Camanche Mokelumne Hill San Andreas Southworth Ranch Estates Valley Springs

No.	#	*ACTIVE* PROJECTS THIS QUARTER	W-WW Agr.Ex.	Plans Rels.
1	01213	New Hogan Lake Estates North TSTM 2003-05, Phases A & B (Platner)	11/02/18	
2	01262 01263	New Hogan Oaks Subdivision Units 1 & 2, Old Golden Oaks, LLC (APN's 073-042-098 and 073-042-028)		
3	01265	Gold Creek Unit 3 Subdivision		
4	15059L	La Contenta Sewer Master Plan		
5	11064J	Jenny Lind Water Master Plan		
6	11064W	West Point Water System Supply Reliability Study (A) and Mokelumne River Long Term Water Needs Study (B)		
7	01258	Mark Twain Medical Center (APNs 073-047-001 and 073-049-002 thru -006)		
8	-	Jenny Lind APN 046-036-052, Grocery Outlet 18,000 sf retail facility		
No.	**#**	***INACTIVE* PROJECTS THIS QUARTER**	**W-WW Agr.Ex.**	**Plans Rels.**
9	01261	Jenny Lind APN 046-035-015,016 Covey Ridge (Robitaille)		
No.	**#**	***COMMENTS***		
1	01213	Request for extension of water/wastewater facilities agreement granted, new expiration date is 11/2/2018.	11/2/2018	
2	01262 01263	Concept Review Applications for water and sewer submitted by Old Golden Oaks, LLC as of Dec. 29, 2017 for New Hogan Oaks Units 1 & 2 consist of proposed 51 and 145 unit residential subdivisions. (APN's 073-042-098 and 073-042-028) Waiting for engineering reports - Letter sent 3/20/2018		
3	01265	Concept review application received 6/20/18. Concept review issued 8/20/18. Waiting on engineering reports		
4	15059L	Master Plan adopted by Board on Dec.13, 2017; capacity fee analysis to follow.		
5	11064J	Master Plan adopted by Board on Mar. 28, 2018; capacity fee analysis to follow.		
6	11064W	Study B adopted at joint CPUD/CCWD Board meeting Oct.4, 2017. As of 9/13/18, CCWD staff issued comments for DRAFT Study A prepared by KASL and ECORP. Study A proposed to be presented to Board 4rd Quarter 2018.		
7	01258	Medical clinic at Vista Del Lago/Hwy 26. Ground breaking on 9/28/18. Cost to serve (CTS) letter mailed 7/24/18. CTS Fees Paid on 9/13/18. 4 sets site plans delivered on 9/20/18 in plan check.	7/24/2018	
8	-	Received CTS application - Working on Commercial CTS Letter 9/4/2018- CTS letter Issued 9/11/2018, 9/25/2018-Revised CTS letter issued		
9	01262	Jenny Lind APN 046-035-015,016 Covey Ridge (Robitaille) - Waiting on Design Report from Developer, letter sent 12/21/2017		

DIVISION 2 - TERRY STRANGE

QUARTERLY PROJECTS SUMMARY / SEPTEMBER 2018

Douglas Flat   Indian Rock Vineyards   Mt. Ranch   Sheep Ranch   Vallecito WWTP   West Point   Wilseyville

No	#	*ACTIVE* PROJECTS THIS QUARTER	V-WW Agr.Ex	Plans Rels.
1	15072	West Point / Wilseyville Sewer Construction/Implementation Grant Application		
2	11064W	West Point Water System Supply Reliability Study (A) and Mokelumne River Long Term Water Needs Study (B)		
3	01258	West Point Dollar General (APN 008-016-009)		
4	15082	Douglas Flat/Vallecito Recycled Water Distribution Project (TSTAN IRWMP)		
5	010039	Middle Fork Mokelumne River Diversion Repairs (Cal-OES/FEMA)		

No	#	*INACTIVE* PROJECTS THIS QUARTER	/-WW Agr.Ex	Plans Rels.

No	#	*COMMENTS*		
1	15072	As of 9/25/18, application has been completed and submitted and Joel Metzger is corresponding with staff at Water Boards, Division of Financial Assistance regarding a short list of requested follow up questions/items.		
2	11064W	Study B adopted at joint CPUD/CCWD Board meeting Oct.4, 2017. As of 9/13/18, CCWD staff issued comments for DRAFT Study A prepared by KASL and ECORP. Study A proposed to be presented to Board 4rd Quarter 2018.		
3	01258	Construction sewer and water service completed in Sept. 2018 and water meters issued. District notified owner that septic tank was constructed too deep and not servicable by CCWD staff and Owner is to make arrangements to privately service the septic tank and pump.		
4	15082	Peter Martin developed a revised schedule for the project. All work including design, environmental, bidding, and construction must be finished by Aug. 2019.		
5	010039	As of Sept. 2018, the intake has been cleared of sediment, intake screen replaced, and pump station is operational again.		

DIVISION 3 - BERTHA UNDERHILL				
QUARTERLY PROJECTS SUMMARY / SEPTEMBER 2018				
Arnold/Avery Big Trees Village Forest Meadows Lakemont Pines Meadowmont Township of Murphys				
No.	**#**	*ACTIVE* PROJECTS THIS QUARTER	W-WW Agr.Ex.	Plans Rels.
1	11085	Reach 1 Water Pipeline Replacement Project		
2	11084	Techite Pipeline / Big Trees / Meko Drive		
3	11095	Ebbetts Pass Redwood Tank Hazard Mitigation Grant Application		
4	-	Snowshoe Springs, Updated Water Service Agreement		
No.	#	*INACTIVE* PROJECTS THIS QUARTER	W-WW Agr.Exp.	Plans Rels.
5	01575	Forest Meadows Subdivision Units 4A & 5 (Sierra Ridge Associates)	02/17/19	
6	01215	Three Oaks Subdivision TSTM 2006-37 (Gillis)	04/18/19	
No.	**#**	*COMMENTS*		
1	11085	District staff is actively working on this project and proposing to issue public notice inviting bids in October 2018 and bidding project by end of this year with construction proposed to begin April-May 2019. District staff waiting on Caltrans encroachment pemit and Army Corps of Engineers permit.		
2	11084	District staff reviewing 90% drawings at this time, project to go to bid Spring of 2019 for construction next summer to overlap with Reach 1 project.		
3	11095	As recommended by Cal-OES staff, Joel Metzger and Charles Palmer updated and resubmitted subject application again on July 2, 2018. The District has two active applications for the project under DR-4301 and DR-4344. Projects may being held up pending FEMA review/approval of local hazard mitigation plan.		
4	-	As of 8/27/18, District issued letter proposal cost to serve for new 6-inch master meter. Richard Mates, President stated CCWD's proposal was approved by Snowshoe Springs Board of Directors on 9/22/18. CCWD staff recommends bringing agreement to CCWD Board for adoption in Oct.2018.		
5	01575	Non-standard water and wastewater facilities agreement approved by Board on Feb. 17, 2016. Time extended to 02/17/2019. Improvement plans reviewed by CCWD staff as of Sept. 2018 and all comments addressed by Weber, Ghio.	02/17/19	
6	01215	Plans received 3/3/17 for proposed 17-lot subdivision. Extension of existing water and wastewater facilities agreement granted until April 2019.	04/18/19	

DIVISION 4 - RUSS THOMAS

QUARTERLY PROJECTS SUMMARY / SEPTEMBER 2018

Angels Camp Six Mile Village Vallecito Connor Estates Copper Cove Copperopolis Lake Tulloch Shores Saddle Creek

No.	#	*ACTIVE* PROJECTS THIS QUARTER	V-WW Agr.Ex	Plans Rels.
1	15059C	Copper Cove Wastewater Master Plan		
2	11064C	Copper Cove Water Master Plan		
3	15082	Douglas Flat/Vallecito Recycled Water Distribution Project (TSTAN IRWMP)		
4	15080	Copper Cove Lift Station 8, 12 &13 Bypass / Sewer Forcemain and Lift Station 15 & 18 Replacement		
5	01596	La Cobra Mina Subdivision Unit 2		
6	01264	Copper Hills Unit 2		
7	-	Copper Hills Units 3 & 4, DeNova Homes		

No.	#	*INACTIVE* PROJECTS THIS QUARTER	/-WW Agr.Ex	Plans Rels.

No.	#	*COMMENTS*		
1	15059C	A final master plan was adopted by the Board on June 27, 2018.		
2	11064C	A presentation of the Draft Water Master Plan was made by Peterson Brustad to the Board on August 22, 2018. Final plan to be brought to the Board for final adoption in Oct. or Nov. 2018.		
3	15082	Peter Martin developed a revised schedule for the project. All work including design, environmental, bidding, and construction must be finished by Aug. 2019.		
4	15076	Lee & Ro held pre-design workshop with CCWD staff on Sept.6 & 7, 2018 and is currently working on pre-design report.		
5	01596	Facilities agreement signed w/CCWD 8/9/2017, Resolution # 2017-47, 7/26/2018-Final Inspection approved. 9/14/2018-Completion and transfer documents being created- 9/21/2018- waiting on recordation of Sub-division map w/County		
6	01264	Previously stopped construction years ago before water and sewer facilities were completed and accepted by District. As of 9/10/2018, the property is being put into new ownership - recorded documentation to be provided. An updated facility agreement to be created/signed after transfer of ownership.		
7	–	Contacted by DeNova Homes for possible re-opening of project. Since Units 3 & 4 construciton never started and agreement expired, District is restarting process with new facilities agreement, plan check and inspections.		

DIVISION 5 - JEFF DAVIDSON

QUARTERLY PROJECTS SUMMARY / SEPTEMBER 2018

AD 604 LaContenta Rancho Calaveras Valley Hills Estates

No.	#	*ACTIVE* PROJECTS THIS QUARTER	W-WW Agr.Ex	Plans Rels.
1	01213	New Hogan Lake Estates North TSTM 2003-05, Phases A & B (Platner)	11/02/18	
2	01262 01263	New Hogan Oaks Subdivision Units 1 & 2, Old Golden Oaks, LLC (APN's 073-042-098 and 073-042-028)		
3	01265	Gold Creek Unit 3 Subdivision		
4	15059L	La Contenta Sewer Master Plan		
5	11064J	Jenny Lind Water Master Plan		
6	11092	Jenny Lind Water Plant Pretreatment FEMA/OES Hazard Mitigation Project		
7	01258	Mark Twain Medical Center (APNs 073-047-001 and 073-049-002 thru -006)		
8	-	Jenny Lind Elementary Sewer Service, APN's 073-043-016/-017		

No.	#	*INACTIVE* PROJECTS THIS QUARTER	W-WW Agr.Exp	Plans Rels.
9	1261	Jenny Lind APN 046-035-015,016 Covey Ridge (Robitaille)		

No.	#	*COMMENTS*		
1	0213	Platner notified facilities agreement to expire on Nov. 2, 2017 and request for extension granted, new date is 11/2/2018	11/02/18	
2	01262 01263	Concept review applications received Dec. 29, 2017 for water and sewer for New Hogan Oaks Units 1 & 2 (51 and 145 unit residential subdivisions). Waiting for engineering reports - Letter sent 3/20/2018		
3	01265	Concept review application received 6/20/18. Concept review issued 8/20/18. Waiting on engineering reports		
4	15059L	Master Plan adopted by Board on Dec.13, 2017; capacity fee analysis to follow.		
5	11064J	Master Plan adopted by Board on Mar. 28, 2018; capacity fee analysis to follow.		
6	11092	Ground breaking occurred April 9, 2018. Cal-OES visited site Apr. 26, 2018 and due to cultural resources project was stopped for 76 days until July 11, 2018. As of Oct.1, 2018, construction is estimated to be 40% complete. Manufacturing of pretreatment equipment finished and to be delivered approx. Nov.12, 2018.		
7	01258	Medical clinic at Vista Del Lago/Hwy 26. Ground breaking on 9/28/18. Cost to serve (CTS) letter mailed 7/24/18. CTS Fees Paid on 9/13/18. 4 sets site plans delivered on 9/20/18 in plan check.	7/24/2018	
8	-	Potential CWSRF project for sewer service, on-going discussions with KASL, Weber Ghio, School District representative during Aug., Sept., Oct. 2018.		
9	1261	Jenny Lind APN 046-035-015,016 Covey Ridge (Robitaille) - Waiting on Design Report from Developer, letter sent 12/21/2017		

Agenda Item

DATE: October 10, 2018

TO: Dave Eggerton, General Manager

FROM: Stacey Lollar, Director of HR and Customer Service

SUBJECT: Discussion/Action Regarding Credit Adjustment for APN 025-016-068

RECOMMENDED ACTION:

Motion: __________/___________ approving Resolution 2018- ___ approving a credit adjustment to customer account number 035671-000 for APN 025-016-068 (3450 Highway 4).

SUMMARY:

Per the District's Ordinance No. 2000-03 (attached) any credit adjustment in excess of $1,000 requires approval from the Board of Directors. The District currently has a customer, Mr. Hughes (C/O Elizabeth Schulz), who is requesting a credit adjustment of $3,128.75 due to the failure of their customer backflow device on a one (1) inch meter. The amount is so large because the customer did not realize the backflow device had failed due to snow on the ground. The backflow device has since been repaired and the past two billing cycles have had normal usage for their account.

As per Section 1 of Ordinance No, 2000-03 "leak adjustments will only be granted once every five (5) years per water service account." Mr. Hughes (C/O Elizabeth Schulz) has not received an adjustment within the last five (5) years. Therefore, staff recommends that the credit adjustment be approved by the Board.

FINANCIAL CONSIDERATIONS:

The credit adjustment for account number 035671-000 will reduce water revenues in the water fund (Fund 300) by the amount of the adjustment $3,128.75.

Attachments: Ordinance No. 2000-03 – Credit Adjustment Policy
Resolution Approving a Water Leak Adjustment for Customer Account Number 035671-000 for APN 025-016-068 at Hwy 4 in Arnold, CA

ORDINANCE NO. 2000- 03

Credit Adjustment Policy

The Board of Directors of CALAVERAS COUNTY WATER DISTRICT (CCWD) has determined that it is necessary and appropriate to adopt a policy for credit adjustments.

NOW, THEREFORE, BE IT ORDAINED as follows:

Section 1. Findings.

The General Manager and his authorized designees may make credit adjustments not to exceed $1,000 to customer accounts in order to resolve customer-disputed charges. Such an adjustment must be requested in writing by the customer and supported by documentation showing that the credit is allowed due to extraordinary circumstances that render established policies and procedures of the District unreasonable or inapplicable.

Inclusive in this adjustment policy is a provision for leak adjustments calculated as 50 percent of the amount in excess of the customer's bill in a like period from a previous year. Leak adjustments will only be granted once every five years per water service account.

Adjustments in excess of $1,000 require approval from the Board of Directors through variance procedures as established by the District.

Section 2. Effect on Prior Actions.

All provisions of prior ordinances and resolutions of CCWD not inconsistent with this Ordinance shall remain in full force and effect.

Section 3. Severability.

This Ordinance and the various sections thereof are hereby declared to be severable. To the extent the terms and provisions of this Ordinance are in conflict or are otherwise inconsistent with the terms and provisions of any prior CCWD ordinances, resolutions, rules, and other actions, the terms and provisions of this Ordinance shall prevail with respect thereto. The District hereby declares that it would have adopted this Ordinance irrespective of the invalidity of any particular portion thereof.

Section 4. Publication/Effective Date.

This Ordinance shall take effect as of this date.

PASSED AND ADOPTED this 14th day of June, 2000, by the following vote:

AYES: Directors Deem, Weinkle, Fonceca, Hebrard and Davidson
NOES: None
ABSENT: None
ABSTAIN: None

CALAVERAS COUNTY WATER DISTRICT

President

ATTEST:

Linda O'Keeffe
Secretary

Simon Granville
General Manager

Agenda Item

DATE: October 10, 2018

TO: Dave Eggerton, General Manager

FROM: Jeffrey Meyer, Director of Administrative Services

SUBJECT: Accept and File the GASB 75 Actuarial Valuation of Other Post-Employment Benefits and Actuarially Determined Contributions Report

RECOMMENDED ACTION:

Accept and File the GASB 75 Actuarial Valuation of Other Post-Employment Benefits and Actuarially Determined Contributions Report, Measurement Date of June 30, 2017.

SUMMARY:

The Government Accounting Standards Board (GASB) Statement No. 75 addresses government agency accounting and financial reporting requirements for postemployment benefits other than pensions (OPEB). Calaveras County Water District currently provides retiree health benefits, which is considered an OPEB. The District utilizes a "pay as you go" method to fund retiree health benefits for existing retirees and makes payments into a trust to prefund retiree health benefits for active employees. The trust is administered by Public Agency Retirement Services (PARS) and the investments are managed by HighMark Capital Management, a division of Union Bank.

In order to establish the accrual requirements under GASB 75 an actuarial valuation must be completed and remain current. The last actuarial valuation, performed by Nicolay Consulting, was for census data and investments as of June 30, 2014. The District once again contracted with Nicolay Consulting to prepare the June 30, 2017 GASB 75 actuarial valuation of postemployment medical benefits (attached), and the accompanying GASB 75 Actuarially Determined Contributions (ADC) report (attached). Staff will review the reports and be available to answer questions.

FINANCIAL CONSIDERATIONS:

None

Attachment: GASB 75 Actuarial Valuation of Postemployment Medical Benefits Measurement Date June 30, 2017
- GASB 75 Actuarially Determined Contributions as of June 30, 2017

Calaveras County Water District
OPEB Plan

Actuarial Valuation as of June 30, 2017
For Purposes of Actuarial Funding
And GASB 75 ADC

June 27, 2018

NICOLAY CONSULTING

Nicolay Consulting Group

June 27, 2018

OPEB CONSULTANTS AND ACTUARIES
530 BUSH STREET, SUITE 500
SAN FRANCISCO, CALIFORNIA 94108-3633
TEL: 415-512-5300
FAX: 415-512-5314

Jeffrey L. Meyer
Director of Administrative Services
Calaveras County Water District
120 Toma Court
San Andreas, California 95249

Re: Calaveras County Water District June 30, 2017 Actuarial Report for Funding

Dear Mr. Meyer,

Calaveras County Water District ("The District") has retained Nicolay Consulting Group to complete this valuation of the District's postemployment medical program (the "Plan") as of June 30, 2017 measurement date compliant under Actuarial Standards of Practice for funding and consistent with Governmental Accounting Standards Board (GASB) Statement 75 for actuarial methods.

The purpose of this valuation is to determine the value of the expected postretirement benefits for current and future retirees and the Actuarial Accrued Liability (i.e., Total OPEB Liability under GASB 75) and Actuarially Determined Contribution for the plan year ending June 30, 2018. The amounts reported herein are not necessarily appropriate for use for a different fiscal year without adjustment.

Based on the foregoing, the cost results and actuarial exhibits presented in this report were determined on a consistent and objective basis in accordance with applicable Actuarial Standards of Practice and generally accepted actuarial procedures. We believe they fully and fairly disclose the actuarial position of the Plan based on the plan provisions, employee and plan cost data submitted.

The actuarial calculations were completed under the supervision of Gary Cline, ASA, MAAA, FCA, Enrolled Actuary. A member of the American Academy of Actuaries whom meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in the actuarial valuation is complete and accurate. In our opinion, assumptions as approved by the plan sponsor are reasonably related to the experience of and expectations for the Plan.

We would be pleased to answer any questions on the material contained in this report or to provide explanation or further detail as may be appropriate.

Respectfully submitted,

NICOLAY CONSULTING GROUP

Gary E. Cline

Gary E. Cline, ASA, MAAA, FCA, EA
Vice President & Chief Operating Officer

Table of Contents

Section	Page

Section I Management Summary

A) Highlights

Summary of Key Valuation Results

	2017
Funded Status for Plan year beginning July 1:	
Present Value of Future Benefits:	
Active	$9,634,127
Retiree	6,345,937
Total	$15,980,064
Actuarial Accrued Liability	
Active	$6,731,369
Retiree	6,345,937
Total	$13,077,306
Market Value of Assets	6,414,366
Funded Status	$6,662,940
Funded Status as a percentage of the AAL	49%
	N/A
Actuarially Determined Contribution for PY beginning July 1:	
Actuarially determined contributions (Exhibit 4)	$854,848
Estimated Trust Contribution	$769,789
Estimated Annual Retiree Premium	$462,556
Active Implicit Subsidy	$85,059
Total Contribution	$1,317,404
Demographic data for Plan year beginning July 1 (2):	
Number of active members	65
Number of retired members and beneficiaries	47
Total	112
Key assumptions as of July 1:	
Discount rate	7.00%
Initial Trend Rate	
Pre-65	8.40%
Post-65	5.00%
Ultimate Rate	5.00%
Year Ultimate Rate is Reached	2033

(1) Includes payments to trust and amounts paid directly by the plan sponsor

(2) Census data as of June 30, 2017 is used in the measurement of the TOL as of June 30, 2017. See Section III for additional details on the demographic data.

B) Gap Analysis

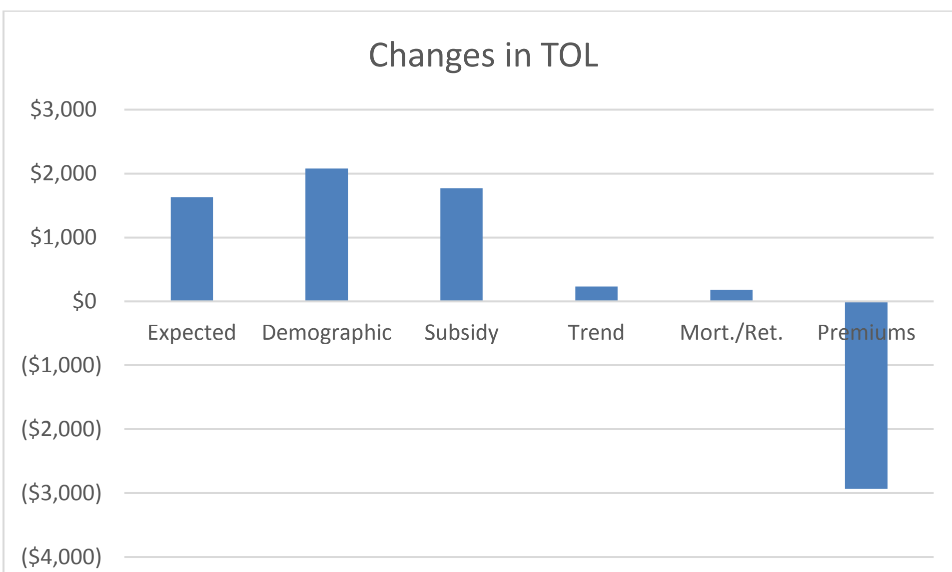
The Actuarial Accrued Liability (AAL) has increased $2,708,790 from $10,368,516 as of June 30, 2014 to $13,077,306 as of June 30, 2017. A breakdown of the sources of this change in liability is shown below *(thousands; amounts may not add due to rounding)*:

Liability Experience	Amount	Percentage
Expected Benefits Earned, Benefit Payments and Interest	$1,627	16%
Actual Demographic and Other Experience	$1,828	17%
Total Liability Experience	$3,455	33%

Changes in Assumptions	Amount	Percentage
Recognition of Age-Related Implicit Subsidy	$1,769	17%
Revised Health Care Cost Trend	$235	2%
Revised CalPERS Mortality and Retirement Tables	$182	2%
Actual 2017 and 2018 Premiums	($2,932)	(28%)
Total Changes in Assumptions	($746)	(7%)

Changes in Benefit Terms	Amount	Percentage
Total Amendments	$0	0%

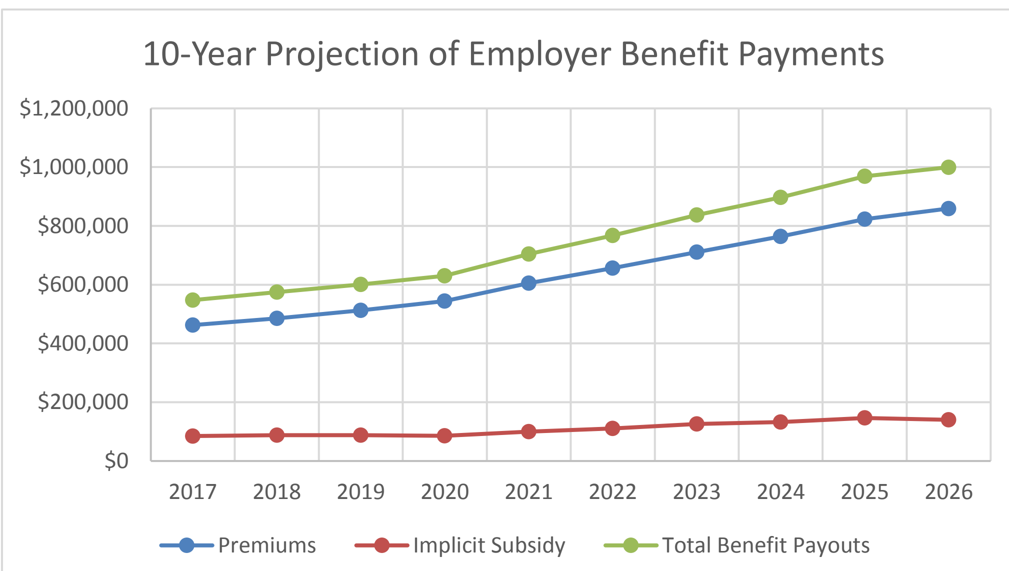
Total Change in TOL	Amount	Percentage
Liability Experience	$3,455	33%
Changes in Assumptions	($746)	(7%)
Amendments	$0	0%
Total	$2,709	26%



C) 10-Year Projection of Employer Benefit Payments

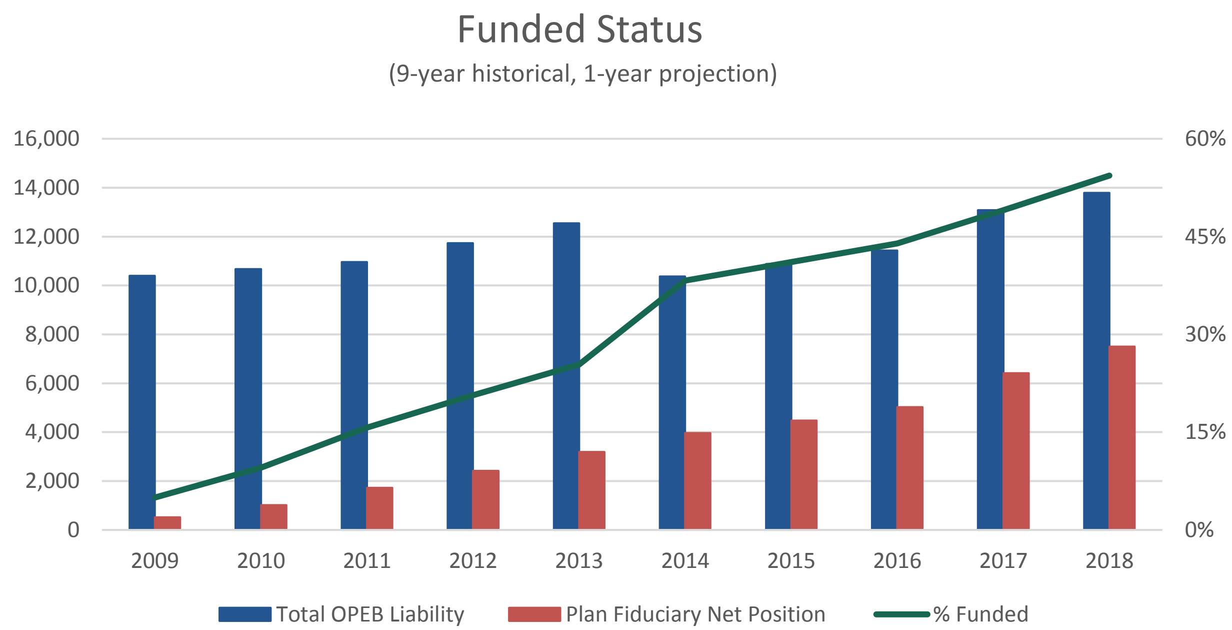
In this table we show the projected pay-as-you-go costs (employer's share of premiums), the implicit subsidy, and total expected benefit payments. The implicit subsidy reflects the shortfall of premiums versus the true cost of coverage. The shortfall exists because claims for active employees are combined with claims of retirees (who generally are older and cost more) to develop a single flat premium paid by both groups.

Fiscal Year Beginning 7/1	Premiums	Implicit Subsidy	Total
2017	$462,556	$85,059	$547,615
2018	$485,823	$88,474	$574,297
2019	$512,494	$88,447	$600,941
2020	$544,637	$85,435	$630,072
2021	$605,008	$99,526	$704,534
2022	$656,609	$111,288	$767,897
2023	$710,863	$126,074	$836,937
2024	$764,379	$132,510	$896,889
2025	$822,511	$146,388	$968,899
2026	$859,284	$140,611	$999,895



D) Funding Progress

Below is an illustration of the funded status of the Plan for the past 9 years, and a projection of the next year looking forward:



Section II Actuarial Funding Exhibits and GASB 75 ADC

A) Derivation of Significant Actuarial Assumptions (Exhibit 1)

Long-term Expected Rate of Return – As of June 30, 2017, the long-term expected rates of return for each major investment class in the Plan's portfolio are as follows:

Investment Class	Target Allocation	Long-Term Expected Real Rate of Return[1]
Equity	48.25%	5.65%
Fixed Income	45.00%	1.39%
REITs	1.75%	5.06%
Cash	5.00%	0.00%

[1]JPMorgan arithmetic Long Term Capital Market assumptions and expected inflation of 2.26%.

The above table shows the target asset allocation in the PARS Moderate investment policy.

Discount rate – The discount rate is based on a blend of (a) the long-term expected rate of return on assets for benefits covered by plan assets and a yield or index for 20-year, tax-exempt general obligation municipal bonds with an average rating of AA/Aa or better for benefits not covered by plan assets.

Above are the arithmetic long-term expected real rates of return by asset class for the next 10 years as provided in a report by JP Morgan. For years thereafter, returns were based on historical average index real returns over the last 30 years assuming a similar equity/fixed investment mix and a 2.26% inflation rate. Investment expenses were assumed to be 25 basis points per year. These returns were matched with cash flows for benefits covered by plan assets and the Bond Buyer 20-Bond General Obligation index was matched with cash flows not covered by plan assets to measure the reasonableness of the choice in discount rate.

	June 30, 2016	June 30, 2017
Discount Rate	7.00%	7.00%
Bond Buyer 20-Bond GO Index	2.85%	3.58%

Section II Actuarial Funding Exhibits and GASB 75 ADC

B) Sensitivity Analysis (Exhibit 2)

Sensitivity of the funded status to changes in the discount rate – The following presents the District's funded status if it were calculated using a discount rate that is 1% point lower (6.00%) or 1% point higher (8.00%) than the current rate:

Sensitivity of the funded status to changes in the Trend rate – The following presents the District's funded status if it were calculated using a trend table that is 1% point lower or 1% point higher than the current rate:

Actuarial Accrued Liability as of June 30, 2017 valuation date: $6,662,940

Sensitivity Analysis:

	Funded Status	$ Change	%Change
Discount Rate			
+1%	$5,147,828	($1,515,112)	(23%)
Base	$6,662,940	-	-
-1%	$8,508,304	$1,845,364	28%
Trend Rate			
+1%	$8,382,084	$1,719,144	26%
Base	$6,662,940	-	-
-1%	$5,140,496	($1,522,444)	(23%)

C) Breakdown of Explicit and Implicit Liabilities (Exhibit 3)

	Explicit	Implicit	Total
Present Value of Future Benefits			
Actives	$8,146,939	$1,487,188	$9,634,127
Retirees	5,632,636	713,301	6,345,937
Total	$13,779,575	$2,200,489	$15,980,064
Actuarial Accrued Liability			
Actives	$5,714,294	$1,017,075	$6,731,369
Retirees	5,632,636	713,301	6,345,937
Total	$11,346,930	$1,730,376	$13,077,306
Normal Cost (boy)	$300,673	$55,359	$356,032

Section II Actuarial Funding Exhibits and GASB 75 ADC

D) Schedule of Actuarially Determined Contributions (Exhibit 4)

Plan Year	2017 - 2018	2018 - 2019	2019 - 2020
		Projected[1]	Projected[1]
Actuarial Accrued Liability	$13,077,306	$13,807,214	$14,579,663
Actuarial Value of Assets[2]	6,414,366	7,659,648	8,985,578
Unfunded Actuarial Accrued Liability	$6,662,940	$6,147,567	$5,594,085
Amortization Period[3]	21	20	19
Normal Cost (eoy)	$380,954	$400,002	$420,002
Amortization of UAAL[4]	473,894	451,957	426,131
Actuarially Determined Contribution	$854,848	$851,958	$846,133
Discount Rate	7.00%	7.00%	7.00%
Expected Return on Assets	7.00%	7.00%	7.00%
Normal Cost Growth Rate	5.00%	5.00%	5.00%

[1] Projections assume that the District funds the Actuarially Determined Contribution (ADC), the Fund earns 7.00% per year, the discount rate remains 7.00% and the Normal Cost component of the ADC increases by 5.0% per year throughout the two-year period. We assumed mid-year benefit withdrawals from the Trust.

[2] Asset Smoothing: GASB 75 calculates the unfunded liability using market value of assets. However, equity risk can result in significant asset volatility, which translates to a volatile unfunded liability. To mitigate this volatility, the District can adopt an asset smoothing method, which recognizes gain/loss for any one year systematically over the smoothing period. Common smoothing periods are 3-5 years in length.

[3] Amortization Method: GASB 75 amortizes asset gain/loss over 5 years, liability experience gain/loss and assumption change gain/loss over a variable period of roughly 5-10 years, and immediately recognizes plan amendment gain/loss and your initial unfunded. Under the GASB 45 methodology, the District was amortizing all of these items over a closed 30 year period. The District should consider whether the old GASB 45 methodology is still appropriate as it may lead to a significant under or over funding when the amortization periods for the ADC calculation are not the same as the amortizations for GASB 75.

[4] Amortization of UAAL Method: Under GASB 45 methodology, excess assets are amortized in the same way that UAAL is amortized, which may result in the presence of an ADC even when the plan would be expected to be fully funded at the end of the year without a contribution.

E) Schedule of Contributions[1] (Exhibit 5)

	Plan Year 2016 - 2017
Actuarially Determined Contribution[1,2]	$746,759
Covered-employee payroll[3]	N/A
Contributions as a percentage of covered-employee payroll[3]	N/A
Contributions to the Trust	612,008
Pay-go Payments by Employer Unreimbursed by the Trust	544,601
Active Implicit Rate Subsidy Transferred to OPEB	0
Total OPEB Contributions[1,2]	$1,156,609

[1] ADC and Contributions are for the measurement period July 1, 2016 to June 30, 2017.

[2] Employers setting a discount rate based on the assumption that assets will be sufficient to cover all future benefit payments under the plan are assumed to annually make contributions equal to the actuarially determined contribution. Annual contributions made that are substantially less than the ADC would require additional support for use of a discount rate equal to the long-term expected return on trust assets. The ADC is based on the actuarial valuation as of the July 1, 2014 report

[3] Covered-Employee Payroll represented above is based on covered-employee payroll provided by the employer. GASB 75 defines covered-employee payroll as the total payroll of employees that are provided OPEBs through the OPEB plan. Accordingly, if OPEB covered-employee payroll shown above is different than total earnings for covered-employees, the employer should display in the disclosure footnotes the payroll based on total earnings for the covered group and recalculate the required payroll-related ratios.

Section III Data

A) Summary of Demographic Information

The participant data used in the valuation was provided by The District as of June 30, 2017. It is assumed that this data is representative of the population as of June 30, 2017. While the participant data was checked for reasonableness, the data was not audited, and the valuation results presented in this report are dependent upon the accuracy of the participant data provided. The table below presents a summary of the basic participant information for the active and retired participants covered under the terms of the Plan.

	Total
Actives	
Total Counts	65
Average Age	47
Average Service	10
Retirees	
Counts	
Under age 65	14
Age 65 and over	33
Total Counts	47
Average Age	68
Total Participants	112
Covered Dependents of Retirees	
Counts	
Spouses / Domestic Partners	38
Children	0
Total	38
Grand Total	150

Section III Data

B) Distribution of Participants by Age and Service

Distribution of Service Groups by Age Groups

Age Group	Retired* Participants	Active Participant – Years of Service						
		0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25+	Total
< 25	0	1	0	0	0	0	0	1
25 - 29	0	0	0	0	0	0	0	0
30 - 34	0	4	1	2	0	0	0	7
35 - 39	0	3	4	3	1	0	0	11
40 - 44	0	3	4	3	1	0	0	11
45 - 49	0	2	0	3	0	0	1	6
50 - 54	1	1	2	3	1	2	0	9
55 - 59	3	1	4	3	2	2	0	12
60 - 64	10	0	3	1	1	0	0	5
65 - 69	14	0	1	2	0	0	0	3
> 70	19	0	0	0	0	0	0	0
Total	47	15	19	20	6	4	1	65

* Retired participants include retirees, disabled participants, and surviving family members. Does not include covered dependents.

Section IV Plan Provision Summary

A) Plan Description

Eligibility Requirements and Plan Description

Employees who retire from the District with a minimum of 5 years of District service and a minimum of 10 years of California PERS service are eligible for lifetime retiree, spouse and surviving spouse medical benefits according to the following schedule:

Years of Service	Percent of Contribution
10	50%
11	55%
12	60%
13	65%
14	70%
15	75%
16	80%
17	85%
18	90%
19	95%
20 or more	100%

This vesting schedule does not apply to active employees hired prior to August 1, 2001, nor does it apply to most current retirees.

In addition, postemployment benefits are provided to a closed group of retired Board members. Current Board members are not eligible for District provided postemployment benefits.

The District also provides postemployment dental and vision benefits to current retirees and eligible employees who were hired prior to January 1, 2008. We assumed that the District contributes 100% of the cost of this coverage.

Benefit Cap

For retirees not subject to the vesting schedule the District's contribution is capped at 100% of the CalPERS PERS Choice "Other Northern California" Basic premium rates. Retirees who are subject to the vesting schedule shown above receive a benefit that is calculated on the retirees eligible years of service and the weighted average as determined by CalPERS, per GC 22893.

The District's contribution toward the cost of dependent coverage is also capped at 100% of the CalPERS PERS Choice "Other Northern California" Basic premium rate for dependent coverage for retirees not on the vesting schedule. Dependents of those retirees who are subject to the vesting schedule shown above receive a benefit that is based off the weighted average per GC 22893 and on the retirees years of service with the District and their overall service in the CalPERS system.

A) Plan Description (continued)

The District Cap does not reduce when a retiree reaches age 65. Retirees who elect a more expensive plan must contribute the difference in cost between the amount the District contributes and the full premium cost.

Below are monthly premium rates for 2017 and 2018:

	Per retiree or spouse	2017	2018
Pre-Medicare Premiums	PERS Choice (Other Northern California)	$820.38	$813.96
	PERS Choice (Sacramento)	$723.47	$735.38
	PERS Choice (Bay Area)	$830.30	$830.30
	PERS Choice (Out of State)	$657.61	$661.45
	PERS Care	$812.40	$797.61
Medicare Premiums	**Per retiree or spouse**	**2017**	**2018**
	PERS Choice	$353.63	$345.97
	PERS Care	$389.76	$382.30
Dental	**Per retiree or spouse**	**2017**	**2018**
	Employee Only	$33.72	$33.72
	Employee + 1	$65.20	$65.20
	Employee + Family	$106.12	$106.12
Vision	**Per retiree or spouse**	**2017**	**2018**
	Composite per employee	$18.56	$18.56

Plan Provision Changes

There have been no plan amendments since the last measurement date.

Section V Actuarial Assumption, Methods, & Considerations

A) Actuarial Assumptions

Discount Rate	7.00%, based on PARS Moderate investment policy
Net Investment Return	7.00%, based on PARS Moderate investment policy
Inflation	We assumed 2.0% annual inflation.
Payroll increases	3.25% annual increases.

Health Care Trend

Year	Increase in Premium Rates	
Beginning	Pre-65	Post-65
2019	8.40%	5.00%
2020	8.15%	5.00%
2021	7.90%	5.00%
2022	7.65%	5.00%
2023	7.40%	5.00%
2024	7.15%	5.00%
2025	6.90%	5.00%
2026	6.65%	5.00%
2027	6.40%	5.00%
2028	6.15%	5.00%
2029	5.90%	5.00%
2030	5.65%	5.00%
2031	5.40%	5.00%
2032	5.15%	5.00%
2033 and later	5.00%	5.00%

Section V Actuarial Assumption, Methods, & Considerations

A) Actuarial Assumptions (continued)

Plan Distribution for Calculating Baseline Cost

Plan	Pre-65	Post-65
PERS Choice	93%	94%
PERS Care	7%	3%
PERS Select	0%	3%
Total	100%	100%

Baseline Cost
Pre-Medicare: $9,447 per year
Post-Medicare: $4,211 per year

Administrative Expenses
$15,813 for the measurement period ending June 30, 2017.

Health Plan Participation
We assumed that 100% of eligible participants will participate.

Medicare Coverage
We assumed that all future retirees will be eligible for Medicare when they reach age 65.

Morbidity Factors
CalPERS 2013 study

Population for Curving
CalPERS 2013 study

Age-Adjusted Claims Cost

Age	Male	Female
50	$7,891	$9,553
55	$10,640	$10,938
60	$13,210	$12,079
65	$4,271	$4,729
70	$3,667	$3,619
75	$4,298	$4,184
80	$4,842	$4,661
85	$5,077	$4,905

Section V Actuarial Assumption, Methods, & Considerations

A) Actuarial Assumptions (continued)

Mortality* — The mortality rates used in this valuation are those used in the most recent CalPERS valuations.

Pre-Retirement: CalPERS 2014 Mortality pre-retirement

Post-Retirement: CalPERS 2014 Mortality post-retirement

	Sample Mortality Rates			
	Active Employees		Retired Employees	
Age	Male	Female	Male	Female
55	0.23%	0.14%	0.60%	0.42%
60	0.31%	0.18%	0.71%	0.44%
65	0.40%	0.26%	0.83%	0.59%
70	0.52%	0.37%	1.31%	0.99%
75	0.71%	0.53%	2.21%	1.72%
80	0.99%	0.81%	3.90%	2.90%
85	0.00%	0.00%	6.97%	5.24%
90	0.00%	0.00%	12.97%	9.89%

Disability — Because of the anticipated low incidence of disability retirements we did not value disability.

Percent Married — 80% of future retirees were assumed to cover spouses at retirement.

* *Source: NCG has not performed an experience study to select these assumptions. NCG has not observed materially consistent gains or consistent losses associated with these assumptions*

Section V Actuarial Assumption, Methods, & Considerations

A) Actuarial Assumptions (continued)

Retirement*

We used the retirement rates that were used in the most recent CalPERS Public Agency Miscellaneous 2% @ 55 for actives hired before January 1, 2013, and 2% @ 62 for actives hired on or after January 1, 2013.

2.7% @ 55

	Years of Service				
Age	5	10	15	20	25
50	0.4%	0.9%	1.4%	3.5%	5.5%
55	7.6%	10.1%	12.5%	16.5%	20.5%
60	6.9%	9.3%	11.6%	15.4%	19.2%
65	13.4%	17.4%	21.5%	27.0%	32.6%
70	14.1%	18.3%	22.6%	28.3%	34.1%
75	100.0%	100.0%	100.0%	100.0%	100.0%

2% @ 62

	Years of Service				
Age	5	10	15	20	25
50	0.0%	0.0%	0.0%	0.0%	0.0%
55	4.4%	5.6%	6.8%	8.0%	9.2%
60	6.2%	7.8%	9.5%	11.2%	12.9%
65	12.9%	16.4%	19.9%	23.4%	26.9%
70	12.5%	16.0%	19.4%	22.8%	26.2%
75	100.0%	100.0%	100.0%	100.0%	100.0%

Withdrawal *

We selected withdrawal rates that were used in the most recent CalPERS Public Agency Miscellaneous valuations.

	Years of Service				
Age	0	5	10	15	20
25	16.7%	8.7%	7.5%	0.0%	0.0%
30	16.1%	7.9%	6.7%	5.8%	0.0%
35	15.4%	7.1%	5.9%	5.0%	4.5%
40	14.7%	6.3%	5.1%	4.2%	3.7%
45	14.0%	5.5%	4.3%	3.5%	2.9%
50	13.3%	1.2%	0.7%	0.3%	0.2%

* *Source: NCG has not performed an experience study to select these assumptions. NCG has not observed materially consistent gains or consistent losses associated with these assumptions*

Assumption Changes

The average per capita claims cost was updated to reflect actual 2017 and 2018 premiums, the health care cost trend rate was updated to reflect 2018 industry survey data, the mortality table was updated to reflect the most recent CalPERS studies, and the implicit subsidy was recognized in accordance with Actuarial Standards of Practice 6 (ASOP 6).

There have been no other assumption changes since the last measurement date.

Section V Actuarial Assumption, Methods, & Considerations

B) Actuarial Methods

Actuarial Cost Method	Entry Age Normal An actuarial cost method under which the Actuarial Present Value of the Projected Benefits of each individual included in the valuation is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit age(s). The portion of this Actuarial Present Value allocated to a valuation year is called the Normal Cost.
Amortization Methodology	We used straight-line amortization. For assumption changes and experience gains/losses, we assumed Average Future Working Lifetime, averages over all actives and retirees (retirees are assumed to have no future working years). For asset gains and losses, we assumed 5 years.
Financial and Census Data	The District provided the participant data, financial information and plan descriptions used in this valuation. The actuary has checked the data for reasonableness, but has not independently audited the data. The actuary has no reason to believe the data is not complete and accurate, and knows of no further information that is essential to the preparation of the actuarial valuation.
Plan Fiduciary Net Position	Market value of assets as of the measurement date
Measurement Date	June 30, 2017
Valuation Date	June 30, 2017
Funding Policy	The District intends to contribute annually the full ADC to PARS plus Pay-as-you-go Premiums.

Section V Actuarial Assumption, Methods, & Considerations

C) Actuarial Considerations

Health Care Reform

Health care delivery is going through an evolution due to enactment of Health Care Reform. The Patient Protection and Affordable Care Act (PPACA), was signed March 23, 2010, with further changes enacted by the Health Care and Education Affordability Reconciliation Act (HCEARA), signed March 30, 2010. This valuation uses various assumptions that may have been modified based on considerations under PPACA. This section discusses particular legislative changes that were reflected in our assumptions. We have not identified any other specific provision of PPACA that would be expected to have a significant impact on the measured obligation. As additional guidance on the Act continues to be issued, we'll continue to monitor impacts.

Individual Mandate

Under PPACA, individuals (whether actively employed or otherwise) must be covered by health insurance or else pay a penalty tax to the government. While it is not anticipated that the Act will result in universal coverage, it is expected to increase the overall portion of the population with coverage. We believe this will result in an increased demand on health care providers, resulting in higher trend for medical services for non-Medicare eligible retirees. (Medicare costs are constrained by Medicare payment mechanisms already in place, plus additional reforms added by PPACA and HCEARA.) While we believe that the mandate may result in somewhat higher participation overall, this issue would have a marginal impact since we assume 100% participation upon retirement.

Employer Mandate

Health Care Reform includes various provisions mandating employer coverage for active employees, with penalties for non-compliance. Those provisions do not directly apply to the postemployment coverage included in this valuation.

C) Actuarial Considerations (continued)

Medicare Advantage Plans	Effective January 1, 2011, the Law provides for reductions to the amounts that would be provided to Medicare Advantage plans starting in 2011. We considered the effect of these reductions in federal payments to Medicare Advantage plans when setting our trend assumption.
Expansion of Child Coverage to Age 26	Health Care Reform mandates that coverage be offered to any child, dependent or not, through age 26, consistent with coverage for any other dependent. We assume that this change has been reflected in current premium rates. While this plan covers dependents, we do not currently assume non-spouse dependent coverage other than for firefighters. We believe the impact this assumption has on the valuation is immaterial due to the lack of retirees that have had or are expected to have non-spouse dependents for any significant amount of time during retirement.
Elimination of Annual or Lifetime Maximums	Health Care Reform provides that annual or lifetime maximums have to be eliminated for all "essential services." We assume that current premium rates already reflect the elimination of any historic maximums.
Cadillac Tax (High Cost Plan Excise Tax)	The PPACA legislation added a new High-Cost Plan Excise Tax (also known as the "Cadillac Tax") starting in calendar year 2022. For valuation purposes, we assumed that the value of the tax will be passed back to the plan in higher premium rates.

- The tax is 40% of the excess of (a) the cost of coverage over (b) the limit. We modeled the cost of the tax by calculating (a) using the working rates projected with trend. We calculated (b) starting with the statutory limits ($10,200 single and $27,500 family), adjusted for the following:
  - Limits will increase from 2018 to 2019 by 4.25% (CPI plus 1%);
  - Limits will increase after 2019 by 3.25% (CPI); and
  - For retirees over age 55 and not on Medicare, the limit is increased by an additional dollar amount of $1,650 for single coverage and $3,450 for family coverage.
- Based on the above assumptions, we estimate that the tax will apply as early as 2028 for some of the District's pre-Medicare plans. In addition, we estimate that the tax will not apply for the District's post-Medicare plans.

Section VI Glossary

A) Key Terms

Actuarially Determined Contribution	The amount recognized by an employer in each Plan Year for contributions to a defined benefit OPEB plan. The amount is calculated using actuarial methods and assumptions as defined by the plan sponsor.
Amortization of Unfunded Liabilities	The actuarial accrued liability existing at the valuation date the plan sponsor begins prefunding and new liabilities arising on future valuation dates are amortized over a period of time as defined by the plan sponsor. New liabilities may arise due to plan amendments, assumption changes, or experience other than assumed.
Covered Payroll	Annual compensation paid (or expected to be paid) to active employees covered by an OPEB plan, in aggregate.
Funded Status	The liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit OPEB plan that is administered through a trust.
Normal Cost	The portion of the Total Present Value of Future Benefits attributed to employee service during the current fiscal year by the actuarial cost method. These terms are used interchangeably.
Other Postemployment Benefits (OPEB)	Retiree health care benefits and post-employment benefits provided separately from a pension plan (excluding termination offers and benefits).
Actuarial Assets	Set equal to the market value of assets as of the valuation date, unless smoothing is performed.
Present Value of Future Benefits (PVFB)	The value, as of the valuation date, of the projected benefits payable to all members for their accrued service and their expected future service, discounted to reflect the time value (present value) of money and adjusted for the probabilities of retirement, withdrawal, death and disability.
Actuarial Accrued Liability	The portion of the actuarial present value of projected benefit payments that is attributed to past period of member service in conformity with the GASB Statements. The Actuarial Accrued Lliability is the liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit OPEB plan that is not administered through a trust.

Calaveras County Water District
OPEB Plan

Governmental Accounting Standards Board
(GASB) Statement 75
Actuarial Valuation Date: June 30, 2017
Measurement Date: June 30, 2017
Fiscal Year End: June 30, 2018
REVISED

June 21, 2018

NICOLAY
CONSULTING

Nicolay Consulting Group

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SAN FRANCISCO, CALIFORNIA 94108-3633
TEL: 415-512-5300
FAX: 415-512-5314

June 21, 2018

Jeffrey L. Meyer
Director of Administrative Services
Calaveras County Water District
120 Toma Court
San Andreas, California 95249

Re: Calaveras County Water District GASB 75 Report for Fiscal Year Ended June 30, 2018

Dear Mr. Meyer,

Calaveras County Water District ("The District") has retained Nicolay Consulting Group to complete this valuation of the District's postemployment medical program (the "Plan") as of June 30, 2017 measurement date compliant under Governmental Accounting Standards Board (GASB) Statement 75. *This report was revised to update formatting, the funding status graph on page 5 and to adjust the liabilities to reflect Director's ineligibility to participate in this Plan..*

The purpose of this valuation is to determine the value of the expected postretirement benefits for current and future retirees and the Net OPEB Liability and OPEB Benefit Cost for the fiscal year ending June 30, 2018. The amounts reported herein are not necessarily appropriate for use for a different fiscal year without adjustment.

Based on the foregoing, the cost results and actuarial exhibits presented in this report were determined on a consistent and objective basis in accordance with applicable Actuarial Standards of Practice and generally accepted actuarial procedures. We believe they fully and fairly disclose the actuarial position of the Plan based on the plan provisions, employee and plan cost data submitted.

The actuarial calculations were completed under the supervision of Gary Cline, ASA, MAAA, FCA, Enrolled Actuary. A member of the American Academy of Actuaries whom meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in the actuarial valuation is complete and accurate. In our opinion, assumptions as approved by the plan sponsor are reasonably related to the experience of and expectations for the Plan.

We would be pleased to answer any questions on the material contained in this report or to provide explanations or further detail as may be appropriate.

Respectfully submitted,

NICOLAY CONSULTING GROUP

Gary E. Cline, ASA, MAAA, FCA, EA
Vice President & Chief Operating Officer

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Section I Management Summary

A) Highlights

Summary of Key Valuation Results

	2017
Disclosure elements as of measurement period ending June 30:	
Present Value of Future Benefits:	
Active	$9,634,127
Retiree	6,345,937
Total	$15,980,064
Actuarial Accrued Liability or Total OPEB Liability (TOL)	
Active	$6,731,369
Retiree	6,345,937
Total	$13,077,306
Plan Fiduciary Net Position (i.e Fair Value of Assets)	6,414,366
Net OPEB Liability (NOL)	$6,662,940
Plan Fiduciary Net Position as a percentage of the TOL	49%
Aggregate OPEB Expense (Exhibit 3)	$804,955
Covered Payroll	N/A
Schedule of contributions for plan year ending June 30:	
Actuarially determined contributions (Exhibit 6)	$746,759
Actual contributions[1]	1,156,609
Contribution deficiency (excess)	($409,850)
Pay-As-You-Go Premiums	$544,601
Demographic data for fiscal year ending June 30[2]:	
Number of active members	65
Number of retired members and beneficiaries	47
Total	112
Key assumptions as of June 30:	
Discount rate	7.00%
Initial Trend Rate	
Pre-65	8.40%
Post-65	5.00%
Ultimate Rate	5.00%
Year Ultimate Rate is Reached	2033

(1) Includes payments to trust and amounts paid directly by the plan sponsor

(2) Census data as of June 30, 2017 is used in the measurement of the TOL as of June 30, 2017. See Section III for additional details on the demographic data.

B) Gap Analysis

The Total OPEB Liability has increased $668,117 from $12,409,189 as of June 30, 2016 to $13,077,306 as of June 30, 2017. A breakdown of the sources of this change in liability is shown below *(thousands; amounts may not add due to rounding)*:

Liability Experience	Amount	Percentage
Expected Benefits Earned, Benefit Payments and Interest	$668	5%
Actual Demographic and Other Experience	$0	0%
Total Liability Experience	$668	5%

Changes in Assumptions	Amount	Percentage
Total Changes in Assumptions	$0	0%

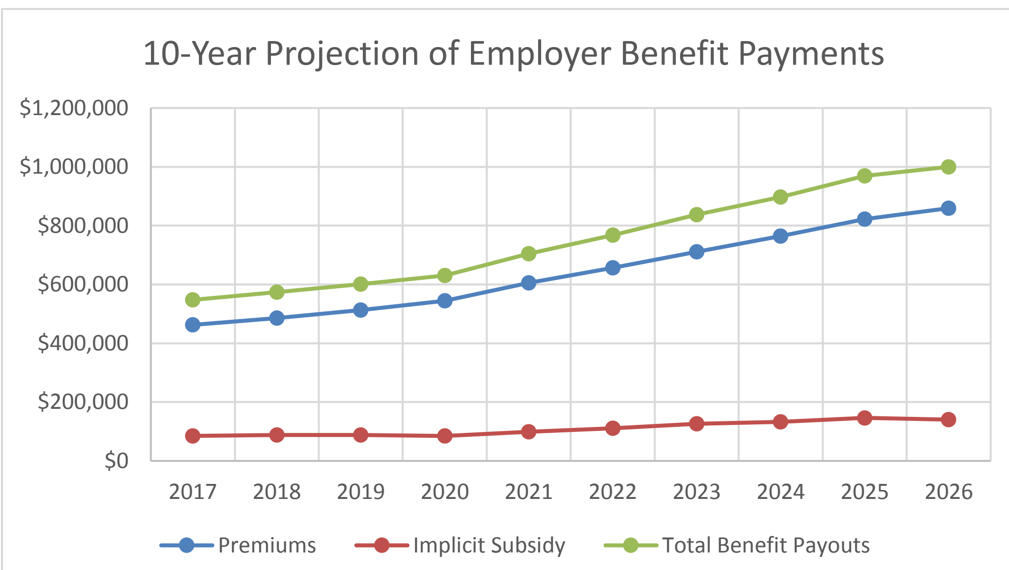
Changes in Benefit Terms	Amount	Percentage
Total Amendments	$0	0%

Total Change in TOL	Amount	Percentage
Liability Experience	$668	5%
Changes in Assumptions	$0	0%
Amendments	$0	0%
Total	$668	5%

C) 10-Year Projection of Employer Benefit Payments

In this table we show the projected pay-as-you-go costs (employer's share of premiums), the implicit subsidy, and total expected benefit payments. The implicit subsidy reflects the shortfall of premiums versus the true cost of coverage. The shortfall exists because claims for active employees are combined with claims of retirees (who generally are older and cost more) to develop a single flat premium paid by both groups.

Fiscal Year Beginning 7/1	Premiums	Implicit Subsidy	Total
2017	$462,556	$85,059	$547,615
2018	$485,823	$88,474	$574,297
2019	$512,494	$88,447	$600,941
2020	$544,637	$85,435	$630,072
2021	$605,008	$99,526	$704,534
2022	$656,609	$111,288	$767,897
2023	$710,863	$126,074	$836,937
2024	$764,379	$132,510	$896,889
2025	$822,511	$146,388	$968,899
2026	$859,284	$140,611	$999,895

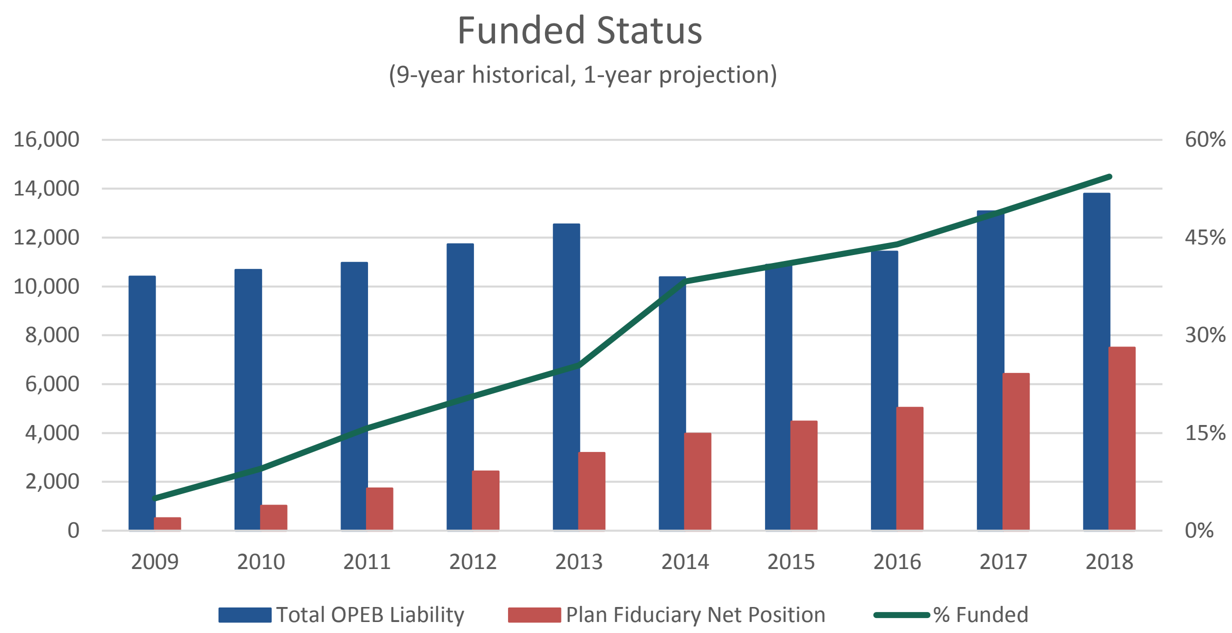


D) Breakdown of Explicit and Implicit Liabilities

	Explicit	Implicit	Total
Present Value of Future Benefits			
Actives	$8,146,939	$1,487,188	$9,634,127
Retirees	5,632,636	713,301	6,345,937
Total	$13,779,575	$2,200,489	$15,980,064
Actuarial Accrued Liability			
Actives	$5,714,294	$1,017,075	$6,731,369
Retirees	5,632,636	713,301	6,345,937
Total	$11,346,930	$1,730,376	$13,077,306
Normal Cost	$300,673	$55,359	$356,032

E) Funding Progress

Below is an illustration of the funded status of the Plan for the past 9 years, and a projection of the next year looking forward:



Section II GASB 75 Exhibits

A) Schedule of Changes in Net OPEB Liability (Exhibit 1)

	2017
Total OPEB Liability	
Service cost	$339,078
Interest	873,640
Change of benefit terms	0
Differences between expected and actual experience	0
Changes of assumptions	0
Benefit payments, including refunds of employee contributions	(544,601)
Net change in Total OPEB Liability	$668,117
Total OPEB Liability – beginning (a)	12,409,189
Total OPEB Liability – ending (b)	$13,077,306
Plan Fiduciary Net Position	
Contributions – employer	$1,156,609
Contributions – employee	0
Net investment income	564,907
Benefit payments, including refunds of employee contributions	(544,601)
Administrative expense	(15,813)
Other	0
Net change in Plan Fiduciary Net Position	$1,161,102
Plan Fiduciary Net Position – beginning (c)	$5,253,264
Plan Fiduciary Net Position – ending (d)	$6,414,366
Net OPEB Liability - beginning (a) – (c)	$7,155,925
Net OPEB Liability – ending (b) – (d)	$6,662,940
Plan Fiduciary Net Position as a percentage of the Total OPEB Liability	49%
Covered employee payroll(1)	N/A
Plan Net OPEB Liability as percentage of covered employee payroll(1)	N/A

1 Covered payroll not available

B) Derivation of Significant Actuarial Assumptions

Long-term Expected Rate of Return – As of June 30, 2017, the long-term expected rates of return for each major investment class in the Plan's portfolio are as follows:

Investment Class	Target Allocation	Long-Term Expected Real Rate of Return[1]
Equity	48.25%	5.65%
Fixed Income	45.00%	1.39%
REITs	1.75%	5.06%
Cash	5.00%	0.00%

[1]JPMorgan arithmetic Long Term Capital Market assumptions and expected inflation of 2.26%.

The above table shows the target asset allocation in the PARS Moderate investment policy.

Discount rate – The discount rate is based on a blend of (a) the long-term expected rate of return on assets for benefits covered by plan assets and a yield or index for 20-year, tax-exempt general obligation municipal bonds with an average rating of AA/Aa or better for benefits not covered by plan assets.

Above are the arithmetic long-term expected real rates of return by asset class for the next 10 years as provided in a report by JP Morgan. For years thereafter, returns were based on historical average index real returns over the last 30 years assuming a similar equity/fixed investment mix and a 2.26% inflation rate. Investment expenses were assumed to be 25 basis points per year. These returns were matched with cash flows for benefits covered by plan assets and the Bond Buyer 20-Bond General Obligation index was matched with cash flows not covered by plan assets to measure the reasonableness of the choice in discount rate.

	June 30, 2016	June 30, 2017
Discount Rate	7.00%	7.00%
Bond Buyer 20-Bond GO Index	2.85%	3.58%

C) Sensitivity Analysis (Exhibit 2)

Sensitivity of the Net OPEB Liability to changes in the discount rate – The following presents the District's Net OPEB Liability if it were calculated using a discount rate that is 1% point lower (6.00%) or 1% point higher (8.00%) than the current rate:

Sensitivity of the Net OPEB Liability to changes in the Trend rate – The following presents the District Net OPEB Liability if it were calculated using a trend table that is 1% point lower or 1% point higher than the current rate:

Net OPEB Liability as of 06/30/2017 measurement date: $6,662,940

Sensitivity Analysis:

	NOL	$ Change	%Change
Discount Rate			
+1%	$5,147,828	($1,515,112)	(23%)
Base	$6,662,940	-	-
-1%	$8,508,304	$1,845,364	28%
Trend Rate			
+1%	$8,382,084	$1,719,144	26%
Base	$6,662,940	-	-
-1%	$5,140,496	($1,522,444)	(23%)

D) Schedule of OPEB Expense for Fiscal Year Ended June 30, 2018 (Exhibit 3)

Components of OPEB Expense	
Service Cost	$339,078
Interest on the Total OPEB Liability (Exhibit 4)	873,640
Changes on Benefit Terms	0
Recognized Differences between Expected and Actual Experience	0
Recognized Changes of Assumptions	0
Employee Contributions	0
Projected Earnings on OPEB Plan Investments (Exhibit 5)	(388,242)
Recognized Differences Between Projected and Actual Earnings on Plan Investments	(35,333)
Administrative Expense	15,813
Other Changes in Fiduciary Net Position	0
Aggregate OPEB Expense	$804,955

E) Interest on the Total OPEB Liability (Exhibit 4)

	Amount for Period a	Portion of Period b	Interest Rate c	Interest on the Total OPEB Liability a*b*c
Beginning Total OPEB Liability	$12,409,189	100%	7.00%	$868,644
Service Cost	$339,078	100%	7.00%	23,735
Benefit payments, including refunds of employee contribution	($544,601)	50%	7.00%	(18,739)
Total Interest on the TOL (total OPEB liability)				$873,640

F) Earnings on Plan Fiduciary Net Position (Exhibit 5)

Total Projected Earnings	Amount for Period a	Portion of Period b	Projected Rate of Return c	Projected Earnings a*b*c
Beginning Plan Fiduciary Net Position	$5,253,264	100%	7.00%	$367,728
Employer Contributions	$1,156,609	50%	7.00%	39,797
Employee Contributions	$0	50%	7.00%	0
Benefits payments, (including refunds of employee contributions)	($544,601)	50%	7.00%	(18,739)
Administrative Expense and Other	($15,813)	50%	7.00%	(544)
Total Projected Earnings				$388,242

Comparison of Projected and Actual Earnings On Investments	
Total Projected Earnings	$388,242
Actual Net Investment Income	564,907
Net Difference Between Projected and Actual Earnings On Investments	($176,665)

G) Schedule of Contributions[1] (Exhibit 6)

	Plan Year 2016 - 2017
Actuarially Determined Contribution[2]	$746,759
Covered-employee payroll[3]	N/A
Contributions as a percentage of covered-employee payroll[3]	N/A
Contributions to the Trust	612,008
Pay-as-you-go Payments by Employer Unreimbursed by the Trust	544,601
Active Implicit Rate Subsidy Transferred to OPEB	0
Total OPEB Contributions[1]	$1,156,609

[1] ADC and Contributions are for the measurement period July 1, 2016 to June 30, 2017.

[2] Employers setting a discount rate based on the assumption that assets will be sufficient to cover all future benefit payments under the plan are assumed to annually make contributions equal to the actuarially determined contribution. Annual contributions made that are substantially less than the ADC would require additional support for use of a discount rate equal to the long-term expected return on trust assets. The ADC is based on the actuarial valuation as of the July 1, 2014 report

[3] Covered-Employee Payroll represented above is based on covered-employee payroll provided by the employer. GASB 75 defines covered-employee payroll as the total payroll of employees that are provided OPEBs through the OPEB plan. Accordingly, if OPEB covered-employee payroll shown above is different than total earnings for covered-employees, the employer should display in the disclosure footnotes the payroll based on total earnings for the covered group and recalculate the required payroll-related ratios.

H) Deferred Inflows/Outflows of Resources (Exhibit 7)

	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between expected and actual experience in the measurement of the TOL	$0	$0
Changes in assumptions	0	0
Net difference between projected and actual earnings of OPEB plan investments	0	141,332
Contribution to OPEB plan after measurement date[1]	0	0
Total	$0	$141,332

[1] To be determined as of the fiscal year ending June 30, 2018

Amounts reported as deferred outflows of resources and deferred inflows of resources related to OPEB will be recognized in OPEB expense as follows:

Fiscal Year Ended June 30	Deferred Outflows/(Inflows) of Resources
2019	($35,333)
2020	(35,333)
2021	(35,333)
2022	(35,333)
2023	0
Thereafter	0
	($141,332)

Section II GASB 75 Exhibits

I) Schedule of Deferred Inflows/Outflows of Resources (Exhibit 8)

Fiscal Year Established	Initial Amount	Deferred Outflows of Resources as of 06/30/17	Deferred Inflows of Resources as of 06/30/17	Initial Years	Years Left	Deferred Outflows/(Inflows) Recognized in Fiscal 2018
Changes in Assumption						
2017	$0	$0	$0	6.8	5.8	$0
Total	$0	$0	$0			$0
Difference Between Expected and Actual Plan Experience						
2017	$0	$0	$0	6.8	5.8	$0
Total	$0	$0	$0			$0
Net Difference Between Projected and Actual Earnings On Investments						
2017	($176,665)	$0	($141,332)	5.0	4.0	($35,333)
Total	($176,665)	$0	($141,332)			($35,333)
Changes in Benefit Terms						
2017	$0	$0	$0	1.0	0.0	$0
Total	$0	$0	$0			$0
Total Balance:		$0	($141,332)			($35,333)

J) Journal Entry to Record the NOL for fiscal year-end June 30, 2018 (Exhibit 9)

	DR	CR
Net Position	$6,804,272	$0
DO-Experience	0	0
DO-Investment	0	0
DO-Contributions	0	0
DO-Assumptions	0	0
DI-Experience	0	0
DI-Investment	0	141,332
DI-Assumptions	0	0
NOL	0	6,662,940
	$6,804,272	$6,804,272

Section III Data

A) Summary of Demographic Information

The participant data used in the valuation was provided by The District as of June 30, 2017. It is assumed that this data is representative of the population as of June 30, 2017. While the participant data was checked for reasonableness, the data was not audited, and the valuation results presented in this report are dependent upon the accuracy of the participant data provided. The table below presents a summary of the basic participant information for the active and retired participants covered under the terms of the Plan.

	Total
Actives	
Total Count	65
Average Age	47
Average Service	10
Retirees	
Counts	
Under age 65	14
Age 65 and over	33
Total Counts	47
Average Age	68
Total Participants	112
Covered Dependents of Retirees	
Counts	
Spouses / Domestic Partners	38
Children	0
Total	38
Grand Total	150

Section III Data

B) Distribution of Participants by Age and Service

Distribution of Service Groups by Age Groups

Age Group	Retired* Participants	Active Participant – Years of Service						
		0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25+	Total
< 25	0	1	0	0	0	0	0	1
25 - 29	0	0	0	0	0	0	0	0
30 - 34	0	4	1	2	0	0	0	7
35 - 39	0	3	4	3	1	0	0	11
40 - 44	0	3	4	3	1	0	0	11
45 - 49	0	2	0	3	0	0	1	6
50 - 54	1	1	2	3	1	2	0	9
55 - 59	3	1	4	3	2	2	0	12
60 - 64	10	0	3	1	1	0	0	5
65 - 69	14	0	1	2	0	0	0	3
> 70	19	0	0	0	0	0	0	0
Total	47	15	19	20	6	4	1	65

* Retired participants include retirees, disabled participants, and surviving family members. Does not include covered dependents.

Section IV Plan Provision Summary

A) Plan Description

Eligibility Requirements and Plan Description

Employees who retire from the District with a minimum of 5 years of District service and a minimum of 10 years of California PERS service are eligible for lifetime retiree, spouse and surviving spouse medical benefits according to the following schedule:

Years of Service	Percent of Contribution
10	50%
11	55%
12	60%
13	65%
14	70%
15	75%
16	80%
17	85%
18	90%
19	95%
20 or more	100%

This vesting schedule does not apply to active employees hired prior to August 1, 2001, nor does it apply to most current retirees.

In addition, postemployment benefits are provided to a closed group of retired Board members. Current Board members are not eligible for District provided postemployment benefits.

The District also provides postemployment dental and vision benefits to current retirees and eligible employees who were hired prior to January 1, 2008. We assumed that the District contributes 100% of the cost of this coverage.

Benefit Cap

For retirees not subject to the vesting schedule the District's contribution is capped at 100% of the CalPERS PERS Choice "Other Northern California" Basic premium rates. Retirees who are subject to the vesting schedule shown above receive a benefit that is calculated on the retirees eligible years of service and the weighted average as determined by CalPERS, per GC 22893.

The District's contribution toward the cost of dependent coverage is also capped at 100% of the CalPERS PERS Choice "Other Northern California" Basic premium rate for dependent coverage for retirees not on the vesting schedule. Dependents of those retirees who are subject to the vesting schedule shown above receive a benefit that is based off the weighted average per GC 22893 and on the retirees years of service with the District and their overall service in the CalPERS system.

A) Plan Description (continued)

The District Cap does not reduce when a retiree reaches age 65. Retirees who elect a more expensive plan must contribute the difference in cost between the amount the District contributes and the full premium cost.

Below are monthly premium rates for 2017 and 2018:

Pre-Medicare Premiums	**Per retiree or spouse**	**2017**	**2018**
	PERS Choice (Other Northern California)	$820.38	$813.96
	PERS Choice (Sacramento)	$723.47	$735.38
	PERS Choice (Bay Area)	$830.30	$830.30
	PERS Choice (Out of State)	$657.61	$661.45
	PERS Care	$812.40	$797.61
Medicare Premiums	**Per retiree or spouse**	**2017**	**2018**
	PERS Choice	$353.63	$345.97
	PERS Care	$389.76	$382.30
Dental	**Per retiree or spouse**	**2017**	**2018**
	Employee Only	$33.72	$33.72
	Employee + 1	$65.20	$65.20
	Employee + Family	$106.12	$106.12
Vision	**Per retiree or spouse**	**2017**	**2018**
	Composite per employee	$18.56	$18.56

Plan Provision Changes

There have been no plan amendments since the last measurement date.

Section V Actuarial Assumption, Methods, & Considerations

A) Actuarial Assumptions

Discount Rate — 7.00%, based on PARS Moderate investment policy

Net Investment Return — 7.00%, based on PARS Moderate investment policy

We assumed 2.0% annual inflation

Payroll increases — 3.25% annual increases

Health Care Trend

Year Beginning	Increase in Premium Rates Pre-65	Post-65
2019	8.40%	5.00%
2020	8.15%	5.00%
2021	7.90%	5.00%
2022	7.65%	5.00%
2023	7.40%	5.00%
2024	7.15%	5.00%
2025	6.90%	5.00%
2026	6.65%	5.00%
2027	6.40%	5.00%
2028	6.15%	5.00%
2029	5.90%	5.00%
2030	5.65%	5.00%
2031	5.40%	5.00%
2032	5.15%	5.00%
2033 and later	5.00%	5.00%

Section V Actuarial Assumption, Methods, & Considerations

A) Actuarial Assumptions (continued)

Plan Distribution for Calculating Baseline Cost

Plan	Pre-65	Post-65
PERS Choice	93%	94%
PERS Care	7%	3%
PERS Select	0%	3%
Total	100%	100%

Baseline Cost: Pre-Medicare: $9,447 per year
Post-Medicare: $4,211 per year

Administrative Expenses: $15,813 for the measurement period ending June 30, 2017.

Health Plan Participation: We assumed that 100% of eligible participants will participate.

Medicare Coverage: We assumed that all future retirees will be eligible for Medicare when they reach age 65.

Morbidity Factors: CalPERS 2013 study

Population for Curving: CalPERS 2013 study

Age-Adjusted Claims Cost

Age	Male	Female
50	$7,891	$9,553
55	$10,640	$10,938
60	$13,210	$12,079
65	$4,271	$4,729
70	$3,667	$3,619
75	$4,298	$4,184
80	$4,842	$4,661
85	$5,077	$4,905

A) Actuarial Assumptions (continued)

Mortality* The mortality rates used in this valuation are those used in the most recent CalPERS valuations.

Pre-Retirement: CalPERS 2014 Mortality pre-retirement

Post-Retirement: CalPERS 2014 Mortality post-retirement

Sample Mortality Rates				
	Active Employees		Retired Employees	
Age	Male	Female	Male	Female
55	0.23%	0.14%	0.60%	0.42%
60	0.31%	0.18%	0.71%	0.44%
65	0.40%	0.26%	0.83%	0.59%
70	0.52%	0.37%	1.31%	0.99%
75	0.71%	0.53%	2.21%	1.72%
80	0.99%	0.81%	3.90%	2.90%
85	0.00%	0.00%	6.97%	5.24%
90	0.00%	0.00%	12.97%	9.89%

Disability Because of the anticipated low incidence of disability retirements we did not value disability.

Percent Married 80% of future retirees were assumed to cover spouses at retirement.

* *Source: NCG has not performed an experience study to select these assumptions. NCG has not observed materially consistent gains or consistent losses associated with these assumptions*

A) Actuarial Assumptions (continued)

Retirement*

We used the retirement rates that were used in the most recent CalPERS Public Agency Miscellaneous 2% @ 55 for actives hired before January 1, 2013, and 2% @ 62 for actives hired on or after January 1, 2013.

2.7% @ 55

	Years of Service				
Age	5	10	15	20	25
50	0.4%	0.9%	1.4%	3.5%	5.5%
55	7.6%	10.1%	12.5%	16.5%	20.5%
60	6.9%	9.3%	11.6%	15.4%	19.2%
65	13.4%	17.4%	21.5%	27.0%	32.6%
70	14.1%	18.3%	22.6%	28.3%	34.1%
75	100.0%	100.0%	100.0%	100.0%	100.0%

2% @ 62

	Years of Service				
Age	5	10	15	20	25
50	0.0%	0.0%	0.0%	0.0%	0.0%
55	4.4%	5.6%	6.8%	8.0%	9.2%
60	6.2%	7.8%	9.5%	11.2%	12.9%
65	12.9%	16.4%	19.9%	23.4%	26.9%
70	12.5%	16.0%	19.4%	22.8%	26.2%
75	100.0%	100.0%	100.0%	100.0%	100.0%

Withdrawal *

We selected withdrawal rates that were used in the most recent CalPERS Public Agency Miscellaneous valuations.

	Years of Service				
Age	0	5	10	15	20
25	16.7%	8.7%	7.5%	0.0%	0.0%
30	16.1%	7.9%	6.7%	5.8%	0.0%
35	15.4%	7.1%	5.9%	5.0%	4.5%
40	14.7%	6.3%	5.1%	4.2%	3.7%
45	14.0%	5.5%	4.3%	3.5%	2.9%
50	13.3%	1.2%	0.7%	0.3%	0.2%

* *Source: NCG has not performed an experience study to select these assumptions. NCG has not observed materially consistent gains or consistent losses associated with these assumptions*

Assumption Changes

There have been no assumption changes since the last measurement date.

Section V Actuarial Assumption, Methods, & Considerations

B) Actuarial Methods

Actuarial Cost Method	Entry Age Normal An actuarial cost method under which the Actuarial Present Value of the Projected Benefits of each individual included in the valuation is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit age(s). The portion of this Actuarial Present Value allocated to a valuation year is called the Normal Cost.
Amortization Methodology	We used straight-line amortization. For assumption changes and experience gains/losses, we assumed Average Future Working Lifetime averages over all actives and retirees (retirees are assumed to have no future working years). For asset gains and losses, we assumed 5 years.
Financial and Census Data	The District provided the participant data, financial information and plan descriptions used in this valuation. The actuary has checked the data for reasonableness, but has not independently audited the data. The actuary has no reason to believe the data is not complete and accurate, and knows of no further information that is essential to the preparation of the actuarial valuation.
Plan Fiduciary Net Position	Market value of assets as of the measurement date
Measurement Date	June 30, 2017
Valuation Date	June 30, 2017
Funding Policy	The District intends to contribute annually the full ADC to PARS plus Pay-as-you-go Premiums.

Section V Actuarial Assumption, Methods, & Considerations

C) Actuarial Considerations

Health Care Reform	Health care delivery is going through an evolution due to enactment of Health Care Reform. The Patient Protection and Affordable Care Act (PPACA), was signed March 23, 2010, with further changes enacted by the Health Care and Education Affordability Reconciliation Act (HCEARA), signed March 30, 2010. This valuation uses various assumptions that may have been modified based on considerations under PPACA. This section discusses particular legislative changes that were reflected in our assumptions. We have not identified any other specific provision of PPACA that would be expected to have a significant impact on the measured obligation. As additional guidance on the Act continues to be issued, we'll continue to monitor impacts.
Individual Mandate	Under PPACA, individuals (whether actively employed or otherwise) must be covered by health insurance or else pay a penalty tax to the government. While it is not anticipated that the Act will result in universal coverage, it is expected to increase the overall portion of the population with coverage. We believe this will result in an increased demand on health care providers, resulting in higher trend for medical services for non-Medicare eligible retirees. (Medicare costs are constrained by Medicare payment mechanisms already in place, plus additional reforms added by PPACA and HCEARA.) While we believe that the mandate may result in somewhat higher participation overall, this issue would have a marginal impact since we assume 100% participation upon retirement.
Employer Mandate	Health Care Reform includes various provisions mandating employer coverage for active employees, with penalties for non-compliance. Those provisions do not directly apply to the postemployment coverage included in this valuation.

C) Actuarial Considerations (continued)

Medicare Advantage Plans	Effective January 1, 2011, the Law provides for reductions to the amounts that would be provided to Medicare Advantage plans starting in 2011. We considered the effect of these reductions in federal payments to Medicare Advantage plans when setting our trend assumption.
Expansion of Child Coverage to Age 26	Health Care Reform mandates that coverage be offered to any child, dependent or not, through age 26, consistent with coverage for any other dependent. We assume that this change has been reflected in current premium rates. While this plan covers dependents, we do not currently assume non-spouse dependent coverage other than for firefighters. We believe the impact this assumption has on the valuation is immaterial due to the lack of retirees that have had or are expected to have non-spouse dependents for any significant amount of time during retirement.
Elimination of Annual or Lifetime Maximums	Health Care Reform provides that annual or lifetime maximums have to be eliminated for all "essential services." We assume that current premium rates already reflect the elimination of any historic maximums.
Cadillac Tax (High Cost Plan Excise Tax)	The PPACA legislation added a new High-Cost Plan Excise Tax (also known as the "Cadillac Tax") starting in calendar year 2022. For valuation purposes, we assumed that the value of the tax will be passed back to the plan in higher premium rates.

- The tax is 40% of the excess of (a) the cost of coverage over (b) the limit. We modeled the cost of the tax by calculating (a) using the working rates projected with trend. We calculated (b) starting with the statutory limits ($10,200 single and $27,500 family), adjusted for the following:
    - Limits will increase from 2018 to 2019 by 4.25% (CPI plus 1%);
    - Limits will increase after 2019 by 3.25% (CPI); and
    - For retirees over age 55 and not on Medicare, the limit is increased by an additional dollar amount of $1,650 for single coverage and $3,450 for family coverage.
- Based on the above assumptions, we estimate that the tax will apply as early as 2028 for some of the District's pre-Medicare plans. In addition, we estimate that the tax will not apply to the District's post-Medicare plans.

Section VI Glossary

A) Key Terms

Annual OPEB Expense	The amount recognized by an employer in each accounting period for contributions to a defined benefit OPEB plan on the modified accrual basis of accounting.
Deferred outflows and inflows of resources related to OPEB	Deferred outflows of resources and deferred inflows of resources related to OPEB arising from certain changes in the collective net OPEB liability or collective total OPEB liability.
Covered Payroll	Annual compensation paid (or expected to be paid) to active employees covered by an OPEB plan, in aggregate.
Net OPEB Liability (NOL)	The liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit OPEB plan that is administered through a trust that meets the criteria of the GASB Statements.
Normal Cost or Service Cost	The portion of the Total Present Value of Future Benefits attributed to employee service during the current fiscal year by the actuarial cost method. These terms are used interchangeably.
Other Postemployment Benefits (OPEB)	Retiree health care benefits and post-employment benefits provided separately from a pension plan (excluding termination offers and benefits).
Plan Fiduciary Net Position (FNP)	Set equal to the market value of assets as of the measurement date.
Present Value of Future Benefits (PVFB)	The value, as of the valuation date, of the projected benefits payable to all members for their accrued service and their expected future service, discounted to reflect the time value (present value) of money and adjusted for the probabilities of retirement, withdrawal, death and disability.
Total OPEB Liability (TOL)	The portion of the actuarial present value of projected benefit payments that is attributed to past period of member service in conformity with the GASB Statements. The total OPEB liability is the liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit OPEB plan that is not administered through a trust that meets the criteria of the GASB Statements.

Agenda Item

DATE: October 10, 2018

TO: Dave Eggerton, General Manager

FROM: Jeffrey Meyer, Director of Administrative Services

SUBJECT: Discussion/Direction regarding PERS Annual Valuation Reports as of June 30, 2017

RECOMMENDED ACTION:

Discussion only.

SUMMARY:

As a public employer, the District is eligible to participate in the California Public Employees' Retirement System ("PERS"), a defined benefit pension plan. The District has three cost-sharing defined benefit pension plans. They are:

- Miscellaneous Plan (2.7% at 55)
- Miscellaneous Second Tier Plan (2.0% at 60)
- PEPRA Miscellaneous Plan (2.0% at 62)

PERS separates its defined benefit plans into two categories, Pooled and Non-Pooled. Public agencies with less than 100 active employees, such as the District, are placed in a Risk Pool. Risk pooling is a process that combines assets and liabilities across employers to produce large, risk sharing pools. These risk sharing pools dramatically reduce or eliminate large fluctuations in an employer's retirement contribution rate caused by unexpected demographic events. PERS aggregates the data and experience of all pooled plans, and the pool's gains/losses are allocated among the pooled plans based on the proportionate share of the accrued liability.

Public agencies and their employees are required to make PERS contributions to fund future retirement benefits. Employee contributions are based on the benefit formulas the agency provides for the employee groups covered, and are a percentage of salary. The minimum required employer contributions are the sum of two components:

- Normal Cost – The annual cost of service accrual for the upcoming fiscal year for active employees. The normal cost is shown as a percentage of payroll and paid as part of the payroll reporting process.

- Unfunded Accrued Liability (UAL) – The UAL is the amortized dollar amount needed to fund past service credit earned (or accrued) for members who are currently receiving benefits, active members, and for members entitled to deferred benefits, as of the valuation date. The UAL can be billed monthly or prepaid with a discount (the District prepaid the UAL in FY 2018-19).

The District's employer contributions for each plan are determined by annual actuarial valuations (attached). These valuations are based on the benefit formulas the agency provides and the employee groups covered. In addition to determining the required employer contributions, the valuations calculate the plan's funded status, projected future employer contributions (normal and UAL), a breakdown of the pool's experience, the market value of assets, and a schedule of the plan's unfunded liabilities. New for this year is a schedule of required UAL amortization payments and "Fresh Start" alternative payment schedules.

Staff will review the three (3) valuations, including options of paying down the Unfunded Accrued Liability for the Miscellaneous Plan, and will be available to answer questions.

FINANCIAL CONSIDERATIONS:

None.

Attachment: Annual Valuation Report for CCWD's Miscellaneous Plan, June 30, 2017
- *Annual Valuation Report for CCWD's Miscellaneous Second Tier Plan, June 30, 2017*
- *Annual Valuation Report for CCWD's Miscellaneous Second Tier Plan, June 30, 2017*

California Public Employees' Retirement System
Actuarial Office
P.O. Box 942709
Sacramento, CA 94229-2709
TTY: (916) 795-3240
(888) 225-7377 phone – (916) 795-2744 fax
www.calpers.ca.gov

August 2018

Miscellaneous Plan of the Calaveras County Water District
(CalPERS ID: 5932694906)
Annual Valuation Report as of June 30, 2017

Dear Employer,

As an attachment to this letter, you will find a copy of the June 30, 2017 actuarial valuation report of the pension plan.

Because this plan is in a risk pool, the following valuation report has been separated into two sections:

- Section 1 contains specific information for the plan including the development of the current and projected employer contributions, and
- Section 2 contains the Risk Pool Actuarial Valuation appropriate to the plan as of June 30, 2017.

Section 2 can be found on the CalPERS website at (www.calpers.ca.gov). From the home page, go to "*Forms & Publications*" and select "*View All*". In the search box, enter "*Risk Pool*" and from the results list download the Miscellaneous or Safety Risk Pool Actuarial Valuation Report as appropriate.

Your June 30, 2017 actuarial valuation report contains important actuarial information about your pension plan at CalPERS. Your assigned CalPERS staff actuary, whose signature appears in the Actuarial Certification section on page 1, is available to discuss the report with you after August 1, 2018.

The exhibit below displays the minimum employer contributions, before any cost sharing, for Fiscal Year 2019-20 along with estimates of the required contributions for Fiscal Year 2020-21. Member contributions other than cost sharing (whether paid by the employer or the employee) are in addition to the results shown below. **The employer contributions in this report do not reflect any cost sharing arrangements you may have with your employees**.

Required Contribution

Fiscal Year	Employer Normal Cost Rate	Employer Payment of Unfunded Liability
2019-20	13.182%	$682,625
Projected Results		
2020-21	*14.0%*	*$772,000*

The actual investment return for Fiscal Year 2017-18 was not known at the time this report was prepared. The projections above assume the investment return for that year would be 7.25 percent. ***If the actual investment return for Fiscal Year 2017-18 differs from 7.25 percent, the actual contribution requirements for the projected years will differ from those shown above.***

Moreover, the projected results for Fiscal Year 2020-21 assume that there are no future plan changes, no further changes in assumptions other than those recently approved, and no liability gains or losses. Such changes can have a significant impact on required contributions. Since they cannot be predicted in advance, the projected employer results shown above are estimates. The actual required employer contributions for Fiscal Year 2020-21 will be provided in next year's report.

For additional details regarding the assumptions and methods used for these projections please refer to the "Projected Employer Contributions" in the "Highlights and Executive Summary" section.

The "Risk Analysis" section of the valuation report also contains estimated employer contributions in future years under a variety of investment return scenarios.

Changes since the Prior Year's Valuation

At its December 2016 meeting, the CalPERS Board of Administration lowered the discount rate from 7.50 percent to 7.00 percent using a three-year phase-in beginning with the June 30, 2016 actuarial valuations. The minimum employer contributions for Fiscal Year 2019-20 determined in this valuation were calculated using a discount rate of 7.25 percent. The projected employer contributions on Page 5 are calculated under the assumption that the discount rate will be lowered to 7.00 percent next year as adopted by the Board.

On December 19, 2017, the CalPERS Board of Administration adopted new actuarial assumptions based on the recommendations in the December 2017 CalPERS Experience Study and Review of Actuarial Assumptions. This study reviewed the retirement rates, termination rates, mortality rates, rates of salary increases and inflation assumption for Public Agencies. These new assumptions are incorporated in your actuarial valuations and will impact the required contribution for FY 2019-20. In addition, the Board adopted a new asset portfolio as part of its Asset Liability Management. The new asset mix supports a 7.00 percent discount rate. The reduction of the inflation assumption will be implemented in two steps in conjunction with the decreases in the discount rate. For the June 30, 2017 valuation an inflation rate of 2.625 percent was used and a rate of 2.50 percent will be used in the following valuation.

The CalPERS Board of Administration has adopted a new amortization policy effective with the June 30, 2019 actuarial valuation. The new policy shortens the period over which actuarial gains and losses are amortized from 30 years to 20 years with the payments computed using a level dollar amount. In addition, the new policy removes the 5-year ramp-up and ramp-down on UAL bases attributable to assumption changes and non-investment gains/losses. The new policy removes the 5-year ramp-down on investment gains/losses. These changes will apply only to new UAL bases established on or after June 30, 2019.

For inactive employers the new amortization policy imposes a maximum amortization period of 15 years for all unfunded accrued liabilities effective June 30, 2017. Furthermore, the plan actuary has the ability to shorten the amortization period on any valuation date based on the life expectancy of plan members and projected cash flow needs to the plan. The impact of this has been reflected in the current valuation results.

The CalPERS Board of Administration adopted a Risk Mitigation Policy which is designed to reduce funding risk over time. This Policy has been temporarily suspended during the period over which the discount rate is being lowered. More details on the Risk Mitigation Policy can be found on our website.

Besides the above noted changes, there may also be changes specific to the plan such as contract amendments and funding changes.

Further descriptions of general changes are included in the "Highlights and Executive Summary" section and in Appendix A, "Statement of Actuarial Data, Methods and Assumptions" of the Section 2 report.

We understand that you might have a number of questions about these results. While we are very interested in discussing these results with your agency, in the interest of allowing us to give every public agency their results, we ask that you wait until after August 1 to contact us with actuarial related questions.

If you have other questions, please call our customer contact center at (888) CalPERS or (**888-225-7377**).

Sincerely,

SCOTT TERANDO
Chief Actuary

CalPERS

Actuarial Valuation
as of June 30, 2017

for the
Miscellaneous Plan
of the
Calaveras County Water District

(CalPERS ID: 5932694906)

Required Contributions
for Fiscal Year
July 1, 2019 - June 30, 2020

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Section 1

Plan Specific Information for the Miscellaneous Plan of the Calaveras County Water District

(CalPERS ID: 5932694906)
(Rate Plan: 837)

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Actuarial Certification

Section 1 of this report is based on the member and financial data contained in our records as of June 30, 2017 which was provided by your agency and the benefit provisions under your contract with CalPERS. Section 2 of this report is based on the member and financial data as of June 30, 2017 provided by employers participating in the Miscellaneous Risk Pool to which the plan belongs and benefit provisions under the CalPERS contracts for those agencies.

As set forth in Section 2 of this report, the pool actuaries have certified that, in their opinion, the valuation of the risk pool containing your Miscellaneous Plan has been performed in accordance with generally accepted actuarial principles consistent with standards of practice prescribed by the Actuarial Standards Board, and that the assumptions and methods are internally consistent and reasonable for the risk pool as of the date of this valuation and as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

Having relied upon the information set forth in Section 2 of this report and based on the census and benefit provision information for the plan, it is my opinion as the plan actuary that Unfunded Accrued Liability amortization bases as of June 30, 2017 and employer contribution as of July 1, 2019, have been properly and accurately determined in accordance with the principles and standards stated above.

The undersigned is an actuary for CalPERS, a member of both the American Academy of Actuaries and Society of Actuaries and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Julian M Robinson

JULIAN ROBINSON, FSA, EA, MAAA
Senior Pension Actuary, CalPERS
Plan Actuary

Highlights and Executive Summary

- **Introduction**
- **Purpose of Section 1**
- **Required Employer Contributions**
- **Plan's Funded Status**
- **Projected Employer Contributions**
- **Changes Since the Prior Year's Valuation**
- **Subsequent Events**

Introduction

This report presents the results of the June 30, 2017 actuarial valuation of the Miscellaneous Plan of the Calaveras County Water District of the California Public Employees' Retirement System (CalPERS). This actuarial valuation sets the required employer contributions for Fiscal Year 2019-20.

Purpose of Section 1

This Section 1 report for the Miscellaneous Plan of the Calaveras County Water District of the California Public Employees' Retirement System (CalPERS) was prepared by the plan actuary in order to:

- Set forth the assets and accrued liabilities of this plan as of June 30, 2017;
- Determine the minimum required employer contribution for this plan for the fiscal year July 1, 2019 through June 30, 2020; and
- Provide actuarial information as of June 30, 2017 to the CalPERS Board of Administration and other interested parties.

The pension funding information presented in this report should not be used in financial reports subject to GASB Statement No. 68 for a Cost Sharing Employer Defined Benefit Pension Plan. A separate accounting valuation report for such purposes is available from CalPERS and details for ordering are available on our website.

The measurements shown in this actuarial valuation may not be applicable for other purposes. The employer should contact their actuary before disseminating any portion of this report for any reason that is not explicitly described above.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; changes in actuarial policies; and changes in plan provisions or applicable law.

California Actuarial Advisory Panel Recommendations

This report includes all the basic disclosure elements as described in the *Model Disclosure Elements for Actuarial Valuation Reports* recommended in 2011 by the California Actuarial Advisory Panel (CAAP), with the exception of including the original base amounts of the various components of the unfunded liability in the Schedule of Amortization Bases shown on page 9.

Additionally, this report includes the following "Enhanced Risk Disclosures" also recommended by the CAAP in the Model Disclosure Elements document:

- A "Deterministic Stress Test," projecting future results under different investment income scenarios
- A "Sensitivity Analysis," showing the impact on current valuation results using alternative discount rates of 6.0 percent, 7.0 percent and 8.0 percent.

Required Employer Contributions

		Fiscal Year
Required Employer Contributions		**2019-20**
Employer Normal Cost Rate		**13.182%**
Plus, Either		
1) Monthly Employer Dollar UAL Payment	**$**	**56,885.39**
Or		
2) Annual Lump Sum Prepayment Option	**$**	**659,149**

*The total minimum required employer contribution is the **sum** of the Plan's Employer Normal Cost Rate (expressed as a percentage of payroll) **plus** the Employer Unfunded Accrued Liability (UAL) Contribution Amount (billed monthly in dollars).*

*Only the UAL portion of the employer contribution can be prepaid **(which must be received in full no later than July 31)**. Plan Normal Cost contributions will be made as part of the payroll reporting process. If there is contractual cost sharing or other change, this amount will change.*

In accordance with Sections 20537 and 20572 of the Public Employees' Retirement Law, if a contracting agency fails to remit the required contributions when due, interest and penalties may apply.

		Fiscal Year 2018-19		Fiscal Year 2019-20
Development of Normal Cost as a Percentage of Payroll[1]				
Base Total Normal Cost for Formula		19.521%		20.468%
Surcharge for Class 1 Benefits[2]				
a) FAC 1		0.643%		0.668%
Phase out of Normal Cost Difference[3]		0.000%		0.000%
Plan's Total Normal Cost		20.164%		21.136%
Formula's Expected Employee Contribution Rate		7.952%		7.954%
Employer Normal Cost Rate		12.212%		13.182%
Projected Payroll for the Contribution Fiscal Year	$	4,600,143	$	4,718,162
Estimated Employer Contributions Based on Projected Payroll				
Plan's Estimated Employer Normal Cost	$	561,770	$	621,948
Plan's Payment on Amortization Bases[4]		564,813		682,625
% of Projected Payroll (illustrative only)		12.278%		14.468%
Estimated Total Employer Contribution	$	1,126,583	$	1,304,573
% of Projected Payroll (illustrative only)		24.490%		27.650%

[1] The results shown for Fiscal Year 2018-19 reflect the prior year valuation and may not take into account any lump sum payment, side fund payoff, or rate adjustment made after June 30, 2017.

[2] Section 2 of this report contains a list of Class 1 benefits and corresponding surcharges for each benefit.

[3] The normal cost difference is phased out over a five-year period. The phase out of normal cost difference is 100 percent for the first year of pooling, and is incrementally reduced by 20 percent of the original normal cost difference for each subsequent year. This is non-zero only for plans that joined a pool within the past 5 years. Most plans joined a pool June 30, 2003, when risk pooling was implemented.

[4] See page 9 for a breakdown of the Amortization Bases.

Plan's Funded Status

	June 30, 2016	June 30, 2017
1. Present Value of Projected Benefits (PVB)	$ 41,386,440	$ 44,452,862
2. Entry Age Normal Accrued Liability (AL)	35,707,446	38,216,333
3. Plan's Market Value of Assets (MVA)	25,884,352	28,447,247
4. Unfunded Accrued Liability (UAL) [(2) - (3)]	9,823,094	9,769,086
5. Funded Ratio [(3) / (2)]	72.5%	74.4%

This measure of funded status is an assessment of the need for future employer contributions based on the selected actuarial cost method used to fund the plan. The UAL is the present value of future employer contributions for service that has already been earned and is in addition to future normal cost contributions for active members. For a measure of funded status that is appropriate for assessing the sufficiency of plan assets to cover estimated termination liabilities, please see "Hypothetical Termination Liability" in the "Risk Analysis" section.

Projected Employer Contributions

The table below shows projected employer contributions (before cost sharing) for the next six fiscal years. Projected results reflect the adopted changes to the discount rate described in Appendix A, "Statement of Actuarial Data, Methods and Assumptions" of the Section 2 report. The projections also assume that all actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur during the projection period.

	Required Contribution	**Projected Future Employer Contributions (Assumes 7.25% Return for Fiscal Year 2017-18)**				
Fiscal Year	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**2023-24**	**2024-25**
Normal Cost %	13.182%	14.0%	14.0%	14.0%	14.0%	14.0%
UAL Payment	$682,625	$772,000	$879,000	$969,000	$1,019,000	$1,073,000

Changes in the UAL due to actuarial gains or losses as well as changes in actuarial assumptions or methods are amortized using a 5-year ramp up. For more information, please see "Amortization of the Unfunded Actuarial Accrued Liability" under "Actuarial Methods" in Appendix A of Section 2. This method phases in the impact of unanticipated changes in UAL over a 5-year period and attempts to minimize employer cost volatility from year to year. As a result of this methodology, dramatic changes in the required employer contributions in any one year are less likely. However, required contributions can change gradually and significantly over the next five years. In years where there is a large increase in UAL the relatively small amortization payments during the ramp up period could result in a funded ratio that is projected to decrease initially while the contribution impact of the increase in the UAL is phased in.

Due to the adopted changes in the discount rate for next year's valuation in combination with the 5-year phase-in ramp, the increases in the required contributions are expected to continue for six years from Fiscal Year 2019-20 through Fiscal Year 2024-25.

For projected contributions under alternate investment return scenarios, please see the "Analysis of Future Investment Return Scenarios" in the "Risk Analysis" section.

Changes since the Prior Year's Valuation

Benefits

None. This valuation generally reflects plan changes by amendments effective before the date of the report. Please refer to the "Plan's Major Benefit Options" and Appendix B of Section 2 for a summary of the plan provisions used in this valuation.

Actuarial Methods and Assumptions

At its December 2016 meeting, the CalPERS Board of Administration lowered the discount rate from 7.50 percent to 7.00 percent using a three-year phase-in beginning with the June 30, 2016 actuarial valuations. The minimum employer contributions for Fiscal Year 2019-20 determined in this valuation were calculated using a discount rate of 7.25 percent. The projected employer contributions on page 5 are calculated assuming that the discount rate will be lowered to 7.00 percent next year as adopted by the Board. The decision to reduce the discount rate was primarily based on reduced capital market assumptions provided by external investment consultants and CalPERS investment staff. The specific decision adopted by the Board reflected recommendations from CalPERS staff and additional input from employer and employee stakeholder groups. Based on the investment allocation adopted by the Board and capital market assumptions, the reduced discount rate assumption provides a more realistic assumption for the long-term investment return of the fund.

On December 19, 2017, the CalPERS Board of Administration adopted new actuarial assumptions based on the recommendations in the December 2017 CalPERS Experience Study and Review of Actuarial Assumptions. This study reviewed the retirement rates, termination rates, mortality rates, rates of salary increases and inflation assumption for Public Agencies. These new assumptions are incorporated in this actuarial valuation and will impact the required contribution for FY 2019-20. In addition, the Board adopted a new asset portfolio as part of its Asset Liability Management. The new asset mix supports a 7.00 percent discount rate. The reduction of the inflation assumption will be implemented in two steps in conjunction with the decreases in the discount rate. For the June 30, 2017 valuation an inflation rate of 2.625 percent will be used and a rate of 2.50 percent in the following valuation.

Notwithstanding the Board's decision to phase into a 7.0 percent discount rate, subsequent analysis of the expected investment return of CalPERS assets or changes to the investment allocation may result in a change to this three-year discount rate schedule.

Subsequent Events

The CalPERS Board of Administration has adopted a new amortization policy effective with the June 30, 2019 actuarial valuation. The new policy shortens the period over which actuarial gains and losses are amortized from 30 years to 20 years with the payments computed using a level dollar amount. In addition, the new policy removes the 5-year ramp-up and ramp-down on UAL bases attributable to assumption changes and non-investment gains/losses. The new policy removes the 5-year ramp-down on investment gains/losses. These changes will apply only to new UAL bases established on or after June 30, 2019.

For inactive employers the new amortization policy imposes a maximum amortization period of 15 years for all unfunded accrued liabilities effective June 30, 2017. Furthermore, the plan actuary has the ability to shorten the amortization period on any valuation date based on the life expectancy of plan members and projected cash flow needs to the plan. The impact of this has been reflected in the current valuation results.

The contribution requirements determined in this actuarial valuation report are based on demographic and financial information as of June 30, 2017. Changes in the value of assets subsequent to that date are not reflected. Investment returns below the assumed rate of return will increase the retired contribution, while investment returns above the assumed rate of return will decrease the retired contribution.

This actuarial valuation report reflects statutory changes, regulatory changes and CalPERS Board actions through January 2018. Any subsequent changes or actions are not reflected.

Assets and Liabilities

- **Breakdown of Entry Age Normal Accrued Liability**
- **Allocation of Plan’s Share of Pool’s Experience/Assumption Change**
- **Development of Plan’s Share of Pool’s MVA**
- **Schedule of Plan’s Amortization Bases**
- **Amortization Schedule and Alternatives**
- **Employer Contribution History**
- **Funding History**

Breakdown of Entry Age Normal Accrued Liability

Active Members	$	15,096,515
Transferred Members		1,685,882
Terminated Members		348,297
Members and Beneficiaries Receiving Payments		21,085,639
Total	$	38,216,333

Allocation of Plan's Share of Pool's Experience/Assumption Change

It is the policy of CalPERS to ensure equity within the risk pools by allocating the pool's experience gains/losses and assumption changes in a manner that treats each employer equitably and maintains benefit security for the members of the System while minimizing substantial variations in employer contributions. The Pool's experience gains/losses and impact of assumption/method changes is allocated to the plan as follows:

1.	Plan's Accrued Liability	$	38,216,333
2.	Projected UAL balance at 6/30/17		10,170,910
3.	Pool's Accrued Liability[1]	$	15,780,998,593
4.	Sum of Pool's Individual Plan UAL Balances at 6/30/17[1]		3,912,002,885
5.	Pool's 2016/17 Investment & Asset (Gain)/Loss		(413,206,167)
6.	Pool's 2016/17 Other (Gain)/Loss		(21,126,605)
7.	Plan's Share of Pool's Asset (Gain)/Loss [(1) - (2)] / [(3) - (4)] * (5)		(976,371)
8.	Plan's Share of Pool's Other (Gain)/Loss [(1)] / [(3)] * (6)		(51,162)
9.	Plan's New (Gain)/Loss as of 6/30/2017 [(7) + (8)]	$	(1,027,532)
10.	Increase in Pool's Accrued Liability due to Change in Assumptions[1]		258,379,047
11.	Plan's Share of Pool's Change in Assumptions [(1)] / [(3)] * (10)	$	625,708

[1] Does not include plans that transferred to Pool on the valuation date.

Development of the Plan's Share of Pool's Market Value of Assets

12.	Plan's UAL [(2) + (9) + (11)]	$	9,769,086
13.	Plan's Share of Pool's MVA [(1) - (12)]	$	**28,447,247**

Schedule of Plan's Amortization Bases

There is a two-year lag between the valuation date and the start of the contribution fiscal year.

- The assets, liabilities, and funded status of the plan are measured as of the valuation date: June 30, 2017.
- The employer contribution determined by the valuation is for the fiscal year beginning two years after the valuation date: Fiscal Year 2019-20.

This two-year lag is necessary due to the amount of time needed to extract and test the membership and financial data, and the need to provide public agencies with their employer contribution well in advance of the start of the fiscal year.

The Unfunded Accrued Liability (UAL) is used to determine the employer contribution and therefore must be rolled forward two years from the valuation date to the first day of the fiscal year for which the contribution is being determined. The UAL is rolled forward each year by subtracting the payment on the UAL for the fiscal year and adjusting for interest. Additional discretionary payments are reflected in the Expected Payments column in the fiscal year they were made by the agency.

								Amounts for Fiscal 2019-20	
Reason for Base	**Date Established**	**Ramp Up/Down 2019-20**	**Amortization Period**	**Balance 6/30/17**	**Payment 2017-18**	**Balance 6/30/18**	**Payment 2018-19**	**Balance 6/30/19**	**Scheduled Payment for 2019-20**
SHARE OF PRE-2013 POOL UAL	06/30/13	No Ramp	17	$3,936,651	$307,537	$3,903,568	$313,084	$3,862,342	$321,587
ASSET (GAIN)/LOSS	06/30/13	100% →	26	$3,346,809	$135,143	$3,449,496	$182,904	$3,510,166	$234,888
NON-ASSET (GAIN)/LOSS	06/30/13	100% →	26	$12,675	$512	$13,064	$693	$13,293	$890
ASSET (GAIN)/LOSS	06/30/14	80% ↗	27	$(2,676,745)	$(73,223)	$(2,794,978)	$(111,418)	$(2,882,228)	$(152,631)
NON-ASSET (GAIN)/LOSS	06/30/14	80% ↗	27	$3,009	$82	$3,142	$125	$3,240	$172
ASSUMPTION CHANGE	06/30/14	80% ↗	17	$1,735,902	$64,623	$1,794,830	$98,741	$1,822,697	$135,237
ASSET (GAIN)/LOSS	06/30/15	60% ↗	28	$1,623,398	$22,860	$1,717,420	$46,342	$1,793,940	$71,424
NON-ASSET (GAIN)/LOSS	06/30/15	60% ↗	28	$(135,244)	$(1,904)	$(143,077)	$(3,861)	$(149,452)	$(5,950)
ASSET (GAIN)/LOSS	06/30/16	40% ↗	29	$1,968,810	$0	$2,111,549	$29,301	$2,234,292	$60,217
NON-ASSET (GAIN)/LOSS	06/30/16	40% ↗	29	$(247,288)	$0	$(265,216)	$(3,680)	$(280,633)	$(7,563)
ASSUMPTION CHANGE	06/30/16	40% ↗	19	$602,933	$(19,338)	$666,672	$12,580	$701,978	$25,850
ASSET (GAIN)/LOSS	06/30/17	20% ↗	30	$(976,371)	$0	$(1,047,158)	$0	$(1,123,077)	$(15,567)
NON-ASSET (GAIN)/LOSS	06/30/17	20% ↗	30	$(51,162)	$0	$(54,871)	$0	$(58,849)	$(816)
ASSUMPTION CHANGE	06/30/17	20% ↗	20	$625,708	$(32,299)	$704,521	$(33,227)	$790,010	$14,888
TOTAL				**$9,769,085**	**$403,993**	**$10,058,962**	**$531,584**	**$10,237,719**	**$682,626**

The (gain)/loss bases are the plan's allocated share of the risk pool's (gain)/loss for the fiscal year as disclosed on the previous page. These (gain)/loss bases will be amortized according to Board policy over 30 years with a 5-year ramp-up.

If the total Unfunded Liability is negative (i.e., plan has a surplus), the scheduled payment is $0, because the minimum required contribution under PEPRA must be at least equal to the normal cost.

Amortization Schedule and Alternatives

The amortization schedule on the previous page shows the minimum contributions required according to CalPERS amortization policy. There has been considerable interest from many agencies in paying off these unfunded accrued liabilities sooner and the possible savings in doing so. As a result, we have provided alternate amortization schedules to help analyze the current amortization schedule and illustrate the advantages of accelerating unfunded liability payments.

Shown on the following page are future year amortization payments based on: 1) the current amortization schedule reflecting the individual bases and remaining periods shown on the previous page, and 2) alternate "fresh start" amortization schedules using two sample periods that would both result in interest savings relative to the current amortization schedule. Note that the payments under each alternate scenario increase by 2.875 percent for each year into the future. **The schedules do not attempt to reflect any experience after June 30, 2017 that may deviate from the actuarial assumptions. Therefore, future amortization payments displayed in the Current Amortization Schedule may not match projected amortization payments shown in connection with Projected Employer Contributions provided elsewhere in this report.**

The Current Amortization Schedule typically contains individual bases that are both positive and negative. Positive bases result from plan changes, assumption changes or plan experience that result in increases to unfunded liability. Negative bases result from plan changes, assumption changes or plan experience that result in decreases to unfunded liability. The combination of positive and negative bases within an amortization schedule can result in unusual or problematic circumstances in future years such as:

- A positive total unfunded liability with a negative total payment,
- A negative total unfunded liability with a positive total payment, or
- Total payments that completely amortize the unfunded liability over a very short period of time

In any year where one of the above scenarios occurs, the actuary will consider corrective action such as replacing the existing unfunded liability bases with a single "fresh start" base and amortizing it over a reasonable period.

The Current Amortization Schedule on the following page may appear to show that, based on the current amortization bases, one of the above scenarios will occur at some point in the future. It is impossible to know today whether such a scenario will in fact arise since there will be additional bases added to the amortization schedule in each future year. Should such a scenario arise in any future year, the actuary will take appropriate action based on guidelines in the CalPERS amortization policy.

Amortization Schedule and Alternatives

	Current Amortization Schedule		Alternate Schedules: 15 Year Amortization		Alternate Schedules: 10 Year Amortization	
Date	**Balance**	**Payment**	**Balance**	**Payment**	**Balance**	**Payment**
6/30/2019	10,237,720	682,625	10,237,720	930,925	10,237,720	1,269,675
6/30/2020	10,273,018	759,116	10,015,874	957,689	9,665,059	1,306,178
6/30/2021	10,231,659	843,998	9,750,227	985,223	9,013,077	1,343,731
6/30/2022	10,099,397	909,372	9,436,806	1,013,548	8,274,937	1,382,363
6/30/2023	9,889,843	933,843	9,071,328	1,042,688	7,443,273	1,422,106
6/30/2024	9,639,755	960,691	8,649,175	1,072,665	6,510,154	1,462,992
6/30/2025	9,343,731	988,310	8,165,372	1,103,504	5,467,043	1,505,053
6/30/2026	8,997,641	1,016,724	7,614,555	1,135,230	4,304,748	1,548,323
6/30/2027	8,597,035	1,045,955	6,990,949	1,167,868	3,013,375	1,592,837
6/30/2028	8,137,112	1,076,026	6,288,331	1,201,444	1,582,277	1,638,631
6/30/2029	7,612,703	1,106,962	5,500,001	1,235,985		
6/30/2030	7,018,236	1,138,787	4,618,745	1,271,520		
6/30/2031	6,347,712	1,171,527	3,636,798	1,308,076		
6/30/2032	5,594,669	1,156,337	2,545,802	1,345,683		
6/30/2033	4,802,762	1,139,304	1,336,762	1,384,372		
6/30/2034	3,971,082	1,100,563				
6/30/2035	3,119,225	1,035,221				
6/30/2036	2,273,277	444,539				
6/30/2037	1,977,719	410,993				
6/30/2038	1,695,472	375,151				
6/30/2039	1,429,881	359,692				
6/30/2040	1,161,045	370,033				
6/30/2041	862,008	292,699				
6/30/2042	621,380	283,763				
6/30/2043	372,560	230,981				
6/30/2044	160,363	121,455				
6/30/2045	46,210	39,672				
6/30/2046	8,475	8,777				
6/30/2047						
6/30/2048						
Totals		**20,003,116**		**17,156,418**		**14,471,888**
Interest Paid		**9,765,396**		**6,918,699**		**4,234,169**
Estimated Savings				**2,846,699**		**5,531,229**

* This schedule does not reflect the impact of adopted discount rate changes that will become effective beyond June 30, 2017. For Projected Employer Contributions, please see page 5.

Employer Contribution History

The table below provides a recent history of the required employer contributions for the plan, as determined by the annual actuarial valuation. It does not account for prepayments or benefit changes made during a fiscal year.

Fiscal Year	Employer Normal Cost	Unfunded Liability Payment ($)
2016 - 17	11.634%	$382,247
2017 - 18	11.675%	$455,629
2018 - 19	12.212%	$564,813
2019 - 20	13.182%	$682,625

Funding History

The funding history below shows the plan's actuarial accrued liability, share of the pool's market value of assets, share of the pool's unfunded liability, funded ratio, and annual covered payroll.

Valuation Date	Accrued Liability (AL)	Share of Pool's Market Value of Assets (MVA)	Plan's Share of Pool's Unfunded Liability	Funded Ratio	Annual Covered Payroll
06/30/2011	$ 24,689,869	$ 17,374,973	$ 7,314,896	70.4%	$ 4,767,494
06/30/2012	26,478,269	19,192,208	7,286,061	72.5%	4,549,070
06/30/2013	28,147,059	21,591,834	6,555,225	76.7%	4,654,277
06/30/2014	31,517,667	25,510,146	6,007,521	80.9%	4,320,373
06/30/2015	33,192,692	25,752,255	7,440,437	77.6%	4,342,774
06/30/2016	35,707,446	25,884,352	9,823,094	72.5%	4,209,783
06/30/2017	38,216,333	28,447,247	9,769,086	74.4%	4,333,545

Risk Analysis

- **Analysis of Future Investment Return Scenarios**
- **Analysis of Discount Rate Sensitivity**
- **Volatility Ratios**
- **Hypothetical Termination Liability**

Analysis of Future Investment Return Scenarios

Analysis was performed to determine the effects of various future investment returns on required employer contributions. The projections below provide a range of results based on five investment return scenarios assumed to occur during the next four fiscal years (2017-18, 2018-19, 2019-20 and 2020-21). The projections also assume that all other actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur.

Each of the five investment return scenarios assumes a return of 7.25 percent for fiscal year 2017-18. For fiscal years 2018-19, 2019-20, and 2020-21 each scenario assumes an alternate fixed annual return. The fixed return assumptions for the five scenarios are 1.0 percent, 4.0 percent, 7.0 percent, 9.0 percent and 12.0 percent.

The alternate investment returns were chosen based on stochastic analysis of possible future investment returns over the four-year period ending June 30, 2021. Using the expected returns and volatility of the asset classes in which the funds are invested, we produced five thousand stochastic outcomes for this period based on the recently completed Asset Liability Management process. We then selected annual returns that approximate the 5th, 25th, 50th, 75th, and 95th percentiles for these outcomes. For example, of all the 4-year outcomes generated in the stochastic analysis, approximately 25 percent of them had an average annual return of 4.0 percent or less.

Required contributions outside of this range are also possible. In particular, whereas it is unlikely that investment returns will average less than 1.0 percent or greater than 12.0 percent over this four-year period, the possibility of a single investment return less than 1.0 percent or greater than 12.0 percent in any given year is much greater.

Assumed Annual Return From 2018-19 through 2020-21	**Projected Employer Contributions**			
	2020-21	**2021-22**	**2022-23**	**2023-24**
1.0%				
Normal Cost	14.0%	14.0%	14.0%	14.0%
UAL Contribution	$772,000	$908,000	$1,056,000	$1,197,000
4.0%				
Normal Cost	14.0%	14.0%	14.0%	14.0%
UAL Contribution	$772,000	$893,000	$1,013,000	$1,110,000
7.0%				
Normal Cost	14.0%	14.0%	14.0%	14.0%
UAL Contribution	$772,000	$879,000	$969,000	$1,019,000
9.0%				
Normal Cost	14.0%	14.3%	14.6%	14.8%
UAL Contribution	$772,000	$870,000	$944,000	$971,000
12.0%				
Normal Cost	14.0%	14.3%	14.6%	14.8%
UAL Contribution	$772,000	$856,000	$899,000	$875,000

Given the temporary suspension of the Risk Mitigation Policy during the period over which the discount rate assumption is being phased down to 7.0 percent, the projections above were performed without reflection of any possible impact of this Policy for Fiscal Year 2020-21. In addition, the projections above do not reflect the recent changes to the new amortization policy effective with the June 30, 2019 valuation but the impact on the results above is expected to be minimal.

Analysis of Discount Rate Sensitivity

Shown below are various valuation results as of June 30, 2017 assuming alternate discount rates. Results are shown using the current discount rate of 7.25 percent as well as alternate discount rates of 6.0 percent, 7.0 percent, and 8.0 percent. The alternate rate of 7.0 percent was selected since the Board has adopted this rate as the final discount rate at the end of the three-year phase-in of the reduction in this assumption. The rates of 6.0 percent and 8.0 percent were selected since they illustrate the impact of a 1 percent increase or decrease to the 7.0 percent assumption. This analysis shows the potential plan impacts if the PERF were to realize investment returns of 6.0 percent, 7.0 percent, or 8.0 percent over the long-term.

This type of analysis gives the reader a sense of the long-term risk to required contributions. For a measure of funded status that is appropriate for assessing the sufficiency of plan assets to cover estimated termination liabilities, please see "Hypothetical Termination Liability" at the end of this section.

Sensitivity Analysis				
As of June 30, 2017	**Plan's Total Normal Cost**	**Accrued Liability**	**Unfunded Accrued Liability**	**Funded Status**
7.25% (current discount rate)	21.136%	$38,216,333	$9,769,086	74.4%
6.0%	27.420%	$44,566,366	$16,119,119	63.8%
7.0%	21.979%	$39,265,608	$10,818,361	72.4%
8.0%	17.817%	$34,870,210	$6,422,963	81.6%

Volatility Ratios

Actuarial calculations are based on a number of assumptions about long-term demographic and economic behavior. Unless these assumptions (terminations, deaths, disabilities, retirements, salary growth, and investment return) are exactly realized each year, there will be differences on a year-to-year basis. The year-to-year differences between actual experience and the assumptions are called actuarial gains and losses and serve to lower or raise required employer contributions from one year to the next. Therefore, employer contributions will inevitably fluctuate, especially due to the ups and downs of investment returns.

Asset Volatility Ratio (AVR)

Plans that have higher asset-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to investment return. For example, a plan with an asset-to-payroll ratio of 8 may experience twice the contribution volatility due to investment return volatility, than a plan with an asset-to-payroll ratio of 4. Shown below is the asset volatility ratio, a measure of the plan's current contribution volatility. It should be noted that this ratio is a measure of the current situation. It increases over time but generally tends to stabilize as the plan matures.

Liability Volatility Ratio (LVR)

Plans that have higher liability-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to investment return and changes in liability. For example, a plan with a liability-to-payroll ratio of 8 is expected to have twice the contribution volatility of a plan with a liability-to-payroll ratio of 4. The liability volatility ratio is also shown in the table below. It should be noted that this ratio indicates a longer-term potential for contribution volatility. The asset volatility ratio, described above, will tend to move closer to the liability volatility ratio as the plan matures. Since the liability volatility ratio is a long-term measure, it is shown below at the current discount rate (7.25 percent) as well as the discount rate the Board has adopted to determine the contribution requirement in the June 30, 2018 actuarial valuation (7.00 percent).

Rate Volatility		As of June 30, 2017
1. Market Value of Assets	$	28,447,247
2. Payroll		4,333,545
3. Asset Volatility Ratio (AVR) [(1) / (2)]		6.6
4. Accrued Liability	$	38,216,333
5. Liability Volatility Ratio (LVR) [(4) / (2)]		8.8
6. Accrued Liability (7.00% discount rate)		39,265,608
7. Projected Liability Volatility Ratio [(6) / (2)]		9.1

Hypothetical Termination Liability

The hypothetical termination liability is an estimate of the financial position of the plan had the contract with CalPERS been terminated as of June 30, 2017. The plan liability on a termination basis is calculated differently compared to the plan's ongoing funding liability. For the hypothetical termination liability calculation, both compensation and service are frozen as of the valuation date and no future pay increases or service accruals are assumed. This measure of funded status is not appropriate for assessing the need for future employer contributions in the case of an ongoing plan, that is, for an employer that continues to provide CalPERS retirement benefits to active employees.

A more conservative investment policy and asset allocation strategy was adopted by the CalPERS Board for the Terminated Agency Pool. The Terminated Agency Pool has limited funding sources since no future employer contributions will be made. Therefore, expected benefit payments are secured by risk-free assets and benefit security for members is increased while funding risk is limited. However, this asset allocation has a lower expected rate of return than the PERF and consequently, a lower discount rate is assumed. The lower discount rate for the Terminated Agency Pool results in higher liabilities for terminated plans.

The effective termination discount rate will depend on actual market rates of return for risk-free securities on the date of termination. As market discount rates are variable, the table below shows a range for the hypothetical termination liability based on the lowest and highest interest rates observed during an approximate 2-year period centered around the valuation date.

Market Value of Assets (MVA)	Hypothetical Termination Liability[1,2] @ 1.75%	Funded Status	Unfunded Termination Liability @ 1.75%	Hypothetical Termination Liability[1,2] @ 3.00%	Funded Status	Unfunded Termination Liability @ 3.00%
$28,447,247	$73,144,783	38.9%	$44,697,536	$65,052,205	43.7%	$36,604,958

[1] The hypothetical liabilities calculated above include a 5 percent mortality contingency load in accordance with Board policy. Other actuarial assumptions can be found in Appendix A.

[2] The current discount rate assumption used for termination valuations is a weighted average of the 10-year and 30-year U.S. Treasury yields where the weights are based on matching asset and liability durations as of the termination date. The discount rates used in the table are based on 20-year Treasury bonds, rounded to the nearest quarter percentage point, which is a good proxy for most plans. The 20-year Treasury yield was 2.61 percent on June 30, 2017, and was 2.83 percent on January 31, 2018.

In order to terminate the plan, you must first contact our Retirement Services Contract Unit to initiate a Resolution of Intent to terminate. The completed Resolution will allow the plan actuary to give you a preliminary termination valuation with a more up-to-date estimate of the plan liabilities. CalPERS advises you to consult with the plan actuary before beginning this process.

Participant Data

The table below shows a summary of your plan's member data upon which this valuation is based:

	June 30, 2016	June 30, 2017
Reported Payroll	$ 4,209,783	$ 4,333,545
Projected Payroll for Contribution Purposes	$ 4,600,143	$ 4,718,162
Number of Members		
Active	53	52
Transferred	21	19
Separated	25	24
Retired	72	76

List of Class 1 Benefit Provisions

This plan has the additional Class 1 Benefit Provisions:

- One Year Final Compensation (FAC 1)

Plan’s Major Benefit Options

Plan's Major Benefit Options

Shown below is a summary of the major optional benefits for which your agency has contracted. A description of principal standard and optional plan provisions is in Appendix B within Section 2 of this report.

	Contract package			
Benefit Provision	Active Misc	Inactive Misc	Receiving Misc	
Benefit Formula	2.7% @ 55	2.0% @ 55		
Social Security Coverage	Yes	Yes		
Full/Modified	Modified	Modified		
Employee Contribution Rate	8.00%			
Final Average Compensation Period	One Year	One Year		
Sick Leave Credit	Yes	Yes		
Non-Industrial Disability	Standard	Standard		
Industrial Disability	No	No		
Pre-Retirement Death Benefits				
Optional Settlement 2	Yes	Yes		
1959 Survivor Benefit Level	No	No		
Special	No	No		
Alternate (firefighters)	No	No	No	
Post-Retirement Death Benefits				
Lump Sum	$600	$600	$600	
Survivor Allowance (PRSA)	No	No	No	
COLA	2%	2%	2%	

Section 2

CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

Section 2 may be found on the CalPERS website (www.calpers.ca.gov) in the Forms and Publications section

California Public Employees' Retirement System
Actuarial Office
P.O. Box 942709
Sacramento, CA 94229-2709
TTY: (916) 795-3240
(888) 225-7377 phone – (916) 795-2744 fax
www.calpers.ca.gov

August 2018

PEPRA Miscellaneous Plan of the Calaveras County Water District
(CalPERS ID: 5932694906)
Annual Valuation Report as of June 30, 2017

Dear Employer,

As an attachment to this letter, you will find a copy of the June 30, 2017 actuarial valuation report of the pension plan.

Because this plan is in a risk pool, the following valuation report has been separated into two sections:

- Section 1 contains specific information for the plan including the development of the current and projected employer contributions, and
- Section 2 contains the Risk Pool Actuarial Valuation appropriate to the plan as of June 30, 2017.

Section 2 can be found on the CalPERS website at (www.calpers.ca.gov). From the home page, go to "*Forms & Publications*" and select "*View All*". In the search box, enter "*Risk Pool*" and from the results list download the Miscellaneous or Safety Risk Pool Actuarial Valuation Report as appropriate.

Your June 30, 2017 actuarial valuation report contains important actuarial information about your pension plan at CalPERS. Your assigned CalPERS staff actuary, whose signature appears in the Actuarial Certification section on page 1, is available to discuss the report with you after August 1, 2018.

The exhibit below displays the minimum employer contributions, before any cost sharing, for Fiscal Year 2019-20 along with estimates of the required contributions for Fiscal Year 2020-21. Member contributions other than cost sharing (whether paid by the employer or the employee) are in addition to the results shown below. **The employer contributions in this report do not reflect any cost sharing arrangements you may have with your employees**.

Required Contribution

Fiscal Year	Employer Normal Cost Rate	Employer Payment of Unfunded Liability
2019-20	6.985%	$5,113
Projected Results		
2020-21	*7.5%*	*$5,500*

The actual investment return for Fiscal Year 2017-18 was not known at the time this report was prepared. The projections above assume the investment return for that year would be 7.25 percent. ***If the actual investment return for Fiscal Year 2017-18 differs from 7.25 percent, the actual contribution requirements for the projected years will differ from those shown above.***

Moreover, the projected results for Fiscal Year 2020-21 assume that there are no future plan changes, no further changes in assumptions other than those recently approved, and no liability gains or losses. Such changes can have a significant impact on required contributions. Since they cannot be predicted in advance, the projected employer results shown above are estimates. The actual required employer contributions for Fiscal Year 2020-21 will be provided in next year's report.

For additional details regarding the assumptions and methods used for these projections please refer to the "Projected Employer Contributions" in the "Highlights and Executive Summary" section.

The "Risk Analysis" section of the valuation report also contains estimated employer contributions in future years under a variety of investment return scenarios.

Changes since the Prior Year's Valuation

At its December 2016 meeting, the CalPERS Board of Administration lowered the discount rate from 7.50 percent to 7.00 percent using a three-year phase-in beginning with the June 30, 2016 actuarial valuations. The minimum employer contributions for Fiscal Year 2019-20 determined in this valuation were calculated using a discount rate of 7.25 percent. The projected employer contributions on Page 5 are calculated under the assumption that the discount rate will be lowered to 7.00 percent next year as adopted by the Board.

On December 19, 2017, the CalPERS Board of Administration adopted new actuarial assumptions based on the recommendations in the December 2017 CalPERS Experience Study and Review of Actuarial Assumptions. This study reviewed the retirement rates, termination rates, mortality rates, rates of salary increases and inflation assumption for Public Agencies. These new assumptions are incorporated in your actuarial valuations and will impact the required contribution for FY 2019-20. In addition, the Board adopted a new asset portfolio as part of its Asset Liability Management. The new asset mix supports a 7.00 percent discount rate. The reduction of the inflation assumption will be implemented in two steps in conjunction with the decreases in the discount rate. For the June 30, 2017 valuation an inflation rate of 2.625 percent was used and a rate of 2.50 percent will be used in the following valuation.

The CalPERS Board of Administration has adopted a new amortization policy effective with the June 30, 2019 actuarial valuation. The new policy shortens the period over which actuarial gains and losses are amortized from 30 years to 20 years with the payments computed using a level dollar amount. In addition, the new policy removes the 5-year ramp-up and ramp-down on UAL bases attributable to assumption changes and non-investment gains/losses. The new policy removes the 5-year ramp-down on investment gains/losses. These changes will apply only to new UAL bases established on or after June 30, 2019.

For inactive employers the new amortization policy imposes a maximum amortization period of 15 years for all unfunded accrued liabilities effective June 30, 2017. Furthermore, the plan actuary has the ability to shorten the amortization period on any valuation date based on the life expectancy of plan members and projected cash flow needs to the plan. The impact of this has been reflected in the current valuation results.

The CalPERS Board of Administration adopted a Risk Mitigation Policy which is designed to reduce funding risk over time. This Policy has been temporarily suspended during the period over which the discount rate is being lowered. More details on the Risk Mitigation Policy can be found on our website.

Besides the above noted changes, there may also be changes specific to the plan such as contract amendments and funding changes.

Further descriptions of general changes are included in the "Highlights and Executive Summary" section and in Appendix A, "Statement of Actuarial Data, Methods and Assumptions" of the Section 2 report.

We understand that you might have a number of questions about these results. While we are very interested in discussing these results with your agency, in the interest of allowing us to give every public agency their results, we ask that you wait until after August 1 to contact us with actuarial related questions.

If you have other questions, please call our customer contact center at (888) CalPERS or (**888-225-7377**).

Sincerely,

SCOTT TERANDO
Chief Actuary

Actuarial Valuation
as of June 30, 2017

for the
PEPRA Miscellaneous Plan
of the
Calaveras County Water District

(CalPERS ID: 5932694906)

Required Contributions
for Fiscal Year
July 1, 2019 - June 30, 2020

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Section 1

CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

Plan Specific Information for the PEPRA Miscellaneous Plan of the Calaveras County Water District

(CalPERS ID: 5932694906)
(Rate Plan: 27373)

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Actuarial Certification

Section 1 of this report is based on the member and financial data contained in our records as of June 30, 2017 which was provided by your agency and the benefit provisions under your contract with CalPERS. Section 2 of this report is based on the member and financial data as of June 30, 2017 provided by employers participating in the Miscellaneous Risk Pool to which the plan belongs and benefit provisions under the CalPERS contracts for those agencies.

As set forth in Section 2 of this report, the pool actuaries have certified that, in their opinion, the valuation of the risk pool containing your PEPRA Miscellaneous Plan has been performed in accordance with generally accepted actuarial principles consistent with standards of practice prescribed by the Actuarial Standards Board, and that the assumptions and methods are internally consistent and reasonable for the risk pool as of the date of this valuation and as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

Having relied upon the information set forth in Section 2 of this report and based on the census and benefit provision information for the plan, it is my opinion as the plan actuary that Unfunded Accrued Liability amortization bases as of June 30, 2017 and employer contribution as of July 1, 2019, have been properly and accurately determined in accordance with the principles and standards stated above.

The undersigned is an actuary for CalPERS, a member of both the American Academy of Actuaries and Society of Actuaries and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Julian M Robinson

JULIAN ROBINSON, FSA, EA, MAAA
Senior Pension Actuary, CalPERS
Plan Actuary

Highlights and Executive Summary

- **Introduction**
- **Purpose of Section 1**
- **Required Employer Contributions**
- **Plan’s Funded Status**
- **Projected Employer Contributions**
- **Changes Since the Prior Year’s Valuation**
- **Subsequent Events**

Introduction

This report presents the results of the June 30, 2017 actuarial valuation of the PEPRA Miscellaneous Plan of the Calaveras County Water District of the California Public Employees' Retirement System (CalPERS). This actuarial valuation sets the required employer contributions for Fiscal Year 2019-20.

Purpose of Section 1

This Section 1 report for the PEPRA Miscellaneous Plan of the Calaveras County Water District of the California Public Employees' Retirement System (CalPERS) was prepared by the plan actuary in order to:

- Set forth the assets and accrued liabilities of this plan as of June 30, 2017;
- Determine the minimum required employer contribution for this plan for the fiscal year July 1, 2019 through June 30, 2020; and
- Provide actuarial information as of June 30, 2017 to the CalPERS Board of Administration and other interested parties.

The pension funding information presented in this report should not be used in financial reports subject to GASB Statement No. 68 for a Cost Sharing Employer Defined Benefit Pension Plan. A separate accounting valuation report for such purposes is available from CalPERS and details for ordering are available on our website.

The measurements shown in this actuarial valuation may not be applicable for other purposes. The employer should contact their actuary before disseminating any portion of this report for any reason that is not explicitly described above.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; changes in actuarial policies; and changes in plan provisions or applicable law.

California Actuarial Advisory Panel Recommendations

This report includes all the basic disclosure elements as described in the *Model Disclosure Elements for Actuarial Valuation Reports* recommended in 2011 by the California Actuarial Advisory Panel (CAAP), with the exception of including the original base amounts of the various components of the unfunded liability in the Schedule of Amortization Bases shown on page 9.

Additionally, this report includes the following "Enhanced Risk Disclosures" also recommended by the CAAP in the Model Disclosure Elements document:

- A "Deterministic Stress Test," projecting future results under different investment income scenarios
- A "Sensitivity Analysis," showing the impact on current valuation results using alternative discount rates of 6.0 percent, 7.0 percent and 8.0 percent.

Required Employer Contributions

		Fiscal Year
Required Employer Contributions		**2019-20**
Employer Normal Cost Rate		**6.985%**
Plus, Either		
1) Monthly Employer Dollar UAL Payment	**$**	**426.12**
Or		
2) Annual Lump Sum Prepayment Option	**$**	**4,938**

The total minimum required employer contribution is the ***sum*** *of the Plan's Employer Normal Cost Rate (expressed as a percentage of payroll)* ***plus*** *the Employer Unfunded Accrued Liability (UAL) Contribution Amount (billed monthly in dollars).*

Only the UAL portion of the employer contribution can be prepaid ***(which must be received in full no later than July 31)****. Plan Normal Cost contributions will be made as part of the payroll reporting process. If there is contractual cost sharing or other change, this amount will change.*

In accordance with Sections 20537 and 20572 of the Public Employees' Retirement Law, if a contracting agency fails to remit the required contributions when due, interest and penalties may apply.

		Fiscal Year 2018-19		Fiscal Year 2019-20
Development of Normal Cost as a Percentage of Payroll[1]				
Base Total Normal Cost for Formula		13.092%		13.735%
Surcharge for Class 1 Benefits[2]				
None		0.000%		0.000%
Phase out of Normal Cost Difference[3]		0.000%		0.000%
Plan's Total Normal Cost		13.092%		13.735%
Plan's Employee Contribution Rate		6.250%		6.750%
Employer Normal Cost Rate		6.842%		6.985%
Projected Payroll for the Contribution Fiscal Year	$	533,865	$	682,286
Estimated Employer Contributions Based on Projected Payroll				
Plan's Estimated Employer Normal Cost	$	36,527	$	47,658
Plan's Payment on Amortization Bases[4]		340		5,113
% of Projected Payroll (illustrative only)		0.064%		0.749%
Estimated Total Employer Contribution	$	36,867	$	52,771
% of Projected Payroll (illustrative only)		6.906%		7.735%

[1] The results shown for Fiscal Year 2018-19 reflect the prior year valuation and may not take into account any lump sum payment, side fund payoff, or rate adjustment made after June 30, 2017.

[2] Section 2 of this report contains a list of Class 1 benefits and corresponding surcharges for each benefit.

[3] The normal cost difference is phased out over a five-year period. The phase out of normal cost difference is 100 percent for the first year of pooling, and is incrementally reduced by 20 percent of the original normal cost difference for each subsequent year. This is non-zero only for plans that joined a pool within the past 5 years. Most plans joined a pool June 30, 2003, when risk pooling was implemented.

[4] See page 9 for a breakdown of the Amortization Bases.

Plan's Funded Status

	June 30, 2016	June 30, 2017
1. Present Value of Projected Benefits (PVB)	$ 676,411	$ 1,014,249
2. Entry Age Normal Accrued Liability (AL)	92,583	191,927
3. Plan's Market Value of Assets (MVA)	83,013	182,769
4. Unfunded Accrued Liability (UAL) [(2) - (3)]	9,570	9,158
5. Funded Ratio [(3) / (2)]	89.7%	95.2%

This measure of funded status is an assessment of the need for future employer contributions based on the selected actuarial cost method used to fund the plan. The UAL is the present value of future employer contributions for service that has already been earned and is in addition to future normal cost contributions for active members. For a measure of funded status that is appropriate for assessing the sufficiency of plan assets to cover estimated termination liabilities, please see "Hypothetical Termination Liability" in the "Risk Analysis" section.

Projected Employer Contributions

The table below shows projected employer contributions (before cost sharing) for the next six fiscal years. Projected results reflect the adopted changes to the discount rate described in Appendix A, "Statement of Actuarial Data, Methods and Assumptions" of the Section 2 report. The projections also assume that all actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur during the projection period.

	Required Contribution	Projected Future Employer Contributions (Assumes 7.25% Return for Fiscal Year 2017-18)				
Fiscal Year	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**2023-24**	**2024-25**
Normal Cost %	6.985%	7.5%	7.5%	7.5%	7.5%	7.5%
UAL Payment	$5,113	$5,500	$6,000	$6,400	$6,900	$1,700

Changes in the UAL due to actuarial gains or losses as well as changes in actuarial assumptions or methods are amortized using a 5-year ramp up. For more information, please see "Amortization of the Unfunded Actuarial Accrued Liability" under "Actuarial Methods" in Appendix A of Section 2. This method phases in the impact of unanticipated changes in UAL over a 5-year period and attempts to minimize employer cost volatility from year to year. As a result of this methodology, dramatic changes in the required employer contributions in any one year are less likely. However, required contributions can change gradually and significantly over the next five years. In years where there is a large increase in UAL the relatively small amortization payments during the ramp up period could result in a funded ratio that is projected to decrease initially while the contribution impact of the increase in the UAL is phased in.

Due to the adopted changes in the discount rate for next year's valuation in combination with the 5-year phase-in ramp, the increases in the required contributions are expected to continue for six years from Fiscal Year 2019-20 through Fiscal Year 2024-25.

For projected contributions under alternate investment return scenarios, please see the "Analysis of Future Investment Return Scenarios" in the "Risk Analysis" section.

Changes since the Prior Year's Valuation

Benefits

None. This valuation generally reflects plan changes by amendments effective before the date of the report. Please refer to the "Plan's Major Benefit Options" and Appendix B of Section 2 for a summary of the plan provisions used in this valuation.

Actuarial Methods and Assumptions

At its December 2016 meeting, the CalPERS Board of Administration lowered the discount rate from 7.50 percent to 7.00 percent using a three-year phase-in beginning with the June 30, 2016 actuarial valuations. The minimum employer contributions for Fiscal Year 2019-20 determined in this valuation were calculated using a discount rate of 7.25 percent. The projected employer contributions on page 5 are calculated assuming that the discount rate will be lowered to 7.00 percent next year as adopted by the Board. The decision to reduce the discount rate was primarily based on reduced capital market assumptions provided by external investment consultants and CalPERS investment staff. The specific decision adopted by the Board reflected recommendations from CalPERS staff and additional input from employer and employee stakeholder groups. Based on the investment allocation adopted by the Board and capital market assumptions, the reduced discount rate assumption provides a more realistic assumption for the long-term investment return of the fund.

On December 19, 2017, the CalPERS Board of Administration adopted new actuarial assumptions based on the recommendations in the December 2017 CalPERS Experience Study and Review of Actuarial Assumptions. This study reviewed the retirement rates, termination rates, mortality rates, rates of salary increases and inflation assumption for Public Agencies. These new assumptions are incorporated in this actuarial valuation and will impact the required contribution for FY 2019-20. In addition, the Board adopted a new asset portfolio as part of its Asset Liability Management. The new asset mix supports a 7.00 percent discount rate. The reduction of the inflation assumption will be implemented in two steps in conjunction with the decreases in the discount rate. For the June 30, 2017 valuation an inflation rate of 2.625 percent will be used and a rate of 2.50 percent in the following valuation.

Notwithstanding the Board's decision to phase into a 7.0 percent discount rate, subsequent analysis of the expected investment return of CalPERS assets or changes to the investment allocation may result in a change to this three-year discount rate schedule.

Subsequent Events

The CalPERS Board of Administration has adopted a new amortization policy effective with the June 30, 2019 actuarial valuation. The new policy shortens the period over which actuarial gains and losses are amortized from 30 years to 20 years with the payments computed using a level dollar amount. In addition, the new policy removes the 5-year ramp-up and ramp-down on UAL bases attributable to assumption changes and non-investment gains/losses. The new policy removes the 5-year ramp-down on investment gains/losses. These changes will apply only to new UAL bases established on or after June 30, 2019.

For inactive employers the new amortization policy imposes a maximum amortization period of 15 years for all unfunded accrued liabilities effective June 30, 2017. Furthermore, the plan actuary has the ability to shorten the amortization period on any valuation date based on the life expectancy of plan members and projected cash flow needs to the plan. The impact of this has been reflected in the current valuation results.

The contribution requirements determined in this actuarial valuation report are based on demographic and financial information as of June 30, 2017. Changes in the value of assets subsequent to that date are not reflected. Investment returns below the assumed rate of return will increase the retired contribution, while investment returns above the assumed rate of return will decrease the retired contribution.

This actuarial valuation report reflects statutory changes, regulatory changes and CalPERS Board actions through January 2018. Any subsequent changes or actions are not reflected.

Assets and Liabilities

- **Breakdown of Entry Age Normal Accrued Liability**
- **Allocation of Plan's Share of Pool's Experience/Assumption Change**
- **Development of Plan's Share of Pool's MVA**
- **Schedule of Plan's Amortization Bases**
- **Amortization Schedule and Alternatives**
- **Employer Contribution History**
- **Funding History**

Breakdown of Entry Age Normal Accrued Liability

Active Members	$	191,927
Transferred Members		0
Terminated Members		0
Members and Beneficiaries Receiving Payments		0
Total	$	191,927

Allocation of Plan's Share of Pool's Experience/Assumption Change

It is the policy of CalPERS to ensure equity within the risk pools by allocating the pool's experience gains/losses and assumption changes in a manner that treats each employer equitably and maintains benefit security for the members of the System while minimizing substantial variations in employer contributions. The Pool's experience gains/losses and impact of assumption/method changes is allocated to the plan as follows:

1.	Plan's Accrued Liability	$	191,927
2.	Projected UAL balance at 6/30/17		12,518
3.	Pool's Accrued Liability[1]	$	15,780,998,593
4.	Sum of Pool's Individual Plan UAL Balances at 6/30/17[1]		3,912,002,885
5.	Pool's 2016/17 Investment & Asset (Gain)/Loss		(413,206,167)
6.	Pool's 2016/17 Other (Gain)/Loss		(21,126,605)
7.	Plan's Share of Pool's Asset (Gain)/Loss [(1) - (2)] / [(3) - (4)] * (5)		(6,246)
8.	Plan's Share of Pool's Other (Gain)/Loss [(1)] / [(3)] * (6)		(257)
9.	Plan's New (Gain)/Loss as of 6/30/2017 [(7) + (8)]	$	(6,503)
10.	Increase in Pool's Accrued Liability due to Change in Assumptions[1]		258,379,047
11.	Plan's Share of Pool's Change in Assumptions [(1)] / [(3)] * (10)	$	3,142

[1] Does not include plans that transferred to Pool on the valuation date.

Development of the Plan's Share of Pool's Market Value of Assets

12.	Plan's UAL [(2) + (9) + (11)]	$	9,158
13.	Plan's Share of Pool's MVA [(1) - (12)]	$	**182,769**

Schedule of Plan's Amortization Bases

There is a two-year lag between the valuation date and the start of the contribution fiscal year.

- The assets, liabilities, and funded status of the plan are measured as of the valuation date: June 30, 2017.
- The employer contribution determined by the valuation is for the fiscal year beginning two years after the valuation date: Fiscal Year 2019-20.

This two-year lag is necessary due to the amount of time needed to extract and test the membership and financial data, and the need to provide public agencies with their employer contribution well in advance of the start of the fiscal year.

The Unfunded Accrued Liability (UAL) is used to determine the employer contribution and therefore must be rolled forward two years from the valuation date to the first day of the fiscal year for which the contribution is being determined. The UAL is rolled forward each year by subtracting the payment on the UAL for the fiscal year and adjusting for interest. Additional discretionary payments are reflected in the Expected Payments column in the fiscal year they were made by the agency.

								Amounts for Fiscal 2019-20	
Reason for Base	**Date Established**	**Ramp Up/Down 2019-20**	**Amortization Period**	**Balance 6/30/17**	**Payment 2017-18**	**Balance 6/30/18**	**Payment 2018-19**	**Balance 6/30/19**	**Scheduled Payment for 2019-20**
FRESH START	06/30/17	No Ramp	5	$9,158	$(6,840)	$16,905	$(4,465)	$22,754	$5,113
TOTAL				**$9,158**	**$(6,840)**	**$16,905**	**$(4,465)**	**$22,754**	**$5,113**

The (gain)/loss bases are the plan's allocated share of the risk pool's (gain)/loss for the fiscal year as disclosed on the previous page. These (gain)/loss bases will be amortized according to Board policy over 30 years with a 5-year ramp-up.

If the total Unfunded Liability is negative (i.e., plan has a surplus), the scheduled payment is $0, because the minimum required contribution under PEPRA must be at least equal to the normal cost.

Amortization Schedule and Alternatives

The amortization schedule on the previous page shows the minimum contributions required according to CalPERS amortization policy. There has been considerable interest from many agencies in paying off these unfunded accrued liabilities sooner and the possible savings in doing so. As a result, we have provided alternate amortization schedules to help analyze the current amortization schedule and illustrate the advantages of accelerating unfunded liability payments.

Shown on the following page are future year amortization payments based on: 1) the current amortization schedule reflecting the individual bases and remaining periods shown on the previous page, and 2) alternate "fresh start" amortization schedules using two sample periods that would both result in interest savings relative to the current amortization schedule. Note that the payments under each alternate scenario increase by 2.875 percent for each year into the future. **The schedules do not attempt to reflect any experience after June 30, 2017 that may deviate from the actuarial assumptions. Therefore, future amortization payments displayed in the Current Amortization Schedule may not match projected amortization payments shown in connection with Projected Employer Contributions provided elsewhere in this report.**

The Current Amortization Schedule typically contains individual bases that are both positive and negative. Positive bases result from plan changes, assumption changes or plan experience that result in increases to unfunded liability. Negative bases result from plan changes, assumption changes or plan experience that result in decreases to unfunded liability. The combination of positive and negative bases within an amortization schedule can result in unusual or problematic circumstances in future years such as:

- A positive total unfunded liability with a negative total payment,
- A negative total unfunded liability with a positive total payment, or
- Total payments that completely amortize the unfunded liability over a very short period of time

In any year where one of the above scenarios occurs, the actuary will consider corrective action such as replacing the existing unfunded liability bases with a single "fresh start" base and amortizing it over a reasonable period.

The Current Amortization Schedule on the following page may appear to show that, based on the current amortization bases, one of the above scenarios will occur at some point in the future. It is impossible to know today whether such a scenario will in fact arise since there will be additional bases added to the amortization schedule in each future year. Should such a scenario arise in any future year, the actuary will take appropriate action based on guidelines in the CalPERS amortization policy.

Amortization Schedule and Alternatives

			Alternate Schedules			
	Current Amortization Schedule		0 Year Amortization		0 Year Amortization	
Date	**Balance**	**Payment**	**Balance**	**Payment**	**Balance**	**Payment**
6/30/2019	22,755	5,114	N/A	N/A	N/A	N/A
6/30/2020	19,109	5,261				
6/30/2021	15,046	5,412				
6/30/2022	10,533	5,567				
6/30/2023	5,530	5,727				
6/30/2024						
6/30/2025						
6/30/2026						
6/30/2027						
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6/30/2043						
6/30/2044						
6/30/2045						
6/30/2046						
6/30/2047						
6/30/2048						
Totals		**27,081**		**N/A**		**N/A**
Interest Paid		**4,326**		**N/A**		**N/A**
Estimated Savings				**N/A**		**N/A**

* This schedule does not reflect the impact of adopted discount rate changes that will become effective beyond June 30, 2017. For Projected Employer Contributions, please see page 5.

Employer Contribution History

The table below provides a recent history of the required employer contributions for the plan, as determined by the annual actuarial valuation. It does not account for prepayments or benefit changes made during a fiscal year.

Fiscal Year	Employer Normal Cost	Unfunded Liability Payment ($)
2016 - 17	6.555%	$15
2017 - 18	6.533%	$75
2018 - 19	6.842%	$340
2019 - 20	6.985%	$5,113

Funding History

The funding history below shows the plan's actuarial accrued liability, share of the pool's market value of assets, share of the pool's unfunded liability, funded ratio, and annual covered payroll.

Valuation Date	Accrued Liability (AL)	Share of Pool's Market Value of Assets (MVA)	Plan's Share of Pool's Unfunded Liability	Funded Ratio	Annual Covered Payroll
06/30/2013	$ 677	$ 908	$ (231)	134.1%	$ 45,084
06/30/2014	7,557	8,163	(606)	108.0%	179,333
06/30/2015	32,282	30,469	1,813	94.4%	324,741
06/30/2016	92,583	83,013	9,570	89.7%	488,562
06/30/2017	191,927	182,769	9,158	95.2%	626,667

Risk Analysis

- **Analysis of Future Investment Return Scenarios**
- **Analysis of Discount Rate Sensitivity**
- **Volatility Ratios**
- **Hypothetical Termination Liability**

Analysis of Future Investment Return Scenarios

Analysis was performed to determine the effects of various future investment returns on required employer contributions. The projections below provide a range of results based on five investment return scenarios assumed to occur during the next four fiscal years (2017-18, 2018-19, 2019-20 and 2020-21). The projections also assume that all other actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur.

Each of the five investment return scenarios assumes a return of 7.25 percent for fiscal year 2017-18. For fiscal years 2018-19, 2019-20, and 2020-21 each scenario assumes an alternate fixed annual return. The fixed return assumptions for the five scenarios are 1.0 percent, 4.0 percent, 7.0 percent, 9.0 percent and 12.0 percent.

The alternate investment returns were chosen based on stochastic analysis of possible future investment returns over the four-year period ending June 30, 2021. Using the expected returns and volatility of the asset classes in which the funds are invested, we produced five thousand stochastic outcomes for this period based on the recently completed Asset Liability Management process. We then selected annual returns that approximate the 5th, 25th, 50th, 75th, and 95th percentiles for these outcomes. For example, of all the 4-year outcomes generated in the stochastic analysis, approximately 25 percent of them had an average annual return of 4.0 percent or less.

Required contributions outside of this range are also possible. In particular, whereas it is unlikely that investment returns will average less than 1.0 percent or greater than 12.0 percent over this four-year period, the possibility of a single investment return less than 1.0 percent or greater than 12.0 percent in any given year is much greater.

Assumed Annual Return From 2018-19 through 2020-21	**Projected Employer Contributions**			
	2020-21	**2021-22**	**2022-23**	**2023-24**
1.0%				
Normal Cost	7.5%	7.5%	7.5%	7.5%
UAL Contribution	$5,500	$6,200	$7,000	$8,100
4.0%				
Normal Cost	7.5%	7.5%	7.5%	7.5%
UAL Contribution	$5,500	$6,100	$6,700	$7,500
7.0%				
Normal Cost	7.5%	7.5%	7.5%	7.5%
UAL Contribution	$5,500	$6,000	$6,400	$6,900
9.0%				
Normal Cost	7.5%	7.7%	7.9%	7.3%
UAL Contribution	$5,500	$5,900	$6,300	$6,700
12.0%				
Normal Cost	7.5%	7.7%	7.9%	7.3%
UAL Contribution	$5,500	$5,800	$1,700	$0

Given the temporary suspension of the Risk Mitigation Policy during the period over which the discount rate assumption is being phased down to 7.0 percent, the projections above were performed without reflection of any possible impact of this Policy for Fiscal Year 2020-21. In addition, the projections above do not reflect the recent changes to the new amortization policy effective with the June 30, 2019 valuation but the impact on the results above is expected to be minimal.

Analysis of Discount Rate Sensitivity

Shown below are various valuation results as of June 30, 2017 assuming alternate discount rates. Results are shown using the current discount rate of 7.25 percent as well as alternate discount rates of 6.0 percent, 7.0 percent, and 8.0 percent. The alternate rate of 7.0 percent was selected since the Board has adopted this rate as the final discount rate at the end of the three-year phase-in of the reduction in this assumption. The rates of 6.0 percent and 8.0 percent were selected since they illustrate the impact of a 1 percent increase or decrease to the 7.0 percent assumption. This analysis shows the potential plan impacts if the PERF were to realize investment returns of 6.0 percent, 7.0 percent, or 8.0 percent over the long-term.

This type of analysis gives the reader a sense of the long-term risk to required contributions. For a measure of funded status that is appropriate for assessing the sufficiency of plan assets to cover estimated termination liabilities, please see "Hypothetical Termination Liability" at the end of this section.

Sensitivity Analysis				
As of June 30, 2017	**Plan's Total Normal Cost**	**Accrued Liability**	**Unfunded Accrued Liability**	**Funded Status**
7.25% (current discount rate)	13.735%	$191,927	$9,158	95.2%
6.0%	17.669%	$253,784	$71,015	72.0%
7.0%	14.273%	$200,350	$17,581	91.2%
8.0%	11.666%	$159,251	$(23,518)	114.8%

Volatility Ratios

Actuarial calculations are based on a number of assumptions about long-term demographic and economic behavior. Unless these assumptions (terminations, deaths, disabilities, retirements, salary growth, and investment return) are exactly realized each year, there will be differences on a year-to-year basis. The year-to-year differences between actual experience and the assumptions are called actuarial gains and losses and serve to lower or raise required employer contributions from one year to the next. Therefore, employer contributions will inevitably fluctuate, especially due to the ups and downs of investment returns.

Asset Volatility Ratio (AVR)

Plans that have higher asset-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to investment return. For example, a plan with an asset-to-payroll ratio of 8 may experience twice the contribution volatility due to investment return volatility, than a plan with an asset-to-payroll ratio of 4. Shown below is the asset volatility ratio, a measure of the plan's current contribution volatility. It should be noted that this ratio is a measure of the current situation. It increases over time but generally tends to stabilize as the plan matures.

Liability Volatility Ratio (LVR)

Plans that have higher liability-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to investment return and changes in liability. For example, a plan with a liability-to-payroll ratio of 8 is expected to have twice the contribution volatility of a plan with a liability-to-payroll ratio of 4. The liability volatility ratio is also shown in the table below. It should be noted that this ratio indicates a longer-term potential for contribution volatility. The asset volatility ratio, described above, will tend to move closer to the liability volatility ratio as the plan matures. Since the liability volatility ratio is a long-term measure, it is shown below at the current discount rate (7.25 percent) as well as the discount rate the Board has adopted to determine the contribution requirement in the June 30, 2018 actuarial valuation (7.00 percent).

Rate Volatility		**As of June 30, 2017**
1. Market Value of Assets	$	182,769
2. Payroll		626,667
3. Asset Volatility Ratio (AVR) [(1) / (2)]		0.3
4. Accrued Liability	$	191,927
5. Liability Volatility Ratio (LVR) [(4) / (2)]		0.3
6. Accrued Liability (7.00% discount rate)		200,350
7. Projected Liability Volatility Ratio [(6) / (2)]		0.3

Hypothetical Termination Liability

The hypothetical termination liability is an estimate of the financial position of the plan had the contract with CalPERS been terminated as of June 30, 2017. The plan liability on a termination basis is calculated differently compared to the plan's ongoing funding liability. For the hypothetical termination liability calculation, both compensation and service are frozen as of the valuation date and no future pay increases or service accruals are assumed. This measure of funded status is not appropriate for assessing the need for future employer contributions in the case of an ongoing plan, that is, for an employer that continues to provide CalPERS retirement benefits to active employees.

A more conservative investment policy and asset allocation strategy was adopted by the CalPERS Board for the Terminated Agency Pool. The Terminated Agency Pool has limited funding sources since no future employer contributions will be made. Therefore, expected benefit payments are secured by risk-free assets and benefit security for members is increased while funding risk is limited. However, this asset allocation has a lower expected rate of return than the PERF and consequently, a lower discount rate is assumed. The lower discount rate for the Terminated Agency Pool results in higher liabilities for terminated plans.

The effective termination discount rate will depend on actual market rates of return for risk-free securities on the date of termination. As market discount rates are variable, the table below shows a range for the hypothetical termination liability based on the lowest and highest interest rates observed during an approximate 2-year period centered around the valuation date.

Market Value of Assets (MVA)	Hypothetical Termination Liability[1,2] @ 1.75%	Funded Status	Unfunded Termination Liability @ 1.75%	Hypothetical Termination Liability[1,2] @ 3.00%	Funded Status	Unfunded Termination Liability @ 3.00%
$182,769	$449,525	40.7%	$266,755	$325,545	56.1%	$142,776

[1] The hypothetical liabilities calculated above include a 5 percent mortality contingency load in accordance with Board policy. Other actuarial assumptions can be found in Appendix A.

[2] The current discount rate assumption used for termination valuations is a weighted average of the 10-year and 30-year U.S. Treasury yields where the weights are based on matching asset and liability durations as of the termination date. The discount rates used in the table are based on 20-year Treasury bonds, rounded to the nearest quarter percentage point, which is a good proxy for most plans. The 20-year Treasury yield was 2.61 percent on June 30, 2017, and was 2.83 percent on January 31, 2018.

In order to terminate the plan, you must first contact our Retirement Services Contract Unit to initiate a Resolution of Intent to terminate. The completed Resolution will allow the plan actuary to give you a preliminary termination valuation with a more up-to-date estimate of the plan liabilities. CalPERS advises you to consult with the plan actuary before beginning this process.

Participant Data

The table below shows a summary of your plan's member data upon which this valuation is based:

	June 30, 2016	June 30, 2017
Reported Payroll	$ 488,562	$ 626,667
Projected Payroll for Contribution Purposes	$ 533,865	$ 682,286
Number of Members		
Active	8	10
Transferred	0	0
Separated	0	0
Retired	0	0

List of Class 1 Benefit Provisions

This plan has the additional Class 1 Benefit Provisions:

- None

Plan’s Major Benefit Options

Plan's Major Benefit Options

Shown below is a summary of the major optional benefits for which your agency has contracted. A description of principal standard and optional plan provisions is in Appendix B within Section 2 of this report.

	Contract package	
Benefit Provision	Active Misc	
Benefit Formula	2.0% @ 62	
Social Security Coverage	Yes	
Full/Modified	Full	
Employee Contribution Rate	6.25%	
Final Average Compensation Period	Three Year	
Sick Leave Credit	Yes	
Non-Industrial Disability	Standard	
Industrial Disability	No	
Pre-Retirement Death Benefits		
Optional Settlement 2	Yes	
1959 Survivor Benefit Level	No	
Special	No	
Alternate (firefighters)	No	
Post-Retirement Death Benefits		
Lump Sum	$600	
Survivor Allowance (PRSA)	No	
COLA	2%	

Section 2

CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

Section 2 may be found on the CalPERS website (www.calpers.ca.gov) in the Forms and Publications section

California Public Employees' Retirement System
Actuarial Office
P.O. Box 942709
Sacramento, CA 94229-2709
TTY: (916) 795-3240
(888) 225-7377 phone – (916) 795-2744 fax
www.calpers.ca.gov

August 2018

Miscellaneous Second Tier Plan of the Calaveras County Water District
(CalPERS ID: 5932694906)
Annual Valuation Report as of June 30, 2017

Dear Employer,

As an attachment to this letter, you will find a copy of the June 30, 2017 actuarial valuation report of the pension plan.

Because this plan is in a risk pool, the following valuation report has been separated into two sections:

- Section 1 contains specific information for the plan including the development of the current and projected employer contributions, and
- Section 2 contains the Risk Pool Actuarial Valuation appropriate to the plan as of June 30, 2017.

Section 2 can be found on the CalPERS website at (www.calpers.ca.gov). From the home page, go to "*Forms & Publications*" and select "*View All*". In the search box, enter "*Risk Pool*" and from the results list download the Miscellaneous or Safety Risk Pool Actuarial Valuation Report as appropriate.

Your June 30, 2017 actuarial valuation report contains important actuarial information about your pension plan at CalPERS. Your assigned CalPERS staff actuary, whose signature appears in the Actuarial Certification section on page 1, is available to discuss the report with you after August 1, 2018.

The exhibit below displays the minimum employer contributions, before any cost sharing, for Fiscal Year 2019-20 along with estimates of the required contributions for Fiscal Year 2020-21. Member contributions other than cost sharing (whether paid by the employer or the employee) are in addition to the results shown below. **The employer contributions in this report do not reflect any cost sharing arrangements you may have with your employees**.

Required Contribution

Fiscal Year	Employer Normal Cost Rate	Employer Payment of Unfunded Liability
2019-20	8.081%	$1,855
Projected Results		
2020-21	*8.7%*	*$2,100*

The actual investment return for Fiscal Year 2017-18 was not known at the time this report was prepared. The projections above assume the investment return for that year would be 7.25 percent. ***If the actual investment return for Fiscal Year 2017-18 differs from 7.25 percent, the actual contribution requirements for the projected years will differ from those shown above.***

Moreover, the projected results for Fiscal Year 2020-21 assume that there are no future plan changes, no further changes in assumptions other than those recently approved, and no liability gains or losses. Such changes can have a significant impact on required contributions. Since they cannot be predicted in advance, the projected employer results shown above are estimates. The actual required employer contributions for Fiscal Year 2020-21 will be provided in next year's report.

For additional details regarding the assumptions and methods used for these projections please refer to the "Projected Employer Contributions" in the "Highlights and Executive Summary" section.

The "Risk Analysis" section of the valuation report also contains estimated employer contributions in future years under a variety of investment return scenarios.

Changes since the Prior Year's Valuation

At its December 2016 meeting, the CalPERS Board of Administration lowered the discount rate from 7.50 percent to 7.00 percent using a three-year phase-in beginning with the June 30, 2016 actuarial valuations. The minimum employer contributions for Fiscal Year 2019-20 determined in this valuation were calculated using a discount rate of 7.25 percent. The projected employer contributions on Page 5 are calculated under the assumption that the discount rate will be lowered to 7.00 percent next year as adopted by the Board.

On December 19, 2017, the CalPERS Board of Administration adopted new actuarial assumptions based on the recommendations in the December 2017 CalPERS Experience Study and Review of Actuarial Assumptions. This study reviewed the retirement rates, termination rates, mortality rates, rates of salary increases and inflation assumption for Public Agencies. These new assumptions are incorporated in your actuarial valuations and will impact the required contribution for FY 2019-20. In addition, the Board adopted a new asset portfolio as part of its Asset Liability Management. The new asset mix supports a 7.00 percent discount rate. The reduction of the inflation assumption will be implemented in two steps in conjunction with the decreases in the discount rate. For the June 30, 2017 valuation an inflation rate of 2.625 percent was used and a rate of 2.50 percent will be used in the following valuation.

The CalPERS Board of Administration has adopted a new amortization policy effective with the June 30, 2019 actuarial valuation. The new policy shortens the period over which actuarial gains and losses are amortized from 30 years to 20 years with the payments computed using a level dollar amount. In addition, the new policy removes the 5-year ramp-up and ramp-down on UAL bases attributable to assumption changes and non-investment gains/losses. The new policy removes the 5-year ramp-down on investment gains/losses. These changes will apply only to new UAL bases established on or after June 30, 2019.

For inactive employers the new amortization policy imposes a maximum amortization period of 15 years for all unfunded accrued liabilities effective June 30, 2017. Furthermore, the plan actuary has the ability to shorten the amortization period on any valuation date based on the life expectancy of plan members and projected cash flow needs to the plan. The impact of this has been reflected in the current valuation results.

The CalPERS Board of Administration adopted a Risk Mitigation Policy which is designed to reduce funding risk over time. This Policy has been temporarily suspended during the period over which the discount rate is being lowered. More details on the Risk Mitigation Policy can be found on our website.

Besides the above noted changes, there may also be changes specific to the plan such as contract amendments and funding changes.

Further descriptions of general changes are included in the "Highlights and Executive Summary" section and in Appendix A, "Statement of Actuarial Data, Methods and Assumptions" of the Section 2 report.

We understand that you might have a number of questions about these results. While we are very interested in discussing these results with your agency, in the interest of allowing us to give every public agency their results, we ask that you wait until after August 1 to contact us with actuarial related questions.

If you have other questions, please call our customer contact center at (888) CalPERS or (**888-225-7377**).

Sincerely,

SCOTT TERANDO
Chief Actuary

Actuarial Valuation
as of June 30, 2017

for the
Miscellaneous Second Tier Plan
of the
Calaveras County Water District
(CalPERS ID: 5932694906)

Required Contributions
for Fiscal Year
July 1, 2019 - June 30, 2020

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Section 1

Plan Specific Information for the Miscellaneous Second Tier Plan of the Calaveras County Water District

(CalPERS ID: 5932694906)
(Rate Plan: 23203)

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Actuarial Certification

Section 1 of this report is based on the member and financial data contained in our records as of June 30, 2017 which was provided by your agency and the benefit provisions under your contract with CalPERS. Section 2 of this report is based on the member and financial data as of June 30, 2017 provided by employers participating in the Miscellaneous Risk Pool to which the plan belongs and benefit provisions under the CalPERS contracts for those agencies.

As set forth in Section 2 of this report, the pool actuaries have certified that, in their opinion, the valuation of the risk pool containing your Miscellaneous Second Tier Plan has been performed in accordance with generally accepted actuarial principles consistent with standards of practice prescribed by the Actuarial Standards Board, and that the assumptions and methods are internally consistent and reasonable for the risk pool as of the date of this valuation and as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

Having relied upon the information set forth in Section 2 of this report and based on the census and benefit provision information for the plan, it is my opinion as the plan actuary that Unfunded Accrued Liability amortization bases as of June 30, 2017 and employer contribution as of July 1, 2019, have been properly and accurately determined in accordance with the principles and standards stated above.

The undersigned is an actuary for CalPERS, a member of both the American Academy of Actuaries and Society of Actuaries and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Julian M Robinson

JULIAN ROBINSON, FSA, EA, MAAA
Senior Pension Actuary, CalPERS
Plan Actuary

Highlights and Executive Summary

- **Introduction**
- **Purpose of Section 1**
- **Required Employer Contributions**
- **Plan’s Funded Status**
- **Projected Employer Contributions**
- **Changes Since the Prior Year’s Valuation**
- **Subsequent Events**

Introduction

This report presents the results of the June 30, 2017 actuarial valuation of the Miscellaneous Second Tier Plan of the Calaveras County Water District of the California Public Employees' Retirement System (CalPERS). This actuarial valuation sets the required employer contributions for Fiscal Year 2019-20.

Purpose of Section 1

This Section 1 report for the Miscellaneous Second Tier Plan of the Calaveras County Water District of the California Public Employees' Retirement System (CalPERS) was prepared by the plan actuary in order to:

- Set forth the assets and accrued liabilities of this plan as of June 30, 2017;
- Determine the minimum required employer contribution for this plan for the fiscal year July 1, 2019 through June 30, 2020; and
- Provide actuarial information as of June 30, 2017 to the CalPERS Board of Administration and other interested parties.

The pension funding information presented in this report should not be used in financial reports subject to GASB Statement No. 68 for a Cost Sharing Employer Defined Benefit Pension Plan. A separate accounting valuation report for such purposes is available from CalPERS and details for ordering are available on our website.

The measurements shown in this actuarial valuation may not be applicable for other purposes. The employer should contact their actuary before disseminating any portion of this report for any reason that is not explicitly described above.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; changes in actuarial policies; and changes in plan provisions or applicable law.

California Actuarial Advisory Panel Recommendations

This report includes all the basic disclosure elements as described in the *Model Disclosure Elements for Actuarial Valuation Reports* recommended in 2011 by the California Actuarial Advisory Panel (CAAP), with the exception of including the original base amounts of the various components of the unfunded liability in the Schedule of Amortization Bases shown on page 9.

Additionally, this report includes the following "Enhanced Risk Disclosures" also recommended by the CAAP in the Model Disclosure Elements document:

- A "Deterministic Stress Test," projecting future results under different investment income scenarios
- A "Sensitivity Analysis," showing the impact on current valuation results using alternative discount rates of 6.0 percent, 7.0 percent and 8.0 percent.

Required Employer Contributions

		Fiscal Year
Required Employer Contributions		**2019-20**
Employer Normal Cost Rate		**8.081%**
Plus, Either		
1) Monthly Employer Dollar UAL Payment	**$**	**154.58**
Or		
2) Annual Lump Sum Prepayment Option	**$**	**1,791**

*The total minimum required employer contribution is the **sum** of the Plan's Employer Normal Cost Rate (expressed as a percentage of payroll) **plus** the Employer Unfunded Accrued Liability (UAL) Contribution Amount (billed monthly in dollars).*

*Only the UAL portion of the employer contribution can be prepaid **(which must be received in full no later than July 31)**. Plan Normal Cost contributions will be made as part of the payroll reporting process. If there is contractual cost sharing or other change, this amount will change.*

In accordance with Sections 20537 and 20572 of the Public Employees' Retirement Law, if a contracting agency fails to remit the required contributions when due, interest and penalties may apply.

		Fiscal Year 2018-19		Fiscal Year 2019-20
Development of Normal Cost as a Percentage of Payroll[1]				
Base Total Normal Cost for Formula		14.546%		14.996%
Surcharge for Class 1 Benefits[2]				
None		0.000%		0.000%
Phase out of Normal Cost Difference[3]		0.000%		0.000%
Plan's Total Normal Cost		14.546%		14.996%
Formula's Expected Employee Contribution Rate		6.912%		6.915%
Employer Normal Cost Rate		7.634%		8.081%
Projected Payroll for the Contribution Fiscal Year	$	341,787	$	357,227
Estimated Employer Contributions Based on Projected Payroll				
Plan's Estimated Employer Normal Cost	$	26,092	$	28,868
Plan's Payment on Amortization Bases[4]		1,975		1,855
% of Projected Payroll (illustrative only)		0.578%		0.519%
Estimated Total Employer Contribution	$	28,067	$	30,723
% of Projected Payroll (illustrative only)		8.212%		8.600%

[1] The results shown for Fiscal Year 2018-19 reflect the prior year valuation and may not take into account any lump sum payment, side fund payoff, or rate adjustment made after June 30, 2017.

[2] Section 2 of this report contains a list of Class 1 benefits and corresponding surcharges for each benefit.

[3] The normal cost difference is phased out over a five-year period. The phase out of normal cost difference is 100 percent for the first year of pooling, and is incrementally reduced by 20 percent of the original normal cost difference for each subsequent year. This is non-zero only for plans that joined a pool within the past 5 years. Most plans joined a pool June 30, 2003, when risk pooling was implemented.

[4] See page 9 for a breakdown of the Amortization Bases.

Plan's Funded Status

		June 30, 2016		June 30, 2017
1. Present Value of Projected Benefits (PVB)	$	660,683	$	758,336
2. Entry Age Normal Accrued Liability (AL)		113,058		206,787
3. Plan's Market Value of Assets (MVA)		108,077		203,847
4. Unfunded Accrued Liability (UAL) [(2) - (3)]		4,981		2,940
5. Funded Ratio [(3) / (2)]		95.6%		98.6%

This measure of funded status is an assessment of the need for future employer contributions based on the selected actuarial cost method used to fund the plan. The UAL is the present value of future employer contributions for service that has already been earned and is in addition to future normal cost contributions for active members. For a measure of funded status that is appropriate for assessing the sufficiency of plan assets to cover estimated termination liabilities, please see "Hypothetical Termination Liability" in the "Risk Analysis" section.

Projected Employer Contributions

The table below shows projected employer contributions (before cost sharing) for the next six fiscal years. Projected results reflect the adopted changes to the discount rate described in Appendix A, "Statement of Actuarial Data, Methods and Assumptions" of the Section 2 report. The projections also assume that all actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur during the projection period.

	Required Contribution	Projected Future Employer Contributions (Assumes 7.25% Return for Fiscal Year 2017-18)				
Fiscal Year	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**2023-24**	**2024-25**
Normal Cost %	8.081%	8.7%	8.7%	8.7%	8.7%	8.7%
UAL Payment	$1,855	$2,100	$2,400	$2,700	$3,000	$1,200

Changes in the UAL due to actuarial gains or losses as well as changes in actuarial assumptions or methods are amortized using a 5-year ramp up. For more information, please see "Amortization of the Unfunded Actuarial Accrued Liability" under "Actuarial Methods" in Appendix A of Section 2. This method phases in the impact of unanticipated changes in UAL over a 5-year period and attempts to minimize employer cost volatility from year to year. As a result of this methodology, dramatic changes in the required employer contributions in any one year are less likely. However, required contributions can change gradually and significantly over the next five years. In years where there is a large increase in UAL the relatively small amortization payments during the ramp up period could result in a funded ratio that is projected to decrease initially while the contribution impact of the increase in the UAL is phased in.

Due to the adopted changes in the discount rate for next year's valuation in combination with the 5-year phase-in ramp, the increases in the required contributions are expected to continue for six years from Fiscal Year 2019-20 through Fiscal Year 2024-25.

For projected contributions under alternate investment return scenarios, please see the "Analysis of Future Investment Return Scenarios" in the "Risk Analysis" section.

Changes since the Prior Year's Valuation

Benefits

None. This valuation generally reflects plan changes by amendments effective before the date of the report. Please refer to the "Plan's Major Benefit Options" and Appendix B of Section 2 for a summary of the plan provisions used in this valuation.

Actuarial Methods and Assumptions

At its December 2016 meeting, the CalPERS Board of Administration lowered the discount rate from 7.50 percent to 7.00 percent using a three-year phase-in beginning with the June 30, 2016 actuarial valuations. The minimum employer contributions for Fiscal Year 2019-20 determined in this valuation were calculated using a discount rate of 7.25 percent. The projected employer contributions on page 5 are calculated assuming that the discount rate will be lowered to 7.00 percent next year as adopted by the Board. The decision to reduce the discount rate was primarily based on reduced capital market assumptions provided by external investment consultants and CalPERS investment staff. The specific decision adopted by the Board reflected recommendations from CalPERS staff and additional input from employer and employee stakeholder groups. Based on the investment allocation adopted by the Board and capital market assumptions, the reduced discount rate assumption provides a more realistic assumption for the long-term investment return of the fund.

On December 19, 2017, the CalPERS Board of Administration adopted new actuarial assumptions based on the recommendations in the December 2017 CalPERS Experience Study and Review of Actuarial Assumptions. This study reviewed the retirement rates, termination rates, mortality rates, rates of salary increases and inflation assumption for Public Agencies. These new assumptions are incorporated in this actuarial valuation and will impact the required contribution for FY 2019-20. In addition, the Board adopted a new asset portfolio as part of its Asset Liability Management. The new asset mix supports a 7.00 percent discount rate. The reduction of the inflation assumption will be implemented in two steps in conjunction with the decreases in the discount rate. For the June 30, 2017 valuation an inflation rate of 2.625 percent will be used and a rate of 2.50 percent in the following valuation.

Notwithstanding the Board's decision to phase into a 7.0 percent discount rate, subsequent analysis of the expected investment return of CalPERS assets or changes to the investment allocation may result in a change to this three-year discount rate schedule.

Subsequent Events

The CalPERS Board of Administration has adopted a new amortization policy effective with the June 30, 2019 actuarial valuation. The new policy shortens the period over which actuarial gains and losses are amortized from 30 years to 20 years with the payments computed using a level dollar amount. In addition, the new policy removes the 5-year ramp-up and ramp-down on UAL bases attributable to assumption changes and non-investment gains/losses. The new policy removes the 5-year ramp-down on investment gains/losses. These changes will apply only to new UAL bases established on or after June 30, 2019.

For inactive employers the new amortization policy imposes a maximum amortization period of 15 years for all unfunded accrued liabilities effective June 30, 2017. Furthermore, the plan actuary has the ability to shorten the amortization period on any valuation date based on the life expectancy of plan members and projected cash flow needs to the plan. The impact of this has been reflected in the current valuation results.

The contribution requirements determined in this actuarial valuation report are based on demographic and financial information as of June 30, 2017. Changes in the value of assets subsequent to that date are not reflected. Investment returns below the assumed rate of return will increase the retired contribution, while investment returns above the assumed rate of return will decrease the retired contribution.

This actuarial valuation report reflects statutory changes, regulatory changes and CalPERS Board actions through January 2018. Any subsequent changes or actions are not reflected.

Assets and Liabilities

- **Breakdown of Entry Age Normal Accrued Liability**
- **Allocation of Plan's Share of Pool's Experience/Assumption Change**
- **Development of Plan's Share of Pool's MVA**
- **Schedule of Plan's Amortization Bases**
- **Amortization Schedule and Alternatives**
- **Employer Contribution History**
- **Funding History**

Breakdown of Entry Age Normal Accrued Liability

Active Members	$	137,559
Transferred Members		0
Terminated Members		69,228
Members and Beneficiaries Receiving Payments		0
Total	$	206,787

Allocation of Plan's Share of Pool's Experience/Assumption Change

It is the policy of CalPERS to ensure equity within the risk pools by allocating the pool's experience gains/losses and assumption changes in a manner that treats each employer equitably and maintains benefit security for the members of the System while minimizing substantial variations in employer contributions. The Pool's experience gains/losses and impact of assumption/method changes is allocated to the plan as follows:

1.	Plan's Accrued Liability	$	206,787
2.	Projected UAL balance at 6/30/17		6,794
3.	Pool's Accrued Liability[1]	$	15,780,998,593
4.	Sum of Pool's Individual Plan UAL Balances at 6/30/17[1]		3,912,002,885
5.	Pool's 2016/17 Investment & Asset (Gain)/Loss		(413,206,167)
6.	Pool's 2016/17 Other (Gain)/Loss		(21,126,605)
7.	Plan's Share of Pool's Asset (Gain)/Loss [(1) - (2)] / [(3) - (4)] * (5)		(6,963)
8.	Plan's Share of Pool's Other (Gain)/Loss [(1)] / [(3)] * (6)		(277)
9.	Plan's New (Gain)/Loss as of 6/30/2017 [(7) + (8)]	$	(7,239)
10.	Increase in Pool's Accrued Liability due to Change in Assumptions[1]		258,379,047
11.	Plan's Share of Pool's Change in Assumptions [(1)] / [(3)] * (10)	$	3,386

[1] Does not include plans that transferred to Pool on the valuation date.

Development of the Plan's Share of Pool's Market Value of Assets

12.	Plan's UAL [(2) + (9) + (11)]	$	2,940
13.	Plan's Share of Pool's MVA [(1) - (12)]	$	**203,847**

Schedule of Plan's Amortization Bases

There is a two-year lag between the valuation date and the start of the contribution fiscal year.

- The assets, liabilities, and funded status of the plan are measured as of the valuation date: June 30, 2017.
- The employer contribution determined by the valuation is for the fiscal year beginning two years after the valuation date: Fiscal Year 2019-20.

This two-year lag is necessary due to the amount of time needed to extract and test the membership and financial data, and the need to provide public agencies with their employer contribution well in advance of the start of the fiscal year.

The Unfunded Accrued Liability (UAL) is used to determine the employer contribution and therefore must be rolled forward two years from the valuation date to the first day of the fiscal year for which the contribution is being determined. The UAL is rolled forward each year by subtracting the payment on the UAL for the fiscal year and adjusting for interest. Additional discretionary payments are reflected in the Expected Payments column in the fiscal year they were made by the agency.

								Amounts for Fiscal 2019-20	
Reason for Base	**Date Established**	**Ramp Up/Down 2019-20**	**Amortization Period**	**Balance 6/30/17**	**Payment 2017-18**	**Balance 6/30/18**	**Payment 2018-19**	**Balance 6/30/19**	**Scheduled Payment for 2019-20**
FRESH START	06/30/17	No Ramp	5	$2,940	$(3,882)	$7,174	$(541)	$8,254	$1,855
TOTAL				**$2,940**	**$(3,882)**	**$7,174**	**$(541)**	**$8,254**	**$1,855**

The (gain)/loss bases are the plan's allocated share of the risk pool's (gain)/loss for the fiscal year as disclosed on the previous page. These (gain)/loss bases will be amortized according to Board policy over 30 years with a 5-year ramp-up.

If the total Unfunded Liability is negative (i.e., plan has a surplus), the scheduled payment is $0, because the minimum required contribution under PEPRA must be at least equal to the normal cost.

Amortization Schedule and Alternatives

The amortization schedule on the previous page shows the minimum contributions required according to CalPERS amortization policy. There has been considerable interest from many agencies in paying off these unfunded accrued liabilities sooner and the possible savings in doing so. As a result, we have provided alternate amortization schedules to help analyze the current amortization schedule and illustrate the advantages of accelerating unfunded liability payments.

Shown on the following page are future year amortization payments based on: 1) the current amortization schedule reflecting the individual bases and remaining periods shown on the previous page, and 2) alternate "fresh start" amortization schedules using two sample periods that would both result in interest savings relative to the current amortization schedule. Note that the payments under each alternate scenario increase by 2.875 percent for each year into the future. **The schedules do not attempt to reflect any experience after June 30, 2017 that may deviate from the actuarial assumptions. Therefore, future amortization payments displayed in the Current Amortization Schedule may not match projected amortization payments shown in connection with Projected Employer Contributions provided elsewhere in this report.**

The Current Amortization Schedule typically contains individual bases that are both positive and negative. Positive bases result from plan changes, assumption changes or plan experience that result in increases to unfunded liability. Negative bases result from plan changes, assumption changes or plan experience that result in decreases to unfunded liability. The combination of positive and negative bases within an amortization schedule can result in unusual or problematic circumstances in future years such as:

- A positive total unfunded liability with a negative total payment,
- A negative total unfunded liability with a positive total payment, or
- Total payments that completely amortize the unfunded liability over a very short period of time

In any year where one of the above scenarios occurs, the actuary will consider corrective action such as replacing the existing unfunded liability bases with a single "fresh start" base and amortizing it over a reasonable period.

The Current Amortization Schedule on the following page may appear to show that, based on the current amortization bases, one of the above scenarios will occur at some point in the future. It is impossible to know today whether such a scenario will in fact arise since there will be additional bases added to the amortization schedule in each future year. Should such a scenario arise in any future year, the actuary will take appropriate action based on guidelines in the CalPERS amortization policy.

Amortization Schedule and Alternatives

	Current Amortization Schedule		Alternate Schedules			
			0 Year Amortization		0 Year Amortization	
Date	**Balance**	**Payment**	**Balance**	**Payment**	**Balance**	**Payment**
6/30/2019	8,254	1,855	N/A	N/A	N/A	N/A
6/30/2020	6,932	1,908				
6/30/2021	5,458	1,963				
6/30/2022	3,821	2,020				
6/30/2023	2,006	2,078				
6/30/2024						
6/30/2025						
6/30/2026						
6/30/2027						
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6/30/2044						
6/30/2045						
6/30/2046						
6/30/2047						
6/30/2048						
Totals		**9,824**		**N/A**		**N/A**
Interest Paid		**1,569**		**N/A**		**N/A**
Estimated Savings				**N/A**		**N/A**

* This schedule does not reflect the impact of adopted discount rate changes that will become effective beyond June 30, 2017. For Projected Employer Contributions, please see page 5.

Employer Contribution History

The table below provides a recent history of the required employer contributions for the plan, as determined by the annual actuarial valuation. It does not account for prepayments or benefit changes made during a fiscal year.

Fiscal Year	Employer Normal Cost	Unfunded Liability Payment ($)
2016 - 17	7.159%	$0
2017 - 18	7.200%	$0
2018 - 19	7.634%	$1,975
2019 - 20	8.081%	$1,855

Funding History

The funding history below shows the plan's actuarial accrued liability, share of the pool's market value of assets, share of the pool's unfunded liability, funded ratio, and annual covered payroll.

Valuation Date	Accrued Liability (AL)	Share of Pool's Market Value of Assets (MVA)	Plan's Share of Pool's Unfunded Liability	Funded Ratio	Annual Covered Payroll
06/30/2013	$ 3,907	$ 3,295	$ 612	84.3%	$ 220,734
06/30/2014	56,517	60,584	(4,067)	107.2%	44,909
06/30/2015	68,144	71,753	(3,609)	105.3%	248,404
06/30/2016	113,058	108,077	4,981	95.6%	312,783
06/30/2017	206,787	203,847	2,940	98.6%	328,107

Risk Analysis

- **Analysis of Future Investment Return Scenarios**
- **Analysis of Discount Rate Sensitivity**
- **Volatility Ratios**
- **Hypothetical Termination Liability**

Analysis of Future Investment Return Scenarios

Analysis was performed to determine the effects of various future investment returns on required employer contributions. The projections below provide a range of results based on five investment return scenarios assumed to occur during the next four fiscal years (2017-18, 2018-19, 2019-20 and 2020-21). The projections also assume that all other actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur.

Each of the five investment return scenarios assumes a return of 7.25 percent for fiscal year 2017-18. For fiscal years 2018-19, 2019-20, and 2020-21 each scenario assumes an alternate fixed annual return. The fixed return assumptions for the five scenarios are 1.0 percent, 4.0 percent, 7.0 percent, 9.0 percent and 12.0 percent.

The alternate investment returns were chosen based on stochastic analysis of possible future investment returns over the four-year period ending June 30, 2021. Using the expected returns and volatility of the asset classes in which the funds are invested, we produced five thousand stochastic outcomes for this period based on the recently completed Asset Liability Management process. We then selected annual returns that approximate the 5^{th}, 25^{th}, 50^{th}, 75^{th}, and 95^{th} percentiles for these outcomes. For example, of all the 4-year outcomes generated in the stochastic analysis, approximately 25 percent of them had an average annual return of 4.0 percent or less.

Required contributions outside of this range are also possible. In particular, whereas it is unlikely that investment returns will average less than 1.0 percent or greater than 12.0 percent over this four-year period, the possibility of a single investment return less than 1.0 percent or greater than 12.0 percent in any given year is much greater.

Assumed Annual Return From 2018-19 through 2020-21	**Projected Employer Contributions**			
	2020-21	**2021-22**	**2022-23**	**2023-24**
1.0%				
Normal Cost	8.7%	8.7%	8.7%	8.7%
UAL Contribution	$2,100	$2,600	$3,300	$4,300
4.0%				
Normal Cost	8.7%	8.7%	8.7%	8.7%
UAL Contribution	$2,100	$2,500	$3,000	$3,600
7.0%				
Normal Cost	8.7%	8.7%	8.7%	8.7%
UAL Contribution	$2,100	$2,400	$2,700	$3,000
9.0%				
Normal Cost	8.7%	8.9%	9.0%	9.2%
UAL Contribution	$2,100	$2,300	$2,600	$1,000
12.0%				
Normal Cost	8.7%	8.9%	9.0%	9.2%
UAL Contribution	$2,100	$1,700	$0	$0

Given the temporary suspension of the Risk Mitigation Policy during the period over which the discount rate assumption is being phased down to 7.0 percent, the projections above were performed without reflection of any possible impact of this Policy for Fiscal Year 2020-21. In addition, the projections above do not reflect the recent changes to the new amortization policy effective with the June 30, 2019 valuation but the impact on the results above is expected to be minimal.

Analysis of Discount Rate Sensitivity

Shown below are various valuation results as of June 30, 2017 assuming alternate discount rates. Results are shown using the current discount rate of 7.25 percent as well as alternate discount rates of 6.0 percent, 7.0 percent, and 8.0 percent. The alternate rate of 7.0 percent was selected since the Board has adopted this rate as the final discount rate at the end of the three-year phase-in of the reduction in this assumption. The rates of 6.0 percent and 8.0 percent were selected since they illustrate the impact of a 1 percent increase or decrease to the 7.0 percent assumption. This analysis shows the potential plan impacts if the PERF were to realize investment returns of 6.0 percent, 7.0 percent, or 8.0 percent over the long-term.

This type of analysis gives the reader a sense of the long-term risk to required contributions. For a measure of funded status that is appropriate for assessing the sufficiency of plan assets to cover estimated termination liabilities, please see "Hypothetical Termination Liability" at the end of this section.

Sensitivity Analysis				
As of June 30, 2017	**Plan's Total Normal Cost**	**Accrued Liability**	**Unfunded Accrued Liability**	**Funded Status**
7.25% (current discount rate)	14.996%	$206,787	$2,940	98.6%
6.0%	19.256%	$255,122	$51,275	79.9%
7.0%	15.588%	$214,081	$10,234	95.2%
8.0%	12.762%	$181,151	$(22,696)	112.5%

Volatility Ratios

Actuarial calculations are based on a number of assumptions about long-term demographic and economic behavior. Unless these assumptions (terminations, deaths, disabilities, retirements, salary growth, and investment return) are exactly realized each year, there will be differences on a year-to-year basis. The year-to-year differences between actual experience and the assumptions are called actuarial gains and losses and serve to lower or raise required employer contributions from one year to the next. Therefore, employer contributions will inevitably fluctuate, especially due to the ups and downs of investment returns.

Asset Volatility Ratio (AVR)

Plans that have higher asset-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to investment return. For example, a plan with an asset-to-payroll ratio of 8 may experience twice the contribution volatility due to investment return volatility, than a plan with an asset-to-payroll ratio of 4. Shown below is the asset volatility ratio, a measure of the plan's current contribution volatility. It should be noted that this ratio is a measure of the current situation. It increases over time but generally tends to stabilize as the plan matures.

Liability Volatility Ratio (LVR)

Plans that have higher liability-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to investment return and changes in liability. For example, a plan with a liability-to-payroll ratio of 8 is expected to have twice the contribution volatility of a plan with a liability-to-payroll ratio of 4. The liability volatility ratio is also shown in the table below. It should be noted that this ratio indicates a longer-term potential for contribution volatility. The asset volatility ratio, described above, will tend to move closer to the liability volatility ratio as the plan matures. Since the liability volatility ratio is a long-term measure, it is shown below at the current discount rate (7.25 percent) as well as the discount rate the Board has adopted to determine the contribution requirement in the June 30, 2018 actuarial valuation (7.00 percent).

Rate Volatility		**As of June 30, 2017**
1. Market Value of Assets	$	203,847
2. Payroll		328,107
3. Asset Volatility Ratio (AVR) [(1) / (2)]		0.6
4. Accrued Liability	$	206,787
5. Liability Volatility Ratio (LVR) [(4) / (2)]		0.6
6. Accrued Liability (7.00% discount rate)		214,081
7. Projected Liability Volatility Ratio [(6) / (2)]		0.7

Hypothetical Termination Liability

The hypothetical termination liability is an estimate of the financial position of the plan had the contract with CalPERS been terminated as of June 30, 2017. The plan liability on a termination basis is calculated differently compared to the plan's ongoing funding liability. For the hypothetical termination liability calculation, both compensation and service are frozen as of the valuation date and no future pay increases or service accruals are assumed. This measure of funded status is not appropriate for assessing the need for future employer contributions in the case of an ongoing plan, that is, for an employer that continues to provide CalPERS retirement benefits to active employees.

A more conservative investment policy and asset allocation strategy was adopted by the CalPERS Board for the Terminated Agency Pool. The Terminated Agency Pool has limited funding sources since no future employer contributions will be made. Therefore, expected benefit payments are secured by risk-free assets and benefit security for members is increased while funding risk is limited. However, this asset allocation has a lower expected rate of return than the PERF and consequently, a lower discount rate is assumed. The lower discount rate for the Terminated Agency Pool results in higher liabilities for terminated plans.

The effective termination discount rate will depend on actual market rates of return for risk-free securities on the date of termination. As market discount rates are variable, the table below shows a range for the hypothetical termination liability based on the lowest and highest interest rates observed during an approximate 2-year period centered around the valuation date.

Market Value of Assets (MVA)	Hypothetical Termination Liability[1,2] @ 1.75%	Funded Status	Unfunded Termination Liability @ 1.75%	Hypothetical Termination Liability[1,2] @ 3.00%	Funded Status	Unfunded Termination Liability @ 3.00%
$203,847	$454,727	44.8%	$250,880	$362,119	56.3%	$158,272

[1] The hypothetical liabilities calculated above include a 5 percent mortality contingency load in accordance with Board policy. Other actuarial assumptions can be found in Appendix A.

[2] The current discount rate assumption used for termination valuations is a weighted average of the 10-year and 30-year U.S. Treasury yields where the weights are based on matching asset and liability durations as of the termination date. The discount rates used in the table are based on 20-year Treasury bonds, rounded to the nearest quarter percentage point, which is a good proxy for most plans. The 20-year Treasury yield was 2.61 percent on June 30, 2017, and was 2.83 percent on January 31, 2018.

In order to terminate the plan, you must first contact our Retirement Services Contract Unit to initiate a Resolution of Intent to terminate. The completed Resolution will allow the plan actuary to give you a preliminary termination valuation with a more up-to-date estimate of the plan liabilities. CalPERS advises you to consult with the plan actuary before beginning this process.

Participant Data

The table below shows a summary of your plan's member data upon which this valuation is based:

	June 30, 2016	June 30, 2017
Reported Payroll	$ 312,783	$ 328,107
Projected Payroll for Contribution Purposes	$ 341,787	$ 357,227
Number of Members		
Active	3	3
Transferred	1	0
Separated	0	1
Retired	0	0

List of Class 1 Benefit Provisions

This plan has the additional Class 1 Benefit Provisions:

- None

Plan's Major Benefit Options

Plan's Major Benefit Options

Shown below is a summary of the major optional benefits for which your agency has contracted. A description of principal standard and optional plan provisions is in Appendix B within Section 2 of this report.

	Contract package	
Benefit Provision	Active Misc	
Benefit Formula	2.0% @ 60	
Social Security Coverage	Yes	
Full/Modified	Modified	
Employee Contribution Rate	7.00%	
Final Average Compensation Period	Three Year	
Sick Leave Credit	Yes	
Non-Industrial Disability	Standard	
Industrial Disability	No	
Pre-Retirement Death Benefits		
Optional Settlement 2	Yes	
1959 Survivor Benefit Level	No	
Special	No	
Alternate (firefighters)	No	
Post-Retirement Death Benefits		
Lump Sum	$600	
Survivor Allowance (PRSA)	No	
COLA	2%	

Section 2

Section 2 may be found on the CalPERS website (www.calpers.ca.gov) in the Forms and Publications section

Agenda Item

DATE: October 10, 2018

TO: Dave Eggerton, General Manager

FROM: Jeffrey Meyer, Director of Administrative Services
John Gomes, Information Systems Administrator

SUBJECT: Presentation/Discussion regarding District's Information Technology Systems

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RECOMMENDED ACTION:

Discussion only.

SUMMARY:

Mr. John Gomes, the District's Information Systems Administrator, will present an overview of the District's information technology ("IT") systems, both past and present. Mr. Gomes will provide details on the District's computer and server systems, the communication systems, including the internet, faxes, telephones and smartphones. He will also cover the challenges and issues of maintaining these system and equipment, and how we are addressing those challenges.

Mr. Gomes will also identify current work processes that will benefit from IT efficiency measures, providing as examples an Asset Management System, an automated work order system, and Geographic Information Systems, or GIS, and what resources may be needed to implement and maintain these system improvements.

FINANCIAL CONSIDERATIONS:

Unknown at this time.

Attachment: None

Agenda Item

DATE: October 10, 2018

TO: Dave Eggerton, General Manager

FROM: Bob Godwin, P.E., Senior Civil Engineer RG 10/10/18
Charles Palmer P.E., District Engineer

SUBJECT: Presentation and the Potential Adoption of the Copper Cove Water System Master Plan, October 2018

RECOMMENDED ACTION:

Motion: __________/__________ adopting Resolution No. 2018-_____ approving the Copper Cove Water System Master Plan, October 2018.

SUMMARY:

The process of updating the water master plan for the community of Copper Cove and adjoining service areas is complete with the submission of the Copper Cove Water System Master Plan, October 2018. If adopted, this Master Plan it will replace the prior Master Plan approved in June 2005 by adoption of Resolution 2005-43.

Development of the Master Plan was authorized by Resolution 2016-44 and funded by CIP 11064C-120. This Master Plan is the last of four master plans prepared for the District water and wastewater service areas of Copper Cove and Jenny Lind. The other three master plans updates are completed and adopted by the Board.

A presentation of the Master Plan will be made by Mr. Karl Brustad, P.E. of Peterson Brustad Inc. This is the second presentation by Peterson Brustad Inc., with the first occurring on August 22, 2018. Comments received at the first presentation along with staff comments were utilized in the development of the Master Plan presented.

Mr. Brustad's presentation will provide an overview of the contents of the Master Plan including the Geographic Information System (GIS) hydraulic model, projected future community water demands, and recommended facility improvements. Capital improvement along with rehabilitation and replacement projects presented in the Master Plan will be used by staff in the development of future capital improvement plans.

A copy of the Master Plan is enclosed with each Board member's agenda packet and a limited number of printed copies will be available at the Board meeting. An electronic version in Adobe Acrobat Reader® format is included with the agenda packet posted on the District website.

FINANCIAL CONSIDERATIONS:

None at this time. Implementation of the Master Plan recommendations will lead into a separate financial analysis and evaluation of proposed capacity fees which will be presented to the Board for adoption at a future date.

Attachments: Copper Cove Water System Master Plan, October 2018

RESOLUTION NO. 2018 -

A RESOLUTION OF THE BOARD OF DIRECTORS
OF THE CALAVERAS COUNTY WATER DISTRICT

ADOPTION OF THE COPPER COVE WATER SYSTEM MASTER PLAN, OCTOBER 2018, CIP 11064C-120

WHEREAS, in order to better serve current and establish needs, and future raw and potable water customers in the Copper Cove water service area, a water master plan update has been developed for the community; and

WHEREAS, Peterson Brustad, Inc. was retained by the District in 2016 to prepare the water master plan update which is a replacement of the prior Copper Cove Water System Master Plan previously adopted by Resolution 2005-43 in June 2005; and

WHEREAS, the Board of Directors received the Draft Copper Cove Water System Master Plan at a public meeting on August 22, 2018 at which time a presentation was given for the purpose of receiving Board, staff, and public comment which have been incorporated into the October 2018 version submitted to the Board for consideration; and

WHEREAS, the Board of Directors of the CALAVERAS COUNTY WATER DISTRICT recognizes that a separate financial analysis and evaluation will be required to address capacity fees to fund the costs of the recommendations within said plan update; and

NOW, THEREFORE, BE IT RESOLVED, the Board of Directors of the CALAVERAS COUNTY WATER DISTRICT hereby adopts of the Copper Cove Water System Master Plan, dated October 2018 attached hereto and made a part hereof.

PASSED AND ADOPTED this 10th day of October, 2018 by the following vote:

AYES:
NOES:
ABSTAIN:
ABSENT:

CALAVERAS COUNTY WATER DISTRICT

____
Scott Ratterman, President
Board of Directors

ATTEST

____
Rebecca Hitchcock
Clerk to the Board

Copper Cover Water System Master Plan

Calaveras County Water District

CIP 11064C-120

October 2018

Authorized by Board Resolution 2016-44

Prepared under the responsible charge of

Karl Brustad
C 57869

PETERSON . BRUSTAD . INC
ENGINEERING . CONSULTING

80 Blue Ravine Road, Suite 280
Folsom, CA 95630

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Introduction

This Copper Cove Water System Master Plan (WMP) update was authorized by Calaveras County Water District (District) Resolution 2016-44. The prior Copper Cove WMP was completed in 2005 and the District's goal is to update water and wastewater master plans approximately every ten years.

This report will provide a basis for the management of rehabilitation existing assets and the expansion of the District's potable water facilities to meet community approved growth. Computer aided hydraulic water system modeling, and findings from evaluation of District facility assets, were utilized in development of the report's capital and rehabilitation and replacement projects. These projects include triggers for implementation.

Developed of the Copper Cove WMP started prior to passage of California AB 1668 and impacts of the bill were not evaluated in this report.

Purpose and Specific Objectives

The purpose of this master plan report is to describe water supply, treatment, storage, and distribution system improvements required to meet current and future service area needs. In particular, this master plan report provides the following information:

- Delineation of the service area.
- Characterization of historic water demands, including existing and projected average day, maximum day, and peak hourly demands.
- Description and evaluation of the existing facilities.
- Identification of the improvements needed to meet growth, improve operations, comply with current and known future regulations, and correct deficiencies.
- Recommendations for system improvements needed to serve buildout conditions.
- Timelines and cost information for constructing the recommended improvements.

Existing System

Existing Service Area

The service area encompasses the communities of Copper Cove, Copperopolis, Saddle Creek, Lake Tulloch Shores, Calypso Beach, Connor Estates, Copper Meadows, and Peninsula Estates. The service area is defined by the *2017 Calaveras County Water District Sphere of Influence Report* [1]. The topography ranges from 1,150 feet to 550 feet above mean sea level (MSL). Hot summers and cool winters characterize the region, with temperatures ranging from the low 40's to the mid 100's.

These communities include a total of 2,562 existing connections spread out across the 5,152-acre service area according to records provided in 2017. The current facilities include one raw water pump station diverting water from the North Fork Stanislaus River located on the west shore of Lake Tulloch, one water treatment plant (Copper Cove WTP), three treated water pump

[1] *Calaveras County Water District (CCWD) Sphere of Influence Report, April 2017.*
https://www.calaveraslafco.org/uploads/1/1/4/5/11454087/ccwd_soi_april_2017.pdf

stations, five treated water storage tanks, and the associated distribution system. A general map of the existing facilities is presented in Figure 1.

Water Supply

Raw water is supplied to the Copper Cove WTP from Lake Tulloch. A two-stage 4.75-mgd capacity pumping system conveys water from the lake to the WTP through the existing 24-inch raw water main. The first stage consists of two 1,650-gpm pumps (2-duty, 1-spare) and the second stage consists of three 1,750-gpm pumps (lead-lag-standby). In addition to the WTP, irrigation water is also seasonally supplied to Saddle Creek Golf Course. The demand from the golf course irrigation requirement decreases the available water supply, in peak periods, by approximately 1.0-mgd (approximately 700-gpm). The water available to supply the WTP during peak periods is approximately 2,600-gpm (3.75-mgd).

Lake Tulloch is owned and operated by the Tri-Dam Project and has a max capacity of approximately 65,000 AF. Lake Tulloch is fed by the surrounding 980 square mile drainage area and the New Melones Reservoir. The New Melones Reservoir has 2,420,000 AF and is immediately upstream of Lake Tulloch.

Raw water is drawn through an intake on the Black Creek arm of the Lake Tulloch Reservoir. The 2013/2014 drought conditions led Tri-Dam Project to consider lowering the surface water elevation in Lake Tulloch, should the drought continue. This prompted the District to relocate the intake. In 2015 the District completed the intake relocation extending the intake length and lowering the intake from 470-ft to 390-ft above MSL. Two of three intakes were moved to the lower elevation. One pump remains at the higher elevation. Relocating the raw water pumps has increased influent raw water turbidity levels and the District is working to move one of the lower pumps back to its original elevation. When complete, the District will have two pumps at 470-ft above MSL and one pump at 390-ft MSL.

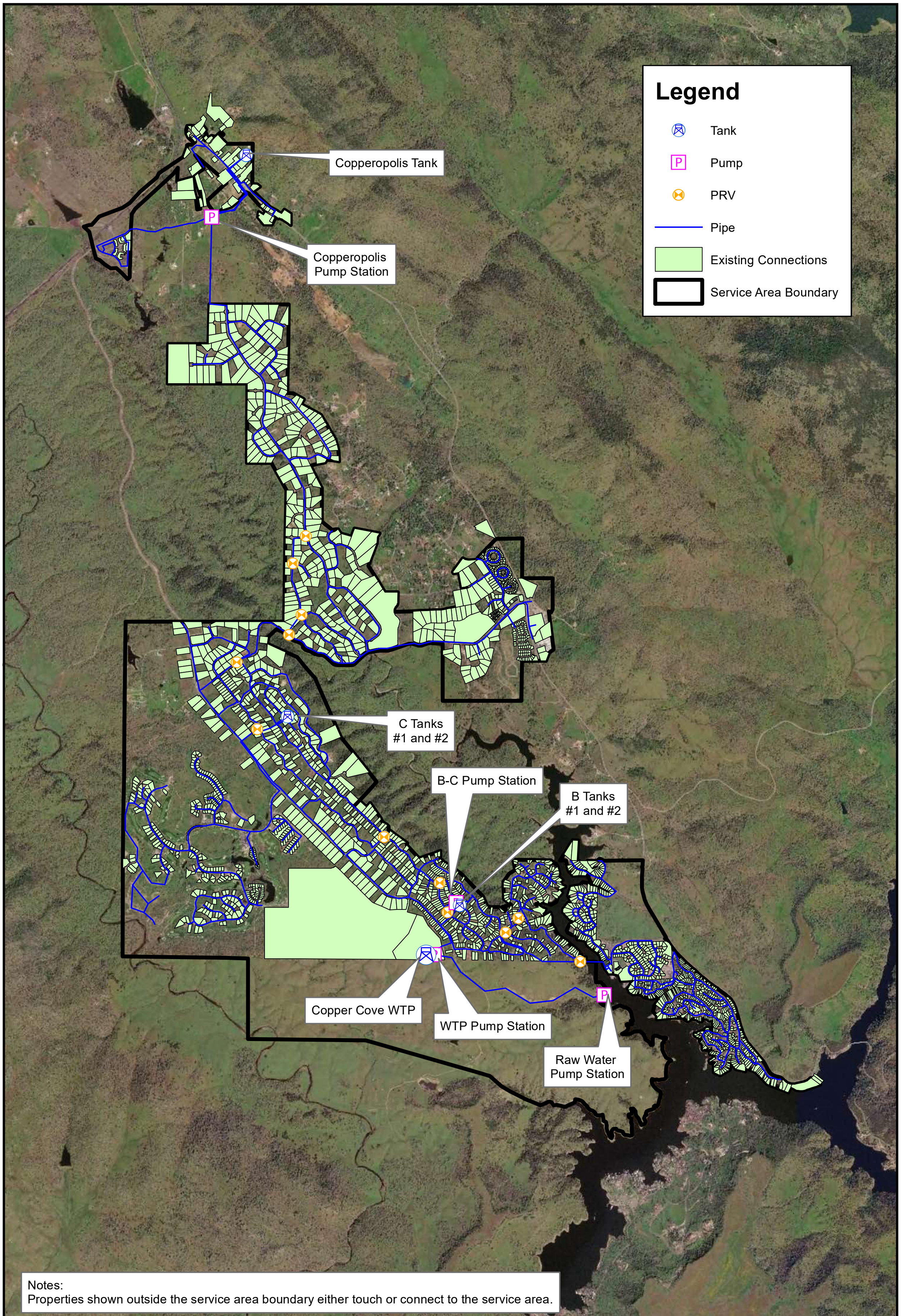
The District maintains Pre-1914 and Post-1914 water rights that allow the District to Divert up to 6,000 AF/yr to supply treated and raw water demands. These water rights can be increased if the District were to file a change petition with the SWRCB and demonstrates a need for an increased supply to the Copper Cove service area. Pursuant to contractual arrangements with NCPA and the Utica Power Authority, the District can also access pre-1914 water supplies from the North Fork Stanislaus stem after it is used for power purposes.

Water Treatment Facilities

The Copper Cove WTP was constructed in 1998 to supply treated water to the Copper Cove and Copperopolis communities. The WTP has a rated capacity of 4-mgd and has room to expand the capacity to 10-mgd. Treatment capacity is provided by two 2-mgd filter units. Service failure of one unit reduces the capacity of the WTP by half.

Treatment consists of pre-ozonation, micro-filtration, and disinfection with sodium hypochlorite. Pre-ozonation provides taste and odor control, as well as TOC and disinfection by-product reduction. A 300,000-gallon clearwell provides contact time prior to delivering water to the distribution system.

Staff operating the WTP reported significant increases in influent turbidity levels and manganese following the relocation of the raw water pumps. The average influent turbidity rose from 0.1 to 0.2 NTU to 1.5 to 2.0 NTU. Daily operations now require additional ozone, coagulant and backwash as a result of the turbidity increase.



Notes:
Properties shown outside the service area boundary either touch or connect to the service area.

PETERSON . BRUSTAD . INC
ENGINEERING . CONSULTING
80 Blue Ravine Rd, Suie 280
Folsom, CA 95630
Phone: (916) 608-2212

0 0.75 Miles
1" = 0.75 mi

2018 COPPER COVE WATER MASTER PLAN

Existing System Map

FIGURE
1

Treated Water Distribution System

The distribution system is operationally divided into ten pressure zones. The pressure zones allow water to be delivered at acceptable pressures to customers over a large range of elevations. The pressure zones are supplied by one of the five existing storage tanks: B Tanks (#1 and #2), C Tanks (#1 and #2) and the Copperopolis Tank. All the pressure zones are gravity fed from their respective storage tank. The pressure zones are summarized in Table 1, which presents the elevation ranges and the pressure ranges throughout each zone. The low-pressure conditions are given for the peak hour demand scenario and the high-pressure conditions are given for static pressure. The low-pressure condition assumes all storage tanks are half full tank and the high-pressure condition assumes all storage tanks are full.

Table 1. Copper Cove Pressure Zones

Pressure Zone	Storage Supply	Elevation Range		PHD Low Pressure Condition (psi)	Static High Pressure Condition (psi)
		Low (ft)	High (ft)		
B1	B Tanks	567	986	31 [1]	110
B2	B Tanks	673	735	80	107
B3	B Tanks	525	673	42	106
B4	B Tanks	499	645	41	105
C1	C Tanks	651	1,138	32 [1]	160 [2]
C2	C Tanks	811	951	46	108
C3	C Tanks	566	813	64	137
C4	C Tanks	618	949	67	150
C5	C Tanks	735	901	39	108
Copperopolis	Copperopolis Tank	883	1,006	51 [1]	110

[1] Low pressure for zones served by tanks is based on the lowest pressure at a distribution node.
[2] High pressure is given for highest pressure at a distribution node and not the force main connecting Zone C1 to Zones C3 and C4.

Treated Water Pumping Stations & Control Valves

The boundaries between pressure zones are defined by booster pumping stations, pressure regulating valves (PRVs), and isolation valves. Information about the booster pumping stations is summarized in Table 2. Information about the PRVs is summarized in Table 3. PRVs used to serve individual homes and cul-de-sacs have been omitted from this report.

Table 2. Copper Cove Pump Stations.

Station	Description	Model ID	Design Head (ft)	Design Flow (gpm)
WTP Pump Station	From Clearwell to B Tank	PMP-1	244	2,600
		PMP-10	244	2,600
B-C Pump Station	From B Tank to C Tank	TANKC_1	215	900
		TANKC_2	215	450
		TANKC_3	215	450
Copperopolis Pump Station	From Zone C5 to Copperopolis	U7008	150	90
		U7000	150	90

Table 3. Copper Cove PRVs.

CCWD ID	Model ID	Location	From Zone	To Zone	Dia. (in)	Elev. (ft)	HGL (ft)	Setting (psi)
#11	PRV-11	Sawmill Road & Fox Court	C1	C5	6	776	1,030	110
#5	PRV-131	Kiva Court	B1	B4	6	567	740	75
#3	PRV-19	Arrowhead Street & Signal Hill Trail	C1	B1	6	912	1,143	100
#12	PRV-32	Copper Cove Drive & Sawmill Road	C1	C4	8	654	885	100
#1	PRV-60	Kiva Drive & Bay View Drive	B1	B2	4	735	920	80
#2	PRV-71	Kiva Drive & Tewa Court	B2	B3	4	644	725	42
#13	PRV-90	Arrowhead Street & Signal Hill Trail	C1	B1	4	947	1,143	85
#6	SADDLE_ CRK	Wail Hill Road & Little John Road	C1	C3	10	935	1,051	50
#9	V8012	Copper Cove Drive & Arrowhead Street	C1	C2	4	869	1,061	83
#4	V8006	Flint Trail & Arrowhead Street	C1	C2	6	860	1,045	80
#8	V8010	Bearclaw Way & Cheyenne Road	C5	C4	4	741	903	70
#10	V8016	Acorn St & Sawmill Road	C1	C4	4	750	912	70

[1] Elevations and settings from InfoWater model, unless updated values were provided by the District.

Treated Water Storage Facilities

The existing water system includes five storage tanks and one clearwell that provide water storage for fire flow, emergency, and operational needs. These tanks are summarized in Table 4.

Table 4. Copper Cove Water Storage Tanks.

Name	Model ID	Type	Nominal Volume (gallons)	Ground Elevation (ft)	Diameter (ft)	Maximum Water Depth (ft)	Overflow Elevation (ft)
WTP Clearwell	WTP	Concrete	300,000	NA	NA	NA	NA
B1 Tank #1	B	Redwood	300,000	980	55.0	17.0	997
B1 Tank #2	B2	Welded Steel	750,000	980	65.0	30.0	1,010
C1 Tank #1	C	Welded Steel	543,000	1,140	60.0	26.0	1,166
C1 Tank #2	C2	Welded Steel	543,000	1,140	60.0	26.0	1,166
Copperopolis Tank	COPPER	Welded Steel	500,000	1,111	57.0	26.5	1,138

Treated Water Pipelines

The distribution system model includes approximately 54 miles of distribution pipe ranging from 4-inches to 30-inches in diameter as shown in Figure 1. The smallest distribution pipe diameter found in the model is four inches. Figure 1 does not show some distribution lines in many of the cul-de-sacs, which in many cases are two inches in diameter. Table 5 summarizes the distribution system characteristics from the distribution system model. Pipeline materials vary throughout the distribution system. Pipeline materials include asbestos concrete, polyvinylchloride, ductile iron and steel.

Table 5. Distribution System Characteristics.

Pipe Diameter (in)	Total Length of Pipe (miles)
4	1.15
6	23.65
8	17.83
10	9.60
12	3.37
16	0.10
18	0.37
20	2.22
24	0.06
30	0.02
Total Length	***54.38***

Existing and Projected (Buildout) Demands

Existing System Demand

The existing system demands are presented in Table 6. The average daily demand (ADD) has been adopted from the 2015 Urban Water Management Plan (2015 UWMP), while the maximum daily demand (MDD) is equal to the maximum daily production on record between 2008 and 2016. For comparison, the historic water records are presented in Table 7. The historic records present an ADD less than that adopted from the UWMP. The UWMP ADD was selected to represent the existing system to provide consistency between planning documents and to be conservative. The existing ADD is 1.58-mgd and the existing MDD is 2.69-mgd. The peak hour demand (PHD) is 4.04-mgd. The PHD was calculated using CCWD's MDD:PHD peaking factor of 1.5. Losses represent multiple issues including leakage, undocumented water consumption, and inaccurate customer meters.

Table 6: Existing System Demands

User Type	Existing ADD (MGD)	Existing MDD (MGD)	Existing PHD (MGD)	ADD: MDD Peaking Factor
Residential	0.76	1.30	1.95	1.71
Landscape	0.01	0.02	0.02	2.00
Public Service	0.01	0.01	0.02	1.00
Commercial	0.14	0.24	0.37	0.24
Losses	0.61	1.12	1.68	1.12
Total	***1.58***	***2.69***	***4.04***	***1.70***

Table 7: Historic Water Demands

Year	ADD (MGD)	MDD (MGD)	ADD: MDD Peaking Factor
2008	1.41	2.62	1.86

Year	ADD (MGD)	MDD (MGD)	ADD: MDD Peaking Factor
2009	1.24	2.69	2.17
2010	1.14	2.54	2.22
2011	1.19	2.40	2.01
2012	1.28	2.47	1.93
2013	1.37	2.53	1.84
2014	1.10	2.36	2.15
2015	0.96	1.79	1.87
2016	1.11	2.41	2.17
Maximum	***1.41***	***2.69***	***2.22***

Peaking Factors

Peaking factors define the relationship between ADD and MDD and the relationship between MDD and PHD. These peaking factors will be used to model both the existing system and the buildout system. The maximum day and peak hour peaking factors proposed for the 2018 Master Plan are as follows:

- Existing ADD:MDD Peaking Factor – 1.70 (per Table 6)
- Buildout ADD:MDD Peaking Factor – 2.22 (per Table 7)
- MDD:PHD Peaking Factor – 1.5 (per the District's *Design and Construction Standards)*

Existing and buildout peaking factors are unique due to the use of the 2015 UWMP ADD which distorts the historic relationship between ADD and MDD. Using a single peaking factor would result in an erroneous buildout MDD; therefore, unique peaking factors are defined.

Buildout System Demand

The average daily water demand at buildout was determined by calculating and summing the demand for each user type. Residential demands were calculated by multiplying the buildout population (16,513 people) by the mean residential per capita user demand (173 gallons per person-day). The mean residential per capita user demand derived from the 2015 UWMP. Using this metric to project future water demands is consistent with SB 20x2020 water conservation goals. See Table 8 for how the mean residential per capita demand was derived.

Table 8: Residential per Capita Water Demand

Year	Existing	2020	2025	2030	2035	2040
Copper Cove Population	4,416	4,708	4,944	5,127	5,280	5,373
Single Family Demand (AF/yr)	856	912	958	994	1023	1041
Residential Demand (AF/yr-person)	0.194	0.194	0.194	0.194	0.194	0.194
Mean Residential Demand (AF/person-yr)	0.194					
Mean Residential GPCD (gal/person-day)	173					
ADD Per Connection (gal/day-connection)	417					

The average daily water demand at buildout is projected to be 5.4-mgd. The buildout ADD was determined by summing residential, commercial, public service, landscape and water loss demands. The buildout MDD and PHD were calculated based on the buildout ADD:MDD peaking factor (2.22) and MDD:PHD peaking factor (1.5) defined in the previous section. The buildout system demands are summarized in Table 9.

Table 9: Buildout System Demands

User Type	Buildout ADD (MGD)	Buildout MDD (MGD)	Buildout PHD (MGD)
Residential	2.86	6.34	9.51
Commercial	0.09	0.20	0.31
Public Service	0.11	0.25	0.37
Landscape	0.06	0.14	0.21
Losses	2.23	4.94	7.41
Total	***5.35***	***11.87***	***17.81***

The commercial, landscape, and public service buildout demand factors were adopted directly from Appendix F of the 2015 UWMP and used to calculate the buildout water demand.

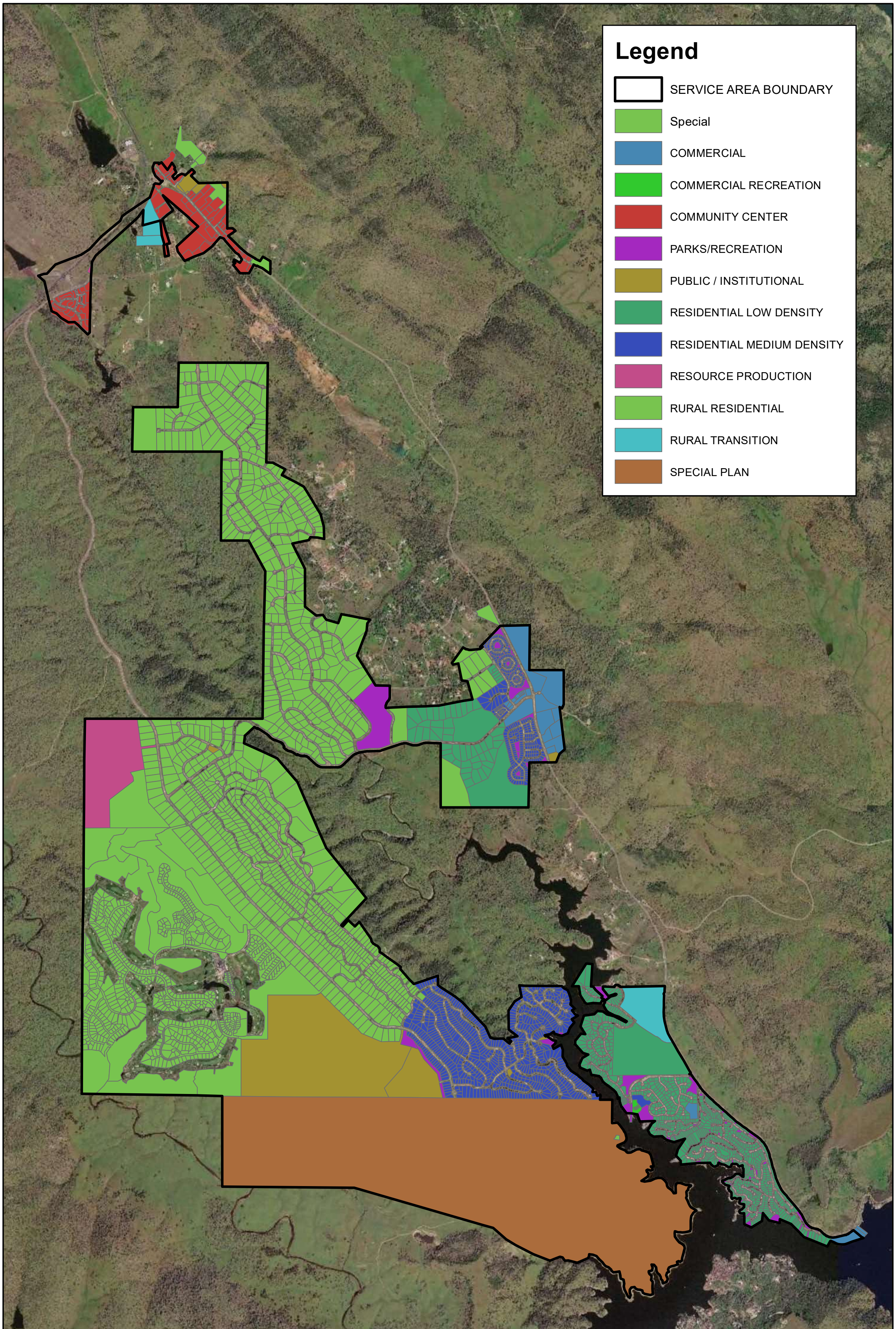
Losses at buildout were projected by deriving the percentage of water losses presented in the 2015 UWMP. Similar to the residential GPCD, losses are consistently 42 percent of the residential and non-residential (commercial, irrigation, and landscape) demands for all future demand projections. To be consistent with the 2015 UWMP, this relationship was used to calculate the average daily loss demand at buildout. Table 10 presents demand data from the 2015 UWMP to support the water loss evaluation.

Table 10: Water Loss Evaluation

Water User Type	Existing ADD (MGD)	2020 ADD (MGD)	2025 ADD (MGD)	2030 ADD (MGD)	2035 ADD (MGD)	2040 ADD (MGD)
Residential	0.76	0.81	0.86	0.89	0.91	0.93
Commercial	0.01	0.01	0.01	0.01	0.01	0.01
Public Service	0.01	0.01	0.01	0.01	0.01	0.01
Landscape	0.14	0.15	0.16	0.17	0.17	0.18
Losses	0.65	0.70	0.74	0.76	0.79	0.80
Total	1.58	1.68	1.77	1.83	1.89	1.92
Percent Losses	***0.42***	***0.42***	***0.42***	***0.42***	***0.42***	***0.42***

Infill Evaluation

The Copper Cove service area has yet to reach buildout and has considerable room to support future developments. Of the 7.5 square miles within the service area, only 3.2 square miles have been developed. The remaining 4.3 square miles provides room for future connections to be served by the WTP. A map presenting complete infill by land use type consistent with the 2016 Draft Calaveras County General Plan Update is presented in Figure 2.



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0 0.25 0.5 Miles

2018 Copper Cove Water Master Plan

Infill Map

FIGURE 2

Approximately 6,852 total residential connections are anticipated at buildout. The total number of residential connections represents the sum of existing connections, existing connection subdivisions, planned connections and unplanned connections. A summary of infill connections is presented in Table 11. Existing connections larger than three times the average land use parcel size were assumed to be subdivided at buildout, these connections represent the existing connection subdivisions. Planned connections include the 300 connections planned for the Tuscany Hills development and the 300 connections planned for the Copper Mill development. Unplanned infill connections include those anticipated in unplanned and undeveloped areas. Unplanned connections were calculated by dividing the total unplanned undeveloped area for each land use type by the respective land use density.

Table 11: Residential Connections at Buildout

Residential Land User Type	Existing Parcel Density (Ac/Conn.)	Unplanned Buildout Area (Ac)	Existing Residential Conn.	Existing Conn. Subdivisions	Planned Conn.	Un-planned Infill Conn.	Total Conn. Per User Type
Low Density	2.72	413	718	214	300	403	1,635
Medium	3.97	293	629	15	0	532	1,176
Rural	0.71	1,402	632	55	0	358	1,045
Transition	0.20	51	2	0	0	8	10
Special	2.72	1,980	338	35	300	2,060	2,733
Community Center	2.72	100	48	72	0	133	251
Total Residential Connections			***6,852***				

Buildout Population

The District is projected to serve approximately 16,510 people at buildout. The buildout population was determined based on the 6,852 buildout connections and the District's planning standard of 2.41 residents per residential connection.

Buildout Year

Copper Cove is assumed to grow at the same rate as the County; therefore, growth rates have been adopted from the 2017 Department of Finance (DOF) population growth rates for Calaveras County. The growth rates are consistent with the UWMP. The DOF growth rates are projected until year 2060. Projections beyond 2060 were assumed to equal the 2055-2060 growth rate, which is the highest incremental growth rate. Table 12 presents the DOF population growth rates in 5-year increments. Buildout is project to occur in year 2300 when the District reaches 6,852 connections based on the growth rates presented.

Table 12: Calaveras County Growth Rates per California Department of Finance, 2017

5-year Period	2016 - 2020	2021 - 2025	2026 - 2030	2031 - 2035	2036 - 2040	2041 - 2045	2046 - 2050	2051 - 2055	2056 - 2060
5-year Incremental Growth Rate	0.59%	2.17%	2.14%	1.53%	0.82%	0.46%	0.64%	1.28%	2.17%

Model Demand Factors

Water demands have been modeled according to user type and were distributed on a demand per acre basis. Demand factors used to distribute water throughout the existing and buildout systems are provided in Table 13. The aforementioned peaking factors were used to scale the demand factors and model MDD and PHD.

Table 13: Existing and Buildout Demand Factors

User Type	Existing			Buildout		
	Area (ac)	ADD (MGD)	Demand Factor [1] (gpm/ac)	Buildout Area (ac)	ADD (MGD)	Demand Factor [2] (gpm/ac)
Residential	1,503	1.53	0.35	4,366	2.86	0.77
Landscape	52	0.14	1.91	78	0.06	0.87
Public Service	260	0.01	0.02	299	0.11	0.57
Commercial	86	0.01	0.07	178	0.09	0.67
Losses [3]	1,937	0.66	0.24	4,922	2.22	0.31

[1] Existing demand factors were all calculated based on the demands presented in the 2015 UWMP and the area associated with the respective user type

[2] The buildout demand factor for the residential user type was calculated based on the residential buildout demand and the associated area. The buildout demand factors for landscape, public service, commercial user types were adopted for the 2015 UWMP.

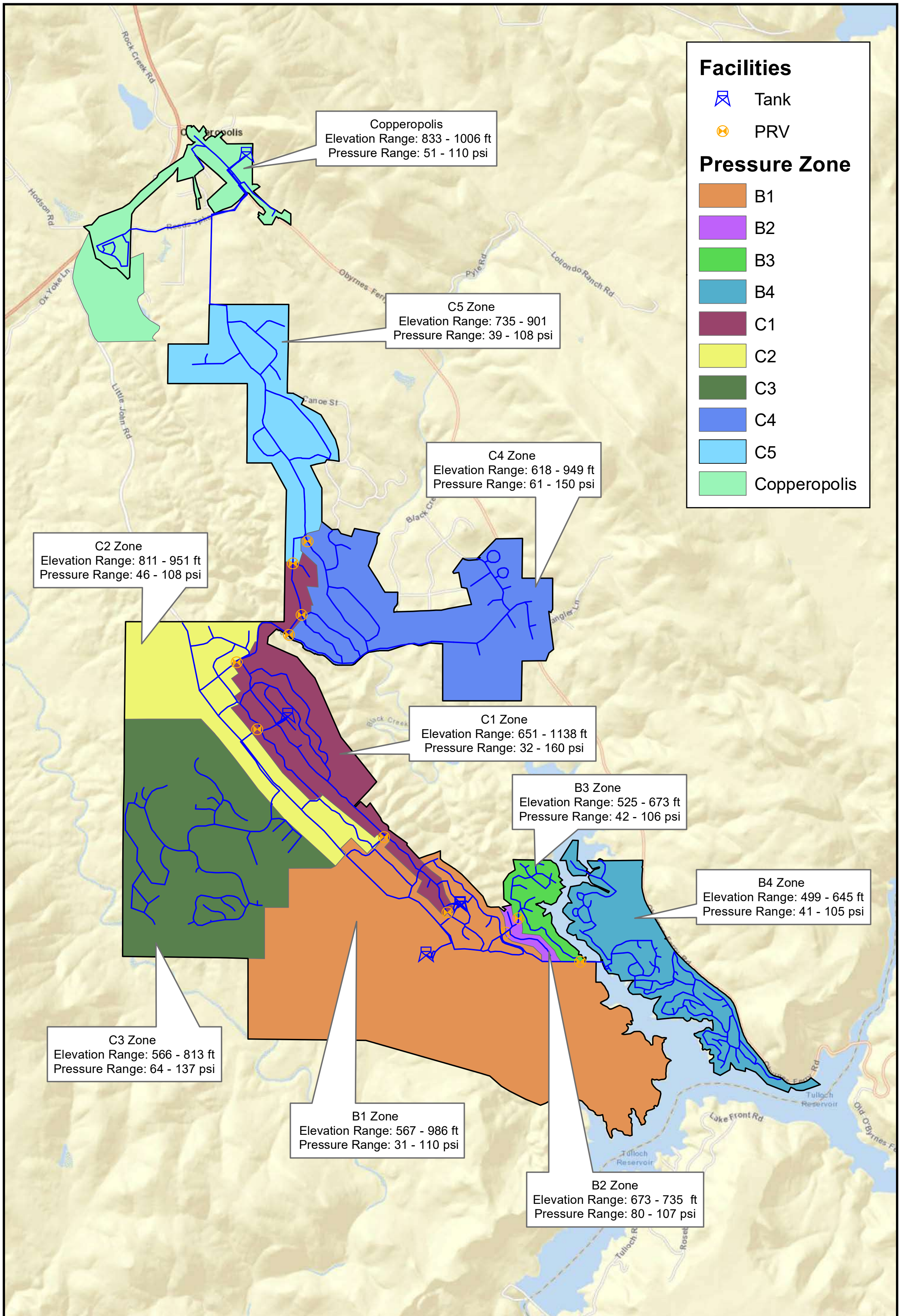
[3] Water losses are distributed evenly throughout the existing and buildout system models across the total area of all user types.

Demand Distribution

Existing and buildout demands were allocated throughout the model and summed to estimate the demand within each pressure zone. This process was repeated to estimate the demand by tank zone. The allocations of demands by pressure zone are shown in Table 14 and by tank zone in . Figure 3 presents a map of the system pressure zones.

Table 14. System Demand by Pressure Zone.

Pressure Zone	Baseline MDD (mgd)	Buildout MDD (mgd)
B1	0.28	3.13
B2	0.01	0.05
B3	0.07	0.22
B4	0.33	0.96
C1	0.29	0.92
C2	0.22	0.96
C3	0.26	1.24
C4	0.65	1.51
C5	0.46	2.34
Copperopolis	0.11	0.66



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1" = 0.75 mi.

2018 COPPER COVE WATER MASTER PLAN

System Pressure Zones

FIGURE 3

Table 15. System Demand by Tank Zone.

Tank Zone	Baseline MDD (mgd)	Buildout MDD (mgd)
B Tank	0.68	4.36
C Tank	1.89	6.96
Copperopolis Tank	0.11	0.66

Existing and Future Regulations

Drinking Water Regulations

The quality of the water provided by existing and any future facilities must meet all existing and proposed regulatory requirements. A summary of the existing and proposed drinking water quality regulations covering surface water and groundwater sources is below.

Background

The Safe Drinking Water Act (SDWA) of 1974 gave the United States Environmental Protection Agency (EPA) the authority to set standards for contaminants in drinking water supplies. The EPA established primary regulations for the control of contaminants that affect public health and secondary regulations for compounds that affect the taste, odor or aesthetics of drinking water. Under the provisions of the SDWA, the California Department of Drinking Water (DDW) has the primary enforcement responsibility. Title 22 of the California Administrative Code establishes DDW authority and stipulates State drinking water quality and monitoring standards.

Existing and Proposed Federal Regulations

The EPA has recently finalized and is in the process of finalizing several new regulations since the 1986 and 1996 Amendments to the SDWA. These regulations address both surface water and groundwater. Significant final and proposed regulations are shown in Table 16. The schedule for promulgation of the Safe Water Drinking Act Regulations (Current as of 2015) is shown in Table 17.

Table 16. Recently Adopted and Proposed Federal Regulations.

Regulations	Year Rule Finalized	Targeted Contaminants
National Interim Primary Drinking Water Regulations	1975	Set maximum levels for a wide variety of contaminants
Total Trihalomethanes	1979	Trihalomethanes
Fluoride Rule	1986	Fluoride limits
Surface Water Treatment Rule	1989	Giardia lamblia, viruses, Legionella and heterotrophic plate count
Total Coliform Rule	1989	Representative sampling of the distribution system for total and fecal coliform
Phase II Rule (organics)	1991	VOCs, SOCs and IOCs
Lead and Copper Rule	1991	Lead and copper corrosion products
Phase V Rule (organics)	1992	VOCs, SOCs and IOCs
Source Water Protection	1997	Delineate boundaries and determine origins and susceptibility of water supplies to contamination
Stage 1 Disinfection/Disinfection By-products Rule (D/DBPR)	1998	Disinfection Byproducts (THMs and HAAs); compliance date for systems serving greater than 10,000 was January 2002
Interim Enhanced Surface Water Treatment Rule (IESWTR)	1998	Giardia, Cryptosporidium, Turbidity, DBPR profiling
Variance and Exemptions Rule	1998	Variance and exceptions to help public water systems achieve compliance with MCLs
Arsenic Rule	2001	Arsenic
Filter Backwash Rule	2001	Filter backwash recycle
Long-term 1 Enhanced Surface Water Treatment Rule	2002	Microbiological, Turbidity and control of DBPs
Public Health Security and Bioterrorism Prevention and Response Act	2002	Vulnerability Assessments
Radon Rule	2004	Radon
Contaminant Candidate List 2	2004	CCL1 required no new regulated contaminants, CCL2 may include perchlorate, metolachor and MTBE
Stage 2 Disinfectants/Disinfection Byproducts Rule	2004	Introduces locational running annual average compliance for the 80/60 TTHM/HAA5 requirements
Long-term 2 Enhanced Surface Water Treatment Rule	2006	Introduction of microbial toolbox for control of Cryptosporidium
Groundwater Rule	2004	Microbial protection of groundwater supplies
Reduction of Lead in Drinking Water Act (RLDWA)	2011	Use of lead free pipes, fittings, fixtures, solder and flux for drinking water
Revised Total Coliform Rule	2014	E Coli and Total Coliforms
Drinking Water Protection Act (DWPA)	2015	Algal Toxins [1]

[1] The DWPA is an amendment to the SWDA. It requires Congress to develop a strategic plan to assess and manage the risks associated with algal toxins in public drinking water supplies. No new regulations were imposed with the amendment to the SWDA.

Table 17. Schedule for Promulgation of Safe Water Drinking Act Regulations (Current as of 2015).

Regulation	Proposed	Final	Effective
Fluoride	11/85	4/86	10/87
Trihalomethanes	2/78	11/79	11/83
8 VOCs (Phase I)	11/85	7/87	1/89
Surface Water Treatment Rule (SWTR)	11/87	6/89	6/93
Coliform Rule	11/87	6/89	12/90
Lead and Copper	8/88	6/91	1/92 [a]
Minor Revisions to Lead and Copper	4/98	1/00	1/01
26 Synthetic Contaminants [h], Seven Inorganic Contaminants (Phase II)	5/89	1/91[b]	7/92
MCLs for barium, pentachlorophenol (Phase II)	1/91	7/91	1/93
Phase V Organics, Inorganics	7/90	7/92	1/94
Radionuclides (Phase III) Except Radon	4/00	12/00	12/03
Radionuclides (Phase III) Radon	11/99	8/01 [c]	8/04 [d]
Sulfate	12/94	Decision on whether to regulate due 8/01	
MCLs for aldicarb, aldicarb sulfoxide, aldicarb sulfone	Administrative hold; no current schedule available		
Disinfectants/Disinfection Byproducts, Stage 1 DBPR	7/94	12/98 [c]	1/02 [f,g]
Disinfectants/Disinfection Byproducts, Stage 2 DBPR	9/01	5/02	5/058
Information Collection Rule	2/94	5/96	Completed
Interim ESWTR	7/94	12/98 [c]	1/02 [f]
Interim ESWTR, Stage 1 Long Term Enhanced SWTR	4/00	8/01	1/047
Interim ESWTR, Stage 2 Long Term Enhanced SWTR	9/01	5/02	5/05
Filter Backwash Recycle Rule	4/00	6/01	12/0 [c]
Consumer Confidence Reports Rule	2/98	8/98	9/98
Ground Water Rule (GWR)	5/00	11/01	6/04
Operator Certification, State Guidance	3/98	2/99	2/01
Unregulated Contaminants, Monitoring Only [i]	2/99	9/99	1/01
Five New Drinking Water Contaminants	8/00	8/01	8/04
Chlorine Gas as Restricted Use	9/00	10/01	10/03
Source Water Protection Program, Guidance [e]	8/97	Completed	Completed
Arsenic Rule	6/00	1/01	1/06
Revised Total Coliform Rule	-	4/14	4/16

Notes:

[a] Start date for tap monitoring in systems of more than 50,000 consumers.
[b] Maximum Contaminant Level (MCL), MCL + Goal (MCLG) for atrazine to be reconsidered.
[c] Dates mandated by district court
[d] Assumes regulation in effect three years after final promulgation.
[e] Program required as part of 1996 amendment.
[f] For Public Water Systems (PWS) serving more than 10,000 consumers
[g] Effective January 2004 for PWS serving more than 10,000 consumers.
[h] MCL for atrazine to be revisited.
[i] Tiered monitoring approach pending availability of analytical methods.

State Regulations

The State of California retains primacy for enforcement of drinking water regulations. In this role, the state must adopt regulations equal to or more stringent than federal regulations. For the most part, state regulations are equal to federal regulations with the following exceptions:

- Cryptosporidium Action Plan - The State set more stringent standards for the recycle of filter backwash and other recycle streams.
- California IESWTR - The State has increased the required level of monitoring for filters and may require additional inspections, monitoring and reporting.
- Source Water Assessment Program - The State has structured its SWAP to allow water utilities to conduct their own assessments to help improve and preserve water quality of the public water supply sources.

Water Age

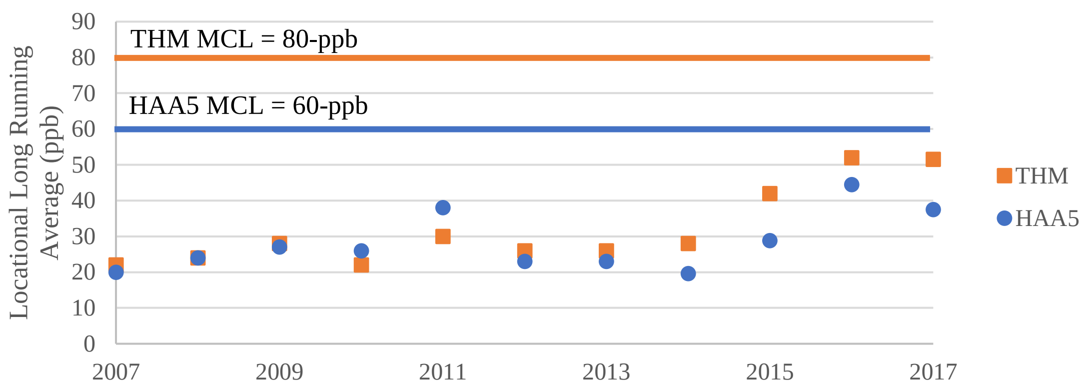
An extended period simulation water age analysis has been performed on the existing distribution and storage system under average day demands. The WTP is not detailed in the hydraulic model so water coming from the clearwell is considered "new" water (i.e., zero hours old). The hydraulic model water age analysis then calculates the age of the water after leaving the WTP (clearwell).

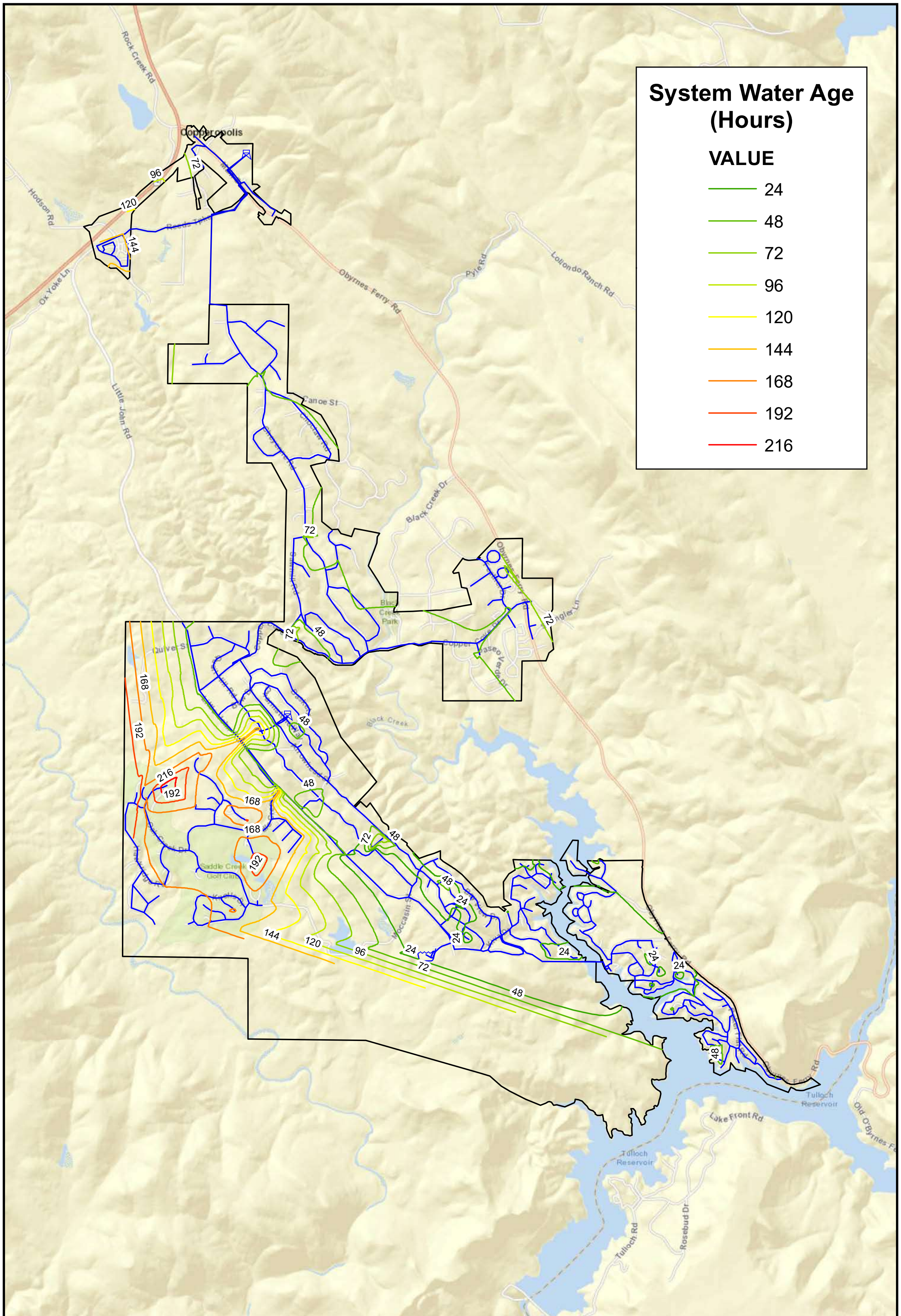
Based on the analysis, water is oldest in the Copperopolis Zone and Zone C3 (Saddle Creek). Figure 5 shows the range of values of water age, in hours, throughout the distribution system.

Disinfection By-Products

Trihalomethane (TTHM) and haloacetic acids (HAA5) monitoring and compliance is required under the Federal Environmental Protection Agency (EPA) regulations for systems with service populations of 500 to 9,999 that use treated surface water supplies. CCWD has not had a single violation in regards to either disinfection by-product over the last 10-years. Figure 4 below summarizes the disinfection by-product records presented in CCWD's Consumer Confidence Reports between 2007 and 2017.

Figure 4. Disinfection By-Product Records.





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System Water Age
Existing ADD

FIGURE
5

System Evaluation

Evaluation Criteria

The Copper Cove water system will be evaluated for its ability to meet existing and future water demands and to comply with the District's Design and Construction Standards. Two different scenarios will be analyzed as part of the 2018 WMP:

1. Existing System
2. Future System at Buildout

The system will be divided into five categories for this evaluation: water supply, water treatment, storage, pumping, and piping. The district provided a system-wide hydraulic model that was updated in 2013 to analyze the system's distribution facilities, including storage, pumping, and piping. The system model has been updated to capture new demand criteria and any new or replacement water mains installed since the last model update. A comprehensive list of model programming is included as Appendix B.

A summary of the system evaluation planning criteria is presented on the following page.

System Model Criteria:

- Existing Demand (ADD) = 1.58-mgd
- Buildout Demand (ADD) = 5.35-mgd
- Existing ADD:MDD Peaking Factor = 1.70
- Buildout ADD:MDD Peaking Factor = 2.22
- MDD:PHD Peaking Factor = 1.5

Water Treatment Design Criteria[1]:

- Treatment Plant Capacity: Hydraulic and treatment capacity sized to meet MDD.

Water Storage Design Criteria[1]:

- Storage tank sizing shall be equal to the sum of the following three components:
  - Fire Storage Reservation: A minimum of four hours times the appropriate fire flow demand.
  - System Peaking Storage: Equal to 20 percent of the maximum day flow.
  - Emergency Storage: Equal to four hours of the MDD.
- Fire Storage may be supplemented by pumps.

Water Pumping Criteria[1]:

- Pump stations shall be able to deliver the MDD with the largest pump out of service. Peak hour demands and fire flows are expected to be supplied by storage without additional pumping. If the uphill zone does not have adequate storage for fire flow, the booster pump station should have the ability to deliver the fire flow to the higher zone.

[1] *Calaveras County Water District Construction and Design Standards, June 2009.*

Existing System Piping System Design Criteria[1]:

- Transmission Lines: Hydraulic capacity sized to pass PHD at a maximum velocity of five feet per second (ft/s) and/or MDD plus fire demand, while maintaining 20 psi residual pressure in the system.
- Hazen Williams "C" Factor: Pipes shall use a "C" factor of 130 for new pipe and 110 for existing pipe.
- Fire Flow Requirements[3]: A maximum velocity of 12 ft/s shall apply to fire flow conditions and the minimum velocity shall be two ft/s. The existing District minimum fire flow requirements are listed in Table 12.
- System Pressure:
  - System shall maintain a minimum pressure of 40-psi under PHD.
  - System shall maintain a maximum pressure of 120-psi under static conditions for distribution mains.

Fire Flow Design Criteria[2]:

- Required Fire Flow:
  - Residential Districts and Individual Dwellings < 3,600-sf = 1,000-gpm
  - Commercial Districts and Individual Dwellings > 3,600-sf = 1,500-gpm
  - Undeveloped Commercial Districts = 1,500-gpm

Raw Water Supply

The existing water rights have been evaluated for their ability to supply existing and projected demand.

The current water rights provide up to 6,000 AF/yr and can support substantial growth before they will need to be expanded. The total raw water demand is 2,172 AF/yr based on the combined irrigation and Copper Cove system demands. The Copper Cove system demand is 1,770 AF/yr based on the existing ADD of Copper Cove. The Saddle Creek Golf Course is the only irrigation water user and uses approximately 400 AF/yr of raw water.

The water rights will need to be expanded to meet the combined raw water demand at buildout. The annual raw water demand will be approximately 13,615 AF/yr at buildout based on the existing commercial raw water demand and the buildout average daily demand. The raw water rights will need to be expanded before the raw water demand reaches 90 percent of the current raw water rights (5,400 AF/yr). The raw water demand is expected to reach 5,400 AF/yr when the number of connections reaches 3,775. Based on the growth rates previously presented, this will occur in year 2083. The raw water rights will need to be expanded by 8,215 AF/yr to support the Copper Cove buildout system demand. Raw water rights will need to be further increased to support any additional commercial raw water demands.

The raw water pump station and pipeline can convey up to 4.75-mgd. The pump station and the transmission main to the WTP can support conveyance of both the existing commercial raw water demands and existing system demands. The golf course only uses water half the year including summer peak demand periods. The capacity of the pump station less the allocated golf course demand is 3.75-mgd.

[1] *Calaveras County Water District Construction and Design Standards, June 2009.*
[2] Calaveras Fire Building Requirements, April 2010

The pump station and pipeline capacity will need to be expanded to support future raw water demands. Plans to expand the raw water intake and pump station are recommended when the MDD plus irrigation demand becomes 90 percent of the raw water pumping capacity available (4.3-mgd). Based on the DOF growth rates (Table 12), the MDD is expected to reach 4.3-mgd when the number of connections reaches 3,300 or in 2056 as long as the golf course remains the only irrigation water demand. The raw water intake, pump station and transmission main will need to be reconsidered if the District decides to sell any additional raw water to new commercial customers.

The existing raw water pumps are sufficient to meet the existing demand. As note in the background, the District plans to relocate one of the raw water pumps to improve influent water quality conditions and repair the existing spare pump. No further improvements are recommended to the raw water pump station at this time.

Water Treatment

The Copper Cove WTP has not been upgraded since it was originally constructed in 1998. The existing facilities have been evaluated for their ability to support existing and future demand and remaining useful life.

The current WTP facilities are rated for 4-mgd. The existing MDD is approximately 2.7-mgd. The MDD projected at buildout is approximately 11.9-mgd.

Plans to expand the WTP should begin when the MDD becomes 90 percent of the WTP's treatment capacity (3.6-mgd). The MDD is expected to reach 3.6-mgd when the number of connections in the District is approximately 3,000. This is projected to occur in 2038 based on the DOF growth rates.

All of the existing WTP facilities are in good condition with the exception of the clearwell. The clearwell coating is failing, the interior is corroding and the roof is failing according to District Staff. The existing clearwell provides disinfection contact-time which is an irreplaceable component in the WTP process. The existing clearwell must be rehabilitated or replaced to allow the District to continue providing a safe and reliable drinking water supply to Copper Cove.

Treated Water Pumping Evaluation

Each booster pump station is required to have a firm capacity equal to the Zones MDD given that each zone is supported by at least one Tank. Firm capacity assumes the largest pump is out of service. The MDD for each pumping zone under existing and buildout conditions is presented in Table 18. The District provided a condition assessment of the existing pumps at each pump station. Current conditions are described in Table 19.

Table 18. Evaluation of Treated Water Pumping without Improvements.

Station	Description	Pump Number	Design Flow (gpm)	Firm Capacity (gpm)	Existing MDD (gpm)	Buildout MDD (gpm)
WTP Pump Station	Clearwell to B Tanks	1	2,600	2,600	1,866 [1]	8,326 [1]
		2	2,600			
B-C Pump Station	B Tanks to C Tanks	1	900	900	1,390 [2]	4,709 [2]
		2	450			
		3	450			

Station	Description	Pump Number	Design Flow (gpm)	Firm Capacity (gpm)	Existing MDD (gpm)	Buildout MDD (gpm)
Copperopolis Pump Station	Zone C5 to Copperopolis	1	90	90	78	461
		2	90			
	[1] WTP Pump Station supports the demand of the entire system [2] B-C Pump Station supports the demands of both the C Zones and Copperopolis					

Table 19. Condition Assessment of Existing Pumps per the District.

Pump Station	Existing Pump Conditions
WTP Pump Station	Satisfactory Condition
B-C Pump Station	Poor Condition
Copperopolis Pump Station	Poor Condition

The WTP pump station is in good condition and has no firm capacity deficiencies. The pump station has more than sufficient firm capacity to meet the existing system demands and sufficient firm capacity to support growth beyond the useful life of the existing pumps. Planning to expand the WTP pump station capacity should begin when the system demand reaches 90 percent of the pump station's firm capacity (3.4-mgd). The system demand is expected to reach 3.4-mgd when the number of connections reaches 2,875. This is projected to occur in 2031.

The B-C Pump Station pumps are insufficient to meet the existing firm capacity required and create high-pressure deficiencies. The B-C Pump Station pumps water from the B Tanks to the C Tanks and distributes water to connections along Arrowhead Street. Due to the elevation difference between the B Tanks and C Tanks, the system pressure exceeds the 120-psi design limit at every connection south of the intersection between Flint Trail and Arrowhead Street. The B-C pump station should be improved or replaced entirely.

While the firm capacity supports existing MDD of Copperopolis, the District's condition assessment reported that the pumps are in poor condition and recommended replacement. Furthermore, the immediate development planned to the south of Copperopolis Town Center will increase the MDD at the Copperopolis Pump Station from 78-gpm to 297-gpm when complete. For planning purposes, the Copperopolis Pump Station needs to support a minimum firm capacity of 300-gpm.

Treated Water Storage Evaluation

The treated water storage evaluation considers both the condition of the existing storage facilities and the storage capacity required by those facilities.

The tank zone capacity in each zone was compared to the required storage based on the water storage design criteria. Evaluations are presented for baseline demands and buildout demands in Table 20 and Table 21 respectively. The available storage exceeds the storage required for the existing conditions in all tank zones but is insufficient to support the buildout demands.

Table 20. Evaluation of Available Storage Capacity under Existing Demand Scenario.

Criteria	B Tank Zone	C Tank Zone	Copperopolis Tank Zone
Total Storage Capacity (gallons)	1,050,000	1,086,000	500,000
Highest FF requirement in zone (gpm)	1,500	1,500	1,500
Required FF storage (gallons)	360,000	144,000 [2]	338,000 [2]
Existing Tank Zone MDD (gallons)	685,000	1,890,000	112,000
Required emergency storage (gallons)	114,000	315,000	19,000
Required operational storage (gallons)	137,00	378,000	22,000
Total required storage (gallons) [1]	611,000	837,000	379,000
Storage deficit (gallons)	-	-	-

[1] Total Required Storage = Required FF storage (4 hours) + Emergency storage (4 hours of MDD) + Operational storage (20 percent of MDD).
[2] The required FF for the C Tank and Copperopolis Tank Zone is supplemented by the existing pump capacity.

Table 21. Evaluation of Available Storage Capacity at Buildout without Improvements.

Criteria	B Tank Zone	C Tank Zone	Copperopolis Tank Zone
Total Storage Capacity (gallons)	1,050,000	1,086,000	500,000
Highest FF requirement in zone (gpm)	1,500	1,500	1,500
Required FF storage (gallons)	360,000	144,000	338,000
Buildout Tank Zone MDD (gallons)	4,365,000	6,961,000	664,000
Required emergency storage (gallons)	727,000	1,160,000	111,000
Required operational storage (gallons)	873,000	1,392,000	133,000
Total required storage (gallons)	1,960,000	2,696,000	582,000
Storage deficit (gallons)	910,000	1,610,000	82,000

Note: Total Required Storage = Required FF storage (4 hours) + Emergency storage (4 hours of MDD) + Operational storage (20 percent of MDD).

A summary of existing tank conditions is provided in Table 22. The steel tanks were assessed by Aqua-Tech Co. in 2012 and B Tank #1 has been assessed based on feedback from operations staff. B Tanks #1 and #2 are no longer in acceptable condition. B Tank #1 is nearly 50-years old, is a redwood tank, and is leaking at this time. Figure 6 presents the B Tank #1 condition and visible leaks. B Tank needs to be replaced immediately.

B Tank #2 has deteriorated significantly and was recommend by Aqua-Tech Co. to be taken out of service for rehabilitation as soon as possible. At minimum, B Tank #2 needs the existing roof and rafters to be replaced and recoating of the interior and exterior surfaces according to Aqua-Tech Co.'s recommendation.

Table 22. Condition Assessment of Existing Tanks.

Tank	Material	Tank Condition
B Tank #1	Redwood	Unacceptable Condition
B Tank #2	Steel	Unacceptable Condition
C Tank #1	Steel	Satisfactory Condition
C Tank #2	Steel	Satisfactory Condition
Copperopolis Tank	Steel	Satisfactory Condition, Lacks Redundancy

Figure 6. Condition of B Tank #1

B Tank #1 should be replaced with a new welded steel tank sized to support the projected future storage requirement at the end of a 50-year service life. The B Zone system demand is projected to be 925,000-gallon in 2070. B Tank #1 will need to provide at least 175,000 to supplement the existing capacity of B Tank #2.

The District should also consider constructing a second tank at the Copperopolis tank site to support future maintenance of the Copperopolis tank. The Copperopolis tank was constructed in 2008 and will be due for recoating maintenance within the next 15 years. The Copperopolis tank cannot to be taken out of service for maintenance unless a second or temporary tank is installed.

Treated Water Distribution Evaluation

The InfoWater hydraulic model was used to evaluate the existing distribution system. Several model scenarios were developed to identify low system pressure areas, high system pressure areas and available fire flow.

Low System Pressure Areas

Areas of low system pressure were identified using the hydraulic model PHD scenario. Nodes throughout the model were screened to determine if the pressure under PHD fell below the 40-psi minimum system pressure design criteria. Nodes where the pressure is less than 40-psi under PHD demand conditions but maintain adequate pressure under static conditions were labeled in the model as low system pressure.

Under PHD, several areas do not maintain the minimum pressure. Low-pressure areas were identified in Zones B1, C1 and C5. Zones B1 and C1 are directly served by tanks and Zone C5 is served by PRVs. The areas identified as low pressure are presented in Figure 8. Nodes where low system pressure was the result of insufficient static head were omitted from Figure 8.

High System Pressure Areas

Areas of high system pressure were identified using the existing ADD scenario. Nodes in the hydraulic model were used to identify areas where the system pressure exceeds the District's 120-psi maximum pressure criteria. Some high-pressure areas cannot be avoided due to the ranging elevations within individual pressure zones. Zones C1, C3 (Saddle Creek) and C4 have the highest susceptibility to high pressure due to pockets of low elevations along pipe mains. Figure 9 presents a map of the areas under high pressure.

High Velocity Pipelines

High velocity pipelines were identified using the existing PHD scenario. Pipelines conveying water at a rate exceeding 5 feet per second do not comply with the current District standard and were flagged. The transmission main conveying water from the B Tanks to the C Tanks and the distribution/transmission main connecting C Tanks to Zones C1, C2, C4 and C5 were both identified as deficient based on the PHD model scenario. Figure 10 presents a map of the pipeline deficiencies.

The transmission main along Arrowhead street conveys water from B-C Pump Station to C Tanks. The maximum flow through this main is limited to the output of the pump station. When the pump station operates at full capacity (1800-gpm) a pipeline velocity of 7.3 feet per second will result under existing conditions.

The distribution/transmission main along Arrowhead Street and Copper Cove Drive connects C Tanks to Zones C1, C2, C4 and C5. Under existing PHD demand conditions the velocity of the distribution main segment along Arrowhead Drive was found to range between 5.1 and 6.4 feet per second. The transmission main segment along Copper Cove Drive was found to be 5.4 feet per second.

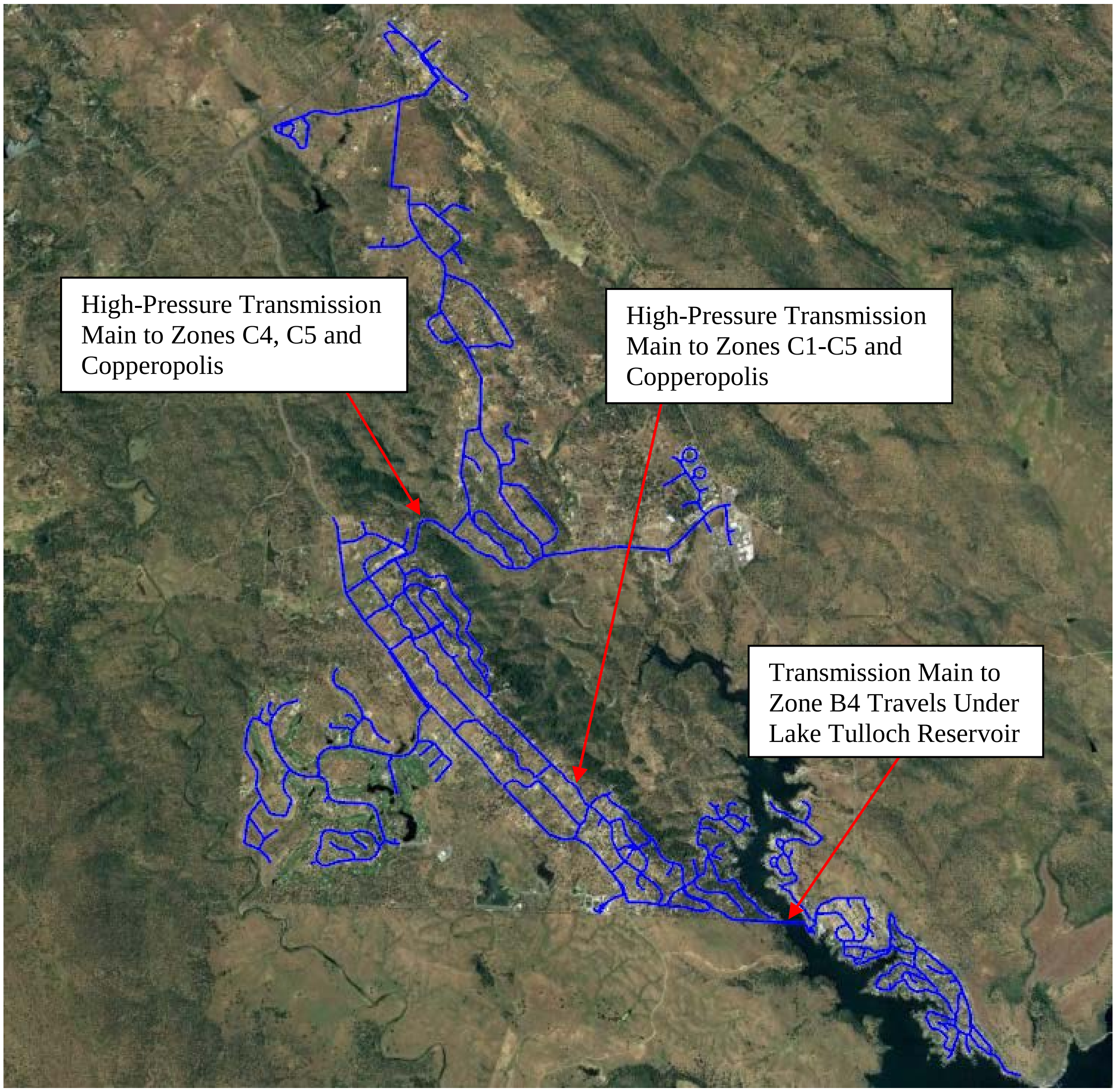
Fire Flow Deficiencies

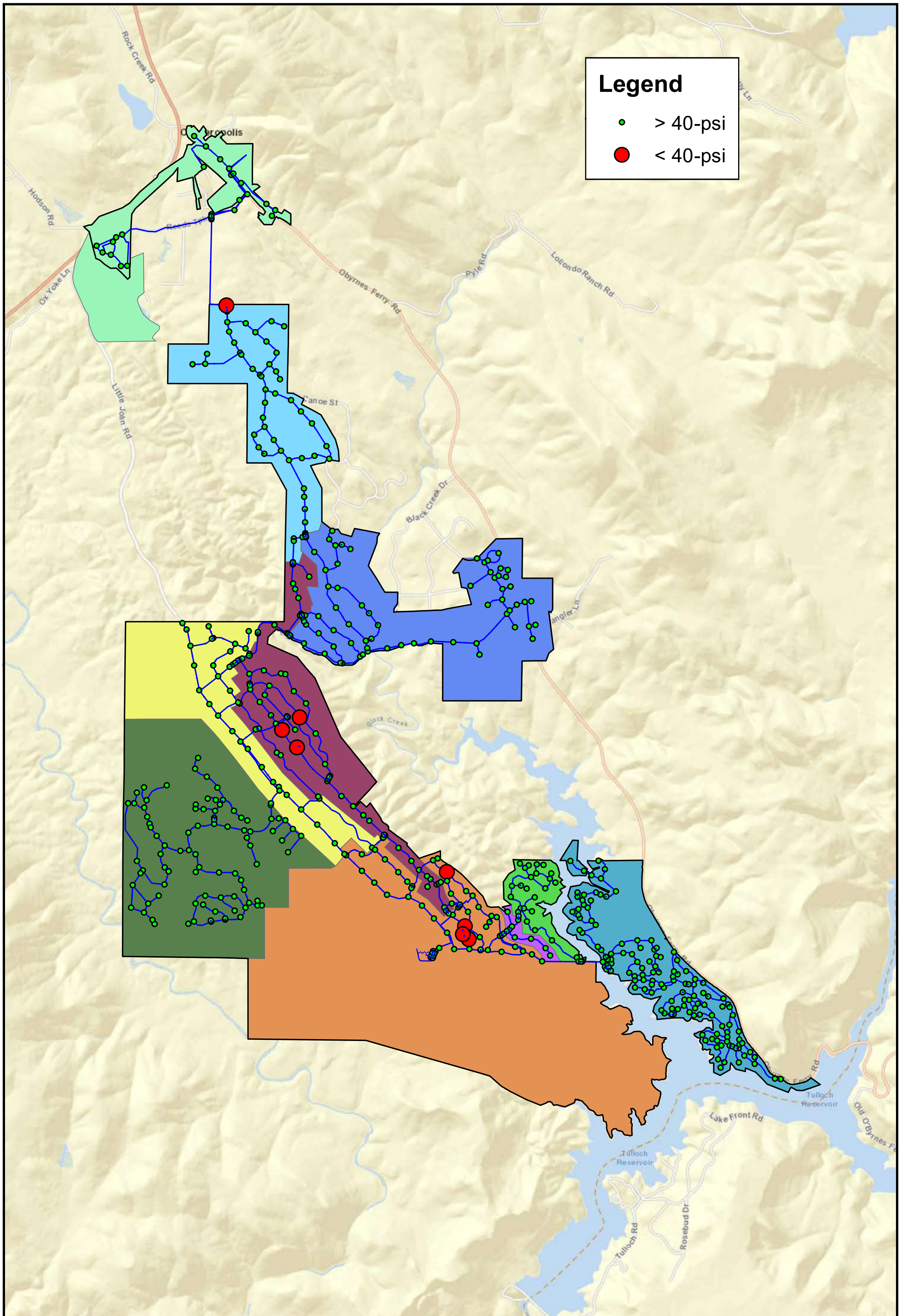
The model was used to calculate the available MDD plus fire flow for the baseline conditions. Nodes throughout the system were programmed to support either a 1,000-gpm fire flow, or a 1,500-gpm fire flow depending on the user type. All nodes within 300 feet of medium residential, commercial, or community center parcels were assigned a 1,500-gpm fire flow. All other nodes were assigned 1,000-gpm. Approximately one-third of the nodes throughout the district were found to be deficient. The greatest deficiencies were found in Zones C5 and Copperopolis where fire flows less than 500-gpm were realized, these deficiencies are presented in Figure 11.

High Risk Zones

Zone B4, Zones C1-C5, and Copperopolis are all at risk due to extended outages caused by transmission main failure (see Figure 7). Zones C1-C5 and Copperopolis are served by a single high-pressure connected to C Tanks along Arrowhead Street. Zones C4, C5, and Copperopolis are served also by a second single high-pressure transmission main along Copper Cove Drive. The high-pressure increases the potential for failure and increases the difficulty of field repairs. Similarly, Zone B4 is served by a single transmission main that crosses beneath the Lake Tulloch Reservoir. An extended outage would be unavoidable if this main were to fail within the reservoir as District field staff would be unable to perform the necessary repairs within the reservoir. It is recommended that the District construct new pipelines to loop these isolated areas to provide a redundant water service and prevent extended system outages in the event of transmission main failures.

Figure 7. High Risk Zones





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1" = 0.75 mi

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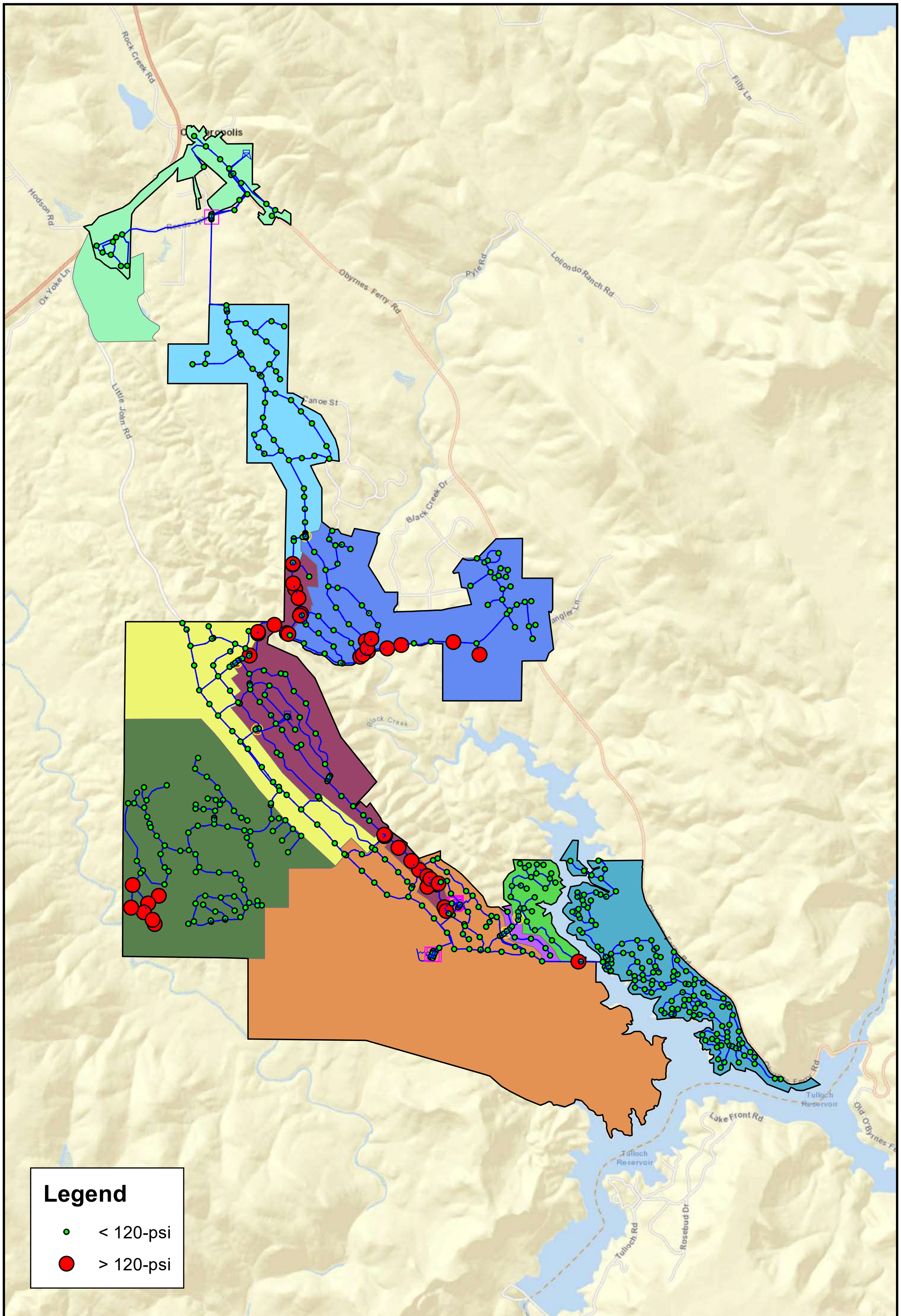
Low Pressure Nodes
Existing PHD

FIGURE

8



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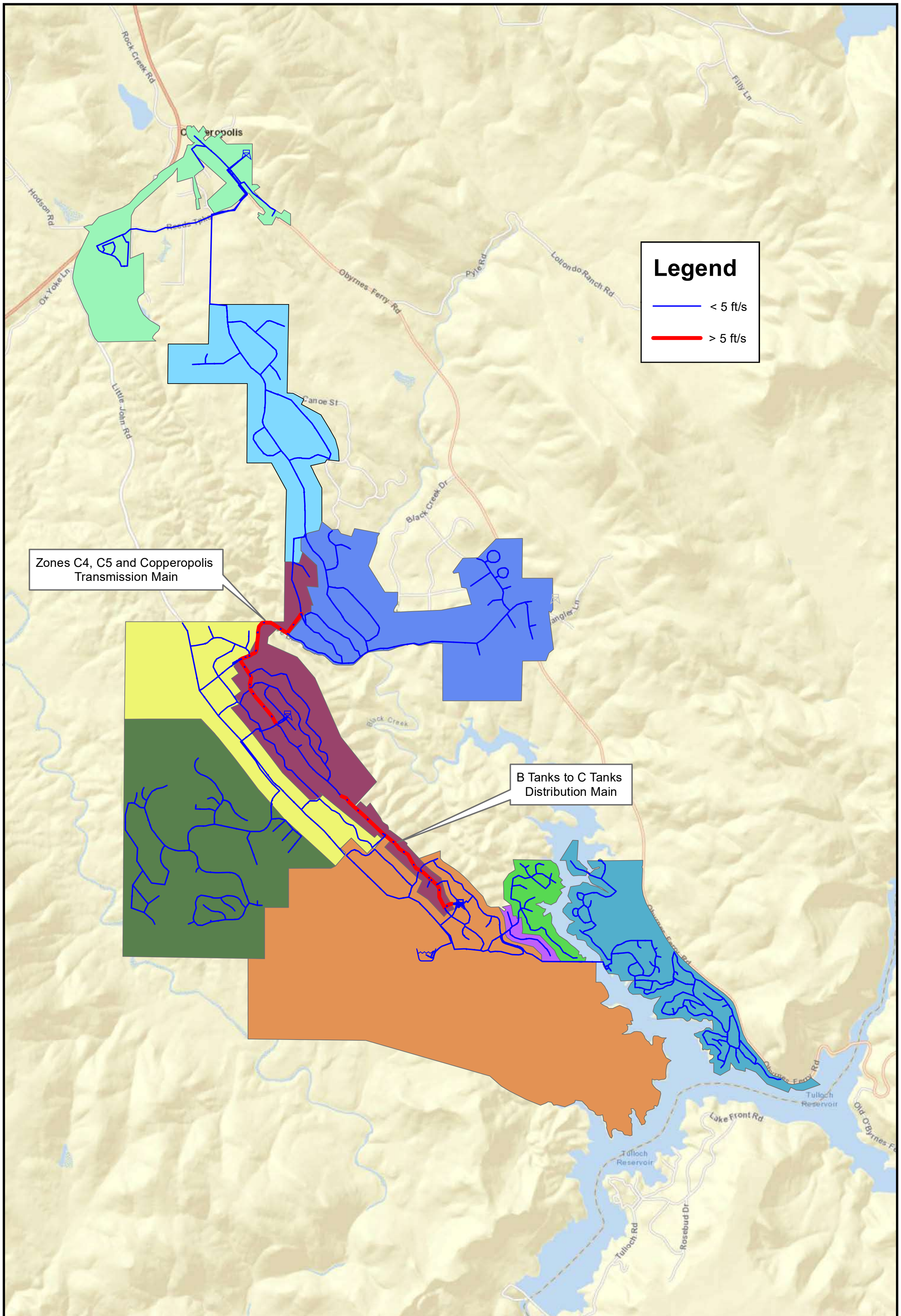
2018 COPPER COVE WATER MASTER PLAN

FIGURE 9

High Pressure Nodes
Existing ADD



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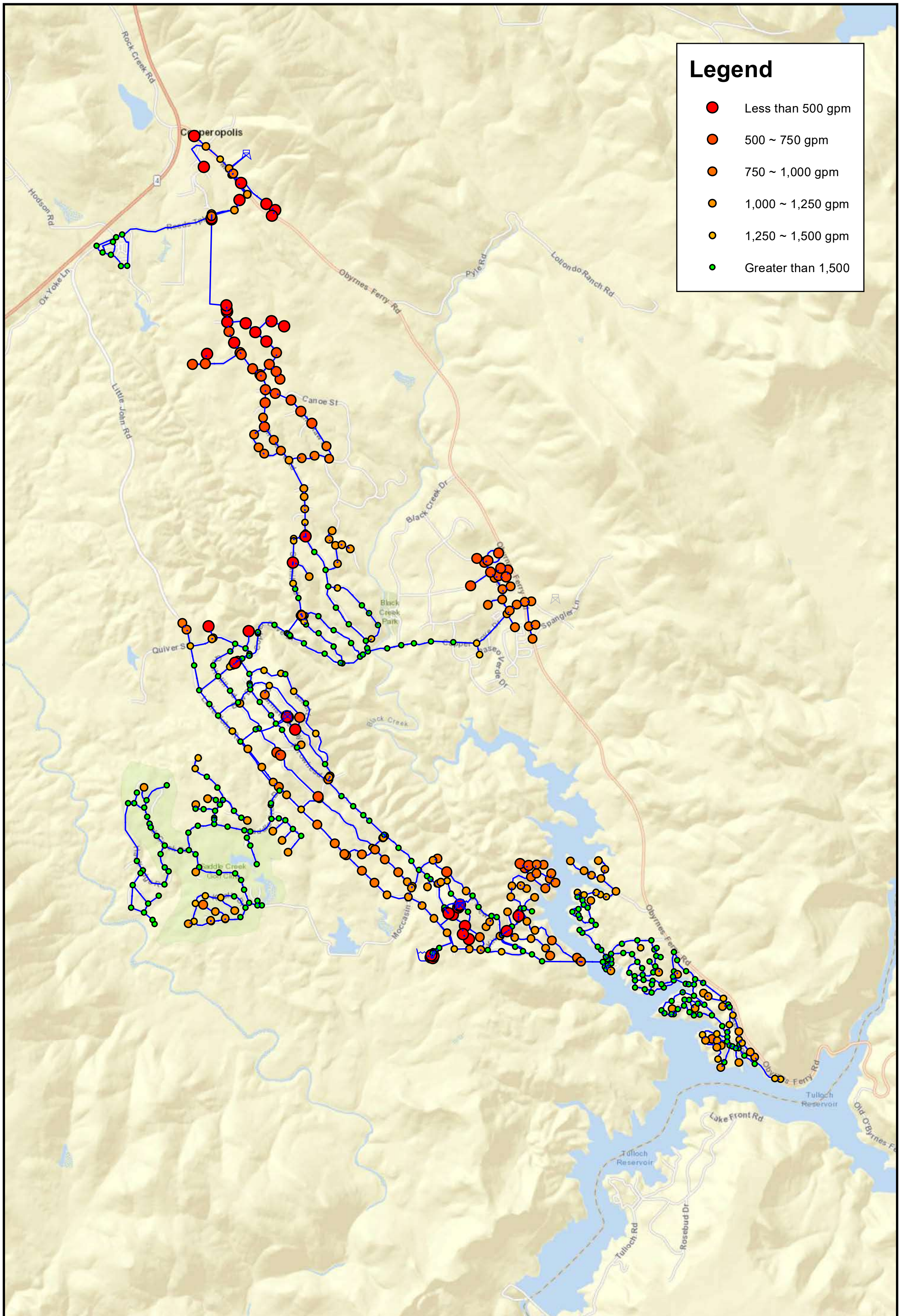
High Velocity Pipes
Existing PHD

FIGURE
10



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Fire Flow Availibility
Existing MDD

FIGURE
11

Recommended Improvements

Based on the system evaluation, the District will need to address a number of existing and near-future system deficiencies to comply with current district standards. The following projects have been identified:

- WTP Clearwell Improvements
- B Tank #1 Replacement
- B Tank #2 Rehabilitation
- C1 and Saddle Creek Transmission Main Project
- Copperopolis Pump Station Improvements
- B4 Loop Main Project
- C4 Loop Main Project
- Annual Pipe Replacement Program
- Annual Infrastructure Repair and Replacement Program

The District will need to replace existing tanks, pumps and pipelines throughout the Coper Cove Water System. For the study area to achieve a sustainable treated water supply and to be assured fire protection meets fire flow requirements, the recommended projects listed above must be in place in the immediate future. Improvements to the raw water rights, raw water pump station, WTP and WTP pump station can all be delayed until the system demand reaches their respective demand trigger (90 percent of the associated capacity). Table summarizes the projections of future improvements beyond the planning horizon of this WMP. The demand triggers are in terms of equivalent number of connections and the projected year based on the growth rates.

Table 23. Future Improvement Triggers

Future Improvement	Existing Capacity	Demand Trigger	Equivalent No. of Connections	Projected Year
Raw Water Rights	6,000-AF	5,400-AF	4,000	2083
Raw Water Pump Station	4.75-mgd	4.30-mgd	3,300	2056
Water Treatment Plant	4.00-mgd	3.60-mgd	3,000	2038
WTP Pump Station	3.75-mgd	3.40-mgd	2,875	2031

WTP Clearwell Improvements

The system evaluation identified an immediate need to rehabilitate and/or replace the existing clearwell. The clearwell is a critical WTP process and the WTP cannot be operated without it. The District can either install temporary facilities to supplement the existing clearwell and facilitate rehabilitation of the existing clearwell or construct a new clearwell. Installing a new clearwell would replace the existing clearwell and allow the District to either rehabilitate or abandon the existing clearwell.

Rehabilitation of the existing clearwell is recommended in lieu of installing a new clearwell. Efforts to install a new/secondary clearwell would be better spent at a later date when the WTP requires a capacity expansion. The existing capacity is projected to be sufficient until the District reaches 3,000 connections (projected to occur in 2033). Recoating and repairing the existing clearwell will allow the District to utilize the clearwell’s remaining useful life.

B Tank #1 Replacement

The system evaluation identified that B Tank #1 is in an unacceptable condition and needs immediate replacement. B Tank #1 is one of two tanks necessary to meet the system storage requirement. The redwood of B Tank #1 has deteriorated to the point where water is leaking through the walls and could fail. B Tank #1 needs be replaced with a tank with a capacity of at least 175,000-gallon; however, a 500,000-gallon tank is recommended. A 500,000-gallon tank will exceed the emergency and operational storage volume required to allow operations staff to take B Tank #2 offline.

B Tank #2 Rehabilitation

The system evaluation identified an immediate need to rehabilitate B Tank #2. Like B Tank #1, B Tank #2 is critical to maintaining the storage capacity requirement. B Tank #2 in an unacceptable condition; the interior and exterior tank coating has worn away allowing the underlying steel to rust. The rafters supporting the roof have deteriorated to the point where it is no longer safe for personnel to walk on the tank. Rehabilitation efforts, at minimum, include replacing the rafters and roof and recoating the interior and exterior of the tank.

C1 and Saddle Creek Transmission Main Project

The C1 and Saddle Creek Transmission Main Project is recommended to address multiple distribution system deficiencies and reduce system pumping requirements identified in the system evaluation. The project consists of constructing a new transmission main to convey water to Saddle Creek and Zone C1 (C Tank); constructing a new 1,900-gpm pump station and decommissioning existing B-C Pump station; and installing new PRV at the Flint Trail and Arrowhead Street intersection.. The C1 and Saddle Creek Transmission Main Project is presented in Figure 12. The project addresses and resolves multiple system deficiencies identified in the system evaluation:

- High-pressure deficiencies in Zone C1
- High-pressure deficiencies in Zone C3 (Saddle Creek)
- High-velocity deficiencies of the B Tank to C Tank Distribution Main
- B-C Pump Station Firm Capacity Deficiency

High pressure deficiencies in Zone C1 are addressed by decommissioning the B-C Pump Station and installing a new PRV at the intersection of Flint Trail and Arrowhead Street.

The project will also relieve Zone C3 high-pressure deficiency while reducing the system pumping requirements . The majority of the time Saddle Creek does not require the head provided by the C Tanks and is better served from B Tanks. Serving Saddle Creek via the WTP will relieve the high-pressure deficiency along Quail Creek Drive between B Tanks and C Tanks. PRVs would otherwise need to be installed along Quail Creek Drive to address the high system pressure deficiencies.

High-velocity deficiencies in the distribution main along Quail Creek Drive will also be addressed. Directly distributing water to C Tanks via the new pipeline will reduce the velocity in the in the main along Quail Creek and eliminate the need to improve the distribution man.

The C Tank Pump Station firm capacity deficiency will be resolved by installing three new 950-gpm pumps designed to support the projected system demand through the next 30-years. The project will also reduce the water age in the system by nearly 24-hours by bypassing the B Tanks and distributing water directly to Saddle Creek and C Tank.

B4 Backup Main Project

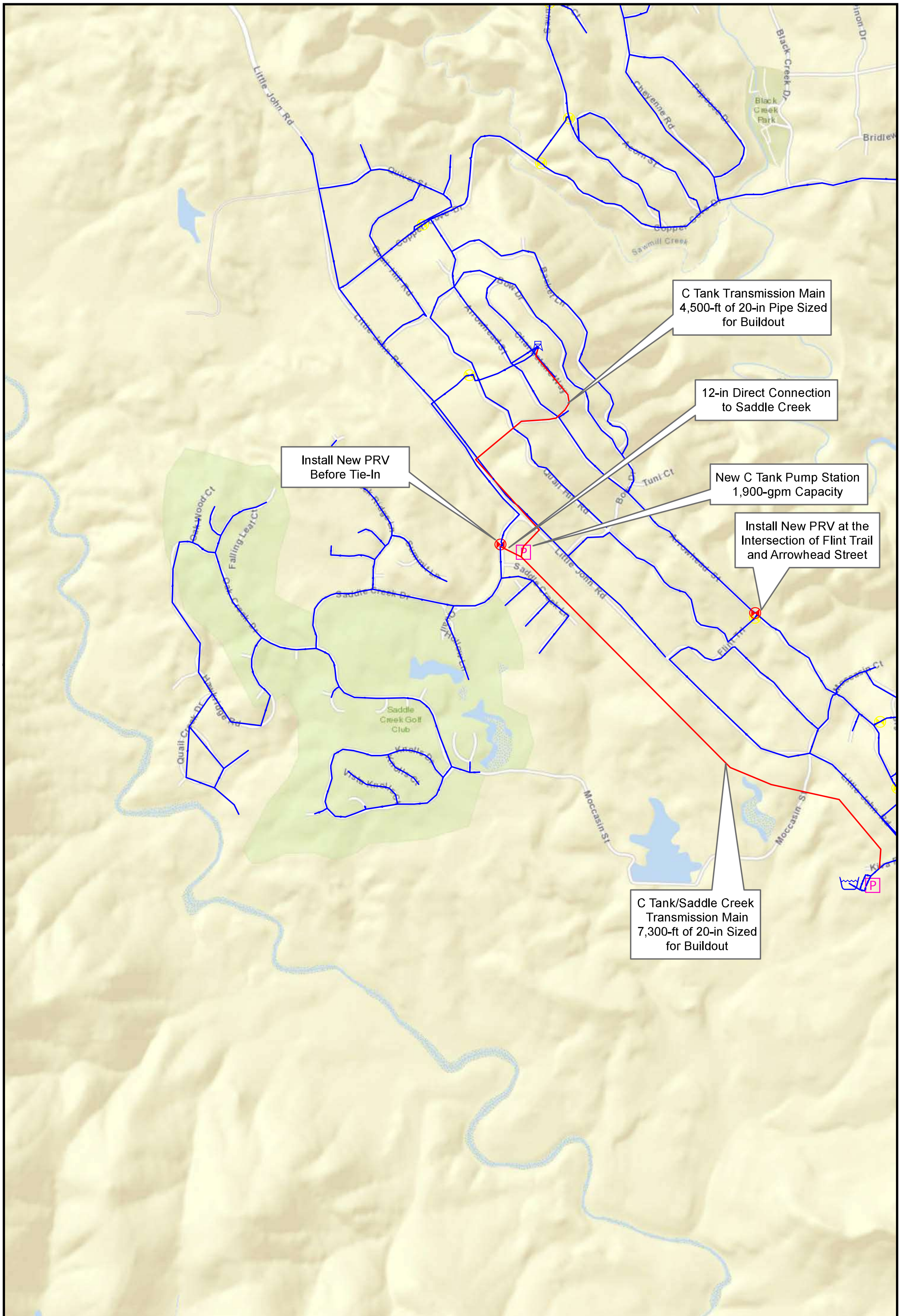
The B4 Backup Main Project is recommended to provide a redundant water source to Zone B4. The redundant water supply eliminates the risk of an extended outage if the transmission main supplying B4 fails within the segment under Lake Tulloch Reservoir. The Project consists of constructing a second 1,000-ft 12-in pipeline crossing under Lake Tulloch Reservoir.

C4 Loop Main Project

The C4 Loop Main Project is recommended to loop Zones B1 and C4. The loop provides a redundant water source and will eliminate fire flow deficiencies in Zone C4. The redundant water supply eliminates the risk of an extended outage if the high-pressure transmission main supplying C4 fails. The Project consists of constructing approximately 8,500-feet of 12-inch pipe parallel to the District's existing force main and installing a PRV. The proposed pipeline alignment is presented in Figure 14.

Copperopolis Pump Station Project

The Copperopolis Pump Station Project is recommended to replace the existing pumps and upsize the pump station capacity. The improved pump station is recommended to provide sufficient capacity to address near future developments discussed in the system evaluation and address the poor condition of existing pumps. Three 150-gpm pumps are recommended to provide a firm capacity of 300-gpm. The pump station will also help offset fire flow deficiencies in Copperopolis Zone.



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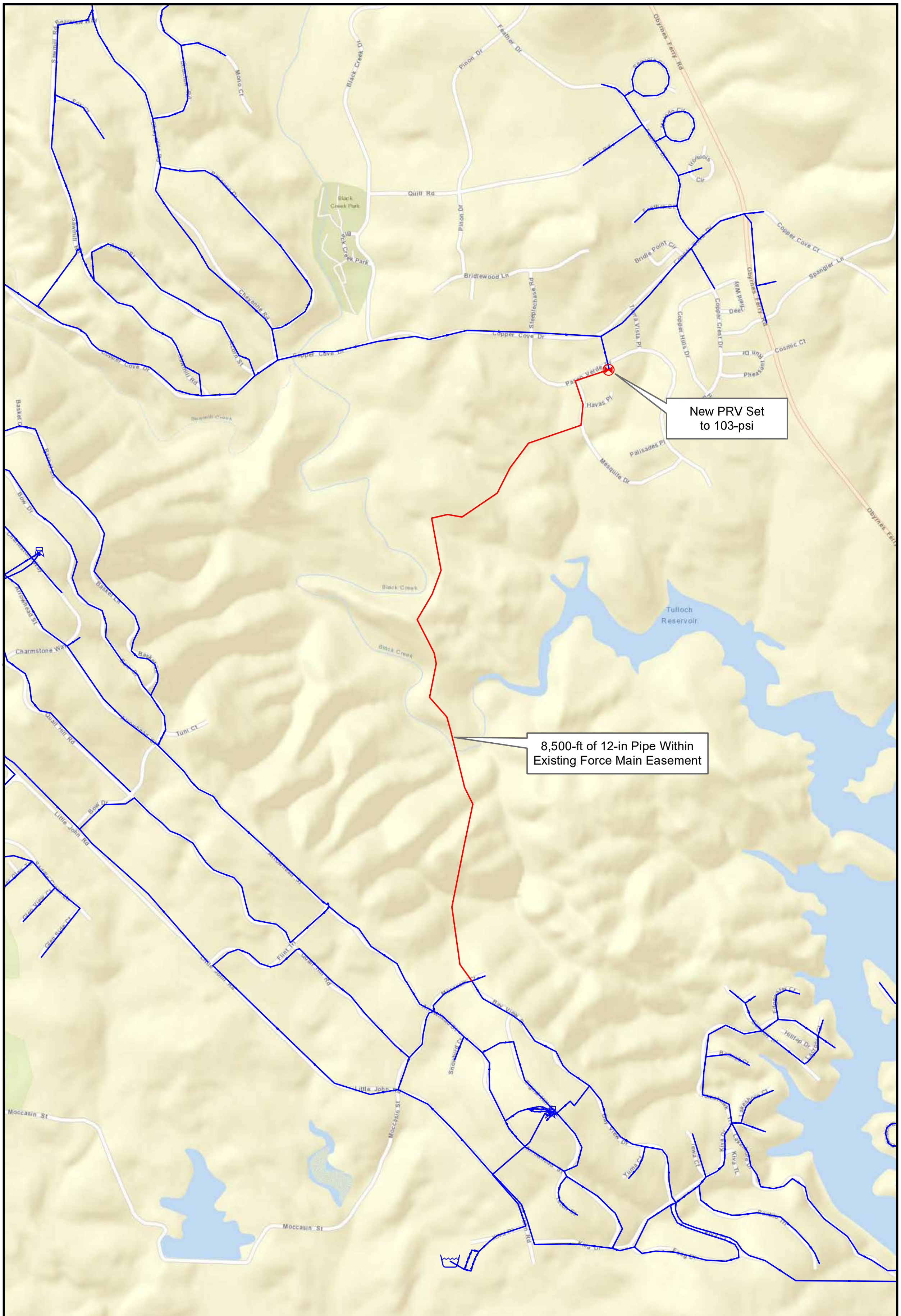
C1 and Saddle Creek Transmission Main Project

FIGURE 12



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1" = 1000 ft.

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Zone C4 Loop Project

FIGURE 13

Annual Pipe Replacement Program

The District currently maintains approximately 54 miles of distribution lines 4-inches and greater. The average useful life of pipe is approximately 100-years. To prevent deferring maintenance, the District should plan to replace approximately 0.5 miles of pipeline each year once the Zone C1 Main Improvements are complete.

Pipe mains are recommended to be replaced with new pipe sized to meet the District Standards under buildout conditions. Appendix A lists all of the distribution system pipe segments that need to be upsized to meet buildout conditions. Pipe segments not listed in Appendix A are recommended to be replaced in kind. The pipes listed in Appendix A have been sized to meet the District's design criteria under both buildout PHD and MMD plus Fire Flow conditions.

Annual Infrastructure Repair and Replacement Program

A life cycle assessment was prepared to update the annual budget required by the District's Repair and Replacement Program (R&R) required to maintain the existing facilities. Based on the value of District assets, the District should allocate at least $464,000 annually for R&R. Table 24 presents a summary of District Assets, their value, their lifetime, and the annual cost of R&R.

Table 24. Annual Rehabilitation and Replacement Program Cost Assessment

Asset	Present Value	Lifetime (years)	Annual R&R Cost ($/year)
Copper Cove WTP & WTP Pump Station	$8,000,000 [1]	30	$267,000
Raw Water Pump Station & Pipeline	$1,500,000 [1]	30	$50,000
C Tank and Copperopolis Pump Stations	$750,000 [1]	30	$25,000
B Tank # 1	$450,000 [2]	50	$9,000
B Tank # 2	$937,000 [3]	50	$19,000
C Tank # 1	$815,000 [2]	50	$16,000
C Tank # 2	$815,000 [2]	50	$16,000
Copperopolis Tank	$815,000 [2]	50	$16,000
Annual Cost of R&R Program			***$418,000***

[1] Per 2014 Capacity Charge Update Escalated to 2018 dollars.
[2] Cost based on $1.50 per gallon for new storage tank.
[3] Cost based on $1.25 per gallon for new storage tank.

Capital Improvement Plan

Recommendations for a CIP have been developed based on the recommended projects presented in the prior chapters. The following section summarizes project recommendations, estimates the cost of each of the recommended projects and presents a prioritized implementation schedule.

Summary of Recommended Improvements and Implementation Schedule

Seven projects and two repair programs are recommended in response to the current conditions of the Copper Cove water system. The Projects have been listed in order of highest priority to lowest; 1 being the highest priority. Priority has been given to the clearwell and B Tanks improvements as they are essential to providing water to the entire system. The remaining projects were prioritized in order of the number of system deficiencies addressed. The Copperopolis Pump Station Project was given the lowest project priority given the dependence on future development in Copperopolis and can be deferred until development progresses or until the existing pumps begin to fail.

Table 25: Recommended Improvements

Priority	Project/ Program	Project Description	Project Goals
1	WTP Clearwell Improvements	Rehabilitate WTP clearwell	Maintain safe and reliable drinking water supply
2	B Tank #1 Replacement	Replace B Tank #1 with 500,000-gallon welded steel tank	Maintain system storage capacity requirement
3	B Tank #2 Rehabilitation	Repair rafters, roof and interior and exterior coating	Maintain system storage capacity requirement
4	C1 and Saddle Creek Transmission Main Project	Construct new transmission main and pump station to supply Zones C1 and C3 (Saddle Creek)	Replace B-C Pump Station, relieve high-pressure deficiencies in C1 and C3, relieve high-velocity deficiencies, reduce pump energy and reduce system water age
5	B4 Backup Main Project	Secondary main under Lake Tulloch.	Provides redundant water supply to Zone C4.
6	C4 Loop Main Project	Loops Zone B1 and C4	Provides redundant water supply to Zones B4 and relieves fire flow deficiency
7	Copperopolis Pump Station Project	Replacement of Existing Pumps	Increase pump station capacity
8	Annual Pipe Replacement Program	Pipe Replacement	Replace 1% of Pipe Annually
9	Annual Infrastructure Repair and Replacement Program	Replace or Rehabilitate District Assets	Maintain District Assets

The Projects have been broken into three phases such that all of the projects are addressed within the next 10 years and that the replacement programs are implemented following completion of the first two phases. Phases are intended to be implemented over 5-year periods according to the following schedule:

- Phase I – (2019-2023)
    - WTP Clearwell Improvements
    - B Tank #1 Replacement
    - B Tank #2 Rehabilitation
    - C1 and Saddle Creek Transmission Main Project
- Phase II – (2024-2028)
    - B4 Backup Main Project
    - C4 Loop Main Project
    - Copperopolis Pump Station Project
- Phase III – Annual Repair and Replacement Programs (2029 and Beyond)
    - Annual Pipe Repair and Replacement Program
    - Annual Infrastructure Repair and Replacement Program

Estimated Costs

Planning-level cost estimates are present in Table 26 for each of the recommended capital improvement projects.

The recommended projects, estimated costs, and proposed schedule were developed through a planning-level analysis that was appropriate for the WMP update and should be revaluated in further detail prior to implementation.

Table 26: Estimated Cost of Capital Improvement Projects

Project	Recommened Imrovements	Quantity	Unit	Unit Cost	Component Cost	Project Cost
Phase I: 2019-2023						
WTP Clearwell Improvements	Aluminum Dome Roof	1	LS	$ 500,000	$ 500,000	$750,000
	Recoat Clearwell	1	LS	$ 250,000	$ 250,000	
B Tank #1 Replacement	New 500,000-Gallon Tank	1	LS	$ 750,000	$ 750,000	$750,000
B Tank #2 Rehabilitation	Coating, Rafters and Roof Rehabilitation	1	LS	$ 400,000	$ 400,000	$400,000
C1 and Saddle Creek Transmission Main Project	20-in Pipe	11800	FT	$ 690	$ 8,142,000	$8,652,000
	C Tank Pump Station	1	LS	$ 500,000	$ 500,000	
	PRV Station	1	EA	$ 10,000	$ 10,000	
					Phase I Total	***$10,552,000***
Phase II: 2024-2028						
Project	**Recommened Imrovements**	**Quantity**	**Unit**	**Unit Cost**	**Component Cost**	**Project Cost**
B4 Backup Main Project	12-in Pipe	1000	FT	$ 1,250	$ 1,250,000	$1,260,000
	PRV Station	1	EA	$ 10,000	$ 10,000	
C4 Loop Project	12-in Pipe	8500	FT	$ 414	$ 3,519,000	$3,529,000
	PRV Station	1	EA	$ 10,000	$ 10,000	
Copperopolis Pump Station	Replace Pumps and Upgrade Electrical	1	LS	$ 400,000	$ 400,000	$400,000
					Phase II Total	***$5,189,000***
Phase III: 2029 and Beyond						
Project	**Recommened Imrovements**	**Quantity**	**Unit**	**Unit Cost**	**Component Cost**	**Project Cost**
Annual Pipe Repair and Replacement Program	1% of Pipe per Year	5	EA	$ 418,000	$ 2,090,000	$6,465,000
Annual Infrastructure Repair and Program	Miscellaneous R&R	5	EA	$ 875,000	$ 4,375,000	
					Phase III Total	***$6,465,000***

TOTAL COST OF CIP IMPLEMENTATION	**$22,206,000**

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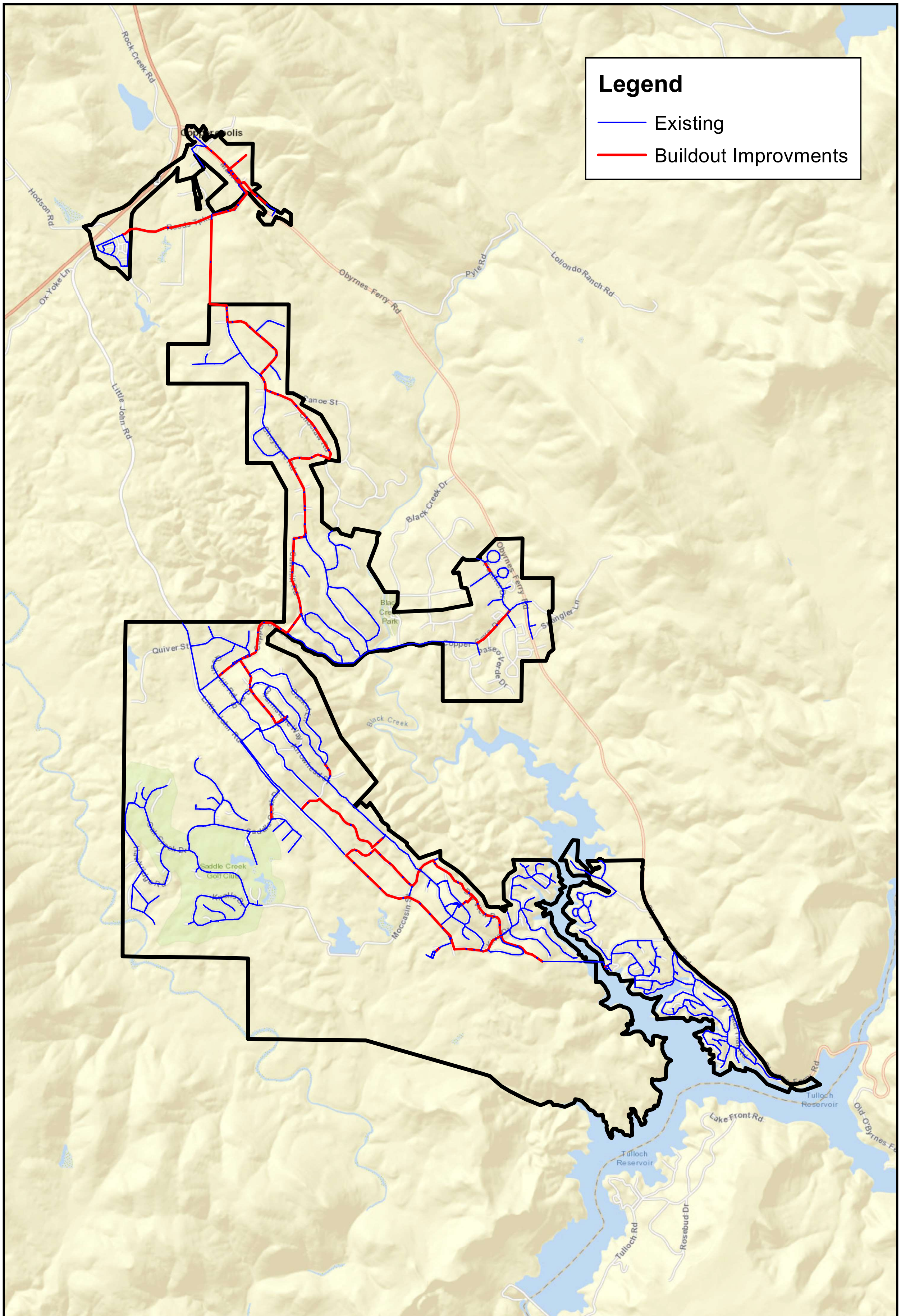
APPENDIX A

BUILDOUT PIPE DIAMETERS



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Distribution System
Buildout Improvements

FIGURE

A-1

Pipe ID	Location	Length (ft)	Existing Diameter (in)	Buildout Diameter (in)
12	Kiva Court	411	10	16
28	Arrowhead Street	443	10	20
29	Arrowhead Street	586	10	20
38	Copper Cove Drive	1420	8	12
42	Copper Cove Drive	132	8	12
54	Feather Drive	380	6	12
67	Kiva Drive	68	6	10
70	Kiva Court	1285	10	16
92	Kiva Drive	258	6	10
94	Kiva Drive	501	6	10
100	Bay View Drive	924	6	10
109	Bow Drive	432	6	8
112	Arrowhead Street	142	10	20
113	Arrowhead Street	338	10	20
114	Arrowhead Street	572	10	20
118	Copper Cove Drive	499	6	8
140	Sawmill Road	540	8	16
151	Lake Tulloch Drive	106	6	10
414	Saddle Creek Drive	468	12	16
477	Cheyenne Road	404	8	12
509	Sawmill Road	292	8	16
514	Cheyenne Road	1062	8	12
515	Canoe Street	517	6	8
520	Choctaw Road	907	6	8
521	Choctaw Road	540	6	8
522	Choctaw Road	568	6	8
525	Salmon Road	456	6	8
526	Salmon Road	522	6	8
527	Salmon Road	434	6	8
P-13	Kiva Place	168	18	26
P-32	Antelope Street	1146	4	10
P33	Main Street	422	4	10
P35	Main Street	644	4	10
P39	Main Street	218	4	10
P-41	Cheyenne Road	346	6	12
P43	Main Street	411	4	10
P-44	Quail-Hill Road	616	6	8
P-46	Flint Trail	475	6	8
P-47	Flint Trail	635	6	8
P-48	Quail-Hill Road	2525	6	8
P49	Reeds Turnpike	6359	12	16
P-49	Bow Drive	746	6	8
P-53	Little John Road	578	6	8

Pipe ID	Location	Length (ft)	Existing Diameter (in)	Buildout Diameter (in)
P69	Sawmill Road	194	6	8
P-73	Bay View Drive	618	6	10
P-75	Moccasin Street	1211	6	8
P-76	Quail-Hill Road	215	6	8
P-78	Copper Cove Drive	88	10	16
P-79	Copper Cove Drive	851	10	16
P-101	Bay View Drive	548	10	20
P-102	Bay View Drive	637	10	20
P133	Bay View Drive	273	6	10
P-133	Cheyenne Road	485	8	12
P135	Bay View Drive	645	10	20
P141	Kiva Drive	639	6	10
P143	Little John Road	650	6	8
P-150	Cheyenne Road	452	8	12
P193	Copper Cove Drive	134	6	10
P195	Copper Cove Drive	162	6	10
P199	Sawmill Road	45	8	16
P211	Copper Cove Drive	239	10	16
P231	Sawmill Road	154	6	8
P233	Copper Cove Drive	768	10	16
P239	Copper Cove Drive	56	10	16
P241	Sawmill Road	80	8	16
P243	Sawmill Road	70	6	8
P307	Copperopolis Transmission Main	3372	6	12
P339	Sawmill Road	640	8	16
P341	Sawmill Road	732	8	16
P353	Copperopolis Transmission Main	140	6	12
P359	Copperopolis Transmission Main	70	6	12
P373	Salmon Road	627	6	8
P377	Salmon Road	471	6	8
P379	Salmon Road	473	6	8
P391	Choctaw Road	348	6	8
P401	Canoe Street	435	6	8
P403	Canoe Street	452	6	8
P405	Choctaw Road	459	6	8
P407	Choctaw Road	497	6	8
P409	Cheyenne Road	281	8	12
P411	Cheyenne Road	355	8	12
P413	Sawmill Road	174	8	16
P415	Sawmill Road	85	8	16
P417	Sawmill Road	207	8	16
P419	Sawmill Road	309	8	16

Pipe ID	Location	Length (ft)	Existing Diameter (in)	Buildout Diameter (in)
P481	Quail-Hill Road	441	6	8
P483	Quail-Hill Road	461	6	8
P485	Flint Trail	519	6	8
P499	Arrowhead Street	311	10	20
P501	Arrowhead Street	523	10	20
P503	Arrowhead Street	59	10	20
P509	Copper Cove Drive	122	6	8
P535	Little John Road	738	6	8
P537	Little John Road	740	6	8
P539	Little John Road	575	6	8
P541	Little John Road	551	6	8
P543	Little John Road	572	6	8
P545	Little John Road	605	6	8
P547	Kiva Drive	373	6	10
P553	Bay View Drive	435	10	20
P555	Bay View Drive	177	10	20
PRV-11_D	Sawmill Road	39	8	16
PRV-11_U	Sawmill Road	696	8	16
PRV-32_U	Copper Cove Drive	509	10	16

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APPENDIX B

JUNCTION REPORTS

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
1	538.04	87.57	86.93	740.55	739.07	0.74	0.71
2	786.43	99.53	95.72	1016.59	1007.79	0.8	2.84
3	681.44	95.35	76.86	901.92	859.17	3.13	10.56
4	567	75.18	74.9	740.85	740.2	0	19.98
6	705.65	84.87	66.38	901.91	859.16	1.11	2.48
8	721.66	77.95	59.46	901.91	859.16	2.34	8.92
9	621.35	121.41	102.89	902.11	859.28	10.83	61.29
10	779.87	2.03	1.58	784.56	783.51	4.53	43.39
12	951.9	82.97	75.81	1143.77	1127.21	1.28	2.97
13	877.39	51.17	51.13	995.72	995.64	0.85	3.68
15	774.07	95.59	95.62	995.11	995.19	1.09	2.15
16	834.78	69.24	69.2	994.9	994.79	0.95	6.67
17	806.44	81.47	81.39	994.83	994.65	0.26	16.41
18	964.64	77.46	70.3	1143.77	1127.22	2.14	3.52
19	887.94	143.09	103.47	1218.85	1127.22	0.57	1.36
20	938.74	124.85	81.5	1227.44	1127.22	0	0.38
21	865.15	149.57	113.33	1211.02	1127.23	0.83	2.72
22	859.02	144.88	115.99	1194.07	1127.25	1.57	2.58
23	945.35	96.03	89.16	1167.42	1151.54	1.5	4.55
24	1063.28	41.31	38.22	1158.8	1151.67	1.45	6.13
25	1046.39	45.97	45.59	1152.7	1151.82	0.81	2.71
26	945.86	88.51	88.87	1150.55	1151.37	1.19	2.41
27	871.38	119.25	120.94	1147.15	1151.05	0.6	1.22
28	867.87	83.59	83.59	1061.17	1061.18	0.76	0.99
29	650.94	212.16	162.22	1141.56	1026.06	1.05	2.8
31	653.69	108.39	90.27	904.35	862.44	1.01	1.86
32	662.57	104.55	86.16	904.35	861.81	0.85	1.42
33	603.35	130.01	111.72	904	861.69	1.01	1.3
34	566.28	145.84	127.74	903.52	861.68	0.15	0.07
35	618.37	122.77	104.18	902.28	859.28	14.05	26.67
36	644.16	111.55	93.02	902.11	859.26	9.63	13.1
37	680.06	95.94	77.46	901.93	859.19	1.98	4.64
38	714.38	81.09	62.61	901.91	859.16	0.9	17.83
39	692.27	90.64	72.17	901.88	859.16	4.41	2.74
40	703.92	85.61	67.13	901.88	859.15	9.18	14.92
41	698.26	88.05	69.57	901.87	859.15	1.73	2.57
43	703.23	85.87	67.41	901.82	859.13	2.05	2.68
44	725.91	76.07	57.6	901.82	859.12	0.54	5.66
45	713.22	81.54	63.09	901.79	859.13	0.96	1.72
46	722.26	77.64	59.18	901.79	859.12	3.37	13.18
47	723.42	77.13	58.68	901.79	859.12	3.24	5.26
48	685.3	93.67	75.19	901.91	859.18	0.52	1.79
49	696.69	88.75	70.26	901.91	859.17	1.67	3.17
50	707.55	84.05	65.56	901.91	859.16	0.79	2.33

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
51	706.24	84.6	66.12	901.87	859.15	2.35	4.43
52	709.45	83.19	64.73	901.82	859.13	0.51	0.74
53	718.43	79.29	60.84	901.79	859.12	1.16	1.87
54	817.93	76.54	76.14	994.93	994	1.28	7.84
56	845.57	64.63	64.43	995.02	994.56	0.74	9.21
57	816.3	77.3	77.17	995.06	994.76	0.98	5.84
58	720.04	86.35	86.35	919.73	919.71	0.14	0.59
59	708.04	91.54	91.53	919.73	919.71	0.39	1.38
60	619.99	64.92	62.91	770.12	765.48	0.58	0.9
61	608.19	70.03	68.02	770.12	765.48	0.28	1.02
62	577.27	83.38	81.34	770.1	765.36	1.2	3.01
63	591.33	77.3	75.23	770.08	765.3	0.53	1.45
64	543.68	97.92	95.91	770.12	765.48	1.74	3.38
65	563.81	89.22	87.21	770.12	765.48	4.57	4.13
66	533.89	102.15	100.06	770.11	765.28	1.85	15.89
67	727.29	83.22	83.21	919.73	919.7	0.44	1.83
69	576.73	83.61	81.55	770.08	765.3	1.72	4.18
70	555.13	92.95	90.88	770.08	765.3	0.57	0.9
71	525.23	105.88	103.81	770.08	765.3	1.8	3.09
72	535.4	101.49	99.42	770.08	765.3	1.47	2.39
73	552.95	93.89	91.83	770.08	765.3	0.84	1.96
74	579.81	82.28	80.21	770.08	765.3	0.61	1.35
75	629.92	60.61	58.54	770.08	765.3	0.45	1.17
76	633.33	59.14	57.07	770.08	765.3	0.76	1.69
77	623.62	63.34	61.27	770.08	765.3	0.32	1.1
78	721.81	85.59	85.58	919.73	919.71	0.78	2.18
79	861.51	57.91	57.94	995.44	995.49	1.86	3.18
80	903.62	39.68	39.59	995.39	995.16	1.54	3.25
81	752.55	119.32	115.05	1028.47	1018.62	1.94	2.93
82	912.19	35.82	35.61	995.02	994.55	0.81	2.05
83	922.49	95.69	88.53	1143.77	1127.22	0.69	2.08
84	843.44	65.62	65.48	995.18	994.85	0.84	1.43
85	815.33	77.6	77.35	994.77	994.21	1.47	3.3
87	807.41	81.03	80.79	994.79	994.23	0.88	1.16
88	792.98	87.26	86.93	994.76	994.01	3.94	7.91
90	764.21	99.86	99.91	995.13	995.25	0	0.39
92	924.4	89.52	89	1131.41	1130.21	0.9	1.78
93	639.56	56.46	54.45	770.12	765.49	0.3	0.67
94	545.88	96.96	94.91	770.1	765.36	0.91	2.52
95	811.57	79.16	78.89	994.63	993.99	3.61	7.26
96	834.88	97.4	95.16	1060.12	1054.94	2.96	8.11
97	892.13	72.7	70.68	1060.24	1055.58	0.48	4.07
98	848.81	87.35	47.18	1050.81	957.92	0.18	5.72
99	934.32	99.76	93.88	1165.01	1151.4	6.18	9.54
100	951.89	90.41	86.26	1160.96	1151.36	3.75	17.22

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
101	1002.17	64.94	64.51	1152.33	1151.35	1.86	4.08
102	962.06	82.03	81.75	1151.75	1151.11	2.75	5.25
103	1056.45	44.26	41.18	1158.8	1151.67	2.89	4.46
104	1103.59	21.07	20.65	1152.33	1151.35	1.92	3.31
105	899.28	108.08	108.94	1149.22	1151.21	2.37	3.57
106	934.44	93.24	93.78	1150.05	1151.31	0.86	1.86
107	849.95	91.24	91.02	1060.94	1060.43	2.52	4.67
108	827.59	100.88	100.26	1060.87	1059.44	1.65	19.08
109	852.47	90.08	89.34	1060.78	1059.07	4.11	7.35
110	878.91	78.69	78.02	1060.88	1059.34	3.9	27
111	905	67.41	66.69	1060.87	1059.22	1.55	28.04
112	925.66	58.48	57.99	1060.91	1059.77	0.57	3.59
113	888.5	74.58	74.31	1060.96	1060.33	2.01	4.73
114	810.84	108.09	107.68	1060.8	1059.85	3.07	5.89
115	983.37	72.28	72.59	1150.52	1151.23	2.37	5.53
117	735.52	74.85	54.56	908.61	861.69	1.27	2.69
118	600.36	131.04	113.06	903.38	861.8	1.54	2.06
119	742.64	69.41	51.83	903.14	862.5	1.18	5.63
120	776.41	152.59	107.5	1129.28	1025	1.36	2.62
121	745.33	68.23	50.74	903.13	862.66	3.2	4.54
122	776.99	109.56	104.59	1030.34	1018.85	4.63	6.84
123	499.12	104.48	104.02	740.74	739.67	0.3	1.46
124	510.2	99.68	99.17	740.71	739.53	0.25	1.53
125	508.72	100.32	99.81	740.7	739.52	0.5	13.16
126	527.63	92.11	91.57	740.63	739.38	1.86	0.96
128	536.37	88.32	87.75	740.61	739.3	0.04	0.51
129	533.92	89.38	88.81	740.61	739.29	0.2	0.27
130	523.21	94.03	93.52	740.65	739.48	0.38	0.28
131	520.75	95.11	94.6	740.7	739.52	0.74	0.2
132	516.66	96.88	96.37	740.69	739.52	3.49	4.72
134	556.33	79.68	79.08	740.59	739.21	0.62	1.64
135	550.95	82	81.34	740.56	739.03	1.69	2.45
136	543.94	85.03	84.37	740.56	739.03	1.26	2.83
137	556.73	79.49	78.8	740.54	738.95	0.89	8.39
138	562.09	77.17	76.47	740.54	738.92	1.37	2.53
139	541.87	85.91	85.21	740.54	738.91	1.13	1.63
140	544.26	84.88	84.17	740.54	738.9	0.61	1.04
141	541.79	85.94	85.24	740.53	738.9	0.24	0.48
142	550.01	82.39	81.69	740.54	738.9	1.04	1.87
143	575.52	71.36	70.65	740.54	738.9	1.16	1.97
144	540.87	86.34	85.63	740.53	738.89	0.24	0.59
145	544.5	84.77	84.06	740.53	738.88	0.99	1.58
146	553.75	80.77	80.04	740.52	738.84	0.55	1.27
147	550.04	82.37	81.63	740.52	738.8	0.48	23.45
148	534.94	88.9	88.15	740.51	738.79	1.23	2.87

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
149	528.39	91.73	90.98	740.51	738.79	0.98	1.5
150	523.71	93.75	93.01	740.51	738.78	4.09	6.4
151	544.26	84.87	84.17	740.54	738.91	0.48	0.73
152	533.46	89.54	88.83	740.53	738.88	1.56	2.24
349	840	91.15	50.96	1050.79	957.85	0.28	7.43
350	834	93.75	53.44	1050.79	957.59	0.74	11.07
352	813.88	102.43	62.18	1050.76	957.68	0	12.95
353	819.05	100.2	116.05	1050.76	1087.43	0.12	6.15
354	822.97	98.49	114.36	1050.73	1087.43	1.51	5.33
355	827.23	96.65	112.55	1050.72	1087.5	0.41	1.46
356	836.65	92.57	108.51	1050.72	1087.58	0.94	1.94
357	850.55	86.56	102.54	1050.72	1087.69	0.22	1.51
358	859.81	82.56	98.58	1050.72	1087.77	0.5	3.56
359	866.91	79.49	95.51	1050.72	1087.77	0.07	5.12
361	832.32	94.44	110.3	1050.71	1087.4	1.33	8.32
366	883.75	72.21	88.72	1050.72	1088.9	1.13	6.27
377	843.86	89.44	105.3	1050.69	1087.37	0.26	7.41
384	887.47	70.58	86.43	1050.69	1087.33	1.02	4.74
385	885.82	71.3	87.14	1050.69	1087.33	1.17	2.73
386	884.7	71.78	87.62	1050.69	1087.33	0.19	5.79
387	882.56	72.71	88.55	1050.69	1087.33	0.3	4.88
388	884.75	71.76	87.6	1050.69	1087.33	1.18	6.1
390	801.4	107.8	123.64	1050.69	1087.31	2.36	12.91
391	783.52	115.53	131.37	1050.69	1087.31	0.27	6.7
392	858.98	82.9	98.75	1050.69	1087.34	1.28	4.61
393	849.18	87.14	103	1050.69	1087.35	0.71	5.54
394	845.84	88.59	104.45	1050.7	1087.39	0.48	3.23
395	861.44	81.84	97.68	1050.69	1087.33	1.12	5.59
396	858.51	83.1	98.94	1050.69	1087.32	0.55	5.1
397	803.9	106.72	122.56	1050.69	1087.32	0.06	6.79
398	768.6	121.98	80.07	1050.69	953.76	0	5.23
399	837.59	92.13	50.57	1050.64	954.54	1.19	4.33
401	780.13	116.91	75.29	1050.5	954.24	22.27	4.05
402	785.79	114.47	72.85	1050.5	954.25	0.05	1.11
403	785.12	114.76	73.14	1050.5	954.25	2.53	5.88
404	782.25	116	74.38	1050.51	954.26	0.96	2.63
405	798.23	109.11	67.61	1050.55	954.58	0.57	10.39
406	813.21	102.64	61.13	1050.57	954.57	1.52	11.73
407	827.84	96.33	54.8	1050.6	954.55	2.46	11.53
408	784.09	115.21	73.55	1050.5	954.18	0.83	2.25
409	817.14	100.91	59.21	1050.5	954.06	1.69	5.48
410	807.55	105.06	63.33	1050.5	954.01	1.62	4.62
411	824.98	97.52	55.81	1050.5	954.05	0.14	4.13
412	825.36	97.36	55.66	1050.5	954.08	0.44	2.83
425	747.27	131.21	89.3	1050.69	953.78	0	4.25

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
429	841.08	90.56	48.83	1050.5	953.99	0.44	6.14
430	743.74	132.73	90.82	1050.69	953.76	0	4.88
431	735.14	136.45	94.54	1050.69	953.76	0	5.35
432	740.6	134.09	92.19	1050.69	953.78	0	2.79
433	766.64	122.83	80.92	1050.69	953.76	0	8.75
434	747.3	131.19	89.28	1050.69	953.76	0	9.38
435	737.78	125.23	121.38	1027.38	1018.47	1.61	2.06
438	756.17	116.49	113.25	1025.55	1018.05	5.4	7.67
439	759.9	114.24	111.49	1024.09	1017.72	4.66	10.3
440	688.95	92.59	75.04	903.05	862.47	1.7	2.51
441	738.18	122.7	120.68	1021.91	1017.24	4.46	7.7
442	771.23	108.04	106.06	1021.08	1016.48	1.25	2.27
443	765.43	110.71	108.68	1021.44	1016.75	1.87	5.66
444	839.79	78.29	76.27	1020.85	1016.16	1.54	4.38
445	799.99	95.62	93.59	1021.11	1016.4	3.78	4.85
446	833.9	80.66	78.69	1020.43	1015.87	6.06	10.83
447	849.17	73.97	72	1020.23	1015.67	5.12	7.14
448	884.1	58.7	56.72	1019.84	1015.26	2.86	3.93
449	874.1	62.73	60.95	1019.15	1015.04	0.89	1.35
450	873.19	62.86	61.12	1018.54	1014.52	2.26	3.32
451	824.25	84.18	82.43	1018.91	1014.87	2.84	3.66
453	880.41	59.65	57.97	1018.35	1014.46	3.87	5.07
458	508.05	100.54	99.89	740.54	739.04	0.95	0.94
459	519.21	95.71	95.05	740.53	739.01	1.21	10.22
460	589.95	65.12	64.46	740.53	739.01	0.58	0.95
461	565.26	75.79	75.12	740.53	738.98	0.45	0.77
462	549.97	82.4	81.73	740.53	738.98	0.71	1.31
463	519.26	95.67	94.98	740.5	738.89	0.96	1.5
464	550.67	82.09	81.38	740.5	738.87	0.04	1.73
465	549.25	82.69	81.96	740.48	738.79	1.35	2.11
466	564.63	76.04	75.3	740.47	738.77	0.85	1.25
467	567.13	74.96	74.22	740.47	738.77	0.87	1.38
468	603.31	59.31	58.57	740.46	738.75	0.61	1.32
469	513.51	98.15	97.41	740.47	738.78	0.99	1.28
470	531.16	90.51	89.77	740.47	738.76	0.55	1
471	556.62	79.5	78.76	740.47	738.75	0.81	1.43
472	562.66	76.89	76.14	740.46	738.74	0.47	0.51
473	554.73	80.32	79.58	740.47	738.75	1.22	4.18
474	548.54	82.99	82.25	740.46	738.74	0.53	0.65
475	561.88	77.22	76.48	740.46	738.75	0.55	0.89
476	593.58	63.52	62.77	740.46	738.75	0.76	1.02
477	590.2	64.98	64.23	740.46	738.74	0.39	0.51
478	612.66	55.27	54.52	740.46	738.74	1.26	1.62
479	538.73	87.24	86.49	740.46	738.74	1.49	2.37
480	562.63	76.9	76.16	740.46	738.75	0.33	0.77

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
481	547.46	83.46	82.72	740.46	738.74	0.59	0.68
482	592.31	64.06	63.31	740.45	738.72	0.38	0.88
483	550.42	82.18	81.43	740.46	738.73	0.35	0.76
484	544.48	84.75	84	740.45	738.72	0.45	0.73
485	538.5	87.33	86.58	740.45	738.71	1.21	1.3
486	536.65	88.13	87.38	740.45	738.71	0.29	0.43
487	506.85	101.02	100.27	740.45	738.71	2.26	2.64
488	545.87	84.14	83.39	740.45	738.71	0.31	0.52
489	525.29	93.04	92.29	740.45	738.71	0.3	0.62
490	525.38	93	92.25	740.45	738.71	0.35	0.7
491	567.3	74.88	74.13	740.45	738.72	0.16	0.3
492	526.77	92.4	91.65	740.45	738.71	2.11	3.39
493	555.42	80.01	79.26	740.45	738.71	3.44	7.78
494	704.27	85.46	66.98	901.91	859.16	6.88	19.68
496	884.45	57.53	56.15	1017.5	1014.31	2.6	3.33
497	781.61	1.26	0.69	784.51	783.2	0.04	4.74
500	792	97.82	93.71	1018.21	1008.7	0.56	0.2
780	882.24	58.78	57.12	1018.18	1014.33	3.05	4.54
J10	837	78.42	76.61	1018.36	1014.17	17.42	22.36
J12	852.42	72	70.14	1018.91	1014.19	1.58	9.16
J14	881.62	77.19	78.21	1060.12	1014.2	1.74	11.42
J16	602.8	59.53	66.87	740.46	1014.43	1.26	5.95
J-17	841.69	66.48	72.28	995.44	1128.06	0.46	1.55
J18	951.42	47.3	70.25	1060.8	1014.86	2.67	3.52
J-18	886.74	56.48	74.17	1017.36	1128.05	1.45	2.22
J-19	750.42	165.71	78.31	1133.63	1128.04	2.9	3.54
J20	1137.96	6.07	82.94	1152	1014.86	2.07	3.5
J-21	815.88	105.58	71.77	1060.04	1129.28	5.01	2.47
J22	551.88	81.55	59.9	740.47	1128.06	0.56	7.9
J-22	526.5	92.54	11.94	740.5	998.45	0.06	1.36
J-23	776.09	109.95	4.47	1030.34	996.06	2.15	1.23
J24	901	98.16	65.65	1128	1128.21	0.12	4.32
J-24	883	105.95	94.25	1128	1054.94	0.12	3.21
J-25	840	91.15	74.95	1050.78	1054.94	2.17	4.97
J26	791.1	147.17	52.53	1131.42	1127.96	1.82	11.49
J-26	808	104.98	62.6	1050.76	738.71	0.49	0.87
J-27	834.89	79.49	100.44	1018.71	738.71	3.72	2.58
J28	876.5	61.72	54.61	1019.23	1128.04	1.24	9.35
J-28	882.82	59.29	88.64	1019.93	738.71	2.26	0.6
J-29	734.55	124.02	66.21	1021.36	738.71	2.04	0.98
J30	754.84	118.42	58.18	1028.68	1128.05	1.82	8.62
J-30	813.49	137.26	69.65	1130.9	738.71	1.13	0.93
J-31	706.36	86.26	68.98	905.84	738.71	1.86	0.48
J32	613.07	125.51	62.68	903.31	1128.06	4.76	4.69
J-32	631.99	117.25	58.79	903.12	738.74	25.05	2.13

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
J-33	667.18	102	76	903.05	738.74	1.69	1.49
J34	949.37	101.46	64.22	1184	1128.06	3.66	5.25
J-34	931.22	110.51	60.84	1186.78	738.74	2.42	0.49
J-35	813.8	78.24	89.11	994.73	738.87	2.77	0.97
J36	887.49	74.72	76.42	1060.27	1128.05	1.55	3.93
J-36	882.41	76.95	66.51	1060.36	995.49	1.91	1.62
J-38	840.22	95.39	33.43	1060.82	994.55	3.39	1.51
J-39	924.79	99.51	65.25	1154.9	994.85	1.3	2.52
J40	803.07	82.9	65.32	994.78	1127.65	4.45	16.72
J-40	833.16	69.9	71.45	994.81	1026.83	3.6	3
J-41	824.58	73.85	86.02	995.37	1060.54	0.6	2.32
J-42	588.37	78.6	46.69	770.12	1059.39	0.89	5.27
J-43	532.45	89.97	55.16	740.51	1014.3	0.83	1.87
J44	527.61	92.07	83.19	740.52	862.44	0.92	18.8
J-44	512.8	98.47	78.82	740.51	1131.3	1.22	7.41
J-45	581.97	68.53	56.24	740.46	995.79	0.64	2.47
J46	554.96	80.22	80.48	740.47	862.47	0.89	2.94
J48	616.74	53.5	158.75	740.45	1025.83	0.59	2.1
J50	851.31	62.32	118.98	995.44	1025.56	0.92	3.72
J-50	788.24	89.45	80.98	995.1	1127.22	0.58	2.5
J-51	607.58	57.51	114.39	740.56	1151.33	0.71	4.29
J52	565.22	75.83	90.43	740.58	1089.96	1.3	1.9
J-52	569.79	73.84	93.91	740.56	1009.17	0.85	5.92
J60	826.7	96.88	7.08	1050.72	1152	0.85	3.04
J62	854.43	84.88	6.07	1050.72	1152.01	1.01	1.37
J64	857.71	83.46	6.56	1050.72	1152	0.43	0.15
J66	875.84	75.61	113.32	1050.69	1151.22	0.54	5.29
J68	854.24	84.97	76.17	1050.72	1059.6	1.02	2.96
J70	614.4	54.56	87.28	740.56	1060.7	0.75	1.66
J72	537.63	87.75	67.28	740.55	994.06	7.1	2.42
J74	880	115.42	103.24	1146.91	1054.61	0	9.86
J76	870	119.46	117.41	1146.24	1127.22	0	3.36
J78	745	168.33	112.87	1134.27	1127.22	0	1.12
J82	776.8	158.65	4.76	1143.67	996.06	0	1.69
J84	750	69.93	87.31	911.71	1127.22	0	2.21
J86	859	144.7	83.91	1193.63	994.94	0	5.79
J88	803	107.04	80.82	1050.53	738.77	0	0.76
J90	980	108.3	91.84	1230.43	738.88	0	0.96
J92	980	6.85	96.2	995.85	738.71	0	1.63
J94	884	72.18	65.24	1050.92	859.13	0	2.45
J96	849	87.27	58.5	1050.81	859.17	0	11.19
J98	783	115.76	120.76	1050.69	1018.41	0	0.11
J100	851.99	71.95	52.75	1018.38	863.23	5.51	1.77
J102	833.34	80.02	104.98	1018.38	1018.86	7.1	3.59
J104	859.8	68.56	28.47	1018.34	1014.11	2.81	0

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
J108	960.9	72.54	94.23	1128.66	1127.91	0.67	13.32
J120	956.52	74.43	96.12	1128.65	859.72	1.73	13.28
J124	946.95	78.57	74.31	1128.65	738.82	2.76	1.23
J126	823.07	84.69	93.8	1018.91	1127.91	2.31	0
J128	963.31	72.19	98.12	1130.25	1127.9	0.79	0
J130	989.53	60.14	105.9	1128.6	1127.9	3.18	0
J132	970.83	12.77	100.71	1000.36	1127.9	0.65	0
J134	985.72	4.53	95.09	996.2	1127.9	0.22	0
J136	976.39	65.93	96.39	1128.85	1127.9	1.83	0
J138	836.98	96.49	95.09	1060.11	1127.9	0.52	0
J140	1006.48	52.58	50.33	1128.07	957.38	7.88	0
J142	593.95	63.35	50.6	740.45	957.01	0.6	0
J144	506.45	101.19	52.61	740.45	956.67	3.84	0
J146	1001.76	54.64	54.78	1128.11	956.67	3.78	0
J148	533.72	89.4	55.79	740.45	957.01	0.25	0
J150	585.61	66.96	57.68	740.45	957.38	0.62	0
J152	993.52	58.32	62.55	1128.38	957.64	2.51	0
J154	577.66	70.4	101.26	740.45	1025.27	0.52	3.07
J156	579.21	69.73	64.69	740.45	957.59	0.3	0
J158	983.11	62.97	52.32	1128.74	1014.29	2.75	2.1
J160	563.01	76.74	46.82	740.46	1151.35	1.3	3.6
J162	979.56	64.49	64.36	1128.7	994.56	2.52	0.77
J164	598.04	61.59	55.88	740.46	1014.4	0.34	8.61
J166	532.8	89.81	66.9	740.5	1014.43	0.52	10.21
J168	951.33	76.7	77.76	1128.7	1014.72	0.76	6.39
J170	917.25	33.63	59.7	995.02	1014.58	0.78	6.42
J172	843.97	65.39	60.04	995.18	1014.37	0.89	5.84
J174	976.6	65.48	58.38	1128.02	1014.44	7.57	5.59
J176	861.6	123.06	62.05	1146.17	1014.55	1.84	6.83
J178	861.62	86.22	62.61	1061.01	1014.86	0.62	9.31
J180	670.07	100.74	59.95	903.03	1015.14	13.05	2.79
J182	949.02	79.46	57.31	1132.76	1015.35	2.91	3.81
J184	865.72	56.26	65	995.82	1015.54	0.28	6.62
J186	676.37	98.03	85.68	903.05	1015.91	1.24	6.66
J188	658.73	208.19	88.6	1140.17	1016.26	1.63	4.31
J190	939.95	124.32	100.24	1227.44	1016.5	1.45	4.78
J192	886.8	114.05	118.33	1150.54	1016.98	2.25	7.91
J194	880.85	73.51	122.03	1050.84	1016.74	0.14	5.38
J196	792	97.99	98.98	1018.59	1016.26	2.3	6.97
J198	1135.63	7.08	59.82	1152	1015.51	1.51	5.66
J200	1136.83	6.56	105.66	1152	1017.85	0.09	6.7
J202	889.17	113.01	119.04	1150.51	1018.29	2.36	6.58
J204	883.46	76.7	118.49	1060.84	1018.53	0.77	1.23
J206	858.87	87.43	114.08	1061.05	1018.64	0.22	3.25
J208	838.49	67.54	91.55	994.67	1025.2	1.36	3.45

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
J210	855.7	155.82	112.32	1216.03	1025.37	1.89	7.04
J212	866.2	151.28	51.69	1216.03	861.69	0.5	1.7
J214	985.05	4.82	72.84	996.2	861.68	0.85	6.07
J216	925.32	94.47	95.32	1143.77	861.68	0.97	4.75
J218	800.9	83.97	93.68	995.09	861.68	0.61	4.85
J220	516.26	96.95	67.19	740.45	861.75	0.83	4.08
J222	708.26	83.69	81.78	901.8	862.26	1.53	3.57
J224	723.89	76.93	89.4	901.78	862.01	12.14	2.72
J226	739.15	124.64	85.01	1027.38	861.82	0.08	1.04
J228	741.24	70	116.47	903.12	861.69	1.25	0.51
J230	948.29	27.12	127.32	1011	861.72	0	0.96
J232	910	94.27	107.56	1128	861.81	0.21	2.65
J234	637.45	114.61	99.4	902.5	861.84	10.35	9.42
J236	566.99	75.03	84.81	740.49	861.9	3.57	8.78
J238	911	93.84	83.16	1128	861.96	1.84	15.29
J240	895	100.76	51.66	1128	862.35	0.63	9.64
J242	908	95.14	70.19	1128	862.23	0.43	7.37
J244	905	96.43	58.16	1128	862.55	0	8.88
J246	908	95.14	84.45	1128	862.47	0	3.32
J248	841	90.72	75.05	1050.78	862.46	1.79	2.93
J250	835	93.31	51.07	1050.78	862.97	2.78	6.79
J252	830	95.47	120.41	1050.78	861.15	5.49	2.26
J254	828	96.34	89.75	1050.78	1151.49	1.56	13.39
J256	824	98.07	90.11	1050.78	1151.47	0.98	11.48
J258	813	102.82	87.39	1050.76	1151.45	0	5.82
J260	893.31	53.53	95.23	1017.1	1151.45	1.63	6.77
J262	1043.08	47.24	83.92	1152.33	1054.94	2.07	2.65
J264	845.73	64.56	118.59	995.02	1127.24	0.44	5.03
J266	885.18	57.55	117.27	1018.27	1127.23	5	4.07
J268	859.73	68.59	116.69	1018.34	1127.22	6.48	2.07
J270	876.53	61.39	83.01	1018.51	994.19	4.02	1.51
J272	875.53	61.73	77.99	1018.28	994.16	4.01	5.88
J274	879.44	60.09	76.93	1018.41	994.1	3.28	6.05
J276	871.06	63.8	80.48	1018.59	994.03	3.98	5.38
J278	870.08	64.38	96.41	1018.95	1054.62	6.97	18.27
J280	865.23	67	99.07	1020.17	1054.72	5.16	19.05
J282	817.78	87.7	78.09	1020.58	1055.33	5.12	6.54
J284	811.39	90.63	72.77	1020.97	1055.77	2.43	5.95
J286	784.69	102.28	75.2	1021.21	1056.3	3.49	8.64
J288	743.35	120.33	70.31	1021.62	1151.23	5.85	6.12
J290	787.38	100.96	52.91	1020.84	1151.72	4.81	4.5
J292	877.17	61.8	75.77	1020.08	1151.53	3.8	4.71
J294	773.52	108.61	91.59	1024.68	1151.33	3.83	0.8
J296	743.01	122.62	85.9	1026.56	1059.93	4.69	6.58
J298	744.53	122.49	85.03	1027.79	1060.39	0.83	6.07

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
J300	765.64	158.52	86.03	1132.21	1061.03	4.04	3.18
J302	742.17	71.75	77.52	908.09	1060.35	0.7	3.72
J304	693.25	92.51	60.46	907.19	1059.74	2.17	4.44
J306	641.25	114.5	92.12	906.02	1059.34	3.26	29.38
J308	645.05	112.34	94.7	904.84	1059.22	3.68	7.76
J310	673.16	99.97	81.36	904.35	1058.06	1.42	8.97
J312	655.27	107.71	69.8	904.35	1057.09	1.57	9.6
J314	665.25	103.39	103.49	904.35	1151.15	0.65	7.2
J316	592.35	134.7	88.79	903.84	1151.11	0.39	8.85
J318	567.29	145.38	91.48	903.48	1151.1	2.14	10.59
J320	665.77	102.62	97.87	903.08	1151.11	24.36	12.41
J322	669.66	100.94	83.29	903.08	1151.16	14.64	15.73
J324	742.87	69.3	33.55	903.12	1151.35	5.26	3.74
J326	699.92	87.91	83.84	903.22	993.97	2.53	18.34
J328	728.06	75.69	83.13	903.09	993.96	4.06	36.71
J330	688.91	92.6	89.18	903.04	993.96	1.56	19.98
J332	744.87	68.43	82.57	903.12	994	3.82	10.34
J334	582.71	138.6	69.55	903.22	994	8.47	8.85
J336	943.95	99.56	68.72	1174.18	994	4.92	4.98
J338	943.08	102.24	63.15	1179.52	994.31	3.65	8.98
J340	860.87	86.16	56.58	1060.11	994.56	1.33	2.93
J342	853	150.23	36.22	1200.4	994.55	2.84	2.35
J344	856.05	151.66	58.18	1206.77	995.66	2.2	3.41
J346	857.38	154.43	73.88	1214.51	995.44	1.12	2.05
J348	802.22	83.27	88.03	994.78	919.71	0.81	2.25
J350	816.2	77.19	89.73	994.7	919.7	2.55	3.04
J352	807.92	80.75	84.17	994.65	919.7	3.75	2.36
J354	831.67	98.76	77.91	1060.04	765.32	8.43	5.44
J356	825.61	101.39	78.44	1060.07	765.38	7.36	4.11
J358	874.75	80.19	76.57	1060.19	765.42	2.24	2.11
J360	988.65	70	77.4	1150.51	765.4	2.86	2.73
J362	1029.35	53.13	83.65	1152.22	765.36	1.86	1.91
J364	976.31	75.69	84.36	1151.33	765.3	1.1	0.89
J366	939.52	91.1	95.81	1150.2	738.78	0.24	3.19
J368	861.29	86.31	95.53	1060.88	738.79	4.36	1.99
J370	863.76	85.27	89.23	1060.94	738.79	4.46	9.76
J372	862.09	86.07	83.91	1061.13	738.82	2	6.43
J374	881.09	77.78	83.13	1060.95	738.85	2.56	1.74
J376	919.91	60.97	88.8	1060.9	738.88	2.51	1.54
J378	846.31	92.78	69.96	1060.87	956.78	6.02	0
J380	869.93	82.47	75.95	1060.63	738.98	2.68	0.88
J382	895.67	71.27	91.39	1060.49	738.95	2.9	1.84
J384	911.84	103.14	97.78	1150.35	738.92	4.33	2.28
J386	945.77	89.23	74.15	1152.11	738.94	0	1.26
J388	939.55	92.55	90.2	1153.57	738.78	1.37	0.79

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
J390	958.55	86.11	82.63	1157.67	738.81	5.83	1.76
J392	1073.77	35.6	70.75	1156.1	738.74	1.4	2.16
J394	800.1	84.12	64.05	994.62	738.74	10.22	0.88
J396	801.72	83.42	67.79	994.64	738.73	21.51	1.43
J398	787.73	89.47	85.99	994.62	738.73	11.12	1.71
J400	835.1	69.09	79.11	994.87	738.74	2.14	1.33
J402	848.27	63.44	77.36	994.98	738.74	1.52	1.36
J404	863.72	56.78	83.27	995.02	738.74	1.1	0.95
J406	910.79	36.42	81.62	995.02	738.74	1	1.02
J408	861.11	58.18	79.47	995.65	738.74	1.49	12.53
J410	716.13	88.04	73.43	919.73	738.75	0.6	2.38
J412	712.2	89.74	92.96	919.73	738.76	0.63	1.81
J414	725.07	84.18	77.56	919.73	738.75	1.05	0.68
J416	585.17	79.98	99.67	770.11	738.71	1.77	1.28
J418	583.99	80.49	73.07	770.12	738.71	1.47	4.77
J420	586.41	79.44	78.38	770.11	738.71	1.1	1.28
J422	571.92	85.7	88.2	770.1	738.71	0.39	1.7
J424	570.21	86.43	84.77	770.08	738.71	0.28	1.31
J426	517.22	96.56	64.51	740.51	738.71	5.06	0.97
J428	517.87	96.28	67.86	740.51	738.72	1.57	0.74
J430	544.79	84.64	52.75	740.52	738.72	0.55	1.26
J432	546.62	83.85	88.35	740.53	738.71	1.17	2.6
J434	533.54	89.51	85.99	740.53	739.27	0.87	0.59
J436	795	110.6	75.35	1050.76	739.17	0.6	3.63
J438	563.35	76.61	84.64	740.53	862.01	0.46	6.28
J440	567.46	74.84	90.93	740.52	1016.47	0.4	7.15
J442	530.18	90.94	107.95	740.47	1026.44	0.41	5.5
J444	547.74	83.35	69.8	740.48	1059.25	0.55	6.85
J446	575.13	71.49	60.91	740.46	859.12	1.45	1.64
J448	590.62	64.8	62.92	740.46	859.12	0.55	1.53
J450	539.87	86.74	91.15	740.46	738.9	1.25	2.77
J452	555.81	79.85	62.35	740.46	995.49	0.6	1.68
J454	559.84	78.11	89.42	740.46	995.01	0.64	2.25
J456	546.18	84.01	57.99	740.46	994.79	0.42	15.67
J458	549.99	82.37	34.26	740.46	1151.74	0.39	4.27
J460	568.95	74.17	69.26	740.47	861.71	1.24	4.64
J462	523.79	93.7	69.73	740.47	739.15	0.83	1.86
J464	559.4	78.3	77.78	740.47	739.12	0.4	1.87
J466	508.23	100.42	56.88	740.45	739.12	0.39	0.93
J468	569.73	73.82	54.31	740.45	739.13	0.79	0.76
J470	557.45	79.13	55.6	740.45	739.15	1.03	1.02
J472	534.74	88.95	59.91	740.45	739.17	0.75	8.85
J474	542.69	85.52	48.83	740.45	739.18	0.95	10.09
J476	589.53	65.26	81.15	740.45	739.09	0.75	0.7
J478	581.78	68.62	75.23	740.45	739.19	0.48	2.34

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
J480	534.39	89.11	73.22	740.45	739.1	1.38	1.1
J482	540.41	86.57	47.23	740.6	739.12	0.44	1.69
J484	564.93	75.96	54.91	740.59	739.15	1.6	1.88
J486	666.28	102.49	40.69	903.29	739.18	4.07	2.12
J488	806.19	92.96	80.18	1021.18	739.23	3.03	1.19
J490	776.8	158.71	59.03	1143.82	739.13	2.12	2
J492	897.84	70.5	63.02	1060.87	739.11	1.88	0.97
J494	718.27	79.37	59.39	901.82	739.21	1.03	7.54
J496	713.62	81.38	91.65	901.82	1088.33	0.72	6.02
J498	528.12	91.86	94.05	740.54	1088.03	2.08	4.6
J500	860.68	58.12	112.97	995.07	1087.48	1.26	1.03
J502	1072.52	35.41	102.54	1154.41	1087.77	2.06	4.55
J504	701.55	89	91.22	907.36	1088.64	2.6	4.2
J506	577.91	70.34	110.71	740.57	1087.43	1.42	9.12
J508	559.24	78.41	112.14	740.56	1087.58	1.38	2.49
J510	613.55	54.93	111.49	740.57	1087.58	0.59	3.5
J512	610.58	56.21	116.88	740.57	1087.41	0.79	5.94
J514	600.62	60.52	96.3	740.58	1087.32	0.54	4.18
J516	626.27	49.43	96.27	740.58	1087.32	0.62	4.72
J518	551.42	81.79	65.97	740.55	954.11	0.51	4.86
J520	629.89	47.86	47.87	740.56	954.02	1.31	6.04
J522	612.16	55.53	67.57	740.57	954.01	1.72	6.93
J524	645.08	41.3	45.02	740.58	954.08	1.65	3.24
J526	553.83	80.76	37.23	740.59	954.08	0.44	2.8
J528	602.63	59.65	54.5	740.57	954.04	2.18	1.94
J530	593.37	63.65	55.02	740.56	954.08	0.3	1.64
J532	601.87	59.98	65.01	740.59	954.13	0.48	3.97
J534	876.39	75.39	61.74	1050.72	954.06	1.66	2.92
J536	870.53	77.92	48.04	1050.72	954.54	1.65	7.9
J538	826.23	97.08	50.03	1050.73	954.54	0.32	8.35
J540	850.66	86.52	91.86	1050.72	1087.32	0.78	5.7
J542	877.69	74.83	80.67	1050.72	1087.33	1.03	9.54
J544	831.41	94.85	93.18	1050.74	1087.33	1.93	7.28
J546	828.25	96.21	112.81	1050.72	1087.58	0.71	3.28
J548	829.77	95.55	100.87	1050.72	1087.68	0.91	1.51
J550	817.13	101.01	99.48	1050.72	1087.77	0.99	3.13
J552	864.62	80.46	91.45	1050.69	1087.32	0.97	2.47
J554	864.71	80.43	100.95	1050.69	1087.68	0.17	3.81
J556	801.55	107.66	53.93	1050.5	739.12	1.61	1.93
J558	843.33	89.59	87.11	1050.5	739.08	1.03	2.82
J560	797.75	109.3	117.19	1050.5	1151.01	1.78	0
J564	849.97	86.72	121.47	1050.5	1150.9	1.11	0
J566	867.99	78.92	121.33	1050.5	1025.58	1.11	0
J568	828.01	96.21	107.94	1050.5	1026.41	0.82	0
J570	826.84	96.72	48.3	1050.5	861.69	0.63	0

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
J572	803.81	106.68	126.46	1050.5	1151.43	2.21	0
J574	811.29	103.44	65.56	1050.5	954.61	1.71	0
J578	838.84	91.59	6.92	1050.64	996	1.53	0
J580	874.9	76.02	89.07	1050.69	1089.97	1.33	0
J582	900.77	64.83	104.2	1050.69	1089.96	2.65	0
J586	871.85	77.34	73.84	1050.69	953.76	1.26	0
PMP-1_ND	792	97.82	93.71	1018.21	1008.7	0.04	0.1
PMP-1_NU	780.51	1.73	1.16	784.51	783.2	0.04	0.1
PMP-10_ND	792	97.99	93.91	1018.59	1009.17	0.92	2.37
PMP-10_NU	777.5	3.05	2.6	784.56	783.51	1	2.58
PRV-108_ND	941.08	97.24	90.97	1165.96	1151.45	0.53	0.75
PRV-108_NU	946.02	95.33	88.85	1166.47	1151.48	0.45	0.61
PRV-11_ND	776.09	110	104.99	1030.45	1018.87	0.14	0.25
PRV-11_NU	776.15	152.67	107.61	1129.19	1024.99	0.08	0.18
PRV-131_ND	567	75.18	74.91	740.86	740.24	0	6.61
PRV-131_NU	567	184.92	184.44	994.63	993.51	0.21	6.05
PRV-19_ND	911.55	100.42	93.26	1143.77	1127.22	0.79	1.31
PRV-19_NU	898.78	138.41	98.78	1218.85	1127.22	0.34	0.66
PRV-32_ND	654.31	108.12	90	904.35	862.44	0	0.41
PRV-32_NU	657.83	208.58	159.13	1140.17	1025.83	0.14	0.44
PRV-6_ND	629	118.38	99.98	902.74	860.19	3.71	8.96
PRV-6_NU	615.55	124.26	105.93	902.9	860.52	4.92	3.88
PRV-60_ND	734.73	80	80	919.73	919.73	0.07	0.72
PRV-60_NU	755.25	103.73	103.78	995.13	995.24	0	0.67
PRV-71_ND	673	42	40	770.12	765.5	0.41	0.65
PRV-71_NU	673	106.69	106.68	919.72	919.69	0.69	1.18
PRV-90_ND	947.22	85	77.84	1143.78	1127.22	1.09	2.56
PRV-90_NU	941.01	123.86	80.52	1227.44	1127.22	0.21	0.46
SADDLE_CRK_ND	935.32	50	67	1050.95	1090.26	2.41	5.56
SADDLE_CRK_NU	949.61	87.5	87.29	1151.95	1151.46	2.38	4.29
U7008_ND	949.64	79.26	78.62	1132.94	1131.45	0	0
U7008_NU	949.03	26.75	28.1	1010.88	1014.01	0	0
V8002_ND	735.82	75.34	54.43	910.05	861.69	0.14	1.14
V8002_NU	743.06	72.7	51.3	911.19	861.69	0.82	1.11
V8006_ND	859.57	86.72	84.48	1060.11	1054.94	0.14	0.4
V8006_NU	858.55	145.09	116.2	1194.07	1127.25	0.11	0.21
V8010_ND	740.75	70.21	52.99	903.12	863.29	0.11	0.14
V8010_NU	739.89	124.32	120.42	1027.38	1018.35	0.12	0.16
V8012_ND	869.41	83	82.98	1061.34	1061.3	0.65	0.84

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
1	538.04	87.32	84.93	739.96	734.44	1.26	1.58
2	786.43	99.52	95.1	1016.57	1006.36	1.36	6.3
3	681.44	93.36	76.33	897.33	857.96	5.33	23.44
4	567	75.15	74.55	740.78	739.4	0	44.36
6	705.65	82.86	65.84	897.28	857.91	1.89	5.5
8	721.66	75.95	58.92	897.28	857.9	3.98	19.81
9	621.35	119.56	102.86	897.82	859.21	18.41	136.06
10	779.87	2.03	1.56	784.56	783.46	7.7	96.33
12	951.9	82.97	75.76	1143.76	1127.1	2.18	6.6
13	877.39	50.81	50.27	994.9	993.65	1.44	8.16
15	774.07	94.8	94.2	993.28	991.92	1.85	4.77
16	834.78	68.3	67.19	992.72	990.15	1.62	14.8
17	806.44	80.48	79.16	992.53	989.5	0.44	36.43
18	964.64	77.45	70.25	1143.75	1127.1	3.64	7.81
19	887.94	142.42	103.43	1217.29	1127.12	0.97	3.02
20	938.74	124.27	81.46	1226.11	1127.11	0.03	0.85
21	865.15	148.81	113.3	1209.27	1127.14	1.41	6.03
22	859.02	144	115.99	1192.02	1127.25	2.68	5.73
23	945.35	95.08	88.47	1165.21	1149.95	2.56	10.11
24	1063.28	40.72	37.76	1157.45	1150.61	2.47	13.61
25	1046.39	45.67	45.4	1152	1151.37	1.38	6.01
26	945.86	86.16	88.24	1145.1	1149.9	2.02	5.34
27	871.38	114.83	120.01	1136.93	1148.9	1.01	2.71
28	867.87	83.47	83.41	1060.89	1060.76	1.29	2.21
29	650.94	204.76	161.56	1124.44	1024.54	1.78	6.22
31	653.69	107.61	90.27	902.55	862.43	1.73	4.13
32	662.57	103.78	85.72	902.55	860.79	1.45	3.14
33	603.35	129.21	111.21	902.15	860.52	1.72	2.89
34	566.28	145	127.24	901.6	860.51	0.26	0.16
35	618.37	121.04	103.78	898.28	858.36	23.89	59.22
36	644.16	109.7	92.63	897.83	858.36	16.37	29.08
37	680.06	93.95	76.96	897.33	858.03	3.36	10.29
38	714.38	79.09	62.07	897.28	857.91	1.53	39.59
39	692.27	88.62	71.62	897.21	857.89	7.49	6.09
40	703.92	83.58	66.57	897.2	857.87	15.61	33.12
41	698.26	86.02	69.01	897.18	857.85	2.95	5.71
43	703.23	83.81	66.82	897.04	857.75	3.49	5.96
44	725.91	74	57	897.04	857.73	0.91	12.57
45	713.22	79.46	62.49	896.98	857.73	1.63	3.82
46	722.26	75.55	58.57	896.98	857.69	5.73	29.25
47	723.42	75.05	58.08	896.98	857.73	5.51	11.69
48	685.3	91.67	74.69	897.29	858.01	0.88	3.98
49	696.69	86.75	69.74	897.28	857.95	2.84	7.04
50	707.55	82.04	65.02	897.28	857.91	1.35	5.17

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
51	706.24	82.57	65.56	897.18	857.85	3.99	9.83
52	709.45	81.12	64.12	897.04	857.74	0.86	1.65
53	718.43	77.21	60.23	896.98	857.71	1.97	4.14
54	817.93	75.61	72.7	992.78	986.05	2.18	17.41
56	845.57	63.77	61.95	993.03	988.84	1.26	20.46
57	816.3	76.47	75.02	993.14	989.79	1.67	12.95
58	720.04	86.35	86.32	919.72	919.66	0.24	1.32
59	708.04	91.54	91.5	919.72	919.63	0.66	3.06
60	619.99	64.92	62.88	770.12	765.41	0.98	2
61	608.19	70.02	67.99	770.12	765.41	0.47	2.26
62	577.27	83.36	81.13	770.05	764.89	2.05	6.69
63	591.33	77.27	74.94	770.01	764.64	0.9	3.21
64	543.68	97.92	95.88	770.11	765.4	2.96	7.51
65	563.81	89.21	87.18	770.11	765.41	7.77	9.17
66	533.89	102.14	99.74	770.09	764.54	3.15	35.28
67	727.29	83.21	83.16	919.72	919.6	0.74	4.07
69	576.73	83.58	81.25	770.01	764.62	2.92	9.28
70	555.13	92.92	90.59	770.01	764.62	0.96	2
71	525.23	105.85	103.52	770.01	764.62	3.06	6.86
72	535.4	101.45	99.12	770.01	764.62	2.5	5.31
73	552.95	93.86	91.53	770.01	764.62	1.43	4.34
74	579.81	82.25	79.92	770.01	764.63	1.03	3
75	629.92	60.58	58.25	770.01	764.63	0.76	2.6
76	633.33	59.11	56.78	770.01	764.63	1.28	3.75
77	623.62	63.31	60.98	770.01	764.63	0.54	2.45
78	721.81	85.58	85.54	919.72	919.62	1.33	4.84
79	861.51	57.35	56.99	994.14	993.31	3.16	7.05
80	903.62	39.09	37.51	994.01	990.35	2.63	7.21
81	752.55	117.39	114.83	1024.03	1018.1	3.29	6.51
82	912.19	34.96	33.12	993.03	988.78	1.37	4.55
83	922.49	95.69	88.48	1143.76	1127.1	1.17	4.63
84	843.44	64.87	62.6	993.45	988.19	1.42	3.18
85	815.33	76.55	73.93	992.36	986.29	2.51	7.34
87	807.41	80	77.4	992.41	986.39	1.5	2.58
88	792.98	86.21	83.39	992.33	985.83	6.7	17.57
90	764.21	99.07	98.6	993.32	992.22	0	0.87
92	924.4	89.16	88.38	1130.58	1128.78	1.54	3.94
93	639.56	56.46	54.43	770.12	765.44	0.52	1.48
94	545.88	96.94	94.7	770.05	764.88	1.56	5.6
95	811.57	78.03	75.26	992	985.62	6.13	16.11
96	834.88	96.52	90.55	1058.07	1044.28	5.03	17.99
97	892.13	71.9	66.27	1058.4	1045.38	0.81	9.04
98	848.81	87.25	44.28	1050.57	951.2	0.3	12.7
99	934.32	98.5	93.09	1162.1	1149.59	10.51	21.18
100	951.89	88.68	85.45	1156.96	1149.5	6.38	38.22

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
101	1002.17	62.65	63.79	1147.05	1149.67	3.17	9.06
102	962.06	79.03	80.75	1144.83	1148.8	4.68	11.66
103	1056.45	43.68	40.72	1157.45	1150.6	4.92	9.9
104	1103.59	18.79	19.91	1147.04	1149.64	3.27	7.35
105	899.28	104.82	108.16	1141.67	1149.4	4.03	7.93
106	934.44	90.54	93.09	1143.82	1149.71	1.46	4.13
107	849.95	90.95	89.99	1060.28	1058.04	4.29	10.36
108	827.59	100.53	98.12	1060.08	1054.5	2.8	42.35
109	852.47	89.68	87.01	1059.85	1053.67	6.98	16.32
110	878.91	78.35	75.66	1060.1	1053.87	6.64	59.95
111	905	67.07	64.14	1060.09	1053.32	2.64	62.26
112	925.66	58.17	56.13	1060.18	1055.46	0.97	7.98
113	888.5	74.3	73.13	1060.31	1057.6	3.41	10.49
114	810.84	107.7	105.72	1059.9	1055.31	5.22	13.09
115	983.37	69.9	71.75	1145.02	1149.3	4.03	12.27
117	735.52	74.48	54.02	907.77	860.46	2.15	5.98
118	600.36	130.25	112.53	901.57	860.59	2.62	4.56
119	742.64	68.76	51.43	901.66	861.58	2.01	12.49
120	776.41	136.8	105.98	1092.77	1021.48	2.3	5.82
121	745.33	67.67	50.39	901.81	861.85	5.44	10.08
122	776.99	109.44	104.55	1030.07	1018.76	7.88	15.19
123	499.12	104.37	102.9	740.47	737.08	0.51	3.23
124	510.2	99.54	97.84	740.38	736.45	0.43	3.4
125	508.72	100.17	98.47	740.37	736.43	0.85	29.21
126	527.63	91.91	90.03	740.18	735.82	3.16	2.13
128	536.37	88.11	86.09	740.13	735.45	0.06	1.13
129	533.92	89.17	87.13	740.12	735.41	0.34	0.61
130	523.21	93.85	92.13	740.24	736.25	0.65	0.62
131	520.75	94.96	93.26	740.36	736.41	1.25	0.45
132	516.66	96.74	95.03	740.36	736.41	5.93	10.49
134	556.33	79.46	77.28	740.08	735.05	1.05	3.65
135	550.95	81.75	79.29	740	734.29	2.87	5.43
136	543.94	84.78	82.32	740	734.29	2.15	6.27
137	556.73	79.23	76.62	739.95	733.9	1.51	18.63
138	562.09	76.91	74.25	739.94	733.8	2.33	5.61
139	541.87	85.65	82.97	739.93	733.75	1.92	3.61
140	544.26	84.61	81.93	739.93	733.72	1.03	2.3
141	541.79	85.68	82.99	739.93	733.7	0.41	1.08
142	550.01	82.13	79.45	739.93	733.72	1.78	4.16
143	575.52	71.1	68.41	739.93	733.72	1.97	4.36
144	540.87	86.08	83.36	739.92	733.64	0.41	1.31
145	544.5	84.51	81.77	739.92	733.6	1.68	3.51
146	553.75	80.5	77.69	739.9	733.42	0.94	2.82
147	550.04	82.1	79.24	739.89	733.28	0.82	52.05
148	534.94	88.62	85.74	739.88	733.21	2.09	6.37

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
149	528.39	91.46	88.57	739.88	733.21	1.66	3.34
150	523.71	93.47	90.59	739.87	733.2	6.95	14.2
151	544.26	84.61	81.93	739.93	733.74	0.81	1.62
152	533.46	89.28	86.55	739.92	733.61	2.66	4.97
349	840	91.04	47.96	1050.52	950.91	0.47	16.49
350	834	93.63	50.1	1050.52	949.85	1.26	24.58
352	813.88	102.3	58.97	1050.45	950.24	0	28.74
353	819.05	100.06	111.2	1050.43	1076.21	0.2	13.66
354	822.97	98.33	109.51	1050.35	1076.21	2.56	11.82
355	827.23	96.49	107.82	1050.35	1076.57	0.7	3.24
356	836.65	92.41	103.94	1050.35	1077	1.6	4.31
357	850.55	86.4	98.16	1050.35	1077.54	0.38	3.36
358	859.81	82.39	94.34	1050.34	1077.97	0.85	7.9
359	866.91	79.32	91.27	1050.34	1077.97	0.12	11.37
361	832.32	94.26	105.4	1050.3	1076.05	2.27	18.47
366	883.75	72.04	86.43	1050.34	1083.61	1.92	13.91
377	843.86	89.25	100.37	1050.26	1075.97	0.44	16.46
384	887.47	70.39	81.43	1050.26	1075.78	1.74	10.52
385	885.82	71.11	82.13	1050.26	1075.75	1.99	6.06
386	884.7	71.59	82.62	1050.26	1075.75	0.32	12.85
387	882.56	72.52	83.54	1050.26	1075.75	0.51	10.84
388	884.75	71.57	82.6	1050.26	1075.75	2	13.54
390	801.4	107.61	118.6	1050.26	1075.67	4.01	28.67
391	783.52	115.35	126.34	1050.26	1075.67	0.46	14.87
392	858.98	82.72	93.76	1050.27	1075.8	2.18	10.24
393	849.18	86.96	98.01	1050.27	1075.83	1.21	12.29
394	845.84	88.4	99.52	1050.27	1075.98	0.82	7.17
395	861.44	81.65	92.68	1050.26	1075.76	1.9	12.41
396	858.51	82.92	93.92	1050.26	1075.71	0.94	11.32
397	803.9	106.53	117.53	1050.26	1075.69	0.1	15.08
398	768.6	121.8	71.67	1050.26	934.35	0	11.6
399	837.59	91.91	43.49	1050.13	938.16	2.03	9.62
401	780.13	116.59	67.59	1049.74	936.44	37.85	9
402	785.79	114.14	65.16	1049.75	936.48	0.08	2.46
403	785.12	114.43	65.45	1049.75	936.48	4.3	13.06
404	782.25	115.68	66.73	1049.77	936.57	1.63	5.85
405	798.23	108.82	60.52	1049.88	938.19	0.98	23.06
406	813.21	102.37	54.04	1049.92	938.17	2.58	26.03
407	827.84	96.08	47.71	1050.01	938.16	4.17	25.59
408	784.09	114.88	65.77	1049.76	936.18	1.4	5
409	817.14	100.59	51.26	1049.75	935.68	2.88	12.17
410	807.55	104.74	55.3	1049.75	935.45	2.75	10.26
411	824.98	97.2	47.84	1049.75	935.61	0.23	9.17
412	825.36	97.04	47.74	1049.76	935.76	0.75	6.28
425	747.27	131.02	80.94	1050.26	934.45	0	9.43

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
429	841.08	90.24	40.77	1049.75	935.36	0.75	13.63
430	743.74	132.55	82.43	1050.26	934.35	0	10.84
431	735.14	136.27	86.15	1050.26	934.36	0	11.88
432	740.6	133.91	83.82	1050.26	934.42	0	6.2
433	766.64	122.65	72.52	1050.26	934.35	0	19.43
434	747.3	131.01	80.89	1050.26	934.35	0	20.83
435	737.78	122.25	121.05	1020.49	1017.7	2.73	4.58
438	756.17	112.85	112.53	1017.14	1016.39	9.18	17.02
439	759.9	110.09	110.47	1014.48	1015.36	7.92	22.87
440	688.95	91.96	74.42	901.61	861.03	2.89	5.56
441	738.18	117.8	119.23	1010.59	1013.9	7.58	17.1
442	771.23	102.85	103.96	1009.08	1011.65	2.12	5.04
443	765.43	105.66	106.81	1009.78	1012.43	3.18	12.57
444	839.79	73.07	73.93	1008.76	1010.75	2.63	9.73
445	799.99	90.47	91.42	1009.19	1011.4	6.42	10.76
446	833.9	75.27	76.11	1007.96	1009.89	10.3	24.03
447	849.17	68.53	69.27	1007.65	1009.36	8.7	15.86
448	884.1	53.19	53.71	1007.1	1008.3	4.87	8.71
449	874.1	57.05	57.79	1006.03	1007.75	1.52	2.99
450	873.19	57.05	57.64	1005.11	1006.47	3.84	7.38
451	824.25	78.44	79.17	1005.64	1007.32	4.83	8.12
453	880.41	53.81	54.49	1004.85	1006.42	6.58	11.25
458	508.05	100.28	97.85	739.95	734.33	1.61	2.09
459	519.21	95.45	92.95	739.93	734.17	2.05	22.7
460	589.95	64.85	62.37	739.93	734.19	0.98	2.11
461	565.26	75.52	72.99	739.91	734.04	0.77	1.72
462	549.97	82.13	79.6	739.91	734.04	1.21	2.92
463	519.26	95.39	92.72	739.85	733.68	1.64	3.33
464	550.67	81.8	79.08	739.83	733.55	0.06	3.84
465	549.25	82.39	79.56	739.77	733.22	2.3	4.68
466	564.63	75.73	72.87	739.76	733.15	1.45	2.78
467	567.13	74.65	71.78	739.75	733.12	1.48	3.06
468	603.31	58.99	56.1	739.73	733.03	1.04	2.93
469	513.51	97.84	94.99	739.76	733.17	1.68	2.83
470	531.16	90.2	87.33	739.75	733.1	0.94	2.21
471	556.62	79.19	76.29	739.74	733.05	1.38	3.17
472	562.66	76.57	73.67	739.74	733.02	0.8	1.12
473	554.73	80.01	77.1	739.75	733.03	2.07	9.28
474	548.54	82.68	79.77	739.74	733.02	0.9	1.43
475	561.88	76.91	74.01	739.74	733.03	0.93	1.99
476	593.58	63.21	60.31	739.74	733.04	1.3	2.27
477	590.2	64.66	61.76	739.73	733.01	0.67	1.12
478	612.66	54.95	52.03	739.72	732.98	2.14	3.61
479	538.73	86.92	84.02	739.74	733.02	2.53	5.25
480	562.63	76.59	73.69	739.74	733.04	0.56	1.7

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
481	547.46	83.15	80.24	739.74	733.02	1	1.52
482	592.31	63.74	60.8	739.71	732.9	0.64	1.96
483	550.42	81.86	78.93	739.72	732.94	0.6	1.68
484	544.48	84.42	81.48	739.71	732.91	0.77	1.62
485	538.5	87.01	84.05	739.7	732.87	2.05	2.89
486	536.65	87.81	84.86	739.7	732.89	0.5	0.96
487	506.85	100.69	97.74	739.7	732.87	3.84	5.87
488	545.87	83.82	80.88	739.7	732.89	0.53	1.16
489	525.29	92.72	89.77	739.7	732.89	0.51	1.38
490	525.38	92.68	89.73	739.7	732.89	0.59	1.55
491	567.3	74.55	71.61	739.7	732.9	0.27	0.66
492	526.77	92.08	89.13	739.7	732.88	3.59	7.53
493	555.42	79.69	76.73	739.7	732.86	5.85	17.27
494	704.27	83.46	66.44	897.28	857.91	11.69	43.69
496	884.45	51.72	52.65	1004.05	1006.21	4.42	7.4
497	781.61	1.25	0.66	784.51	783.14	0.07	10.53
500	792	97.81	93.09	1018.19	1007.28	0.13	0.45
780	882.24	52.96	53.62	1004.7	1006.23	5.18	10.08
J10	837	72.48	72.62	1004.62	1004.94	29.61	49.64
J12	852.42	66.02	66.19	1004.67	1005.06	9.37	20.34
J14	881.62	74.09	74.27	1004.67	1005.08	12.08	25.34
J16	602.8	62.71	63.34	1004.82	1006.28	4.78	13.21
J-17	841.69	72.29	71.94	1128.06	1127.26	1.14	3.43
J18	951.42	66.26	66.98	1005.64	1007.31	2.69	7.81
J-18	886.74	74.17	73.8	1128.04	1127.18	2.94	4.93
J-19	750.42	78.31	77.93	1128.03	1127.17	4.69	7.86
J20	1137.96	78.95	79.67	1005.64	1007.31	3.92	7.78
J-21	815.88	71.9	71.26	1129.58	1128.1	1.34	5.49
J22	551.88	59.96	59.56	1128.2	1127.27	5.4	17.54
J-22	526.5	12.76	11.8	1000.34	998.11	1.11	3.03
J-23	776.09	4.53	4.45	996.19	996	0.38	2.73
J24	901	65.73	65.28	1128.39	1127.35	3.11	9.59
J-24	883	95.6	89.74	1058.06	1044.49	0.88	7.12
J-25	840	76.3	70.35	1058.06	1044.31	2.95	11.02
J26	791.1	52.03	52.04	1126.8	1126.82	13.39	25.51
J-26	808	63.03	60.08	739.7	732.88	1.01	1.93
J-27	834.89	100.87	97.92	739.7	732.89	6.53	5.72
J28	876.5	54.12	54.23	1126.91	1127.18	6.43	20.76
J-28	882.82	89.07	86.13	739.7	732.89	0.43	1.34
J-29	734.55	66.64	63.69	739.7	732.89	1.05	2.17
J30	754.84	57.99	57.82	1127.62	1127.22	4.27	19.13
J-30	813.49	70.07	67.13	739.7	732.89	0.89	2.06
J-31	706.36	69.4	66.46	739.7	732.89	0.51	1.07
J32	613.07	62.77	62.34	1128.27	1127.27	4.67	10.42
J-32	631.99	59.21	56.31	739.73	733.01	2.14	4.73

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
J-33	667.18	76.42	73.52	739.73	733.03	2.22	3.32
J34	949.37	64.26	63.87	1128.17	1127.26	4.29	11.65
J-34	931.22	61.28	58.37	739.74	733.02	0.58	1.09
J-35	813.8	89.52	86.81	739.83	733.55	0.88	2.16
J36	887.49	76.47	76.05	1128.17	1127.18	1.29	8.72
J-36	882.41	65.92	65.56	994.14	993.31	0.79	3.61
J-38	840.22	32.77	30.93	993.03	988.79	1.32	3.35
J-39	924.79	64.64	62.37	993.45	988.19	1.51	5.6
J40	803.07	64.89	64.37	1126.67	1125.45	12.87	37.12
J-40	833.16	118.11	71.41	1134.74	1026.74	3.13	6.66
J-41	824.58	85.98	85.07	1060.45	1058.35	1.06	5.15
J-42	588.37	46.9	44.26	1059.88	1053.77	4.55	11.7
J-43	532.45	50.67	51.66	1003.92	1006.21	2.47	4.14
J44	527.61	100.11	82.52	901.57	860.89	22.18	41.73
J-44	512.8	79.02	78.1	1131.76	1129.63	4.95	16.45
J-45	581.97	55.98	55.75	995.17	994.64	0.47	5.48
J46	554.96	97.4	79.85	901.61	861.02	2.11	6.52
J48	616.74	200.05	157.9	1121.34	1023.88	2.78	4.66
J50	851.31	154.09	117.91	1106.75	1023.08	4.93	8.26
J-50	788.24	123.74	80.94	1226.11	1127.12	2.46	5.56
J-51	607.58	111.69	113.7	1145.07	1149.72	3.83	9.53
J52	565.22	73.43	89.92	1050.65	1088.8	0.24	4.22
J-52	569.79	97.97	93.3	1018.57	1007.76	3.91	13.14
J60	826.7	7.08	7.08	1152	1152	2.57	6.75
J62	854.43	6.07	6.07	1152	1152.01	1.26	3.04
J64	857.71	6.56	6.56	1152	1152	0.16	0.34
J66	875.84	110.63	112.46	1145.01	1149.24	4.02	11.74
J68	854.24	76.34	74.33	1060	1055.35	1.31	6.56
J70	614.4	87.22	86.52	1060.56	1058.93	0.38	3.69
J72	537.63	66.43	63.71	992.1	985.83	2.31	5.37
J74	880	104.64	98.14	1057.87	1042.83	8.51	21.89
J76	870	155.11	117.37	1214.4	1127.12	3.22	7.47
J78	745	150.57	112.83	1214.4	1127.13	0.85	2.49
J82	776.8	4.82	4.73	996.19	996	1.45	3.75
J84	750	94.46	87.26	1143.75	1127.1	1.65	4.91
J86	859	83.16	82.07	993.21	990.69	1.04	12.85
J88	803	81.24	78.39	739.76	733.15	0.96	1.69
J90	980	92.26	89.56	739.84	733.6	0.11	2.13
J92	980	96.62	93.67	739.7	732.87	1.42	3.63
J94	884	81.62	64.64	896.99	857.74	2.6	5.44
J96	849	74.84	57.96	896.94	857.92	20.64	24.83
J98	783	121.64	120.39	1020.46	1017.55	0.14	0.24
J100	851.99	69.77	52.71	902.59	863.13	2.13	3.94
J102	833.34	109.84	104.95	1030.08	1018.79	3.66	7.98
J104	859.8	21.58	24.97	998.18	1006.03	0	0

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
J108	960.9	94.27	94.1	1128	1127.61	0.36	29.57
J120	956.52	113.04	95.65	898.86	858.63	17.59	29.47
J124	946.95	74.73	71.95	739.8	733.37	6.07	2.73
J126	823.07	93.84	93.68	1128	1127.62	3.12	0
J128	963.31	98.16	97.98	1128	1127.57	0.2	0
J130	989.53	105.95	105.76	1128	1127.57	0.2	0
J132	970.83	100.76	100.57	1128	1127.57	1.07	0
J134	985.72	95.13	94.95	1128	1127.57	0.74	0
J136	976.39	96.43	96.25	1128	1127.57	0	0
J138	836.98	95.13	94.95	1128	1127.57	0	0
J140	1006.48	90.6	46.71	1050.51	949.01	3.04	0
J142	593.95	91.03	46.49	1050.51	947.52	3.69	0
J144	506.45	93.19	48.06	1050.5	946.14	4.72	0
J146	1001.76	95.35	50.22	1050.49	946.14	9.34	0
J148	533.72	96.22	51.68	1050.51	947.52	2.65	0
J150	585.61	97.95	54.06	1050.51	949.01	1.66	0
J152	993.52	102.68	59.28	1050.45	950.09	0	0
J154	577.66	133.43	99.96	1099.65	1022.27	3.09	6.81
J156	579.21	104.84	61.37	1050.45	949.91	0.84	0
J158	983.11	47.73	48.82	1003.68	1006.2	2.78	4.65
J160	563.01	44.96	46.09	1147.05	1149.66	3.52	7.98
J162	979.56	63.7	61.88	993.03	988.83	0.75	1.7
J164	598.04	51.72	52.39	1004.77	1006.32	8.51	19.11
J166	532.8	62.74	63.38	1004.82	1006.3	11.01	22.66
J168	951.33	73.71	74.42	1005.34	1006.98	6.33	14.19
J170	917.25	55.58	56.27	1005.05	1006.66	6.83	14.24
J172	843.97	55.91	56.54	1004.81	1006.28	6.81	12.96
J174	976.6	54.28	54.89	1004.96	1006.37	5.57	12.41
J176	861.6	58	58.59	1005.17	1006.55	6.77	15.16
J178	861.62	58.65	59.34	1005.72	1007.3	11.85	20.68
J180	670.07	56.06	56.87	1006.14	1008.01	2.11	6.19
J182	949.02	53.79	54.36	1007.21	1008.53	3.84	8.47
J184	865.72	61.58	62.2	1007.63	1009.06	8.77	14.69
J186	676.37	82.39	83.15	1008.3	1010.06	8.7	14.8
J188	658.73	85.43	86.33	1008.95	1011.02	4.13	9.57
J190	939.95	97.15	98.16	1009.36	1011.69	5.93	10.61
J192	886.8	115.33	116.65	1010.05	1013.12	9.94	17.56
J194	880.85	118.93	120.15	1009.58	1012.4	3.47	11.95
J196	792	95.69	96.71	1008.66	1011.01	8.18	15.48
J198	1135.63	56.32	56.99	1007.42	1008.95	6.46	12.58
J200	1136.83	104.66	104.76	1015.55	1015.78	6.51	14.88
J202	889.17	119.34	118.53	1018.98	1017.11	7.98	14.6
J204	883.46	119.9	118.19	1021.8	1017.85	1.41	2.72
J206	858.87	116.69	113.88	1024.68	1018.18	3.1	7.22
J208	838.49	123.01	90.2	1097.96	1022.07	1.92	7.67

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
J210	855.7	145.54	111.1	1102.2	1022.56	6.88	15.62
J212	866.2	71.33	51.15	907.11	860.45	1.18	3.78
J214	985.05	91.99	72.3	905.98	860.44	3.69	13.48
J216	925.32	113.86	94.79	904.54	860.44	5.54	10.54
J218	800.9	111.6	93.15	903.13	860.47	6.25	10.78
J220	516.26	85.62	66.7	904.35	860.62	3.16	9.05
J222	708.26	99.2	81.65	902.55	861.98	2.42	7.93
J224	723.89	106.93	89.1	902.55	861.31	2.67	6.05
J226	739.15	102.62	84.58	902.55	860.83	1.11	2.31
J228	741.24	133.89	115.97	901.96	860.52	0.67	1.12
J230	948.29	144.56	126.81	901.59	860.53	3.64	2.14
J232	910	124.7	107.03	901.45	860.59	8.1	5.87
J234	637.45	116.41	98.85	901.18	860.58	42.58	20.92
J236	566.99	101.79	84.25	901.15	860.6	41.42	19.49
J238	911	100.12	82.59	901.18	860.65	24.89	33.95
J240	895	68.6	51.2	901.52	861.27	8.94	21.41
J242	908	87.22	69.72	901.62	861.15	4.31	16.36
J244	905	75.09	57.66	901.71	861.4	6.91	19.71
J246	908	101.37	83.82	901.61	861.02	2.88	7.36
J248	841	91.97	74.4	901.59	860.96	2.65	6.5
J250	835	68.05	50.88	902.23	862.54	6.5	15.08
J252	830	137.55	119.89	900.79	859.96	14.39	5.01
J254	828	98.6	88.94	1171.95	1149.61	8.36	29.72
J256	824	101.29	89.22	1177.32	1149.41	6.2	25.48
J258	813	100.52	86.45	1181.82	1149.28	6.23	12.92
J260	893.31	109.59	94.26	1184.64	1149.21	4.12	15.04
J262	1043.08	85.27	79.42	1058.06	1044.54	2.26	5.89
J264	845.73	149.38	118.57	1198.45	1127.2	4.83	11.16
J266	885.18	150.87	117.24	1204.94	1127.16	3.74	9.04
J268	859.73	153.71	116.65	1212.84	1127.13	1.91	4.59
J270	876.53	82.24	79.59	992.4	986.28	1.37	3.36
J272	875.53	77.18	74.52	992.27	986.13	4.7	13.05
J274	879.44	76.09	73.4	992.16	985.94	4.33	13.44
J276	871.06	79.62	76.89	992.05	985.72	6.38	11.94
J278	870.08	97.82	91.33	1057.87	1042.87	14.33	40.57
J280	865.23	100.47	94.14	1057.94	1043.3	12.51	42.29
J282	817.78	79.36	73.59	1058.27	1044.92	3.8	14.51
J284	811.39	73.94	68.43	1058.48	1045.74	2.64	13.21
J286	784.69	76.24	71.11	1058.72	1046.86	3.25	19.19
J288	743.35	67.62	69.46	1145.01	1149.28	4.86	13.58
J290	787.38	52.38	52.62	1150.48	1151.04	3.16	9.99
J292	877.17	74.09	75.3	1147.63	1150.44	1.86	10.46
J294	773.52	88.51	90.92	1144.19	1149.77	0.4	1.77
J296	743.01	85.97	84.37	1060.1	1056.39	7.42	14.6
J298	744.53	84.98	83.93	1060.28	1057.86	7.58	13.48

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
J300	765.64	85.91	85.67	1060.76	1060.21	3.4	7.06
J302	742.17	77.49	76.35	1060.29	1057.66	4.36	8.25
J304	693.25	60.65	58.56	1060.17	1055.33	4.26	9.85
J306	641.25	92.44	89.76	1060.08	1053.89	10.23	65.23
J308	645.05	95.01	92.43	1059.94	1053.97	5.77	17.23
J310	673.16	81.95	78.32	1059.45	1051.05	4.56	19.91
J312	655.27	70.65	66.16	1059.05	1048.66	4.92	21.31
J314	665.25	99.99	102.58	1143.06	1149.05	7.36	15.98
J316	592.35	86.28	87.78	1145.28	1148.76	0	19.65
J318	567.29	89.78	90.45	1147.17	1148.71	2.33	23.5
J320	665.77	96.91	96.83	1148.89	1148.71	2.21	27.55
J322	669.66	83.88	82.29	1152.52	1148.84	9.9	34.91
J324	742.87	33.55	32.77	1151.36	1149.56	2.39	8.3
J326	699.92	82.97	80.19	991.97	985.54	17.37	40.72
J328	728.06	82.29	79.5	992.01	985.56	36.57	81.49
J330	688.91	88.32	85.54	991.97	985.54	18.9	44.36
J332	744.87	81.87	79.04	992.39	985.84	7.57	22.95
J334	582.71	68.89	66.04	992.48	985.87	6.11	19.65
J336	943.95	68.12	65.23	992.62	985.95	3.64	11.07
J338	943.08	62.55	60.25	992.92	987.61	2.59	19.94
J340	860.87	55.92	54.09	993.03	988.81	1.87	6.5
J342	853	35.56	33.73	993.03	988.78	1.71	5.21
J344	856.05	57.77	57.49	994.71	994.05	2.53	7.56
J346	857.38	73.25	72.86	993.97	993.08	1.02	4.56
J348	802.22	88.04	88	919.72	919.63	1.01	4.99
J350	816.2	89.74	89.69	919.72	919.61	1.08	6.75
J352	807.92	84.18	84.12	919.72	919.6	1.79	5.23
J354	831.67	79.97	77.65	770.09	764.73	3.01	12.08
J356	825.61	80.48	78.27	770.1	764.98	2.49	9.13
J358	874.75	78.59	76.46	770.11	765.17	1.51	4.69
J360	988.65	79.42	77.26	770.07	765.07	1.88	6.05
J362	1029.35	85.68	83.44	770.05	764.88	0.66	4.24
J364	976.31	86.4	84.07	770.01	764.62	0.47	1.99
J366	939.52	96.28	93.4	739.87	733.2	8.61	7.08
J368	861.29	96	93.12	739.87	733.21	2.67	4.41
J370	863.76	89.7	86.81	739.88	733.21	1.41	21.66
J372	862.09	84.37	81.55	739.9	733.36	0.93	14.27
J374	881.09	83.58	80.8	739.91	733.47	1.99	3.86
J376	919.91	89.25	86.52	739.92	733.62	1.49	3.43
J378	846.31	110.46	65.62	1050.45	946.74	1.02	0
J380	869.93	76.35	73.81	739.91	734.04	0.78	1.95
J382	895.67	91.8	89.21	739.88	733.91	1.56	4.08
J384	911.84	98.19	95.56	739.86	733.78	2.08	5.06
J386	945.77	74.56	71.97	739.88	733.88	0.67	2.79
J388	939.55	90.63	87.77	739.76	733.16	0.7	1.76

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
J390	958.55	83.05	80.25	739.79	733.31	0.93	3.91
J392	1073.77	71.18	68.28	739.73	733.03	2.47	4.8
J394	800.1	64.48	61.57	739.73	733	0.93	1.95
J396	801.72	68.21	65.29	739.72	732.96	1.08	3.17
J398	787.73	86.42	83.5	739.72	732.97	2.13	3.81
J400	835.1	79.54	76.63	739.74	733.02	1.02	2.94
J402	848.27	77.8	74.89	739.74	733.02	1.08	3.03
J404	863.72	83.7	80.79	739.74	733.02	0.71	2.12
J406	910.79	82.06	79.15	739.74	733.02	0.67	2.27
J408	861.11	79.91	77	739.74	733.02	1.51	27.82
J410	716.13	73.86	70.96	739.75	733.05	2.11	5.29
J412	712.2	93.39	90.5	739.75	733.08	1.41	4.01
J414	725.07	77.99	75.09	739.74	733.04	0.68	1.51
J416	585.17	100.1	97.15	739.7	732.89	0.67	2.85
J418	583.99	73.5	70.55	739.7	732.87	1.35	10.59
J420	586.41	78.81	75.85	739.7	732.87	1.76	2.83
J422	571.92	88.63	85.68	739.7	732.87	1.27	3.78
J424	570.21	85.2	82.25	739.7	732.88	1.62	2.91
J426	517.22	64.94	61.99	739.7	732.88	1.27	2.16
J428	517.87	68.29	65.35	739.7	732.9	0.81	1.64
J430	544.79	53.18	50.24	739.71	732.93	1	2.79
J432	546.62	88.78	85.82	739.7	732.86	2.35	5.78
J434	533.54	86.36	84.28	740.11	735.31	0.75	1.3
J436	795	75.73	73.5	740.07	734.9	2.72	8.05
J438	563.35	101.76	84.14	901.59	860.85	6.91	13.95
J440	567.46	87.83	88.84	1009.31	1011.64	5.15	15.86
J442	530.18	152.52	107.6	1129.49	1025.61	3.6	12.21
J444	547.74	70.16	67.29	1060.09	1053.45	3.2	15.2
J446	575.13	77.31	60.31	897.04	857.73	1.74	3.63
J448	590.62	79.32	62.32	897.04	857.73	1.22	3.39
J450	539.87	91.59	88.91	739.93	733.73	3.54	6.16
J452	555.81	61.76	61.4	994.14	993.31	1.57	3.73
J454	559.84	88.65	87.71	993.24	991.06	0.99	4.99
J456	546.18	57.29	55.91	993.17	989.96	2.14	34.78
J458	549.99	35.03	33.93	1153.52	1150.99	3.5	9.48
J460	568.95	88.51	68.74	906.21	860.5	4.42	10.31
J462	523.79	70.1	67.85	740.03	734.82	2.41	4.13
J464	559.4	78.17	75.86	740	734.67	2.34	4.15
J466	508.23	57.26	54.95	740	734.65	1.21	2.06
J468	569.73	54.69	52.4	740.02	734.73	1.01	1.69
J470	557.45	55.98	53.71	740.03	734.79	1.35	2.26
J472	534.74	60.29	58.06	740.05	734.88	0.92	19.65
J474	542.69	49.21	46.99	740.06	734.94	1.05	22.4
J476	589.53	81.54	79.19	739.98	734.54	0.86	1.56
J478	581.78	75.6	73.4	740.05	734.96	2.21	5.19

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
J480	534.39	73.6	71.27	739.99	734.6	1.45	2.43
J482	540.41	47.62	45.3	740	734.65	2.23	3.74
J484	564.93	55.29	53.03	740.03	734.79	2.93	4.18
J486	666.28	41.07	38.86	740.06	734.94	2.81	4.71
J488	806.19	80.54	78.42	740.09	735.17	0.75	2.65
J490	776.8	59.41	57.12	740.02	734.73	3.71	4.44
J492	897.84	63.4	61.08	739.99	734.61	0.51	2.16
J494	718.27	59.76	57.59	740.07	735.04	0.81	16.73
J496	713.62	75.22	88.38	1050.34	1080.78	2.82	13.36
J498	528.12	77.76	90.27	1050.34	1079.27	2.81	10.2
J500	860.68	96.92	108.21	1050.35	1076.47	0.55	2.28
J502	1072.52	86.35	98.3	1050.34	1077.96	1.33	10.1
J504	701.55	74.66	88.49	1050.34	1082.32	1.75	9.33
J506	577.91	94.69	105.86	1050.39	1076.21	3.29	20.24
J508	559.24	96.04	107.57	1050.35	1077	1.21	5.52
J510	613.55	95.39	106.91	1050.35	1076.99	1.54	7.77
J512	610.58	100.84	111.99	1050.33	1076.12	1.67	13.19
J514	600.62	80.28	91.28	1050.26	1075.72	1.66	9.29
J516	626.27	80.24	91.25	1050.26	1075.72	0.29	10.48
J518	551.42	107.33	58.1	1049.76	935.89	2.73	10.79
J520	629.89	89.27	39.86	1049.75	935.5	1.74	13.42
J522	612.16	108.97	59.54	1049.75	935.44	3.02	15.38
J524	645.08	86.39	37.09	1049.75	935.74	1.89	7.19
J526	553.83	78.6	29.3	1049.75	935.74	1.89	6.21
J528	602.63	95.89	46.53	1049.75	935.61	1.39	4.31
J530	593.37	96.4	47.1	1049.75	935.75	1.07	3.65
J532	601.87	106.36	57.16	1049.76	936	3.76	8.8
J534	876.39	103.12	53.79	1049.75	935.68	2.9	6.47
J536	870.53	89.41	40.96	1050.22	938.17	4.08	17.53
J538	826.23	91.37	42.95	1050.13	938.15	2.61	18.53
J540	850.66	75.83	86.84	1050.26	1075.72	2.27	12.66
J542	877.69	64.64	75.67	1050.26	1075.75	4.5	21.17
J544	831.41	77.15	88.18	1050.26	1075.77	2.15	16.17
J546	828.25	96.71	108.24	1050.35	1076.99	1.45	7.28
J548	829.77	84.72	96.48	1050.35	1077.54	1.71	3.36
J550	817.13	83.3	95.24	1050.34	1077.97	0.73	6.96
J552	864.62	75.42	86.43	1050.26	1075.72	0.91	5.48
J554	864.71	84.8	96.56	1050.34	1077.53	1.73	8.45
J556	801.55	54.32	52	740	734.65	1.27	4.28
J558	843.33	87.5	85.13	739.97	734.5	12.07	6.26
J560	797.75	110.87	116.23	1136.38	1148.78	0	0
J564	849.97	114.55	120.42	1134.9	1148.46	0	0
J566	867.99	157.05	120.29	1108.19	1023.16	0	0
J568	828.01	152.36	107.56	1129.14	1025.54	0	0
J570	826.84	69.91	47.76	911.67	860.46	0	0

Node ID	Elevation	Pressure (psi)		Head (ft)		Demand (gpm)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout
J572	803.81	143.82	125.43	1191.58	1149.06	0	0
J574	811.29	106.74	58.48	1049.83	938.23	0	0
J578	838.84	6.85	6.92	995.85	996	0	0
J580	874.9	72.16	88.58	1050.88	1088.85	0	0
J582	900.77	87.17	103.69	1050.59	1088.79	0	0
J586	871.85	115.57	65.45	1050.26	934.35	0	0
PMP-1_ND	792	97.81	93.09	1018.19	1007.28	0.07	0.23
PMP-1_NU	780.51	1.73	1.14	784.51	783.14	0.06	0.22
PMP-10_ND	792	97.97	93.3	1018.57	1007.76	1.56	5.26
PMP-10_NU	777.5	3.05	2.58	784.56	783.46	1.7	5.72
PRV-108_ND	941.08	96.1	90.22	1163.33	1149.73	0.91	1.67
PRV-108_NU	946.02	94.25	88.12	1163.98	1149.8	0.76	1.36
PRV-11_ND	776.09	109.99	104.97	1030.44	1018.83	0.24	0.56
PRV-11_NU	776.15	136.78	106.08	1092.45	1021.45	0.14	0.39
PRV-131_ND	567	75.16	74.62	740.8	739.55	0	14.66
PRV-131_NU	567	183.78	180.55	991.98	984.53	0.36	13.42
PRV-19_ND	911.55	100.41	93.22	1143.75	1127.11	1.34	2.9
PRV-19_NU	898.78	137.73	98.74	1217.29	1127.11	0.59	1.47
PRV-32_ND	654.31	107.34	90	902.55	862.44	0	0.91
PRV-32_NU	657.83	200.43	158.28	1121.34	1023.86	0.25	0.98
PRV-6_ND	629	116.98	99.47	899.51	859.02	6.31	19.89
PRV-6_NU	615.55	122.98	105.42	899.93	859.33	8.36	8.61
PRV-60_ND	734.73	80	79.99	919.73	919.71	0.12	1.59
PRV-60_NU	755.25	102.95	102.45	993.32	992.17	0	1.5
PRV-71_ND	673	42	39.99	770.12	765.49	0.7	1.44
PRV-71_NU	673	106.69	106.61	919.71	919.54	1.16	2.61
PRV-90_ND	947.22	85	77.79	1143.78	1127.11	1.86	5.69
PRV-90_NU	941.01	123.29	80.48	1226.11	1127.11	0.35	1.03
SADDLE_CRK_ND	935.32	50	67	1050.95	1090.26	4.09	12.34
SADDLE_CRK_NU	949.61	87.46	86.38	1151.85	1149.37	4.05	9.52
U7008_ND	949.64	78.82	77.9	1131.91	1129.77	0	0
U7008_NU	949.03	21.21	24.61	998.08	1005.93	0	0
V8002_ND	735.82	75.13	53.9	909.57	860.46	0.24	2.53
V8002_NU	743.06	72.63	50.77	911.01	860.46	1.39	2.46
V8006_ND	859.57	85.83	80	1058.06	1044.57	0.24	0.9
V8006_NU	858.55	144.2	116.19	1192.02	1127.23	0.18	0.47
V8010_ND	740.75	69.99	52.97	902.62	863.26	0.19	0.32
V8010_NU	739.89	121.32	120.01	1020.43	1017.42	0.21	0.35
V8012_ND	869.41	82.99	82.93	1061.33	1061.19	1.11	1.86

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APPENDIX C

PIPELINE REPORTS

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
2	224.83	8	8	2	9	0.01	0.06	0	0	0	0
12	410.58	10	16	133	681	0.55	1.09	0.07	0.15	0.17	0.35
16	184.11	24	24	5520	10703	3.91	7.59	0.44	1.49	2.38	8.1
22	340.19	10	10	1216	-27	4.97	0.11	3.49	0	10.26	0.01
23	623.73	10	10	1213	-33	4.96	0.14	6.37	0.01	10.22	0.01
24	674.63	10	10	-1209	41	4.94	0.17	6.85	0.01	10.15	0.02
26	1,519.42	10	10	883	-132	3.61	0.54	8.62	0.26	5.67	0.17
27	782.42	10	10	878	-143	3.59	0.58	4.4	0.15	5.62	0.19
28	443.41	10	20	441	-1308	1.8	1.34	0.7	0.18	1.57	0.4
29	585.58	10	20	433	1153	1.77	1.18	0.89	0.19	1.51	0.32
33	814.38	8	8	-2	124	0.02	0.79	0	0.36	0	0.44
34	678.2	8	8	-133	-92	0.85	0.59	0.34	0.17	0.51	0.26
35	203.53	8	8	244	86	1.55	0.55	0.32	0.05	1.55	0.23
37	771.46	8	8	85	65	0.54	0.41	0.17	0.1	0.22	0.13
38	1,419.79	8	12	64	109	0.41	0.31	0.19	0.07	0.13	0.05
40	222.73	12	12	1	18	0	0.05	0	0	0	0
41	279.83	8	8	-12	-32	0.08	0.21	0	0.01	0.01	0.04
42	132.13	8	12	59	75	0.38	0.21	0.01	0	0.11	0.02
43	315.88	8	8	14	36	0.09	0.23	0	0.01	0.01	0.04
44	453.84	8	8	-45	-37	0.29	0.24	0.03	0.02	0.07	0.05
45	531.53	8	8	-9	-15	0.06	0.1	0	0	0	0.01
46	345.85	8	8	31	20	0.2	0.12	0.01	0.01	0.03	0.01
47	280.51	6	6	2	4	0.03	0.05	0	0	0	0
50	459.24	6	6	27	13	0.31	0.14	0.05	0.01	0.11	0.03
51	141.01	6	6	3	10	0.03	0.11	0	0	0	0.02
52	277.17	6	6	1	5	0.01	0.05	0	0	0	0
54	379.88	6	12	9	22	0.1	0.06	0.01	0	0.01	0
55	123.91	6	6	5	15	0.05	0.17	0	0	0	0.04
57	645.63	6	6	2	7	0.02	0.08	0	0.01	0	0.01
58	290.12	6	6	-3	-5	0.04	0.06	0	0	0	0.01
61	122.39	10	10	29	73	0.12	0.3	0	0.01	0.01	0.06
62	503.57	6	6	1	2	0.01	0.02	0	0	0	0

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
64	602.87	6	6	1	4	0.02	0.05	0	0	0	0
67	67.92	6	10	-38	-331	0.43	1.35	0.01	0.06	0.2	0.92
70	1,285.19	10	16	134	687	0.55	1.1	0.22	0.46	0.17	0.36
72	452.42	8	8	50	-8	0.32	0.05	0.03	0	0.07	0
73	106.88	10	10	7	9	0.03	0.03	0	0	0	0
74	288.1	10	10	5	4	0.02	0.02	0	0	0	0
75	547.29	6	6	2	3	0.02	0.04	0	0	0	0
76	585.11	6	6	13	30	0.15	0.34	0.02	0.08	0.03	0.13
77	303.75	6	6	1	4	0.01	0.05	0	0	0	0
78	906.1	6	6	9	20	0.11	0.23	0.01	0.06	0.01	0.06
80	134.25	6	6	0	1	0	0.01	0	0	0	0
81	222.66	6	6	1	2	0.01	0.02	0	0	0	0
82	218.49	6	6	4	9	0.05	0.1	0	0	0	0.01
83	316.1	6	6	1	3	0.01	0.03	0	0	0	0
84	498.77	6	6	2	4	0.03	0.05	0	0	0	0
85	189.59	6	6	1	2	0.02	0.03	0	0	0	0
86	227.67	6	6	2	3	0.02	0.04	0	0	0	0
87	370.31	6	6	-1	-2	0.02	0.02	0	0	0	0
88	603.03	6	6	3	6	0.04	0.07	0	0	0	0.01
89	489.43	6	6	6	28	0.07	0.31	0	0.05	0.01	0.11
91	532.39	6	6	5	2	0.06	0.02	0	0	0.01	0
92	258.26	6	10	33	300	0.38	1.22	0.04	0.2	0.16	0.77
94	500.94	6	10	-27	-272	0.3	1.11	0.05	0.32	0.11	0.64
99	312.64	6	6	23	65	0.26	0.74	0.02	0.17	0.08	0.54
100	924.37	6	10	52	255	0.59	1.04	0.33	0.52	0.36	0.57
105	857.96	6	6	13	28	0.15	0.32	0.03	0.1	0.03	0.12
106	500.01	12	12	107	31	0.3	0.09	0.02	0	0.05	0
107	1,910.43	6	6	149	-8	1.69	0.09	4.85	0.02	2.54	0.01
109	431.79	6	8	302	38	3.43	0.24	4.05	0.02	9.39	0.05
110	1,291.62	6	6	149	29	1.7	0.33	3.29	0.16	2.54	0.12
111	1,547.27	6	6	2	3	0.02	0.04	0	0	0	0
112	142.02	10	20	563	1102	2.3	1.13	0.35	0.04	2.46	0.29

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
113	337.83	10	20	561	1100	2.29	1.12	0.83	0.1	2.45	0.29
114	571.88	10	20	693	1065	2.83	1.09	2.07	0.16	3.62	0.27
115	636.4	6	6	138	-24	1.57	0.27	1.4	0.05	2.2	0.09
116	173.04	6	6	3	4	0.03	0.05	0	0	0	0
118	498.71	6	8	52	213	0.59	1.36	0.18	0.6	0.37	1.21
119	779.33	6	6	25	102	0.29	1.16	0.07	0.99	0.1	1.26
120	573.19	6	6	25	55	0.28	0.62	0.05	0.23	0.09	0.4
122	784.61	6	6	-37	-101	0.41	1.15	0.15	0.97	0.19	1.24
123	846.79	6	6	-1	29	0.02	0.32	0	0.1	0	0.12
124	562.93	6	6	3	35	0.04	0.4	0	0.1	0	0.17
125	772	6	6	-15	-63	0.17	0.71	0.03	0.39	0.03	0.51
126	770.74	6	6	-20	-76	0.23	0.86	0.05	0.56	0.06	0.73
129	764.75	6	6	7	-19	0.08	0.22	0.01	0.04	0.01	0.06
134	672.98	6	6	-140	23	1.59	0.26	1.53	0.05	2.27	0.08
135	744.13	6	6	-116	-1	1.31	0.01	1.18	0	1.58	0
136	246.29	8	8	115	-70	0.73	0.45	0.1	0.04	0.39	0.15
137	793.29	8	8	60	-68	0.38	0.43	0.09	0.12	0.12	0.15
138	1,059.86	6	6	15	40	0.18	0.46	0.04	0.24	0.04	0.23
139	549.85	8	8	-32	137	0.2	0.88	0.02	0.29	0.04	0.54
140	539.99	8	16	324	623	2.07	0.99	1.42	0.16	2.62	0.3
141	763.37	6	6	-5	-7	0.05	0.08	0	0.01	0	0.01
143	184.73	10	10	133	301	0.54	1.23	0.03	0.14	0.17	0.77
144	90.31	10	10	70	77	0.29	0.32	0	0.01	0.05	0.06
145	102.44	10	10	69	64	0.28	0.26	0.01	0	0.05	0.04
146	144.07	10	10	-127	-281	0.52	1.15	0.02	0.1	0.16	0.68
148	126.93	10	10	126	280	0.51	1.14	0.02	0.09	0.15	0.68
149	121.76	10	10	35	85	0.14	0.35	0	0.01	0.01	0.07
151	105.65	6	10	-63	-222	0.71	0.91	0.05	0.05	0.51	0.44
152	79.62	6	6	-65	-59	0.74	0.67	0.04	0.04	0.55	0.46
153	135.84	6	6	-3	-5	0.04	0.05	0	0	0	0
154	186.32	10	10	90	194	0.37	0.79	0.02	0.06	0.08	0.34
156	716.61	8	8	-32	-79	0.21	0.5	0.03	0.14	0.04	0.19

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
157	123.59	8	8	1	3	0.01	0.02	0	0	0	0
158	525.36	8	8	29	74	0.19	0.47	0.02	0.09	0.03	0.17
159	198.8	8	8	28	65	0.18	0.42	0	0.02	0.02	0.12
160	462.05	8	8	-13	-29	0.08	0.19	0	0.01	0.01	0.03
161	111.61	8	8	12	28	0.07	0.18	0	0	0	0.02
162	210.94	8	8	8	20	0.05	0.13	0	0	0	0.01
163	238.85	8	8	9	23	0.05	0.15	0	0	0	0.02
164	451.3	8	8	14	34	0.09	0.21	0	0.02	0.01	0.04
165	275.81	6	6	1	2	0.01	0.02	0	0	0	0
166	158.97	8	8	12	30	0.08	0.19	0	0.01	0.01	0.03
167	155.16	8	8	20	52	0.13	0.33	0	0.01	0.02	0.09
168	211.29	6	6	-5	-12	0.06	0.13	0	0	0	0.02
169	241.42	6	6	2	8	0.03	0.09	0	0	0	0.01
170	187.69	8	8	15	40	0.1	0.26	0	0.01	0.01	0.05
171	404.93	8	8	17	46	0.11	0.3	0	0.03	0.01	0.07
172	379.81	8	8	14	37	0.09	0.24	0	0.02	0.01	0.05
173	650.2	8	8	14	26	0.09	0.16	0	0.02	0.01	0.02
174	334.74	8	8	2	11	0.01	0.07	0	0	0	0.01
175	339.54	8	8	11	12	0.07	0.07	0	0	0	0.01
268	154.11	8	8	3	6	0.02	0.04	0	0	0	0
301	265.03	8	8	-4	23	0.03	0.15	0	0	0	0.02
330	319.7	8	8	-6	-3	0.04	0.02	0	0	0	0
349	244.09	8	8	-6	-8	0.04	0.05	0	0	0	0
414	467.91	12	16	107	466	0.3	0.74	0.02	0.07	0.04	0.15
415	250.58	8	8	16	213	0.1	1.36	0	0.26	0.01	1.05
417	907.76	12	12	91	245	0.26	0.69	0.03	0.17	0.03	0.19
419	566.35	12	12	90	-6	0.26	0.02	0.02	0	0.03	0
442	878.64	8	8	0	37	0	0.24	0	0.04	0	0.04
445	145.51	8	8	14	-115	0.09	0.74	0	0.05	0.01	0.34
446	238.62	8	8	13	-118	0.08	0.75	0	0.08	0.01	0.35
447	252.9	8	8	10	-129	0.06	0.82	0	0.1	0	0.41
448	189.1	8	8	7	-136	0.05	0.87	0	0.09	0	0.45

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
449	555.78	8	8	1	6	0	0.04	0	0	0	0
450	462.75	8	8	5	-152	0.03	0.97	0	0.26	0	0.56
452	550.4	12	12	-73	-95	0.21	0.27	0.01	0.02	0.02	0.03
453	596.81	12	12	71	71	0.2	0.2	0.01	0.01	0.02	0.02
454	420.77	8	8	9	27	0.06	0.17	0	0.01	0	0.02
455	552.26	12	12	-17	-63	0.05	0.18	0	0.01	0	0.02
456	290.15	8	8	-17	-68	0.11	0.43	0	0.04	0.01	0.13
457	320.23	8	8	-7	-31	0.04	0.2	0	0.01	0	0.03
459	380.78	8	8	-4	-3	0.02	0.02	0	0	0	0
460	493.78	8	8	-6	-26	0.04	0.16	0	0.01	0	0.02
461	462.68	8	8	4	16	0.03	0.11	0	0	0	0.01
465	708.24	8	8	48	-21	0.3	0.13	0.05	0.01	0.06	0.01
466	544.16	8	8	45	-32	0.29	0.2	0.03	0.02	0.06	0.03
467	298.85	8	8	44	-44	0.28	0.28	0.02	0.02	0.06	0.06
468	336.34	8	8	43	-54	0.27	0.35	0.02	0.03	0.05	0.08
469	283.19	8	8	25	42	0.16	0.27	0.01	0.01	0.02	0.05
470	147.56	8	8	22	35	0.14	0.22	0	0.01	0.02	0.04
473	200.46	8	8	17	133	0.11	0.85	0	0.09	0.01	0.44
474	461.94	8	8	6	61	0.04	0.39	0	0.05	0	0.1
475	532.42	8	8	-6	-61	0.04	0.39	0	0.05	0	0.1
476	474.29	8	8	3	50	0.02	0.32	0	0.03	0	0.07
477	404.49	8	12	-292	-382	1.86	1.08	0.88	0.2	2.16	0.49
478	642.28	8	8	2	44	0.01	0.28	0	0.04	0	0.06
479	511.3	8	8	-2	-47	0.01	0.3	0	0.03	0	0.06
480	613.66	8	8	1	-33	0.01	0.21	0	0.02	0	0.03
499	443.99	8	8	0	-5	0	0.03	0	0	0	0
500	321.15	8	8	0	-15	0	0.09	0	0	0	0.01
501	384.28	8	8	0	-34	0	0.21	0	0.01	0	0.03
502	447.98	8	8	0	13	0	0.09	0	0	0	0.01
504	753.39	8	8	0	-4	0	0.03	0	0	0	0
505	155.34	8	8	0	36	0	0.23	0	0.01	0	0.04
509	292.19	8	16	-304	-590	1.94	0.94	0.68	0.08	2.34	0.27

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
513	621.7	6	6	19	30	0.22	0.35	0.04	0.08	0.06	0.13
514	1,061.68	8	12	283	365	1.81	1.03	2.17	0.48	2.05	0.45
515	516.68	6	8	65	132	0.74	0.84	0.28	0.26	0.54	0.5
517	609.24	6	6	-54	-55	0.61	0.63	0.24	0.25	0.39	0.4
518	488.2	6	6	-47	-46	0.53	0.52	0.14	0.14	0.3	0.28
520	907.11	6	8	59	122	0.67	0.78	0.41	0.39	0.45	0.43
521	539.67	6	8	53	112	0.6	0.71	0.2	0.2	0.37	0.36
522	567.67	6	8	44	99	0.5	0.63	0.15	0.17	0.26	0.29
525	456.49	6	8	64	113	0.73	0.72	0.24	0.17	0.53	0.37
526	521.54	6	8	54	96	0.61	0.61	0.2	0.14	0.38	0.28
527	434.09	6	8	37	68	0.42	0.44	0.08	0.06	0.19	0.15
528	398.59	8	8	-105	-74	0.67	0.47	0.13	0.07	0.33	0.17
535	237.74	6	6	14	34	0.16	0.38	0.01	0.04	0.03	0.16
536	287.31	10	10	50	107	0.21	0.44	0.01	0.03	0.03	0.11
537	300.6	10	10	50	106	0.2	0.43	0.01	0.03	0.03	0.11
538	435.26	10	10	49	103	0.2	0.42	0.01	0.05	0.03	0.11
539	338.05	6	6	13	24	0.14	0.27	0.01	0.03	0.03	0.08
540	359.5	6	6	-1	0	0.01	0	0	0	0	0
541	459.25	6	6	10	21	0.11	0.23	0.01	0.03	0.02	0.06
542	175.7	10	10	38	80	0.15	0.33	0	0.01	0.02	0.07
543	490.66	10	10	33	62	0.14	0.26	0.01	0.02	0.01	0.04
544	438.18	10	10	32	60	0.13	0.25	0.01	0.02	0.01	0.04
545	297.13	10	10	27	46	0.11	0.19	0	0.01	0.01	0.02
546	850.12	10	10	26	45	0.11	0.18	0.01	0.02	0.01	0.02
547	177.03	10	10	4	13	0.02	0.05	0	0	0	0
548	382.95	10	10	-22	-48	0.09	0.2	0	0.01	0.01	0.03
549	497.35	8	8	7	18	0.04	0.11	0	0.01	0	0.01
551	237.6	6	6	3	-1	0.04	0.02	0	0	0	0
552	249.98	6	6	2	-4	0.02	0.05	0	0	0	0
553	461.21	8	8	13	28	0.09	0.18	0	0.01	0.01	0.03
555	255.81	10	10	23	40	0.09	0.16	0	0	0.01	0.02
556	291.31	10	10	20	36	0.08	0.15	0	0	0.01	0.02

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
557	315.59	8	8	-4	-9	0.03	0.06	0	0	0	0
558	359.36	6	6	1	1	0.01	0.01	0	0	0	0
559	157.88	6	6	3	7	0.03	0.08	0	0	0	0.01
560	473.53	8	8	8	17	0.05	0.11	0	0.01	0	0.01
561	306.77	8	8	-4	-1	0.02	0.01	0	0	0	0
562	436.91	8	8	2	-2	0.01	0.01	0	0	0	0
563	504.73	6	6	8	12	0.1	0.14	0.01	0.01	0.01	0.03
564	393.49	6	6	5	10	0.06	0.11	0	0.01	0	0.02
565	582.99	8	8	14	25	0.09	0.16	0	0.01	0.01	0.02
566	156.18	6	6	11	18	0.13	0.21	0	0.01	0.02	0.05
567	558.62	6	6	-4	-7	0.04	0.07	0	0	0	0.01
568	480.11	6	6	1	-1	0.01	0.01	0	0	0	0
569	163.27	6	6	7	10	0.07	0.11	0	0	0.01	0.02
570	159.16	6	6	5	7	0.06	0.08	0	0	0	0.01
571	584.08	6	6	3	7	0.04	0.08	0	0	0	0.01
572	94.84	6	6	1	0	0.02	0	0	0	0	0
574	164.52	8	8	9	16	0.06	0.1	0	0	0	0.01
575	126.53	8	8	9	16	0.06	0.1	0	0	0	0.01
577	912.36	8	8	5	10	0.03	0.07	0	0	0	0
583	73.55	24	24	2760	7557	1.96	5.36	0.05	0.31	0.66	4.25
1091	805.29	8	8	0	-5	0	0.03	0	0	0	0
1093	936.94	8	8	4	10	0.03	0.06	0	0	0	0
1095	2,061.45	8	8	1	-10	0.01	0.06	0	0.01	0	0
1099	63.33	6	6	0	0	0	0	0	0	0	0
P-3	143.73	10	10	-65	-142	0.27	0.58	0.01	0.02	0.04	0.16
P-4	522.79	8	8	3	29	0.02	0.19	0	0.02	0	0.03
P-6	428.6	12	12	7	1	0.02	0	0	0	0	0
P-8	381.89	8	8	11	-57	0.07	0.36	0	0.04	0	0.11
P13	153.48	10	10	-26	-67	0.11	0.28	0	0.01	0.01	0.05
P-13	168.06	18	26	5511	10615	6.95	6.41	1.62	0.91	9.62	5.4
P15	1,262.65	6	6	30	43	0.34	0.49	0.16	0.32	0.13	0.25
P17	332.22	6	6	6	9	0.06	0.1	0	0	0.01	0.01

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P-18	1,688.11	18	18	5510	4088	6.95	5.15	16.24	9.34	9.62	5.53
P19	428.57	6	6	17	22	0.2	0.25	0.02	0.03	0.05	0.08
P-19	431.84	18	18	5509	4087	6.95	5.15	4.15	2.39	9.62	5.53
P21	684.31	6	6	9	16	0.11	0.18	0.01	0.03	0.01	0.04
P23	329.93	6	6	4	7	0.04	0.08	0	0	0	0.01
P25	291.98	6	6	2	4	0.02	0.04	0	0	0	0
P27	829.17	6	6	-120	-104	1.36	1.18	1.4	1.08	1.69	1.3
P29	715.47	6	6	-82	-24	0.93	0.28	0.6	0.06	0.83	0.09
P31	304.39	6	6	-82	-60	0.93	0.68	0.26	0.14	0.84	0.47
P-32	1,146.30	4	10	5	7	0.13	0.03	0.04	0	0.04	0
P33	422.34	4	10	22	46	0.55	0.19	0.22	0.01	0.52	0.02
P-33	369.85	4	4	4	6	0.11	0.15	0.01	0.02	0.03	0.04
P-34	209.15	4	4	3	4	0.07	0.09	0	0	0.01	0.02
P35	643.76	4	10	19	38	0.49	0.15	0.26	0.01	0.41	0.02
P37	516.97	4	4	8	11	0.2	0.29	0.04	0.08	0.08	0.16
P-37	681.23	6	6	-120	-106	1.37	1.21	1.16	0.93	1.71	1.36
P39	218.03	4	10	-24	-19	0.63	0.08	0.14	0	0.64	0
P-39	58.36	12	12	0	-1	0	0	0	0	0	0
P41	89.47	4	4	-36	-40	0.91	1.02	0.12	0.14	1.29	1.58
P-41	345.63	6	12	130	123	1.48	0.35	0.68	0.02	1.97	0.06
P-42	614.87	8	8	-145	-132	0.93	0.84	0.36	0.31	0.59	0.5
P43	411.29	4	10	8	16	0.22	0.07	0.04	0	0.09	0
P-44	616.43	6	8	20	52	0.23	0.33	0.04	0.06	0.06	0.09
P45	790.84	4	4	1	4	0.02	0.1	0	0.02	0	0.02
P-46	474.72	6	8	-1	-3	0.02	0.02	0	0	0	0
P47	1,243.31	4	4	8	17	0.19	0.43	0.09	0.39	0.07	0.32
P-47	635.15	6	8	-13	-38	0.14	0.25	0.02	0.03	0.03	0.05
P-48	2,524.69	6	8	2	6	0.02	0.04	0	0	0	0
P49	6,359.31	12	16	3	116	0.01	0.19	0	0.09	0	0.01
P-49	745.78	6	8	-4	-11	0.04	0.07	0	0	0	0.01
P-50	1,924.75	6	6	2	5	0.03	0.06	0	0.01	0	0.01
P-52	680.58	6	6	27	67	0.31	0.75	0.08	0.39	0.11	0.57

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P-53	578.12	6	8	-12	-7	0.14	0.05	0.01	0	0.03	0
P-54	404.19	6	6	3	6	0.04	0.07	0	0	0	0.01
P-55	446.36	8	8	5	9	0.03	0.06	0	0	0	0
P-56	132.09	6	6	1	-1	0.01	0.01	0	0	0	0
P-57	89.83	6	6	-3	-4	0.04	0.05	0	0	0	0
P-58	495.11	6	6	-4	-3	0.04	0.03	0	0	0	0
P59	48.79	8	8	0	190	0	1.21	0	0.05	0	0.98
P-59	175.59	6	6	-1	-1	0.01	0.01	0	0	0	0
P-60	205.58	6	6	1	1	0.01	0.01	0	0	0	0
P61	730.94	8	8	5	-181	0.03	1.16	0	0.65	0	0.9
P-61	344.87	6	6	-1	-2	0.02	0.03	0	0	0	0
P-62	204.38	6	6	-1	-2	0.01	0.02	0	0	0	0
P63	343.81	6	6	1	3	0.01	0.03	0	0	0	0
P-63	536.74	6	6	-3	-4	0.03	0.04	0	0	0	0
P-64	205.93	6	6	0	0	0	0.01	0	0	0	0
P65	310.55	6	6	13	19	0.15	0.21	0.01	0.02	0.03	0.05
P-65	163.57	6	6	1	1	0.01	0.01	0	0	0	0
P67	88.32	12	12	0	130	0	0.37	0	0.01	0	0.07
P-68	202.95	6	6	3	5	0.03	0.06	0	0	0	0
P69	193.67	6	10	266	-2	3.02	0.01	1.43	0	7.41	0
P-69	620.52	6	6	3	6	0.03	0.07	0	0	0	0.01
P-70	295.15	6	6	2	4	0.02	0.05	0	0	0	0
P71	25.48	6	6	267	0	3.03	0	0.19	0	7.45	0
P-71	59.08	6	6	0	0	0	0	0	0	0	0
P-73	617.69	6	10	50	251	0.57	1.03	0.21	0.34	0.34	0.55
P-74	157.58	6	6	1	1	0.01	0.02	0	0	0	0
P75	1,239.97	12	12	2	1	0	0	0	0	0	0
P-75	1,211.21	6	8	-49	-129	0.55	0.82	0.39	0.58	0.32	0.48
P-76	214.99	6	8	-25	-62	0.28	0.39	0.02	0.03	0.09	0.12
P77	658.65	12	12	107	389	0.3	1.1	0.03	0.29	0.04	0.44
P-77	769.97	6	6	-142	23	1.61	0.26	1.78	0.06	2.32	0.08
P-78	88.36	10	16	600	770	2.45	1.23	0.25	0.04	2.78	0.45

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P-79	851.35	10	16	598	767	2.44	1.22	2.35	0.38	2.76	0.44
P-80	379.13	6	6	-32	-65	0.36	0.74	0.05	0.21	0.14	0.55
P-81	598.3	2	2	3	6	0.31	0.6	0.21	0.7	0.35	1.16
P-82	227.83	6	6	35	73	0.4	0.83	0.04	0.15	0.18	0.68
P-83	407.85	2	2	-3	-5	0.27	0.54	0.11	0.39	0.27	0.94
P-84	839.31	12	12	10	12	0.03	0.03	0	0	0	0
P-88	778.65	6	6	121	108	1.38	1.23	1.35	1.09	1.73	1.4
P97	80.8	16	16	2752	3091	4.39	4.93	0.38	0.47	4.72	5.85
P-101	548.47	10	20	208	1112	0.85	1.14	0.21	0.16	0.39	0.3
P-102	636.9	10	20	-262	-1377	1.07	1.41	0.38	0.28	0.6	0.44
P103	15.16	30	30	440	-1311	0.2	0.59	0	0	0.01	0.05
P-103	832.11	6	6	-4	1	0.04	0.01	0	0	0	0
P105	16.24	30	30	181	-3241	0.08	1.47	0	0	0	0.26
P107	25.46	30	30	259	1930	0.12	0.88	0	0	0	0.1
P109	33.96	30	30	179	2805	0.08	1.27	0	0.01	0	0.2
P111	218.67	12	12	0	65	0	0.19	0	0	0	0.02
P113	1,143.28	12	12	1	51	0	0.15	0	0.01	0	0.01
P115	208.63	12	12	1	-5	0	0.01	0	0	0	0
P117	534.1	12	12	1	-5	0	0.01	0	0	0	0
P119	477.85	8	8	1	-1	0.01	0.01	0	0	0	0
P121	273.19	10	10	1220	-20	4.98	0.08	2.82	0	10.32	0.01
P123	276.09	6	6	2	3	0.02	0.04	0	0	0	0
P125	614.89	8	8	0	-1	0	0.01	0	0	0	0
P-126	831.84	10	10	1221	-10	4.99	0.04	8.6	0	10.33	0
P127	29.96	18	18	4932	2545	6.22	3.21	0.2	0.06	6.75	1.98
P129	85.02	6	6	7	7	0.08	0.08	0	0	0.01	0.01
P-130	623.02	6	6	-27	-80	0.3	0.91	0.07	0.5	0.11	0.8
P131	115.43	6	6	0	9	0	0.1	0	0	0	0.01
P-131	604.28	6	6	10	21	0.11	0.24	0.01	0.04	0.02	0.07
P-132	2,143.51	6	6	8	17	0.09	0.19	0.02	0.1	0.01	0.05
P133	272.89	6	10	-53	-258	0.6	1.06	0.1	0.16	0.37	0.58
P-133	485.31	8	12	218	259	1.39	0.73	0.61	0.12	1.26	0.24

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P-134	835.04	6	6	-22	-71	0.25	0.8	0.06	0.53	0.07	0.64
P135	645.38	10	20	204	1104	0.83	1.13	0.24	0.19	0.38	0.29
P137	807.76	6	6	-12	-37	0.13	0.42	0.02	0.15	0.02	0.19
P139	668.72	6	6	13	45	0.15	0.51	0.02	0.18	0.03	0.27
P141	638.87	6	10	-24	-284	0.27	1.16	0.05	0.44	0.08	0.7
P143	649.57	6	8	-23	-6	0.26	0.04	0.05	0	0.08	0
P145	141.2	10	10	32	85	0.13	0.35	0	0.01	0.01	0.07
P147	183.18	10	10	32	83	0.13	0.34	0	0.01	0.01	0.07
P149	171.47	10	10	-18	-36	0.07	0.15	0	0	0	0.02
P-150	451.65	8	12	297	390	1.9	1.1	1.01	0.23	2.24	0.51
P151	485.57	6	6	19	38	0.22	0.44	0.03	0.1	0.06	0.21
P153	127.01	10	10	57	120	0.23	0.49	0	0.02	0.04	0.14
P155	221.85	6	6	-2	-6	0.03	0.07	0	0	0	0.01
P157	290.82	12	12	0	-3	0	0.01	0	0	0	0
P159	216.46	6	6	2	3	0.03	0.03	0	0	0	0
P161	247.94	6	6	-2	-4	0.02	0.05	0	0	0	0
P163	654.81	6	6	2	7	0.02	0.07	0	0.01	0	0.01
P165	304.11	6	6	1	4	0.01	0.05	0	0	0	0
P167	238.41	6	6	22	0	0.25	0	0.02	0	0.08	0
P169	803.1	6	6	12	-24	0.14	0.27	0.02	0.07	0.02	0.09
P171	681.07	10	10	133	302	0.54	1.23	0.12	0.53	0.17	0.78
P173	274.62	8	8	-34	-84	0.22	0.54	0.01	0.06	0.04	0.22
P175	302.5	12	12	0	-5	0	0.01	0	0	0	0
P177	710.73	12	12	0	52	0	0.15	0	0.01	0	0.01
P179	220.2	8	8	15	202	0.09	1.29	0	0.21	0.01	0.95
P181	548.18	6	6	1	0	0.01	0	0	0	0	0
P183	389.04	8	8	12	202	0.08	1.29	0	0.37	0.01	0.95
P185	520.72	6	6	2	0	0.02	0	0	0	0	0
P187	360.11	8	8	8	202	0.05	1.29	0	0.34	0	0.95
P189	43.19	8	8	0	190	0	1.21	0	0.04	0	0.98
P191	41.92	8	8	0	190	0	1.21	0	0.04	0	0.98
P193	134.11	6	10	92	293	1.04	1.2	0.14	0.1	1.04	0.74

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P195	161.9	6	10	91	292	1.03	1.19	0.16	0.12	1.01	0.73
P197	95.39	6	6	124	116	1.41	1.31	0.17	0.15	1.81	1.58
P199	44.68	8	16	315	606	2.01	0.97	0.11	0.01	2.49	0.29
P201	65.11	6	6	124	116	1.41	1.31	0.12	0.1	1.81	1.58
P203	699.54	6	6	5	0	0.06	0	0	0	0	0
P205	233.59	12	12	1	232	0	0.66	0	0.04	0	0.17
P207	274.68	12	12	1	232	0	0.66	0	0.05	0	0.17
P209	662.87	8	8	1	232	0	1.48	0	0.81	0	1.22
P211	238.79	10	16	600	770	2.45	1.23	0.66	0.11	2.78	0.45
P221	690.29	8	8	109	140	0.7	0.89	0.24	0.38	0.35	0.56
P231	154.46	6	10	266	-1	3.02	0	1.14	0	7.41	0
P233	768.43	10	16	596	762	2.44	1.22	2.11	0.34	2.74	0.44
P237	659.24	10	10	37	78	0.15	0.32	0.01	0.04	0.02	0.06
P239	56.43	10	16	596	762	2.44	1.22	0.15	0.02	2.74	0.44
P241	80.04	8	16	593	626	3.79	1	0.65	0.02	8.06	0.31
P243	69.58	6	8	267	0	3.03	0	0.52	0	7.45	0
P247	22.25	6	6	267	0	3.03	0	0.17	0	7.46	0
P255	469.12	8	8	43	178	0.27	1.13	0.03	0.35	0.05	0.74
P273	81.42	8	8	314	162	2.01	1.04	0.2	0.06	2.48	0.73
P275	18.41	8	8	594	0	3.79	0	0.15	0	8.06	0
P277	16.23	8	8	636	0	4.06	0	0.15	0	9.15	0
P279	2,090.35	12	12	107	33	0.3	0.09	0.08	0.01	0.04	0
P307	3,371.98	6	12	124	116	1.41	0.33	6.1	0.18	1.81	0.05
P309	536.25	8	8	147	144	0.94	0.92	0.33	0.31	0.61	0.59
P311	475.13	8	8	0	0	0	0	0	0	0	0
P317	410.64	8	8	206	212	1.31	1.35	0.47	0.49	1.14	1.2
P321	510.62	8	8	185	174	1.18	1.11	0.41	0.37	0.8	0.72
P331	423.61	8	8	113	149	0.72	0.95	0.16	0.26	0.37	0.62
P339	640.34	8	16	317	609	2.02	0.97	1.61	0.19	2.52	0.29
P341	731.61	8	16	593	626	3.79	1	5.9	0.22	8.06	0.3
P353	140.2	6	12	126	118	1.43	0.33	0.26	0.01	1.85	0.06
P359	70.46	6	12	127	120	1.45	0.34	0.13	0	1.89	0.06

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P367	354.92	6	6	4	7	0.05	0.08	0	0	0	0.01
P369	32.63	6	6	4	10	0.05	0.11	0	0	0	0.01
P371	369.03	6	6	2	4	0.02	0.04	0	0	0	0
P373	627.01	6	8	32	60	0.36	0.38	0.09	0.07	0.14	0.11
P375	457.24	6	6	3	6	0.03	0.07	0	0	0	0.01
P377	470.82	6	8	58	102	0.65	0.65	0.2	0.15	0.43	0.31
P379	472.5	6	8	50	90	0.56	0.57	0.16	0.11	0.33	0.24
P381	327.75	8	8	-101	-68	0.65	0.43	0.1	0.05	0.31	0.15
P383	390.5	8	8	-109	-79	0.69	0.51	0.14	0.08	0.35	0.19
P385	75.99	8	8	-141	-126	0.9	0.8	0.04	0.03	0.56	0.45
P387	313.15	8	8	-152	-142	0.97	0.9	0.2	0.18	0.65	0.57
P389	59.8	8	8	217	256	1.39	1.63	0.07	0.1	1.25	1.7
P391	347.76	6	8	42	95	0.47	0.61	0.08	0.09	0.24	0.27
P393	428.6	8	8	180	168	1.15	1.07	0.33	0.29	0.76	0.67
P395	322.27	8	8	190	181	1.21	1.16	0.27	0.25	0.84	0.77
P397	441.54	6	6	-44	-41	0.5	0.47	0.12	0.1	0.27	0.24
P399	285.67	6	6	-51	-51	0.57	0.57	0.1	0.1	0.34	0.34
P401	434.56	6	8	73	145	0.83	0.92	0.29	0.26	0.67	0.59
P403	452.38	6	8	67	137	0.76	0.87	0.26	0.24	0.58	0.53
P405	459.09	6	8	64	129	0.72	0.83	0.24	0.22	0.52	0.48
P407	497.09	6	8	48	104	0.54	0.67	0.15	0.16	0.31	0.32
P409	280.91	8	12	-288	-375	1.84	1.06	0.59	0.13	2.11	0.48
P411	355.34	8	12	302	396	1.93	1.12	0.82	0.19	2.3	0.53
P413	174.07	8	16	-304	-588	1.94	0.94	0.41	0.05	2.33	0.27
P415	85.36	8	16	-306	-592	1.96	0.95	0.2	0.02	2.37	0.27
P417	207	8	16	318	613	2.03	0.98	0.52	0.06	2.53	0.29
P419	309.42	8	16	320	616	2.04	0.98	0.79	0.09	2.56	0.29
P421	296.72	6	6	-122	-13	1.38	0.15	0.52	0.01	1.74	0.03
P423	524.38	6	6	-121	-11	1.37	0.13	0.9	0.01	1.72	0.02
P425	700.57	6	6	-119	-5	1.35	0.06	1.17	0	1.67	0.01
P427	563.01	6	6	-112	4	1.27	0.05	0.84	0	1.49	0
P429	675.06	6	6	-139	27	1.57	0.3	1.49	0.07	2.21	0.11

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P431	509.72	8	8	-1	128	0.01	0.81	0	0.24	0	0.47
P433	621.54	8	8	-4	121	0.03	0.77	0	0.26	0	0.43
P435	57.83	8	8	-5	120	0.03	0.77	0	0.02	0	0.42
P437	107.17	8	8	244	87	1.56	0.55	0.17	0.02	1.55	0.23
P439	104.54	8	8	117	-69	0.75	0.44	0.04	0.02	0.4	0.15
P441	200.8	6	6	-53	4	0.61	0.05	0.08	0	0.38	0
P443	578.78	6	6	-49	7	0.55	0.08	0.18	0	0.32	0.01
P445	492.82	6	6	-24	16	0.27	0.18	0.04	0.02	0.08	0.04
P447	350.04	6	6	1	25	0.01	0.28	0	0.03	0	0.09
P449	313.82	6	6	21	50	0.23	0.57	0.02	0.11	0.07	0.33
P451	809.72	8	8	54	-82	0.34	0.52	0.08	0.17	0.09	0.2
P453	482.32	6	6	23	39	0.26	0.45	0.04	0.1	0.08	0.22
P455	291.6	6	6	3	6	0.03	0.07	0	0	0	0.01
P457	222.96	6	6	15	22	0.17	0.25	0.01	0.02	0.03	0.07
P459	571.54	8	8	1	-188	0.01	1.2	0	0.55	0	0.96
P461	654.56	8	8	126	155	0.81	0.99	0.3	0.44	0.46	0.67
P463	680.97	10	10	-1194	79	4.88	0.32	6.76	0.04	9.92	0.06
P465	535.05	10	10	-1199	65	4.9	0.27	5.35	0.02	10	0.05
P467	445.03	10	10	-1202	54	4.91	0.22	4.47	0.01	10.05	0.03
P469	275.41	10	10	-1206	48	4.93	0.2	2.78	0.01	10.11	0.03
P471	56.16	6	6	0	0	0	0	0	0	0	0
P473	622.25	10	10	1210	-38	4.94	0.16	6.33	0.01	10.17	0.02
P475	414.42	10	10	1215	-29	4.96	0.12	4.25	0	10.25	0.01
P477	147.93	10	10	1217	-25	4.97	0.1	1.52	0	10.28	0.01
P479	68.46	6	6	23	66	0.26	0.75	0.01	0.04	0.08	0.57
P481	440.79	6	8	23	58	0.26	0.37	0.04	0.05	0.08	0.11
P483	461	6	8	18	46	0.2	0.3	0.02	0.03	0.05	0.07
P485	518.75	6	8	-16	-44	0.19	0.28	0.02	0.03	0.04	0.06
P487	470.37	6	6	5	10	0.06	0.11	0	0.01	0	0.02
P489	742.31	6	6	21	47	0.24	0.54	0.05	0.22	0.07	0.3
P491	366.78	6	6	30	73	0.34	0.83	0.05	0.25	0.13	0.68
P493	248.87	6	6	-30	-77	0.34	0.88	0.03	0.19	0.13	0.75

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P495	619.69	6	6	-32	-83	0.36	0.94	0.09	0.53	0.14	0.86
P497	153.87	6	6	5	11	0.06	0.13	0	0	0.01	0.02
P499	310.85	10	20	435	1158	1.78	1.18	0.47	0.1	1.53	0.32
P501	522.72	10	20	432	1149	1.76	1.17	0.79	0.16	1.51	0.32
P503	58.51	10	20	562	1101	2.3	1.12	0.14	0.02	2.46	0.29
P505	473.93	6	6	-22	-74	0.25	0.84	0.04	0.32	0.08	0.69
P507	412.45	6	6	2	-25	0.03	0.29	0	0.04	0	0.1
P509	121.77	6	8	54	216	0.62	1.38	0.05	0.15	0.39	1.24
P511	307.63	6	6	9	-16	0.11	0.18	0	0.01	0.02	0.04
P513	63.32	6	6	-17	-67	0.2	0.76	0	0.04	0.05	0.58
P515	656.92	6	6	-7	-1	0.08	0.01	0.01	0	0.01	0
P517	477.42	6	6	22	47	0.25	0.53	0.03	0.14	0.07	0.3
P519	699.22	6	6	-39	-110	0.45	1.25	0.15	1.01	0.21	1.45
P521	767.68	6	6	-34	-92	0.38	1.04	0.12	0.79	0.16	1.03
P523	542.7	6	6	134	-31	1.52	0.35	1.13	0.08	2.07	0.14
P525	156.6	6	6	141	-19	1.6	0.21	0.36	0.01	2.28	0.05
P527	642.53	6	6	141	-10	1.6	0.11	1.47	0.01	2.28	0.02
P529	571.15	6	6	142	1	1.61	0.01	1.33	0	2.32	0
P531	1,171.92	6	6	144	13	1.63	0.15	2.77	0.03	2.36	0.03
P533	1,512.49	6	6	148	-12	1.68	0.13	3.77	0.04	2.5	0.02
P535	738.15	6	8	9	31	0.1	0.2	0.01	0.03	0.01	0.03
P537	739.76	6	8	-34	-44	0.38	0.28	0.12	0.05	0.16	0.06
P539	575.45	6	8	-1	13	0.01	0.08	0	0	0	0.01
P541	550.77	6	8	-15	13	0.17	0.08	0.02	0	0.04	0.01
P543	571.86	6	8	-20	3	0.22	0.02	0.03	0	0.06	0
P545	605.48	6	8	-25	-11	0.29	0.07	0.06	0	0.1	0
P547	373.14	6	10	-28	-281	0.32	1.15	0.04	0.25	0.12	0.68
P549	471.13	6	6	4	9	0.04	0.1	0	0.01	0	0.01
P551	264.16	6	6	1	2	0.01	0.02	0	0	0	0
P553	434.68	10	20	209	1116	0.85	1.14	0.17	0.13	0.39	0.3
P555	177.28	10	20	204	1106	0.83	1.13	0.07	0.05	0.38	0.29
P557	352.6	6	6	3	9	0.03	0.11	0	0.01	0	0.02

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P559	554.06	6	6	2	7	0.02	0.08	0	0.01	0	0.01
P561	292.08	6	6	0	2	0	0.02	0	0	0	0
P563	1,056.54	6	6	2	16	0.02	0.18	0	0.04	0	0.04
P565	837.75	6	6	4	21	0.04	0.24	0	0.06	0	0.07
P567	453	6	6	5	25	0.06	0.29	0	0.04	0	0.1
P569	373.03	6	6	12	28	0.13	0.31	0.01	0.04	0.02	0.11
P571	213.33	6	6	1	3	0.01	0.03	0	0	0	0
P573	237.17	6	6	1	2	0.01	0.02	0	0	0	0
P575	584.14	8	8	4	6	0.03	0.04	0	0	0	0
P577	288.94	8	8	9	10	0.06	0.06	0	0	0	0
P579	419.93	8	8	1	2	0.01	0.01	0	0	0	0
P581	213.44	8	8	15	43	0.09	0.28	0	0.01	0.01	0.06
P583	161.27	8	8	15	45	0.1	0.29	0	0.01	0.01	0.07
P585	144.51	6	6	-4	-10	0.05	0.12	0	0	0	0.02
P589	119.84	6	6	-1	1	0.01	0.01	0	0	0	0
P591	394.38	6	6	11	22	0.12	0.25	0.01	0.03	0.02	0.08
P593	431.65	6	6	9	18	0.1	0.21	0.01	0.02	0.01	0.05
P595	336.4	10	10	50	104	0.2	0.43	0.01	0.04	0.03	0.11
P597	104.97	10	10	-18	-37	0.08	0.15	0	0	0	0.02
P599	299.01	10	10	-34	-64	0.14	0.26	0	0.01	0.01	0.04
P601	189.84	6	6	-1	-1	0.01	0.02	0	0	0	0
P603	95.74	10	10	21	37	0.09	0.15	0	0	0.01	0.02
P605	264.65	6	6	4	8	0.05	0.1	0	0	0	0.01
P607	287.84	6	6	7	11	0.08	0.12	0	0.01	0.01	0.02
P609	191.95	8	8	2	-1	0.02	0	0	0	0	0
P611	184.16	8	8	-3	0	0.02	0	0	0	0	0
P613	222.37	6	6	2	-4	0.02	0.04	0	0	0	0
P615	76.61	6	6	3	-2	0.03	0.03	0	0	0	0
P617	163.22	6	6	4	11	0.05	0.13	0	0	0	0.02
P619	502.21	8	8	5	15	0.03	0.1	0	0	0	0.01
P621	399.83	8	8	8	20	0.05	0.12	0	0.01	0	0.01
P623	222.7	8	8	-4	-10	0.03	0.06	0	0	0	0

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P625	363.11	6	6	-4	-8	0.05	0.09	0	0	0	0.01
P627	207.7	6	6	2	5	0.03	0.06	0	0	0	0.01
P629	486.06	6	6	2	0	0.02	0.01	0	0	0	0
P631	233.12	6	6	0	-3	0	0.03	0	0	0	0
P633	312.68	8	8	6	11	0.04	0.07	0	0	0	0
P635	219.31	6	6	3	5	0.03	0.06	0	0	0	0
P637	150.57	6	6	4	7	0.04	0.08	0	0	0	0.01
P639	270.69	8	8	14	24	0.09	0.15	0	0.01	0.01	0.02
P641	193.25	8	8	3	8	0.02	0.05	0	0	0	0
P643	94.15	8	8	-35	-85	0.22	0.54	0	0.02	0.04	0.22
P645	165.73	8	8	-34	-83	0.22	0.53	0.01	0.03	0.04	0.21
P647	705.71	8	8	56	-74	0.36	0.47	0.07	0.12	0.1	0.17
P649	426.28	8	8	150	151	0.96	0.97	0.27	0.27	0.63	0.64
P653	259.44	6	6	2	28	0.02	0.32	0	0.03	0	0.11
P655	274.02	6	6	0	3	0	0.03	0	0	0	0
P657	243.43	6	6	0	3	0	0.03	0	0	0	0
P659	201.94	6	6	2	3	0.02	0.04	0	0	0	0
P661	308.76	6	6	12	42	0.14	0.48	0.01	0.08	0.03	0.25
P663	490.07	6	6	-10	-21	0.12	0.24	0.01	0.03	0.02	0.07
P665	305.78	10	10	876	-147	3.58	0.6	1.71	0.06	5.6	0.2
P667	531.92	6	6	-143	18	1.62	0.21	1.25	0.03	2.34	0.05
P669	270.57	6	6	-1	-4	0.01	0.05	0	0	0	0
P671	289.47	6	6	3	7	0.04	0.08	0	0	0	0.01
P673	452.2	12	12	88	-15	0.25	0.04	0.01	0	0.03	0
P675	403.68	12	12	-72	-89	0.2	0.25	0.01	0.01	0.02	0.03
P677	180.17	8	8	-5	-22	0.03	0.14	0	0	0	0.01
P679	541.38	8	8	-8	-66	0.05	0.42	0	0.06	0	0.12
P681	524.43	8	8	3	53	0.02	0.34	0	0.04	0	0.08
P683	364.98	8	8	-9	-65	0.05	0.41	0	0.04	0	0.11
P687	128.63	12	12	6	13	0.02	0.04	0	0	0	0
P689	341.48	8	8	7	19	0.05	0.12	0	0	0	0.01
P691	202.53	6	6	2	8	0.02	0.09	0	0	0	0.01

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P693	448.12	6	6	2	6	0.03	0.07	0	0	0	0.01
P695	469.5	6	6	1	3	0.01	0.03	0	0	0	0
P697	42.02	6	6	-1	-2	0.01	0.02	0	0	0	0
P699	202.41	6	6	2	7	0.02	0.08	0	0	0	0.01
P701	652.85	6	6	2	3	0.02	0.03	0	0	0	0
P703	395.74	8	8	2	9	0.02	0.06	0	0	0	0
P705	57.09	8	8	13	-116	0.09	0.74	0	0.02	0.01	0.34
P707	270.57	8	8	2	7	0.01	0.04	0	0	0	0
P709	132.57	6	6	1	4	0.01	0.04	0	0	0	0
P711	211.09	8	8	2	5	0.01	0.03	0	0	0	0
P713	555.62	8	8	1	6	0	0.04	0	0	0	0
P715	337.22	8	8	1	8	0.01	0.05	0	0	0	0
P717	219.91	6	6	1	5	0.01	0.05	0	0	0	0
P719	508.72	6	6	3	10	0.03	0.11	0	0.01	0	0.01
P721	378.61	8	8	1	23	0	0.15	0	0.01	0	0.02
P723	363.18	8	8	1	6	0.01	0.04	0	0	0	0
P725	195.87	8	8	-1	15	0.01	0.09	0	0	0	0.01
P727	305.85	6	6	1	4	0.01	0.04	0	0	0	0
P729	509.32	8	8	4	-157	0.02	1	0	0.3	0	0.59
P731	488.88	8	8	2	-163	0.01	1.04	0	0.31	0	0.63
P733	392.23	8	8	1	-167	0.01	1.07	0	0.26	0	0.66
P735	303.07	10	10	58	114	0.24	0.47	0.01	0.03	0.03	0.11
P737	315.07	10	10	56	112	0.23	0.46	0.01	0.03	0.03	0.11
P739	260.42	6	6	10	21	0.12	0.24	0	0.02	0.02	0.06
P741	238.5	6	6	9	20	0.11	0.23	0	0.01	0.01	0.05
P743	392.07	8	8	-19	-37	0.12	0.23	0	0.02	0.01	0.04
P745	206.86	8	8	-20	-38	0.12	0.24	0	0.01	0.01	0.04
P747	258.11	8	8	1	2	0.01	0.01	0	0	0	0
P749	358.41	8	8	-22	-42	0.14	0.27	0.01	0.02	0.02	0.05
P751	151.5	8	8	2	2	0.01	0.01	0	0	0	0
P753	223.98	8	8	-25	-45	0.16	0.29	0	0.01	0.02	0.06
P755	88.75	8	8	2	2	0.01	0.01	0	0	0	0

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P757	327.32	8	8	-28	-48	0.18	0.3	0.01	0.02	0.02	0.07
P759	464.96	10	10	-28	-57	0.11	0.23	0	0.01	0.01	0.03
P761	289.56	8	8	2	2	0.01	0.01	0	0	0	0
P763	544.7	10	10	-30	-69	0.12	0.28	0.01	0.02	0.01	0.04
P765	402.67	10	10	-59	-116	0.24	0.48	0.01	0.05	0.03	0.11
P767	269.63	8	8	-28	-56	0.18	0.36	0.01	0.02	0.02	0.09
P769	552.74	10	10	-45	-89	0.18	0.36	0.01	0.04	0.02	0.07
P771	266.52	6	6	1	2	0.01	0.02	0	0	0	0
P773	212.76	10	10	-38	-86	0.15	0.35	0	0.01	0.01	0.07
P775	523.98	10	10	31	76	0.13	0.31	0.01	0.03	0.01	0.05
P777	37.64	6	6	3	8	0.03	0.09	0	0	0	0.01
PMP-1_D	126.01	99	99	2760	4431	0.12	0.18	0	0	0	0
PMP-1_U	115.37	99	99	2760	4432	0.12	0.18	0	0	0	0
PMP-10_D	109.11	99	99	2754	3097	0.11	0.13	0	0	0	0
PMP-10_U	121.4	99	99	2756	3102	0.11	0.13	0	0	0	0
PMP-101	1	99	99	2755	3100	0.11	0.13	0	0	0	0
PMP-102	1	99	99	2755	3100	0.11	0.13	0	0	0	0
PMP-11	1	99	99	2760	4432	0.12	0.18	0	0	0	0
PMP-12	1	99	99	2760	4432	0.12	0.18	0	0	0	0
PRV-108_D	97.46	6	6	309	47	3.5	0.54	0.95	0.03	9.75	0.3
PRV-108_U	97.46	6	6	310	49	3.51	0.55	0.96	0.03	9.81	0.32
PRV-1081	77.96	6	6	309	48	3.51	0.55	0.5	0.02	6.47	0.21
PRV-11_D	38.82	8	16	315	607	2.01	0.97	0.1	0.01	2.5	0.29
PRV-11_U	695.84	8	16	-308	-596	1.97	0.95	1.67	0.19	2.4	0.28
PRV-111	1	6	6	315	606	3.58	6.88	0.01	0.02	6.71	22.46
PRV-112	1	6	6	315	606	3.58	6.88	0.01	0.02	6.71	22.52
PRV-131_D	40.29	10	10	133	322	0.54	1.32	0.01	0.04	0.17	0.88
PRV-131_U	1,206.44	10	10	133	335	0.54	1.37	0.21	1.14	0.17	0.94
PRV-1311	56.36	6	6	133	329	1.51	3.73	0.08	0.41	1.36	7.25
PRV-1312	27.86	6	6	133	329	1.51	3.73	0.04	0.2	1.36	7.25
PRV-18_U	687.83	6	6	-36	-75	0.4	0.85	0.12	0.49	0.18	0.71
PRV-19_D	443.43	6	6	2	-5	0.02	0.05	0	0	0	0

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
PRV-19_U	259.77	6	6	-1	7	0.01	0.08	0	0	0	0.01
PRV-191	1	6	6	0	8	0	0.09	0	0	0	0
PRV-192	1	6	6	0	8	0	0.09	0	0	0	0
PRV-32_D	63.65	12	12	0	129	0	0.37	0	0	0	0.07
PRV-32_U	508.66	10	16	595	759	2.43	1.21	1.39	0.22	2.73	0.43
PRV-321	1	8	8	0	130	0	0.83	0	0	0	0.37
PRV-322	1	8	8	0	130	0	0.83	0	0	0	0.37
PRV-6_D	751.32	8	8	99	127	0.63	0.81	0.22	0.35	0.29	0.46
PRV-6_U	802.97	8	8	118	153	0.75	0.98	0.32	0.52	0.4	0.65
PRV-601	1	4	4	32	84	0.81	2.15	0	0	0.67	4.15
PRV-602	1	4	4	32	84	0.81	2.15	0	0	0.67	4.15
PRV-71_D	210.78	10	10	26	68	0.11	0.28	0	0.01	0.01	0.05
PRV-71_U	367.93	10	10	27	70	0.11	0.29	0	0.02	0.01	0.05
PRV-711	1	4	4	27	69	0.68	1.75	0	0	0.49	2.87
PRV-712	1	4	4	27	69	0.68	1.75	0	0	0.49	2.87
PRV-90_D	726.55	6	6	6	4	0.07	0.05	0	0	0.01	0
PRV-90_U	76.29	6	6	7	7	0.08	0.08	0	0	0.01	0.01
PRV-901	1	4	4	7	7	0.18	0.17	0	0	0	0
PRV-902	1	4	4	7	7	0.18	0.17	0	0	0	0
SADDLE_CRK1	1	10	10	110	394	0.45	1.61	0	0	0.12	0.85
SADDLE_CRK2	1	10	10	110	394	0.45	1.61	0	0	0	0.85
U70081	1	99	99	124	116	0.01	0	0	0	0	0
U70082	1	99	99	124	116	0.01	0	0	0	0	0
V80061	1	6	6	0	0	0	0	0	0	0	0
V80062	1	6	6	0	0	0	0	0	0	0	0
V80101	1	4	4	0	190	0	4.85	0	0.02	0	18.92

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
2	224.83	8	8	3.98	19.81	0.03	0.13	0	0	0	0.01
12	410.58	10	16	226.93	1526.36	0.93	2.44	0.19	0.65	0.46	1.58
16	184.11	24	24	5524.81	10871.31	3.92	7.71	0.44	1.54	2.38	8.34
22	340.19	10	10	1230.2	-59.03	5.03	0.24	3.57	0.01	10.49	0.04
23	623.73	10	10	1225.05	-74.1	5	0.3	6.49	0.04	10.4	0.06
24	674.63	10	10	-1217.37	151.9	4.97	0.62	6.94	0.15	10.28	0.22
26	1,519.42	10	10	834.15	-321.06	3.41	1.31	7.76	1.32	5.11	0.87
27	782.42	10	10	826.76	-344.57	3.38	1.41	3.93	0.78	5.02	0.99
28	443.41	10	20	6.4	-2558.78	0.03	2.61	0	0.62	0	1.39
29	585.58	10	20	812.33	2188.74	3.32	2.24	2.85	0.61	4.86	1.04
33	814.38	8	8	-4.14	205.35	0.03	1.31	0	0.92	0	1.13
34	678.2	8	8	-143.94	-145.53	0.92	0.93	0.4	0.4	0.58	0.6
35	203.53	8	8	262.92	120.93	1.68	0.77	0.36	0.09	1.78	0.42
37	771.46	8	8	143.97	-39.93	0.92	0.25	0.45	0.04	0.59	0.05
38	1,419.79	8	12	109.2	255.76	0.7	0.73	0.5	0.33	0.35	0.24
40	222.73	12	12	1.53	39.59	0	0.11	0	0	0	0.01
41	279.83	8	8	-20.44	-71.8	0.13	0.46	0	0.05	0.02	0.16
42	132.13	8	12	100.51	180.07	0.64	0.51	0.04	0.02	0.3	0.12
43	315.88	8	8	23.28	78.84	0.15	0.5	0.01	0.06	0.02	0.19
44	453.84	8	8	-76.35	-97.25	0.49	0.62	0.08	0.13	0.18	0.28
45	531.53	8	8	-15.61	-33.12	0.1	0.21	0.01	0.02	0.01	0.04
46	345.85	8	8	53.25	58.04	0.34	0.37	0.03	0.04	0.09	0.11
47	280.51	6	6	3.99	9.83	0.05	0.11	0	0	0	0.02
50	459.24	6	6	46.32	42.5	0.53	0.48	0.13	0.11	0.29	0.25
51	141.01	6	6	4.74	21.25	0.05	0.24	0	0.01	0	0.07
52	277.17	6	6	1.93	9.98	0.02	0.11	0	0	0	0.02
54	379.88	6	12	14.85	48.9	0.17	0.14	0.01	0	0.04	0.01
55	123.91	6	6	7.7	33.4	0.09	0.38	0	0.02	0.01	0.16
57	645.63	6	6	2.88	14.68	0.03	0.17	0	0.02	0	0.03
58	290.12	6	6	-5.51	-11.69	0.06	0.13	0	0.01	0.01	0.02
61	122.39	10	10	48.71	162.92	0.2	0.67	0	0.03	0.03	0.25
62	503.57	6	6	1.33	4.84	0.02	0.05	0	0	0	0

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
64	602.87	6	6	2.53	9.31	0.03	0.11	0	0.01	0	0.01
67	67.92	6	10	-63.97	-776.63	0.73	3.17	0.04	0.3	0.53	4.47
70	1,285.19	10	16	228.55	1541.16	0.93	2.46	0.6	2.07	0.46	1.61
72	452.42	8	8	85.4	31.62	0.55	0.2	0.09	0.01	0.19	0.03
73	106.88	10	10	11.2	18.94	0.05	0.08	0	0	0	0.01
74	288.1	10	10	7.77	9.17	0.03	0.04	0	0	0	0
75	547.29	6	6	2.96	7.51	0.03	0.09	0	0.01	0	0.01
76	585.11	6	6	21.99	67.38	0.25	0.76	0.04	0.34	0.07	0.58
77	303.75	6	6	2.21	9.84	0.03	0.11	0	0.01	0	0.02
78	906.1	6	6	15.85	44.8	0.18	0.51	0.04	0.25	0.04	0.27
80	134.25	6	6	0.54	2.45	0.01	0.03	0	0	0	0
81	222.66	6	6	1.28	3.75	0.01	0.04	0	0	0	0
82	218.49	6	6	7.07	18.98	0.08	0.22	0	0.01	0.01	0.06
83	316.1	6	6	1.9	6.33	0.02	0.07	0	0	0	0.01
84	498.77	6	6	4.14	9.65	0.05	0.11	0	0.01	0	0.02
85	189.59	6	6	2.5	5.31	0.03	0.06	0	0	0	0.01
86	227.67	6	6	3.06	6.86	0.03	0.08	0	0	0	0.01
87	370.31	6	6	-2.38	-4.54	0.03	0.05	0	0	0	0
88	603.03	6	6	5.3	13.82	0.06	0.16	0	0.02	0.01	0.03
89	489.43	6	6	10.17	61.17	0.12	0.69	0.01	0.24	0.02	0.49
91	532.39	6	6	8.81	4.4	0.1	0.05	0.01	0	0.01	0
92	258.26	6	10	56.29	706.28	0.64	2.89	0.11	0.97	0.42	3.75
94	500.94	6	10	-45.42	-644.58	0.52	2.63	0.14	1.59	0.28	3.17
99	312.64	6	6	38.32	104.38	0.43	1.18	0.06	0.41	0.2	1.31
100	924.37	6	10	88.42	706.99	1	2.89	0.89	3.47	0.96	3.76
105	857.96	6	6	22.84	62.45	0.26	0.71	0.07	0.43	0.08	0.51
106	500.01	12	12	182.07	72.49	0.52	0.21	0.06	0.01	0.13	0.02
107	1,910.43	6	6	161.3	-34.64	1.83	0.39	5.6	0.32	2.93	0.17
109	431.79	6	8	343.58	51.69	3.9	0.33	5.14	0.04	11.89	0.09
110	1,291.62	6	6	175.9	48.11	2	0.55	4.45	0.4	3.44	0.31
111	1,547.27	6	6	3.27	7.35	0.04	0.08	0	0.01	0	0.01
112	142.02	10	20	940.67	2058.49	3.84	2.1	0.91	0.13	6.38	0.93

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
113	337.83	10	20	938.8	2052.58	3.83	2.1	2.15	0.31	6.36	0.92
114	571.88	10	20	1084.18	1959.5	4.43	2	4.75	0.49	8.3	0.85
115	636.4	6	6	156.77	-69.17	1.78	0.78	1.77	0.39	2.78	0.61
116	173.04	6	6	4.92	9.9	0.06	0.11	0	0	0	0.02
118	498.71	6	8	89.1	425.32	1.01	2.71	0.49	2.17	0.98	4.35
119	779.33	6	6	43.11	204.49	0.49	2.32	0.2	3.55	0.25	4.55
120	573.19	6	6	42.57	86.47	0.48	0.98	0.14	0.53	0.25	0.92
122	784.61	6	6	-62.14	-164.49	0.71	1.87	0.39	2.39	0.5	3.04
123	846.79	6	6	-2.26	75.67	0.03	0.86	0	0.61	0	0.72
124	562.93	6	6	5.84	77.46	0.07	0.88	0	0.42	0.01	0.75
125	772	6	6	-24.97	-126.97	0.28	1.44	0.07	1.45	0.09	1.88
126	770.74	6	6	-34.75	-156.5	0.39	1.78	0.13	2.14	0.17	2.77
129	764.75	6	6	11.49	-44.34	0.13	0.5	0.02	0.21	0.02	0.27
134	672.98	6	6	-156.46	39.27	1.78	0.45	1.86	0.14	2.77	0.21
135	744.13	6	6	-127.62	9.81	1.45	0.11	1.41	0.01	1.9	0.02
136	246.29	8	8	44.5	-27.51	0.28	0.18	0.02	0.01	0.07	0.03
137	793.29	8	8	-26.42	-63.92	0.17	0.41	0.02	0.1	0.03	0.13
138	1,059.86	6	6	48.69	48.38	0.55	0.55	0.34	0.33	0.32	0.32
139	549.85	8	8	97.28	176.51	0.62	1.13	0.16	0.47	0.28	0.85
140	539.99	8	16	607.46	1108.63	3.88	1.77	4.54	0.47	8.42	0.88
141	763.37	6	6	-7.88	-15.19	0.09	0.17	0.01	0.03	0.01	0.04
143	184.73	10	10	225.61	667.38	0.92	2.73	0.08	0.62	0.45	3.38
144	90.31	10	10	118.9	171.31	0.49	0.7	0.01	0.02	0.14	0.27
145	102.44	10	10	118.05	142.1	0.48	0.58	0.01	0.02	0.14	0.19
146	144.07	10	10	-216.5	-623.21	0.88	2.55	0.06	0.43	0.42	2.98
148	126.93	10	10	213.34	621.08	0.87	2.54	0.05	0.38	0.41	2.96
149	121.76	10	10	59.47	189.24	0.24	0.77	0	0.04	0.04	0.33
151	105.65	6	10	-106.29	-492.67	1.21	2.01	0.14	0.2	1.35	1.93
152	79.62	6	6	-110.86	-131.16	1.26	1.49	0.12	0.16	1.46	2
153	135.84	6	6	-5.93	-10.49	0.07	0.12	0	0	0.01	0.02
154	186.32	10	10	153.81	430.71	0.63	1.76	0.04	0.28	0.22	1.5
156	716.61	8	8	-54.61	-175.64	0.35	1.12	0.07	0.61	0.1	0.85

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
157	123.59	8	8	2.15	6.27	0.01	0.04	0	0	0	0
158	525.36	8	8	49.6	163.94	0.32	1.05	0.04	0.39	0.08	0.74
159	198.8	8	8	48.09	145.3	0.31	0.93	0.01	0.1	0.07	0.51
160	462.05	8	8	-21.77	-65.17	0.14	0.42	0.01	0.05	0.02	0.12
161	111.61	8	8	19.85	61.56	0.13	0.39	0	0.01	0.01	0.1
162	210.94	8	8	13.59	44.05	0.09	0.28	0	0.01	0.01	0.07
163	238.85	8	8	14.46	51.48	0.09	0.33	0	0.02	0.01	0.09
164	451.3	8	8	23.99	74.53	0.15	0.48	0.01	0.08	0.02	0.17
165	275.81	6	6	1.97	4.36	0.02	0.05	0	0	0	0
166	158.97	8	8	20.25	66.01	0.13	0.42	0	0.02	0.02	0.14
167	155.16	8	8	34.31	116.41	0.22	0.74	0.01	0.06	0.04	0.39
168	211.29	6	6	-8.25	-26.27	0.09	0.3	0	0.02	0.01	0.1
169	241.42	6	6	4.11	17.88	0.05	0.2	0	0.01	0	0.05
170	187.69	8	8	25.65	88.83	0.16	0.57	0	0.04	0.02	0.24
171	404.93	8	8	28.08	103.2	0.18	0.66	0.01	0.13	0.03	0.32
172	379.81	8	8	24.22	82.24	0.15	0.52	0.01	0.08	0.02	0.21
173	650.2	8	8	23.4	57.05	0.15	0.36	0.01	0.07	0.02	0.11
174	334.74	8	8	3.07	25	0.02	0.16	0	0.01	0	0.02
175	339.54	8	8	18.23	25.68	0.12	0.16	0	0.01	0.01	0.02
268	154.11	8	8	4.3	13.06	0.03	0.08	0	0	0	0.01
301	265.03	8	8	-6.68	59.01	0.04	0.38	0	0.03	0	0.1
330	319.7	8	8	-9.91	0.79	0.06	0.01	0	0	0	0
349	244.09	8	8	-10.23	-12.06	0.07	0.08	0	0	0	0.01
414	467.91	12	16	181.76	984.7	0.52	1.57	0.05	0.28	0.11	0.61
415	250.58	8	8	26.36	454.83	0.17	2.9	0.01	1.06	0.02	4.25
417	907.76	12	12	154.93	513.37	0.44	1.46	0.07	0.67	0.08	0.74
419	566.35	12	12	152.87	-13.66	0.43	0.04	0.04	0	0.08	0
442	878.64	8	8	-0.44	90.7	0	0.58	0	0.19	0	0.21
445	145.51	8	8	23.2	-281.78	0.15	1.8	0	0.25	0.02	1.75
446	238.62	8	8	21.94	-287.3	0.14	1.83	0	0.43	0.02	1.81
447	252.9	8	8	16.14	-312.18	0.1	1.99	0	0.53	0.01	2.12
448	189.1	8	8	12.32	-327.36	0.08	2.09	0	0.44	0.01	2.31

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
449	555.78	8	8	1.09	14.21	0.01	0.09	0	0	0	0.01
450	462.75	8	8	9.29	-363.69	0.06	2.32	0	1.3	0	2.81
452	550.4	12	12	-123.82	-236.06	0.35	0.67	0.03	0.1	0.05	0.17
453	596.81	12	12	119.88	199.59	0.34	0.57	0.03	0.08	0.05	0.13
454	420.77	8	8	14.89	52.61	0.1	0.34	0	0.03	0.01	0.08
455	552.26	12	12	-28.36	-130.95	0.08	0.37	0	0.03	0	0.06
456	290.15	8	8	-29.57	-143.24	0.19	0.91	0.01	0.15	0.03	0.5
457	320.23	8	8	-11.29	-68.1	0.07	0.43	0	0.04	0	0.13
459	380.78	8	8	-6.23	-5.13	0.04	0.03	0	0	0	0
460	493.78	8	8	-9.39	-55.69	0.06	0.36	0	0.04	0	0.09
461	462.68	8	8	6.79	35.08	0.04	0.22	0	0.02	0	0.04
465	708.24	8	8	80.76	3.48	0.52	0.02	0.12	0	0.17	0
466	544.16	8	8	76.58	-22.12	0.49	0.14	0.09	0.01	0.16	0.02
467	298.85	8	8	74.01	-48.15	0.47	0.31	0.04	0.02	0.15	0.07
468	336.34	8	8	73.03	-71.21	0.47	0.45	0.05	0.05	0.14	0.14
469	283.19	8	8	42.24	111.08	0.27	0.71	0.01	0.09	0.05	0.31
470	147.56	8	8	37.85	95.56	0.24	0.61	0.01	0.03	0.04	0.24
473	200.46	8	8	29.16	296.5	0.19	1.89	0.01	0.39	0.03	1.92
474	461.94	8	8	10.4	136.6	0.07	0.87	0	0.21	0	0.46
475	532.42	8	8	-10.87	-135.31	0.07	0.86	0	0.24	0	0.45
476	474.29	8	8	5.27	111.97	0.03	0.71	0	0.15	0	0.32
477	404.49	8	12	-402.16	-702.01	2.57	1.99	1.59	0.62	3.92	1.53
478	642.28	8	8	3.65	98.49	0.02	0.63	0	0.16	0	0.25
479	511.3	8	8	-2.88	-104.54	0.02	0.67	0	0.14	0	0.28
480	613.66	8	8	2.12	-72.85	0.01	0.46	0	0.09	0	0.14
499	443.99	8	8	0	-11.6	0	0.07	0	0	0	0
500	321.15	8	8	0.26	-33	0	0.21	0	0.01	0	0.03
501	384.28	8	8	0	-74.58	0	0.48	0	0.06	0	0.15
502	447.98	8	8	0.26	29.69	0	0.19	0	0.01	0	0.03
504	753.39	8	8	-0.26	-8.86	0	0.06	0	0	0	0
505	155.34	8	8	0	80.78	0	0.52	0	0.03	0	0.17
509	292.19	8	16	-574.97	-1034.85	3.67	1.65	2.22	0.23	7.6	0.77

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
513	621.7	6	6	32.72	67.68	0.37	0.77	0.09	0.36	0.15	0.59
514	1,061.68	8	12	387.73	664.26	2.47	1.88	3.89	1.46	3.66	1.38
515	516.68	6	8	88.43	235.16	1	1.5	0.5	0.75	0.96	1.45
517	609.24	6	6	-73.85	-100.67	0.84	1.14	0.42	0.75	0.69	1.22
518	488.2	6	6	-61.5	-79.3	0.7	0.9	0.24	0.38	0.49	0.79
520	907.11	6	8	78.13	214.64	0.89	1.37	0.69	1.11	0.77	1.23
521	539.67	6	8	67.83	190.61	0.77	1.22	0.32	0.53	0.59	0.98
522	567.67	6	8	52.67	162.17	0.6	1.04	0.21	0.41	0.37	0.73
525	456.49	6	8	82.53	185.64	0.94	1.18	0.39	0.43	0.85	0.94
526	521.54	6	8	64.76	147.74	0.73	0.94	0.28	0.32	0.54	0.61
527	434.09	6	8	35.56	86.37	0.4	0.55	0.08	0.1	0.18	0.23
528	398.59	8	8	-112.15	-83.14	0.72	0.53	0.15	0.08	0.37	0.21
535	237.74	6	6	23.54	74.87	0.27	0.85	0.02	0.17	0.08	0.71
536	287.31	10	10	85.5	237.47	0.35	0.97	0.02	0.14	0.08	0.5
537	300.6	10	10	84.52	235.36	0.35	0.96	0.02	0.15	0.07	0.49
538	435.26	10	10	84.09	228.3	0.34	0.93	0.03	0.2	0.07	0.46
539	338.05	6	6	21.48	52.17	0.24	0.59	0.02	0.12	0.07	0.36
540	359.5	6	6	-1.79	0.6	0.02	0.01	0	0	0	0
541	459.25	6	6	16.93	45.77	0.19	0.52	0.02	0.13	0.05	0.28
542	175.7	10	10	64.28	178.11	0.26	0.73	0.01	0.05	0.04	0.29
543	490.66	10	10	56.33	138.61	0.23	0.57	0.02	0.09	0.03	0.18
544	438.18	10	10	54.02	133.93	0.22	0.55	0.01	0.08	0.03	0.17
545	297.13	10	10	45.57	102.67	0.19	0.42	0.01	0.03	0.02	0.11
546	850.12	10	10	44.08	99.61	0.18	0.41	0.02	0.08	0.02	0.1
547	177.03	10	10	7.01	28.48	0.03	0.12	0	0	0	0.01
548	382.95	10	10	-36.58	-107.64	0.15	0.44	0.01	0.04	0.02	0.12
549	497.35	8	8	11.43	39.36	0.07	0.25	0	0.03	0.01	0.05
551	237.6	6	6	5.74	-3.03	0.07	0.03	0	0	0.01	0
552	249.98	6	6	2.88	-9.94	0.03	0.11	0	0	0	0.02
553	461.21	8	8	22.81	62.05	0.15	0.4	0.01	0.06	0.02	0.12
555	255.81	10	10	38.36	88.57	0.16	0.36	0	0.02	0.02	0.08
556	291.31	10	10	34.62	80.76	0.14	0.33	0	0.02	0.01	0.07

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
557	315.59	8	8	-6.79	-20.25	0.04	0.13	0	0	0	0.02
558	359.36	6	6	1.3	2.27	0.01	0.03	0	0	0	0
559	157.88	6	6	4.94	16.28	0.06	0.18	0	0.01	0	0.04
560	473.53	8	8	13.96	37.13	0.09	0.24	0	0.02	0.01	0.05
561	306.77	8	8	-6.09	-3.23	0.04	0.02	0	0	0	0
562	436.91	8	8	2.98	-4.26	0.02	0.03	0	0	0	0
563	504.73	6	6	14.41	27.62	0.16	0.31	0.02	0.06	0.03	0.11
564	393.49	6	6	8.26	21.84	0.09	0.25	0	0.03	0.01	0.07
565	582.99	8	8	24.22	55.32	0.15	0.35	0.01	0.06	0.02	0.1
566	156.18	6	6	18.86	40.79	0.21	0.46	0.01	0.04	0.06	0.23
567	558.62	6	6	-6.2	-14.51	0.07	0.16	0	0.02	0.01	0.03
568	480.11	6	6	1.05	-1.81	0.01	0.02	0	0	0	0
569	163.27	6	6	11.22	21.81	0.13	0.25	0	0.01	0.02	0.07
570	159.16	6	6	8.27	15.54	0.09	0.18	0	0.01	0.01	0.04
571	584.08	6	6	5.49	15.09	0.06	0.17	0	0.02	0.01	0.04
572	94.84	6	6	2.27	-0.93	0.03	0.01	0	0	0	0
574	164.52	8	8	15.86	35.31	0.1	0.23	0	0.01	0.01	0.04
575	126.53	8	8	15.59	34.65	0.1	0.22	0	0.01	0.01	0.04
577	912.36	8	8	8.19	23.05	0.05	0.15	0	0.02	0	0.02
583	73.55	24	24	2760.27	7648.4	1.96	5.42	0.05	0.32	0.66	4.35
1091	805.29	8	8	0.26	-10.56	0	0.07	0	0	0	0
1093	936.94	8	8	6.7	20	0.04	0.13	0	0.01	0	0.02
1095	2,061.45	8	8	2.22	-23.54	0.01	0.15	0	0.04	0	0.02
1099	63.33	6	6	0.18	60.9	0	0.69	0	0.02	0	0.48
P-3	143.73	10	10	-110.64	-314.43	0.45	1.28	0.02	0.1	0.1	0.72
P-4	522.79	8	8	5.33	65.4	0.03	0.42	0	0.07	0	0.14
P-6	428.6	12	12	11.69	1.73	0.03	0	0	0	0	0
P-8	381.89	8	8	18.41	-324.77	0.12	2.07	0	1.01	0.01	2.64
P13	153.48	10	10	-44.34	-149.49	0.18	0.61	0	0.03	0.02	0.21
P-13	168.06	18	26	5509.61	10675.45	6.95	6.45	1.62	0.92	9.62	5.46
P15	1,262.65	6	6	51.06	95.32	0.58	1.08	0.44	1.4	0.35	1.11
P17	332.22	6	6	9.37	20.34	0.11	0.23	0.01	0.02	0.02	0.06

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P-18	1,688.11	18	18	5508.25	3822.69	6.94	4.82	16.23	8.25	9.61	4.89
P19	428.57	6	6	29.61	49.64	0.34	0.56	0.05	0.14	0.13	0.33
P-19	431.84	18	18	5507.14	3819.66	6.94	4.82	4.15	2.11	9.61	4.88
P21	684.31	6	6	15.79	35.88	0.18	0.41	0.03	0.12	0.04	0.18
P23	329.93	6	6	6.61	15.59	0.08	0.18	0	0.01	0.01	0.04
P25	291.98	6	6	2.69	7.81	0.03	0.09	0	0	0	0.01
P27	829.17	6	6	-109.71	-85.27	1.24	0.97	1.19	0.75	1.44	0.9
P29	715.47	6	6	-45.23	91.38	0.51	1.04	0.2	0.73	0.28	1.02
P31	304.39	6	6	-70.37	-45.31	0.8	0.51	0.19	0.08	0.63	0.28
P-32	1,146.30	4	10	8.77	16.22	0.22	0.07	0.11	0	0.1	0
P33	422.34	4	10	36.95	102.51	0.94	0.42	0.58	0.04	1.38	0.11
P-33	369.85	4	4	7.63	12.79	0.19	0.33	0.03	0.07	0.07	0.19
P-34	209.15	4	4	4.69	7.86	0.12	0.2	0.01	0.02	0.03	0.08
P35	643.76	4	10	32.68	83.38	0.83	0.34	0.71	0.05	1.1	0.07
P37	516.97	4	4	13.39	25.51	0.34	0.65	0.11	0.36	0.21	0.69
P-37	681.23	6	6	-111.05	-90.76	1.26	1.03	1	0.69	1.47	1.01
P39	218.03	4	10	-17.22	16.64	0.44	0.07	0.07	0	0.34	0
P-39	58.36	12	12	-0.38	-2.73	0	0.01	0	0	0	0
P41	89.47	4	4	-36.23	-30.37	0.92	0.78	0.12	0.09	1.33	0.96
P-41	345.63	6	12	127.21	127.36	1.44	0.36	0.65	0.02	1.89	0.06
P-42	614.87	8	8	-179.38	-213.41	1.14	1.36	0.54	0.75	0.88	1.21
P43	411.29	4	10	14.34	36.59	0.37	0.15	0.1	0.01	0.24	0.02
P-44	616.43	6	8	34.45	99.45	0.39	0.63	0.1	0.18	0.17	0.29
P45	790.84	4	4	1.29	8.72	0.03	0.22	0	0.08	0	0.1
P-46	474.72	6	8	-2.5	53.64	0.03	0.34	0	0.04	0	0.09
P47	1,243.31	4	4	12.87	37.12	0.33	0.95	0.24	1.73	0.2	1.39
P-47	635.15	6	8	-21.43	-68.69	0.24	0.44	0.04	0.09	0.07	0.15
P-48	2,524.69	6	8	3.38	-46.53	0.04	0.3	0.01	0.18	0	0.07
P49	6,359.31	12	16	5.7	258.42	0.02	0.41	0	0.38	0	0.06
P-49	745.78	6	8	-6.33	35.5	0.07	0.23	0.01	0.03	0.01	0.04
P-50	1,924.75	6	6	4.02	11.74	0.05	0.13	0.01	0.04	0	0.02
P-52	680.58	6	6	46.71	87.23	0.53	0.99	0.2	0.64	0.3	0.94

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P-53	578.12	6	8	-20.97	-32.5	0.24	0.21	0.04	0.02	0.07	0.04
P-54	404.19	6	6	5.91	13.62	0.07	0.15	0	0.01	0.01	0.03
P-55	446.36	8	8	8.15	21.04	0.05	0.13	0	0.01	0	0.02
P-56	132.09	6	6	1.69	-2.48	0.02	0.03	0	0	0	0
P-57	89.83	6	6	-5.28	-9.54	0.06	0.11	0	0	0.01	0.01
P-58	495.11	6	6	-6.53	-5.72	0.07	0.06	0	0	0.01	0.01
P59	48.79	8	8	151.5	293.9	0.97	1.88	0.03	0.11	0.64	2.19
P-59	175.59	6	6	-1.05	-2.17	0.01	0.02	0	0	0	0
P-60	205.58	6	6	0.89	2.06	0.01	0.02	0	0	0	0
P61	730.94	8	8	-142.34	-273.98	0.91	1.75	0.42	1.41	0.57	1.93
P-61	344.87	6	6	-2.45	-5.31	0.03	0.06	0	0	0	0.01
P-62	204.38	6	6	-2.14	-4.73	0.02	0.05	0	0	0	0
P63	343.81	6	6	2.11	6.52	0.02	0.07	0	0	0	0.01
P-63	536.74	6	6	-4.69	-8.11	0.05	0.09	0	0.01	0	0.01
P-64	205.93	6	6	0.58	1.09	0.01	0.01	0	0	0	0
P65	310.55	6	6	22.18	41.73	0.25	0.47	0.02	0.07	0.07	0.24
P-65	163.57	6	6	0.88	2.16	0.01	0.02	0	0	0	0
P67	88.32	12	12	0.25	219.3	0	0.62	0	0.02	0	0.18
P-68	202.95	6	6	4.72	10.78	0.05	0.12	0	0	0	0.02
P69	193.67	6	10	301.08	-4.99	3.42	0.02	1.8	0	9.31	0
P-69	620.52	6	6	4.4	13.11	0.05	0.15	0	0.02	0	0.03
P-70	295.15	6	6	3.08	9.76	0.03	0.11	0	0	0	0.02
P71	25.48	6	6	302.71	0	3.43	0	0.24	0	9.41	0
P-71	59.08	6	6	0	0	0	0	0	0	0	0
P-73	617.69	6	10	85.79	699.78	0.97	2.86	0.56	2.28	0.91	3.69
P-74	157.58	6	6	1.42	3.18	0.02	0.04	0	0	0	0
P75	1,239.97	12	12	1.54	0.71	0	0	0	0	0	0
P-75	1,211.21	6	8	-82.86	-230.16	0.94	1.47	1.03	1.69	0.85	1.39
P-76	214.99	6	8	-41.66	-119.84	0.47	0.76	0.05	0.09	0.24	0.42
P77	658.65	12	12	182.3	912.52	0.52	2.59	0.07	1.41	0.11	2.14
P-77	769.97	6	6	-148.96	67.34	1.69	0.76	1.95	0.45	2.53	0.58
P-78	88.36	10	16	926.64	1365.93	3.79	2.18	0.55	0.11	6.2	1.29

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P-79	851.35	10	16	923.52	1359.28	3.77	2.17	5.25	1.09	6.17	1.28
P-80	379.13	6	6	-54.01	-130.9	0.61	1.49	0.15	0.76	0.39	1.99
P-81	598.3	2	2	5.22	13.09	0.53	1.34	0.56	3.04	0.93	5.09
P-82	227.83	6	6	60.29	149.13	0.68	1.69	0.11	0.58	0.47	2.54
P-83	407.85	2	2	-4.55	-11.7	0.46	1.2	0.29	1.69	0.72	4.14
P-84	839.31	12	12	17.56	27.04	0.05	0.08	0	0	0	0
P-88	778.65	6	6	112.59	94.71	1.28	1.07	1.17	0.85	1.51	1.09
P97	80.8	16	16	2749.67	3102.47	4.39	4.95	0.38	0.48	4.71	5.89
P-101	548.47	10	20	352.76	2525.98	1.44	2.58	0.57	0.74	1.04	1.36
P-102	636.9	10	20	-445.62	-3254.17	1.82	3.32	1.02	1.38	1.6	2.17
P103	15.16	30	30	3.83	-2565.53	0	1.16	0	0	0	0.16
P-103	832.11	6	6	-6.63	2.2	0.08	0.02	0.01	0	0.01	0
P105	16.24	30	30	7.32	-3406.83	0	1.55	0	0	0	0.29
P107	25.46	30	30	-3.65	840.97	0	0.38	0	0	0	0.02
P109	33.96	30	30	6.06	2428.91	0	1.1	0	0.01	0	0.15
P111	218.67	12	12	1.26	144.87	0	0.41	0	0.02	0	0.08
P113	1,143.28	12	12	1.31	113.54	0	0.32	0	0.05	0	0.05
P115	208.63	12	12	1.11	-10.05	0	0.03	0	0	0	0
P117	534.1	12	12	0.91	-10.05	0	0.03	0	0	0	0
P119	477.85	8	8	0.91	-1.99	0.01	0.01	0	0	0	0
P121	273.19	10	10	1236.18	-44.48	5.05	0.18	2.89	0.01	10.58	0.02
P123	276.09	6	6	3.22	7.47	0.04	0.08	0	0	0	0.01
P125	614.89	8	8	0.18	-1.99	0	0.01	0	0	0	0
P-126	831.84	10	10	1237.73	-22.17	5.06	0.09	8.82	0.01	10.61	0.01
P127	29.96	18	18	4756.45	525.51	6	0.66	0.19	0	6.32	0.11
P129	85.02	6	6	12.22	16.61	0.14	0.19	0	0	0.02	0.04
P-130	623.02	6	6	-45.61	-152.65	0.52	1.73	0.18	1.65	0.28	2.65
P131	115.43	6	6	0.59	19.29	0.01	0.22	0	0.01	0	0.06
P-131	604.28	6	6	16.73	47.12	0.19	0.53	0.03	0.18	0.04	0.3
P-132	2,143.51	6	6	12.9	37.59	0.15	0.43	0.06	0.42	0.03	0.2
P133	272.89	6	10	-89.86	-715.15	1.02	2.92	0.27	1.05	0.99	3.84
P-133	485.31	8	12	277.38	428.9	1.77	1.22	0.96	0.3	1.97	0.61

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P-134	835.04	6	6	-36.88	-131.49	0.42	1.49	0.16	1.68	0.19	2.01
P135	645.38	10	20	346.23	2507.04	1.41	2.56	0.65	0.86	1	1.34
P137	807.76	6	6	-19.92	-86.37	0.23	0.98	0.05	0.74	0.06	0.92
P139	668.72	6	6	21.94	104.21	0.25	1.18	0.05	0.87	0.07	1.31
P141	638.87	6	10	-40.18	-667.64	0.46	2.73	0.14	2.16	0.22	3.38
P143	649.57	6	8	-39.61	-69.79	0.45	0.45	0.14	0.1	0.22	0.15
P145	141.2	10	10	53.7	188.38	0.22	0.77	0	0.05	0.03	0.32
P147	183.18	10	10	53.58	185.29	0.22	0.76	0.01	0.06	0.03	0.31
P149	171.47	10	10	-30.53	-80.85	0.12	0.33	0	0.01	0.01	0.07
P-150	451.65	8	12	411.34	719.04	2.63	2.04	1.85	0.72	4.09	1.6
P151	485.57	6	6	32.91	85.45	0.37	0.97	0.08	0.44	0.15	0.9
P153	127.01	10	10	97.29	265.68	0.4	1.09	0.01	0.08	0.1	0.61
P155	221.85	6	6	-4.01	-14.29	0.05	0.16	0	0.01	0	0.03
P157	290.82	12	12	-1.07	-8.07	0	0.02	0	0	0	0
P159	216.46	6	6	3.84	5.87	0.04	0.07	0	0	0	0.01
P161	247.94	6	6	-3.63	-9.53	0.04	0.11	0	0	0	0.02
P163	654.81	6	6	2.85	14.57	0.03	0.17	0	0.02	0	0.03
P165	304.11	6	6	1.95	9.62	0.02	0.11	0	0	0	0.02
P167	238.41	6	6	38.09	15.29	0.43	0.17	0.05	0.01	0.2	0.04
P169	803.1	6	6	20.64	-39.04	0.23	0.44	0.05	0.17	0.07	0.21
P171	681.07	10	10	226.13	670.61	0.92	2.74	0.31	2.32	0.46	3.41
P173	274.62	8	8	-58.38	-187.34	0.37	1.2	0.03	0.26	0.11	0.95
P175	302.5	12	12	-0.9	-10.05	0	0.03	0	0	0	0
P177	710.73	12	12	0.9	115.3	0	0.33	0	0.03	0	0.05
P179	220.2	8	8	25.1	430.25	0.16	2.75	0	0.84	0.02	3.83
P181	548.18	6	6	1.66	0	0.02	0	0	0	0	0
P183	389.04	8	8	20.4	430.25	0.13	2.75	0.01	1.49	0.01	3.83
P185	520.72	6	6	2.65	0	0.03	0	0	0	0	0
P187	360.11	8	8	14.06	430.24	0.09	2.75	0	1.38	0.01	3.83
P189	43.19	8	8	151.36	293.67	0.97	1.87	0.03	0.09	0.64	2.19
P191	41.92	8	8	150.97	293	0.96	1.87	0.03	0.09	0.64	2.18
P193	134.11	6	10	156.52	590.85	1.78	2.41	0.37	0.36	2.77	2.7

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P195	161.9	6	10	154.47	587.41	1.75	2.4	0.44	0.43	2.71	2.67
P197	95.39	6	6	117.54	111.16	1.33	1.26	0.16	0.14	1.63	1.47
P199	44.68	8	16	592.9	1071.75	3.78	1.71	0.36	0.04	8.05	0.82
P201	65.11	6	6	117.54	111.16	1.33	1.26	0.11	0.1	1.63	1.47
P203	699.54	6	6	9.34	0	0.11	0	0.01	0	0.01	0
P205	233.59	12	12	1.86	484.64	0.01	1.37	0	0.15	0	0.66
P207	274.68	12	12	1.86	484.64	0.01	1.37	0	0.18	0	0.66
P209	662.87	8	8	1.02	484.64	0.01	3.09	0	3.17	0	4.78
P211	238.79	10	16	926.64	1365.93	3.79	2.18	1.48	0.31	6.2	1.29
P219	26.14	10	#N/A	926.64	#N/A	3.79	#N/A	0.16	#N/A	6.2	#N/A
P221	690.29	8	8	185.45	112.63	1.18	0.72	0.65	0.26	0.93	0.37
P231	154.46	6	10	301.32	-2.46	3.42	0.01	1.44	0	9.33	0
P233	768.43	10	16	919.91	1347.07	3.76	2.15	4.7	0.97	6.12	1.26
P237	659.24	10	10	63.33	172.11	0.26	0.7	0.03	0.18	0.04	0.27
P239	56.43	10	16	919.91	1347.07	3.76	2.15	0.35	0.07	6.12	1.26
P241	80.04	8	16	915.11	1116.89	5.84	1.78	1.44	0.07	17.98	0.89
P243	69.58	6	8	302.71	0	3.43	0	0.65	0	9.41	0
P247	22.25	6	6	302.71	0	3.43	0	0.21	0	9.41	0
P255	469.12	8	8	73.03	413.43	0.47	2.64	0.07	1.67	0.14	3.56
P273	81.42	8	8	303.24	33.5	1.94	0.21	0.19	0	2.32	0.04
P275	18.41	8	8	604.86	0	3.86	0	0.15	0	8.35	0
P277	16.23	8	8	647.55	0	4.13	0	0.15	0	9.47	0
P279	2,090.35	12	12	182.3	76.7	0.52	0.22	0.23	0.05	0.11	0.02
P307	3,371.98	6	12	117.54	111.16	1.33	0.32	5.5	0.17	1.63	0.05
P309	536.25	8	8	196.14	253.4	1.25	1.62	0.56	0.89	1.04	1.67
P311	475.13	8	8	0	0	0	0	0	0	0	0
P317	410.64	8	8	278.31	382.5	1.78	2.44	0.81	1.47	1.98	3.57
P321	510.62	8	8	242.19	298.6	1.55	1.91	0.67	0.99	1.32	1.95
P331	423.61	8	8	191.76	132.52	1.22	0.85	0.42	0.21	0.99	0.5
P339	640.34	8	16	595.58	1078.52	3.8	1.72	5.2	0.53	8.11	0.83
P341	731.61	8	16	915.11	1116.89	5.84	1.78	13.15	0.65	17.98	0.89
P353	140.2	6	12	120.32	115.81	1.37	0.33	0.24	0.01	1.7	0.05

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P359	70.46	6	12	122.79	119.95	1.39	0.34	0.12	0	1.77	0.06
P367	354.92	6	6	6.79	15.33	0.08	0.17	0	0.01	0.01	0.04
P369	32.63	6	6	7.03	21.31	0.08	0.24	0	0	0.01	0.07
P371	369.03	6	6	2.59	8.8	0.03	0.1	0	0	0	0.01
P373	627.01	6	8	27.05	67.26	0.31	0.43	0.07	0.09	0.11	0.14
P375	457.24	6	6	4.78	13.21	0.05	0.15	0	0.01	0	0.03
P377	470.82	6	8	71.09	161.93	0.81	1.03	0.3	0.34	0.64	0.73
P379	472.5	6	8	57.93	133.5	0.66	0.85	0.21	0.24	0.44	0.51
P381	327.75	8	8	-105.34	-70.18	0.67	0.45	0.11	0.05	0.33	0.15
P383	390.5	8	8	-117.72	-95.55	0.75	0.61	0.16	0.11	0.4	0.27
P385	75.99	8	8	-172.62	-198.24	1.1	1.27	0.06	0.08	0.82	1.06
P387	313.15	8	8	-191.23	-234.08	1.22	1.49	0.31	0.45	0.99	1.44
P389	59.8	8	8	275.27	422.72	1.76	2.7	0.12	0.26	1.94	4.3
P391	347.76	6	8	48.83	153.71	0.55	0.98	0.11	0.23	0.32	0.66
P393	428.6	8	8	233.42	283.91	1.49	1.81	0.53	0.76	1.23	1.77
P395	322.27	8	8	250.89	313.4	1.6	2	0.45	0.69	1.41	2.13
P397	441.54	6	6	-57.38	-69.73	0.65	0.79	0.19	0.27	0.43	0.62
P399	285.67	6	6	-67.92	-90.06	0.77	1.02	0.17	0.28	0.59	1
P401	434.56	6	8	101.84	264.67	1.16	1.69	0.54	0.79	1.25	1.81
P403	452.38	6	8	91.9	247.11	1.04	1.58	0.47	0.72	1.03	1.59
P405	459.09	6	8	86.31	230.12	0.98	1.47	0.42	0.64	0.92	1.39
P407	497.09	6	8	59.13	174.75	0.67	1.12	0.23	0.42	0.46	0.84
P409	280.91	8	12	-395.65	-687.13	2.53	1.95	1.07	0.41	3.8	1.47
P411	355.34	8	12	419.32	733.64	2.68	2.08	1.51	0.59	4.24	1.66
P413	174.07	8	16	-573.56	-1032.12	3.66	1.65	1.32	0.13	7.57	0.77
P415	85.36	8	16	-578.26	-1041.36	3.69	1.66	0.66	0.07	7.68	0.78
P417	207	8	16	597.5	1086.19	3.81	1.73	1.69	0.17	8.16	0.84
P419	309.42	8	16	600.59	1093	3.83	1.74	2.55	0.26	8.24	0.85
P421	296.72	6	6	-138.04	-17.99	1.57	0.2	0.65	0.02	2.2	0.05
P423	524.38	6	6	-136.86	-14.21	1.55	0.16	1.13	0.02	2.16	0.03
P425	700.57	6	6	-133.17	-0.73	1.51	0.01	1.44	0	2.06	0
P427	563.01	6	6	-121.37	20.59	1.38	0.23	0.97	0.04	1.73	0.06

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P429	675.06	6	6	-153.31	48.32	1.74	0.55	1.8	0.21	2.67	0.31
P431	509.72	8	8	-1.73	213.28	0.01	1.36	0	0.62	0	1.21
P433	621.54	8	8	-6.81	199.3	0.04	1.27	0	0.66	0	1.07
P435	57.83	8	8	-7.93	196.99	0.05	1.26	0	0.06	0	1.05
P437	107.17	8	8	263.59	122.05	1.68	0.78	0.19	0.05	1.79	0.43
P439	104.54	8	8	48.14	-25.37	0.31	0.16	0.01	0	0.08	0.02
P441	200.8	6	6	-68.3	-31.85	0.78	0.36	0.12	0.03	0.6	0.15
P443	578.78	6	6	-60.21	-25.98	0.68	0.29	0.27	0.06	0.47	0.1
P445	492.82	6	6	-17.63	-5.06	0.2	0.06	0.02	0	0.05	0
P447	350.04	6	6	23.79	14.43	0.27	0.16	0.03	0.01	0.08	0.03
P449	313.82	6	6	57.63	69.78	0.65	0.79	0.14	0.19	0.44	0.62
P451	809.72	8	8	-37.64	-94.23	0.24	0.6	0.04	0.22	0.05	0.27
P453	482.32	6	6	39.62	87.39	0.45	0.99	0.11	0.45	0.22	0.94
P455	291.6	6	6	4.99	13.88	0.06	0.16	0	0.01	0	0.03
P457	222.96	6	6	24.84	48.24	0.28	0.55	0.02	0.07	0.09	0.31
P459	571.54	8	8	-148.83	-289.06	0.95	1.85	0.36	1.22	0.62	2.13
P461	654.56	8	8	214.52	146.14	1.37	0.93	0.8	0.39	1.22	0.6
P463	680.97	10	10	-1192.46	235.05	4.87	0.96	6.74	0.33	9.9	0.49
P465	535.05	10	10	-1200.83	205.34	4.91	0.84	5.36	0.2	10.03	0.38
P467	445.03	10	10	-1207.02	179.86	4.93	0.73	4.51	0.13	10.12	0.3
P469	275.41	10	10	-1213.25	166.93	4.96	0.68	2.81	0.07	10.22	0.26
P471	56.16	6	6	-0.24	59.53	0	0.68	0	0.03	0	0.46
P473	622.25	10	10	1220.23	-85.26	4.98	0.35	6.43	0.05	10.33	0.07
P475	414.42	10	10	1228.79	-65.06	5.02	0.27	4.34	0.02	10.46	0.05
P477	147.93	10	10	1232.11	-54.44	5.03	0.22	1.56	0	10.52	0.03
P479	68.46	6	6	39.7	107.74	0.45	1.22	0.01	0.1	0.22	1.39
P481	440.79	6	8	39.15	112.5	0.44	0.72	0.09	0.16	0.21	0.37
P483	461	6	8	30.12	86.01	0.34	0.55	0.06	0.1	0.13	0.23
P485	518.75	6	8	-27.81	-80.64	0.32	0.51	0.06	0.1	0.11	0.2
P487	470.37	6	6	8.51	21.89	0.1	0.25	0.01	0.03	0.01	0.07
P489	742.31	6	6	35.35	104.74	0.4	1.19	0.13	0.98	0.18	1.32
P491	366.78	6	6	50.52	101.74	0.57	1.15	0.13	0.46	0.34	1.25

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P493	248.87	6	6	-51.33	-110.78	0.58	1.26	0.09	0.36	0.35	1.46
P495	619.69	6	6	-53.97	-123.99	0.61	1.41	0.24	1.12	0.39	1.8
P497	153.87	6	6	8.87	25.33	0.1	0.29	0	0.01	0.01	0.1
P499	310.85	10	20	815.49	2198.73	3.33	2.25	1.52	0.33	4.9	1.05
P501	522.72	10	20	810.46	2178.28	3.31	2.22	2.53	0.54	4.84	1.03
P503	58.51	10	20	940.26	2056.71	3.84	2.1	0.37	0.05	6.38	0.93
P505	473.93	6	6	-38.19	-138.05	0.43	1.57	0.1	1.04	0.2	2.2
P507	412.45	6	6	3.91	-57.82	0.04	0.66	0	0.18	0	0.44
P509	121.77	6	8	92.5	432.38	1.05	2.76	0.13	0.55	1.05	4.48
P511	307.63	6	6	15.85	-36.09	0.18	0.41	0.01	0.06	0.04	0.18
P513	63.32	6	6	-29.23	-136.82	0.33	1.55	0.01	0.14	0.12	2.16
P515	656.92	6	6	-12.49	10.44	0.14	0.12	0.02	0.01	0.03	0.02
P517	477.42	6	6	36.8	69.24	0.42	0.79	0.09	0.29	0.19	0.61
P519	699.22	6	6	-66.7	-184.4	0.76	2.09	0.4	2.63	0.57	3.76
P521	767.68	6	6	-57.21	-143.18	0.65	1.62	0.33	1.81	0.43	2.35
P523	542.7	6	6	149.41	-85.16	1.7	0.97	1.38	0.49	2.54	0.9
P525	156.6	6	6	161.45	-57.51	1.83	0.65	0.46	0.07	2.94	0.43
P527	642.53	6	6	161.45	-37.86	1.83	0.43	1.89	0.13	2.94	0.2
P529	571.15	6	6	163.78	-14.36	1.86	0.16	1.72	0.02	3.02	0.03
P531	1,171.92	6	6	165.99	13.2	1.88	0.15	3.62	0.03	3.09	0.03
P533	1,512.49	6	6	158.92	-42.95	1.8	0.49	4.31	0.38	2.85	0.25
P535	738.15	6	8	15.29	52.58	0.17	0.34	0.03	0.07	0.04	0.09
P537	739.76	6	8	-57.54	-113.99	0.65	0.73	0.32	0.28	0.43	0.38
P539	575.45	6	8	-2.07	11.86	0.02	0.08	0	0	0	0.01
P541	550.77	6	8	-25.92	-27.19	0.29	0.17	0.05	0.01	0.1	0.03
P543	571.86	6	8	-33.49	-50.14	0.38	0.32	0.09	0.05	0.16	0.08
P545	605.48	6	8	-43.24	-80.86	0.49	0.52	0.16	0.12	0.26	0.2
P547	373.14	6	10	-48.01	-664.52	0.54	2.71	0.12	1.25	0.31	3.35
P549	471.13	6	6	6.27	19.61	0.07	0.22	0	0.03	0.01	0.06
P551	264.16	6	6	1.37	4.55	0.02	0.05	0	0	0	0
P553	434.68	10	20	355.29	2533.55	1.45	2.59	0.46	0.59	1.05	1.37
P555	177.28	10	20	347.25	2511.6	1.42	2.56	0.18	0.24	1.01	1.34

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P557	352.6	6	6	4.62	21.05	0.05	0.24	0	0.02	0	0.07
P559	554.06	6	6	3.61	16.06	0.04	0.18	0	0.02	0	0.04
P561	292.08	6	6	0.74	4.07	0.01	0.05	0	0	0	0
P563	1,056.54	6	6	3.15	35.28	0.04	0.4	0	0.19	0	0.18
P565	837.75	6	6	6.16	47.35	0.07	0.54	0.01	0.25	0.01	0.3
P567	453	6	6	8.65	56.48	0.1	0.64	0.01	0.19	0.01	0.42
P569	373.03	6	6	20.11	61.33	0.23	0.7	0.02	0.18	0.06	0.49
P571	213.33	6	6	1.56	5.6	0.02	0.06	0	0	0	0.01
P573	237.17	6	6	1.43	4.34	0.02	0.05	0	0	0	0
P575	584.14	8	8	6.95	14.2	0.04	0.09	0	0	0	0.01
P577	288.94	8	8	15.56	21.28	0.1	0.14	0	0	0.01	0.02
P579	419.93	8	8	1.66	3.34	0.01	0.02	0	0	0	0
P581	213.44	8	8	25.15	96.51	0.16	0.62	0	0.06	0.02	0.28
P583	161.27	8	8	26.09	99.33	0.17	0.63	0	0.05	0.02	0.29
P585	144.51	6	6	-6.77	-22.85	0.08	0.26	0	0.01	0.01	0.08
P589	119.84	6	6	-1.01	2.56	0.01	0.03	0	0	0	0
P591	394.38	6	6	18.48	49.85	0.21	0.57	0.02	0.13	0.05	0.33
P593	431.65	6	6	14.85	40.71	0.17	0.46	0.02	0.1	0.04	0.23
P595	336.4	10	10	84.76	231.09	0.35	0.94	0.02	0.16	0.07	0.47
P597	104.97	10	10	-31.23	-82.61	0.13	0.34	0	0.01	0.01	0.07
P599	299.01	10	10	-57.26	-142.52	0.23	0.58	0.01	0.06	0.04	0.19
P601	189.84	6	6	-2.22	-3.32	0.03	0.04	0	0	0	0
P603	95.74	10	10	35.55	82.71	0.15	0.34	0	0.01	0.02	0.07
P605	264.65	6	6	7.18	18.66	0.08	0.21	0	0.01	0.01	0.05
P607	287.84	6	6	12.27	23.81	0.14	0.27	0.01	0.02	0.03	0.08
P609	191.95	8	8	4	-1.31	0.03	0.01	0	0	0	0
P611	184.16	8	8	-5.01	-0.2	0.03	0	0	0	0	0
P613	222.37	6	6	3.59	-7.82	0.04	0.09	0	0	0	0.01
P615	76.61	6	6	5.07	-5.3	0.06	0.06	0	0	0	0
P617	163.22	6	6	7.24	24.79	0.08	0.28	0	0.01	0.01	0.09
P619	502.21	8	8	9.32	34.07	0.06	0.22	0	0.02	0	0.04
P621	399.83	8	8	12.84	43.37	0.08	0.28	0	0.03	0.01	0.06

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P623	222.7	8	8	-7.47	-21.76	0.05	0.14	0	0	0	0.02
P625	363.11	6	6	-6.87	-17.36	0.08	0.2	0	0.02	0.01	0.05
P627	207.7	6	6	4.15	11.62	0.05	0.13	0	0	0	0.02
P629	486.06	6	6	2.8	1.02	0.03	0.01	0	0	0	0
P631	233.12	6	6	-0.23	-5.59	0	0.06	0	0	0	0.01
P633	312.68	8	8	9.77	23.95	0.06	0.15	0	0.01	0	0.02
P635	219.31	6	6	4.64	11.46	0.05	0.13	0	0	0	0.02
P637	150.57	6	6	6.72	15.26	0.08	0.17	0	0.01	0.01	0.04
P639	270.69	8	8	23.22	52.53	0.15	0.34	0.01	0.02	0.02	0.09
P641	193.25	8	8	5.85	17.27	0.04	0.11	0	0	0	0.01
P643	94.15	8	8	-59.14	-188.64	0.38	1.2	0.01	0.09	0.11	0.96
P645	165.73	8	8	-57.33	-183.69	0.37	1.17	0.02	0.15	0.11	0.92
P647	705.71	8	8	-33.33	-77.87	0.21	0.5	0.03	0.13	0.04	0.19
P649	426.28	8	8	201.28	269.26	1.28	1.72	0.46	0.8	1.09	1.87
P653	259.44	6	6	2.64	62.26	0.03	0.71	0	0.13	0	0.5
P655	274.02	6	6	0.21	5.98	0	0.07	0	0	0	0.01
P657	243.43	6	6	0.71	6.59	0.01	0.07	0	0	0	0.01
P659	201.94	6	6	3.16	7.05	0.04	0.08	0	0	0	0.01
P661	308.76	6	6	20.95	99.22	0.24	1.13	0.02	0.37	0.07	1.19
P663	490.07	6	6	-17.77	-51.59	0.2	0.59	0.02	0.17	0.05	0.36
P665	305.78	10	10	823.27	-354.04	3.36	1.45	1.52	0.32	4.98	1.04
P667	531.92	6	6	-160.88	28.96	1.83	0.33	1.55	0.06	2.92	0.12
P669	270.57	6	6	-1.9	-9.73	0.02	0.11	0	0	0	0.01
P671	289.47	6	6	5.44	15.88	0.06	0.18	0	0.01	0	0.03
P673	452.2	12	12	149.58	-33.9	0.42	0.1	0.03	0	0.08	0
P675	403.68	12	12	-122.15	-222.87	0.35	0.63	0.02	0.06	0.05	0.16
P677	180.17	8	8	-7.74	-46.4	0.05	0.3	0	0.01	0	0.06
P679	541.38	8	8	-13.13	-147.39	0.08	0.94	0	0.29	0.01	0.53
P681	524.43	8	8	4.62	117.96	0.03	0.75	0	0.18	0	0.35
P683	364.98	8	8	-14.63	-144.11	0.09	0.92	0	0.18	0.01	0.51
P687	128.63	12	12	10.74	22.9	0.03	0.06	0	0	0	0
P689	341.48	8	8	12.74	36.44	0.08	0.23	0	0.01	0.01	0.04

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P691	202.53	6	6	2.61	18.53	0.03	0.21	0	0.01	0	0.05
P693	448.12	6	6	3.78	13.41	0.04	0.15	0	0.01	0	0.03
P695	469.5	6	6	1.89	6.21	0.02	0.07	0	0	0	0.01
P697	42.02	6	6	-1.39	-4.31	0.02	0.05	0	0	0	0
P699	202.41	6	6	3.02	15.38	0.03	0.17	0	0.01	0	0.03
P701	652.85	6	6	2.9	6.47	0.03	0.07	0	0	0	0.01
P703	395.74	8	8	4.2	20.57	0.03	0.13	0	0.01	0	0.01
P705	57.09	8	8	22.65	-284.06	0.14	1.81	0	0.1	0.02	1.77
P707	270.57	8	8	2.99	15.06	0.02	0.1	0	0	0	0.01
P709	132.57	6	6	1.54	7.77	0.02	0.09	0	0	0	0.01
P711	211.09	8	8	3.44	11.82	0.02	0.08	0	0	0	0.01
P713	555.62	8	8	1.09	14.22	0.01	0.09	0	0	0	0.01
P715	337.22	8	8	2.06	17.06	0.01	0.11	0	0	0	0.01
P717	219.91	6	6	1.33	10.1	0.02	0.11	0	0	0	0.01
P719	508.72	6	6	4.5	21.17	0.05	0.24	0	0.03	0	0.06
P721	378.61	8	8	1.24	52.16	0.01	0.33	0	0.03	0	0.08
P723	363.18	8	8	2.27	12.66	0.01	0.08	0	0	0	0.01
P725	195.87	8	8	-1.94	34.02	0.01	0.22	0	0.01	0	0.03
P727	305.85	6	6	1.73	8.45	0.02	0.1	0	0	0	0.01
P729	509.32	8	8	6.49	-373.9	0.04	2.39	0	1.5	0	2.95
P731	488.88	8	8	3.67	-387.25	0.02	2.47	0	1.54	0	3.15
P733	392.23	8	8	1.92	-396.58	0.01	2.53	0	1.29	0	3.29
P735	303.07	10	10	98.38	253.39	0.4	1.04	0.03	0.15	0.08	0.48
P737	315.07	10	10	95.97	249.26	0.39	1.02	0.03	0.15	0.08	0.47
P739	260.42	6	6	17.53	47.61	0.2	0.54	0.01	0.07	0.04	0.26
P741	238.5	6	6	16.08	45.17	0.18	0.51	0.01	0.06	0.04	0.24
P743	392.07	8	8	-32.66	-81.16	0.21	0.52	0.01	0.07	0.03	0.17
P745	206.86	8	8	-33.17	-83.31	0.21	0.53	0.01	0.04	0.03	0.18
P747	258.11	8	8	2.23	3.74	0.01	0.02	0	0	0	0
P749	358.41	8	8	-37.88	-93.4	0.24	0.6	0.02	0.08	0.04	0.23
P751	151.5	8	8	3.71	4.44	0.02	0.03	0	0	0	0
P753	223.98	8	8	-42.61	-99.53	0.27	0.64	0.01	0.06	0.05	0.25

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P755	88.75	8	8	2.93	4.18	0.02	0.03	0	0	0	0
P757	327.32	8	8	-46.88	-105.97	0.3	0.68	0.02	0.09	0.06	0.29
P759	464.96	10	10	-47.81	-125.62	0.2	0.51	0.01	0.06	0.02	0.13
P761	289.56	8	8	2.81	4.71	0.02	0.03	0	0	0	0
P763	544.7	10	10	-51.67	-152.74	0.21	0.62	0.01	0.1	0.03	0.19
P765	402.67	10	10	-100.58	-258.59	0.41	1.06	0.04	0.2	0.09	0.5
P767	269.63	8	8	-47.88	-124.76	0.31	0.8	0.02	0.1	0.07	0.39
P769	552.74	10	10	-76.09	-197.51	0.31	0.81	0.03	0.17	0.05	0.31
P771	266.52	6	6	1.27	4.28	0.01	0.05	0	0	0	0
P773	212.76	10	10	-64.02	-191.25	0.26	0.78	0.01	0.06	0.04	0.29
P775	523.98	10	10	52.48	169.47	0.21	0.69	0.01	0.12	0.03	0.23
P777	37.64	6	6	4.85	17.06	0.06	0.19	0	0	0	0.04
PMP-1_D	126.01	99	99	2760.07	4461.6	0.12	0.19	0	0	0	0
PMP-1_U	115.37	99	99	2760.21	4462.04	0.12	0.19	0	0	0	0
PMP-10_D	109.11	99	99	2753.57	3115.61	0.11	0.13	0	0	0	0
PMP-10_U	121.4	99	99	2756.83	3126.59	0.11	0.13	0	0	0	0
PMP-101	1	99	99	2755.13	3120.87	0.11	0.13	0	0	0	0
PMP-102	1	99	99	2755.14	3120.87	0.11	0.13	0	0	0	0
PMP-11	1	99	99	2760.14	4461.82	0.12	0.19	0	0	0	0
PMP-12	1	99	99	2760.14	4461.82	0.12	0.19	0	0	0	0
PRV-108_D	97.46	6	6	354.09	72.87	4.02	0.83	1.23	0.07	12.58	0.67
PRV-108_U	97.46	6	6	355.75	75.9	4.04	0.86	1.24	0.07	12.69	0.73
PRV-1081	77.96	6	6	354.99	74.54	4.03	0.85	0.65	0.04	8.36	0.47
PRV-11_D	38.82	8	16	593.27	1072.7	3.79	1.71	0.31	0.03	8.06	0.82
PRV-11_U	695.84	8	16	-581.36	-1048.58	3.71	1.67	5.4	0.55	7.76	0.79
PRV-111	1	6	6	593.13	1072.31	6.73	12.17	0.02	0.06	21.61	64.76
PRV-112	1	6	6	593.13	1072.31	6.73	12.17	0.02	0.06	21.61	64.7
PRV-131_D	40.29	10	10	226.13	714.97	0.92	2.92	0.02	0.15	0.46	3.84
PRV-131_U	1,206.44	10	10	226.48	743.06	0.93	3.04	0.55	4.97	0.46	4.12
PRV-1311	56.36	6	6	226.13	729.63	2.57	8.28	0.2	1.79	3.63	31.74
PRV-1312	27.86	6	6	226.13	729.63	2.57	8.28	0.1	0.88	3.62	31.74
PRV-18_U	687.83	6	6	-60.67	-152.82	0.69	1.73	0.33	1.82	0.48	2.65

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
PRV-19_D	443.43	6	6	2.99	-10.01	0.03	0.11	0	0.01	0	0.02
PRV-19_U	259.77	6	6	-1.34	14.92	0.02	0.17	0	0.01	0	0.04
PRV-191	1	6	6	0	17.82	0	0.2	0	0	0	0.12
PRV-192	1	6	6	0	17.82	0	0.2	0	0	0	0
PRV-32_D	63.65	12	12	0	217.41	0	0.62	0	0.01	0	0.17
PRV-32_U	508.66	10	16	918.13	1340.85	3.75	2.14	3.1	0.63	6.1	1.25
PRV-321	1	8	8	0	218.32	0	1.39	0	0	0	0.85
PRV-322	1	8	8	0	218.32	0	1.39	0	0	0	0.85
PRV-6_D	751.32	8	8	167.86	83.16	1.07	0.53	0.58	0.16	0.78	0.21
PRV-6_U	802.97	8	8	200.12	141.13	1.28	0.9	0.86	0.45	1.08	0.56
PRV-601	1	4	4	53.69	186.88	1.37	4.77	0	0.02	1.83	18.37
PRV-602	1	4	4	53.69	186.88	1.37	4.77	0	0.02	1.83	18.37
PRV-71_D	210.78	10	10	44.86	150.97	0.18	0.62	0	0.05	0.02	0.22
PRV-71_U	367.93	10	10	46.72	155.02	0.19	0.63	0.01	0.08	0.02	0.23
PRV-711	1	4	4	45.55	152.41	1.16	3.89	0	0.01	1.34	12.57
PRV-712	1	4	4	45.55	152.41	1.16	3.89	0	0.01	1.34	12.63
PRV-90_D	726.55	6	6	9.98	9.03	0.11	0.1	0.01	0.01	0.02	0.01
PRV-90_U	76.29	6	6	12.19	15.75	0.14	0.18	0	0	0.02	0.04
PRV-901	1	4	4	11.84	14.72	0.3	0.38	0	0	0.12	0.12
PRV-902	1	4	4	11.84	14.72	0.3	0.38	0	0	0.12	0.24
SADDLE_CRK1	1	10	10	186.4	928.36	0.76	3.79	0	0	0.24	4.15
SADDLE_CRK2	1	10	10	186.4	924.86	0.76	3.78	0	0	0.12	4.15
U70081	1	99	99	117.54	111.16	0	0	0	0	0	0
U70082	1	99	99	117.54	111.16	0	0	0	0	0	0
V80061	1	6	6	0	60.43	0	0.69	0	0	0	0.37
V80062	1	6	6	0	60.43	0	0.69	0	0	0	0.37
V80101	1	4	4	151.16	293.32	3.86	7.49	0.01	0.04	12.39	42.3

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
2	224.83	8	8	5.97	29.71	0.04	0.19	0	0.01	0	0.03
12	410.58	10	16	340.39	2295.31	1.39	3.66	0.4	1.38	0.97	3.37
16	184.11	24	24	5530.59	10996.65	3.92	7.8	0.44	1.57	2.39	8.52
22	340.19	10	10	1249.62	-88.54	5.1	0.36	3.67	0.03	10.79	0.08
23	623.73	10	10	1241.9	-111.15	5.07	0.45	6.66	0.08	10.67	0.12
24	674.63	10	10	-1230.37	318.3	5.03	1.3	7.08	0.58	10.49	0.86
26	1,519.42	10	10	760.37	-537.33	3.11	2.19	6.54	3.44	4.3	2.26
27	782.42	10	10	749.28	-572.59	3.06	2.34	3.28	1.99	4.19	2.54
28	443.41	10	20	-516.45	-3706.66	2.11	3.79	0.93	1.23	2.1	2.76
29	585.58	10	20	1253.68	3095.86	5.12	3.16	6.36	1.16	10.86	1.98
33	814.38	8	8	80.96	284.14	0.52	1.81	0.16	1.68	0.2	2.06
34	678.2	8	8	-232.41	-197.96	1.48	1.26	0.96	0.72	1.42	1.06
35	203.53	8	8	358.14	157.5	2.29	1.01	0.64	0.14	3.16	0.69
37	771.46	8	8	215.96	-123.73	1.38	0.79	0.96	0.34	1.24	0.44
38	1,419.79	8	12	163.79	389.13	1.05	1.1	1.05	0.73	0.74	0.51
40	222.73	12	12	2.29	59.39	0.01	0.17	0	0	0	0.02
41	279.83	8	8	-30.66	-107.57	0.2	0.69	0.01	0.1	0.03	0.34
42	132.13	8	12	150.76	275.48	0.96	0.78	0.08	0.04	0.64	0.27
43	315.88	8	8	34.91	118.14	0.22	0.75	0.01	0.13	0.04	0.41
44	453.84	8	8	-114.53	-151.37	0.73	0.97	0.17	0.29	0.38	0.64
45	531.53	8	8	-23.41	-49.68	0.15	0.32	0.01	0.04	0.02	0.08
46	345.85	8	8	79.88	92.56	0.51	0.59	0.07	0.09	0.2	0.26
47	280.51	6	6	5.98	14.75	0.07	0.17	0	0.01	0.01	0.04
50	459.24	6	6	69.47	69.24	0.79	0.79	0.28	0.28	0.62	0.61
51	141.01	6	6	7.11	31.87	0.08	0.36	0	0.02	0.01	0.15
52	277.17	6	6	2.89	14.97	0.03	0.17	0	0.01	0	0.04
54	379.88	6	12	22.27	73.35	0.25	0.21	0.03	0.01	0.08	0.02
55	123.91	6	6	11.56	50.09	0.13	0.57	0	0.04	0.02	0.34
57	645.63	6	6	4.31	22.02	0.05	0.25	0	0.05	0	0.07
58	290.12	6	6	-8.27	-17.53	0.09	0.2	0	0.01	0.01	0.05
61	122.39	10	10	73.07	244.39	0.3	1	0.01	0.06	0.06	0.53
62	503.57	6	6	1.99	7.26	0.02	0.08	0	0	0	0.01

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
64	602.87	6	6	3.8	13.96	0.04	0.16	0	0.02	0	0.03
67	67.92	6	10	-95.96	-1180	1.09	4.82	0.08	0.66	1.12	9.71
70	1,285.19	10	16	342.82	2317.51	1.4	3.7	1.26	4.41	0.98	3.43
72	452.42	8	8	128.1	255.84	0.82	1.63	0.18	0.66	0.41	1.46
73	106.88	10	10	16.8	28.41	0.07	0.12	0	0	0	0.01
74	288.1	10	10	11.65	13.76	0.05	0.06	0	0	0	0
75	547.29	6	6	4.44	11.26	0.05	0.13	0	0.01	0	0.02
76	585.11	6	6	32.98	101.08	0.37	1.15	0.09	0.72	0.16	1.23
77	303.75	6	6	3.32	14.76	0.04	0.17	0	0.01	0	0.03
78	906.1	6	6	23.78	67.21	0.27	0.76	0.08	0.52	0.08	0.58
80	134.25	6	6	0.81	3.67	0.01	0.04	0	0	0	0
81	222.66	6	6	1.93	5.62	0.02	0.06	0	0	0	0.01
82	218.49	6	6	10.6	28.47	0.12	0.32	0	0.03	0.02	0.12
83	316.1	6	6	2.85	9.5	0.03	0.11	0	0	0	0.02
84	498.77	6	6	6.21	14.47	0.07	0.16	0	0.02	0.01	0.03
85	189.59	6	6	3.74	7.97	0.04	0.09	0	0	0	0.01
86	227.67	6	6	4.6	10.3	0.05	0.12	0	0	0	0.02
87	370.31	6	6	-3.58	-6.8	0.04	0.08	0	0	0	0.01
88	603.03	6	6	7.95	20.72	0.09	0.24	0.01	0.04	0.01	0.07
89	489.43	6	6	15.25	91.76	0.17	1.04	0.02	0.5	0.04	1.03
91	532.39	6	6	13.21	6.6	0.15	0.07	0.02	0	0.03	0.01
92	258.26	6	10	84.43	1074.48	0.96	4.39	0.23	2.11	0.88	8.16
94	500.94	6	10	-68.13	-981.93	0.77	4.01	0.3	3.46	0.59	6.91
99	312.64	6	6	57.49	141.37	0.65	1.6	0.14	0.72	0.43	2.3
100	924.37	6	10	132.62	1108.97	1.5	4.53	1.89	8	2.04	8.65
105	857.96	6	6	34.25	93.68	0.39	1.06	0.14	0.92	0.17	1.07
106	500.01	12	12	273.1	124.97	0.77	0.35	0.13	0.03	0.27	0.06
107	1,910.43	6	6	183.85	-68.57	2.09	0.78	7.14	1.15	3.74	0.6
109	431.79	6	8	410.55	42.82	4.66	0.27	7.14	0.03	16.54	0.06
110	1,291.62	6	6	217.13	54.05	2.46	0.61	6.57	0.5	5.08	0.39
111	1,547.27	6	6	4.91	11.02	0.06	0.13	0.01	0.03	0	0.02
112	142.02	10	20	1388.08	2883.87	5.67	2.95	1.86	0.25	13.11	1.74

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
113	337.83	10	20	1385.29	2875.02	5.66	2.94	4.41	0.58	13.06	1.73
114	571.88	10	20	1556.64	2717.28	6.36	2.78	9.27	0.89	16.21	1.55
115	636.4	6	6	188.44	-121.87	2.14	1.38	2.49	1.11	3.91	1.74
116	173.04	6	6	7.38	14.85	0.08	0.17	0	0.01	0.01	0.04
118	498.71	6	8	133.65	567.22	1.52	3.62	1.03	3.7	2.07	7.41
119	779.33	6	6	64.67	270.21	0.73	3.07	0.42	5.94	0.54	7.62
120	573.19	6	6	63.86	75.65	0.72	0.86	0.3	0.41	0.53	0.72
122	784.61	6	6	-93.21	-156.28	1.06	1.77	0.83	2.17	1.06	2.77
123	846.79	6	6	-3.39	131.03	0.04	1.49	0	1.69	0	2
124	562.93	6	6	8.76	116.19	0.1	1.32	0.01	0.9	0.01	1.6
125	772	6	6	-37.46	-172.93	0.43	1.96	0.15	2.57	0.2	3.34
126	770.74	6	6	-52.13	-217.23	0.59	2.46	0.28	3.92	0.36	5.09
129	764.75	6	6	17.24	-68.68	0.2	0.78	0.04	0.46	0.05	0.6
134	672.98	6	6	-164.03	55.35	1.86	0.63	2.04	0.27	3.02	0.4
135	744.13	6	6	-138.69	18.27	1.57	0.21	1.65	0.04	2.22	0.05
136	246.29	8	8	30.51	4.18	0.19	0.03	0.01	0	0.03	0
137	793.29	8	8	-70.3	-62.26	0.45	0.4	0.12	0.1	0.16	0.12
138	1,059.86	6	6	78.6	60.75	0.89	0.69	0.82	0.51	0.77	0.48
139	549.85	8	8	182.15	219.32	1.16	1.4	0.5	0.7	0.9	1.28
140	539.99	8	16	877.8	1555.31	5.6	2.48	8.99	0.89	16.64	1.64
141	763.37	6	6	-11.82	-22.78	0.13	0.26	0.02	0.06	0.02	0.08
143	184.73	10	10	338.42	1001.07	1.38	4.09	0.18	1.32	0.96	7.16
144	90.31	10	10	178.35	256.96	0.73	1.05	0.03	0.05	0.29	0.58
145	102.44	10	10	177.07	213.15	0.72	0.87	0.03	0.04	0.29	0.41
146	144.07	10	10	-324.76	-934.81	1.33	3.82	0.13	0.91	0.89	6.31
148	126.93	10	10	320.02	931.62	1.31	3.81	0.11	0.8	0.87	6.27
149	121.76	10	10	89.21	283.86	0.36	1.16	0.01	0.08	0.08	0.69
151	105.65	6	10	-159.43	-739.01	1.81	3.02	0.3	0.43	2.87	4.08
152	79.62	6	6	-166.3	-196.74	1.89	2.23	0.25	0.34	3.1	4.23
153	135.84	6	6	-8.89	-15.73	0.1	0.18	0	0.01	0.01	0.04
154	186.32	10	10	230.72	646.06	0.94	2.64	0.09	0.59	0.47	3.18
156	716.61	8	8	-81.91	-263.46	0.52	1.68	0.15	1.28	0.21	1.79

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
157	123.59	8	8	3.22	9.41	0.02	0.06	0	0	0	0
158	525.36	8	8	74.39	245.91	0.47	1.57	0.09	0.83	0.17	1.58
159	198.8	8	8	72.13	217.96	0.46	1.39	0.03	0.22	0.14	1.09
160	462.05	8	8	-32.65	-97.75	0.21	0.62	0.01	0.11	0.03	0.25
161	111.61	8	8	29.77	92.33	0.19	0.59	0	0.02	0.03	0.22
162	210.94	8	8	20.39	66.08	0.13	0.42	0	0.03	0.02	0.14
163	238.85	8	8	21.69	77.22	0.14	0.49	0	0.04	0.02	0.18
164	451.3	8	8	35.99	111.79	0.23	0.71	0.02	0.17	0.04	0.37
165	275.81	6	6	2.95	6.55	0.03	0.07	0	0	0	0.01
166	158.97	8	8	30.38	99.01	0.19	0.63	0.01	0.05	0.03	0.29
167	155.16	8	8	51.47	174.62	0.33	1.11	0.01	0.13	0.09	0.84
168	211.29	6	6	-12.38	-39.41	0.14	0.45	0.01	0.05	0.03	0.22
169	241.42	6	6	6.16	26.82	0.07	0.3	0	0.03	0.01	0.11
170	187.69	8	8	38.47	133.25	0.25	0.85	0.01	0.1	0.05	0.51
171	404.93	8	8	42.11	154.8	0.27	0.99	0.02	0.27	0.06	0.67
172	379.81	8	8	36.33	123.36	0.23	0.79	0.02	0.17	0.05	0.44
173	650.2	8	8	35.1	85.58	0.22	0.55	0.03	0.15	0.04	0.22
174	334.74	8	8	4.61	37.5	0.03	0.24	0	0.02	0	0.05
175	339.54	8	8	27.35	38.53	0.17	0.25	0.01	0.02	0.03	0.05
268	154.11	8	8	6.45	19.6	0.04	0.13	0	0	0	0.01
301	265.03	8	8	-10.02	130.97	0.06	0.84	0	0.11	0	0.42
330	319.7	8	8	-14.86	37.23	0.09	0.24	0	0.01	0.01	0.04
349	244.09	8	8	-15.35	17.96	0.1	0.11	0	0	0.01	0.01
414	467.91	12	16	272.64	1268.63	0.77	2.02	0.11	0.45	0.23	0.97
415	250.58	8	8	39.54	604.2	0.25	3.86	0.01	1.8	0.05	7.18
417	907.76	12	12	232.39	639.69	0.66	1.81	0.15	1.01	0.17	1.11
419	566.35	12	12	229.3	-20.49	0.65	0.06	0.09	0	0.17	0
442	878.64	8	8	-0.66	178.51	0	1.14	0	0.66	0	0.75
445	145.51	8	8	34.8	-531.35	0.22	3.39	0.01	0.82	0.04	5.66
446	238.62	8	8	32.92	-539.64	0.21	3.44	0.01	1.39	0.03	5.83
447	252.9	8	8	24.22	-576.95	0.15	3.68	0	1.67	0.02	6.6
448	189.1	8	8	18.48	-599.72	0.12	3.83	0	1.34	0.01	7.09

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
449	555.78	8	8	1.63	21.32	0.01	0.14	0	0.01	0	0.01
450	462.75	8	8	13.94	-654.22	0.09	4.18	0	3.85	0.01	8.32
452	550.4	12	12	-185.73	-462.76	0.53	1.31	0.06	0.33	0.11	0.61
453	596.81	12	12	179.82	465.31	0.51	1.32	0.06	0.37	0.11	0.61
454	420.77	8	8	22.33	42.87	0.14	0.27	0.01	0.02	0.02	0.05
455	552.26	12	12	-42.54	-153.96	0.12	0.44	0	0.04	0.01	0.08
456	290.15	8	8	-44.36	-172.4	0.28	1.1	0.02	0.2	0.06	0.7
457	320.23	8	8	-16.94	-95.74	0.11	0.61	0	0.08	0.01	0.24
459	380.78	8	8	-9.35	-1.28	0.06	0.01	0	0	0	0
460	493.78	8	8	-14.09	-77.12	0.09	0.49	0	0.08	0.01	0.16
461	462.68	8	8	10.19	46.2	0.07	0.29	0	0.03	0	0.06
465	708.24	8	8	121.14	213.63	0.77	1.36	0.26	0.74	0.37	1.05
466	544.16	8	8	114.88	175.24	0.73	1.12	0.18	0.39	0.33	0.73
467	298.85	8	8	111.01	136.19	0.71	0.87	0.09	0.14	0.31	0.46
468	336.34	8	8	109.54	101.6	0.7	0.65	0.1	0.09	0.3	0.26
469	283.19	8	8	63.35	239.85	0.4	1.53	0.03	0.37	0.11	1.3
470	147.56	8	8	56.78	216.57	0.36	1.38	0.01	0.16	0.09	1.07
473	200.46	8	8	43.75	449.56	0.28	2.87	0.01	0.83	0.06	4.16
474	461.94	8	8	15.6	207.44	0.1	1.32	0	0.46	0.01	0.99
475	532.42	8	8	-16.31	-205.22	0.1	1.31	0	0.52	0.01	0.97
476	474.29	8	8	7.91	170.22	0.05	1.09	0	0.33	0	0.69
477	404.49	8	12	-533.61	-990.83	3.41	2.81	2.68	1.17	6.62	2.89
478	642.28	8	8	5.48	149.99	0.03	0.96	0	0.35	0	0.54
479	511.3	8	8	-4.31	-159.36	0.03	1.02	0	0.31	0	0.61
480	613.66	8	8	3.18	-111.53	0.02	0.71	0	0.19	0	0.31
499	443.99	8	8	0	-17.4	0	0.11	0	0	0	0.01
500	321.15	8	8	0.57	-49.51	0	0.32	0	0.02	0	0.07
501	384.28	8	8	0	-111.87	0	0.71	0	0.12	0	0.32
502	447.98	8	8	0.57	44.54	0	0.28	0	0.03	0	0.06
504	753.39	8	8	-0.57	-13.3	0	0.08	0	0	0	0.01
505	155.34	8	8	0	121.17	0	0.77	0	0.06	0	0.37
509	292.19	8	16	-829.06	-1444.64	5.29	2.31	4.37	0.42	14.97	1.43

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
513	621.7	6	6	49.07	101.52	0.56	1.15	0.2	0.77	0.32	1.24
514	1,061.68	8	12	511.96	934.21	3.27	2.65	6.51	2.75	6.13	2.59
515	516.68	6	8	116.3	328.38	1.32	2.1	0.83	1.39	1.6	2.69
517	609.24	6	6	-97.44	-141.51	1.11	1.61	0.7	1.4	1.15	2.3
518	488.2	6	6	-78.92	-109.46	0.9	1.24	0.38	0.7	0.78	1.43
520	907.11	6	8	100.85	297.61	1.14	1.9	1.11	2.04	1.23	2.24
521	539.67	6	8	85.41	261.56	0.97	1.67	0.49	0.95	0.9	1.77
522	567.67	6	8	62.66	218.9	0.71	1.4	0.29	0.72	0.51	1.27
525	456.49	6	8	103.7	250.95	1.18	1.6	0.59	0.75	1.29	1.64
526	521.54	6	8	77.05	194.09	0.87	1.24	0.39	0.53	0.75	1.02
527	434.09	6	8	33.24	102.03	0.38	0.65	0.07	0.13	0.16	0.31
528	398.59	8	8	-118.68	-90.04	0.76	0.57	0.16	0.1	0.41	0.25
535	237.74	6	6	35.3	112.31	0.4	1.27	0.04	0.36	0.18	1.5
536	287.31	10	10	128.25	356.2	0.52	1.46	0.05	0.3	0.16	1.06
537	300.6	10	10	126.77	353.04	0.52	1.44	0.05	0.31	0.16	1.04
538	435.26	10	10	126.13	342.45	0.52	1.4	0.07	0.43	0.15	0.98
539	338.05	6	6	32.22	78.26	0.37	0.89	0.05	0.26	0.15	0.77
540	359.5	6	6	-2.69	0.9	0.03	0.01	0	0	0	0
541	459.25	6	6	25.39	68.66	0.29	0.78	0.04	0.28	0.1	0.6
542	175.7	10	10	96.41	267.16	0.39	1.09	0.02	0.11	0.09	0.62
543	490.66	10	10	84.49	207.91	0.35	0.85	0.04	0.19	0.07	0.39
544	438.18	10	10	81.03	200.9	0.33	0.82	0.03	0.16	0.07	0.37
545	297.13	10	10	68.35	154.01	0.28	0.63	0.01	0.07	0.05	0.22
546	850.12	10	10	66.13	149.42	0.27	0.61	0.04	0.18	0.05	0.21
547	177.03	10	10	10.52	42.72	0.04	0.17	0	0	0	0.02
548	382.95	10	10	-54.88	-161.46	0.22	0.66	0.01	0.09	0.03	0.24
549	497.35	8	8	17.15	59.04	0.11	0.38	0.01	0.06	0.01	0.11
551	237.6	6	6	8.6	-4.54	0.1	0.05	0	0	0.01	0
552	249.98	6	6	4.32	-14.91	0.05	0.17	0	0.01	0	0.04
553	461.21	8	8	34.22	93.08	0.22	0.59	0.02	0.12	0.04	0.26
555	255.81	10	10	57.54	132.86	0.24	0.54	0.01	0.04	0.04	0.17
556	291.31	10	10	51.93	121.14	0.21	0.49	0.01	0.04	0.03	0.14

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
557	315.59	8	8	-10.19	-30.37	0.07	0.19	0	0.01	0	0.03
558	359.36	6	6	1.94	3.4	0.02	0.04	0	0	0	0
559	157.88	6	6	7.41	24.42	0.08	0.28	0	0.01	0.01	0.09
560	473.53	8	8	20.94	55.69	0.13	0.36	0.01	0.05	0.02	0.1
561	306.77	8	8	-9.14	-4.84	0.06	0.03	0	0	0	0
562	436.91	8	8	4.47	-6.39	0.03	0.04	0	0	0	0
563	504.73	6	6	21.61	41.42	0.25	0.47	0.04	0.12	0.07	0.24
564	393.49	6	6	12.39	32.75	0.14	0.37	0.01	0.06	0.03	0.15
565	582.99	8	8	36.33	82.98	0.23	0.53	0.03	0.12	0.05	0.21
566	156.18	6	6	28.28	61.19	0.32	0.69	0.02	0.08	0.12	0.49
567	558.62	6	6	-9.3	-21.77	0.11	0.25	0.01	0.04	0.01	0.07
568	480.11	6	6	1.57	-2.72	0.02	0.03	0	0	0	0
569	163.27	6	6	16.82	32.71	0.19	0.37	0.01	0.02	0.04	0.15
570	159.16	6	6	12.4	23.31	0.14	0.26	0	0.01	0.03	0.08
571	584.08	6	6	8.23	22.64	0.09	0.26	0.01	0.05	0.01	0.08
572	94.84	6	6	3.41	-1.4	0.04	0.02	0	0	0	0
574	164.52	8	8	23.79	52.97	0.15	0.34	0	0.02	0.02	0.09
575	126.53	8	8	23.38	51.98	0.15	0.33	0	0.01	0.02	0.09
577	912.36	8	8	12.29	34.57	0.08	0.22	0.01	0.04	0.01	0.04
583	73.55	24	24	2760.84	7711.49	1.96	5.47	0.05	0.32	0.66	4.41
1091	805.29	8	8	0.57	-15.84	0	0.1	0	0.01	0	0.01
1093	936.94	8	8	10.04	23.58	0.06	0.15	0	0.02	0	0.02
1095	2,061.45	8	8	3.34	-41.72	0.02	0.27	0	0.12	0	0.06
1099	63.33	6	6	0.27	181.8	0	2.06	0	0.14	0	3.66
P-3	143.73	10	10	-165.96	-471.64	0.68	1.93	0.03	0.22	0.22	1.53
P-4	522.79	8	8	7.99	98.22	0.05	0.63	0	0.15	0	0.29
P-6	428.6	12	12	17.54	2.47	0.05	0.01	0	0	0	0
P-8	381.89	8	8	27.61	-556.48	0.18	3.55	0.01	2.73	0.03	7.15
P13	153.48	10	10	-66.51	-224.24	0.27	0.92	0.01	0.07	0.05	0.45
P-13	168.06	18	26	5507.79	10702.86	6.94	6.47	1.62	0.92	9.61	5.49
P15	1,262.65	6	6	76.59	142.97	0.87	1.62	0.93	2.96	0.74	2.34
P17	332.22	6	6	14.06	30.51	0.16	0.35	0.01	0.04	0.03	0.13

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P-18	1,688.11	18	18	5505.75	3671.4	6.94	4.63	16.22	7.66	9.61	4.54
P19	428.57	6	6	44.41	74.45	0.5	0.84	0.12	0.3	0.27	0.7
P-19	431.84	18	18	5504.08	3666.86	6.94	4.62	4.15	1.95	9.6	4.53
P21	684.31	6	6	23.69	53.82	0.27	0.61	0.06	0.26	0.08	0.38
P23	329.93	6	6	9.92	23.39	0.11	0.27	0.01	0.03	0.02	0.08
P25	291.98	6	6	4.03	11.72	0.05	0.13	0	0.01	0	0.02
P27	829.17	6	6	-94.93	-65.72	1.08	0.75	0.91	0.46	1.1	0.56
P29	715.47	6	6	1.78	199.26	0.02	2.26	0	3.1	0	4.34
P31	304.39	6	6	-55.33	-29.87	0.63	0.34	0.12	0.04	0.4	0.13
P-32	1,146.30	4	10	13.15	24.33	0.34	0.1	0.23	0.01	0.2	0.01
P33	422.34	4	10	55.43	153.77	1.42	0.63	1.23	0.09	2.92	0.22
P-33	369.85	4	4	11.45	19.18	0.29	0.49	0.06	0.15	0.16	0.41
P-34	209.15	4	4	7.04	11.79	0.18	0.3	0.01	0.03	0.06	0.17
P35	643.76	4	10	49.02	125.07	1.25	0.51	1.5	0.1	2.33	0.15
P37	516.97	4	4	20.08	38.26	0.51	0.98	0.23	0.76	0.45	1.47
P-37	681.23	6	6	-96.94	-73.96	1.1	0.84	0.78	0.47	1.14	0.69
P39	218.03	4	10	-6.42	49.05	0.16	0.2	0.01	0.01	0.05	0.03
P-39	58.36	12	12	-0.57	-4.09	0	0.01	0	0	0	0
P41	89.47	4	4	-34.94	-21.47	0.89	0.55	0.11	0.05	1.24	0.5
P-41	345.63	6	12	121.18	128.85	1.38	0.37	0.6	0.02	1.73	0.07
P-42	614.87	8	8	-219.54	-285.44	1.4	1.82	0.79	1.28	1.28	2.08
P43	411.29	4	10	21.51	54.89	0.55	0.22	0.21	0.01	0.51	0.03
P-44	616.43	6	8	51.68	143.54	0.59	0.92	0.22	0.36	0.36	0.58
P45	790.84	4	4	1.93	13.08	0.05	0.33	0	0.16	0.01	0.2
P-46	474.72	6	8	-3.75	170.92	0.04	1.09	0	0.38	0	0.8
P47	1,243.31	4	4	19.3	55.67	0.49	1.42	0.52	3.66	0.41	2.95
P-47	635.15	6	8	-32.14	-97.4	0.36	0.62	0.09	0.18	0.15	0.28
P-48	2,524.69	6	8	5.07	-160.25	0.06	1.02	0.01	1.8	0	0.71
P49	6,359.31	12	16	8.54	387.62	0.02	0.62	0	0.8	0	0.13
P-49	745.78	6	8	-9.5	143.71	0.11	0.92	0.01	0.43	0.02	0.58
P-50	1,924.75	6	6	6.02	17.61	0.07	0.2	0.01	0.09	0.01	0.05
P-52	680.58	6	6	70.07	40.4	0.8	0.46	0.43	0.15	0.63	0.23

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P-53	578.12	6	8	-31.46	-54.39	0.36	0.35	0.08	0.06	0.14	0.1
P-54	404.19	6	6	8.86	20.43	0.1	0.23	0.01	0.03	0.01	0.06
P-55	446.36	8	8	12.23	31.56	0.08	0.2	0	0.02	0.01	0.04
P-56	132.09	6	6	2.53	-3.72	0.03	0.04	0	0	0	0
P-57	89.83	6	6	-7.92	-14.32	0.09	0.16	0	0	0.01	0.03
P-58	495.11	6	6	-9.8	-8.59	0.11	0.1	0.01	0.01	0.02	0.01
P59	48.79	8	8	263.49	395.42	1.68	2.52	0.09	0.19	1.79	3.8
P-59	175.59	6	6	-1.58	-3.25	0.02	0.04	0	0	0	0
P-60	205.58	6	6	1.34	3.1	0.02	0.04	0	0	0	0
P61	730.94	8	8	-249.74	-365.53	1.59	2.33	1.19	2.4	1.62	3.29
P-61	344.87	6	6	-3.68	-7.96	0.04	0.09	0	0	0	0.01
P-62	204.38	6	6	-3.21	-7.1	0.04	0.08	0	0	0	0.01
P63	343.81	6	6	3.16	9.78	0.04	0.11	0	0.01	0	0.02
P-63	536.74	6	6	-7.03	-12.17	0.08	0.14	0	0.01	0.01	0.02
P-64	205.93	6	6	0.87	1.64	0.01	0.02	0	0	0	0
P65	310.55	6	6	33.28	62.6	0.38	0.71	0.05	0.16	0.16	0.51
P-65	163.57	6	6	1.33	3.24	0.02	0.04	0	0	0	0
P67	88.32	12	12	87.54	305.06	0.25	0.87	0	0.03	0.03	0.33
P-68	202.95	6	6	7.08	16.17	0.08	0.18	0	0.01	0.01	0.04
P69	193.67	6	10	328.21	-7.48	3.72	0.03	2.12	0	10.93	0
P-69	620.52	6	6	6.6	19.66	0.07	0.22	0	0.04	0.01	0.06
P-70	295.15	6	6	4.62	14.64	0.05	0.17	0	0.01	0	0.03
P71	25.48	6	6	330.66	0	3.75	0	0.28	0	11.08	0
P-71	59.08	6	6	0	0	0	0	0	0	0	0
P-73	617.69	6	10	128.68	1098.16	1.46	4.49	1.19	5.25	1.93	8.5
P-74	157.58	6	6	2.13	4.77	0.02	0.05	0	0	0	0
P75	1,239.97	12	12	3.34	0.71	0.01	0	0	0	0	0
P-75	1,211.21	6	8	-124.28	-324.41	1.41	2.07	2.19	3.19	1.81	2.63
P-76	214.99	6	8	-62.49	-174.13	0.71	1.11	0.11	0.18	0.51	0.83
P77	658.65	12	12	273.45	1577.17	0.78	4.47	0.15	3.88	0.23	5.89
P-77	769.97	6	6	-165.33	117.61	1.88	1.33	2.36	1.26	3.07	1.63
P-78	88.36	10	16	1320.34	1917.39	5.39	3.06	1.06	0.21	11.95	2.42

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P-79	851.35	10	16	1315.64	1907.4	5.37	3.04	10.11	2.04	11.87	2.39
P-80	379.13	6	6	-81.02	-176.67	0.92	2	0.31	1.32	0.82	3.47
P-81	598.3	2	2	7.83	19.63	0.8	2	1.18	6.45	1.97	10.78
P-82	227.83	6	6	90.44	204.01	1.03	2.31	0.23	1.03	1	4.53
P-83	407.85	2	2	-6.82	-17.56	0.7	1.79	0.62	3.58	1.52	8.77
P-84	839.31	12	12	26.35	40.44	0.07	0.11	0	0.01	0	0.01
P-88	778.65	6	6	99.25	79.87	1.13	0.91	0.93	0.62	1.19	0.8
P97	80.8	16	16	2747.45	3104.5	4.38	4.95	0.38	0.48	4.71	5.9
P-101	548.47	10	20	529.14	3809.81	2.16	3.89	1.21	1.59	2.2	2.91
P-102	636.9	10	20	-668.43	-4950.59	2.73	5.06	2.16	3.01	3.39	4.72
P103	15.16	30	30	-520.31	-3716.78	0.24	1.69	0	0.01	0.01	0.33
P-103	832.11	6	6	-9.95	3.3	0.11	0.04	0.01	0	0.02	0
P105	16.24	30	30	-212.34	-3430.61	0.1	1.56	0	0	0.01	0.29
P107	25.46	30	30	-308.21	-286.67	0.14	0.13	0	0	0	0
P109	33.96	30	30	-214.23	2283.72	0.1	1.04	0	0	0	0.14
P111	218.67	12	12	1.18	217.29	0	0.62	0	0.04	0	0.17
P113	1,143.28	12	12	2.69	170.33	0.01	0.48	0	0.11	0	0.1
P115	208.63	12	12	2.38	-15.06	0.01	0.04	0	0	0	0
P117	534.1	12	12	2.09	-15.06	0.01	0.04	0	0	0	0
P119	477.85	8	8	1.81	-2.18	0.01	0.01	0	0	0	0
P121	273.19	10	10	1258.59	-66.72	5.14	0.27	2.99	0.01	10.94	0.05
P123	276.09	6	6	4.83	11.2	0.05	0.13	0	0.01	0	0.02
P125	614.89	8	8	0.7	-2.18	0	0.01	0	0	0	0
P-126	831.84	10	10	1260.91	-33.25	5.15	0.14	9.13	0.01	10.98	0.01
P127	29.96	18	18	4543.26	-1215.92	5.73	1.53	0.17	0.02	5.8	0.51
P129	85.02	6	6	18.33	24.91	0.21	0.28	0	0.01	0.05	0.09
P-130	623.02	6	6	-68.41	-192.56	0.78	2.19	0.37	2.54	0.6	4.07
P131	115.43	6	6	0.88	28.94	0.01	0.33	0	0.01	0	0.12
P-131	604.28	6	6	25.1	70.68	0.28	0.8	0.06	0.38	0.09	0.64
P-132	2,143.51	6	6	19.35	56.39	0.22	0.64	0.12	0.9	0.06	0.42
P133	272.89	6	10	-134.79	-1121.22	1.53	4.58	0.57	2.41	2.1	8.83
P-133	485.31	8	12	346.44	581.16	2.21	1.65	1.44	0.52	2.97	1.08

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P-134	835.04	6	6	-55.32	-160.82	0.63	1.82	0.34	2.43	0.4	2.92
P135	645.38	10	20	519.35	3781.39	2.12	3.86	1.37	1.85	2.12	2.87
P137	807.76	6	6	-29.88	-131.34	0.34	1.49	0.1	1.62	0.13	2
P139	668.72	6	6	32.91	158.11	0.37	1.79	0.1	1.89	0.15	2.83
P141	638.87	6	10	-60.28	-1014.74	0.68	4.15	0.3	4.69	0.47	7.34
P143	649.57	6	8	-59.41	-125.52	0.67	0.8	0.3	0.29	0.46	0.45
P145	141.2	10	10	80.55	282.57	0.33	1.15	0.01	0.1	0.07	0.69
P147	183.18	10	10	80.36	277.93	0.33	1.14	0.01	0.12	0.07	0.67
P149	171.47	10	10	-45.8	-121.28	0.19	0.5	0	0.02	0.02	0.14
P-150	451.65	8	12	547.38	1016.37	3.49	2.88	3.13	1.37	6.94	3.03
P151	485.57	6	6	49.37	128.17	0.56	1.45	0.16	0.93	0.33	1.92
P153	127.01	10	10	145.94	398.52	0.6	1.63	0.03	0.17	0.2	1.3
P155	221.85	6	6	-6.02	-21.44	0.07	0.24	0	0.02	0.01	0.07
P157	290.82	12	12	-1.33	-12.89	0	0.04	0	0	0	0
P159	216.46	6	6	5.76	8.8	0.07	0.1	0	0	0.01	0.01
P161	247.94	6	6	-5.44	-14.3	0.06	0.16	0	0.01	0.01	0.03
P163	654.81	6	6	4.28	21.86	0.05	0.25	0	0.05	0	0.07
P165	304.11	6	6	2.92	14.43	0.03	0.16	0	0.01	0	0.03
P167	238.41	6	6	57.13	28.43	0.65	0.32	0.1	0.03	0.43	0.12
P169	803.1	6	6	30.96	-53.07	0.35	0.6	0.11	0.3	0.14	0.37
P171	681.07	10	10	339.19	1005.92	1.39	4.11	0.66	4.92	0.96	7.22
P173	274.62	8	8	-87.57	-281	0.56	1.79	0.06	0.55	0.23	2.02
P175	302.5	12	12	-0.63	-15.06	0	0.04	0	0	0	0
P177	710.73	12	12	0.63	172.94	0	0.49	0	0.07	0	0.1
P179	220.2	8	8	37.66	567.33	0.24	3.62	0.01	1.41	0.04	6.39
P181	548.18	6	6	2.49	0	0.03	0	0	0	0	0
P183	389.04	8	8	30.6	567.33	0.2	3.62	0.01	2.49	0.03	6.39
P185	520.72	6	6	3.98	0	0.05	0	0	0	0	0
P187	360.11	8	8	21.08	567.33	0.13	3.62	0.01	2.3	0.01	6.39
P189	43.19	8	8	263.28	395.06	1.68	2.52	0.08	0.16	1.79	3.79
P191	41.92	8	8	262.68	394.06	1.68	2.52	0.07	0.16	1.78	3.78
P193	134.11	6	10	234.78	795.83	2.66	3.25	0.79	0.63	5.88	4.68

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P195	161.9	6	10	231.7	790.66	2.63	3.23	0.93	0.75	5.73	4.62
P197	95.39	6	6	106.68	104.55	1.21	1.19	0.13	0.13	1.36	1.31
P199	44.68	8	16	855.95	1500	5.46	2.39	0.71	0.07	15.88	1.53
P201	65.11	6	6	106.68	104.55	1.21	1.19	0.09	0.09	1.36	1.31
P203	699.54	6	6	14	0	0.16	0	0.02	0	0.03	0
P205	233.59	12	12	2.79	596.58	0.01	1.69	0	0.23	0	0.97
P207	274.68	12	12	2.79	596.58	0.01	1.69	0	0.27	0	0.97
P209	662.87	8	8	1.53	596.58	0.01	3.81	0	4.65	0	7.02
P211	238.79	10	16	1320.34	1917.39	5.39	3.06	2.85	0.58	11.95	2.42
P221	690.29	8	8	278.17	99.62	1.78	0.64	1.37	0.2	1.98	0.3
P231	154.46	6	10	328.58	-3.69	3.73	0.02	1.69	0	10.95	0
P233	768.43	10	16	1310.24	1889.08	5.35	3.01	9.06	1.81	11.78	2.35
P237	659.24	10	10	95	258.17	0.39	1.05	0.06	0.38	0.09	0.58
P239	56.43	10	16	1310.24	1889.08	5.35	3.01	0.67	0.13	11.79	2.35
P241	80.04	8	16	1215.86	1567.71	7.76	2.5	2.44	0.13	30.42	1.66
P243	69.58	6	8	330.66	0	3.75	0	0.77	0	11.08	0
P247	22.25	6	6	330.66	0	3.75	0	0.25	0	11.08	0
P255	469.12	8	8	109.54	698.18	0.7	4.46	0.14	4.41	0.3	9.39
P273	81.42	8	8	289.65	-77.52	1.85	0.49	0.17	0.02	2.13	0.19
P275	18.41	8	8	619.6	0	3.95	0	0.16	0	8.73	0
P277	16.23	8	8	663.33	0	4.23	0	0.16	0	9.9	0
P279	2,090.35	12	12	273.45	131.3	0.78	0.37	0.48	0.12	0.23	0.06
P307	3,371.98	6	12	106.68	104.55	1.21	0.3	4.6	0.15	1.36	0.04
P309	536.25	8	8	254.25	351.76	1.62	2.25	0.9	1.64	1.68	3.06
P311	475.13	8	8	0	0	0	0	0	0	0	0
P317	410.64	8	8	364.17	535.92	2.32	3.42	1.34	2.74	3.26	6.67
P321	510.62	8	8	309.99	410.07	1.98	2.62	1.07	1.79	2.09	3.5
P331	423.61	8	8	287.64	129.46	1.84	0.83	0.89	0.2	2.11	0.48
P339	640.34	8	16	859.97	1510.16	5.49	2.41	10.26	0.99	16.02	1.55
P341	731.61	8	16	1215.86	1567.71	7.76	2.5	22.26	1.22	30.42	1.66
P353	140.2	6	12	110.85	111.53	1.26	0.32	0.21	0.01	1.46	0.05
P359	70.46	6	12	114.56	117.74	1.3	0.33	0.11	0	1.55	0.06

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P367	354.92	6	6	10.19	22.99	0.12	0.26	0.01	0.03	0.02	0.08
P369	32.63	6	6	10.54	31.96	0.12	0.36	0	0	0.02	0.15
P371	369.03	6	6	3.88	13.19	0.04	0.15	0	0.01	0	0.03
P373	627.01	6	8	20.49	73.37	0.23	0.47	0.04	0.11	0.06	0.17
P375	457.24	6	6	7.17	19.82	0.08	0.22	0	0.03	0.01	0.06
P377	470.82	6	8	86.54	215.38	0.98	1.37	0.44	0.58	0.93	1.23
P379	472.5	6	8	66.81	172.73	0.76	1.1	0.27	0.39	0.57	0.82
P381	327.75	8	8	-108.47	-70.59	0.69	0.45	0.11	0.05	0.35	0.16
P383	390.5	8	8	-127.04	-108.65	0.81	0.69	0.18	0.14	0.46	0.35
P385	75.99	8	8	-209.38	-262.69	1.34	1.68	0.09	0.14	1.17	1.78
P387	313.15	8	8	-237.31	-316.45	1.51	2.02	0.46	0.79	1.48	2.52
P389	59.8	8	8	343.28	571.89	2.19	3.65	0.17	0.45	2.92	7.53
P391	347.76	6	8	56.9	206.2	0.65	1.32	0.15	0.4	0.43	1.14
P393	428.6	8	8	296.84	388.04	1.89	2.48	0.83	1.36	1.93	3.16
P395	322.27	8	8	323.04	432.26	2.06	2.76	0.73	1.25	2.25	3.86
P397	441.54	6	6	-72.72	-95.1	0.83	1.08	0.3	0.49	0.67	1.1
P399	285.67	6	6	-88.55	-125.59	1	1.43	0.28	0.53	0.97	1.84
P401	434.56	6	8	136.42	372.64	1.55	2.38	0.93	1.48	2.15	3.4
P403	452.38	6	8	121.51	346.3	1.38	2.21	0.78	1.34	1.74	2.97
P405	459.09	6	8	113.13	320.83	1.28	2.05	0.7	1.18	1.52	2.58
P407	497.09	6	8	72.35	237.77	0.82	1.52	0.33	0.74	0.66	1.48
P409	280.91	8	12	-523.84	-968.51	3.34	2.75	1.8	0.78	6.4	2.77
P411	355.34	8	12	559.35	1038.27	3.57	2.95	2.57	1.12	7.22	3.15
P413	174.07	8	16	-826.95	-1440.56	5.28	2.3	2.59	0.25	14.9	1.42
P415	85.36	8	16	-834	-1454.41	5.32	2.32	1.29	0.12	15.14	1.45
P417	207	8	16	862.85	1521.66	5.51	2.43	3.34	0.33	16.12	1.58
P419	309.42	8	16	867.48	1531.88	5.54	2.44	5.04	0.49	16.28	1.59
P421	296.72	6	6	-154.33	-23.44	1.75	0.27	0.8	0.02	2.7	0.08
P423	524.38	6	6	-152.55	-17.76	1.73	0.2	1.39	0.03	2.64	0.05
P425	700.57	6	6	-147.01	2.45	1.67	0.03	1.73	0	2.47	0
P427	563.01	6	6	-129.32	34.44	1.47	0.39	1.1	0.09	1.95	0.17
P429	675.06	6	6	-159.3	68.93	1.81	0.78	1.93	0.41	2.86	0.61

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P431	509.72	8	8	84.59	296.03	0.54	1.89	0.11	1.13	0.22	2.22
P433	621.54	8	8	76.95	275.07	0.49	1.76	0.11	1.21	0.18	1.94
P435	57.83	8	8	75.29	271.6	0.48	1.73	0.01	0.11	0.18	1.9
P437	107.17	8	8	359.15	159.19	2.29	1.02	0.34	0.08	3.18	0.7
P439	104.54	8	8	35.98	7.39	0.23	0.05	0	0	0.04	0
P441	200.8	6	6	-96.89	-59.6	1.1	0.68	0.23	0.09	1.14	0.46
P443	578.78	6	6	-84.74	-50.79	0.96	0.58	0.52	0.2	0.89	0.34
P445	492.82	6	6	-20.87	-19.41	0.24	0.22	0.03	0.03	0.07	0.06
P447	350.04	6	6	41.25	9.82	0.47	0.11	0.08	0.01	0.23	0.02
P449	313.82	6	6	92.01	92.86	1.04	1.05	0.33	0.33	1.04	1.05
P451	809.72	8	8	-87.13	-107.73	0.56	0.69	0.19	0.28	0.23	0.34
P453	482.32	6	6	59.43	131.09	0.67	1.49	0.22	0.96	0.46	2
P455	291.6	6	6	7.49	20.82	0.08	0.24	0	0.02	0.01	0.07
P457	222.96	6	6	37.26	72.35	0.42	0.82	0.04	0.15	0.19	0.66
P459	571.54	8	8	-259.48	-388.16	1.66	2.48	1	2.1	1.74	3.67
P461	654.56	8	8	321.78	149.88	2.05	0.96	1.7	0.41	2.59	0.63
P463	680.97	10	10	-1193.01	443.04	4.87	1.81	6.75	1.08	9.91	1.58
P465	535.05	10	10	-1205.56	398.46	4.92	1.63	5.4	0.7	10.1	1.3
P467	445.03	10	10	-1214.85	360.24	4.96	1.47	4.56	0.48	10.24	1.08
P469	275.41	10	10	-1224.2	340.86	5	1.39	2.86	0.27	10.39	0.97
P471	56.16	6	6	-0.36	179.76	0	2.04	0	0.2	0	3.58
P473	622.25	10	10	1234.65	-127.9	5.04	0.52	6.57	0.1	10.56	0.16
P475	414.42	10	10	1247.51	-97.59	5.1	0.4	4.46	0.04	10.76	0.1
P477	147.93	10	10	1252.48	-81.66	5.12	0.33	1.6	0.01	10.84	0.07
P479	68.46	6	6	59.54	146.41	0.68	1.66	0.03	0.17	0.46	2.45
P481	440.79	6	8	58.73	163.12	0.67	1.04	0.2	0.32	0.45	0.74
P483	461	6	8	45.18	123.38	0.51	0.79	0.13	0.2	0.28	0.44
P485	518.75	6	8	-41.71	-115.32	0.47	0.74	0.12	0.2	0.24	0.39
P487	470.37	6	6	12.76	32.83	0.14	0.37	0.01	0.07	0.03	0.15
P489	742.31	6	6	53.02	157.12	0.6	1.78	0.28	2.07	0.37	2.79
P491	366.78	6	6	75.78	62.16	0.86	0.71	0.27	0.18	0.72	0.5
P493	248.87	6	6	-76.99	-75.72	0.87	0.86	0.19	0.18	0.75	0.72

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P495	619.69	6	6	-80.96	-95.53	0.92	1.08	0.51	0.69	0.82	1.11
P497	153.87	6	6	13.31	37.99	0.15	0.43	0	0.03	0.03	0.2
P499	310.85	10	20	1258.42	3110.84	5.14	3.18	3.4	0.62	10.94	2
P501	522.72	10	20	1250.88	3080.17	5.11	3.15	5.65	1.03	10.81	1.96
P503	58.51	10	20	1387.48	2881.21	5.67	2.94	0.77	0.1	13.1	1.73
P505	473.93	6	6	-57.28	-170.66	0.65	1.94	0.2	1.54	0.43	3.25
P507	412.45	6	6	5.87	-88.9	0.07	1.01	0	0.4	0.01	0.97
P509	121.77	6	8	138.75	577.81	1.57	3.69	0.27	0.93	2.22	7.67
P511	307.63	6	6	23.78	-56.3	0.27	0.64	0.03	0.13	0.08	0.42
P513	63.32	6	6	-43.85	-187.71	0.5	2.13	0.02	0.25	0.26	3.88
P515	656.92	6	6	-18.74	33.19	0.21	0.38	0.04	0.1	0.05	0.16
P517	477.42	6	6	55.2	49.81	0.63	0.57	0.19	0.16	0.4	0.33
P519	699.22	6	6	-100.04	-186.14	1.14	2.11	0.85	2.67	1.21	3.82
P521	767.68	6	6	-85.82	-124.32	0.97	1.41	0.7	1.39	0.91	1.81
P523	542.7	6	6	177.4	-145.85	2.01	1.65	1.9	1.32	3.5	2.43
P525	156.6	6	6	195.46	-104.38	2.22	1.18	0.66	0.21	4.18	1.31
P527	642.53	6	6	195.46	-74.89	2.22	0.85	2.69	0.45	4.18	0.71
P529	571.15	6	6	198.96	-39.64	2.26	0.45	2.47	0.12	4.32	0.22
P531	1,171.92	6	6	202.27	1.69	2.3	0.02	5.22	0	4.46	0
P533	1,512.49	6	6	180.27	-81.03	2.05	0.92	5.45	1.24	3.6	0.82
P535	738.15	6	8	22.94	73.24	0.26	0.47	0.06	0.12	0.08	0.17
P537	739.76	6	8	-86.31	-176.63	0.98	1.13	0.68	0.63	0.92	0.85
P539	575.45	6	8	-3.11	12.16	0.04	0.08	0	0	0	0.01
P541	550.77	6	8	-38.89	-61.61	0.44	0.39	0.12	0.07	0.21	0.12
P543	571.86	6	8	-50.24	-96.04	0.57	0.61	0.19	0.16	0.34	0.28
P545	605.48	6	8	-64.86	-142.12	0.74	0.91	0.33	0.35	0.54	0.57
P547	373.14	6	10	-72.01	-1011.84	0.82	4.13	0.25	2.72	0.66	7.3
P549	471.13	6	6	9.41	29.42	0.11	0.33	0.01	0.06	0.02	0.13
P551	264.16	6	6	2.06	6.83	0.02	0.08	0	0	0	0.01
P553	434.68	10	20	532.93	3821.15	2.18	3.9	0.97	1.27	2.23	2.92
P555	177.28	10	20	520.88	3788.23	2.13	3.87	0.38	0.51	2.13	2.88
P557	352.6	6	6	6.93	31.57	0.08	0.36	0	0.05	0.01	0.14

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P559	554.06	6	6	5.41	24.09	0.06	0.27	0	0.05	0.01	0.09
P561	292.08	6	6	1.11	6.11	0.01	0.07	0	0	0	0.01
P563	1,056.54	6	6	4.72	52.92	0.05	0.6	0	0.39	0	0.37
P565	837.75	6	6	9.24	71.03	0.1	0.81	0.01	0.54	0.01	0.64
P567	453	6	6	12.98	84.72	0.15	0.96	0.01	0.4	0.03	0.89
P569	373.03	6	6	30.17	92	0.34	1.04	0.05	0.39	0.13	1.04
P571	213.33	6	6	2.33	8.4	0.03	0.1	0	0	0	0.01
P573	237.17	6	6	2.14	6.52	0.02	0.07	0	0	0	0.01
P575	584.14	8	8	10.43	21.3	0.07	0.14	0	0.01	0	0.02
P577	288.94	8	8	23.34	31.91	0.15	0.2	0.01	0.01	0.02	0.04
P579	419.93	8	8	2.49	5.01	0.02	0.03	0	0	0	0
P581	213.44	8	8	37.72	144.77	0.24	0.92	0.01	0.13	0.05	0.59
P583	161.27	8	8	39.14	149	0.25	0.95	0.01	0.1	0.05	0.62
P585	144.51	6	6	-10.15	-34.27	0.12	0.39	0	0.02	0.02	0.17
P589	119.84	6	6	-1.52	3.83	0.02	0.04	0	0	0	0
P591	394.38	6	6	27.72	74.78	0.31	0.85	0.04	0.28	0.11	0.71
P593	431.65	6	6	22.27	61.07	0.25	0.69	0.03	0.21	0.07	0.49
P595	336.4	10	10	127.14	346.64	0.52	1.42	0.05	0.34	0.16	1
P597	104.97	10	10	-46.85	-123.92	0.19	0.51	0	0.02	0.02	0.15
P599	299.01	10	10	-85.88	-213.78	0.35	0.87	0.02	0.12	0.08	0.41
P601	189.84	6	6	-3.33	-4.98	0.04	0.06	0	0	0	0
P603	95.74	10	10	53.32	124.07	0.22	0.51	0	0.01	0.03	0.15
P605	264.65	6	6	10.77	27.99	0.12	0.32	0.01	0.03	0.02	0.11
P607	287.84	6	6	18.41	35.71	0.21	0.41	0.02	0.05	0.05	0.18
P609	191.95	8	8	6.01	-1.97	0.04	0.01	0	0	0	0
P611	184.16	8	8	-7.51	-0.31	0.05	0	0	0	0	0
P613	222.37	6	6	5.39	-11.73	0.06	0.13	0	0.01	0.01	0.02
P615	76.61	6	6	7.6	-7.95	0.09	0.09	0	0	0.01	0.01
P617	163.22	6	6	10.87	37.18	0.12	0.42	0	0.03	0.02	0.19
P619	502.21	8	8	13.98	51.1	0.09	0.33	0	0.04	0.01	0.09
P621	399.83	8	8	19.26	65.06	0.12	0.42	0.01	0.05	0.01	0.13
P623	222.7	8	8	-11.21	-32.64	0.07	0.21	0	0.01	0.01	0.04

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P625	363.11	6	6	-10.31	-26.04	0.12	0.3	0.01	0.04	0.02	0.1
P627	207.7	6	6	6.23	17.43	0.07	0.2	0	0.01	0.01	0.05
P629	486.06	6	6	4.21	1.54	0.05	0.02	0	0	0	0
P631	233.12	6	6	-0.34	-8.39	0	0.1	0	0	0	0.01
P633	312.68	8	8	14.66	35.92	0.09	0.23	0	0.01	0.01	0.04
P635	219.31	6	6	6.96	17.19	0.08	0.2	0	0.01	0.01	0.05
P637	150.57	6	6	10.08	22.89	0.11	0.26	0	0.01	0.02	0.08
P639	270.69	8	8	34.83	78.8	0.22	0.5	0.01	0.05	0.04	0.19
P641	193.25	8	8	8.77	25.9	0.06	0.17	0	0	0	0.02
P643	94.15	8	8	-88.7	-282.95	0.57	1.81	0.02	0.19	0.24	2.04
P645	165.73	8	8	-85.99	-275.53	0.55	1.76	0.04	0.32	0.23	1.95
P647	705.71	8	8	-80.67	-83.18	0.51	0.53	0.14	0.15	0.2	0.21
P649	426.28	8	8	261.97	375.56	1.67	2.4	0.76	1.47	1.77	3.45
P653	259.44	6	6	3.96	93.39	0.04	1.06	0	0.28	0	1.07
P655	274.02	6	6	0.31	8.97	0	0.1	0	0	0	0.01
P657	243.43	6	6	1.06	9.88	0.01	0.11	0	0	0	0.02
P659	201.94	6	6	4.73	10.58	0.05	0.12	0	0	0	0.02
P661	308.76	6	6	31.43	150.61	0.36	1.71	0.04	0.8	0.14	2.58
P663	490.07	6	6	-26.66	-79.17	0.3	0.9	0.05	0.38	0.1	0.78
P665	305.78	10	10	744.04	-586.81	3.04	2.4	1.26	0.81	4.13	2.66
P667	531.92	6	6	-170.66	39.88	1.94	0.45	1.73	0.12	3.25	0.22
P669	270.57	6	6	-2.85	-14.59	0.03	0.17	0	0.01	0	0.03
P671	289.47	6	6	8.17	23.82	0.09	0.27	0	0.02	0.01	0.07
P673	452.2	12	12	224.37	-50.85	0.64	0.14	0.07	0	0.16	0.01
P675	403.68	12	12	-183.22	-442.98	0.52	1.26	0.04	0.23	0.11	0.56
P677	180.17	8	8	-11.6	-63.19	0.07	0.4	0	0.02	0	0.11
P679	541.38	8	8	-19.7	-223.63	0.13	1.43	0.01	0.62	0.01	1.14
P681	524.43	8	8	6.93	179.48	0.04	1.15	0	0.4	0	0.76
P683	364.98	8	8	-21.95	-218.42	0.14	1.39	0.01	0.4	0.02	1.09
P687	128.63	12	12	16.11	-1.7	0.05	0	0	0	0	0
P689	341.48	8	8	19.11	18.62	0.12	0.12	0	0	0.01	0.01
P691	202.53	6	6	3.91	27.79	0.04	0.32	0	0.02	0	0.1

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P693	448.12	6	6	5.67	20.11	0.06	0.23	0	0.02	0	0.05
P695	469.5	6	6	2.84	9.32	0.03	0.11	0	0.01	0	0.01
P697	42.02	6	6	-2.08	-6.47	0.02	0.07	0	0	0	0.01
P699	202.41	6	6	4.54	23.06	0.05	0.26	0	0.01	0	0.07
P701	652.85	6	6	4.35	9.71	0.05	0.11	0	0.01	0	0.01
P703	395.74	8	8	6.3	30.86	0.04	0.2	0	0.01	0	0.03
P705	57.09	8	8	33.97	-534.77	0.22	3.41	0	0.33	0.03	5.73
P707	270.57	8	8	4.49	22.58	0.03	0.14	0	0	0	0.02
P709	132.57	6	6	2.31	11.66	0.03	0.13	0	0	0	0.02
P711	211.09	8	8	5.16	17.72	0.03	0.11	0	0	0	0.01
P713	555.62	8	8	1.63	21.32	0.01	0.14	0	0.01	0	0.01
P715	337.22	8	8	3.09	25.59	0.02	0.16	0	0.01	0	0.02
P717	219.91	6	6	2	15.15	0.02	0.17	0	0.01	0	0.03
P719	508.72	6	6	6.75	31.75	0.08	0.36	0	0.06	0.01	0.12
P721	378.61	8	8	1.86	84.65	0.01	0.54	0	0.07	0	0.19
P723	363.18	8	8	3.4	18.98	0.02	0.12	0	0	0	0.01
P725	195.87	8	8	-2.9	57.44	0.02	0.37	0	0.02	0	0.09
P727	305.85	6	6	2.6	12.68	0.03	0.14	0	0.01	0	0.02
P729	509.32	8	8	9.73	-669.52	0.06	4.27	0	4.43	0	8.69
P731	488.88	8	8	5.51	-689.56	0.04	4.4	0	4.49	0	9.18
P733	392.23	8	8	2.89	-703.55	0.02	4.49	0	3.74	0	9.52
P735	303.07	10	10	147.57	380.09	0.6	1.55	0.05	0.31	0.18	1.03
P737	315.07	10	10	143.95	373.9	0.59	1.53	0.05	0.31	0.17	1
P739	260.42	6	6	26.3	71.41	0.3	0.81	0.02	0.15	0.09	0.56
P741	238.5	6	6	24.12	67.76	0.27	0.77	0.02	0.12	0.07	0.51
P743	392.07	8	8	-48.99	-121.73	0.31	0.78	0.03	0.14	0.07	0.37
P745	206.86	8	8	-49.75	-124.97	0.32	0.8	0.01	0.08	0.07	0.39
P747	258.11	8	8	3.35	5.62	0.02	0.04	0	0	0	0
P749	358.41	8	8	-56.83	-140.09	0.36	0.89	0.03	0.17	0.09	0.48
P751	151.5	8	8	5.57	6.66	0.04	0.04	0	0	0	0
P753	223.98	8	8	-63.91	-149.29	0.41	0.95	0.03	0.12	0.11	0.54
P755	88.75	8	8	4.39	6.27	0.03	0.04	0	0	0	0

Node ID	Elevation	Diameter (in)		Flow (gpm)		Velocity (ft/s)		Headloss (ft)		Headloss/1000 (ft/1000-ft)	
		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
P757	327.32	8	8	-70.33	-158.96	0.45	1.01	0.04	0.2	0.13	0.61
P759	464.96	10	10	-71.71	-188.43	0.29	0.77	0.02	0.13	0.05	0.28
P761	289.56	8	8	4.22	7.07	0.03	0.05	0	0	0	0
P763	544.7	10	10	-77.51	-229.11	0.32	0.94	0.03	0.22	0.05	0.4
P765	402.67	10	10	-150.87	-387.88	0.62	1.58	0.07	0.43	0.19	1.07
P767	269.63	8	8	-71.82	-187.15	0.46	1.19	0.04	0.22	0.14	0.82
P769	552.74	10	10	-114.14	-296.26	0.47	1.21	0.06	0.36	0.11	0.65
P771	266.52	6	6	1.91	6.42	0.02	0.07	0	0	0	0.01
P773	212.76	10	10	-96.03	-286.87	0.39	1.17	0.02	0.13	0.08	0.61
P775	523.98	10	10	78.72	254.21	0.32	1.04	0.03	0.26	0.06	0.49
P777	37.64	6	6	7.28	25.58	0.08	0.29	0	0	0.01	0.08
PMP-1_D	126.01	99	99	2760.54	4477.42	0.12	0.19	0	0	0	0
PMP-1_U	115.37	99	99	2760.74	4478.08	0.12	0.19	0	0	0	0
PMP-10_D	109.11	99	99	2753.31	3124.21	0.11	0.13	0	0	0	0
PMP-10_U	121.4	99	99	2758.2	3140.68	0.11	0.13	0	0	0	0
PMP-101	1	99	99	2755.65	3132.1	0.11	0.13	0	0	0	0
PMP-102	1	99	99	2755.65	3132.1	0.11	0.13	0	0	0	0
PMP-11	1	99	99	2760.65	4477.76	0.12	0.19	0	0	0	0
PMP-12	1	99	99	2760.65	4477.76	0.12	0.19	0	0	0	0
PRV-108_D	97.46	6	6	426.31	74.59	4.84	0.85	1.73	0.07	17.74	0.7
PRV-108_U	97.46	6	6	428.81	79.14	4.87	0.9	1.75	0.08	17.93	0.79
PRV-1081	77.96	6	6	427.67	77.09	4.85	0.87	0.92	0.04	11.8	0.49
PRV-11_D	38.82	8	16	856.51	1501.43	5.47	2.4	0.62	0.06	15.9	1.54
PRV-11_U	695.84	8	16	-838.64	-1465.25	5.35	2.34	10.64	1.02	15.29	1.47
PRV-111	1	6	6	856.3	1500.84	9.72	17.03	0.04	0.12	42.72	120.67
PRV-112	1	6	6	856.3	1500.84	9.72	17.03	0.04	0.12	42.72	120.73
PRV-131_D	40.29	10	10	339.19	1072.45	1.39	4.38	0.04	0.33	0.97	8.13
PRV-131_U	1,206.44	10	10	339.72	1114.59	1.39	4.55	1.17	10.54	0.97	8.73
PRV-1311	56.36	6	6	339.19	1094.45	3.85	12.42	0.43	3.79	7.68	67.25
PRV-1312	27.86	6	6	339.19	1094.45	3.85	12.42	0.21	1.87	7.68	67.25
PRV-18_U	687.83	6	6	-91.01	-209.54	1.03	2.38	0.7	3.27	1.02	4.76
PRV-19_D	443.43	6	6	4.48	-15.02	0.05	0.17	0	0.02	0	0.04

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		Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout	Existing	Buildout
PRV-19_U	259.77	6	6	-2	22.38	0.02	0.25	0	0.02	0	0.08
PRV-191	1	6	6	0	26.73	0	0.3	0	0	0	0
PRV-192	1	6	6	0	26.73	0	0.3	0	0	0	0.12
PRV-32_D	63.65	12	12	87.17	302.22	0.25	0.86	0	0.02	0.03	0.32
PRV-32_U	508.66	10	16	1307.56	1879.75	5.34	3	5.97	1.19	11.74	2.33
PRV-321	1	8	8	87.17	303.59	0.56	1.94	0	0	0.24	1.59
PRV-322	1	8	8	87.17	303.59	0.56	1.94	0	0	0.12	1.59
PRV-6_D	751.32	8	8	251.79	55.41	1.61	0.35	1.24	0.08	1.65	0.1
PRV-6_U	802.97	8	8	300.18	142.37	1.92	0.91	1.83	0.46	2.28	0.57
PRV-601	1	4	4	80.54	280.33	2.06	7.16	0	0.04	3.91	38.88
PRV-602	1	4	4	80.54	280.33	2.06	7.16	0	0.04	3.85	38.88
PRV-71_D	210.78	10	10	67.28	226.46	0.27	0.93	0.01	0.1	0.05	0.46
PRV-71_U	367.93	10	10	70.08	232.54	0.29	0.95	0.02	0.18	0.05	0.48
PRV-711	1	4	4	68.33	228.61	1.74	5.84	0	0.03	2.87	26.67
PRV-712	1	4	4	68.33	228.61	1.74	5.84	0	0.03	2.81	26.67
PRV-90_D	726.55	6	6	14.97	13.54	0.17	0.15	0.03	0.02	0.04	0.03
PRV-90_U	76.29	6	6	18.28	23.63	0.21	0.27	0	0.01	0.05	0.08
PRV-901	1	4	4	17.76	22.08	0.45	0.56	0	0	0.24	0.37
PRV-902	1	4	4	17.76	22.08	0.45	0.56	0	0	0.24	0.37
SADDLE_CRK1	1	10	10	279.6	1596.76	1.14	6.52	0	0.01	0.49	11.23
SADDLE_CRK2	1	10	10	279.6	1595.68	1.14	6.52	0	0.01	0.37	11.23
U70081	1	99	99	106.68	104.55	0	0	0	0	0	0
U70082	1	99	99	106.68	104.55	0	0	0	0	0	0
V80061	1	6	6	0	181.1	0	2.05	0	0	0	2.44
V80062	1	6	6	0	181.1	0	2.05	0	0	0	2.44
V80101	1	4	4	262.97	394.54	6.71	10.07	0.03	0.07	34.55	73.24

Agenda Item

DATE: October 10, 2018

TO: Dave Eggerton, General Manager

FROM: Peter Martin, Manager of Water Resources

SUBJECT: Update on the Draft Calaveras River Habitat Conservation Plan

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RECOMMENDED ACTION:

None; informational update only.

SUMMARY:

Calaveras County Water District (CCWD) and Stockton East Water District (SEWD) will shortly submit an application for the Calaveras River Habitat Conservation Plan (HCP) to the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS). The HCP will provide coverage for the collective activities of CCWD and SEWD in connection with their operations below New Hogan Reservoir. The resulting permit will allow for incidental take coverage of two Federal Endangered Species Act (ESA) listed fish species: 1) the California Central Valley distinct population segment of steelhead (*Oncorhynchus mykiss*) and, 2) any fall-, late- fall-, spring- or winter-run Chinook Salmon (*Oncorhynchus tshawytscha*) that may opportunistically migrate upstream of Bellota in the lower Calaveras River.

Throughout the multi-year development of the HCP, the districts have worked closely with NMFS and other interested stakeholders as part of the Calaveras River Technical Review Group (including the US Fish and Wildlife Service and California Department of Fish and Wildlife) to develop operational criteria which would help maintain the health of the Calaveras River fishery. Incidental take may occur as a result of certain covered activities including those related to the districts' operations and/or maintenance activities. The HCP also includes a supplementary fish monitoring program designed to assess the salmonid populations throughout all phases of their life history. All covered activities will follow best management practices in order to minimize the effect of covered activities on ESA-listed species.

By the HCP, the Districts seek a 50-year Incidental Take Permit (ITP) for ESA-listed species under the authority of NMFS. There are two types of covered activities under the HCP: (1) activities necessary to operate and maintain project facilities during the ITP duration, and (2) activities associated with conservation strategies. In, total there are eight covered activities in the Draft Calaveras HCP:

1. New Hogan Reservoir Water Impoundment and Non-Flood Control Operations;
2. CCWD Jenny Lind Diversion Facility Operations;
3. SEWD Old Calaveras River Headworks Facility Operations;
4. SEWD Bellota Diversion Facility Operations;
5. Artificial Instream Structures and SEWD Small Instream Dam Operations;
6. Privately Owned Diversion Facilities Operated within the Districts' Service Areas ;
7. SEWD Channel Maintenance for Instream Structures; and
8. Fisheries Monitoring Program.

For CCWD, the permit will cover: (1) impacts associated with the existing and future use of Jenny Lind Water Treatment Plant's subsurface intakes, including their expansion and/or modification; and (2) coverage for private diversions downstream of New Hogan within Calaveras County that receive project water (agricultural diversions).

In addition to the Calaveras HCP, SEWD and CCWD have also developed a Draft Environmental Assessment (EA) and Initial Study (IS) for review and submission. The EA was prepared pursuant the National Environmental Policy Act of 1969 (NEPA). The IS was prepared in fulfillment of obligations pursuant to the California Environmental Quality Act (CEQA). SEWD and CCWD are both required to comply with CEQA; SEWD will act as the lead agency and CCWD will act as a responsible agency for the purposes of CEQA.

Lastly, the District will still need to finalize a funding agreement with SEWD for cost-sharing going forward and an operations agreement to outline duties of the two districts for implementation of the HCP.

NEXT STEPS

Staff will bring forward an item at the October 24, 2018 Board Meeting requesting approval of the final submission of the application to NMFS. Further, staff are still awaiting a final cost-share and operations agreement proposal from SEWD for presentation and consideration by the Board.

After submission to NMFS, it will take approximately 4-6 weeks to move through their internal approval process. At the culmination of that process, it will then be published in the Federal Register, which will initiate a 45-day comment period. The two districts will hold a public workshop to educate the public on the HCP and receive any feedback regarding the document.

FINANCIAL CONSIDERATIONS:

None at this time

Agenda Item

DATE: October 10, 2018

TO: Dave Eggerton, General Manager

FROM: Stacey Lollar, Director of HR and Customer Service
Robert Creamer, Engineering Analyst

SUBJECT: Discussion/Action regarding an Approval of an Exception to District Policy Regarding Termination of Services for One (1) of the Two (2) wastewater services at 1141 Sequoia Street in Arnold

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RECOMMENDED ACTION:

Motion:__________/___________ to adopt Resolution No. 2018-____ authorizing termination of services for one (1) of the two (2) wastewater connections serving 1141 Sequoia Street, Arnold, APN 027-042-114, due to unique circumstances regarding the subject property.

SUMMARY:

Mr. and Mrs. Cocco, owners of 1141 Sequoia Street in Arnold, have requested an exception to Section 21.E. of Article III of the District's Rules and Regulations Governing the Furnishing of Water and/or Wastewater Services which states, "Termination of water and/or wastewater services to a property is not allowable under this policy."

Though the District has Resolution 2002-86 which established a policy relating to "Exceptions to Construction Standards" and "Fee Waivers," staff has determined that this resolution does not apply to this request for an exception to the District's termination of service policy, as the request does not involve the District's construction standards nor is it a request for waiver of fees. The District has other policies to assist customers for temporary suspension of services/billing situations where an event has occurred that temporarily interrupts the need for service such as fire damage to a home that must be rebuilt. However, this situation does not fall within these parameters either. This request for termination of service involves a property that is of approximately 0.01 acres thus rendering it an unbuildable lot.

Due to the unique circumstances of this situation, which predates the current owners and were effectively beyond their control, staff recommends allowing this individual exception to the District's policy regarding termination of service. Situations such as this which are beyond the control of the owner and have made it impossible to utilize their sewer connection warrant Board consideration of a variance to the District's policy prohibiting termination of service.

Mr. and Mrs. Cocco's request was taken to the most recent Engineering Committee meeting on October 2, 2018 prior to bringing this proposal to the full Board of Directors for consideration. The committee members were in favor of authorizing an exception to the District's current no termination of service policy.

FINANCIAL CONSIDERATIONS:

Loss of bi-monthly billing for wastewater services. No capacity fees or previous bi-monthly rates will be refunded. Furthermore should the current or future owner request a sewer connection the current capacity fees, rates, and all other charges must be paid in full with no consideration of past payments, fess, charges paid.

Attachments: Section 21.R. of Article III
Resolution 2002-86
Parcel Map: APN 026-027-030 & -031
CCWD System Map
Resolution authorizing Exception to Policy

APPLICATION FOR SERVICE RATES AND BILLING

The owner must notify the District at least forty-eight (48) hours (excluding weekends and Holidays) prior to the reconnection of the services. If an owner does not establish a reconnection within two (2) years, automatic termination of the suspension will occur and monthly service and consumption charges will be reinstated.

If any District facilities are found to be in use during such time as service has been suspended, owner will immediately become liable for the monthly water and wastewater service and consumption charges that would have been billed during the suspension period.

E. <u>Termination of Services</u>. Termination of water and/or wastewater services to a property is not allowable under this policy.

Resolution 2010-78
November 23, 2010

E.1 <u>Granting and Accepting Capacity Transfers</u>.

Owners of two parcels within the same CCWD service area as defined below may request the ability to transfer capacity from one lot to another provided:

a. Both lots involved must be:

    i. Owned in fee title per County of Calaveras Recorder's Office by the same owner at the time capacity transference.

    ii. Located in the same CCWD service area hereby defined as an area served by the same CCWD distribution and/or collection plants.

    iii. Designated for single family residential construction only. Capacity transfer is not available to multi-unit or commercial properties.

RESOLUTION N0. 2002 - 86

A RESOLUTION OF THE BOARD OF DIRECTORS
OF THE CALAVERAS COUNTY WATER DISTRICT
RESCINDING PROCEDURE RELATING TO "VARIANCES"
AND ESTABLISHING POLICIES RELATING TO "EXCEPTIONS
TO CONSTRUCTION STANDARDS" AND "FEE WAIVERS"

WHEREAS the Calaveras County Water District has in the past allowed consideration of requests for "variances" in the application of its standards, policies and fees based primarily on the alleged financial impact upon individual applicants; and

WHEREAS the past practice is inconsistent with both the District's business and the applicable law.

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Calaveras County Water District that the past procedure for consideration of requests for "variances" in standards, policies and fees is hereby rescinded.

BE IT FURTHER RESOLVED that the policies regarding "Exceptions" (Attachment One, incorporated herein by reference) and "Fee Waivers" (Attachment Two, incorporated herein by reference) are hereby adopted and shall be universally applied to all applicants.

BE IT FURTHER RESOLVED that District staff shall develop, and present for Board review, procedures implementing the above-referenced policies.

PASSED AND ADOPTED this 10th day of December, 2002 by the following votes:

AYES:	Directors Davidson, Hebrard, and Deem
NOES:	Directors Fonceca and Underhill
ABSENT:	None
ABSTAIN:	None

CALAVERAS COUNTY WATER DISTRICT

Jeff A. Davidson

President

ATTEST:

John W. Stewart

Secretary/General Manager

CALAVERAS COUNTY WATER DISTRICT
POLICY REGARDING EXCEPTIONS TO STANDARDS, RULES AND POLICIES

It is the express policy of the Calaveras County Water District that all of its standards, rules and policies be equally and fairly applied to every person or entity affected thereby. Because of the potential for disparity of treatment, exceptions to the standards, rules, and policies are generally disfavored and shall not be granted unless all of the following conditions are satisfied:

1. Granting of an exception shall not discriminate in favor of, or against, any applicant for the exception or any other District customer.
2. An exception shall not be considered for purposes of financial benefit or relief.
3. Exceptions may be considered only for purposes of protecting significant environmental or aesthetic natural features, or for allowing reasonable beneficial use of real property for residential purposes.
4. Exceptions shall not, in any way, have the effect of establishing sub-standard facilities or services, or result in increased District costs.

All applications for an exception to District standards, rules and policies shall be reviewed in accordance with administrative guidelines promulgated by the General Manager.

End of Document

One of Two Attachments

CALAVERAS COUNTY WATER DISTRICT
POLICY REGARDING WAIVER OF
FEES, RATES AND CHARGES

It is the express policy of the Calaveras County Water District that all of its fees, rates and charges be equally and fairly applied to every person or entity affected thereby.

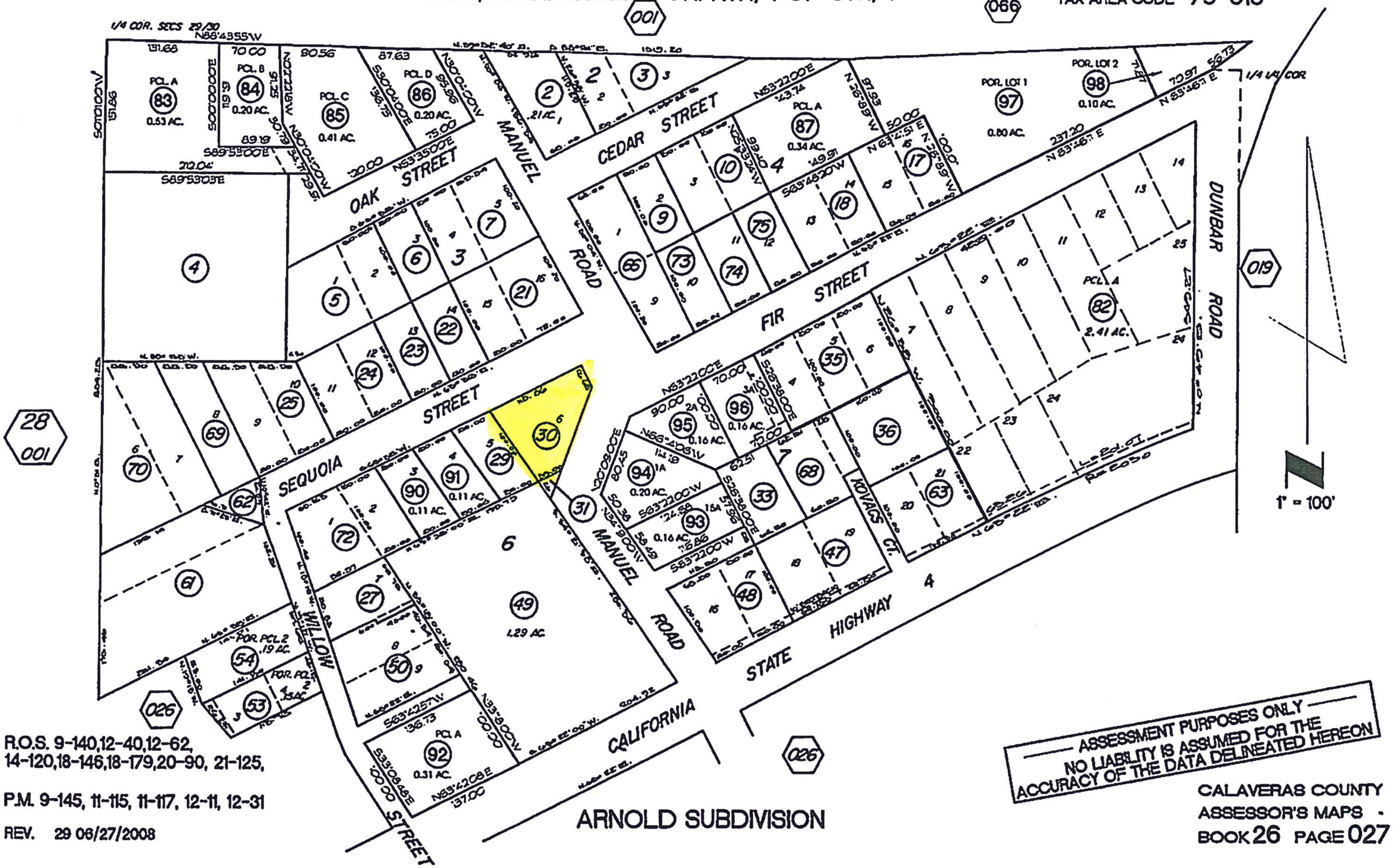
End of Document

Second of Two Attachments

T.5N., R.15E. SEC.29 POR. NW1/4 OF SW1/4

TAX AREA CODE 79-013

98



ARNOLD SUBDIVISION

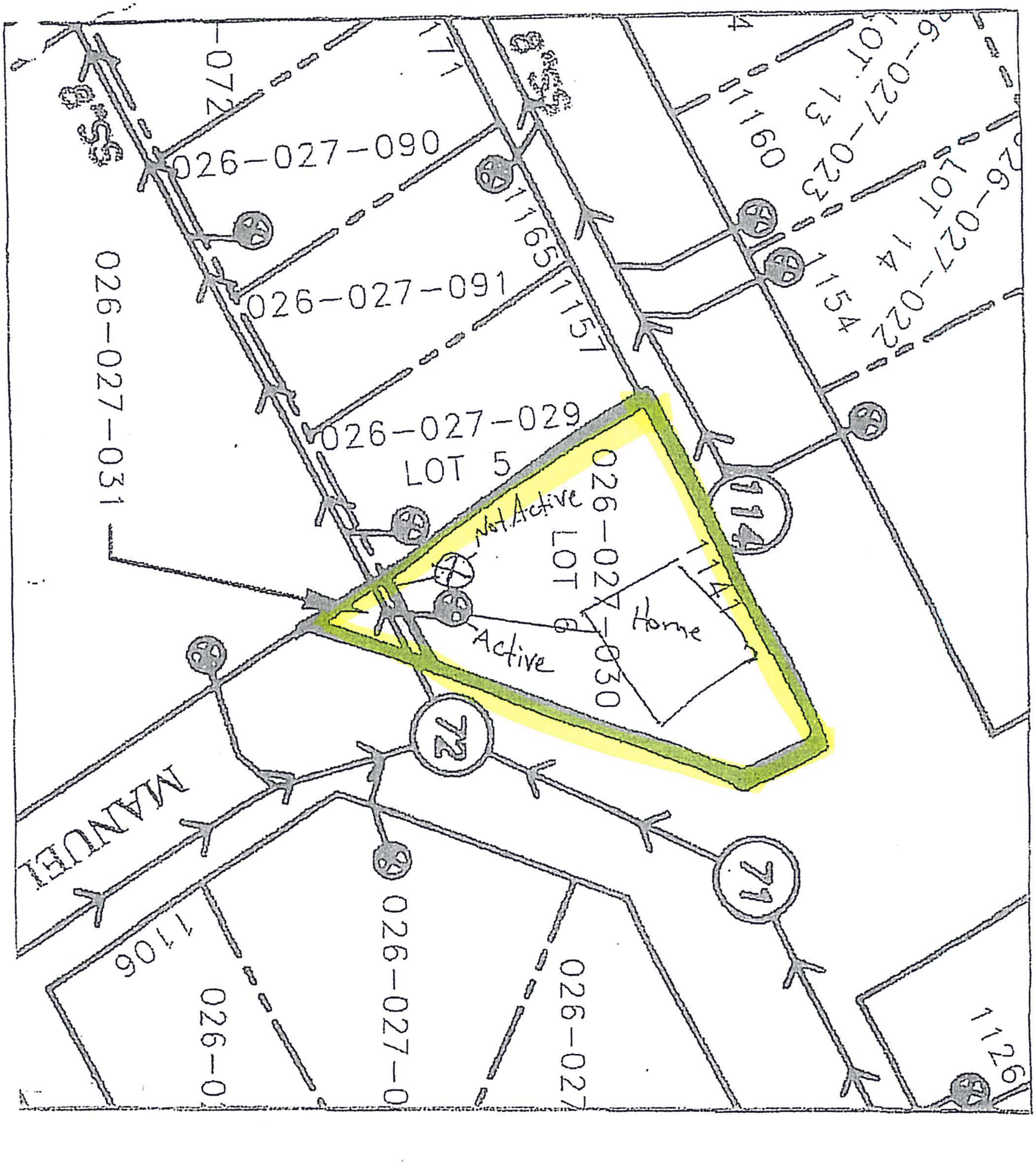
R.O.S. 9-140,12-40,12-62, 14-120,18-146,18-179,20-90, 21-125,

P.M. 9-145, 11-115, 11-117, 12-11, 12-31

REV. 29 06/27/2008

ASSESSMENT PURPOSES ONLY
NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA DELINEATED HEREON

CALAVERAS COUNTY
ASSESSOR'S MAPS -
BOOK 26 PAGE 027



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LOT 5
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LOT 6
Not Active
Active
Home
1141
1157
1165
1154
1160
LOT 13
026-027-023
LOT 14
026-027-022
114
72
71
MANUEL

RESOLUTION NO. 2018 –

**A RESOLUTION OF THE BOARD OF DIRECTORS
OF THE CALAVERAS COUNTY WATER DISTRICT**

EXCEPTION TO CALAVERAS COUNTY WATER DISTRICT'S RULES AND REGULATIONS GOVERNING THE FURNISHING OF WATER AND/OR WASTEWATER SERVICES, ARTICLE III, SECTION 21.E. TERMINATION OF SERVICES, FOR 1141 SEQUOIA STREET LOCATED IN ARNOLD, CA

WHEREAS, the Board of Directors of the Calaveras County Water District (the District) adopted the Rules and Regulations Governing the Furnishing of Water and/or Wastewater Services on December 7, 1954; and

WHEREAS, the Board of Directors amended the District's Rules and Regulations Governing the Furnishing of Water and/or Wastewater Services, Article III, Section 21.E. Termination of Services by Resolution 2010-78 on November 23, 2010; and

WHEREAS, the property owners, Mr. and Mrs. Cocco, of APN 026-027-030, being Lot 6 of the Arnold Subdivision, located in Arnold, California, requested an exception to the District's Article III Section 21.E. to allow termination of a single wastewater service connection only on this property; and

WHERAS, the property currently has two (2) wastewater connections, one (1) which is active and connected to the single family residence on the property and the second connection which is not active nor connected to any structure on the property; and

WHERAS, the County of Calaveras reported two units on the parcel, APN 026-027-030, and have since updated the unit count to one (1) single family residence in August of 2018; and

WHERAS, the updated unit count of the property per the County of Calaveras makes it unnecessary to have a second wastewater connection; and

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of the Calaveras County Water District hereby approves an exception to Section 21.E. of Article III of CCWD's Rules and Regulations Governing the Furnishing of Water and/or Wastewater Services for only one (1) wastewater connection currently located at 1141 Sequoia Street, Arnold, California;

THEREFORE, BE IT FURTHER RESOLVED there shall be no refund of any monies to this customer or future customers for any capacity fees paid and / or bi-monthly rates paid prior to the adoption of this resolution.

THEREFORE, BE IT FURTHER RESOLVED, should the current or previous owner request a sewer connection the current capacity fees, rates, and all other charges must be paid in full with no consideration of past payments, fees, charges paid.

PASSED AND ADOPTED this 10th day of October, 2018 by the following vote:

AYES:
NOES:
ABSTAIN:
ABSENT:

CALAVERAS COUNTY WATER DISTRICT

____
Scott Ratterman, President
Board of Directors

ATTEST:

____
Rebecca Hitchcock, Clerk to the Board

Agenda Item

DATE: October 10, 2018

TO: Dave Eggerton, General Manager

FROM: Charles Palmer, P.E., District Engineer

RE: Discussion / Action Authorizing Contract Amendment for Archaeological Services Jenny Lind Water Plant Pretreatment Project, CIP #11092

RECOMMENDED ACTION

Motion: ______/_______ adopting Resolution 2018-____ authorizing contract amendment for additional archaeological services by Garcia and Associates (GANDA) for the Jenny Lind Water Plant Pretreatment Project, CIP #11092

BACKGROUND

The Jenny Lind Water Treatment Plant contains a significant cultural resources site designated as CA-CAL-1180/H that extends across the water plant property. The current Water Treatment Plant Pretreatment Project approved by the Cal-OES Hazard Mitigation Grant Program is largely funded by the federal government through FEMA. Thus, prior to commencement of the project, extensive environmental review under federal law (NEPA) was conducted by FEMA staff including the National Historic Preservation Act and legal requirements for the protection of potentially significant cultural resources. In the process FEMA engaged with various agencies including the State Historic Preservation Office (SHPO), Advisory Council on Historic Preservation (ACHP), and consulted with designated tribal representatives.

Unfortunately with the discovery of cultural artifacts after commencement of construction, FEMA was forced to issue an Adverse Effects Finding on May 23, 2018, which temporarily halted construction to allow for the development and implementation of an Archaeological Treatment Plan (ATP) approved by state and federal authorities. GANDA was integral in documenting and reporting on the discovery of the artifacts, coordinating with FEMA, developing the ATP, and performing necessary consultation with tribal representatives to allow the project to move forward. Time was of the essence as any delay to the work of the construction contractor poses a far greater risk of additional costs to the District.

GANDA has provided similar professional services for numerous federal, state and local agencies and was selected for this project based upon the qualifications and experience of its staff and established professional relationships with local tribal representatives. In the early stages of this project, their scope of work was limited to preliminary archaeological investigation and a cultural resources report for purposes of CEQA. However with the subsequent expansion of FEMA's review of cultural resource issues under NEPA and the required development and implementation of an ATP for this project, the scope of GANDA's contract has expanded to include other necessary services required to meet state and federal legal requirements such as monitoring of excavations during construction for cultural resources and the development and implementation of the ATP.

As of September 26, 2018, the cost of all archaeological work performed by GANDA on this project totals $160,000. The continued monitoring of excavations at the construction site by a qualified, professional archaeologist is mandated by the FEMA-approved ATP, including consultation with a designated tribal representative. Thus this proposed contract amendment would allow for the continued performance by GANDA of these necessary services through the remainder of this 2018 construction season at an estimated cost of $8,333/week. Also, GANDA has responsibility for final reporting upon project closeout. At this time, District staff is requesting Board approval for additional archaeological services by GANDA and authorization for the General Manager to execute amendments to the professional services agreements with GANDA to increase the total not-to-exceed budget for all of their work on this project, including all past and future work, to $299,995 to cover all work through the end of this year and to provide a contingency should additional services be necessary thereafter to meet state and federal requirements. Previously performed services, and associated costs, as well as future services contemplated with this proposed contract amendment include:

DATE	SCOPE OF WORK	P.O.#	FEES
1/25/16	Preliminary Archaeological Investigation	74057	$8,725.00
6/27/17	Prepare Cultural Resources Report for CEQA	74057	$9,765.00
3/20/18	Construction / Archaeological Monitoring (80 hrs)	74057	$7,500.00
4/21/18	Construction / Tribal Monitoring (180 hrs)	74057	$15,000.00
5/11/18	Construction / Archaeological Monitoring (20-days)	75393	$19,271.00
5/11/18	Prepare Data Recovery and Monitoring Plan	75393	$8,024.00
8/9/18	Construction / Monitoring (45-days) for July, August and September 2018	75393	$73,903.00
8/9/18	Construction / Analysis and Reporting	75393	$17,811.00
9/25/18	Construction / Monitoring (45-days) for October and November 2018	-	$74,996.00
Other	Proposed Contingency for Remainder of Project	-	$65,000.00
	Subtotal		$299,995.00

With the Board's action at its September 19, 2018 special meeting to authorize the pursuit of additional federal grant funds to pay for 75% of these and other related extra costs, the District is actively working with Cal OES to increase the amount of federal funding for this project.

FINANCIAL CONSIDERATIONS

No budget adjustment is required at this time. On September 19, 2018, the Board authorized increases to the project budget and a funding-match commitment with FEMA. The District has requested additional funding from FEMA for these and other related costs.

Attachments: Resolution Authorizing Contract Amendment for Archaeological Services for the Jenny Lind Water Plant Pretreatment Project, CIP #11092

RESOLUTION NO. 2018- ____

**A RESOLUTION OF THE BOARD OF DIRECTORS
OF THE CALAVERAS COUNTY WATER DISTRICT**

AUTHORIZING CONTRACT AMENDMENT FOR ARCHAEOLOGICAL SERVICES FOR THE JENNY LIND WATER PLANT PRETREATMENT PROJECT, CIP #11092

WHEREAS, the Board on July 25, 2018 has previously approved a professional services agreement with Garcia and Associates (GANDA) to provide various archaeological services for the Jenny Lind Water Plant Pretreatment Project including monitoring excavations and reporting for cultural resources during construction in accordance with the Archaeological Treatment Plan (ATP) jointly approved by FEMA, tribal representatives, the State Historic Preservation Officer (SHPO), and Advisory Council on Historic Preservation (ACHP); and

WHEREAS, as of September 26, 2018, GANDA's previously approved scope and fees totaling $160,000 have been exhausted and additional funds of $74,996.00 are requested for GANDA to continue work during October and November and contingency funds of $65,000 are recommended to carry out the agreed ATP for the remaining duration of the project; and

BE IT RESOLVED, the Calaveras County Water District Board of Directors approves and authorizes the General Manager to execute contract amendments with GANDA up to an additional $139,996.00 is scope and fees (all contract amounts not to exceed $299,995.00 in total fees) for archaeological services performed by GANDA for the Jenny Lind Water Treatment Plant Pretreatment Project, CIP #11092.

PASSED AND ADOPTED this 10th day of October, 2018 by the following vote:

AYES:
NOES:
ABSTAIN:
ABSENT:

CALAVERAS COUNTY WATER DISTRICT

____
Scott Ratterman, President
Board of Directors

ATTEST:

____
Rebecca Hitchcock
Clerk to the Board