AGENDA

REGULAR MEETING OF THE BOARD OF DIRECTORS
LA PUENTE VALLEY COUNTY WATER DISTRICT
112 N. FIRST STREET, LA PUENTE, CALIFORNIA
MONDAY, FEBRUARY 10, 2020 AT 5:30 PM

1. **CALL TO ORDER**

2. **PLEDGE OF ALLEGIANCE**

3. **ROLL CALL OF BOARD OF DIRECTORS**

   President Hernandez____ Vice President Hastings____ Director Barajas____

   Director Escalera____ Director Rojas____

4. **PUBLIC COMMENT**

   Anyone wishing to discuss items on the agenda or pertaining to the District may do so now. The Board may allow additional input during the meeting. A five-minute limit on remarks is requested.

5. **ADOPTION OF AGENDA**

   Each item on the Agenda shall be deemed to include an appropriate motion, resolution or ordinance to take action on any item. Materials related to an item on this agenda submitted after distribution of the agenda packet are available for public review at the District office, located at the address listed above.

6. **APPROVAL OF CONSENT CALENDAR**

   There will be no separate discussion of Consent Calendar items as they are considered to be routine by the Board of Directors and will be adopted by one motion. If a member of the Board, staff, or public requests discussion on a particular item, that item will be removed from the Consent Calendar and considered separately.

   A. Approval of Minutes of the Regular Meeting of the Board of Directors held on January 27, 2020.

   B. Approval of District Expenses for the Month of January 2020.

   C. Approval of City of Industry Waterworks System Expenses for the Month of January 2020.

   D. Receive and File the District’s Water Sales Report for January 2020.

   E. Receive and File the City of Industry Waterworks System’s Water Sales Report for January 2020.

7. ACTION / DISCUSSION ITEMS

A. Consideration of Proposal from Civiltec Engineering for Construction Support Services for the District's Recycled Water System Project.

Recommendation: Authorize the General Manger to Proceed with the Work as Proposed by Civiltec Engineering for an Amount Not to Exceed $69,000.

B. Consideration of Resolution 262 Authorizing the Execution and Delivery of the 2020 Installment Agreement for the District's Recycled Water System and Nitrate Treatment System.

Recommendation: Approve Resolution 262.

C. Consideration to Receive and File the Nitrate Treatment System Technical Memorandum Prepared by Geosyntec Consultants, Inc.

Recommendation: Receive and File.

8. GENERAL MANAGER'S REPORT

9. OPERATIONS AND COMPLIANCE REPORT

Recommendation: Receive and File.

10. OTHER ITEMS

A. Upcoming Events.

B. Information Items.

11. ATTORNEY'S COMMENTS

12. BOARD MEMBER COMMENTS

A. Report on Events Attended.

B. Other Comments.

13. FUTURE AGENDA ITEMS

14. ADJOURNMENT

POSTED: Friday, February 7, 2020

President Henry P. Hernandez, Presiding.

Any qualified person with a disability may request a disability-related accommodation as needed to participate fully in this public meeting. In order to make such a request, please contact Mr. Greg Galindo, Board Secretary, at (626) 330-2126 in sufficient time prior to the meeting to make the necessary arrangements.

Note: Agenda materials are available for public inspection at the District office or visit the District's website at www.lapuentewater.com.

MINUTES OF THE REGULAR MEETING OF
THE BOARD OF DIRECTORS OF THE
LA PUENTE VALLEY COUNTY WATER DISTRICT
FOR MONDAY, JANUARY 27, 2020 AT 5:30 PM

1. CALL TO ORDER

President Hernandez called the meeting to order at 5:30 p.m.

2. PLEDGE OF ALLEGIANCE

President Hernandez led the meeting in the Pledge of Allegiance.

3. ROLL CALL OF THE BOARD OF DIRECTORS

President Hernandez	Vice President Hastings	Director Barajas	Director Escalera	Director Rojas
Present	Present	Absent	Present	Present

OTHERS PRESENT

Staff and Counsel: General Manager & Board Secretary, Greg Galindo; Office Manager, Gina Herrera; Operations & Maintenance Superintendent, Paul Zampiello; Customer Service & Accounting Clerk, Vanessa Koyama and District Counsel James Ciampa.

Public: No members of the public were present.

4. PUBLIC COMMENTS

There were no comments from the public.

5. ADOPTION OF AGENDA

Motion: Adopt Agenda as Presented.
1st: President Hernandez
2nd: Vice President Hastings

	President Hernandez	Vice President Hastings	Director Barajas	Director Escalera	Director Rojas
Vote	Yes	Yes	Absent	Yes	Yes

Motion carried by a vote of: 4 Yes, 0 No, 0 Abstain, 1 Absent.

6. APPROVAL OF CONSENT CALENDAR

Motion: Approve Consent Calendar as Presented.
1st: President Hernandez
2nd: Director Escalera

	President Hernandez	Vice President Hastings	Director Barajas	Director Escalera	Director Rojas
Vote	Yes	Yes	Absent	Yes	Yes

Motion carried by a vote of: 4 Yes, 0 No, 0 Abstain 1 Absent.

7. FINANCIAL REPORTS

A. Summary of the District's Cash and Investments as of December 31, 2019.

Mr. Galindo provided a summary of the balances in each account provided in the Summary of Cash and Investments as of December 31, 2019.

Motion: Receive and file the Summary of Cash and Investments as of December 31, 2019.
1st: Director Escalera
2nd: Director Rojas

	President Hernandez	Vice President Hastings	Director Barajas	Director Escalera	Director Rojas
Vote	Yes	Yes	Absent	Yes	Yes

Motion carried by a vote of: 4 Yes, 0 No, 0 Abstain, 1 Absent.

B. Statement of District's Revenue and Expenses as for December 31, 2019.

Mrs. Herrera provided a summary of the Statement of Revenues and Expenses for the District and explained the budget to date balances for various accounts. Mrs. Herrera also provided some information on the 2019 District Audit process. Mr. Galindo added some information regarding 2019 year-end figures.

Motion: Receive and file the Statement of the District's Revenue and Expenses as of December 31, 2019.
1st: Director Rojas
2nd: President Hernandez

	President Hernandez	Vice President Hastings	Director Barajas	Director Escalera	Director Rojas
Vote	Yes	Yes	Absent	Yes	Yes

Motion carried by a vote of: 4 Yes, 0 No, 0 Abstain, 1 Absent.

C. Statement of the Industry Public Utilities' Water Operations Revenue and Expenses as of December 31, 2019.

Mrs. Herrera provided a summary of the Statement of Revenues and Expenses for the Industry Public Utilities' Water Operations and explained the budget to date balances for various accounts.

Motion: Receive and file the Statement of the Industry Public Utilities Water Operations' Revenue and Expenses as of December 31, 2019.

1st: Director Rojas
2nd: Director Hastings

	President Hernandez	**Vice President Hastings**	**Director Barajas**	**Director Escalera**	**Director Rojas**
Vote	Yes	Yes	Absent	Yes	Yes

Motion carried by a vote of: 4 Yes, 0 No, 0 Abstain, 1 Absent.

8. ACTION / DISCUSSION ITEMS

A. Consideration of the Lease of 43.87 Acre-Feet of 2019-20 Main San Gabriel Basin Groundwater Production Rights from Mr. and Mrs. Tate.

Mr. Galindo summarized his staff report on the item. Mr. Galindo stated that La Puente Valley County Water has been leasing production rights on a annual basis from Mr. and Mrs. Tate for many years and would like to continue doing so even though this year the District has access to enough water rights through its other leases.

Motion: Authorize the General Manager to Lease 43.87 Acre-Feet of Main San Gabriel Basin Water Production Rights from Mr. and Mrs. Tate.
1st: Director Rojas
2nd: Director Escalera

	President Hernandez	**Vice President Hastings**	**Director Barajas**	**Director Escalera**	**Director Rojas**
Vote	Yes	Yes	Absent	Yes	Yes

Motion carried by a vote of: 4 Yes, 0 No, 0 Abstain, 1 Absent.

B. Consideration of Letter of Intent from Opus Bank for a Loan to the District in the Amount of $3,000,000, and Potential Approval of the Loan.

Mr. Galindo discussed the updated Letter of Intent and briefly reviewed the terms of the proposed loan. Mr. Ciampa provided some additional information related to the terms of the loan. After some discussion a motion was made by President Hernandez.

Motion: Review the Letter of Intent and Direct Staff and District Counsel to Take the Necessary Actions to Secure a Loan Agreement from Opus Bank.
1st: President Hernandez
2nd: Director Escalera

	President Hernandez	**Vice President Hastings**	**Director Barajas**	**Director Escalera**	**Director Rojas**
Vote	Yes	Yes	Absent	Yes	Yes

Motion carried by a vote of: 4 Yes, 0 No, 0 Abstain, 1 Absent.

9. OPERATIONS AND MAINTENANCE SUPERINTENDENT'S REPORT

Mr. Zampiello reported on various projects that were completed within the last month and a half.

- Park Pipeline Project
- Hudson Booster Repairs
- LPVCWD Well #5 Start up and Testing
- CIWS Well 5 Electrical Repairs
- Hudson 14" Waterline Tie-In for PVOU-IZ

10. GENERAL MANAGER'S REPORT

Mr. Galindo reported on the following items:

- Recycled Water Project
- Shallow Zone South Project Agreement and CEQA process.
- Water Rate Study for Industry Public Utilities.
- Groundwater Treatment Feasibility Study for the City of Industry's Wellfield.
- Nitrate Treatment Technical Memorandum.

11. OTHER ITEMS

A. Upcoming Events.

Mrs. Herrera reviewed upcoming events verified which events each Board Member would be attending.

B. Information Items.

Included in Board Packet.

12. ATTORNEY'S COMMENTS

Mr. Ciampa provided information on the status of the legislative session.

13. BOARD MEMBER COMMENTS

A. Report on Events Attended.

President Hernandez reported that he attended 1 event: Regional Recycled Water Purification Tour.

Vice President Hastings reported that he attended 2 events: Regional Recycled Water Purification Tour; SCWUA Monthly Meeting.

Director Escalera reported that he attended 2 events: Regional Recycled Water Purification Tour; SCWUA Monthly Meeting.

Director Rojas reported that he attended 2 events: First Consolidated Oversight Committee Meeting; SCWUA Monthly Meeting.

B. Other Comments.

No additional comments.

14. FUTURE AGENDA ITEMS

No future agenda items were requested.

15. ADJOURNMENT

President Hernandez adjourned the meeting at 6:11 p.m.

Attest:

Henry P. Hernandez, President	Greg B. Galindo, Secretary

La Puente Water District January 2020 Disbursements

Check #	Payee		Amount	Description
7433	ACWA/JPIA	$	36,266.33	Health Benefits
7434	Cell Business Equipment	$	44.75	Office Expense
7435	E & M Tech Support	$	4,972.00	Technical Support & Software
7436	Ferguson Enterprises Inc	$	25.57	Field Supplies
7437	Geosyntec Consultants	$	38,109.39	Nitrate Treatment Projecct
7438	Lincoln National Life Insurance Company	$	650.42	Disability Insurance
7439	Petty Cash	$	114.45	Office/Field Expense
7440	Platinum Consulting Group	$	869.81	Administrative Support
7441	Premier Access Insurance Co	$	3,013.70	Dental Insurance
7442	SC Edison	$	5,061.08	Power Expense
7443	Underground Service Alert	$	76.95	Line Notifications
7444	Weck Laboratories Inc	$	754.00	Water Sampling
7445	MetLife	$	238.50	Life Insurance
7446	United Site Services of Calif Inc	$	402.15	Restroom Service @ Treatment Plant
7447	Waste Management of SG Valley	$	206.22	Trash Service
7448	Petty Cash	$	200.00	Office Expense
7449	Merritt's Hardware	$	296.19	Field Supplies
7450	Miguel A Molina	$	237.59	Clothing Allowance
7451	Eurofins Eaton Analytical Inc	$	400.00	Water Sampling
7452	Evoqua	$	97,799.84	Resin Changeout
7453	Hach Company	$	1,477.90	Field Supplies - Compliance
7454	Konecranes	$	345.00	UV Maintenance
7455	Northstar Chemical	$	7,816.69	Chemicals Expense
7456	Trojan UV	$	625.00	UV Maintenance
7457	USA BlueBook	$	266.77	Field Supplies
7458	Weck Laboratories Inc	$	3,526.64	Water Sampling
7459	Weck Laboratories Inc	$	1,606.25	Water Sampling
7460	ACWA/JPIA	$	7,087.46	Worker's Compensation Program
7461	Chevron	$	2,123.15	Fuel Expense
7462	Coverall North America Inc	$	255.00	Cleaning Service
7463	Highroad IT	$	402.00	Technical Support
7464	Hose-Man Inc	$	364.24	Truck Maintenance
7465	InfoSend	$	1,156.54	Billing Expense
7466	MJM Communications & Fire	$	720.00	Security Monitoring
7467	O'Reilly Auto Parts	$	290.70	Truck Maintenance
7468	San Gabriel Valley Water Association	$	2,164.24	Producer Dues & Assessments
7469	Trojan UV	$	26,000.00	UV Maintenance
7470	Valley Vista Services	$	324.16	Trash Service
7472	Wesco Security Systems Inc	$	260.00	Security Monitoring
7473	Western Water Works	$	14,532.43	La Puente Park Project
7474	Time Warner Cable	$	642.28	Telephone Service
7475	United Site Services of Calif Inc	$	402.15	Restroom Service @ Treatment Plant
7476	Weck Laboratories Inc	$	203.50	Water Sampling
7477	Tahoe Christmas Trees	$	1,080.48	Construction Meter Refund
7478	Answering Service Care	$	110.45	Answering Service
7479	AWWA	$	286.00	Membership Dues
7480	BAVCO-Backflow Apparatus	$	65.98	Backflow Maintenance
7481	CCSInteractive	$	54.40	Monthly Website Hosting

La Puente Water District January 2020 Disbursements - continued

Check #	Payee		Amount	Description
7482	Citi Cards	$	1,036.15	Conference & Administrative Expenses
7483	Firestone Auto Care	$	133.82	Truck Maintenance
7484	Highroad IT	$	717.00	Computer Equipment & Setup
7485	Lagerlof, Senecal, Gosney & Kruse	$	2,587.00	Attorney Fee's
7486	Locus Technologies	$	420.00	SCADA System Maintenance
7487	Red Wing Shoes	$	350.00	Clothing Allowance
7489	San Gabriel Valley Water Company	$	162.62	Water Service @ Treatment Plant
7490	SC Edison	$	53.06	Power Expense
7491	Superior Laundry - Laundry Up	$	405.55	Uniform Maintenance
7492	Time Warner Cable	$	282.89	Telephone Service
7493	Vulcan Materials Company	$	680.78	Field Supplies - Asphalt
7494	Weck Laboratories Inc	$	245.00	Water Sampling
7495	Western Water Works	$	1,991.77	La Puente Park Project
7496	CAT Specialties Inc	$	457.80	Uniform Expense
7497	ACWA/JPIA	$	32,969.53	Health Benefits
7498	Bank of America-Visa	$	630.88	Conference & Administrative Expenses
7499	Civiltec Engineering Inc	$	200.00	Engineering Services
7500	Claris Strategy	$	2,844.00	Administrative Support
7501	Ferguson Enterprises Inc	$	1,231.01	La Puente Park Project
7502	Highroad IT	$	1,100.00	Antivirus & Security Protection
7503	Hunter Electric	$	5,579.02	Well 5 Improvement Project
7504	Jack Henry & Associates	$	47.00	Web E-Check Fee's
7505	Lincoln National Life Insurance Company	$	650.42	Disability Insurance
7506	MetLife	$	248.21	Life Insurance
7507	Premier Access Insurance Co	$	3,013.70	Dental Insurance
7508	Staples	$	204.61	Office Supplies
7509	Sunbelt Rentals	$	396.98	Equipment Rental
7510	Time Warner Cable	$	307.09	Telephone Service
7511	Verizon Wireless	$	404.99	Cellular Services
7512	Weck Laboratories Inc	$	181.50	Water Sampling
7513	Western Water Works	$	1,334.26	La Puente Park Project & Field Supplies
7514	So Cal Water Utilities Association	$	210.00	Seminar Expense
7515	JR's Environmental Services	$	2,245.00	Fiels Supplies
7516	Verizon Wireless	$	76.02	Cellular Services
7517	Verizon Wireless	$	76.02	Cellular Services
7518	Cell Business Equipment	$	41.93	Office Expense
7519	Eurofins Eaton Analytical Inc	$	20.00	Water Sampling
7520	Ferguson Waterworks	$	3,153.24	Meter Expense
7521	Lagerlof, Senecal, Gosney & Kruse	$	426.00	Attorney Fee's
7522	Peck Road Gravel	$	700.00	Asphalt & Concrete Disposal
7523	So Cal Water Utilities Association	$	225.00	Membership Dues
7524	Sunbelt Rentals	$	975.95	La Puente Park Project
7525	Weck Laboratories Inc	$	151.50	Water Sampling
7526	Wesco Security Systems Inc	$	282.00	Security Monitoring
7527	SC Edison	$	2,227.78	Power Expense
7528	Konecranes	$	345.00	UV Maintenance
7529	SC Edison	$	26,903.49	Power Expense

La Puente Water District January 2020 Disbursements - continued

Check #	Payee		Amount	Description
Online	Home Depot	$	589.02	Field Supplies
Online	Lincoln Financial Group	$	3,540.00	Deferred Comp
Online	CalPERS	$	13,850.70	Retirement Program
Online	Employment Development Dept	$	6,352.48	California State & Unemployment Taxes
Online	United States Treasury	$	27,807.74	Federal, Social Security & Medicare Taxes
Autodeduct	Bluefin Payment Systems	$	709.50	Web Merchant Fee's
Autodeduct	Wells Fargo	$	535.90	Bank Fee's
Autodeduct	Wells Fargo	$	151.70	Merchant Fee's
Autodeduct	First Data Global Leasing	$	44.00	Credit Card Machine Lease
	Total Payments	**$**	**416,434.96**	

La Puente Valley County Water District
Payroll Summary
January 2020

	January 2020
Employee Wages, Taxes and Adjustments	
Gross Pay	
Total Gross Pay	109,793.51
Deductions from Gross Pay	
Total Deductions from Gross Pay	-4,425.68
Adjusted Gross Pay	105,367.83
Taxes Withheld	
Federal Withholding	-10,980.00
Medicare Employee	-1,594.79
Social Security Employee	-6,819.08
CA - Withholding	-4,864.36
Medicare Employee Addl Tax	0.00
Total Taxes Withheld	-24,258.23
Net Pay	**81,109.60**
Employer Taxes and Contributions	
Medicare Company	1,594.79
Social Security Company	6,819.08
CA - Unemployment	1,400.58
CA - Employment Training Tax	87.54
Total Employer Taxes and Contributions	10,093.99

La Puente Water District January 2020 Disbursements

Total Vendor Payables	$	416,434.96
Total Payroll	$	81,109.60
Total January 20209 Disbursements	$	497,544.56

Invoice No. 4- 2020-01

February 1, 2020

BPOU Project Committee Members

RE: BPOU O & M Expense Reimbursement Summary

The following cost breakdown represents O & M expenses incurred by the LPVCWD for the month of January 2020.

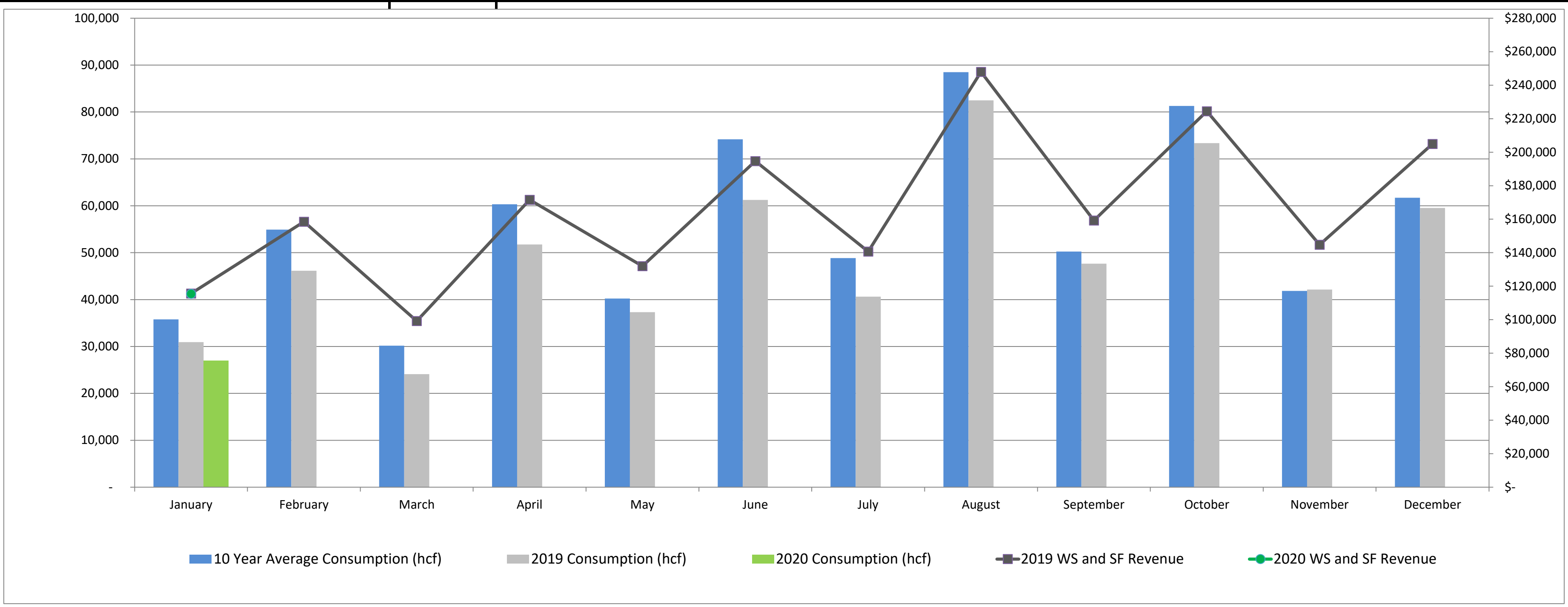
BPOU Acct No.	Description	Invoice No.	Vendor	Amount	Subtotal
LP.02.01.01.00	Power	2-15-629-6188	SC Edison	$ 19,591.00	
		2-03-187-2179	SC Edison	$ 7,312.49	$ 26,903.49
LP.02.01.02.00	Labor Costs	Jan-20	LPVCWD	$ 20,056.04	$ 20,056.04
LP.02.01.05.00	Transportation	Jan-20	LPVCWD - 1576 miles @ .575	$ 906.20	$ 906.20
LP.02.01.07.00	Water Testing	L0490042	Eurofins	$ 80.00	
		L0490346	Eurofins	$ 40.00	
		L0491360	Eurofins	$ 80.00	
		L0492472	Eurofins	$ 80.00	
		L0493570	Eurofins	$ 80.00	
		L0493769	Eurofins	$ 40.00	
		W0A0571	Weck Labs	$ 87.00	
		W0A0607	Weck Labs	$ 134.00	
		W0A0753	Weck Labs	$ 180.00	
		W0A0754	Weck Labs	$ 180.00	
		W0A0755	Weck Labs	$ 180.00	
		W0A0783	Weck Labs	$ 87.00	
		W0A0975	Weck Labs	$ 87.00	
		W0A1596	Weck Labs	$ 190.75	
		W0A1597	Weck Labs	$ 184.00	
		W0A1598	Weck Labs	$ 87.00	
		W0A1768	Weck Labs	$ 190.75	
		W0A1769	Weck Labs	$ 184.00	
		W0A1980	Weck Labs	$ 190.75	
		W0A2009	Weck Labs	$ 520.00	
		W0A2143	Weck Labs	$ 180.00	
		W0A2145	Weck Labs	$ 278.00	
		W0A2147	Weck Labs	$ 278.00	
		W0A2148	Weck Labs	$ 180.00	
		W0A2149	Weck Labs	$ 184.00	
		W0A2196	Weck Labs	$ 87.00	
		W0A2329	Weck Labs	$ 87.00	
		W0A2461	Weck Labs	$ 184.00	
		W0B0041	Weck Labs	$ 180.00	
		W0B0042	Weck Labs	$ 190.75	
		W0B0265	Weck Labs	$ 180.00	
		W0B0266	Weck Labs	$ 338.00	$ 5,229.00
LP.02.01.10.00	Operations Monitoring	9462;01/20	Spectrum Business	$ 342.28	
		2906;01/20	Spectrum Business	$ 300.00	
		9846382344	Verizon	$ 76.02	$ 718.30
LP.02.01.12.00	Materials/Supplies				
LP.02.01.12.05	Hydrogen Peroxide	160860	Northstar Chemical	$ 2,221.00	$ 2,221.00
LP.02.01.12.06	Sodium Hypochlorite	160140	Northstar Chemical	$ 1,811.77	
		161423	Northstar Chemical	$ 1,746.02	$ 3,557.79
LP.02.01.12.11	Sodium Hydroxide	160861	Northstar Chemical	$ 1,321.08	$ 1,321.08
LP.02.01.12.15	Other Expendables	11810627	HACH	$ 491.62	
		11813306	HACH	$ 468.61	
		1522112	Home Depot	$ 64.68	
		4540365	Home Depot	$ 150.25	$ 1,175.16
LP.02.01.12.17	Sulfuric Acid	160723	Northstar Chemical	$ 1,987.50	$ 1,987.50
LP.02.01.14.00	Repair/Replacement	3620300066	Hopkins Technical Products	$ 70.26	
		154173951	Konecranes	$ 345.00	
		16877	Tri County Pump Company	$ 18,020.40	$ 18,435.66
LP.02.01.15.00	Contractor Labor	899	JR'S Environmental Services	$ 2,245.00	
		15502	Nobel Systems	$ 7,350.00	
		SLS/10291113	Trojan UV	$ 26,000.00	
		SLS/10291978	Trojan UV	$ 48,803.27	$ 84,398.27
LP.02.01.80.00	Other O & M	20685	Highroad IT	$ 134.00	
		20705	Highroad IT	$ 320.00	
		22017	MJM Communications	$ 223.20	
		114-9737253	United Site Services	$ 402.15	
		0858280-2519-8	Waste Management	$ 206.22	$ 1,285.57
			Total Expenditures		$ 168,195.06
			District Pumping Cost Deduction		$ 15,115.79
			Total Cost Reimbursable		**$ 153,079.27**

Industry Public Utilities January 2020 Disbursements

Check #	Payee		Amount	Description
3885	Cell Business Equipment	$	44.74	Office Expense
3886	E & M Tech Support	$	1,243.00	Technical Support & Software
3887	Merritt's Hardware	$	92.46	Field Supplies
3888	Platinum Consulting Group	$	67.50	Administrative Support
3889	SC Edison	$	8,335.52	Power Expense
3890	SoCal Gas	$	14.79	Gas Expense
3891	Underground Service Alert	$	76.94	Line Notifications
3892	ACWA/JPIA	$	1,771.87	Worker's Compensation Program
3893	Airgas USA LLC	$	53.44	Field Supplies
3894	Highroad IT	$	268.00	Technical Support
3895	InfoSend	$	992.18	Billing Expense
3896	La Puente Valley County Water District	$	63,729.55	Labor Costs December 2019
3897	MJM Communications & Fire	$	180.00	Security Monitoring
3898	Time Warner Cable	$	76.32	Telephone Service
3899	Weck Laboratories Inc	$	230.00	Water Sampling
3900	Answering Service Care	$	110.45	Answering Service
3901	CCSInteractive	$	13.60	Monthly Website Hosting
3902	Highroad IT	$	717.00	Computer Equipment & Setup
3903	La Puente Valley County Water District	$	267.95	Bank Fee's Reimbursement
3904	Locus Technology	$	1,008.00	SCADA System Maintenance
3905	SC Edison	$	1,428.70	Power Expense
3906	SoCal Gas	$	18.06	Gas Expense
3907	Time Warner Cable	$	282.88	Telephone Service
3908	Weck Laboratories Inc	$	230.00	Water Sampling
3909	Highroad IT	$	780.00	Antivirus & Security Protection
3910	Industry Public Utility Commission	$	875.94	Industry Hills Power Expense
3911	La Puente Valley County Water District	$	19,051.70	Truck & Equipment Expense
3912	Platinum Consulting Group	$	305.85	Administrative Support
3913	S & J Supply Co Inc	$	158.30	Developer Project Expense
3914	San Gabriel Valley Water Company	$	1,112.67	Purchased Water - Salt Lake
3915	SC Edison	$	173.43	Power Expense
3916	Staples	$	204.61	Office Supplies
3917	Verizon Wireless	$	404.98	Cellular Services
3918	Weck Laboratories Inc	$	126.00	Water Sampling
3919	Western Water Works	$	249.04	Field Supplies
3920	Verizon Wireless	$	76.02	Cellular Services
3921	Cell Business Equipment	$	41.93	Office Expense
3922	Eurofins Eaton Analytical Inc	$	20.00	Water Sampling
3923	La Puente Valley County Water District	$	20,729.60	Inventory Reimbursement
3924	Peck Road Gravel	$	700.00	Asphalt & Concrete Disposal
3925	Raftelis Financial Consultants	$	4,932.50	Water Rate Study
3926	SoCal Gas	$	14.79	Gas Expense
3927	Weck Laboratories Inc	$	107.50	Water Sampling
Online	Home Depot Credit Services	$	368.80	Field Supplies
Autodeduct	Wells Fargo Merchant Fee's	$	74.34	Merchant Fee's
Autodeduct	Bluefin Payment Systems	$	1,101.10	Web Merchant Fee's
Autodeduct	Jack Henry & Associates	$	46.70	Web E-Check Fee's
Autodeduct	First Data Global Leasing	$	44.00	Credit Card Machine Lease - Monthly
	Total January 2020 Disbursements	**$**	**132,952.75**	

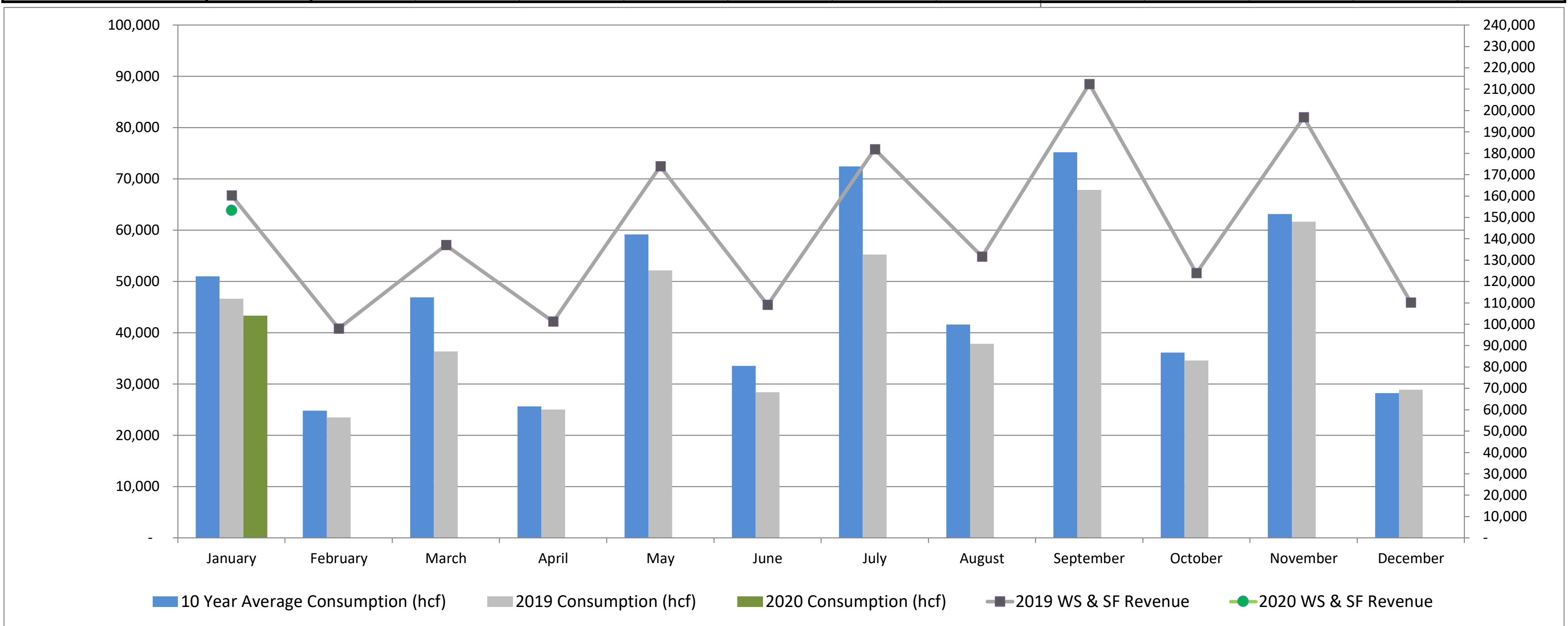
WATER SALES REPORT LPVCWD 2020

LPVCWD	January	February	March	April	May	June	July	August	September	October	November	December	YTD
No. of Customers	1,228	-	-	-	-	-	-	-	-	-	-	-	1,228
2020 Consumption (hcf)	27,032	-	-	-	-	-	-	-	-	-	-	-	27,032
2019 Consumption (hcf)	30,923	46,152	24,105	51,751	37,307	61,263	40,622	82,473	47,666	73,372	42,125	59,523	597,282
10 Year Average Consumption (hcf)	35,783	$ 54,919	$ 30,166	$ 60,322	$ 40,220	$ 74,185	$ 48,845	$ 88,505	$ 50,244	$ 81,287	$ 41,839	$ 61,701	668,015
2020 Water Sales	$ 60,668	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 60,668
2019 Water Sales	65,872	$ 99,793	$ 49,373	$ 112,591	$ 81,601	$ 135,597	$ 90,296	$ 187,941	$ 108,273	$ 164,349	$ 93,779	$ 140,375	$ 1,329,838
2020 Service Fees	$ 54,774	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,774
2019 Service Fees	$ 49,766	$ 58,668	$ 49,865	$ 59,032	$ 50,396	$ 59,065	$ 50,376	$ 60,011	$ 50,936	$ 60,127	$ 50,962	$ 64,547	$ 663,752
2020 Hyd Fees	$ 950	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 950
2020 DC Fees	$ 246	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 246
2020 System Revenue	$ 116,638	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 116,638



WATER SALES REPORT CIWS 2020

CIWS	January	February	March	April	May	June	July	August	September	October	November	December	YTD
No. of Customers	963	-	-	-	-	-	-	-	-	-	-	-	963
2020 Consumption (hcf)	43,254	-	-	-	-	-	-	-	-	-	-	-	43,254
2019 Consumption (hcf)	46,656	23,510	36,382	25,014	52,169	28,423	55,251	37,850	67,871	34,623	61,667	28,932	498,348
10 Year Average Consumption (hcf)	50,985	24,808	46,902	25,636	59,207	33,535	72,455	41,624	75,220	36,162	63,167	28,266	557,964
2020 Water Sales	$ 96,852	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 96,852
2019 Water Sales	$ 104,539	$ 51,588	$ 80,950	$ 54,785	$ 117,646	$ 62,656	$ 125,539	$ 85,198	$ 156,165	$ 77,314	$ 140,661	$ 63,795	$ 1,120,834
2020 Service Fees	$ 56,384	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 56,384
2019 Service Fees	$ 55,744	$ 46,354	$ 56,091	$ 46,445	$ 56,273	$ 46,411	$ 56,356	$ 46,484	$ 56,247	$ 46,569	$ 56,153	$ 46,373	$ 615,502
2020 Hyd Fees	$ 1,550	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,550
2020 DC Fees	$ 11,689	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,689
2020 System Revenues	$ 166,475	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 166,475



Civil, Water, Wastewater, Drainage, Transportation and
Electrical/Controls Engineering ● Construction Management ● Surveying
California ● Arizona

February 7, 2020

La Puente Valley County Water District
112 N. First Street
La Puente, CA 91744

Sent Via Email: ggalindo@lapuentewater.com

ATTN: Mr. Greg Galindo | General Manager

RE: Proposal for Recycled Water Project – Phase 1 Construction Support

Dear Mr. Galindo:

Civiltec Engineering, Inc. (Civiltec) appreciates the opportunity to submit this proposal to La Puente Valley County Water District (LPVCWD) for professional engineering support services for the above referenced project. We understand this project is for construction support services required for LPVCWD's Recycled Water Project. The project will consist of installing recycled PVC water mains on Don Julian Road and Parriott Place, recycled steel main across a bridge over San Jose Creek and a packaged pump station. ***Civiltec*** will perform all services directly from our Monrovia office.

AUTHORIZED RESPONSIBLE ENGINEERS

Civiltec proposes to assign Mr. David Song, PE, as company representative. He will be responsible for the firm's timely response and quality completion of this project. Mr. Song will be the principal with complete authority to handle all contractual matters, commit ***Civiltec's*** resources as necessary and take all action necessary to meet your requests.

SCOPE OF SERVICES

Based on our project understanding and professional experience, we have identified the following scope of services.

Construction Support Services

Task 1 – Project Management, Coordination and Meetings

Civiltec will provide overall project management for the anticipated duration of the project construction. We will coordinate with LPVCWD during the construction phase of the project via e-mail and phone correspondence. We assume ***Civiltec*** will be requested to attend the following construction meetings (each up to four hours including travel):

- Four (4) months of project management.
- Project coordination
- Attend a pre-construction meeting with La Puente VCWD and Contractor
- Up to a maximum of two (2) miscellaneous progress/field meetings or site visits

Task 2 – Shop Drawing Review

Civiltec will review shop drawing submittals for completeness and conformity. We assume a maximum of ten (10) shop drawings, and that half will require a second review. The review does not relieve the Contractor from specification or contractual requirements. Submittals will be reviewed and returned within 10 working days after ***Civiltec*** has received the submittal.

Task 3 – Requests for Information (RFIs)

Our team will review RFIs and prepare responses to LPVCWD. We assume a maximum of three (3) RFIs will be required. The Contractor will submit all RFIs in writing to LPVCWD

Task 4 – Change Order Assistance

We will review and analyze change order requests to determine their merit relative to the Contract Documents and design intent. These reviews will be performed on request by LPVCWD. It is assumed that there will be a maximum of two (2) change orders. ***Civiltec's*** change order request reviews and analyses will include the review of scope and pricing information submitted by the Contractor and/or LPVCWD.

Task 5 – Start-up Assistance

Civiltec will provide engineering support and troubleshooting during startup and will review the Contractor's pump startup and testing.

Task 6 – Environmental Mitigation and Monitoring Reporting Program (MMRP)

Civiltec will team with Meridian Consultants to provide monitoring and reporting for biological and cultural resources during construction activities in accordance with the CEQA Mitigated Negative Declaration prepared for the Upper San Gabriel Valley Municipal Water District Recycled Water Program Expansion Project dated June 25, 2015.

FEE DISTRIBUTION SCHEDULE

Professional fees for the above-described services will be billed on a time and materials, not to exceed basis as summarized below. A breakdown of our hours and fees is included as Attachment A.

Task 1: Project Management, Coordination and Meetings	$4,000.00
Task 2: Shop Drawing Review	$4,470.00
Task 3: Requests for Information (RFI)	$1,670.00
Task 4: Change Order Assistance	$2,870.00
Task 5: Start-up Assistance	$2,870.00
Task 6: Environmental MMRP	$52,640.10
Total	**$68,520.10**

If this proposal is acceptable, please return a signed copy to our office. Again, thank you for the opportunity to submit this proposal. We look forward to working with you on this exciting project. Please contact the undersigned directly with any comments or questions.

Sincerely,

CIVILTEC ENGINEERING, INC.

David Song, PE
Principal, Senior Project Manager

Attachment(s): A – Breakdown of Hours and Fees

Proposal Acceptance:
The Terms and Conditions of this proposal are:

Accepted this ____________ day of ____________________________________ 2020.

By Authorized Client Representative:

____ ________________________
Greg Galindo Title

Recycled Water Project - Phase 1 Construction Support
La Puente Valley Water District
Time and Fee Estimate

Date: February 7, 2020

Scope of Work	HOURS BY PIC $ 235.00	HOURS BY SrPM $ 200.00	Meridian Consultants (x1.15)	TOTAL COST
Construction Support Services				**$ 68,520.10**
Task 1 - Project Management, Coordination and Meetings		20		$ 4,000.00
Task 2 - Shop Drawing Review	2	20		$ 4,470.00
Task 3 - Requests for Information (RFI)	2	6		$ 1,670.00
Task 4 - Change Order Assistance	2	12		$ 2,870.00
Task 5 - Start-up Assistance	2	12		$ 2,870.00
Task 6 - Environmental MMRP			$ 52,640.10	$ 52,640.10
HOURS	**8**	**70**		**78**
BUDGET	**$ 1,880.00**	**$ 14,000.00**	**$ 52,640.10**	**$ 68,520.10**

PIC = Principal Engineer SrPM = Sr. Project Manager

RESOLUTION NO. 262

RESOLUTION OF THE BOARD OF DIRECTORS OF THE LA PUENTE VALLEY COUNTY WATER DISTRICT AUTHORIZING THE EXECUTION AND DELIVERY OF THE 2020 INSTALLMENT AGREEMENT FOR THE LA PUENTE VALLEY COUNTY WATER DISTRICT RECYCLED WATER SYSTEM AND NITRATE TREATMENT SYSTEM, AND OTHER RELATED DOCUMENTS WITH RESPECT TO THE ACQUISITION, PURCHASE AND FINANCING OF A RECYCLED WATER PROJECT AND NITRATE TREATMENT SYSTEM FOR THE PUBLIC BENEFIT; AUTHORIZING THE EXECUTION AND DELIVERY OF DOCUMENTS REQUIRED IN CONNECTION THEREWITH; AND AUTHORIZING THE TAKING OF ALL OTHER ACTIONS NECESSARY TO THE CONSUMMATION OF THE TRANSACTIONS CONTEMPLATED BY THIS RESOLUTION

WHEREAS, the La Puente Valley County Water District (the *"District"*), a body politic and corporate duly organized as a county water district under Division 12 of the California Water Code and political subdivision of the State of California, is authorized by the laws of the State of California to purchase, acquire, and lease personal property for the benefit of the District and those it provides services to and to enter into contracts with respect thereto;

WHEREAS, the District desires to purchase, acquire and construct a Recycled Water Project and Nitrate Treatment System (jointly, the *"Project"*) to provide recycled water service to certain of its customers, and to treat and remediate groundwater the District produces, respectively, in connection with its performance of essential governmental functions, in an amount not more than $3,000,000.00;

WHEREAS, in order to acquire such Project, the District proposes to enter into the 2020 Installment Agreement for the La Puente Valley County Water District Recycled Water System and Nitrate Treatment System (together with all related exhibits, schedules, and certificates attached thereto, the *"Installment Agreement"*) with Opus Bank (the *"Lender"*), as presented to and reviewed by the Board of Directors at this meeting;

WHEREAS, the District's Board of Directors, as the governing body of the District, deems it for the benefit of the District and for the efficient and effective administration thereof to enter into the Installment Agreement for the purchase, acquisition, and construction of the Project to be therein described on the terms and conditions therein provided;

NOW, THEREFORE, BE IT RESOLVED by the District's Board of Directors, as the governing body of the La Puente Valley County Water District as follows:

Section 1. Approval of Documents. The governing body of the District hereby approves the form, terms and provisions of the Installment Agreement in substantially the form presented to this meeting and authorizes and directs Henry Hernandez, the President of the Board of Directors of the La Puente Valley County Water District, and Gregory B. Galindo, the General Manager of the La Puente Valley County Water District, and such other persons as they may delegate (the “Designated Officers”), and each of them individually, for and in the name of and on behalf of the District, to execute and deliver the Installment Agreement, and any related certificate, exhibits, or other documents attached thereto in such forms with such changes, insertions, revisions, corrections, or amendments as shall be approved by the officer executing them. The execution of the foregoing by a Designated Officer shall constitute conclusive evidence of such officer’s and the governing body’s approval of any such changes, insertions, revisions, corrections, or amendments to the respective forms of agreements presented to this meeting.

Section 2. Other Actions Authorized. The officers and employees of the District shall take all action necessary or reasonably required by the parties to the Installment Agreement to carry out, give effect to, and consummate the transactions contemplated thereby (including the execution and delivery of Funding Requests and any tax certificate or other certificate or agreement, each with respect to and as contemplated in the Installment Agreement) and to take all action necessary in conformity therewith, including, without limitation, the execution and delivery of any closing and other documents required to be delivered in connection with the Installment Agreement. The Designated Officers and all other officers and employees of the District are hereby directed and authorized to take and shall take all action necessary or reasonably required in order to select, purchase, approve and take delivery of the Project. All actions heretofore taken by officers, employees, and agents of the District that are in conformity with the purposes and intent of this resolution are hereby approved, confirmed, and ratified.

Section 3. No General Liability. Nothing contained in this Resolution No. 262, the Installment Agreement, nor any other instrument shall be construed with respect to the District as incurring a pecuniary liability or charge upon the general credit of the District or against its taxing power, nor shall the breach of any agreement contained in this Resolution No. 262, the Installment Agreement, or any other instrument or document executed in connection therewith impose any pecuniary liability upon the District or any charge upon its general credit or against its taxing power, except to the extent that the installment payments payable under the Installment Agreement are special limited obligations of the District as provided therein.

Section 4. Appointment of Authorized District Representatives. The Designated Officers are each hereby designated to act as authorized representatives of the District for purposes of the Installment Agreement until such time as the governing body of the District shall designate any other or different authorized representative for purposes of the Installment Agreement.

Section 5. Severability. If any section, paragraph, clause, or provision of this Resolution shall for any reason be held to be invalid or unenforceable, the invalidity or unenforceability of such section, paragraph, clause, or provision shall not affect any of the remaining provisions of this Resolution No. 262.

Section 6. Repealer. All bylaws, orders, and resolutions or parts thereof, inconsistent herewith, are hereby repealed to the extent only of such inconsistency. This repealer shall not be construed as reviving any bylaw, order, resolution, or ordinance or part thereof.

Section 7. Effective Date. This Resolution 262 shall be effective immediately upon its approval and adoption.

The foregoing Resolution was duly passed and adopted at a meeting of the governing body of the La Puente Valley County Water District held on February 10, 2020, by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

____

Presiding Officer

ATTEST:

By: __________________________________

Secretary/Clerk

Geosyntec consultants

2100 Main Street, Suite 150
Huntington Beach, California 92648
PH 714.969.0800
FAX 714.969.0820
www.geosyntec.com

Technical Memorandum

Date: January 31, 2020

To: Greg Galindo, La Puente Valley County Water District (LPVCWD)

From: Chao Zhou, P.E. (Geosyntec)
Hamid Amini, Ph.D., P.E. (Geosyntec)
Brian Petty, PE, Geosyntec Consultants (Geosyntec)

Subject: Groundwater Nitrate Treatment System Technical Memorandum

1. INTRODUCTION

1.1 Background

La Puente Valley County Water District (LPVCWD) is evaluating the potential for adding a nitrate treatment system at LPVCWD's Groundwater Treatment Facility (Facility) located at 1695 Puente Avenue, Baldwin Park, California, which is part of the Baldwin Park Operable Unit (BPOU) within the San Gabriel Valley Superfund Site. Geosyntec Consultants, Inc. (Geosyntec) prepared this technical memorandum (TM) for LPCVWD to describe and document a feasibility study that was performed to evaluate nitrate treatment alternatives.

LPVCWD operates the Facility under an existing 97-005 permit issued by the California State Water Resources Control Board (SWRCB) Division of Drinking Water (DDW). The treated groundwater from the Facility is served as drinking water by LPVCWD . The main source of groundwater supply for the Facility are three wells (named as Wells No. 2, 3, and 5) that extract groundwater from the Main San Gabriel Basin. Of the three wells, LPVCWD uses Well No. 5 as the primary source of groundwater, while Wells No. 2 and 3 serve as backup sources.

According to LPVCWD's Request for Proposal (RFP), dated August 13, 2019, the Facility's current flow capacity is rated for 2,500 gallons per minute (gpm). Currently, the Facility includes treatment processes for removal of volatile organic compounds (VOCs), perchlorate, N-Nitrosodimethylamine (NDMA), and 1,4-dioxane in the following sequence:

- Two air strippers in parallel for VOC removal;
- A Single Pass Ion Exchange (SPIX) system for perchlorate removal, which consists of four Ion Exchange (IX) vessels (two pairs in parallel, each pair containing two vessels in series);
- An advanced oxidation process (AOP) using UV light and hydrogen peroxide for NDMA and 1,4-dioxane removal; and
- Disinfection by sodium hypochlorite before entering the distribution system.

It is Geosyntec's understanding that the treated groundwater meets state and federal drinking water regulations. However, the nitrate as nitrogen (N) concentrations in the groundwater from the three source wells has gradually increased since 2018. The existing treatment system at the Facility does not include a treatment process for removal of nitrate. According to data provided by LPVCWD, in 2018 the average nitrate concentration in the three wells was 7.0 ± 0.6, 8.4 ± 0.7, and 7.8 ± 0.2 milligrams per liter (mg/L) as N for wells No. 2, 3, and 5, respectively. It should be noted that the average nitrate concentration of the SPIX effluent was 7.7 ± 0.5 mg/L as N, which is less than 80% of the applicable Maximum Contaminant Level (MCL) of 10 mg/L. While the nitrate concentrations of wells 3 and 5 have exceeded 80% of the MCL, LPVCWD blends the water supply from wells 3 and 2 (i.e., the wells with the highest and lowest nitrate concentrations, respectively) while in operation, in order to avoid an exceedance of nitrate in the blended effluent.

1.2 Objectives

Upon observing the increasing nitrate concentrations in the source wells, LPVCWD is proactively evaluating mitigation measures to address the matter. Geosyntec's work in performing the feasibility analysis and preparing this TM is part of LPVCWD's efforts in evaluating nitrate treatment systems for the Facility. Per the RFP, the objectives of the evaluation performed by Geosyntec included:

- Investigating, analyzing and evaluating different cost-effective groundwater treatment systems for nitrate removal that are accepted by DDW;
- Developing evaluation criteria and working with LPVCWD personnel to rank the treatment systems accordingly;
- Ranking the treatment systems in accordance to feasibility, operational complexity, cost and other parameters developed in the evaluation criteria; and
- Preparing this TM for documenting the evaluation process and describing the basis for the recommended treatment system approach.

Per the RFP, the nitrate treatment technologies and alternatives evaluated must meet the following requirements by LPVCWD:

- Capable to treat a design influent flow rate that meets or exceeds the Facility's flow capacity of 2,500 gpm;
- Nitrate concentration in the blended effluent shall be less than or equal to 7.8 mg/L as N; and
- Introduce no issues that would affect LPVCWD's treatment of other target contaminants, including 1,2-dichloroethane (1,2-DCA), 1,4-dioxane, chlortetracycline (CTC), N-Nitrosodimethylamine (NDMA), perchloroethylene (PCE), trichloroethylene (TCE), and perchlorate.

2. SUMMARY OF WATER QUALITY DATA

From Geosyntec's preliminary evaluations and in discussion with LPVCWD, it is anticipated that a potential nitrate treatment system, if needed, will be located downstream of the SPIX and upstream of the AOP treatment processes. The sequence for a potential nitrate treatment system within the Facility's treatment process is further discussed in Sections 5.1 and 5.2. Assuming that the nitrate treatment process will follow the SPIX, **Table 1** presents the water quality data for the effluent of the SPIX treatment system.

Based on groundwater modeling information prepared by Stetson Engineers Inc. and provided by LPVCWD (see **Attachment A**), potential future nitrate concentrations in the groundwater may increase to 20 mg/L as N in 20 years [Stetson Engineers, 2019]. Although the modeling substantiates the potential future nitrate concentration of 20 mg/L as N, there are many variables that can impact future concentrations. The ability of the nitrate treatment system to adapt to changes in the influent water quality is an important factor. For the purpose of this evaluation and per LPVCWD's request, Geosyntec evaluated treatment alternatives for influent nitrate concentrations of both 10 and 15 mg/L as N.

3. SCREENING OF NITRATE TREATMENT ALTERNATIVES

This section summarizes the screening of alternate nitrate treatment technologies prior to this TM effort.

3.1 Screening of Non-Treatment Alternatives

The following non-treatment alternatives were contemplated in discussion with LPVCWD, and were evaluated as infeasible alternatives to manage nitrate concentrations due to various reasons, including regulatory compliance requirements, operational constraints, and source limitations:

- No action;
- Well abandonment;
- Wellhead protection and land-use management;
- Alternative water sources and source modification; and
- Blending.

3.2 Screening of Treatment Alternatives

For treatment alternatives, the SWRCB DDW consider the following as potentially effective technologies for removing nitrate from groundwater [Leung, 2016]:

- IX treatment;
- Biological treatment;
- Reverse osmosis (RO) treatment;

- Electrodialysis; and
- Distillation.

The Environmental Protection Agency (EPA) considers IX treatment, RO treatment, and electrodialysis as best available technologies (BATs) for nitrate treatment [EPA, 2014]. Biological, RO, electrodialysis, and distillation treatment technologies were contemplated in discussion with LPVCWD and were evaluated as infeasible alternatives. RO treatment, while effective in nitrate removal, is typically used for the purpose of desalination, i.e., when multiple ionic contaminants, including bulk total dissolved solids (TDS), need to be treated simultaneously. In RO treatment the water is forced through a membrane and treated primarily based on the principle of size exclusion. Chemicals that have a larger size than the pore size of the membrane are retained, while water and chemicals with a smaller size pass through. For this reason, RO systems require a significant amount of energy to operate. Capital costs for RO treatment systems are relatively high, and they also have very high operation and maintenance (O&M) demands and cost. Also, RO produces a concentrated stream in large quantity (typically 15% to 20% of the total flow, depending on water quality and type of treatment system). This concentrate stream is considered wastewater and would require appropriate disposal. Due to these reasons, RO treatment was not retained for further analysis.

Distillation and electrodialysis treatment technologies are rarely implemented for drinking water treatment systems. While small systems may exist, it is impractical to distill water at the scale required for drinking water supply. For electrodialysis, to our knowledge, there are no full-scale drinking water treatment systems in the US. Based on limited case studies from abroad, the capital cost for electrodialysis is prohibitive and even higher than that of RO treatment [Jensen et al., 2012]. Due to these reasons, distillation and electrodialysis treatment were not retained for further analysis.

There are a limited number of biological treatment systems for drinking water in the US, typically in inland areas where brine waste discharge options are limited. However, for the case of this project and LPVCWD, biological treatment was evaluated to be an infeasible alternative due to difficulties with public acceptance for use in a drinking water system and the unknown impacts to the treatment of 1,4-dioxane and NDMA which occur in the AOP step downstream of the proposed nitrate treatment system.

IX treatment is the most commonly implemented technology for nitrate treatment for drinking water systems in the US, and it is the most feasible alternative for potential implementation at the Facility. LPVCWD's preliminary evaluations and therefore also recognized IX as the most feasible technology for the Facility. Pursuant to the scope of work defined in the RFP, the remainder of Geosyntec's study was focused on analyzing the following three IX treatment system alternatives:

- Nitrate selective regenerable, fixed bed IX treatment system by Evoqua Treatment Technologies (Evoqua);
- Ion Separator (ISEP) system by Calgon Carbon (Calgon); and

- A second regenerable, fixed bed IX treatment system.

The principles of IX treatment is further described in Section 4.

4. FEASIBILITY EVALUATION OF SELECT NITRATE TREATMENT ALTERNATIVES

This section describes the process, method, and results of the feasibility evaluation of the three nitrate treatment alternatives.

4.1 General Introduction to Regenerable IX for Nitrate Treatment

The conventional regenerable IX treatment system comprises one or more vessels, each containing a fixed-bed IX resin. As water flows through the IX vessels, nitrate ions from the liquid stream are loaded onto the resin which simultaneously sheds a chloride ion into the liquid stream. This is referred to as the loading cycle. As more water is treated, the resin becomes exhausted, or “spent.” The maximum concentration of ions that could be loaded onto a resin is referred to as the resin’s “capacity.” As shown in **Figure 1**, once the resin reaches its capacity, or is spent, a regenerant, typically a 10% sodium chloride (i.e., salt) solution, is passed through it to restore its ion exchange capacity. This is referred to as the “regeneration cycle.” The wastewater generated through the regeneration process is referred to as “brine.”

4.1.1 Treatment and Bypass Flow Streams

Primarily for optimizing water quality and reducing system footprint, brine waste, and operational costs, an IX treatment system is typically implemented with a bypass stream (**Figure 2**). In this configuration, a portion of the total flow is treated by the IX treatment system. The treated stream would have a lowered nitrate concentration and would be blended with the bypass stream after the IX treatment system. The bypass/treat stream ratio is designed and controlled to achieve a target nitrate concentration in the blended effluent.

Depending on influent and target nitrate concentrations, as well as hydraulic design requirements, the treated stream may be processed through one or more IX vessels. A schematic block flow diagram of a conventional IX treatment system using four vessels is shown in **Figure 2.**

4.1.2 Regeneration and Brine Stream

In a conventional regenerable IX treatment system there are three types of regeneration flow regimes:

- Co-flow;
- Counter-flow; and
- Split counter-flow.

In a co-flow regime, the regenerant is fed in the same direction as the feed (or untreated influent) flow. A counter-flow regime is the opposite of co-flow, with the regenerant fed in the reverse direction. In a split counter-flow, however, the regenerant is fed in both directions. While more regenerant is required to regenerate the spent resin, the co-flow regeneration process requires relatively simpler equipment and straightforward operation compared to the counter-flow or split counter-flow types. For this reason, co-flow regeneration regimes are more commonly implemented.

Following regeneration, the resulting brine stream contains high concentrations of sodium chloride and nitrate and would need to be disposed of properly. An IX treatment system may generate a brine stream at a quantity of up to 3% of the raw water volume [Jensen et al., 2012]. Therefore, it is critical for water treatment facilities implementing IX treatment systems to be able to discharge or otherwise handle large quantities of brine waste..

4.1.3 Nitrate Analyzer

Nitrate does not cause or add odor, taste, or discoloration to water. Therefore, real-time monitoring of nitrate concentrations is pertinent for the treatment of drinking water. Typically, inline nitrate analyzers are installed for the raw water, treated effluent, and blended effluent to provide an almost instantaneous reading of nitrate concentrations, to facilitate the O&M procedures.

4.2 Alternatives for Nitrate Treatment Systems

This section describes the three nitrate treatment alternatives that were evaluated by Geosyntec, as listed below:

- Nitrate selective regenerable IX treatment system by Evoqua;
- ISEP system by Calgon; and
- Regenerable IX treatment system by a third-party equipment provider using a general IX resin provided by Purolite Corporation (Purolite).

Both Evoqua and Purolite recommended conventional regenerable IX treatment systems that could be modulated over time to accommodate increased source nitrate concentrations. Calgon recommended a continuous ion exchange ISEP system. Each system is further described in the following subsections.

4.2.1 Evoqua's Nitrate Selective Regenerable IX Treatment System

Evoqua's nitrate selective regenerable IX treatment system is a conventional system that follows a co-flow regeneration regime. The IX resin is nitrate selective, meaning it prefers removal of nitrate over other anions. Nitrate selective resins are recommended when other anions, particularly sulfate, are present in high concentrations in the raw water, but are more expensive than non-selective resins. Evoqua supplies the IX treatment system, including the vessels and accessory equipment, and retains a third-party manufacturer (e.g., DuPont or Purolite) for furnishing the resin.

4.2.2 Calgon ISEP-SB System

Calgon's ISEP system is a variation of the conventional IX treatment process. To date, two versions of the ISEP system have been developed, the original ISEP and the ISEP with simulated moving bed technology (ISEP-SB). The original ISEP uses a carousel configuration, and multiple resin vessels are positioned on a turntable and rotated from active treatment to resin regeneration and rinsing and back to active treatment. LPVCWD installed and operated an original ISEP system for perchlorate removal, which has been replaced by the SPIX system. The mechanical complexity of the original ISEP system caused operation and maintenance issues.

ISEP-SB is an improved version of the original ISEP. Similar to the original system, the ISEP-SB includes a network of vessels, each containing nitrate selective IX resins. However, in the ISEP-SB system, the vessels are stationary and mounted to the floor, and the continuous IX is simulated by a rotary valve. This reduces the operational complexity of the system relative to the original ISEP design.

In the original ISEP or ISEP-SB systems, a subset of the resin vessels are in use and a subset are undergoing regeneration. Therefore, resin regeneration does not cause system downtime as is the case in a conventional IX treatment system.

Calgon claims that the ISEP-SB system has the following advantages compared to convention IX treatment systems:

- No regeneration downtime;
- Smaller total resin volume required;
- Smaller amount of brine required to regenerate the resins; and
- Higher regeneration efficiency.

The ISEP system is not easily modified or expanded to accommodate changes in influent flow and water quality. However, because of its configuration and enhanced control features, ISEP technology is advertised by Calgon to target a low and relatively consistent nitrate concentration in the treated effluent. In contrast, the operational records reviewed by Geosyntec suggested the conventional IX treatment system for nitrate treatment provided by Evoqua (then Siemens Water Technologies) to the San Gabriel Valley Water Company (SGVWC) produces treated water with fluctuating nitrate concentrations.

A schematic of Calgon's ISEP system is shown in **Figure 3** [Jensen et al., 2012]. While the mechanical components and number of cells vary between the two generations, the principles of the ISEP-SB are similar to those of the original ISEP system.

4.2.3 Treatment System with Purolite General Regenerable IX Resin

Similar to the nitrate selective regenerable IX treatment system provided by Evoqua, this alternative is a conventional IX treatment system. The primary difference is that a non-nitrate selective, general strong base anion exchange resin (general SBA resin, or "general resin" hereafter) is used. Nitrate is one of the anions removed and the general resin is cheaper than the nitrate selective resin. The general resin is also easier to regenerate (i.e., requires less brine); however, it has a lower affinity for nitrate than sulfate. For raw water with a high sulfate concentration, sulfate ions can displace nitrate ions in the resin, causing the sudden increase of nitrate concentration in the effluent, which can be much higher than that in the raw groundwater. This phenomenon is known as "nitrate dumping."

For LPVCWD, the historical raw groundwater laboratory analysis shows relatively low sulfate concentration, but sulfuric acid is added for pH control upstream of the SPIX system. Overall, preliminary analysis of the ratio between sulfate and nitrate concentrations in the SPIX effluent suggests that nitrate dumping *could* occur if the resin were not regenerated at higher frequency compared to using a nitrate selective resin. Nevertheless, this alternative was included in the evaluation to investigate if there are benefits in cost and operations by using the general resin and to provide a comparison against the nitrate selective resin.

5. ALTERNATIVES EVALUATION MATRIX

This section describes the methodology and parameters that were evaluated for the various alternatives and presents the results for the alternatives evaluation matrix.

5.1 Methods and Ranking Matrix for Alternatives Evaluation

This section presents an alternatives evaluation matrix, including evaluation criteria and criteria ranking weight. The general process of developing the alternatives evaluation matrix and ranking is presented in **Figure 4**. In summary, the evaluation matrix, including the criteria, sub-criteria, and their weighting factors, was initially proposed by Geosyntec, presented to LPVCWD during two in-person and one teleconference meetings, modified as needed, and finalized based on the input received. Then, each vendor was asked to provide system details for two nitrate concentrations (10 and 15 mg/L as N) that were used to score each criterion. Finally, the overall score was computed, and the alternatives were ranked based on their overall scores.

The evaluation matrix is presented as **Table 2**. Each alternative was evaluated based on the following five criteria, each of which has a set of sub-criteria that are described in the following subsections:

- Technical feasibility;
- Permitting considerations;
- Estimated capital and O&M costs;
- Operability; and
- Project delivery.

5.1.1 Technical Feasibility

Technical feasibility was allocated a relative weight of 25 percent (%), with the following breakdown of its sub-criteria:

- 10% for material availability;
- 5% for pre- and post-treatment requirements;
- 5% for the system footprint; and
- 5% for the system's modularity.

Included in the material availability evaluation was the consideration for where the product is manufactured (i.e., manufactured within the US or shipped from abroad) and the estimated lead time for procurement and installation of the treatment system.

A weight of 5% was allocated to the pre- and post-treatment requirements. The alternatives evaluated appeared to have similar pre-treatment and no post-treatment requirements.

Alternatives were also evaluated for their footprint, which was allocated 5% weight within the technical feasibility criteria. LPVCWD indicated that they would prefer the new nitrate system to be located inside of the existing building which houses the now-decommissioned ISEP system. Thus, under this sub-criterion the ability of a proposed treatment system to fit into the existing building on site was assessed.

Given the expected increase in the influent nitrate concentration in the future, the ability to adjust and potentially expand the system to increase the capacity to treat higher nitrate concentrations was considered as an evaluation factor. Each treatment alternative was evaluated on its modularity, or lack thereof, accounting for 5% of the technical feasibility criteria. As directed by LPVCWD, the initial design for the nitrate system should include redundant vessels or extra treatment capacity to improve operator flexibility. To allow for the desired level of operator flexibility, the conventional IX treatment system vendors (Evoqua and Purolite) were asked to include two standby/regeneration vessels at the initial design condition (for the scenario of influent nitrate concentration of 10 mg/L as N). This design would also be able to treat an increased nitrate concentration (15 mg/L as N), but with a higher regeneration frequency and more brine waste. For the ISEP-SB system, which after installation cannot be readily modified to add capacity, the vendor was asked to provide the initial condition at the 15 mg/L as N. Therefore, the modularity consideration for treatment is mainly for even higher nitrate concentrations. A system would be scored higher if it can be more easily modified to handle higher nitrate concentrations (e.g., 20 mg/L as N) with additional vessels while maintaining the desired operator flexibility (i.e., the option of adding two standby/regeneration vessels).

5.1.2 Permitting Considerations

Permitting considerations were weighted as 20% of the overall scores.

The permitting record was considered a critical criterion by LPVCWD because of the potential urgency to install and permit the nitrate treatment system. To generate a score for this criterion, each vendor was asked to provide the number of each of the same type of nitrate treatment systems permitted by DDW. A treatment system that has been previously permitted by DDW for other projects is anticipated to have a more streamlined and less time-consuming permitted process.

5.1.3 Estimated Costs

The cost criteria were weighted at 30%. This includes an equal weight distribution between capital (15%) and O&M (15%) costs.

Capital cost estimates included the treatment system's budgetary costs provided by each vendor and the calculated one-time sewer connection fee charged by the Los Angeles County Sanitation District (LACSD) for the disposal of the brine waste. Other capital cost items, including those related to construction, installation, permitting (other than LACSD), were evaluated to not be differentiating factors between the treatment alternatives at the feasibility evaluation level, and thus were not considered in this analysis.

The following O&M costs were included in the evaluation:

- Annual wastewater disposal surcharge fee to LACSD;
- Cost for the amount of water purchased to make up for the groundwater supply loss due to brine generation and disposal (i.e., makeup water costs); and
- Salt costs for brine generation and regeneration cycles.

The quantity of wastewater from each technology was conceptually estimated by each of the vendors using their proprietary models which estimate performance based on flowrates and water quality parameters. The vendors provided outputs from their conceptual models including treatment flowrate, bypass flowrate, regeneration frequency, and wastewater generation.

Similar to capital costs, some O&M cost items, such as electrical costs and added monitoring requirements, were evaluated to not be differentiating factors between the treatment alternatives at the feasibility evaluation level, and thus were not considered in this analysis.

5.1.4 Operability

System operability was allocated a relative weight 20%, and consists of the following three sub-criteria:

- 10% for brine waste disposal and water recovery;
- 5% for system complexity, flexibility, and downtime; and
- 5% for salt use.

The brine generation quantity (which is directly related to water recovery) is a major consideration for operability. The brine waste quantity and LACSD's capacity to accept brine waste discharge will impact considerations for brine storage, equalization, and discharge schedule. These considerations will be addressed during the design phase. For LPVCWD, there is an existing sewer discharge connection to the interceptor to the Joint Water Pollution Control Plant (JWPCP) in Carson, CA, of the LACSD, that can be used for the discharge of the brine waste.

Several factors affect system complexity, flexibility, and downtime. First, from the mechanical and controls perspective, the fixed-bed conventional IX treatment system is less complex compared to the ISEP-SB system. The operation of the loading cycle of conventional IX treatment systems is generally similar to that of a liquid granular activated carbon (LGAC) treatment system or the SPIX system that is currently operating at the Facility. In contrast, the ISEP-SB system involves moving mechanical components. The ISEP-SB system also involves a complex and proprietary control system which could be a challenge for LPVCWD operators to self-modify the control system.

The treatment alternatives are evaluated for their ability to maintain a low treated effluent nitrate concentration, which corresponds to a low volume of treated influent, and thus less frequent regenerations, and less brine waste. Therefore, the treatment system's flexibility in its ability to obtain and maintain a relatively low nitrate concentration in the treated effluent is key to reducing demands for operator attention and intervention. For the same reason, it would provide a higher level of reliability and reduce demands for operator attention and intervention.

5.1.5 Project Delivery

Project delivery was weighted at 5% of the overall scores. This criterion distinguishes whether the vendor could provide a full-service scope for the treatment system, including furnishing the equipment, furnishing the resin, providing startup and commissioning service, and providing resin changeout and other maintenance services, as needed. The highest score for the project delivery criteria is assigned to a full-service vendor, because schedule, permitting, and operation risk will be owned by the same entity.

5.2 Results of Alternatives Evaluation

Attachments B-1, B-2, and B-3 summarize design, operational, and budgetary data obtained from Evoqua, Calgon, and Purolite, respectively. These data were used as a basis for the evaluation of each of the three treatment alternatives.

5.2.1 Evoqua Treatment Technologies

Evoqua provides both the resin and the equipment. Based on the water quality data and operational specifications provided by Geosyntec, Evoqua recommended use of Dupont's nitrate selective resin (NSR) PWA5. Evoqua has two permitted nitrate treatment systems (San Gabriel Valley Water Company B6 Plant, and Golden State Water Barstow) installed in California, one of which is also located in the San Gabriel Valley.

Based on the water quality data provided, Evoqua performed conceptual modeling and suggested a four-vessel system two of which are active and the other two are on standby for regeneration at all times.

For a budgetary price of about $1.8 million, Evoqua would provide the PTIM96x60 fourplex IX treatment system, which includes the following:

- Four 8-foot diameter IX vessels;

- The control panel;
- Automated valves;
- Nitrate sensors for automatic regeneration; and
- The water softener(s).

A salt silo and Supervisory Control and Data Acquisition (SCADA) system would entail additional costs, as would the installation of the system.

5.2.2 Calgon

Calgon's proposed treatment system involves retrofitting the existing ISEP system on site at the Facility, to reuse the existing fiber-reinforced polymer (FRP) vessels and provide new equipment for other component of the treatment system. Currently, there are three permitted installations of Calgon's ISEP system for nitrate treatment in California, two of which are for the City of Chino Hills, while the third is for the Valley County Water District.

Given the water quality data provided, Calgon's ISEP-SB system conceptual model includes fifteen 35x72 vessels, ten of which are active, while the remaining five are on standby. In contrast to the conventional regenerable IX treatment system, the ISEP system is not modular, as it is difficult to add or adjust physical components to the system after initial installation. For this reason, Calgon recommended the initial system be designed to treat up to 15 mg/L nitrate as N. Although the equipment is not modular, Calgon's ISEP system is programmable and can be programmed to operate at a range of conditions, including those targeted by LPVCWD.

For a budgetary price of about $1.5 million, Calgon would provide the following:

- The 15-cell retrofitted ISEP system;
- The control system;
- The water softener; and
- One dual-use brine tank, in which the salt can be stored and the brine can be generated, thus not requiring a stand-alone salt silo.

The budgetary price takes into consideration that the existing FRP vessels would be reused and retrofitted. A second brine tank may be required and would be provided for an additional cost.

5.2.3 Purolite Corporation

As opposed to the two preceding alternatives, Purolite only provides the regenerable resin. The treatment equipment would be provided by a different provider. Given the water quality data, Purolite recommended their general regenerable IX resin A600E/9149. Purolite has four permitted general regenerable IX resins installed in California and used specifically for nitrate treatment.

Based on the water quality data provided, Purolite proposes a treatment system which includes four IX vessels, with either two or three in service and the remaining vessel(s) is on standby for regeneration. In the case that the influent nitrate concentration increases over time, another IX resin and vessel can be added to the system.

While this vendor only provides the resin itself, Purolite would be willing to coordinate with an equipment vendor preferred by LPVCWD to provide the treatment system components. Purolite estimated the following budgetary costs:

- The A600E/9149 general IX resin costs approximately \$170,000; and
- The treatment skid and remaining equipment is estimated to cost approximately \$1.5 million, with a total combined cost of about \$1.67 million.

5.3 Ranking of Alternatives

The basis of the scores are summarized in **Attachments B-1, B-2, and B-3**. The scoring and ranking of alternatives are summarized in **Table 3**.

Based on the scores allocated to each alternative, Evoqua's conventional IX treatment system with a nitrate selective resin ranked highest among the three nitrate treatment systems evaluated in this effort.

Although the estimated capital cost of Calgon's ISEP system was approximately 20% less than either the Evoqua or the Purolite systems, the estimated design and installation costs for the ISEP system are expected to be higher than that of the conventional IX treatment systems. The approximate difference between capital costs provided by each vendor is considered to be within the typical range of variability and uncertainty for a pre-design conceptual evaluation. The average pre-design conceptual capital cost among the three vendors is \$1,660,000 ± \$150,000. The average estimated O&M costs among the three vendors is \$68,700 ± \$16,600. Therefore, the three alternatives scored equally when evaluated for both estimated capital and O&M costs.

Calgon's ISEP-SB system ranked second. The contributing factor for Calgon's lower score compared to Evoqua's conventional IX treatment system include material availability (material fabricated overseas), modularity (the ISEP system is not a modular system), and complexity (the ISEP system involves several moving mechanical components and a complex and proprietary control system).

The IX treatment system with Purolite general resin ranked the lowest. Compared to the alternative of Evoqua's conventional IX treatment system, the main disadvantages include material availability, system complexity (due to increased monitoring responsibility for potential nitrate dumping), and project delivery (needing LPVCWD to retain a 3rd party to furnish the treatment system equipment). Overall, the analysis indicated that, for conventional IX treatment systems, using a general resin and an alternative project delivery approach to that provided by Evoqua, which involves separate suppliers for equipment and resin, does not provide apparent advantages over selecting Evoqua.

5.3.1 Effects of Uncertainty in Vendor-Provided Data on Feasibility Evaluation Results

Geosyntec notes that the scores for Evoqua's conventional IX treatment and Calgon's ISEP systems were relatively close and highly dependent on the majority of the data provided by each vendor, including the key evaluation metrics of brine generation and salt use. While this is largely expected because the systems use almost identical IX treatment principles, Geosyntec opted to provide a brief discussion on the effects of uncertainty in vendor-provided data on the outcome of the feasibility evaluation.

5.3.1.1 Evoqua's Conventional IX Treatment System

Evoqua's IX modeling outputs in bypass flow, brine generation, and salt use appear to rely solely on the ability to reach an effluent nitrate concentration of 2.39 mg/L as N. However, up until the time of this writing, Evoqua has not been able to provide satisfactory analysis or empirical evidence that this effluent concentration is achievable.

As described in Section 4.3.4, Evoqua's treatment system at SGVWC:

- Appeared to be able to have a treated effluent nitrated concentration of approximately twice the projected 2.9 mg/L as N after being in service for only a few months;
- Appeared to be inefficient in regenerating the full capacity of the resin via the co-flow regime, as explained by Evoqua, thus already exceeding a nitrate concentration of 2.9 mg/L as N at the beginning of each loading cycle;
- Reportedly resulted in major challenges and disruptions in operations; and
- Reportedly doubled the expected brine regeneration and salt use.

The level of regeneration efficiency is mainly affected by the water quality and predicting regeneration efficiency is highly complex. Evoqua does not provide more efficient counter-flow and split counter-flow regeneration flow regimes. Therefore, this issue remains unresolved. If SGVWC's experience is to be repeated, then Evoqua's IX treatment system would score significantly lower in the operability criterion (20%), potentially sufficiently lower to result in a lower overall score compared to Calgon's ISEP.

5.3.1.2 Calgon ISEP-SB

Although there is insufficient information to fully verify Calgon's claims in its ability to achieve a low effluent nitrate concentration and reduced brine generation, it appears to Geosyntec that the claims are logical based on our understanding of the continuous ISEP-SB process. In addition, the limited operational data provided for one ISEP installation for Chino, CA, appeared to show that the effluent treated by the ISEP-SB unit was able to reach nitrate concentrations below 1 mg/L as N over a period of one month. Based on these analyses and observations, Geosyntec considers that the evaluation score for ISEP-SB is less significantly affected by vendor-provided data than Evoqua's conventional IX treatment system.

6. SELECTED NITRATE TREATMENT SYSTEM IMPLEMENTATION

Based on the outcome of evaluating the three alternatives and considering feedback from LPVCWD throughout this evaluation, Geosyntec recommends proceeding with the nitrate selective regenerable IX treatment system provided by Evoqua. However, we recommend a treatability test be performed by the vendor and a site-specific performance guarantee be obtained for the nitrate treatment system.

6.1 Siting and Layout

The proposed nitrate treatment system will be installed within the Facility's existing treatment system building, which was used to house the previous ISEP system. Through the detailed design stage, the current layout of the facility will be modified, as needed, to accommodate the installation of the IX treatment system, including following components:

- Four 8-foot diameter IX vessels;
- Process piping to include connections from the SPIX effluent stream to the nitrate treatment system inlet, bypass stream(s), and blending stream(s);
- Nitrate analyzers to monitor the influent stream (i.e., the SPIX effluent), the treated effluent, and the blended stream;
- A recirculation pipeline from the effluent of the nitrate IX treatment system, in case of an unexpected nitrate treatment system failure emergency; and
- Considerations for including a general equipment storage area.

A preliminary site plan/layout to conceptually present the configuration and integration of the selected nitrate treatment system into the existing facility is included as **Figure 5**. A preliminary Process Flow Diagram (PFD) is provided in **Figure 6**. An example of a conceptual Process and Instrumentation Diagram (P&ID) prepared by Evoqua is presented in **Attachment C**. It is assumed that the existing extraction wells and active treatment systems at the Facility will not require modifications and that the electrical systems can handle the startup and routine operation of the new nitrate treatment system.

6.2 O&M Considerations

With regards to O&M considerations, the Evoqua IX treatment system is generally similar to an LGAC treatment system or the existing SPIX system. The proposed four-vessel system is very flexible, and modules/vessels can be put on- or off-line easily, based on treatment needs.

The various sizes of the Evoqua IX vessels are rated for certain optimal nominal flow rates in order to maintain the appropriate contact time and hydraulic conditions. For instance, the 8-foot diameter vessel is sized to operate optimally in a flow range of approximately 200 and 1,500 gpm.

Based on the influent water quality parameters (provided in the RFP) and an assumed influent nitrate concentration of 10 mg/L as N, Evoqua anticipates that the treatment system should treat a nominal flow of approximately 700 to 750 gpm. Under these operating conditions Evoqua estimates that the system will go through a regeneration process about once every 30 to 36 hours and use approximately 750 to 850 tons of salt annually.

6.3 Required Operator Training and Certifications

Regarding operator certifications, the Facility is currently classified as a T3 water treatment facility, according to the classification system described in Title 22, Chapter 15, Article 2, Section 64413.1 of the California Code of Regulations. If the nitrate treatment system is implemented, a total of ten points would be added to the Facility's current 58 points for a water treatment process required to meet the nitrate MCL. This addition would elevate the Facility to a T4 facility.

6.4 DDW Permitting Requirements

The addition of the nitrate treatment system to the Facility is anticipated to require an amendment to the existing DDW Domestic Water Supply Permit. According to DDW, the following minimum documentation is required for a permit amendment application:

- A technical report which includes the following components:
  - System description and layout;
  - Design capacities; and
  - Treatment chemicals;
- A set of design drawings and site plan; and
- Environmental documentation, if applicable (see Section 6.4).

Also, according to DDW, prior to permit amendment issuance, a set of operational plans, as follows, will also be required:

- Water quality monitoring plan;
- Water systems operations plan; and
- Disaster/emergency plan.

As stated in the RFP by LPVCWD, it is assumed that the 97-005 permit process is not required for the nitrate treatment process.

The flow chart for the general DDW permitting process is presented in **Figure 7**.

6.5 CEQA Requirements

Based on Geosyntec's correspondence with the SWRCB Environmental Review Unit (ERU), this project may be exempt from additional California Environmental Quality Act (CEQA) documentation, as it may qualify as a categorical exemption under one of the following classes:

- Class 1, Existing Facilities; and/or
- Class 3, New Construction or Conversion of Small Structures.

The Class 1 exemption consists of the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of existing or former use (14 CCR § 15301).

The Class 3 exemption consists of construction and location of limited numbers of new, small facilities or structures; installation of small new equipment and facilities in small structures; and the conversion of existing small structures from one use to another where only minor modifications are made in the exterior of the structure (14 CCR § 15303).

Further evaluation of CEQA requirements for the new nitrate treatment system will be performed. If the project is considered as a categorical exemption, a Notice of Exemption (NOE) will be prepared and filed with the County of Los Angeles. No further CEQA process will be required following the NOE.

If the project does not qualify as a categorical exemption, an initial study will be prepared, which is anticipated to result in a Negative Declaration, which would include the appropriate evaluations and conclude that there is no substantial evidence that the project may have a significant effect on the environment. After preparation of the Negative Declaration, a Notice of Determination (NOD) would be filed with the County of Los Angeles. The NOD will remain posted for a 30-day statute of limitations for legal challenges to the project. The Negative Declaration will also be posted for public review, and any questions or comments made by the public will be addressed accordingly.

6.6 Estimated Costs

A preliminary calculated capital cost estimate is provided in **Table 4**, which was prepared based on the conceptual layout and sizing of the Evoqua IX treatment system. The total capital and O&M costs include the following:

- Engineering design costs estimated as approximately $350,000;
- Construction costs estimated as approximately $750,000;
- Construction oversight costs estimated to be approximately $230,000;
- Fees for construction permits estimated as approximately $70,000; and
- The equipment for the treatment system estimated to be approximately $1.8 million, as provided by Evoqua.

The preliminary pre-design costs are conceptual approximations with a ±30% uncertainty range. The estimated cost for treatment equipment includes the following items:

- Four 8-foot diameter IX vessels;
- Control panel;

- Automated valves and nitrate sensors for automatic regeneration; and
- Water softener(s).

Furthermore, the annual O&M costs for the system are conceptually calculated as $70,000 to $80,000 for the following costs and activities:

- Annual surcharge for discharge to the LACSD sewer line estimated as approximately $2,000;
  - The formula to calculate LACSD connection and surcharge fees are provided in **Attachment D-1**;
  - Conceptually calculated connection and surcharge fees are presented in **Attachment D-2**; and
  - **Attachment D-3** includes the LACSD industrial wastewater surcharge rates for District 21;
- Annual makeup water cost estimated as approximately $4,000;
- Annual salt use cost estimated as approximately $60,000 to $70,000; and
- Other anticipated maintenance costs.

6.7 Estimated Schedule

Figure 8 includes a preliminary estimated schedule for the implementation of the proposed nitrate treatment system.

7. GRANT/LOAN ANALYSIS

Geosyntec considered and evaluated the following grant/loan program opportunities:

- California Proposition 1, the Water Bond (Assembly Bill 1471);
- California Proposition 68, the Drought, Water, Parks, Climate, Coastal Protection, and Outdoor Access for All Act of 2018; and
- The Drinking Water State Revolving Fund (DWSRF).

The Proposition No. 1 program is currently not accepting proposals. Proposition No. 68 applies to projects that are seeking funding support for O&M costs, as opposed to capital costs.

LPVCWD may apply to the DWSRF program for funding support for the project's capital costs. For schedule considerations, LPVCWD has indicated that it would apply for the DWSRF loan for construction projects. The applicant is to apply for the DWSRF via the Financial Assistance Application Submittal Tool (FAAST). **Table 5** summarizes the required application packages and the main contents of each application package. **Figure 9** presents the general flow chart for the DWSRF process.

The DWSRF option is described in more detail below.

7.1 Components of DWSRF Application

The DWSRF application consists of four packages:

- General information package;
- Technical package, including an engineering report;
- Environmental package; and
- Financial security package.

7.1.1 General Information Package

The general information package includes the following information regarding the applicant and the location of the proposed or constructed drinking water infrastructure project (i.e., the proposed nitrate treatment system):

- The type and amount of assistance requested;
- General information about the applicant;
- Description of the project and the proposed implementation schedule; and
- Managerial information.

The general information package submitted through the Financial Assistance Application Submittal Tool (FAAST) on December 16, 2019 is included as **Attachment E-1**.

7.1.2 Technical Package

The technical package consists of several items, including the following main elements:

- A complete engineering report;
- A copy of the technical, managerial, and financial (TMF) assessment form;
- A copy of the professional engineering services contract;
- A copy of plans and specifications; and
- The Certification for Compliance with Water Metering form.

The engineering report, which will be prepared by Geosyntec, must present the following information:

- Description of the water system and facility, including information about the source, storage, treatment, and distribution system;
- Schematic(s) of the treatment system and facility;
- Description of the problem to be addressed by this project;

- Evaluation of possible alternative solutions, including consolidation; and
- Details of the selected solution (i.e. the selected nitrate treatment system), including green components, the proposed implementation schedule, and a breakdown of estimated project costs.

A blank copy of the technical package is presented as **Attachment E-2**.

7.1.3 Environmental Package

The environmental package requires information regarding the following:

- California Environmental Quality Act (CEQA) status;
- CEQA exemption information; and
- A completed evaluation form for federal environmental coordination with and/or regarding land and resource management and wildlife protection and conservation.

A blank copy of the environmental package is presented as **Attachment E-3**.

7.1.4 Financial Security Package

The financial security package requires the applicant's financial information, cost estimates for the project, and relevant documentation, including, but not limited to, the following:

- Other funding sources;
- Service connection charges;
- Water rate study, if applicable;
- Projected project costs including:
  - Construction costs;
  - Equipment costs;
  - Engineering and administrative costs during construction;
  - Legal fees; and
  - Projected O&M costs.
- Debt management policy;
- Audited financial statements for a minimum of three years;
- A completed tax questionnaire; and
- A rate adoption resolution.

A blank copy of the financial security package is presented as **Attachment E-4**.

7.2 General DWSRF Application Process

A project number and project manager will be assigned by the DWSRF program, which will place the applicant on the Comprehensive List once one of the four packages described above is received.

The next step is placement on the Fundable List. For non-disadvantaged community (non-DAC) applicants, this requires ranking and selection by the DWSRF program. Projects on the comprehensive list are ranked by categories and bonus scores. Based on the DWSRF policy reviewed by Geosyntec, this project will be placed in the highest priority category (Category A, immediate health risk) which includes addressing nitrate above its MCL [SWRCB, 2019].

The DWSRF program develops the Fundable List from the applications in process by February, based on the ranking process described above [SWRCB, 2019]. The DWSRF program's objective is to execute the financing agreements for projects on the fundable list by June 30. Projects on the Fundable List that are not financed by the end of the state fiscal year will be carried over to the subsequent year's Fundable List.

7.3 Recommended DWSRF Application Timeline

The DWSRF program recommends that the general information package be submitted first. Within the other three packages, the DWSRF program indicates that generally, the environmental package takes the longest time to review and recommends that it should be prepared and submitted first.

Based on the information presented above, to be able to obtain the DWSRF funding in 2020 for the construction of the selected nitrate treatment system, the application must be complete well in advance of the June 30, 2020 target date for the execution of the financing agreement. Therefore, Geosyntec suggests that LPVCWD prepare and submit the general information package by the end of 2019, and the technical, environmental, and financial security packages no later than early 2020.

8. CONCLUSION

Based on the results of the alternatives evaluation matrix prepared by Geosyntec, Evoqua's nitrate selective regenerable IX treatment system ranked highest as the most feasible evaluated alternative for removal of nitrate at LPVCWD's groundwater treatment Facility. This ranking appears justified based on the following:

- The treatment system's modularity;
- The material's availability; and
- Evoqua's full-service project delivery.

To implement the recommended nitrate treatment system, Geosyntec recommends proceeding sequence of tasks:

- Submit the DWSRF application and its corresponding packages;

- Perform a treatability test;
- Prepare the engineering report and design drawings;
- Confirm categorical exemption from CEQA requirements;
- Submit permit amendment application and required documentation to DDW;
- Procure the general contractor and selected vendor equipment; and
- Proceed with construction and installation procedures.

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TABLES

Geosyntec consultants

TABLE 1

SPIX Effluent Water Quality Data [1,2]

La Puente Valley County Water District Groundwater Treatment Facility, California

Analyte	Average Concentration (mg/L)	Highest Detection (mg/L)	Start Date	End Date
Nitrate as N	7.5	8.8	January 2018	September 2019
Sulfate	58	64	August 2018	July 2019
Alkalinity as $CaCO_3$	154	160		
Perchlorate	ND <0.00095	ND <0.00095		
pH	7.66	7.99		
TDS	333	360		
Total Chlorides	25	27		

Notes:

[1] Water quality data were retrieved from spreadsheets provided by LPVCWD in October 2019.

[2] From preliminary evaluations and with input from LPVCWD, it is anticipated that a potential nitrate treatment system, if needed, will be located downstream of the SPIX and upstream of the AOP treatment processes; therefore, the SPIX effluent water quality is assumed to be the influent water quality for the potential nitrate treatment system.

Abbreviations:

AOP - Advanced Oxidation Process

$CaCO_3$ - Calcium Carbonate

LPVCWD - La Puente Valley County Water District

mg/L - milligrams per liter

N - Nitrogen

ND - Non-Detect

SPIX - Single Pass Ion Exchange

TDS - Total Dissolved Solids

TABLE 2
Treatment Alternatives Evaluation Matrix
Ion Exchange Nitrate Treatment System
La Puente Valley County Water District Groundwater Treatment Facility, California

Criteria	Weight	Subcriteria	Weight
Technical Feasibility	25%	Material Availability	10%
		Pre and Post-Treatment Requirements	5%
		Footprint	5%
		Modularity	5%
		Weighted Subtotal	**25%**
Permitting	20%	# of Systems Permitted in California	20%
		Weighted Subtotal	**20%**
Cost	30%	Capital Cost	15%
		O&M Cost	15%
		Weighted Subtotal	**30%**
Operability	20%	Brine Disposal and Water Recovery	10%
		Complexity, Flexibility, Downtime	5%
		Salt Use	5%
		Weighted Subtotal	**20%**
Project Delivery	5%	Provide Treatment Skid and Media	5%
		Weighted Subtotal	**5%**
WEIGHTED TOTALS			**100%**

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TABLE 3
Treatment Alternatives Evaluation Matrix Results
Ion Exchange Nitrate Treatment System
La Puente Valley County Water District Groundwater Treatment Facility, California

Criteria	Weight	Subcriteria	Weight	Evoqua System with Nitrate Specific Resin (1)	Calgon ISEP-SB (2)	System with Purolite General Resin (3)
Technical Feasibility	25%	Material Availability	10%	5	3	4
		Pre and Post-Treatment Requirements	5%	5	5	5
		Footprint	5%	5	5	5
		Modularity	5%	4	3.5	4
		Weighted Subtotal	**25%**	**24**	**20**	**22**
Permitting	20%	# of Systems Permitted in California	20%	3	3	3
		Weighted Subtotal	**20%**	**12**	**12**	**12**
Cost	30%	Capital Cost	15%	3	3	3
		O&M Cost	15%	4	4	4
		Weighted Subtotal	**30%**	**21**	**21**	**21**
Operability	20%	Brine Disposal and Water Recovery	10%	4	4	4
		Complexity, Flexibility, Downtime	5%	4	3	3
		Salt Use	5%	3	3	3
		Weighted Subtotal	**20%**	**15**	**14**	**14**
Project Delivery	5%	Provide treatment skid and media (4)	5%	5	5	0
		Weighted Subtotal	**5%**	**5**	**5**	**0**
WEIGHTED TOTALS			**100%**	**77**	**72**	**69**

Notes:

1 Evoqua provides an IX system with a nitrate selective regenerable resin manufactured by another vendor.

2 Calgon provides an ISEP-SB that also contains a nitrate selective resin manufactured by Calgon.

3 The third treatment alternative is a conventional IX system that uses a non-nitrate selective (general) resin manufactured by Purolite.

4 This sub-criterion considers whether the vendor provides the treatment skid, system components and equipment in addition to the resin. While Evoqua and Calgon provide the full package, Purolite only manufactures and provides the resin itself.

Each alternative is evaluated and assigned a score from 0 to 5, with 5 being the best possible score, for each sub-criterion.

Abbreviations:

ISEP-SB - Ion separator system with a simulated moving bed technology

IX - Ion Exchange

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TABLE 4
Preliminary Pre-Design Cost Estimate for Selected Nitrate Treatment System
Ion Exchange Nitrate Treatment System
La Puente Valley County Water District Groundwater Treatment Facility, California

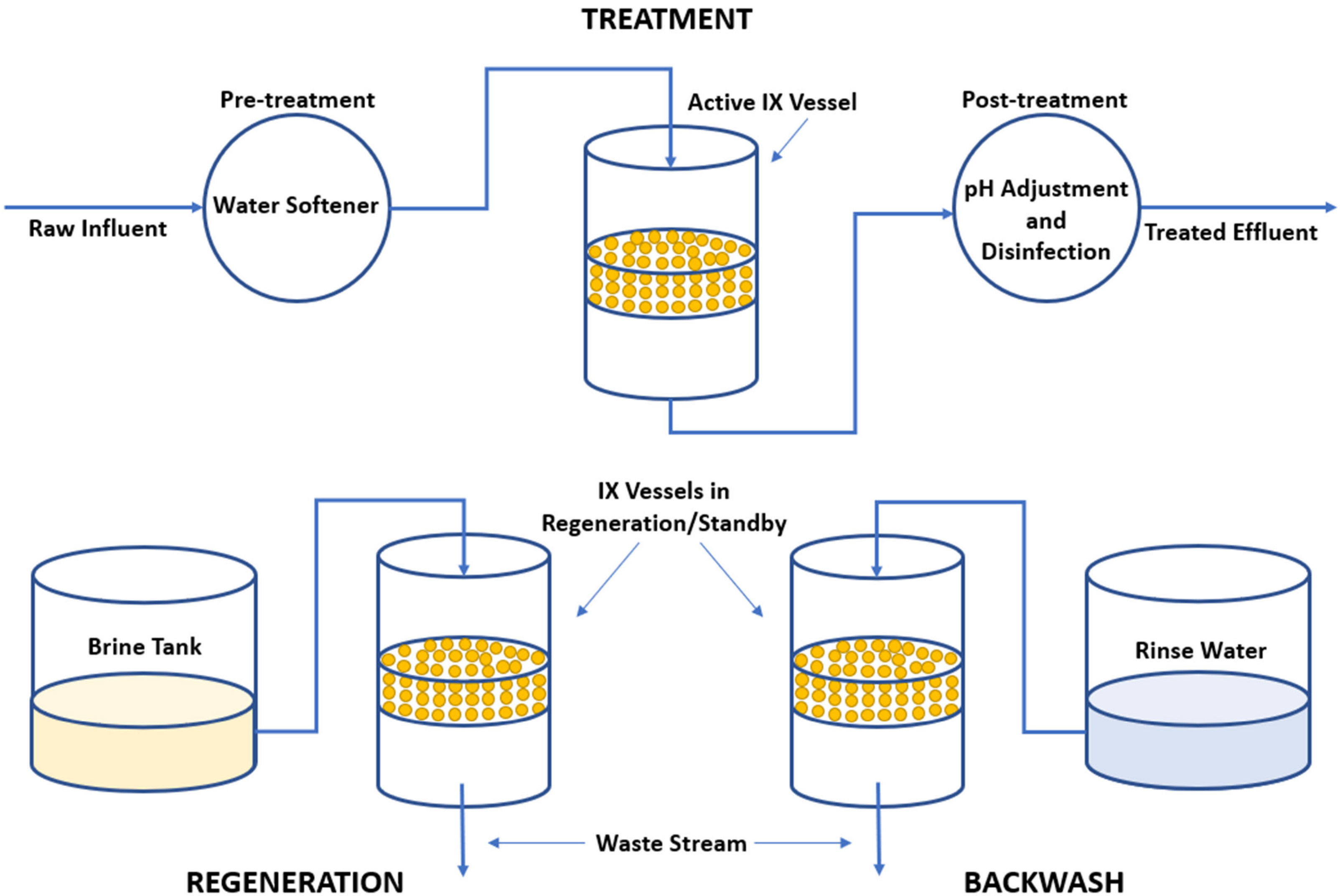
Category	Estimated Costs	
Engineering Design	$	350,000
Treatment Equipment	$	1,800,000
Construction (contractor cost)	$	750,000
Permitting	$	70,000
Construction Oversight and Quality Assurance	$	230,000
Estimated Total Capital and O&M Costs	**$**	**3,200,000**

Notes:
- The cost estimate presented above is for planning purposes (±30%) and no contingency is included.
- It is assumed that modifications to the electrical system, the ISEP building, and the concrete slab in the ISEP building.
- It is assumed that geotechnical investigations will not be required.
- The cost estimate for permitting fees considers construction permits only.
- No booster pumps will be needed for the nitrate treatment system.
- Treatment equipment cost estimate provided by Evoqua includes the four 8-foot diameter IX vessels, the control panel, automated valves, nitrate sensors for automatic regeneration, and water softener(s).

TABLE 5
Drinking Water State Revolving Fund Application Packages
Ion Exchange Nitrate Treatment System
La Puente Valley County Water District Groundwater Treatment Facility, California

Application Package	Main Package Contents	Notes
General Information Package	Amount of funding requested	To be assigned project number and manager; to be added to "Comprehensive List"; recommended by DWSRF program to be completed as the first step in the application process
	Applicant information	
	Project description	
	Proposed implementation schedule	
	Managerial information	
Technical Package	Complete engineering report	Requires coordination with project manager to present the most up-to-date information as possible
	Technical, managerial, and financial (TMF) assessment form	
	Professional engineering services contract	
	Plans and specifications	
	Certificate for Compliance with Water Metering	
Environmental Package	CEQA status	Generally requires the longest review time; recommended by DWSRF program to be completed second, following the General Information Package
	CEQA exemption information	
	Complete evaluation form for federal environmental coordination	
Financial Security Package	Alternate sources of funding	Requires coordination with project manager to present the most up-to-date information as possible
	Service connection charges	
	Water rate study, if applicable	
	Projected project costs	
	Debt management policy	
	Audited financial statements	
	Complete tax questionnaire	
	Rate adoption resolution	

FIGURES



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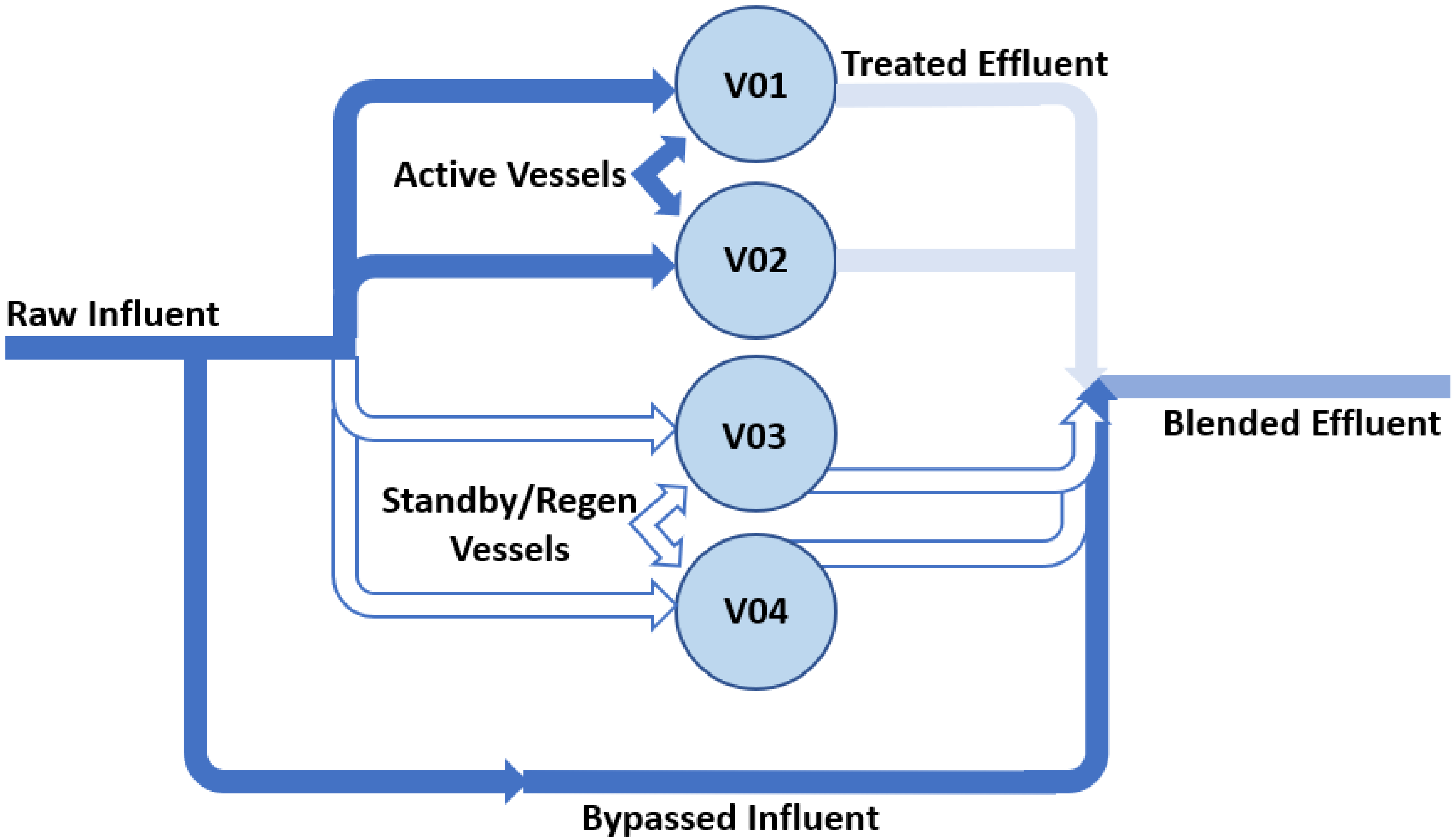
CONVENTIONAL IX SYSTEM
TREATMENT AND REGENERATION FLOW SCHEMATIC
LPVCWD GROUNDWATER TREATMENT FACILITY, CALIFORNIA

DATE:	DECEMBER 2019	FILE NO.	FIGURE 1.DOCX
PROJECT NO.	HPE1738	FIGURE NO.	1

Figure 1



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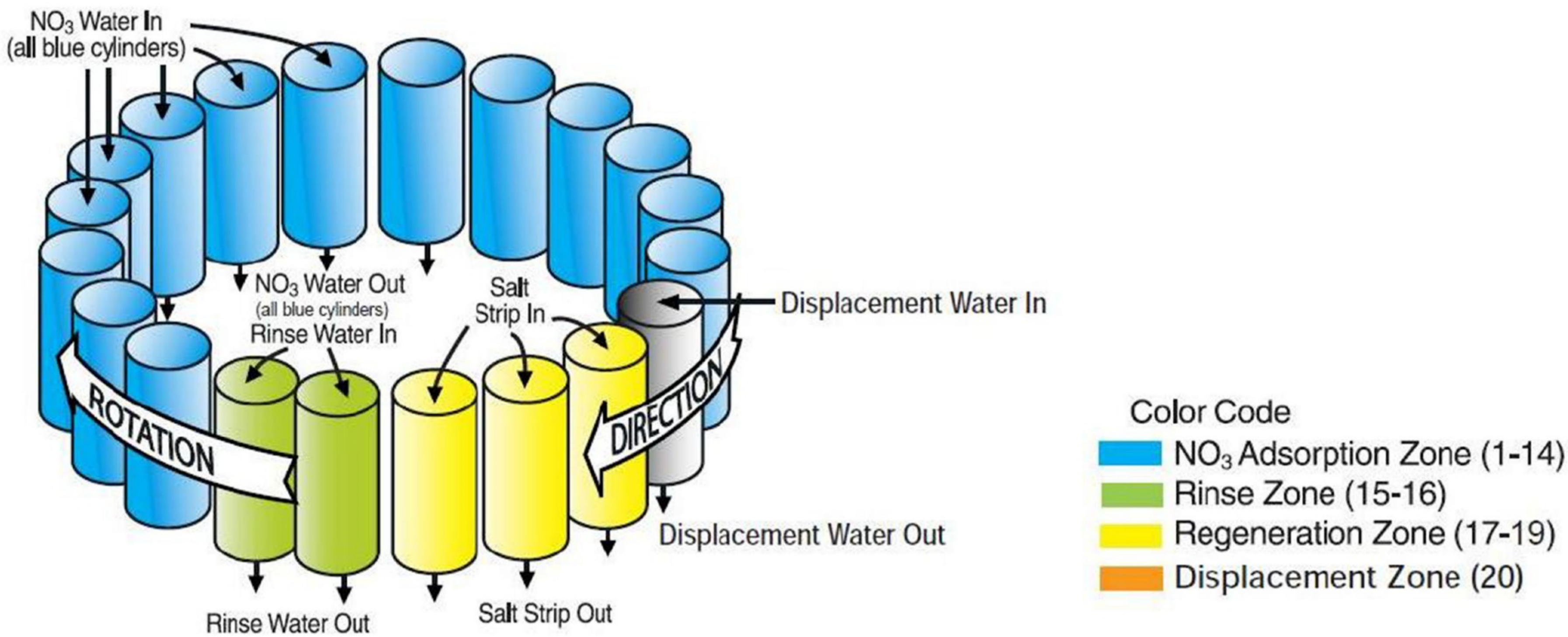
CONVENTIONAL IX SYSTEM BLOCK FLOW DIAGRAM, FOUR VESSEL SYSTEM LPVCWD GROUNDWATER TREATMENT FACILITY, CALIFORNIA			
DATE:	DECEMBER 2019	FILE NO.	FIGURE 2.DOCX
PROJECT NO.	HPE1738	FIGURE NO.	2

Figure 2



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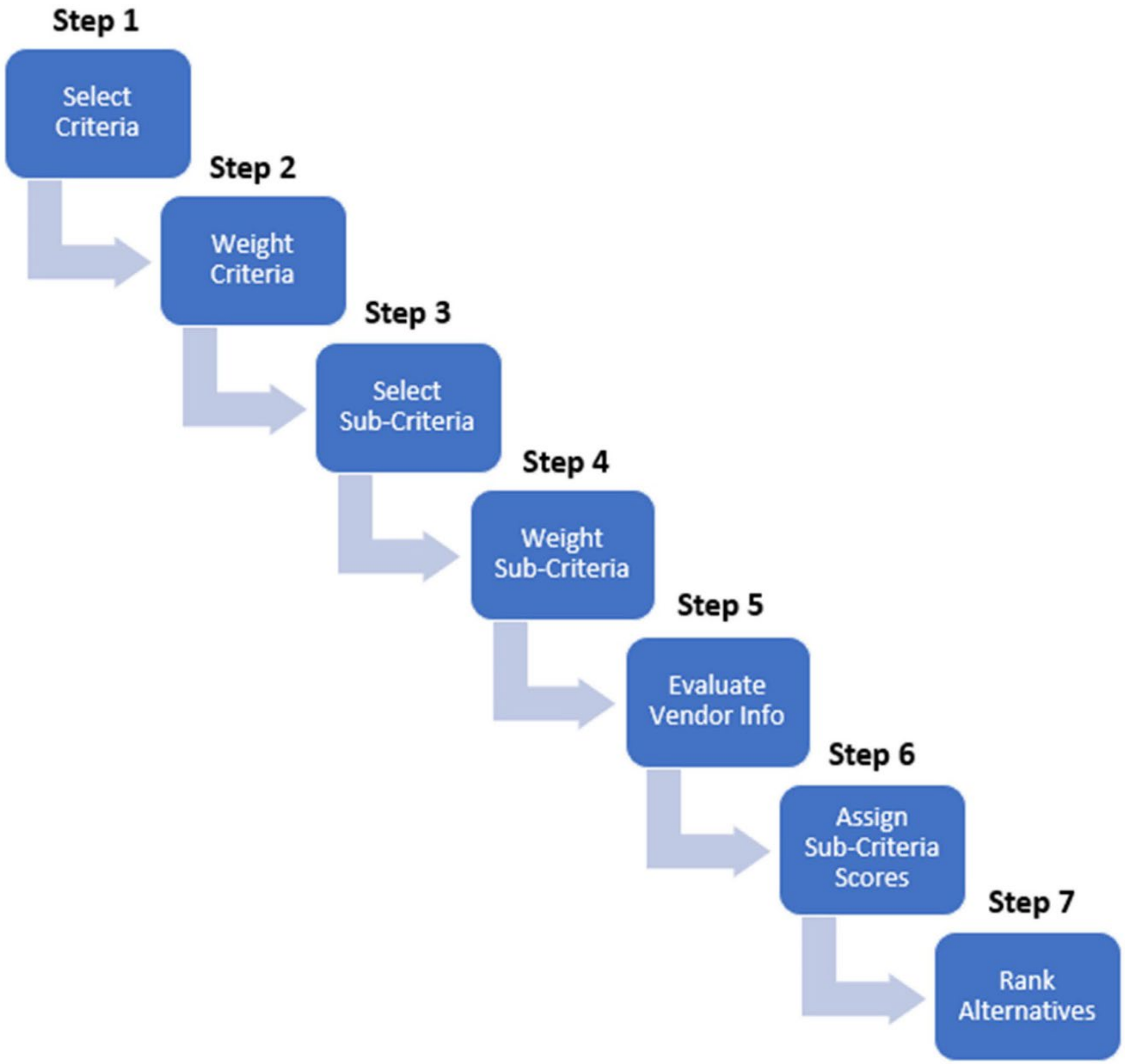
CALGON ION SEPARATOR (ISEP)
CAROUSEL SCHEMATIC [JENSEN ET AL., 2012]
LPVCWD GROUNDWATER TREATMENT FACILITY, CALIFORNIA

DATE:	DECEMBER 2019	FILE NO.	FIGURE 3.DOCX
PROJECT NO.	HPE1738	FIGURE NO.	3

Figure 3



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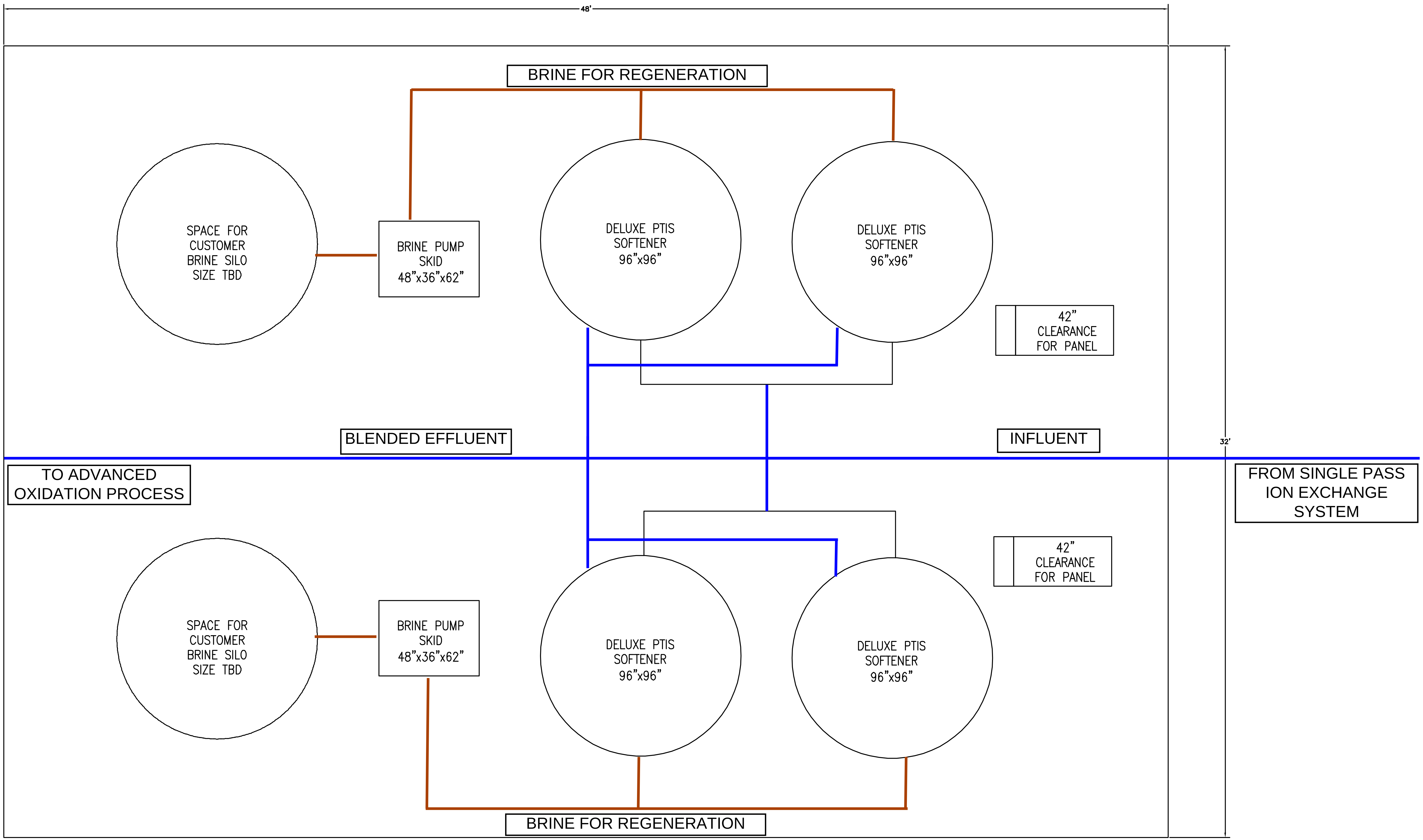
**ALTERNATIVES EVALUATION MATRIX
DEVELOPMENT FLOW CHART
LPVCWD GROUNDWATER TREATMENT FACILITY, CALIFORNIA**

DATE:	DECEMBER 2019	FILE NO.	FIGURE 4.DOCX
PROJECT NO.	HPE1738	FIGURE NO.	4

Figure 4



NOTE: ADAPTED FROM EVOQUA'S SYSTEM LAYOUT

PRELIMINARY SITE PLAN/LAYOUT [EVOQUA]

FIGURE NO. 5

COMPANY CONFIDENTIAL

DESIGNER	DATE
CHECKER	DATE
ENGINEER	DATE
MANAGER	DATE
FILE:	
SCALE: NONE	

TITLE LAYOUT DRAWING

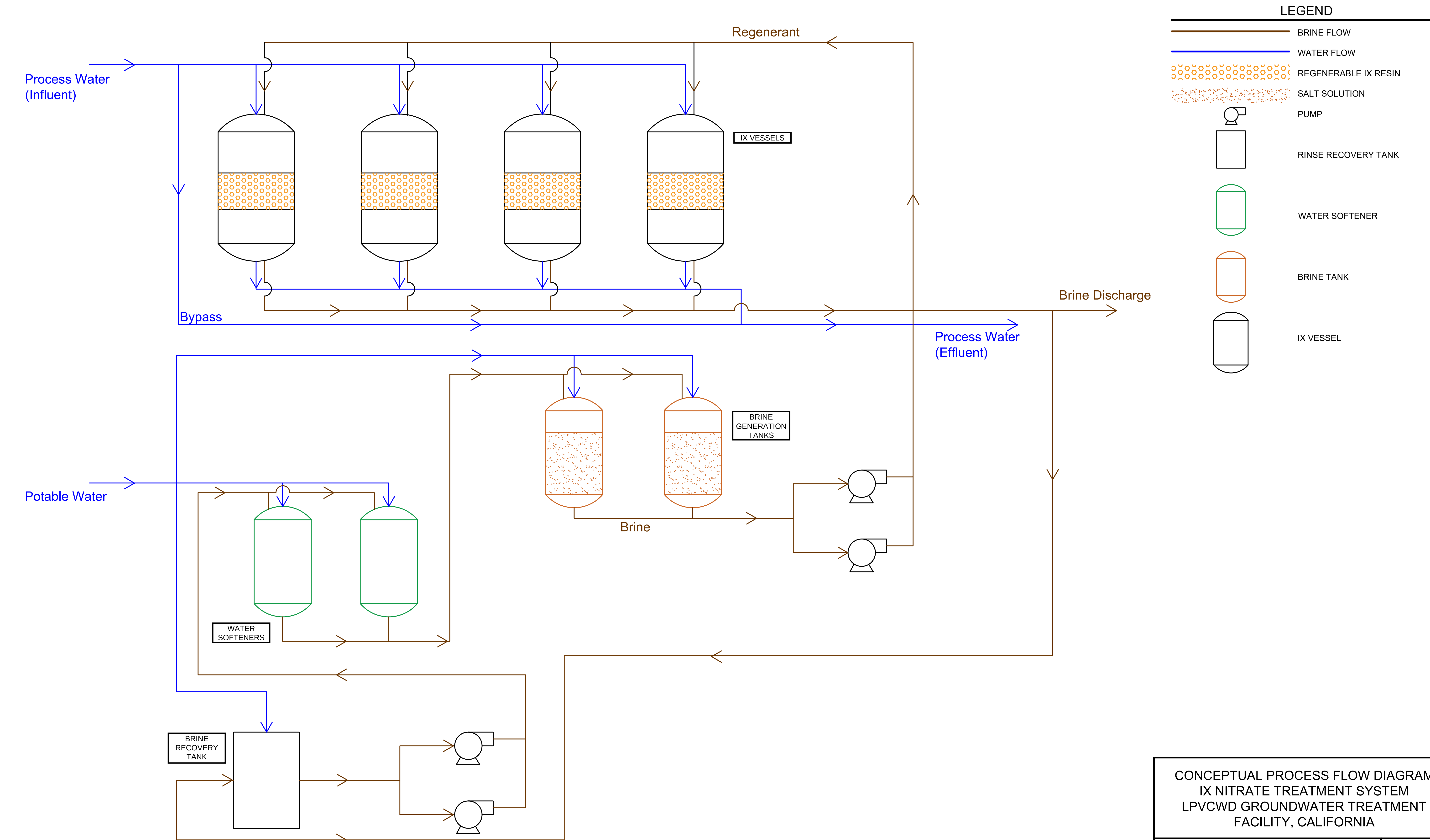
CLIENT GEOSYNTEC

EVOQUA WATER TECHNOLOGIES
SCHAUMBURG, IL.
847-805-1155

PROJECT	CODE	DRAWING	SHEET	REV
			OF	A

REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN

BORDER: 24X36D BAR = 1" AT PLOT SCALE INTL REF:



P:\PRJ4\CAWP\HPE1738 - LPVCWD\PROJECT DOCUMENTS\TECHNICAL MEMORANDUM\FIGURES - IMAGES AND WORD FILES\PFD_ - Last Saved by: KKhadarian on 12/17/19

CONCEPTUAL PROCESS FLOW DIAGRAM
IX NITRATE TREATMENT SYSTEM
LPVCWD GROUNDWATER TREATMENT
FACILITY, CALIFORNIA

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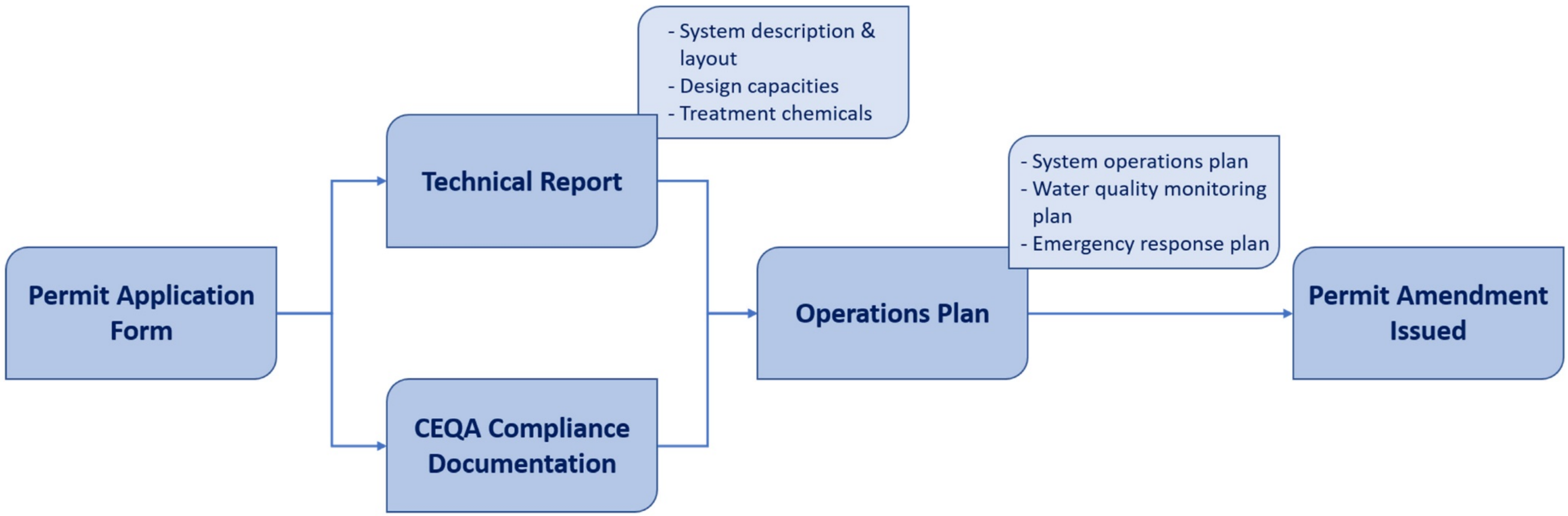
FIGURE 6

PROJECT NO: HPE1738 | DECEMBER 2019



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DDW PERMIT AMENDMENT PROCESS FLOW
LPVCWD GROUNDWATER TREATMENT FACILITY, CALIFORNIA

DATE:	DECEMBER 2019	FILE NO.	FIGURE 7.DOCX
PROJECT NO.	HPE1738	FIGURE NO.	7

Figure 7

Item	Month									
	1	2	3	4	5	6	7	8	9	10
Design Basis Report and Engineering Design										
Permitting: Division of Drinking Water										
Permitting: Los Angeles County/City of Baldwin Park										
Procurement: Vendor and General Contractor										
Procurement: Equipment Fabrication and Delivery										
Construction										
System Integration, Startup, and Commissioning										

Notes:

CEQA permitting process, DWSRF application process, and the demolition of the existing Ion Separator (ISEP) system are not included in the preliminary implementation schedule.

Abbreviations:

CEQA - California Environmental Quality Act

DWSRF - Drinking Water State Revolving Fund

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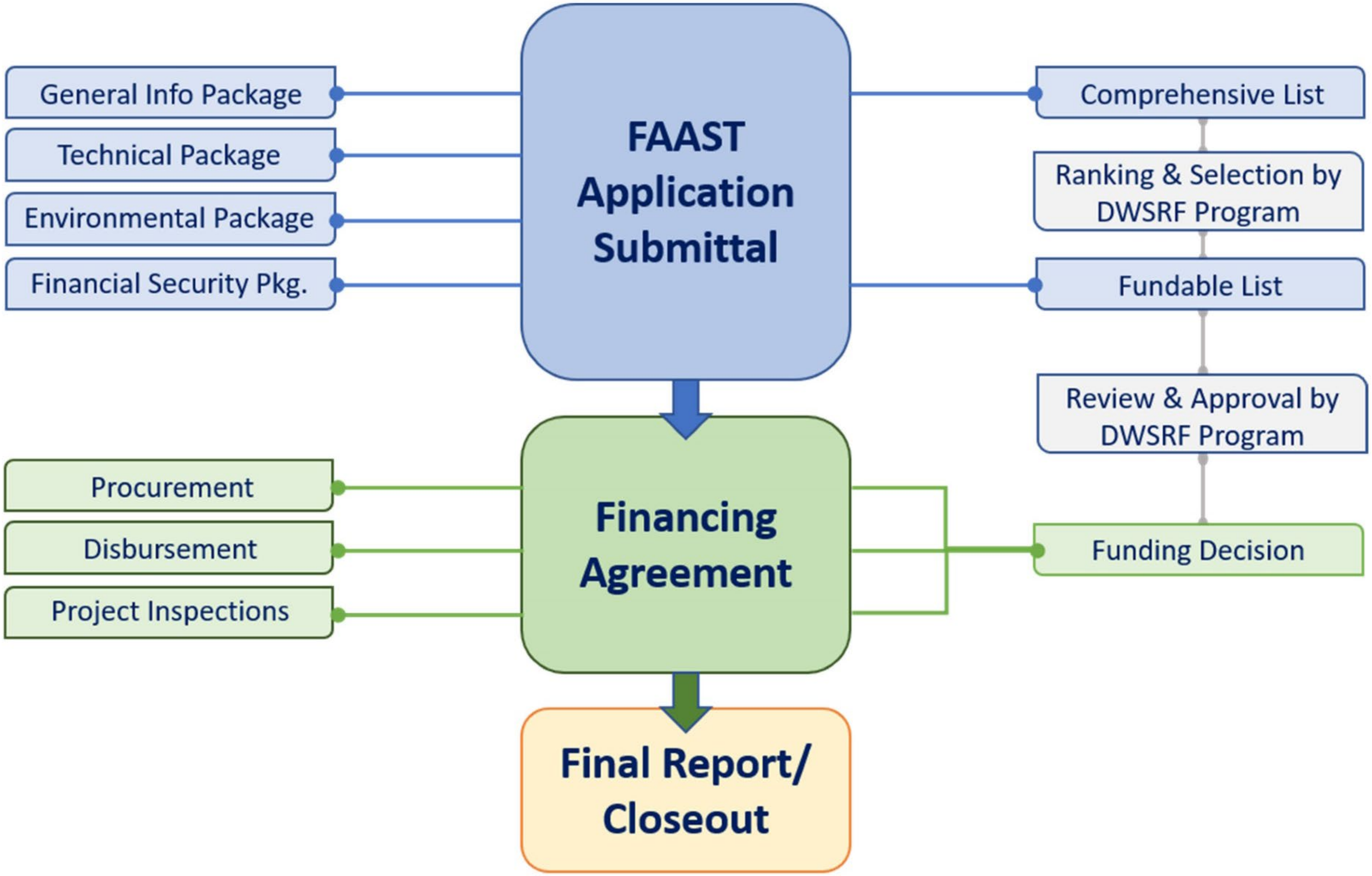
PRELIMINARY IMPLEMENTATION SCHEDULE
LPVCWD GROUNDWATER TREATMENT FACILITY, CALIFORNIA

DATE:	DECEMBER 2019	FILE NO.	FIGURE 8.DOCX
PROJECT NO.	HPE1738	FIGURE NO.	8

Figure 8



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DWSRF PROGRAM PROCESS FLOW
LPVCWD GROUNDWATER TREATMENT FACILITY, CALIFORNIA

DATE:	DECEMBER 2019	FILE NO.	FIGURE 9.DOCX
PROJECT NO.	HPE1738	FIGURE NO.	9

Figure 9

ATTACHMENTS

ATTACHMENT A

Numerical Study of Projected Nitrate-Nitrogen Concentrations at LPVCWD Wellfield
(Stetson Engineers, Inc.)

861 Village Oaks Drive, Suite 100 • Covina , California 91724
Phone: (626) 967-6202 • FAX: (626) 331-7065 • Web site: www.stetsonengineers.com

Northern California • Southern California • New Mexico • Arizona • Nevada • Colorado

STETSON ENGINEERS INC.

Reply to: Covina

TECHNICAL MEMORANDUM

TO: **Mr. Greg Galindo**

FROM: **Stetson Engineers Inc.**

SUBJECT: **Numerical Study of Projected Nitrate-Nitrogen Concentrations at La Puente Valley County Water District Wellfield**

DATE: **November 22, 2019**

JOB NO: **2721-002**

INTRODUCTION

In a letter dated July 17, 2019, Stetson Engineers Inc (Stetson) provided La Puente Valley County Water District (LPVCWD) with a scope of work and budget to evaluate potential future Nitrate-Nitrogen (NO_3-N) concentrations at the LPVCWD Wellfield (Wells No. 2, 3, and 5), with an emphasis on Well No. 5. (LPWCWD subsequently authorized Stetson to proceed in an email dated July 26, 2019). As stated in the scope of work, the LPVCWD Wellfield and treatment facility is a component of the Baldwin Park Operable Unit (BPOU) EPA Superfund cleanup program and includes treatment facilities for a variety of contaminants, but not NO_3-N. Historically, NO_3-N concentrations in the LPVCWD Wellfield have been trending gradually upward over the last 30 years. For example, the NO_3-N concentration in Well No. 3 was around 5 to 6 milligrams per liter (mg/l) during the 1990's, which was below the Maximum Contaminant Level (MCL) of 10 mg/l. The NO_3-N concentrations in Well No. 3 have gradually increased and are currently averaging about 8.4 mg/l.

The Study Area (Figure 1) is located in the south-central portion of the Main San Gabriel Basin (Main Basin). LPVCWD owns three (3) extraction wells (Well No. 2, No. 3, and No. 5) and a groundwater treatment facility at its Wellfield located in the City of Baldwin Park. Major groundwater extraction wells, including the United States Environmental Protection Agency (USEPA) BPOU Remedy wells, and other municipal wells, are located within the Study Area. These wells include the LPVCWD Wells No. 2, No. 3 and No. 5; San Gabriel Valley Water Company's (San Gabriel's) Plant B4 (Wells B4B and B4C); Plant B6 (Wells B6C and B6D, and Wells B25A, B25B, B26A, and B26B); Suburban Water Systems (SWS) Plant 140 (Wells 140W-4 and 140W-5); and Valley County Water District (VCWD) Wells Big Dalton and Paddy Lane. Location of the Study Area is shown on Figure 1.

Historically, the Study Area included significant agricultural activities, often times associated with elevated NO_3-N concentrations in the groundwater. The Study Area is now highly urbanized, and on-going sources of NO_3-N from agricultural activities are almost nonexistent. However, the cause of the steady rate of increase of NO_3-N concentrations observed in the LPVCWD Wellfield is likely the combination of upgradient NO_3-N migration, possibly variable groundwater levels, residual NO_3-N in the vadose zone (unsaturated zone) from past agricultural activities, and other sources. Consequently, without planned treatment (including potential blending) for NO_3-N, the existing sources of supply to the LPVCWD BPOU treatment facility may need to be removed from service, which would impact the BPOU cleanup program under the USEPA Superfund.

PURPOSE AND SCOPE

A detailed analysis was conducted to assess the current and future NO_3-N concentrations in the Study Area. This includes reviewing historical water quality data, evaluating the possible occurrence and distribution of NO_3-N concentrations, and developing possible NO_3-N loading scenarios for 30-year groundwater flow and transport model simulations. In addition, knowledge and experience with increasing NO_3-N concentrations at the nearby San Gabriel Valley Water Company (San Gabriel) Plant B6 Wellfield was used in this evaluation.

The following tasks were undertaken as part of this study to evaluate the need for NO_3-N treatment and/or blending of LPVCWD groundwater supply.

- Overview of Hydrology, Geology and Hydrogeology in the Study Area;
- Review Historical Water Quality Data in the Vicinity of the LPVCWD Wellfield (Study Area);
- Evaluate the Distribution and Occurrence of Nitrate-Nitrogen Concentration at the LPVCWD Wellfield and the Vicinity;
- Conduct Future NO_3-N Concentration Model Simulations; and
- Recommend the Preliminary Design Criteria for a LPVCWD NO_3-N Treatment Facility.

To achieve these goals, two (2) United States Geological Survey's (USGS's) models were used to simulate temporal variations in NO_3-N concentrations at the LPVCWD Wellfield, with an emphasis on Well No. 5, under different scenarios. The models used are Watermaster's 3-D Basin Model, coupled with the USGS transport Multi-Species Model (MT3D-USGS). The 3-D Basin Model was developed using the USGS modular structure MODFLOW-2005 (Harbaugh, 2005) code to perform the regional transient groundwater flow analysis. The 3-D Basin Model was calibrated from FY 1973-74 to FY 2014-15 in the shallow, intermediate, and deep water bearing formations. The 3-D Basin Model has been applied to various groundwater flow studies in the Main Basin including a recent study (coupled with the MT3D-USGS model) to evaluate impacts of indirect potable reuse water replenishment in the Main Basin (Stetson, 2018).

STUDY AREA

As noted above, the Study Area is located in the south-central portion of the

Main Basin, as shown on Figure 1. The following is a brief overview of the historical hydrology, geology, and hydrogeology in the Study Area.

Hydrology

The annual rainfall from Water Year (WY) 1958-59 through WY 2017-18 in the San Gabriel Valley averaged approximately 17.1 inches per year, as shown on Table 1 and Figure 2. The Study Area is drained by Big Dalton Wash and by Walnut Creek. Big Dalton Wash is a lined channel discharging into Walnut Creek about 1,000 feet westerly of the LPVCWD Wellfield. Flow in Big Dalton Wash is recorded by the Los Angeles County Department of Public Works (LACDPW) gaging station F274B-R located near Merced Avenue. There is little water flowing in Big Dalton Wash except for periods during and after heavy rainstorms or the release of untreated imported water into San Dimas Wash (which flows into Big Dalton Wash). According to the LACDPW's WY 2017-18 Hydrologic Report, stream flow in Big Dalton Wash at gaging station F274B-R ranged from 0.03 cubic feet per second (cfs) to 340 cfs. Walnut Creek is also a lined channel except for the westerly most 6,000 feet, discharging into the San Gabriel River about two miles southwesterly of the LPVCWD Wellfield. There is little water flowing in Walnut Creek except for periods during and after heavy rain and releases from Puddingstone Dam. Stream flow in Walnut Creek is recorded by LACDPW gaging station F304-R located about 850 feet easterly of Puente Avenue. The LACDPW's WY 2017-18 Hydrologic Report indicates stream flow in Walnut Creek ranged from 0.03 cfs to 101 cfs during WY 2017-18. The location of gaging stations F274B-R and F304-R are shown on Figure 1.

Geology

Available driller logs for production wells in the Study Area indicate the water bearing formations consist of alluvial materials ranging from fine-grained sand to boulders. Available drillers' logs for the LPVCWD wells indicates the water bearing formations consist of unconsolidated materials ranging from sand to coarse gravel and rocks with various clay shales (fine-grained units) present at a depth from about 400 feet through 550 feet below ground surface (bgs). These clay shales may not be spatially continuous, but can act as local vertical flow barriers. Lithologic profiles for the LPVCWD wells are shown on Figure 3.

Hydrogeology

The direction and movement of groundwater can be estimated using a groundwater contour map. Over the years, groundwater contour maps prepared by Watermaster as part of its Basin-wide Groundwater Elevation Monitoring Program (BGWEMP) using static water level data from water production wells throughout the Basin indicate that the general direction of groundwater flow in the study area appears to be from the east-northeast toward the west-southwest. The groundwater direction and gradient in the Study Area, based on the calibrated Watermaster's 3D MODFLOW-based San Gabriel Basin Model (3D Basin Model) between Fiscal Year (FY) 1973-74 and FY 2014-15, indicates the groundwater flow direction (measured as a counter-clockwise rotation from the positive X-axis) ranges from a westerly flow (FY 2002-03) to a southwesterly flow (FY 2004-05). The hydraulic gradient ranges from approximately 0.00085 (FY 1976-77) to approximately 0.00135 (FY 2005-06). Groundwater flow direction and hydraulic gradient are calculated using simulated water level data from three (3) locations located close to the LPVCWD Wellfield within the Study Area. The locations of these three (3) data points and estimated annual groundwater flow directions and hydraulic gradients between FY 1973-74 and FY 2014-15 are shown in Figure 4 and Table 2.

The characteristics of the aquifer in the vicinity of LPVCWD Well No. 5 were estimated from an aquifer performance test (APT) conducted at the SGVWC Plant B6 on September 24, 1992 and the LPVCWD Wells 2 and 3 on March 15, 2006. Plant B6 is located approximately 1,200 feet westerly of Well No. 5. SGVWC Well B6B was used as the pumping well, and Well B6C was used as the monitoring well for the APT. For the LPVCWD Wells 2 and 3 APTs, two (2) nearby piezometers, PZ3-LP3A S/D and PZ3-LP3B S/D were used as the monitoring wells. The results of the APT indicate the shallow aquifer in the vicinity of the SGVWC Plant B6 act as a semi-confined aquifer with a transmissivity of approximately 71,000 square per feet per day (ft2/day), a coefficient of storage of approximately 8.2x10-5, and a hydraulic conductivity of approximately 260 feet per day (ft/day) (Watermaster, January 1993). The average hydraulic conductivity and coefficient of storage in the shallow aquifer in the vicinity of the LPVCWD Well 2 are approximately 487 ft/day and 1.5x10-3, respectively and the average hydraulic conductivity and coefficient of storage in the deep aquifer approximately 62 ft/day and 6.5x10-6, respectively. Similarly, the average hydraulic conductivity and coefficient of storage in shallow aquifer in the vicinity of the LPVCWD Well 3 are approximately 289 ft/day and 1.3x10-4, respectively (Geomatrix, January 2007). In addition, Stetson Engineers, Inc. (Stetson) performed a step-drawdown test at the LPVCWD Well No. 5 on March 11, 2008. The step-drawdown test indicated that Well No. 4 is capable of achieving the design flow rate of 2,500 gallons per minute (gpm) and the estimated specific capacity at the LPVCWD Well No. 5 is approximately 90 gpm/foot (Stetson, July 2008). The high values of hydraulic conductivity and transmissivity from the APTs suggest a high groundwater movement system in the Study Area.

HISTORICAL WATER QUALITY DATA

Groundwater NO_3-N Data

This study assesses the historical and current NO_3-N concentrations within the Study Area to project NO_3-N concentrations in the LPVCWD Wellfield and to evaluate the need for a potential new treatment facility to remove the NO_3-N in the groundwater. The current NO_3-N concentrations are shown on Figure 5, and the historical high and current NO_3-N concentrations in the upgradient wells are summarized on Table 3. It is noted that for model simulation purpose, Figure 5 is a composite NO_3-N concentration of the shallow, intermediate and deep zones. The deep zone is assumed to be clean (no NO_3-N concentration contamination) and the shallow and intermediate zones are assumed to have the same NO_3-N concentrations. As noted earlier, the regional groundwater flow direction is from the east-northeast toward the west-southwest. Wells which are upgradient of the LPVCWD Wellfield are shown on Figures 1 and 5. Upgradient wells include, but are not limited to, the Valley County Water District (VCWD) Big Dalton Well (perforated between 250 feet and 582 feet bgs, in the shallow and intermediate zones), and the Suburban Water System (SWS) Wells 139-W2 (perforated between 105 feet and 361 feet bgs, in the shallow zone), 139-W4 (perforated between 566 feet and 825 feet bgs, in the intermediate and deep zones) and 139-W5 (perforated between 750 feet and 1,060 feet bgs, in the deep zone). The EPA multiport well MW5-20, which is located downgradient of the LPVCWD Wellfield, has NO_3-N concentrations for the shallow zone (port 7, 210 feet bgs, 12.0 mg/l in June 2017) and the intermediate zone (port 6, 410 feet bgs, 16.0 mg/l in June 2017). As noted on Figure 5, there is a substantial NO_3-N plume located to the northeast and east of the LPVCWD Wellfield. In many cases wells have ceased operation (or have been destroyed) as a result of elevated NO_3-N. Although recent data is not available, information has been provided on Table 3 and Figure 5 to characterize the widespread occurrence of NO_3-N in the Study Area.

Plots of historical NO_3-N concentrations in the LPVCWD Wellfield are shown on Figure 6A and nearby production wells are shown on Figure 6B. Figure 7 shows the NO_3-N concentrations sampled at the EPA BPOU multi-port wells within the Study Area. Historical NO_3-N concentrations (Figure 6A) generally show a gradually increasing trend for the LPVCWD Wells No. 2, No. 3, and No. 5, particularly after year 1990; however, the nearby production wells do not show the same increasing pattern except the Valley County Water district (VCWD) Paddy Lane Well (Figure 6B).

The LPVCWD Wells No. 2 and No. 5 are perforated from 576 feet to 926 feet and from 590 feet to 765 feet bgs, respectively. Based on the lithologic information in the Study Area, both wells are considered to be intermediate and deep wells. Despite slight fluctuations of NO_3-N concentration observed in the LPVCWD Wellfield, NO_3-N concentrations in the LPVCWD Wellfield generally show a steady upward trend over the past 30 years, as shown on Figure 6A. The NO_3-N concentration in Well No. 2 was measured at a concentration of 2.6 milligrams per liter (mg/l) in March 1993. The NO_3-N concentration in Well No. 2 has gradually increased to 6.4 mg/l in November 2017 and the maximum concentration of 8.0 mg/l was detected in May 2017. Although Well No. 5 has been in operation for a shorter period of time, the NO_3-N concentration in Well No. 5 shows a similar upward trend as Well No. 2. The NO_3-N concentration in Well No. 5 was measured at a concentration of 6.9 mg/l in January 2016. The NO_3-N concentration in Well No. 5 gradually increased to 8.2 mg/l in December 2018. Figure 6B and Figure 7 show historic water levels and NO_3-N concentrations for several key wells within the Study Area (including production wells and EPA BPOU monitoring wells).

Available NO_3-N concentrations in the up- and downgradient wells suggest plume migration, in conjunction with groundwater movement, is one of the mechanisms which has caused the increasing NO_3-N concentrations at the LPVCWD Wellfield. Another mechanism that causes the upward trend of the NO_3-N concentration is the impact of the residual NO_3-N in the unsaturated zone due to past agricultural activities in the upgradient Study Area. The occurrence and potential NO_3-N loading from the unsaturated zone to groundwater is discussed below.

Occurrence and Loading of NO_3-N

Sources of NO_3-N in the Study Area are believed to be the result of leaching (from historical agricultural and other activities) of NO_3-N from the unsaturated zone of the aquifer into the groundwater; however, the sources of NO_3-N cannot be delineated due to the lack of data and characterization of the spatial and temporal variabilities of the NO_3-N source through direct NO_3-N monitor in the Study Area which were not performed as part of this study. To gain an understanding of the NO_3-N sources and the corresponding loading rates in the Study Area, an indirect approach was performed through sensitivity analysis from transport simulations. It was determined the NO_3-N leakage from the unsaturated zone to groundwater is considered a function of NO_3-N loading rate uniformly applied to the future 30-year study period. NO_3-N loading rates were increased incrementally from the initial 5 Kilogram per Acre per day (Kg Acre-1 per day) to the largest level of 30 Kg Acre-1 per day during sensitivity analysis. The results of sensitivity analysis suggest the 5 Kg Acre-1 per day NO_3-N loading rate appear to be underestimated as this loading rate failed to support the gradual NO_3-N concentration increase observed at the LPVCWD Wellfield. Similarly, the 30 Kg Acre-1 per day NO_3-N loading rate seemed to be overestimated as this loading rate will significantly increase NO_3-N concentrations at the LPVCWD Wellfield in a short period.

The NO_3-N concentration data in the past ten (10) years obtained from the

Watermaster Database shows the average increased NO_3-N concentrations at the LPVCWD Wellfield is about 3.9 mg/l (Wells 2 increased from 5.1 mg/l on April 6, 2007 to 8.0 mg/l on May 17, 2017, Well 3 increased from 3.8 mg/l on April 1, 2007 to 9.9 mg/l on May 1, 2017 and Well 5 increased from 5.5 mg/l on March 3, 2008 to 8.2 mg/l on December 10, 2018). Model simulated NO_3-N concentrations at the LPVCWD Wellfield were able to produce the similar upward trends using the initial spatial NO_3-N distribution shown on Figure 5, and the NO_3-N loading rates (15 Kilogram per Acre per day (Kg Acre-1 per day) and 25 Kg Acre-1 per day) within the Study Area shown on Figure 8. Model simulation results will be discussed in the "***Transport Simulation***" Section later.

GROUNDWATER FLOW AND TRANSPORT SIMULATION

Watermaster's 3-D Basin Model, coupled with the USGS Transport Multi-Species Model (MT3D-USGS) were used for groundwater flow and solute transport simulations, respectively, to assess the future NO_3-N concentrations in the LPVCWD Wellfield. The 3D Basin Model is calibrated from FY 1973-74 to FY 2014-15. The technical basis of these two (2) models are documented the USGS's reports (Harbaugh, 2005 and Bedekar et al., 2016), and are included by reference. The 3D Basin Model closely simulates the hydraulic head and groundwater flow fields in the Study Area which provide the necessary groundwater velocity fields for transport simulations. Results of the flow simulations which generate the highest hydraulic gradient in the Study Area was chosen and used as the required velocity field for the transport simulations. (It is recognized there will be variations through the years based on varying hydrologic conditions. However, using the highest hydraulic gradient in the Study Area should be a dispersion dominant groundwater condition and results of simulated NO_3-N concentrations are deemed the most conservative in terms of planning and design (i,e, concentrations of NO_3-N will arrive sooner than later). The future NO_3-N concentrations in the LPVCWD Wellfield were simulated using the solute transport model under current NO_3-N distribution with and without possible NO_3-N loadings.

Both the flow and transport simulations (with and without NO_3-N loading) were performed under the following assumptions:

- Model calibration was performed for flow simulations. The calibrated flow model provides the flow velocity files required in the transport simulations.
- The efforts involved in the transport calibration of the NO_3-N concentrations will require a good understanding of the temporal and spatial changes of the NO_3-N concentration, possible nitrogen transformations in the unsaturated zone and groundwater, historical land use and NO_3-N loading, and impacts from the spreading activities. In addition, the purpose of this study is to provide a quick understanding of the future NO_3-N concentrations at the LPVCWD Wellfield for the design of a NO_3-N treatment plant under current NO_3-N information; therefore, transport calibration of the historical NO_3-N concentrations in the LPVCWD Wellfield was not performed.
- Groundwater basin production was assumed to increase over the next 30 years as a result of increased population, as shown on Table 4.
- Replacement Water deliveries to the Basin were assumed to average about 43,000 acre-feet per year, but will increase proportionally as a result of increased population.
- Hydrologic conditions for future flow and transport simulations remain the same.
- The unsaturated zone is a mixture of gaseous, solid and liquid material. Contaminant transport in the multiphase unsaturated zone is complex and requires field measurements to help calibrate and make simulation results meaningful and reliable. Because of the lack of data needed for transport simulation in the unsaturated zone, transport simulations of NO_3-N through the vadose zone were not performed. The NO_3-N loadings entering the shallow aquifer through the vadose zone is assumed to occur immediately (no time lag) and continuously for the entire 30-year simulation period.
- To be conservative, the loss of NO_3-N due to chemical reaction and adsorption were not considered in the transport simulation. This

assumption may affect the simulation results; however, it is believed the magnitude of impacts from this assumption is far less than the impacts from uncertainty.

There are some additional “qualifications” needed for these two model run scenarios (with and without NO_3-N loading).

1. By using the “highest hydraulic gradient” in the Study Area for the model runs, it is coincidentally a year when significant amounts of replenishment water was replenished in up-gradient spreading grounds. It is observed in the model runs (especially a model run without NO_3-N loading) that modeling this higher replenishment amount (about twice long-term average) results in abnormal and unrealistic lower future concentrations of NO_3-N in the LPVCWD Wellfield.
2. Available NO_3-N data in up-gradient wells is incomplete, very old, and at some locations, limited to multi-port well sampling zones. Efforts were made to correlate and use the most current and representative NO_3-N data available.

<u>Groundwater Flow Simulation</u>

Watermaster’s 3-D Basin Model was calibrated between FY 1973-74 to FY 2014-15. Results of model simulated groundwater flow direction and hydraulic gradient in the Study Area are shown on Table 2. Groundwater flow directions range from northeast to southwest to and east to west direction. The hydraulic gradient ranges from 0.00085 (FY1976-77) to 0.00135 (FY 2005-06). The simulated groundwater condition in FY 2005-06 (the largest hydraulic gradient) in the Study Area was chosen and used as the initial conditions for the 30-year predictive flow simulation. The predictive simulation was performed with an annual stress period.

Assumptions made for the predictive simulation include:

- Groundwater demand was estimated based on the correlation between the projected population (San Gabriel Valley Economic Forecast and Regional Overview reports) and hydrologic conditions. The 30-year projected groundwater demand is provided in Table 4 and Figure 9.

- The Main Basin receives a long-term average replenishment of about 39 MGD (approximately 43,250 AFY). The long-term average replenishment is uniformly applied to the predictive model (applied to the Main Basin through spreading grounds) for the entire model simulation period.
- The hydrologic condition in FY 2005-06 is assumed and applied to the entire model simulation period, as a conservative approach.

Transport Simulation

The transport simulation was performed using the USGS MT3D-USGS model (Bedekar et al., 2016), which is an updated release of the MT3DMS (Zheng, 2010), for the simulation of advection and dispersion of potential dissolved constituents in groundwater. Plume migration in groundwater is chemical dependent, and the migration pathways are highly dependent on the characteristics of the constituents. Despite many other factors that may affect plume migration, two (2) major factors, groundwater flow (advection) and mixing process (a result of the change of concentration gradient), were considered (conservative solute transport simulation). Two scenarios were assumed for the transport simulation; 1) that a considerable amount of NO_3-N remains in the vadose zone and continues to leach into the groundwater (with loading), and 2) the NO_3-N contaminant plume moves solely with groundwater movement and there is no additional loading, that is, NO_3-N leaching from the unsaturated zone is not considered. Both scenarios start with the same initial distribution of NO_3-N concentrations, as shown on Figure 5. The initial NO_3-N concentrations were applied to the 3-D Basin Model's shallow and intermediate layers from which the LPVCWD Wellfield produces. Zero (0) NO_3-N concentration was assumed and applied to the 3-D Basin Model's deep layer (deep zone). The difference between these two (2) scenarios is that a constant NO_3-N loading is only applied to Scenario 1.

Despite the unknowns of spatial distribution and leaching rate of NO_3-N in the unsaturated zone, the spatial distribution and leaching rate of NO_3-N were estimated through several transport test runs prior to applying the findings to the final transport simulations. In addition, the NO_3-N leaching was only applied to the shallow 3-D Basin Model layer for the entire simulation period. The well perforation information (Table 3) indicates the LPVCWD Well 2 (perforated between 576 feet and 926 feet bgs) extracts groundwater from the intermediate and deep zones and both Wells 3 (perforated between 620 feet and 770 feet bgs) and Well 5 (perforated between 590 feet and 765 feet bgs) mainly extract groundwater from the intermediate zone. Extracted groundwater from Well 2 will blend with more clean water from the deep zone and is expected to produce better groundwater quality than Wells 3 and 5. The results, assuming NO_3-N leaching (NO_3-N loading as shown on Figure 8) is applied to the Study Area (Scenario 1), are shown on Figure 10. The simulated NO_3-N concentrations at the LPVCWD Wells 2, 3 and 5 were calculated based on the weighted average (blended) of NO_3-N concentrations (the LPVCWD Wells 2, 3 and 5 are perforated in different aquifer zones). Model simulated NO_3-N concentrations at the LPVCWD Wells 2, 3 and 5 for Scenario 1 are shown on Table 5. Results of Scenario 1 transport simulation shows a steady increase in NO_3-N concentrations in LPVCWD Wells 2, 3 and 5 during the first fifteen (15) years simulation. The simulated concentrations stay relatively stable once NO_3-N concentrations reach about 16 mg/l, 21 mg/l ad 20 mg/l for the LPVCWD Wells 2, 3 and 5, respectively. The relatively stable concentrations at the LPVCWD Wellfield after fifteen (15) years of simulation are mainly due to the upgradient NO_3-N loading (leaching). A spatial NO_3-N plume map after 20-year transport simulation for Scenario 1 is shown on Figure 11.

Scenario 2 simulation is believed not realistic because it does not consider upgradient NO_3-N loading and, because it uses the "largest hydraulic gradient year" (with significantly larger quantities of replenishment water up-gradient). It is believed NO_3-N leaching will continue to occur as is reflected by increases observed historically and the Scenario 2 results likely are not indicative of expected future NO_3-N concentrations in the LPVCWD Wellfield. Results of Scenario 2 show gradual NO_3-N concentration decrease in the LPVCWD Wells 2, 3 and 5 after the concentrations at each well reach their highest levels. Results of simulated NO_3-N concentrations at the LPVCWD Wells 2, 3 and 5 for Scenario 2 are attached in Appendix A. In addition, a comparison of simulated NO_3-N concentrations between Scenario 1 and Scenario 2 shows the simulated NO_3-N concentrations at the LPVCWD Well 2 are 8.0 mg/l and 11.4 mg/l, respectively; 12.3 mg/l and 16.4 mg/l, respectively for Well 3; and 10.6 mg/l and 14.1 mg/l, respectively for Well 4. On average, the model simulated NO_3-N concentration at the LPVCWD Wellfield under the Scenario 1 is about 3.7 mg/l higher than the Scenario 2 over the first ten (10) years simulation, which is comparable to the results of 3.9 mg/l NO_3-N concentration increase as discussed in the earlier Section "***Occurrence and Loading of NO_3-N***".

MODELING CAPABILITIES AND LIMITATIONS

This study used groundwater flow and transport numerical tools to assess the potential NO_3-N support concentrations which the LPVCWD Wellfield may experience in the future. Simulation results may be used as one of several tools to support of the decision-making processes involved in the design of an appropriate NO_3-N treatment and/or possible blending options. The numerical model is a simplified system to define the complex physical systems in the Main Basin. The level of detail in the subsurface system is far more complex than the numerical model can describe; therefore, simulation results derived from this study are subject to some variability related to parameters used in the 3-D Basin Model, local variation in the aquifer structure, sources and spatial distribution of NO_3-N in the vicinity of the Study Area, and the magnitude of chemical and microbiological impacts (although not considered in the study). Because of the variability associated with 3-D Basin Model parameters, the study results should not be used as the singular component for actual design of a NO_3-N treatment facility. However, this numerical study provides great insight and understanding of the groundwater system in the Study Area.

CONCLUSIONS AND RECOMMENDATIONS

The 3-D Basin Model is a simplified numerical tool to represent the real world in context of the Main Basin. However, it lacks some hydrogeologic information such as the vertical hydraulic gradients which impacts the NO_3-N plume's vertical migration, and spatial and temporal variabilities of the NO_3-N sources in the Study Area.

Model results shown on Figure 10 are dependent on the amount of NO_3-N that may be in the soils overlying the aquifer. Further study is needed to better understand and quantify the occurrence and distribution of NO_3-N in the Study Area. Because of the uncertainty involved in this study, it is recommended to set the design concentration for the proposed LPVCWD NO_3-N Treatment Facility based on the highest simulated NO_3-N concentration that may be occurred at the LPVCWD Wellfield within 15-year from now; and model results must be carefully evaluated by considering its intrinsic limitations. Based on the 3-D Basin Model results, the LPVCWD Well 3 may suffer the worst NO_3-N contamination with the highest NO_3-N concentration of approximately 20 mg/l (twice the MCL) in the next 15 years. Similarly, the LPVCWD Well No. 5 will reach the same magnitude of concentration level (20 mg/l) within the same time frame. The NO_3-N concentrations for both wells will then remain fairly constant for the next 15 years (between years 16 and 30), as shown on Figure 10. The duration of the plateau (the highest concentration) shown on Figure 10 is the model simulated results based on the current NO_3-N distribution in the Study Area and the NO_3-N loading rates in the soils overlying the aquifer. The simulated results are dependent on the amount of NO_3-N that may be in the soils and are subject to change when future information becomes available. It is recommended LPVCWD consider the 20 mg/l NO_3-N concentration for the proposed NO_3-N treatment plant or blend plan and consider preparing a preliminary design report for NO_3-N treatment at the LPVCWD Wellfield.

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TABLES

TABLE 1

ANNUAL RAINFALL IN THE SAN GABRIEL VALLEY
FROM 1958-59 THROUGH 2017-18*

WATER YEAR	RAINFALL IN INCHES
1958-59	8.5
1959-60	10.6
1960-61	5.9
1961-62	22.4
1962-63	12.3
1963-64	9.4
1964-65	15.2
1965-66	19.6
1966-67	25.0
1967-68	15.0
1968-69	30.5
1969-70	11.1
1970-71	13.3
1971-72	8.5
1972-73	22.4
1973-74	16.8
1974-75	14.9
1975-76	12.1
1976-77	14.5
1977-78	38.4
1978-79	23.9
1979-80	34.8
1980-81	10.3
1981-82	18.9
1982-83	39.3
1983-84	10.6
1984-85	14.6
1985-86	22.0
1986-87	9.1
1987-88	14.9
1988-89	11.2
1989-90	12.4
1990-91	15.1
1991-92	22.8
1992-93	35.9
1993-94	11.6
1994-95	30.4
1995-96	15.6
1996-97	17.5
1997-98	36.1
1998-99	8.6
1999-00	14.4
2000-01	15.5
2001-02	6.4
2002-03	19.4
2003-04	12.7
2004-05	45.3
2005-06	16.8
2006-07	4.9
2007-08	16.4
2008-09	14.0
2009-10	20.2
2010-11	24.9
2011-12	10.9
2012-13	8.0
2013-14	6.3
2014-15	11.4
2015-16	10.1
2016-17	21.4
2017-18	7.0
TOTAL	**1028.0**
60-YEAR AVERAGE	**17.1**

*Annual rainfall determined as the average of rainfall at San Dimas (station 95), Pomona† (station 356C), El Monte (station 108D), and Pasadena (station 610B).
†Pomona (station 356C) replaced Walnut (station 102D) in 2000-01.
Pomona (average of stations 1260 and 1271) replaced in 2011-12.

TABLE 2
ANNUAL GROUNDWATER FLOW DIRECTION AND HYDRAULIC GRADIENT
FROM FY1973-74 THROUGH FY2014-15

Year	Simulated Water Levels of Three Point Analysis			Hydraulic Gradient	Flow Direction
	Location 1	Location 2	Location 3		
FY 1973-74	238.55	239.40	232.80	0.00100	201.90
FY 1974-75	231.80	232.80	226.43	0.00096	199.54
FY 1975-76	220.00	221.20	215.10	0.00090	196.09
FY 1976-77	214.90	216.00	210.23	0.00085	196.64
FY 1977-78	244.73	243.80	239.30	0.00087	224.16
FY 1978-79	252.30	252.10	246.55	0.00094	214.23
FY 1979-80	265.48	265.00	259.13	0.00103	217.12
FY 1980-81	252.30	253.20	246.60	0.00100	201.27
FY 1981-82	251.60	251.90	245.75	0.00098	208.21
FY 1982-83	276.40	275.20	269.40	0.00113	224.23
FY 1983-84	271.44	271.56	264.26	0.00119	210.58
FY 1984-85	258.48	259.47	252.11	0.00112	201.46
FY 1985-86	253.93	254.28	247.22	0.00113	208.10
FY 1986-87	248.61	249.68	242.13	0.00114	200.90
FY 1987-88	239.48	240.69	232.99	0.00116	199.58
FY 1988-89	230.71	231.96	224.92	0.00105	197.73
FY 1989-90	220.88	222.31	215.61	0.00098	194.56
FY 1990-91	213.36	214.68	208.28	0.00094	195.26
FY 1991-92	218.54	218.81	212.30	0.00105	208.58
FY 1992-93	236.94	236.47	230.12	0.00111	216.92
FY 1993-94	243.94	244.33	237.23	0.00113	207.63
FY 1994-95	241.20	241.93	234.98	0.00107	203.99
FY 1995-96	242.71	243.34	236.13	0.00112	205.30
FY 1996-97	240.94	241.59	233.94	0.00120	205.35
FY 1997-98	249.51	249.83	243.11	0.00107	208.32
FY 1998-99	248.11	249.48	242.32	0.00106	196.65
FY 1999-00	235.15	236.85	229.69	0.00104	192.48
FY 2000-01	229.43	230.93	223.81	0.00105	194.90
FY 2001-02	220.08	222.02	214.04	0.00116	191.88
FY 2002-03	213.36	215.38	207.44	0.00115	190.99
FY 2003-04	212.98	213.33	205.74	0.00122	208.47
FY 2004-05	225.15	223.86	219.34	0.00101	228.84
FY 2005-06	244.88	243.63	236.47	0.00135	222.44
FY 2006-07	236.53	237.13	229.53	0.00119	205.79
FY 2007-08	220.68	221.86	214.45	0.00111	199.31
FY 2008-09	210.40	211.61	204.78	0.00102	197.75
FY 2009-10	203.55	204.26	198.06	0.00096	203.11
FY 2010-11	216.46	215.38	209.94	0.00105	223.87
FY 2011-12	220.76	220.28	214.11	0.00109	216.45
FY 2012-13	208.88	209.48	203.03	0.00100	204.74
FY 2013-14	195.38	196.00	189.74	0.00097	204.39
FY 2014-15	183.70	185.12	178.44	0.00099	194.73
Maximum	276.40	275.20	269.40	0.00135	228.84
Minimum	183.70	185.12	178.44	0.00085	190.99

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Table 3
Nitrate Nitrogen Concentrations and Well Perforation Data in the Study Area

Owner	Well ID	Recordation Number	Well Type	Well Status	Port	Top of Screen (ft, bgs)	Bottom of Screen (ft, bgs)	Historic High		Most Recent	
								Value	Date	Value	Date
Asuza Light & Water	Gen 2 (OLD 5)	1902537	Municipal	Inactive		350	638	23.8	02/93	3.6	02/08
Asuza Light & Water	Well 10 (AVWC8)	8000103	Municipal	Active		792	1,132	14.9	05/08	12.0	05/19
Covina Irrigating Company	Baldwin 1	1900885	Municipal	Active		104*	398*	8.0	12/89	3.6	04/19
Covina Irrigating Company	Baldwin 2	1900883	Municipal	Active		104*	398*	10.6	03/10	6.5	04/19
Covina Irrigating Company	Baldwin 3	1900882	Municipal	Active		198	485	16.3	10/73	5.3	04/19
Glendora, City of	Well 03G	1901525	Municipal	Inactive		186	478	36.7	08/83	25.1	08/99
Glendora, City of	Well 04E	1901524	Municipal	Inactive		205	370	28.5	06/83	12.8	08/91
Glendora, City of	Well 07G	1900831	Municipal	Inactive		252	474	17.1	04/98	17.1	04/98
La Puente Valley County Water District	LPVCWD 02	1901460	Municipal	Active		576	926	8.0	05/17	6.4	11/17
La Puente Valley County Water District	LPVCWD 03	1902859	Municipal	Active		620	770	21.5	01/80	9.9	05/17
La Puente Valley County Water District	LPVCWD 05	8000209	Municipal	Active		590	765	8.2	12/18	8.2	12/18
San Gabriel Valley Water Company	SA3-2S (B26A)	8000189	Municipal	Active		380	780	16.0	05/17	12.0	05/19
San Gabriel Valley Water Company	SA3-2D (B26B)	8000190	Municipal	Active		850	1,010	3.8	09/18	3.4	05/19
San Gabriel Valley Water Company	Well B6C	1903093	Municipal	Inactive		275	506	22.0	08/16	22.0	08/16
San Gabriel Valley Water Company	Well B6D	8000098	Municipal	Inactive		760	1,032	6.6	05/15	5.5	08/17
Suburban Water Systems-San Jose	121-W1	8000181	Municipal	Active		660	1,130	6.1	04/17	4.0	11/18
Suburban Water Systems-San Jose	139-W2	1901599	Municipal	Inactive		105	361	23.4	10/08	20.0	06/17
Suburban Water Systems-San Jose	139-W4	8000069	Municipal	Standby		566	825	12.0	12/15	9.9	11/18
Suburban Water Systems-San Jose	139-W5	8000095	Municipal	Inactive		750	1,060	8.2	06/01	8.2	10/09
Suburban Water Systems-San Jose	139-W6	1910205	Municipal	Inactive		750	1,200	9.7	10/08	8.8	06/17
Suburban Water Systems-San Jose	140-W3	1903067	Municipal	Standby		150	438	17.6	03/85	12.0	11/18
Suburban Water Systems-San Jose	140-W4	8000093	Municipal	Inactive		420	1,190	8.2	10/03	8.2	12/04
Suburban Water Systems-San Jose	140-W5	8000145	Municipal	Active		600	1,320	8.3	12/15	7.4	11/18
Suburban Water Systems-San Jose	142-W2	8000183	Municipal	Active		680	1,365	14.0[1]	11/14	3.8	08/18
Suburban Water Systems-San Jose	151-W2	8000207	Municipal	Active		750	1,340	8.6[1]	11/14	2.0	02/19
Valley County Water District	Paddy Lane	1900031	Municipal	Inactive		300	585	17.0	05/16	13.0	06/17
Valley County Water District	Big Dalton	1900035	Municipal	Inactive		250	582	18.0	04/15	17.0	05/17
Valley County Water District	Palm	8000039	Municipal	Inactive		540	602	2.5	12/94	2.3	02/04
Valley County Water District	Well 01 (Main East)	1900027	Municipal	Active		250	580	4.7	02/11	0.9	05/19
Valley County Water District	Well 02 (Main West)	1900028	Municipal	Active		250	580	4.7	05/90	0.8	05/19
Valley County Water District	Well 06E (Nixon East)	1900032	Municipal	Active		300	586	3.1	02/05	0.8	11/18

Table 3
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Owner	Well ID	Recordation Number	Well Type	Well Status	Port	Top of Screen (ft, bgs)	Bottom of Screen (ft, bgs)	Historic High		Most Recent	
								Value	Date	Value	Date
Valley County Water District	Well 06W (Nixon West)	1902356	Municipal	Active		300	584	1.9	08/13	1.0	05/19
Valley County Water District	Lante (SA1-3)	8000060	Municipal	Active		275	577	43[1]	04/15	11.0	11/18
Valley County Water District	Arrow	1900034	Municipal	Inactive		300	524	6.0	08/96	6.0	08/96
Valley County Water District	SA1-1	8000185	Municipal	Active		250	650	20.0	05/18	20.0	05/18
Valley County Water District	SA1-2	8000186	Municipal	Standby		250	650	21.0	05/18	21.0	05/18
Valley County Water District	Morada	1900029	Municipal	Inactive		275	585	25.0	11/90	19.0	06/17
Valley View Municipal Water Company	Well 01	1900363	Municipal	Inactive		300	585	1.4	09/09	1.3	09/10
Valley View Municipal Water Company	Well 02	1900364	Municipal	Active		300	535	1.8	09/15	1.6	09/18
Valley View Municipal Water Company	Well 03	1900365	Municipal	Inactive		180	200	6.1	03/98	6.1	03/98
EPA-BPOU	MW5-01	NA	Monitoring		1	1,495	1,505	0.6	05/15	0.3	06/17
					2	1,387	1,397	0.9	09/06	0.2	06/17
					3	1,256	1,266	0.5	05/15	0.2	06/17
					4	1,123	1,133	3.8	06/17	3.8	06/17
					5	1,030	1,040	14.0	06/17	14.0	06/17
					6	875	885	13.0	06/17	13.0	06/17
					7	765	775	15.0	06/17	15.0	06/17
					8	640	650	18.0	05/12	3.8	06/17
					9	523	533	10.0	08/98	1.4	06/17
					10	430	440	8.2	08/98	0.6	06/17
					11	335	345	7.6	03/96	0.1	06/17
					12	287	297	8.4	06/96	0.1	06/17
					13	216	226	4.8	05/11	0.1	05/14
EPA-BPOU	MW5-05	NA	Monitoring		1	552	562	9.2	08/95	5.1	05/17
					2	464	474	12.0	10/95	4.7	05/17
					3	380	390	13.0	10/95	5.1	05/17
					4	218	228	42.0	10/95	10.0	05/17
EPA-BPOU	MW5-08	NA	Monitoring		1	795	805	1.4	05/17	1.4	05/17
					2	670	680	1.9	04/07	1.7	05/17
					3	554	564	1.8	04/07	1.6	05/17
					4	380	390	12.0	05/17	12.0	05/17
EPA-BPOU	MW5-11	NA	Monitoring		1	690	700	16.0	05/10	11.0	06/17

Table 3
Nitrate Nitrogen Concentrations and Well Perforation Data in the Study Area

Owner	Well ID	Recordation Number	Well Type	Well Status	Port	Top of Screen (ft, bgs)	Bottom of Screen (ft, bgs)	Historic High		Most Recent	
								Value	Date	Value	Date
					2	530	540	6.2	10/06	3.5	06/17
					3	310	320	12.0	06/17	12.0	06/17
EPA-BPOU	MW5-13	NA	Monitoring		1	684	694	3.8	03/07	1.9	05/17
					2	520	530	5.7	01/98	2.9	05/17
					3	340	350	8.3	03/96	1.0	05/17
EPA-BPOU	MW5-15	NA	Monitoring		1	670	680	8.9	05/11	2.3	06/17
					2	450	460	5.1	10/06	3.6	06/17
					3	235	245	7.8	05/16	6.7	06/17
EPA-BPOU	MW5-17	NA	Monitoring		1	698	708	2.6	05/10	0.3	06/17
					2	540	550	4.5	03/08	2.8	06/17
					3	305	315	7.6	03/96	5.5	05/13
EPA-BPOU	MW5-18	NA	Monitoring		1	780	790	31.0	06/17	31.0	06/17
					2	630	640	31.0	06/17	31.0	06/17
					3	500	510	16.0	05/16	15.0	06/17
EPA-BPOU	MW5-19	NA	Monitoring		1	985	995	1.0	10/06	0.6	05/17
					2	874	884	1.0	05/11	0.9	05/17
					3	730	740	8.2	08/98	2.5	01/00
					4	615	625	5.9	05/11	2.7	05/17
					5	430	440	20.0	10/12	13.0	05/17
					6	225	235	4.8	08/98	3.5	05/17
EPA-BPOU	MW5-20	NA	Monitoring		1	940	950	3.9	06/17	3.9	06/17
					2	850	860	1.9	05/16	1.6	06/17
					3	760	770	5.7	05/14	5.1	06/17
					4	672	682	6.5	06/17	6.5	06/17
					5	594	604	2.7	05/16	2.0	06/17
					6	400	410	18.0	05/12	16.0	06/17
					7	210	220	20.3	08/98	12.0	06/17
EPA-BPOU	MW5-22	NA	Monitoring		1	950	960	1.6	07/98	1.1	06/17
					2	790	800	2.3	06/17	2.3	06/17
					3	694	704	5.4	05/15	5.1	06/17
					4	600	610	2.5	05/11	1.6	06/17

Table 3
Nitrate Nitrogen Concentrations and Well Perforation Data in the Study Area

Owner	Well ID	Recordation Number	Well Type	Well Status	Port	Top of Screen (ft, bgs)	Bottom of Screen (ft, bgs)	Historic High		Most Recent	
								Value	Date	Value	Date
					5	410	420	15.0	07/98	9.9	06/17
					6	235	245	16.0	10/06	15.0	06/17
EPA-BPOU	MW5-23	NA	Monitoring		1	980	990	3.0	05/11	1.5	06/17
					2	888	898	3.0	04/07	2.5	06/17
					3	700	710	6.6	06/17	6.6	06/17
					4	566	576	10.0	06/17	10.0	06/17
					5	426	436	23.0	05/11	16.0	06/17
					6	240	250	2.4	10/06	1.4	06/17
EPA-BPOU	MW5-24	NA	Monitoring		1	1,190	1,200	2.0	05/17	2.0	05/17
					2	1,020	1,030	2.8	05/17	2.8	05/17
					3	875	885	6.4	05/17	6.4	05/17
					4	730	740	10.0	05/17	10.0	05/17
					5	580	590	9.1	05/17	9.1	05/17
					6	420	430	28.0	11/13	3.3	05/17
					7	270	280	16.0	09/09	7.7	05/17
EPA-BPOU	MW5-25	NA	Monitoring		1	1,185	1,195	3.5	05/17	3.5	05/17
					2	1,015	1,025	5.3	05/14	3.0	05/17
					3	875	885	23.0	05/17	23.0	05/17
					4	750	760	23.0	10/14	22.0	05/17
					5	570	580	23.0	10/14	13.0	05/17
					6	425	435	13.0	03/07	1.4	05/17
					7	285	295	9.4	09/07	1.1	05/17
EPA-BPOU	MW5-26	NA	Monitoring		1	1,130	1,140	0.6	05/11	0.5	06/17
					2	1,020	1,030	0.6	05/11	0.5	06/17
					3	880	890	0.6	05/11	0.5	06/17
					4	700	710	0.6	05/11	0.5	06/17
					5	540	550	4.9	05/10	2.8	06/17
					6	410	420	9.5	03/07	1.4	06/17
					7	290	300	4.8	05/15	2.1	06/17
EPA-BPOU	MW5-27	NA	Monitoring		1	1,124	1,134	0.4	06/17	0.4	06/17
					2	1,005	1,015	0.5	05/11	0.5	06/17

Table 3
Nitrate Nitrogen Concentrations and Well Perforation Data in the Study Area

Owner	Well ID	Recordation Number	Well Type	Well Status	Port	Top of Screen (ft, bgs)	Bottom of Screen (ft, bgs)	Historic High		Most Recent	
								Value	Date	Value	Date
					3	880	890	0.4	03/07	0.3	06/17
					4	700	710	3.8	05/10	2.0	06/17
					5	568	578	1.1	05/11	0.7	06/17
					6	430	440	3.3	03/07	1.6	06/17
					7	274	284	1.4	03/07	0.5	06/17

Note:
* Well perforation is not available. It is assumed perforated in permeable zones by examining well logs.
1 Questionable data. The measurement might be the Nitrate-NO3 reading.

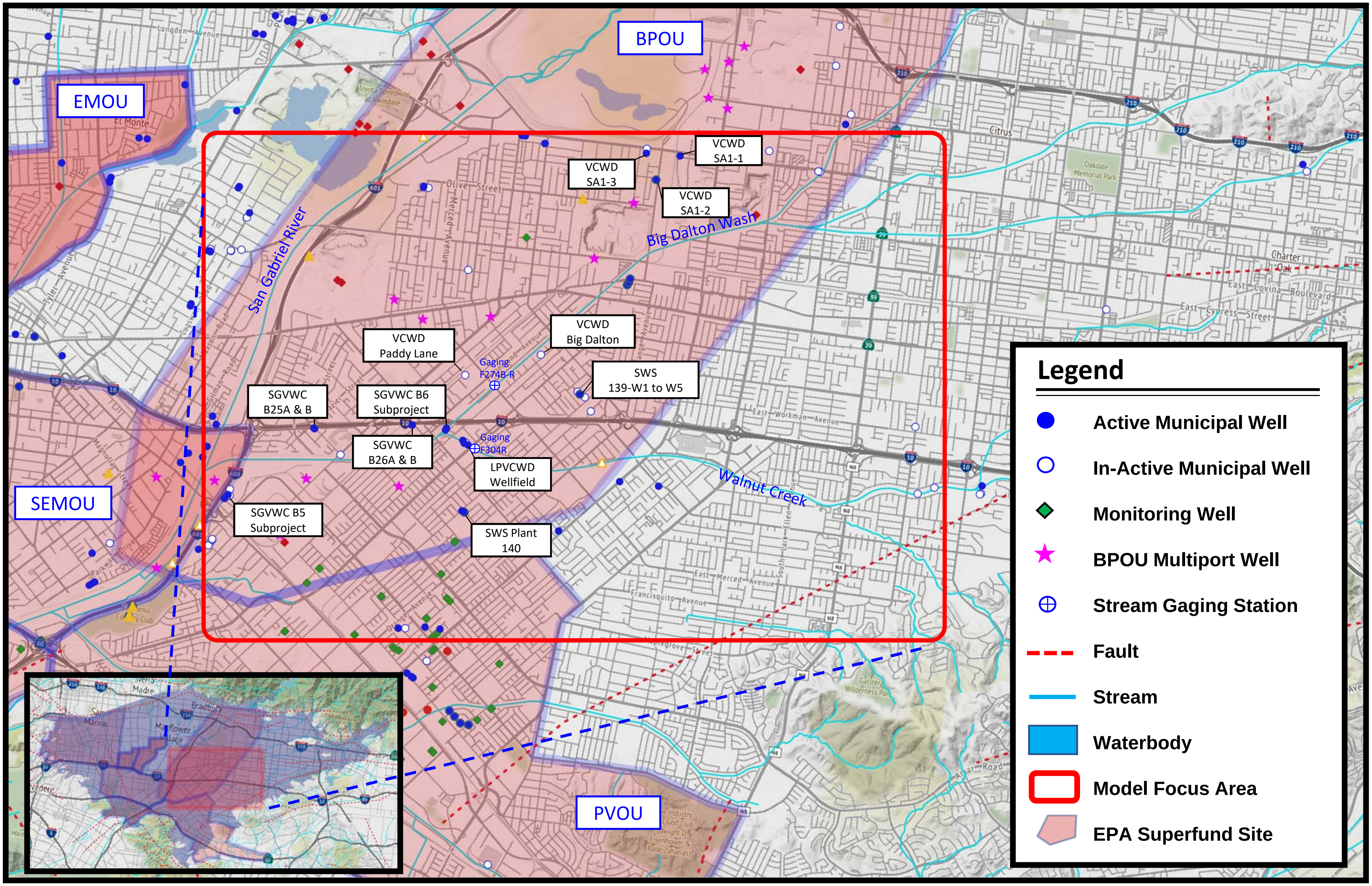
Table 4
Projected Groundwater Production For the Predictive 30-Year Simulation

Projected Year	Projected Main Basin Groundwater Production (AF)
1	200,337
2	199,313
3	198,647
4	197,857
5	197,260
6	197,520
7	197,744
8	197,958
9	198,130
10	198,319
11	198,840
12	199,353
13	199,864
14	200,373
15	200,890
16	201,214
17	201,537
18	201,862
19	202,188
20	202,518
21	203,044
22	203,573
23	204,103
24	204,636
25	205,171
26	205,709
27	206,248
28	206,790
29	207,335
30	207,881
Maxmum:	207,881
Minimun:	197,260
Mean:	201,541

Table 5
Projected 30 Years Nitrate Nitrogen Concentrations (unit: mg/l)

Year	LPVCWD Scenario 1 Simulation		
	Well 2	Well 3	Well 5
1	6.39	9.31	8.08
2	6.77	9.13	7.94
3	9.43	11.51	10.52
4	10.71	14.09	12.50
5	11.14	15.33	13.37
6	11.35	15.94	13.84
7	11.41	16.21	14.04
8	11.26	16.24	14.01
9	11.18	16.24	13.96
10	11.36	16.37	14.05
11	11.86	16.68	14.37
12	12.69	17.34	15.08
13	13.78	18.41	16.22
14	14.92	19.74	17.62
15	15.88	20.99	18.89
16	16.59	21.95	19.87
17	17.07	22.60	20.52
18	17.35	22.96	20.88
19	17.48	23.07	21.00
20	17.50	23.01	20.97
21	17.47	22.89	20.86
22	17.42	22.77	20.76
23	17.39	22.70	20.70
24	17.38	22.68	20.70
25	17.39	22.71	20.75
26	17.43	22.78	20.83
27	17.48	22.88	20.93
28	17.54	23.00	21.05
29	17.60	23.14	21.19
30	17.66	23.30	21.34

FIGURES



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MAIN SAN GABRIEL BASIN WATERMASTER

LPVCWD Nitrate Modeling Study Area

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Figure 1

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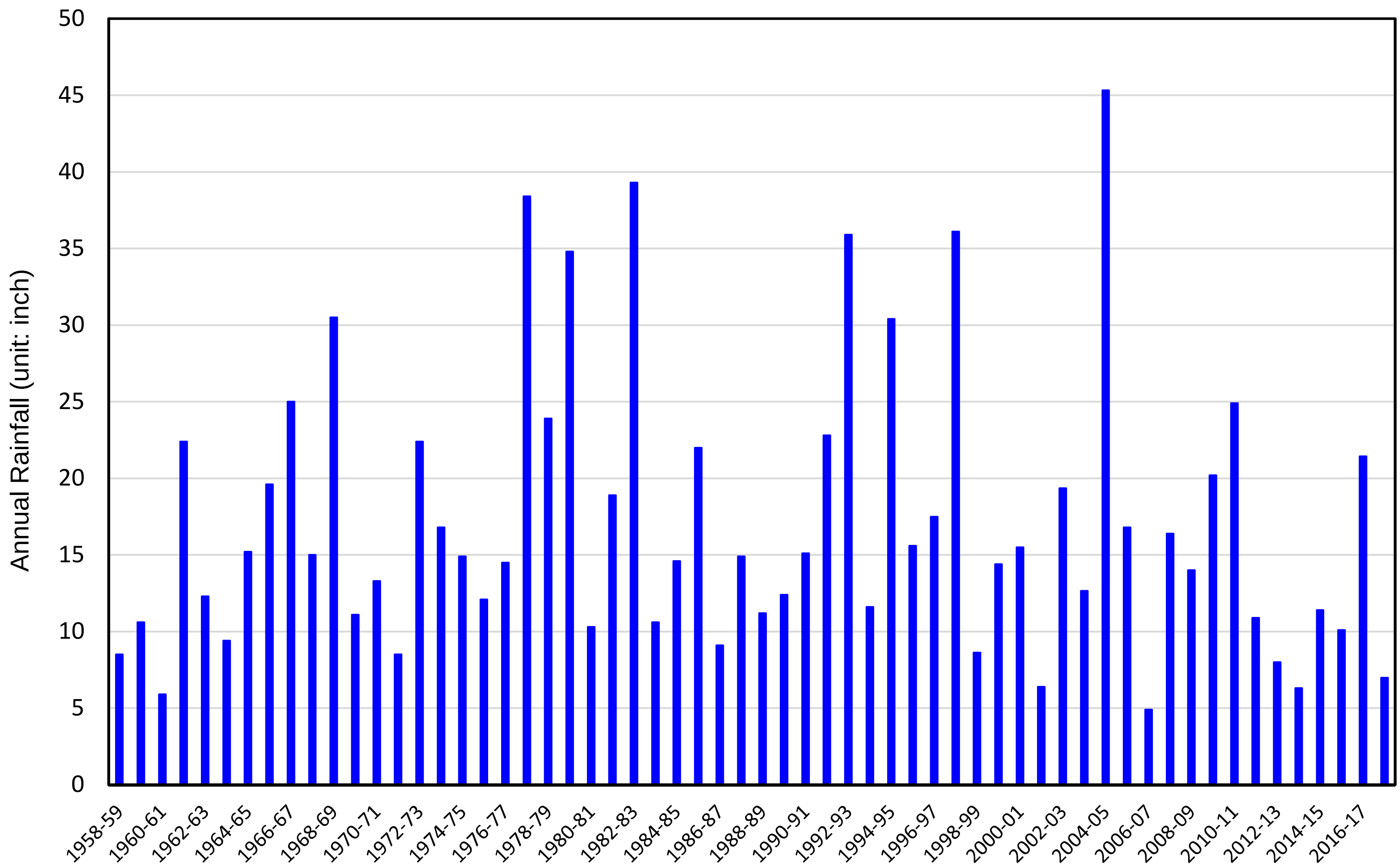

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SAN GABRIEL VALLEY ANNUAL RAINFALL

From 1958-59 Through 2017-18

MainSanGabrielBasin WATERMASTER

FIGURE 2

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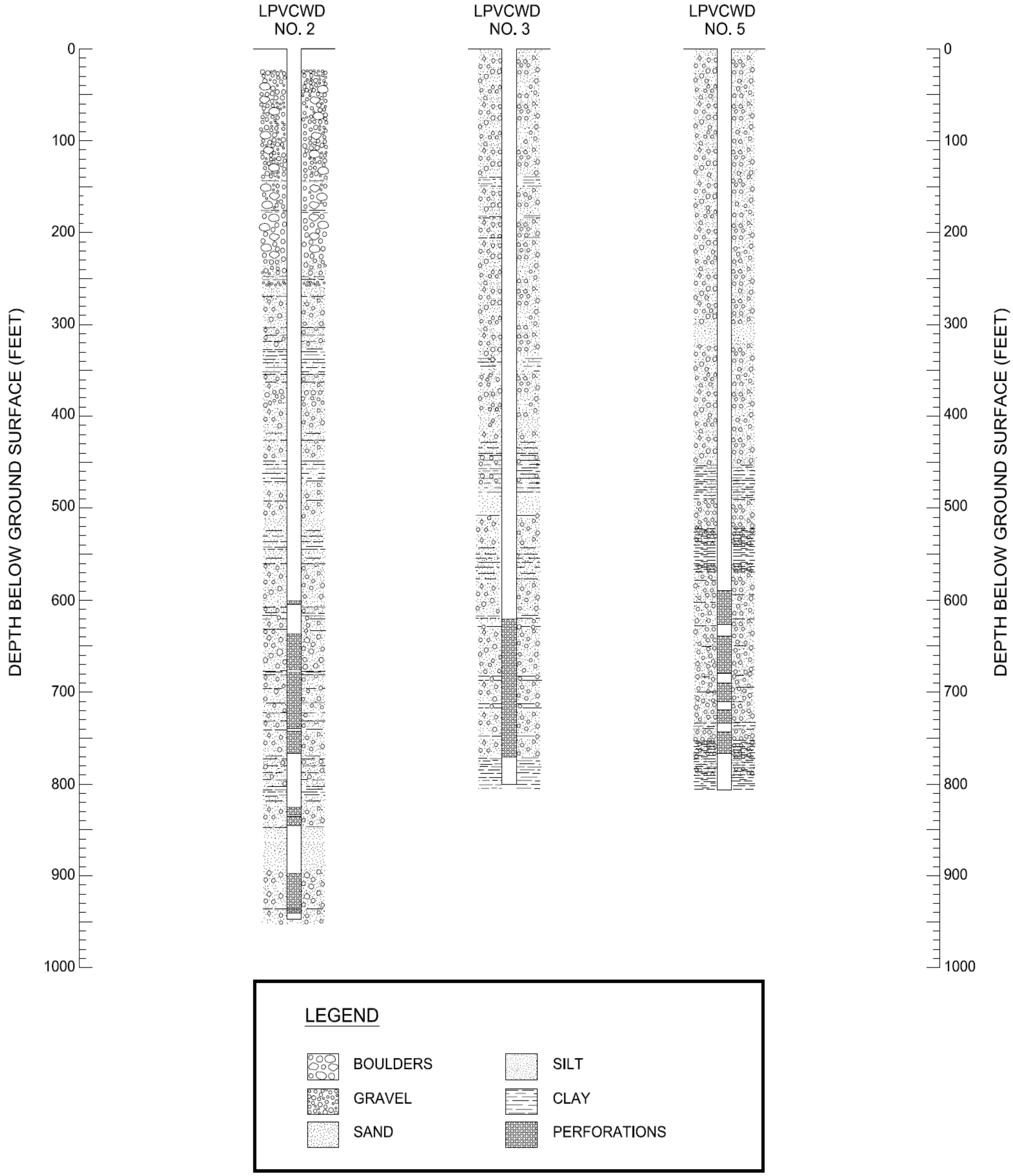

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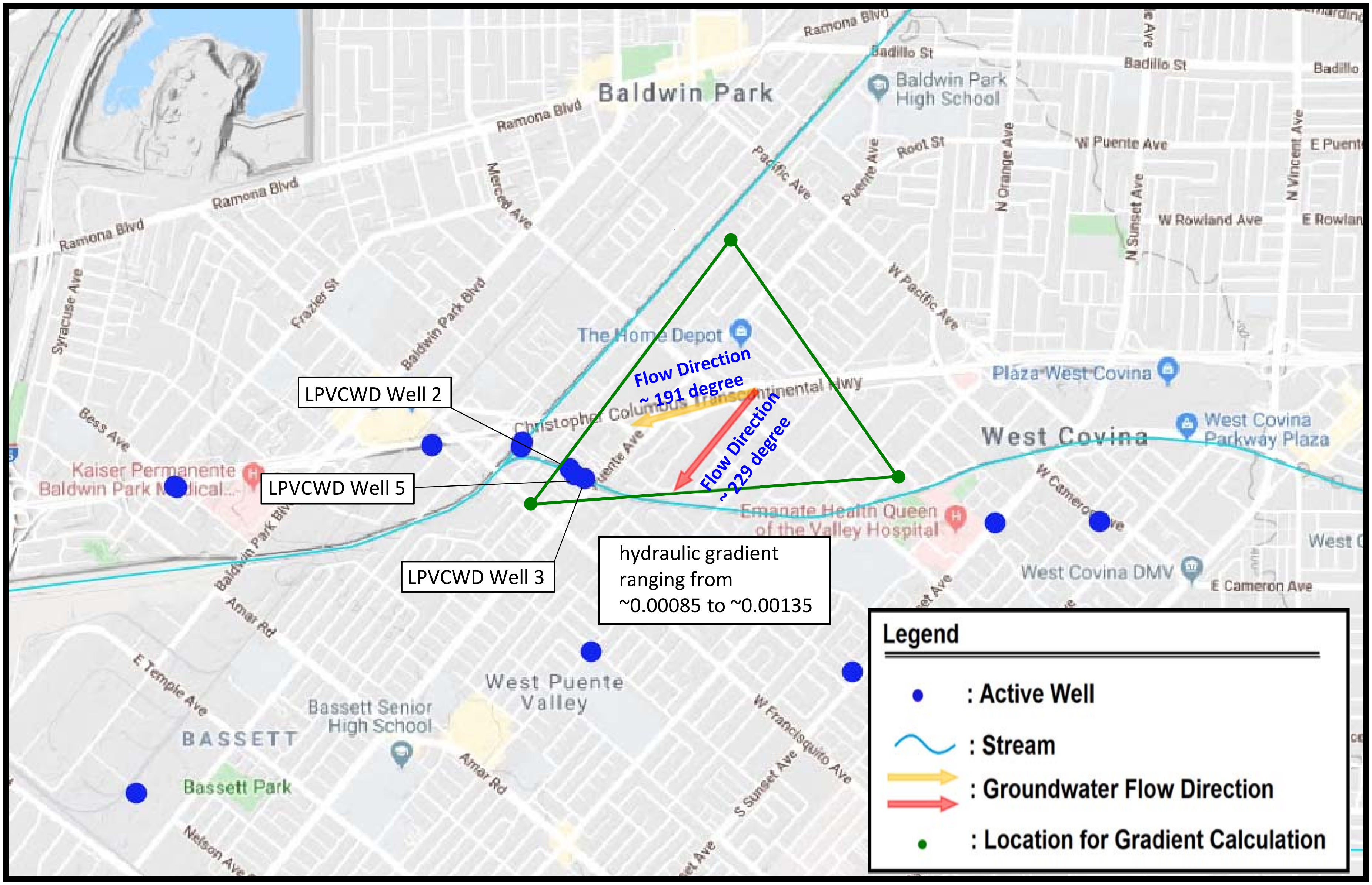
MAIN SAN GABRIEL BASIN WATERMASTER

LITHOLOGIC DATA
LA PUENTE VALLEY COUNTY WATER DISTRICT

MainSanGabrielBasin WATERMASTER



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MAIN SAN GABRIEL BASIN WATERMASTER

Groundwater Flow Direction and Hydraulic Gradient in the Study Area

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Figure 4

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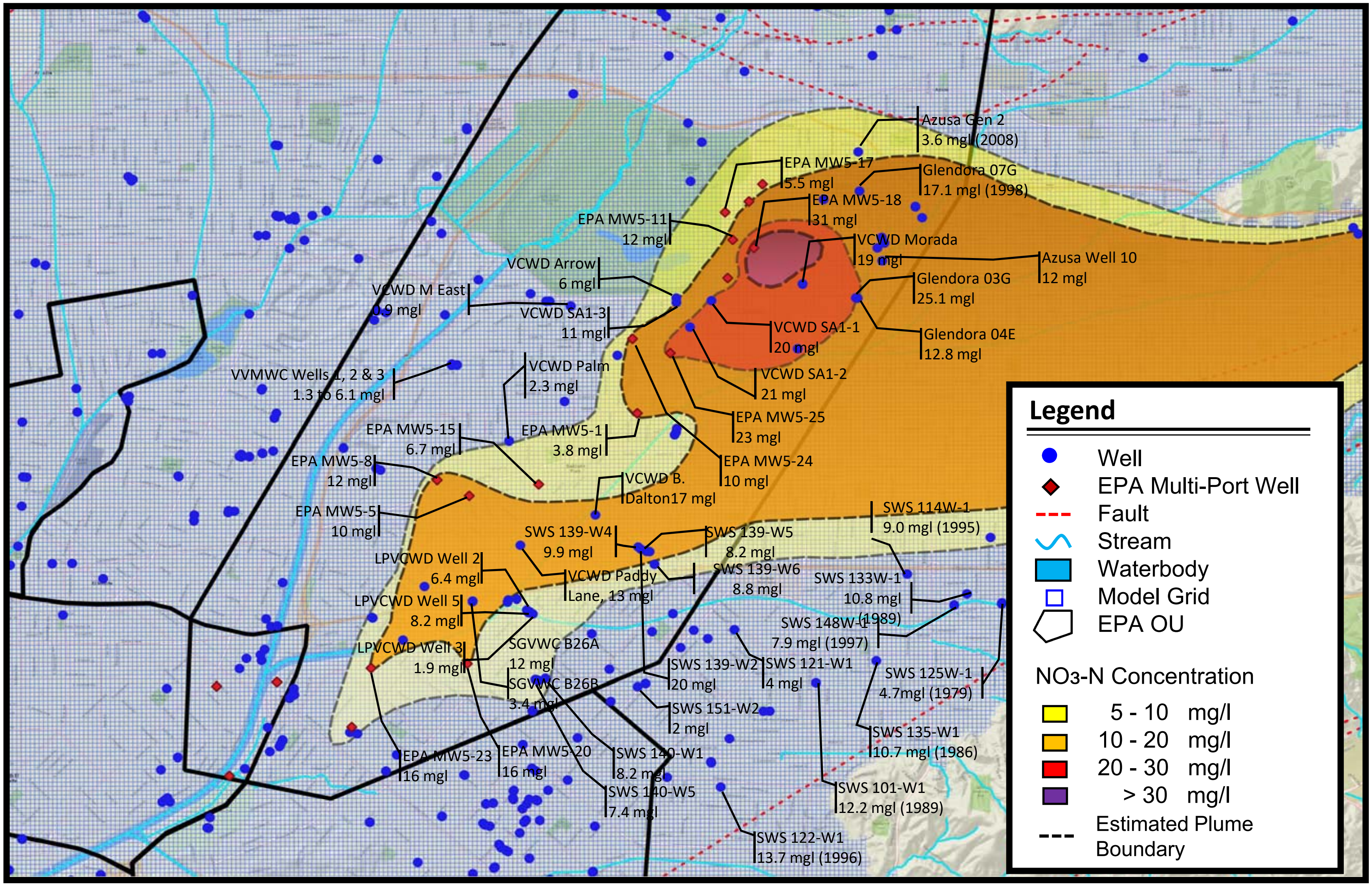

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MAIN SAN GABRIEL BASIN WATERMASTER

Composite LPVCWD Nitrate Nitrogen Concentration Contour Map

MainSanGabrielBasin WATERMASTER

Figure 5

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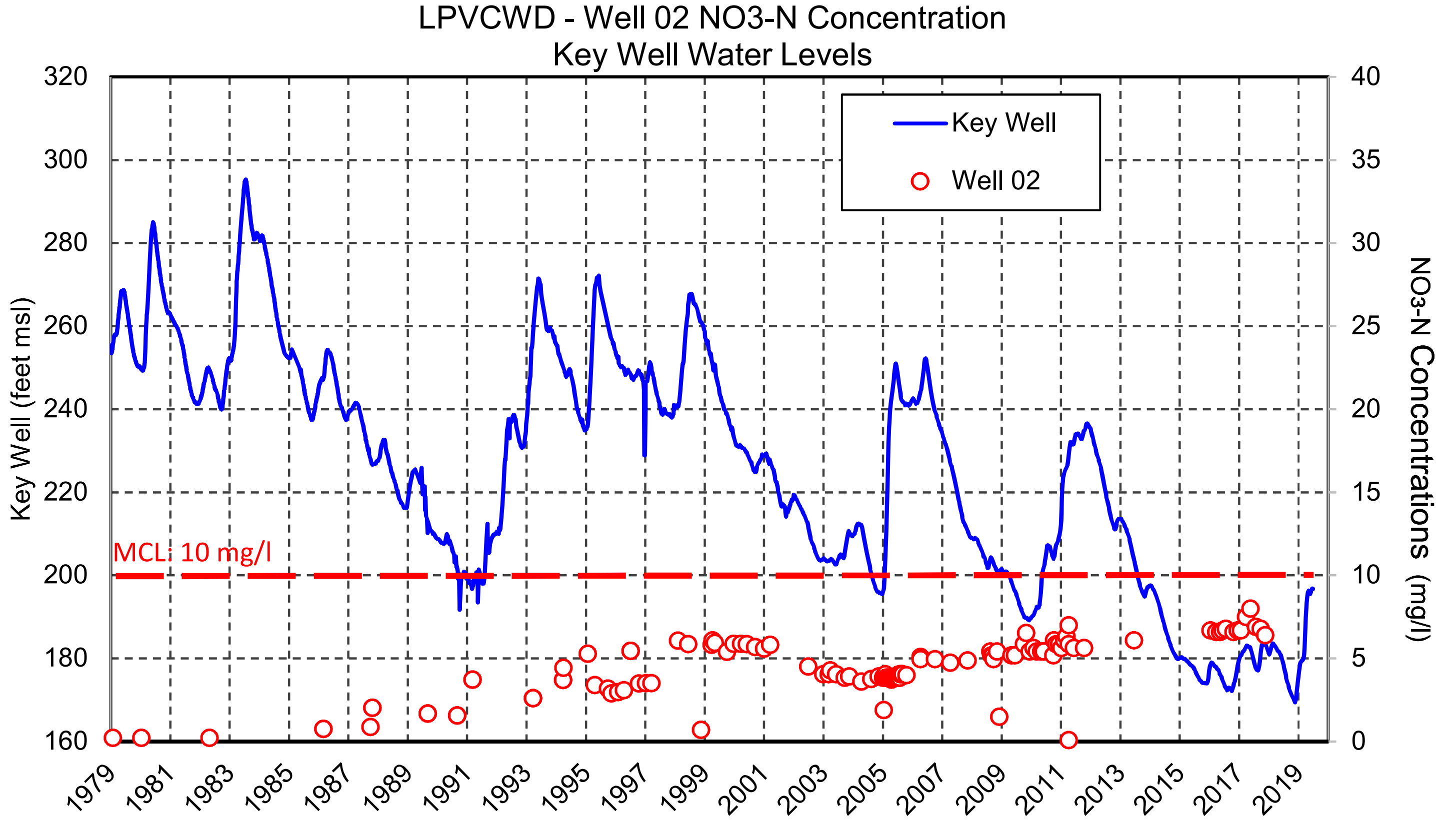
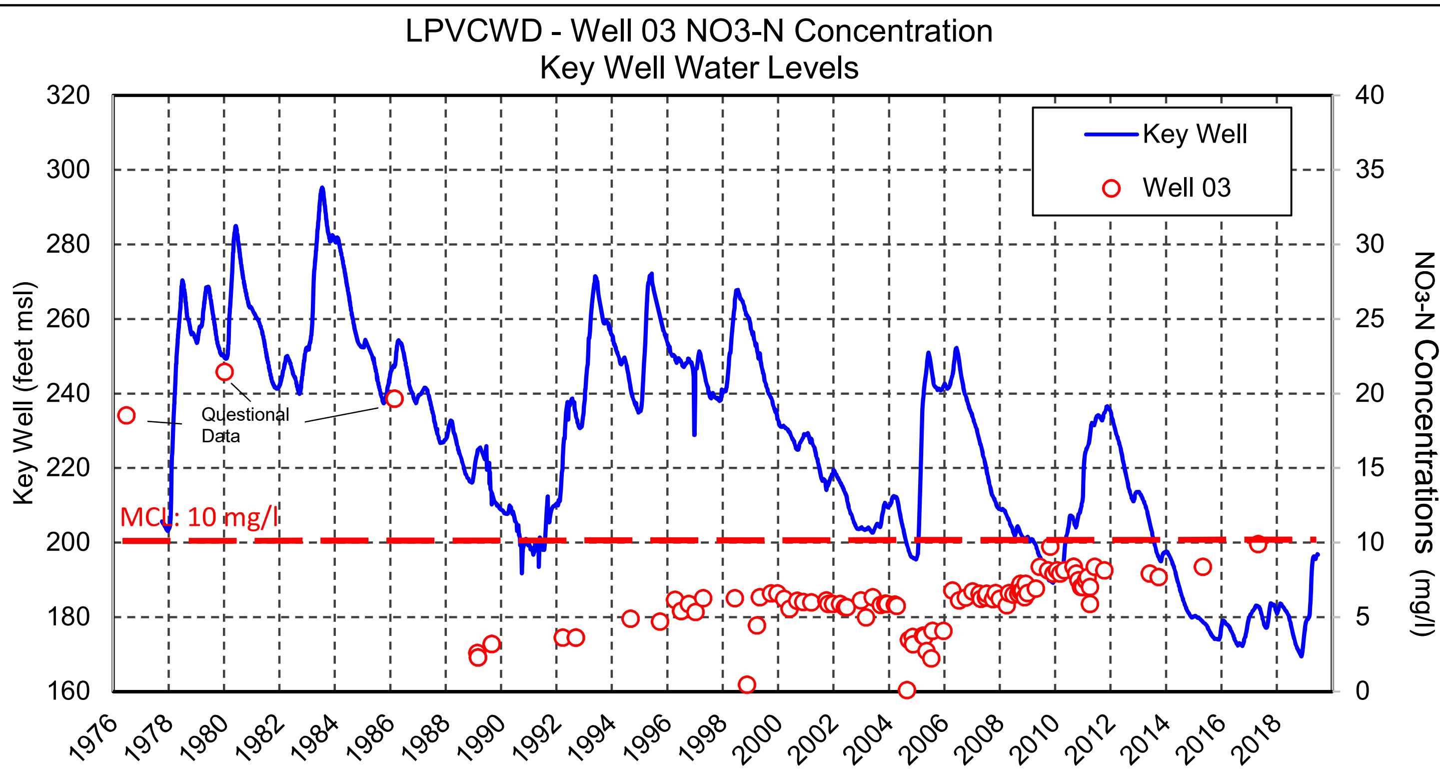


(Watermaster Database, www.msgbwmdata.com/)



(Watermaster Database, www.msgbwmdata.com/)

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LA PUENTE VALLEY COUNTY WATER DISTRICT
Nitrate Nitrogen Concentrations

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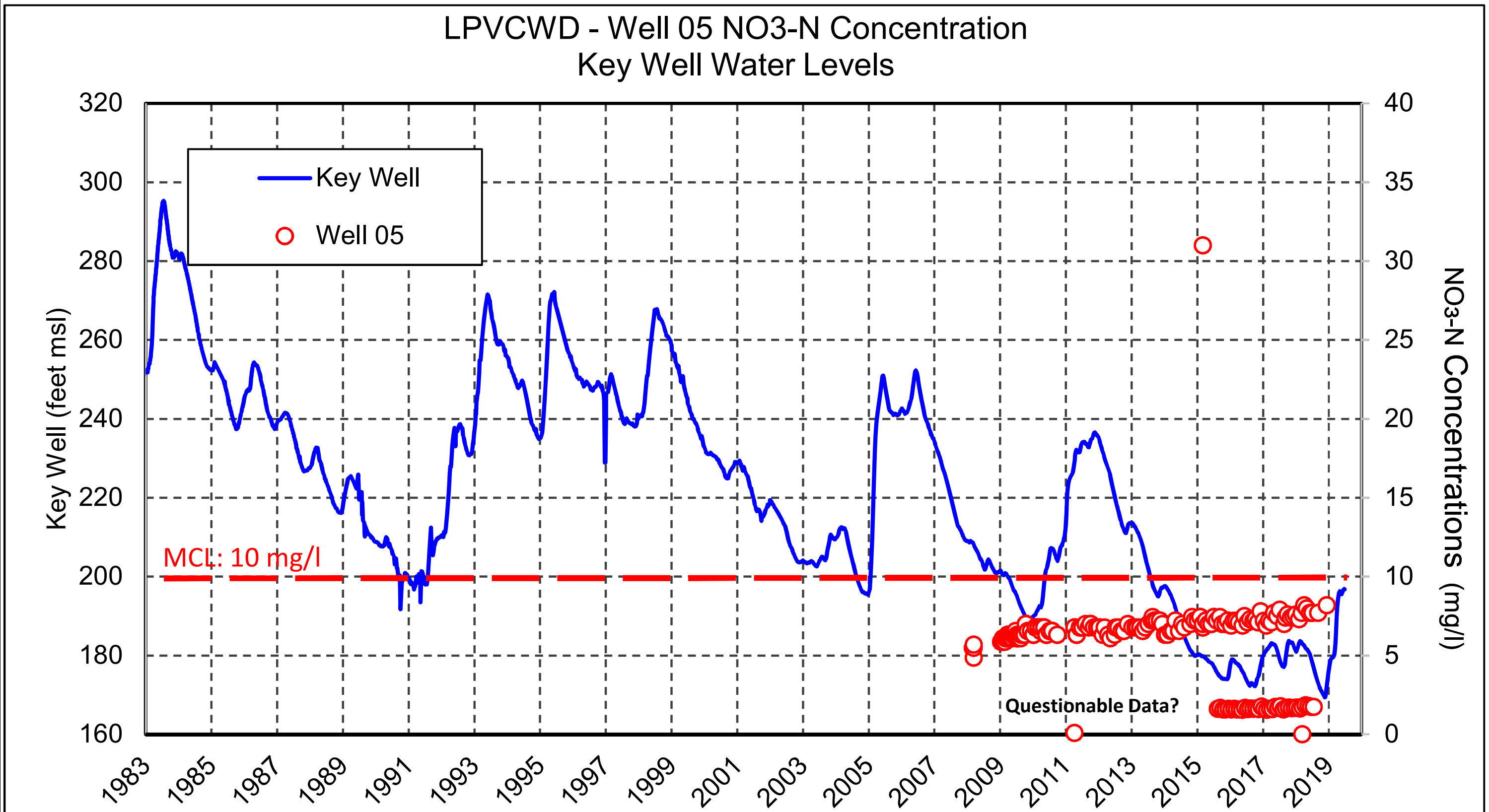
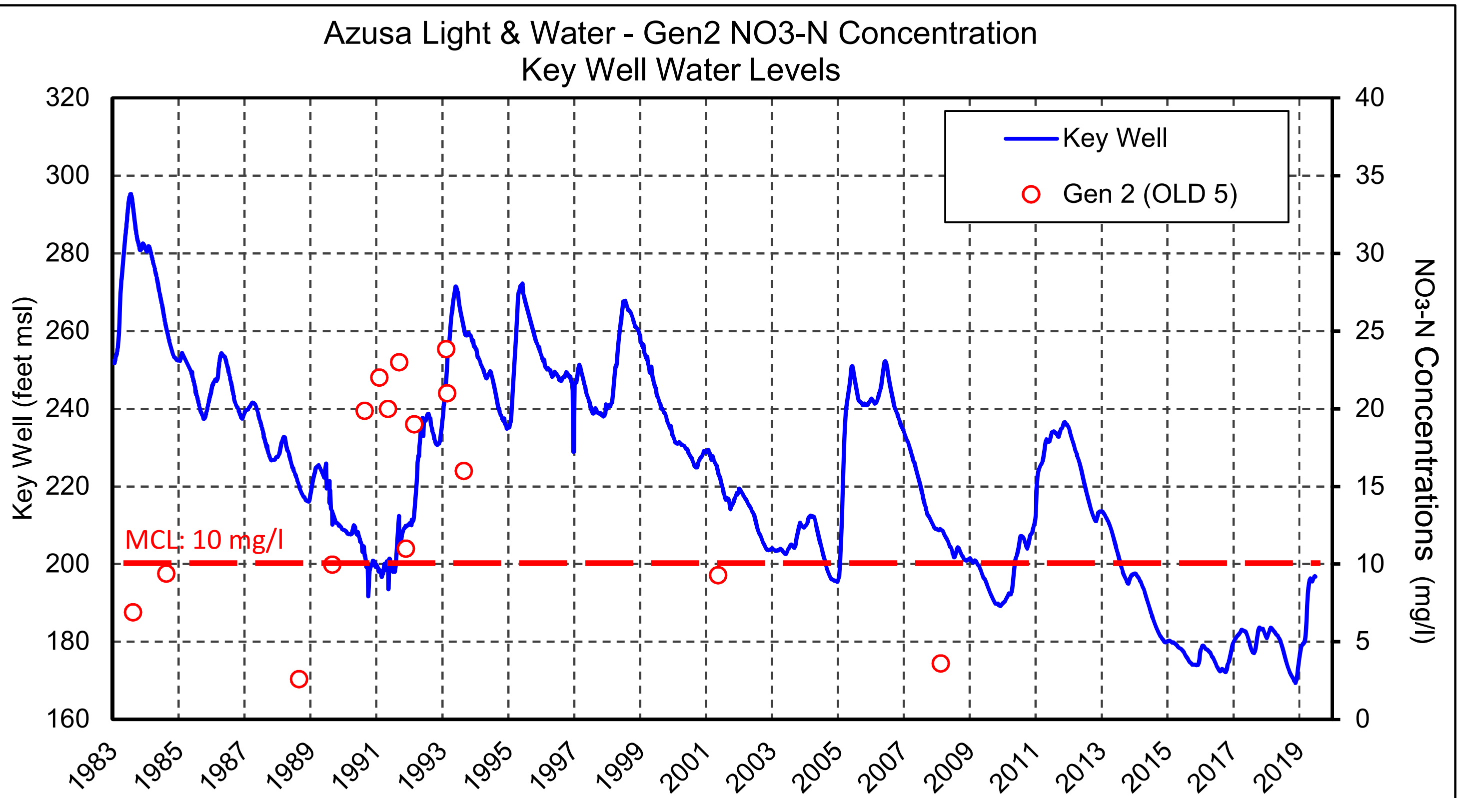


(Watermaster Database (www.msgbwmdata.com) and LPVCWD Annual Report)

LA PUENTE VALLEY COUNTY WATER DISTRICT
AND SAN GABRIEL VALLEY WATER COUNTY
Nitrate Nitrogen Concentrations



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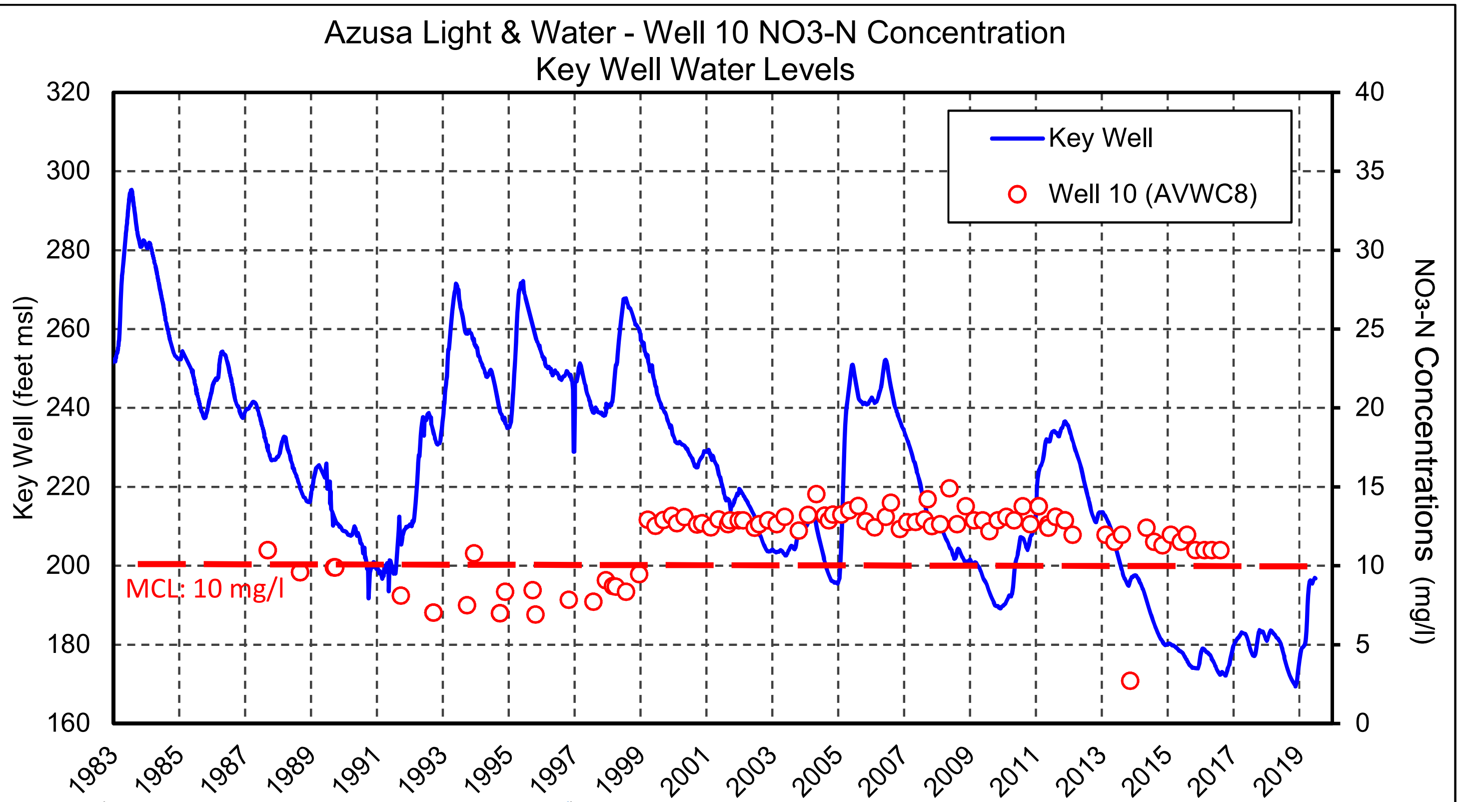

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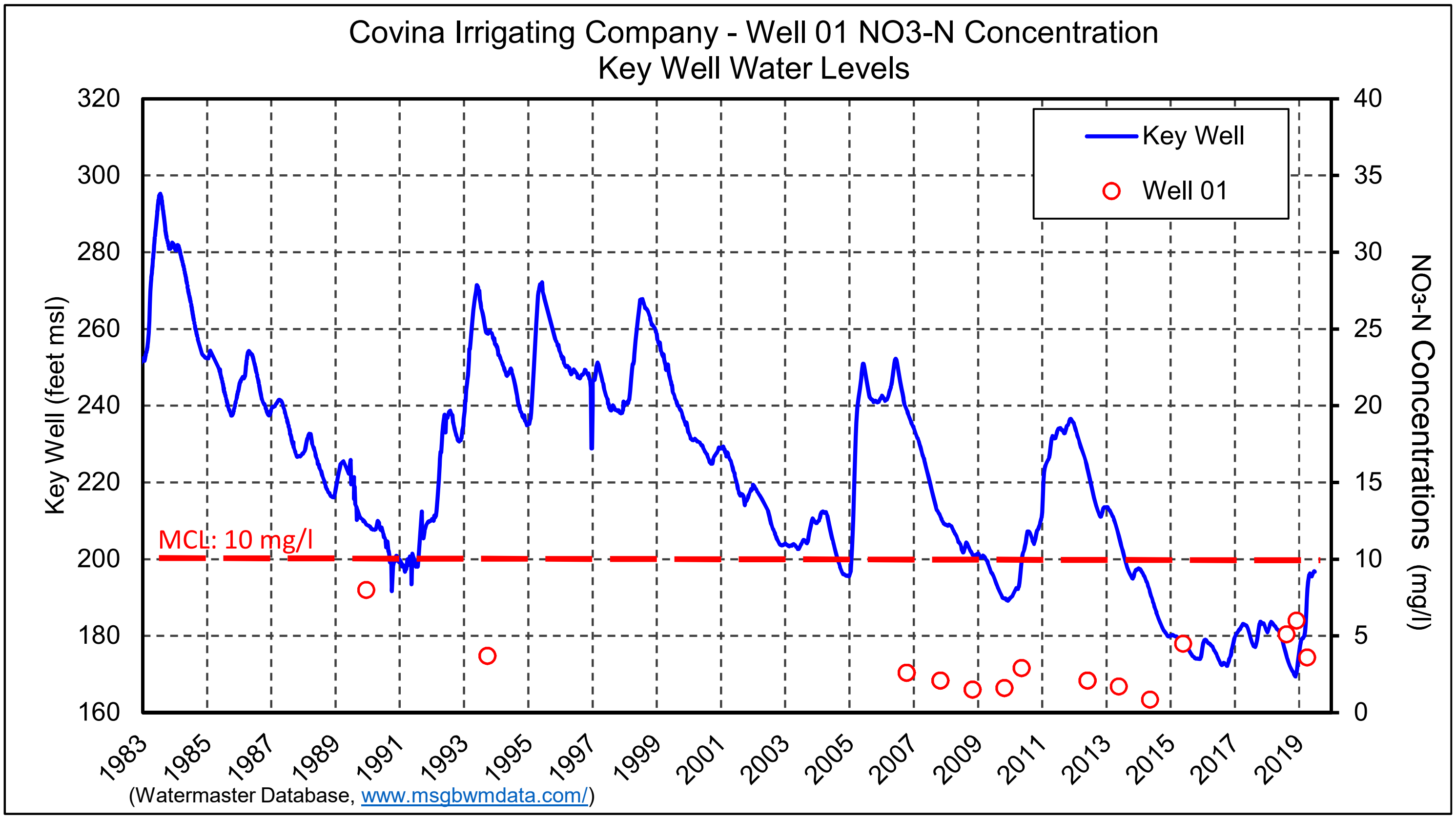
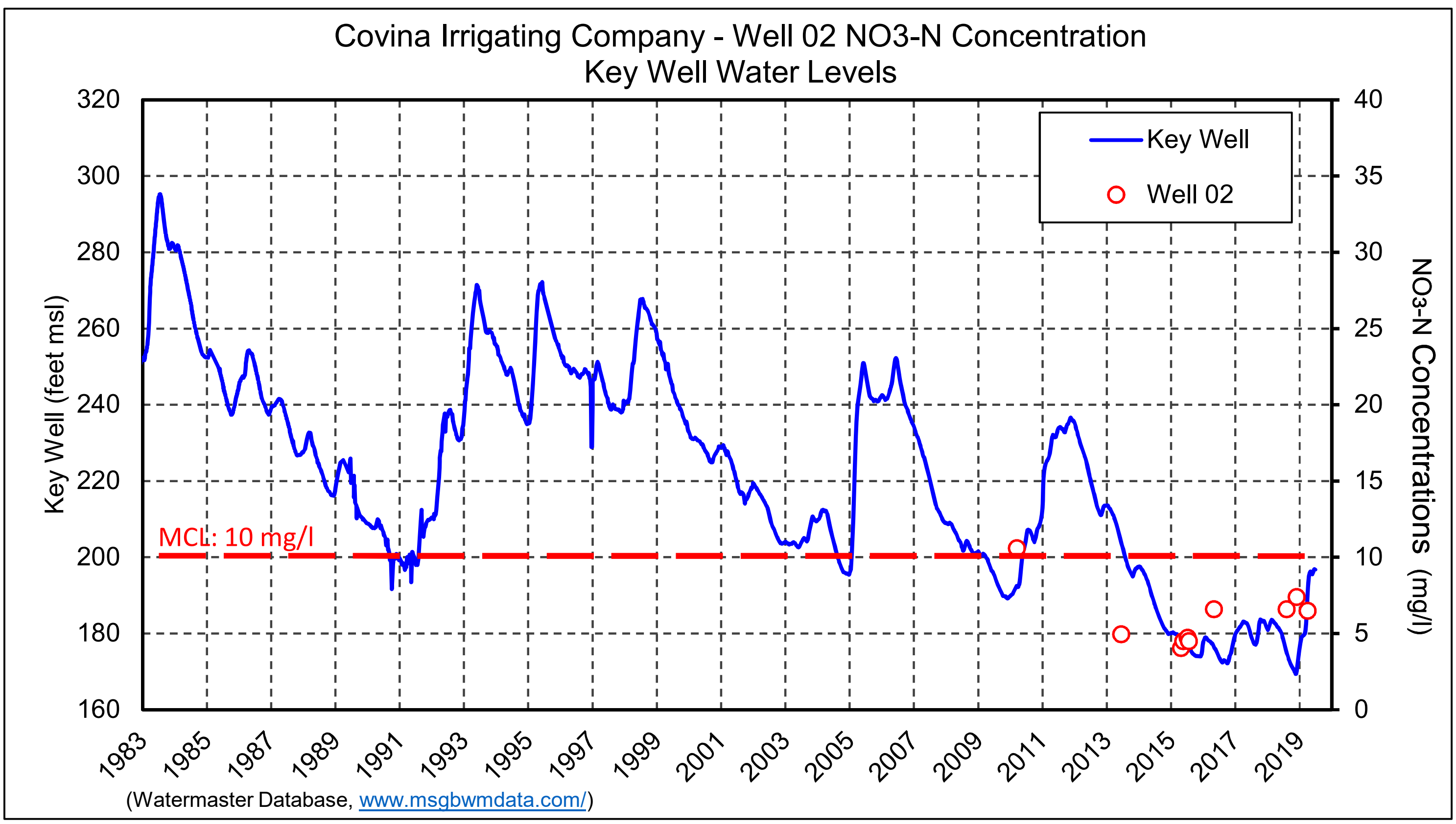
STETSON ENGINEERS INC.

AZUSA LIGHT & WATER
Nitrate Nitrogen Concentrations

MainSanGabrielBasin WATERMASTER

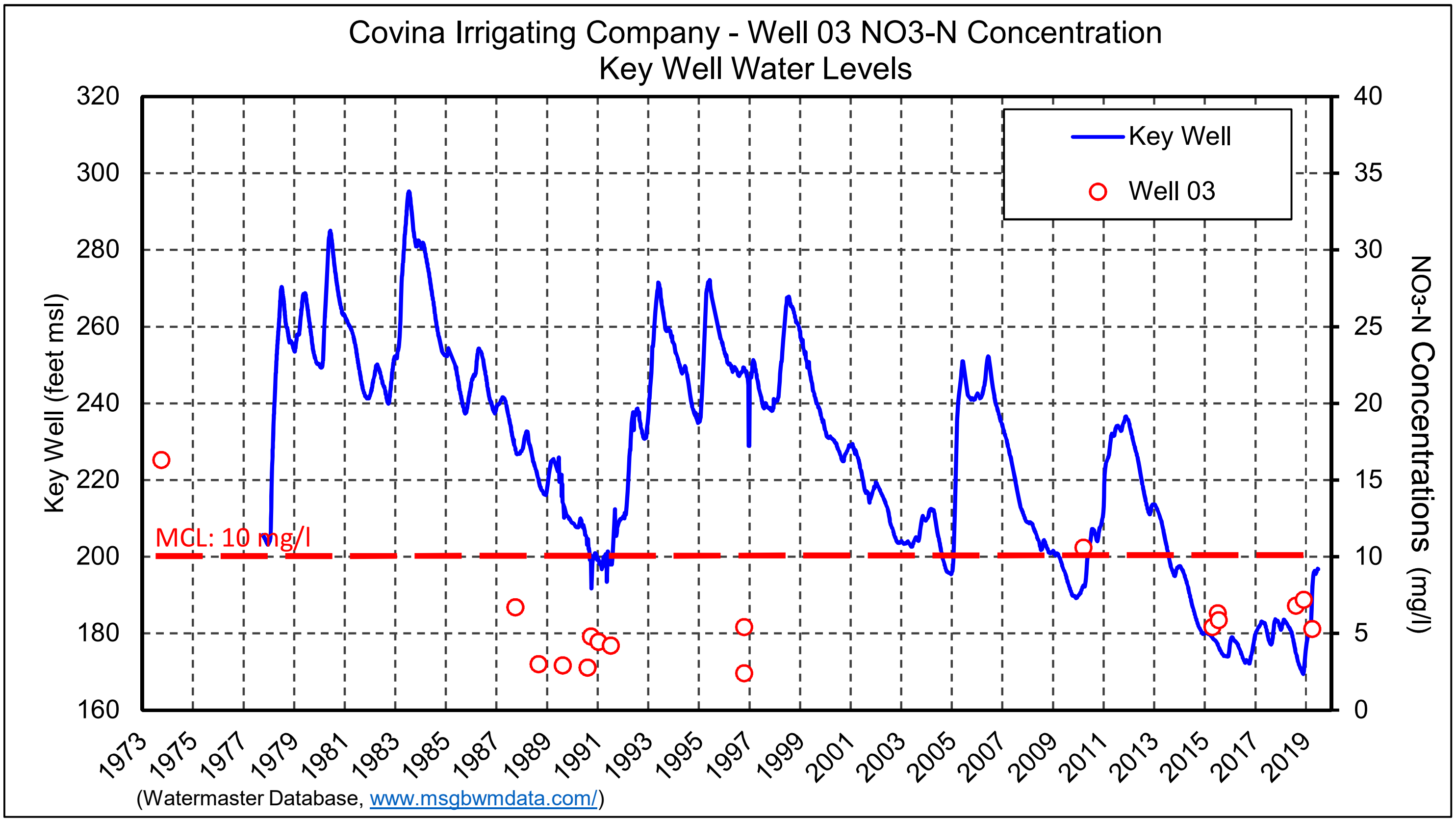


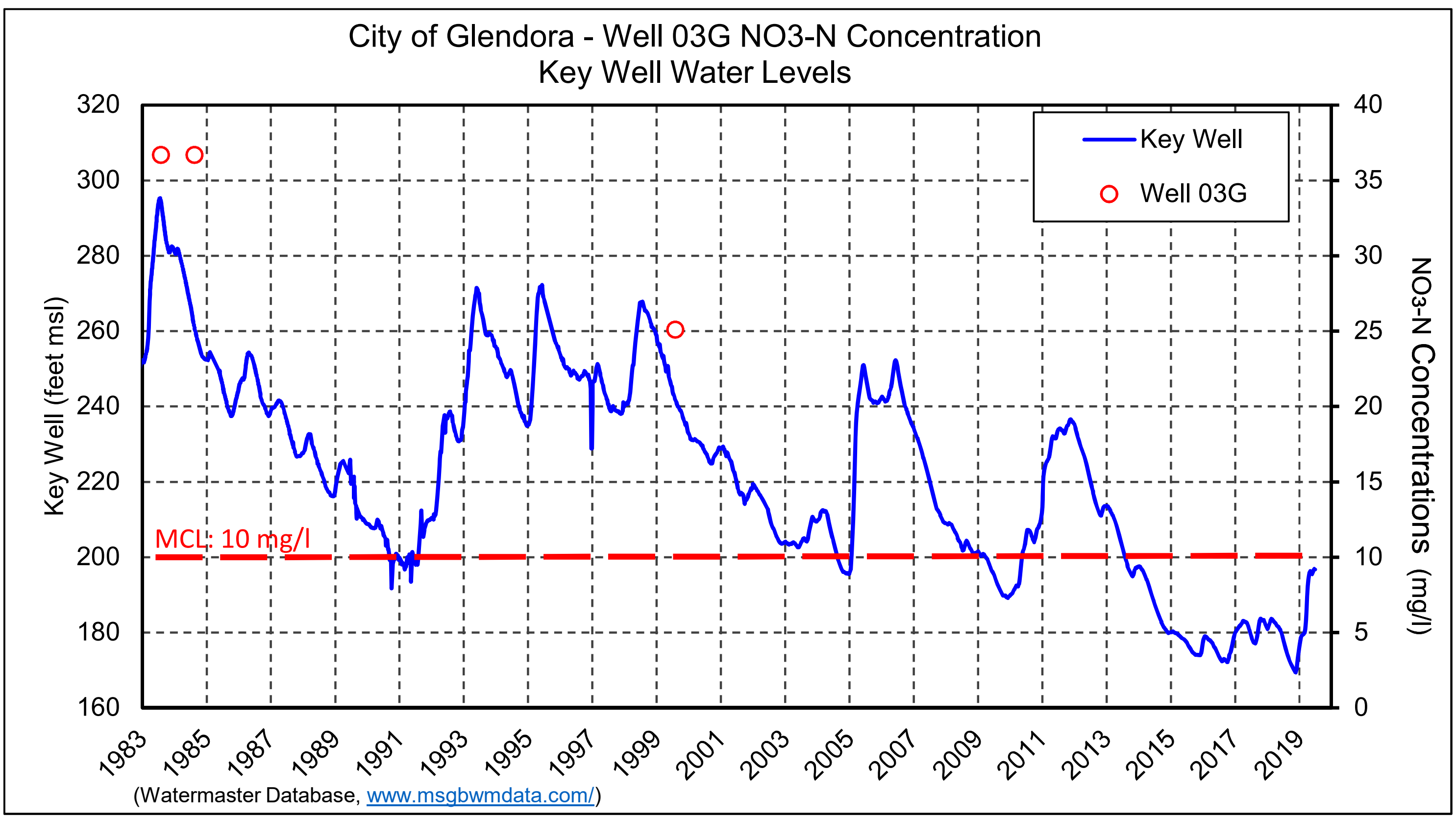


STETSON ENGINEERS INC.

COVINA IRRIGATING COMPANY
Nitrate Nitrogen Concentrations

MainSanGabrielBasin WATERMASTER





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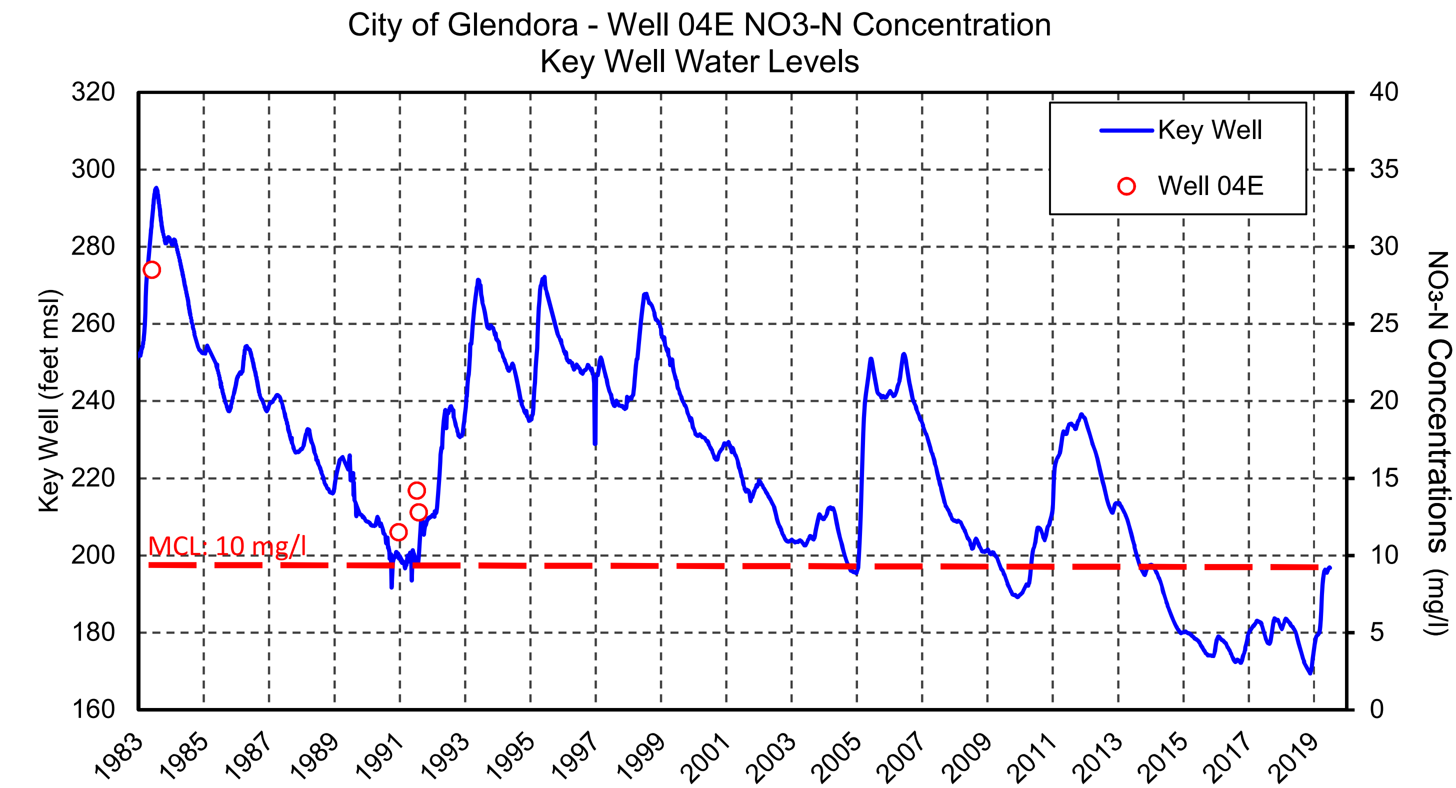
COVINA IRRIGATING COMPANY
CITY OF GLENDORA WELLS
Nitrate Nitrogen Concentrations

MainSanGabrielBasin WATERMASTER



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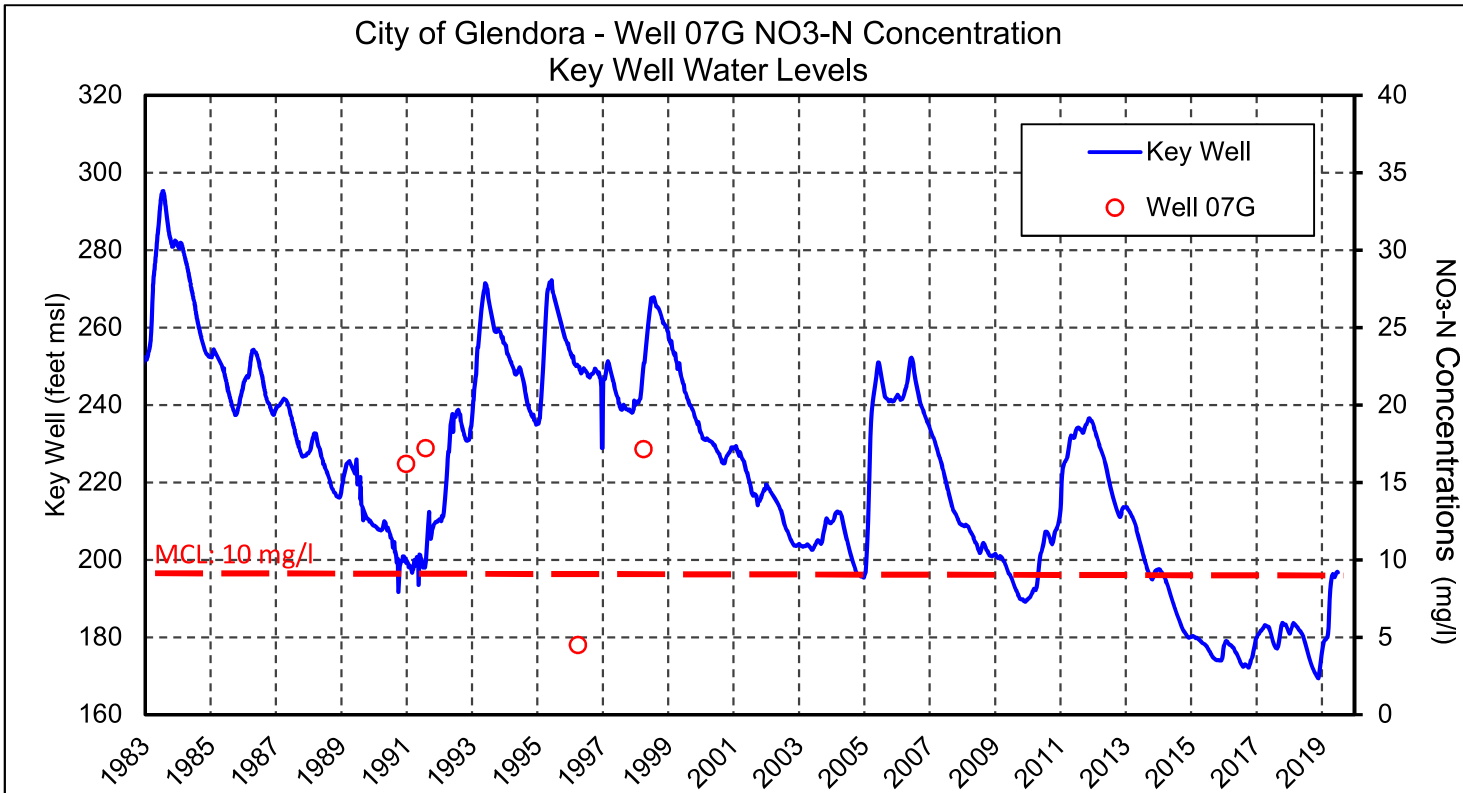

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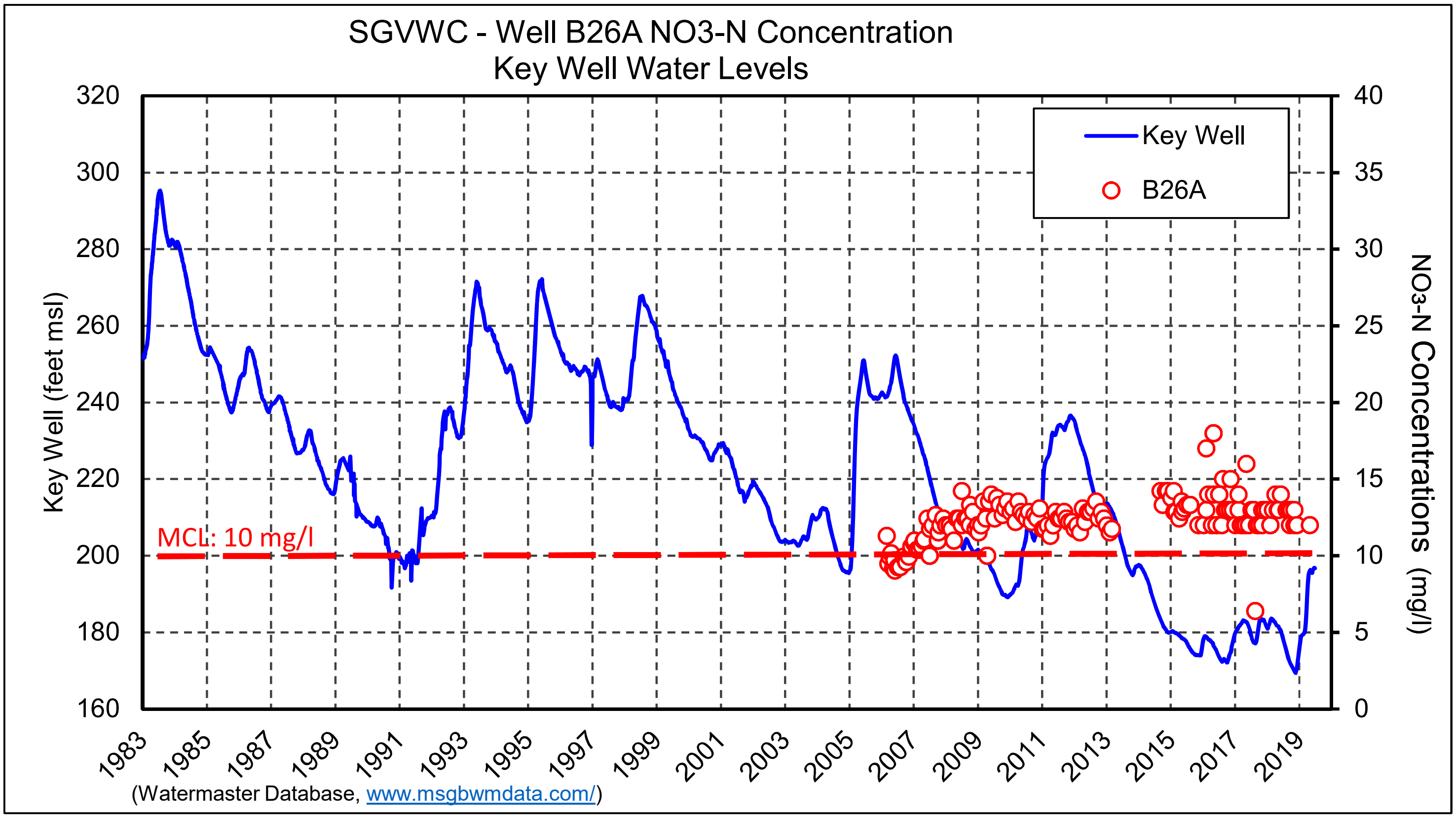
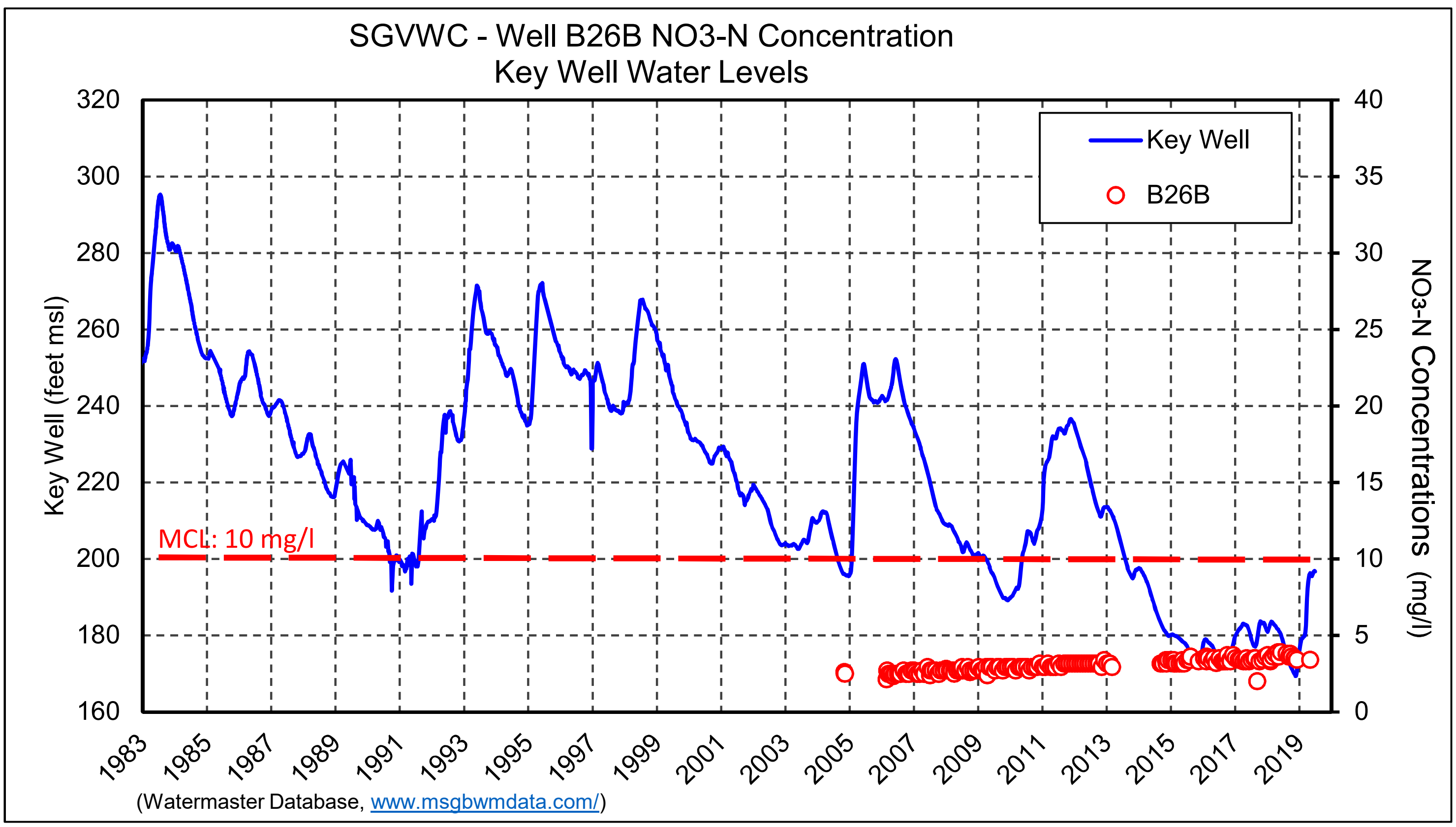
STETSON ENGINEERS INC.

CITY OF GLENDORA
Nitrate Nitrogen Concentrations

MainSanGabrielBasin WATERMASTER





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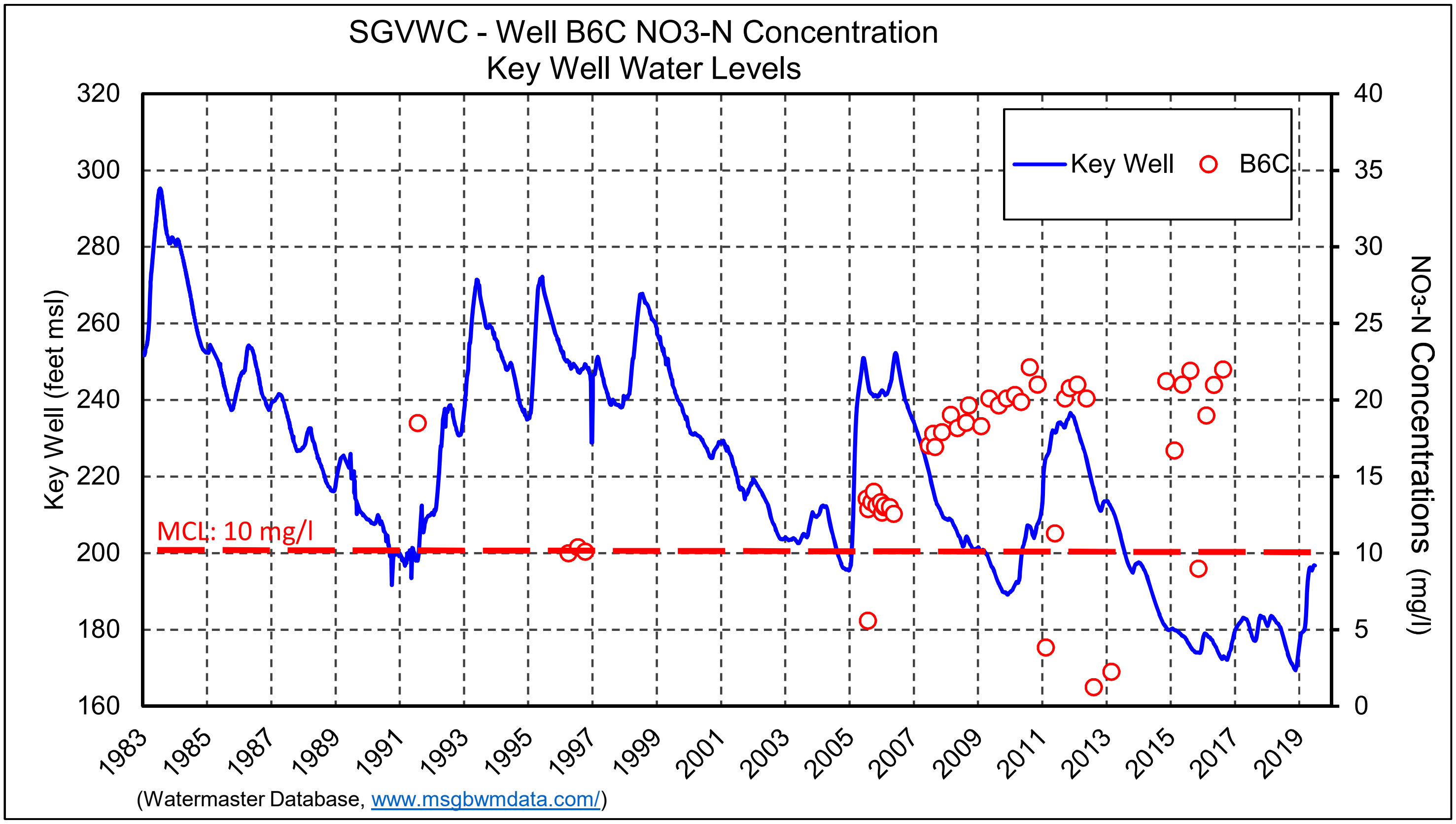
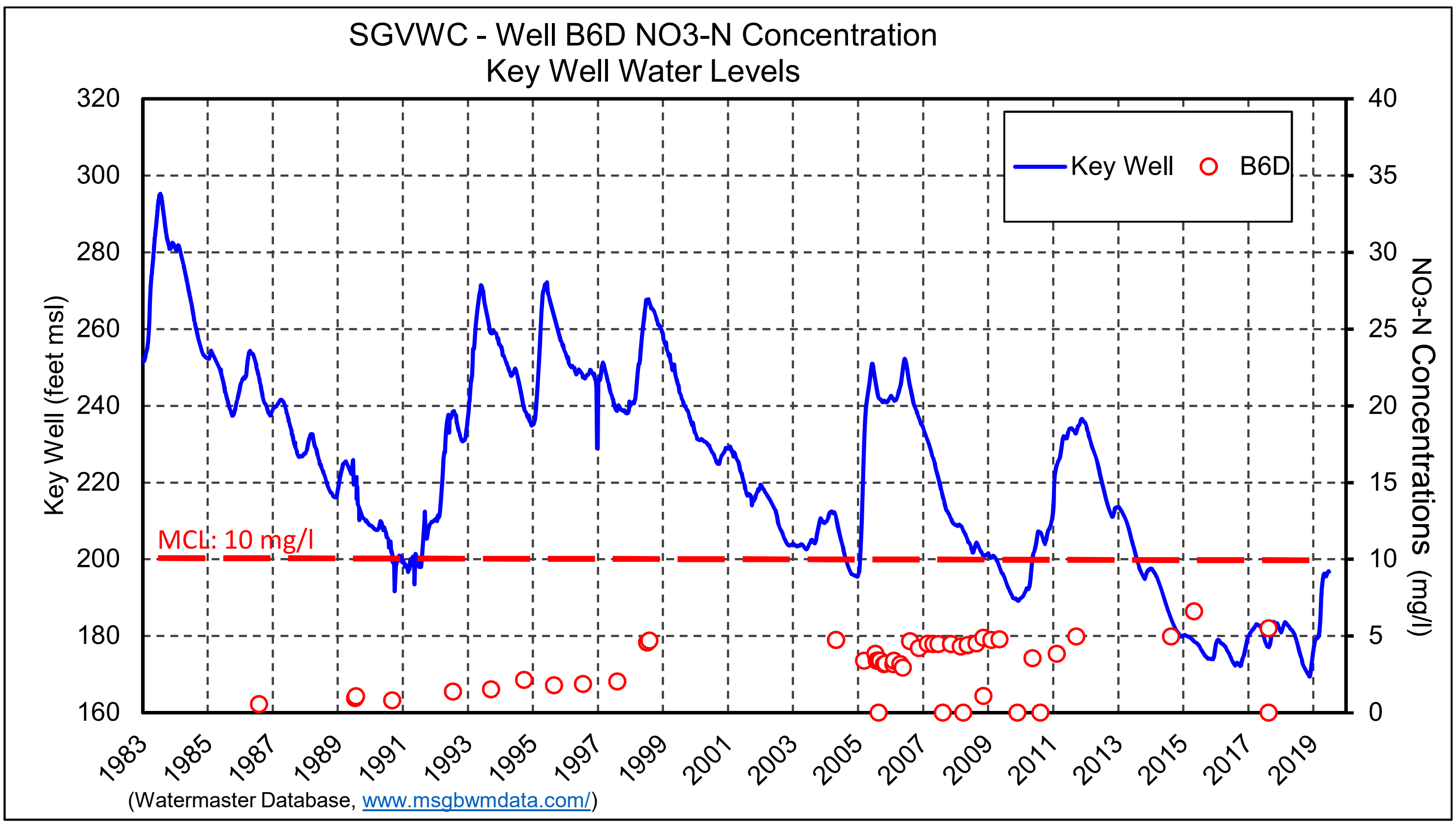
LA PUENTE VALLEY COUNTY WATER DISTRICT
Nitrate Nitrogen Concentrations

MainSanGabrielBasin WATERMASTER





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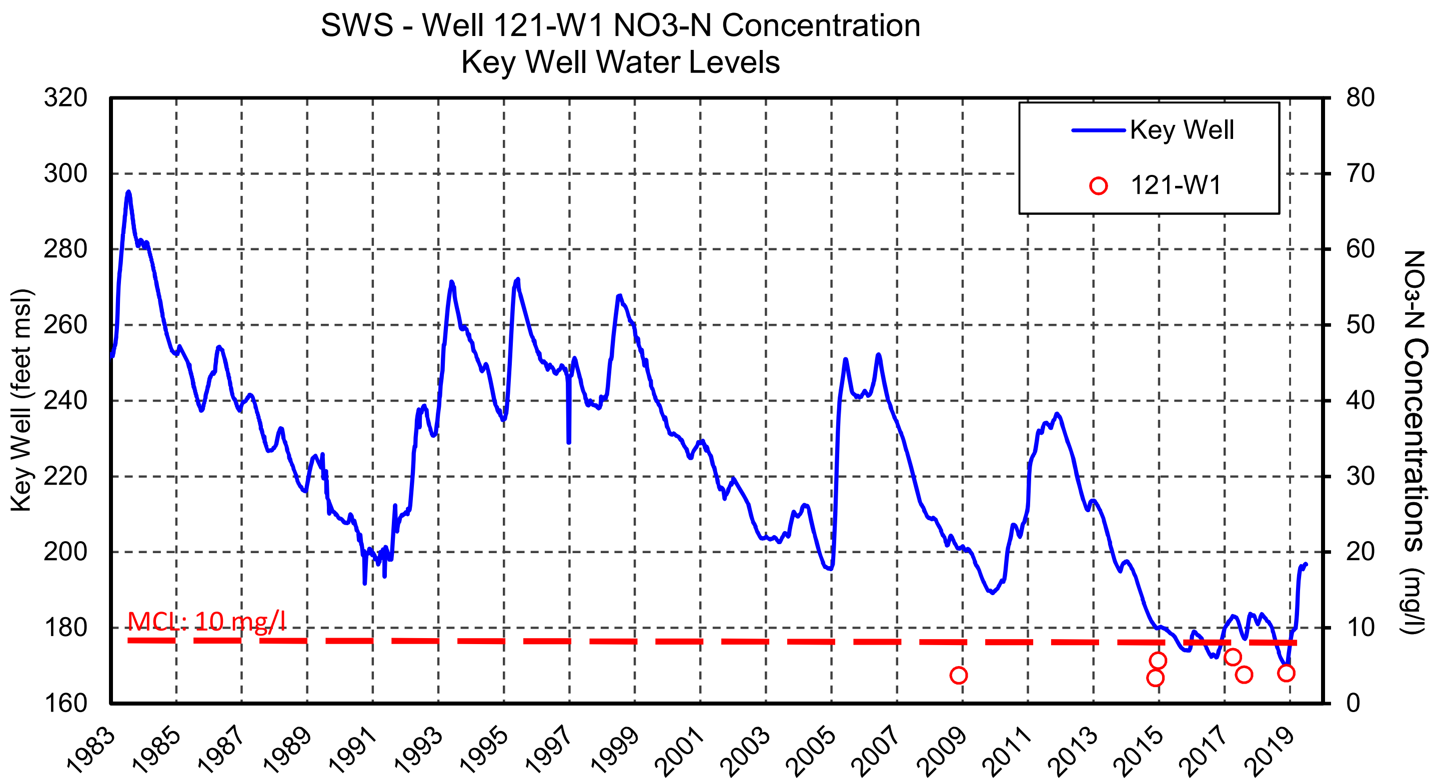
LA PUENTE VALLEY COUNTY WATER DISTRICT AND SAN GABRIEL VALLEY WATER COUNTY
Nitrate Nitrogen Concentrations

MainSanGabrielBasin WATERMASTER



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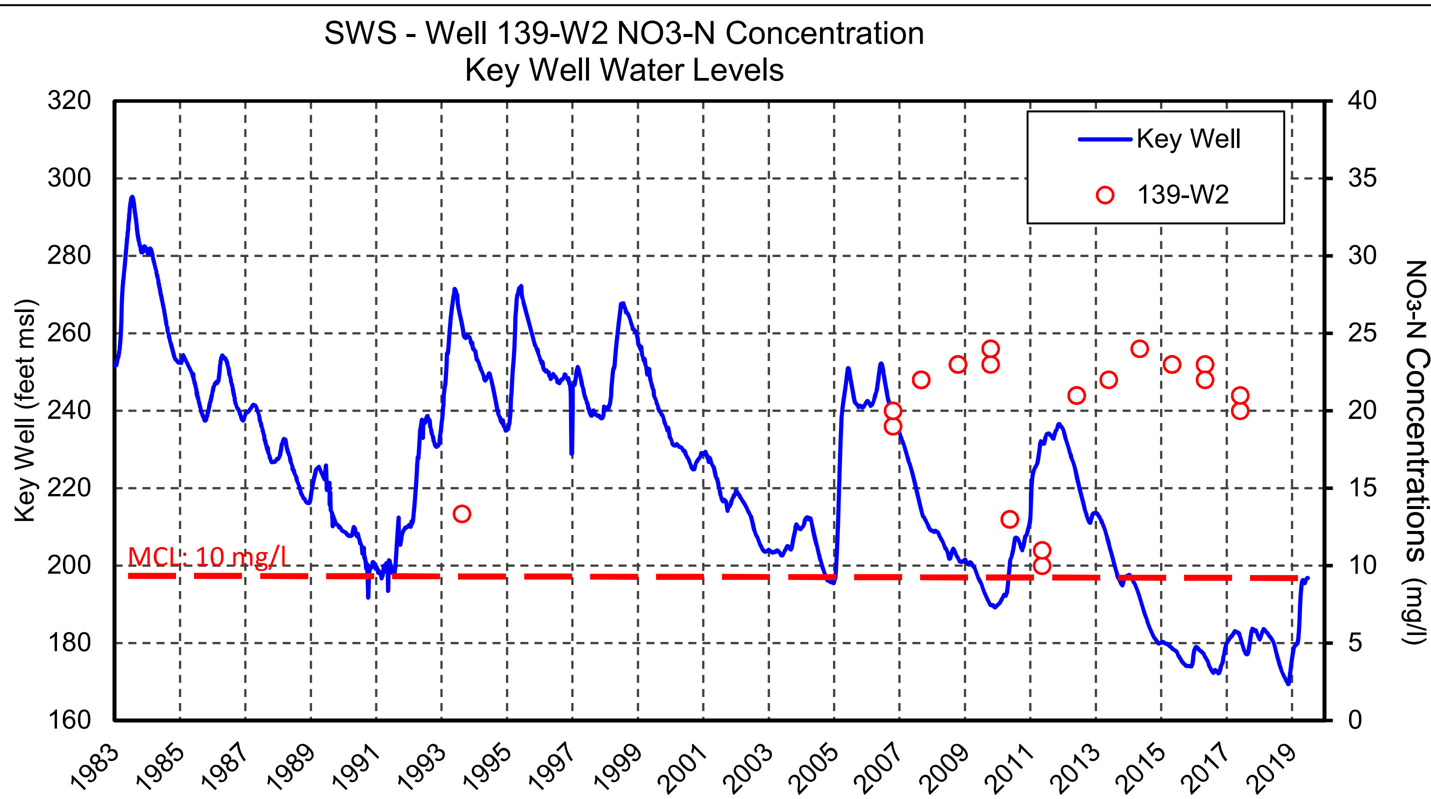

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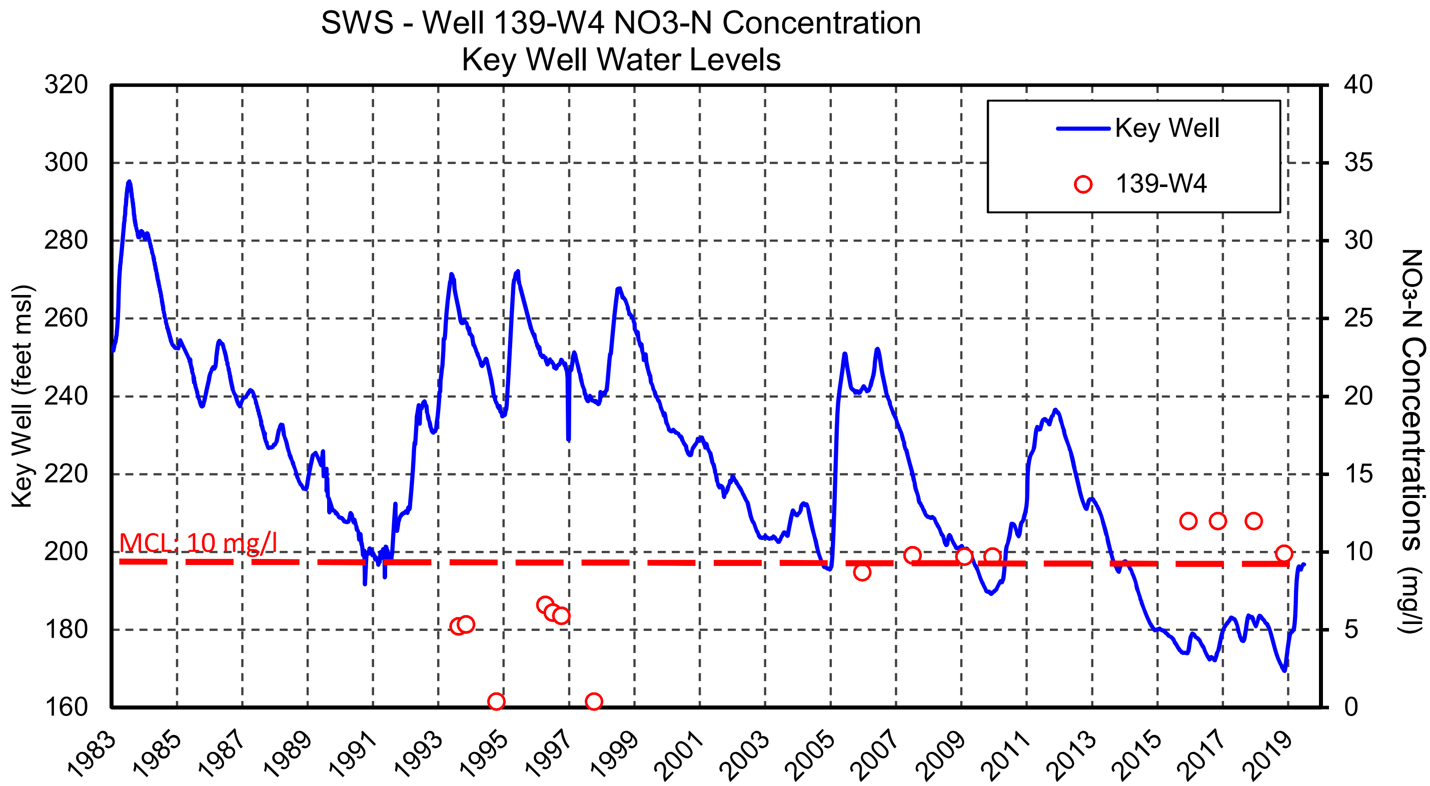
SAN GABRIEL VALLEY WATER COUNTY
Nitrate Nitrogen Concentrations



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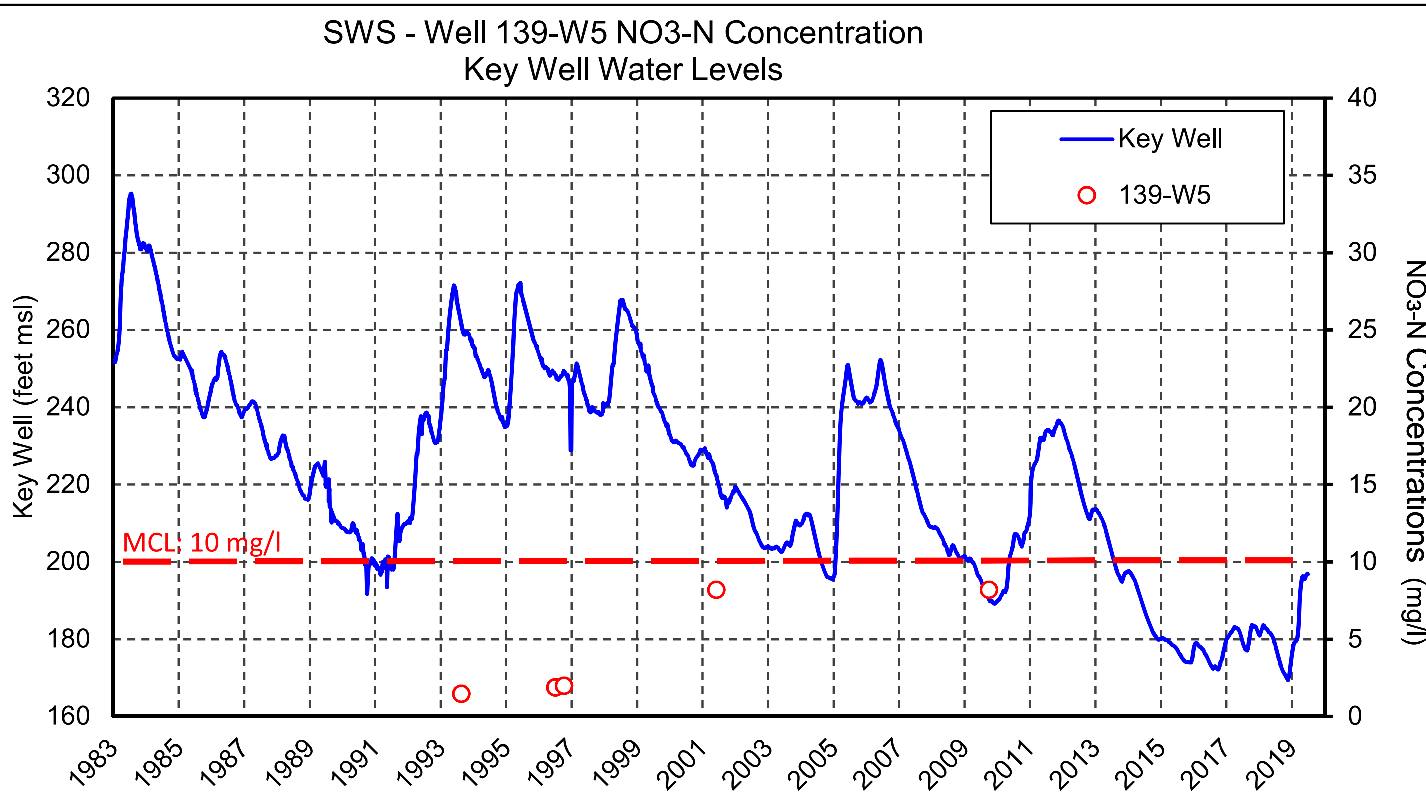

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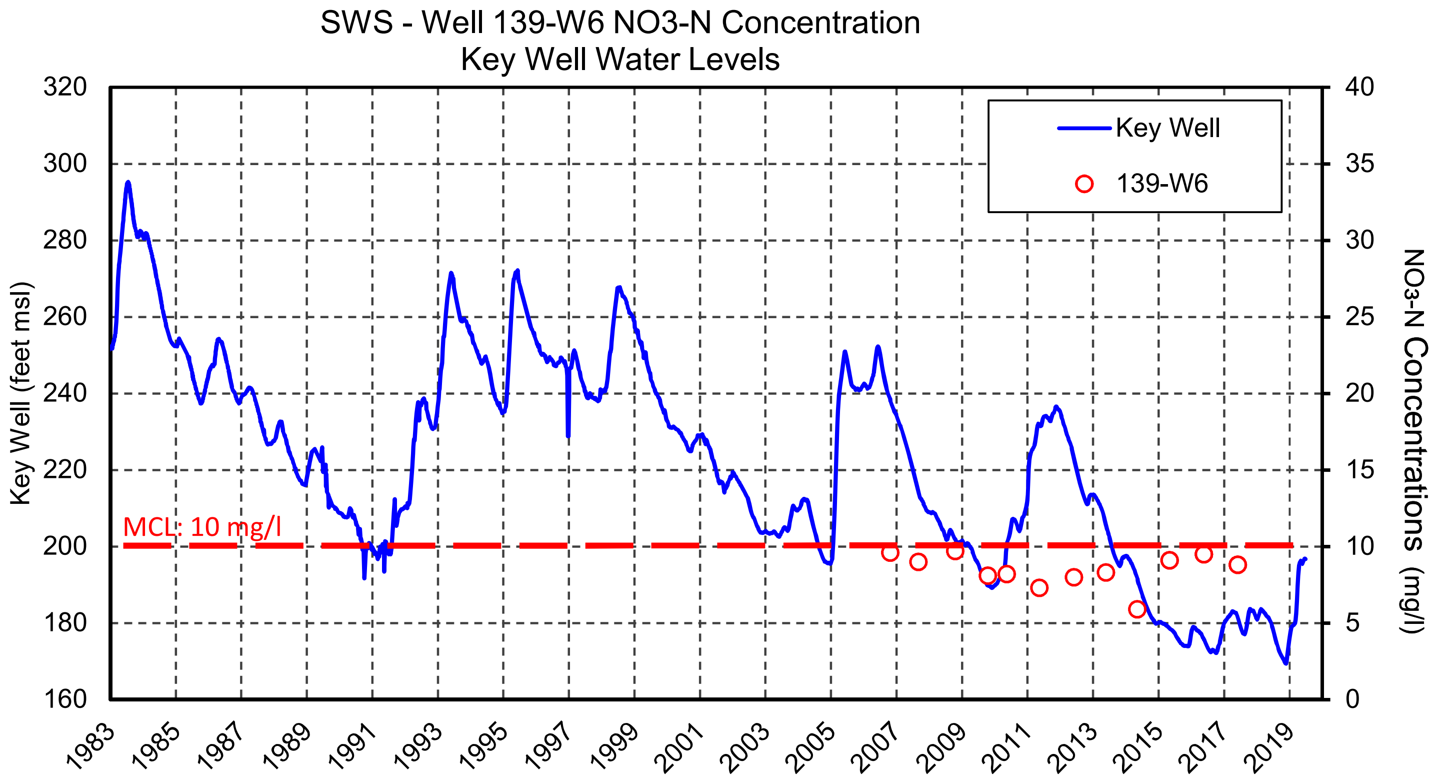
SAN GABRIEL VALLEY WATER COUNTY AND SUBURBAN WATER SYSTEMS
Nitrate Nitrogen Concentrations

MainSanGabrielBasin WATERMASTER



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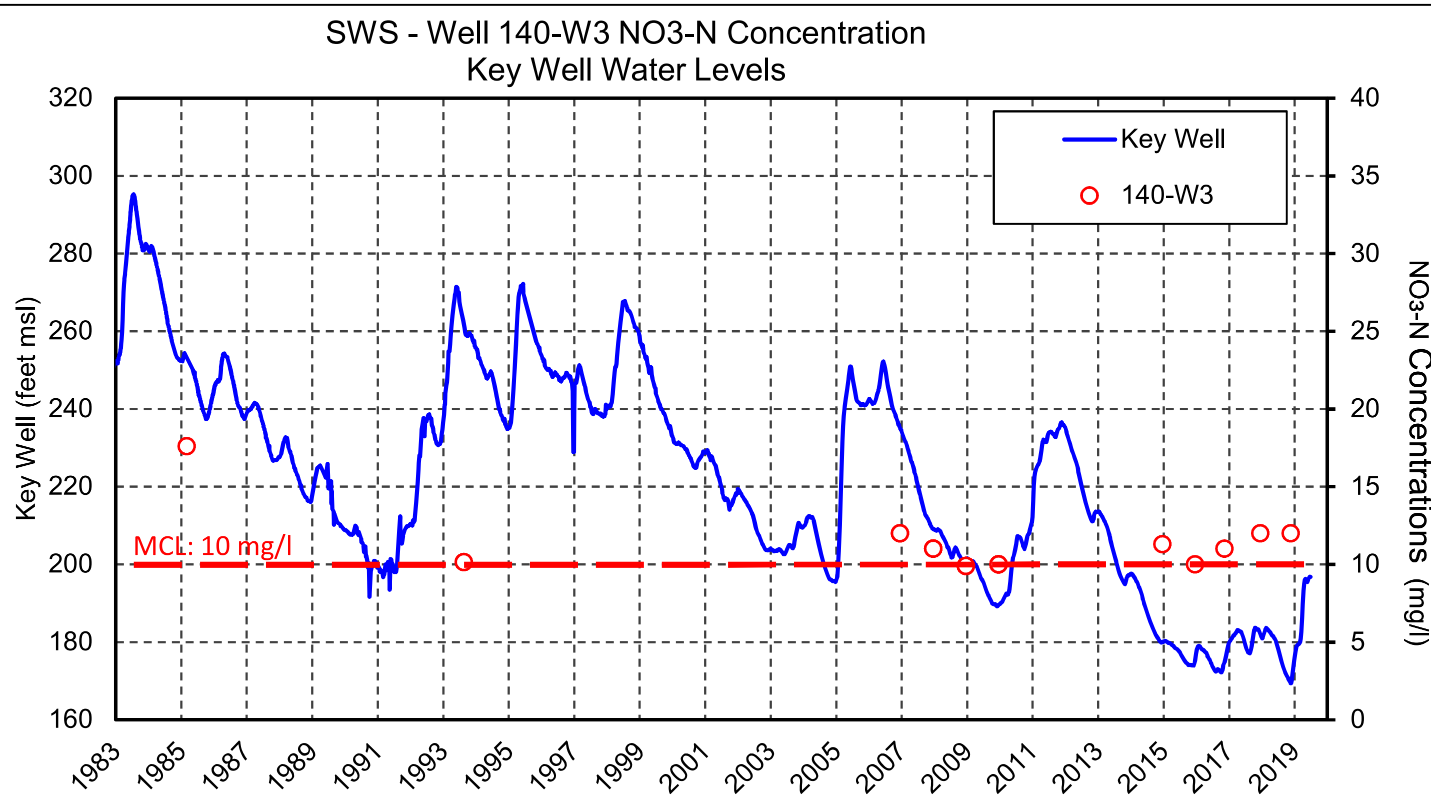

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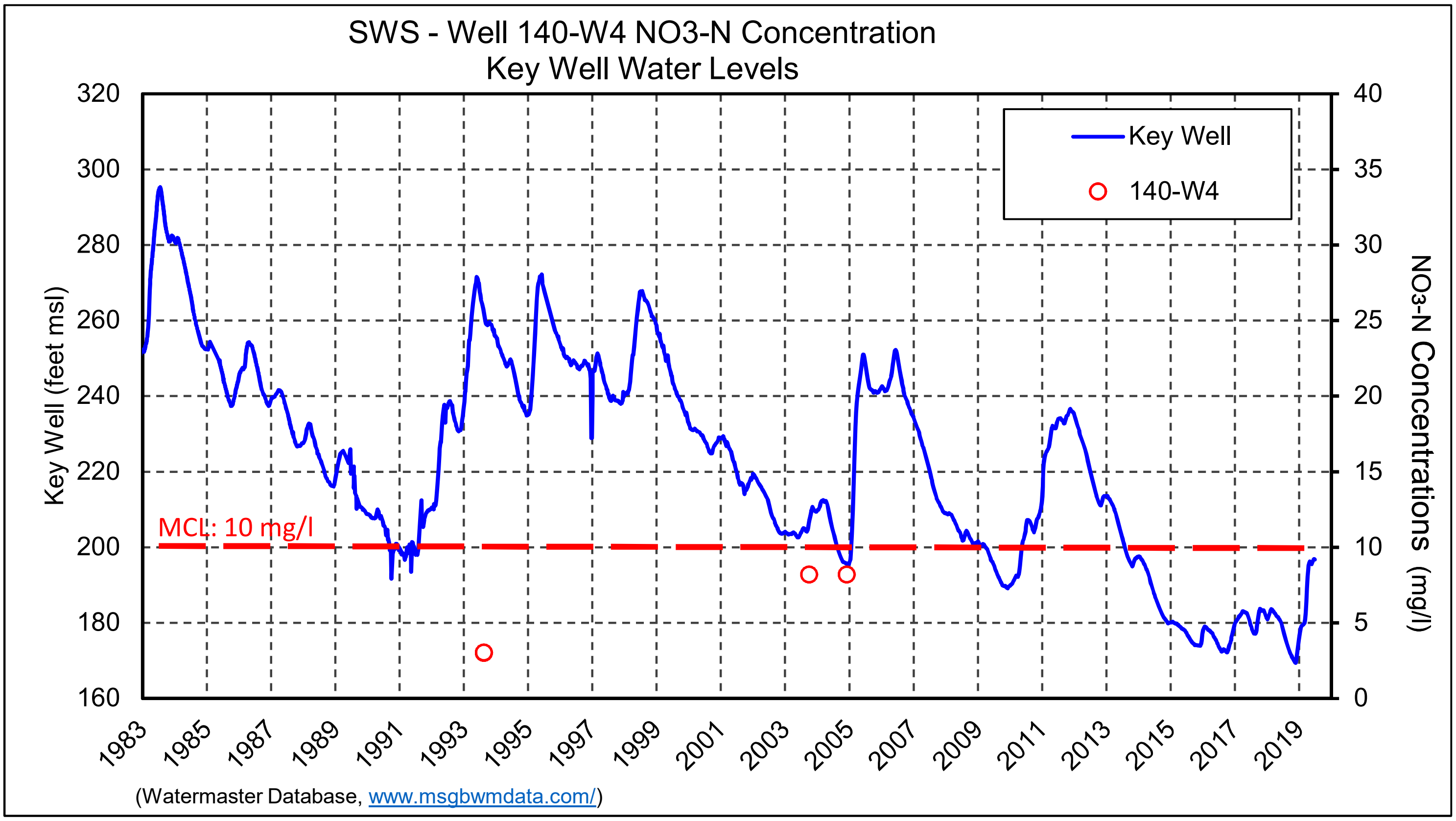
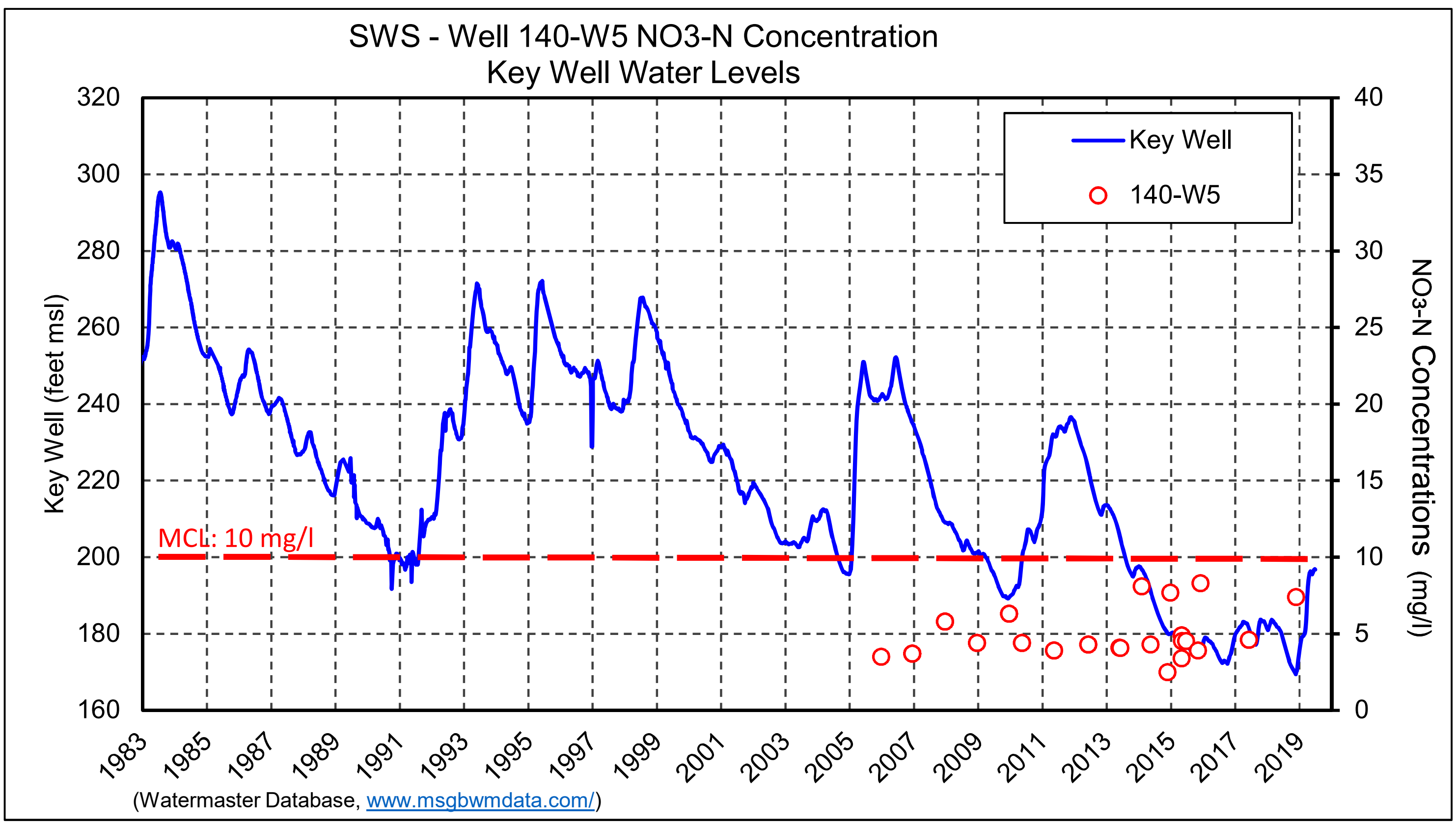
STETSON ENGINEERS INC.

SUBURBAN WATER SYSTEMS
Nitrate Nitrogen Concentrations

MainSanGabrielBasin WATERMASTER





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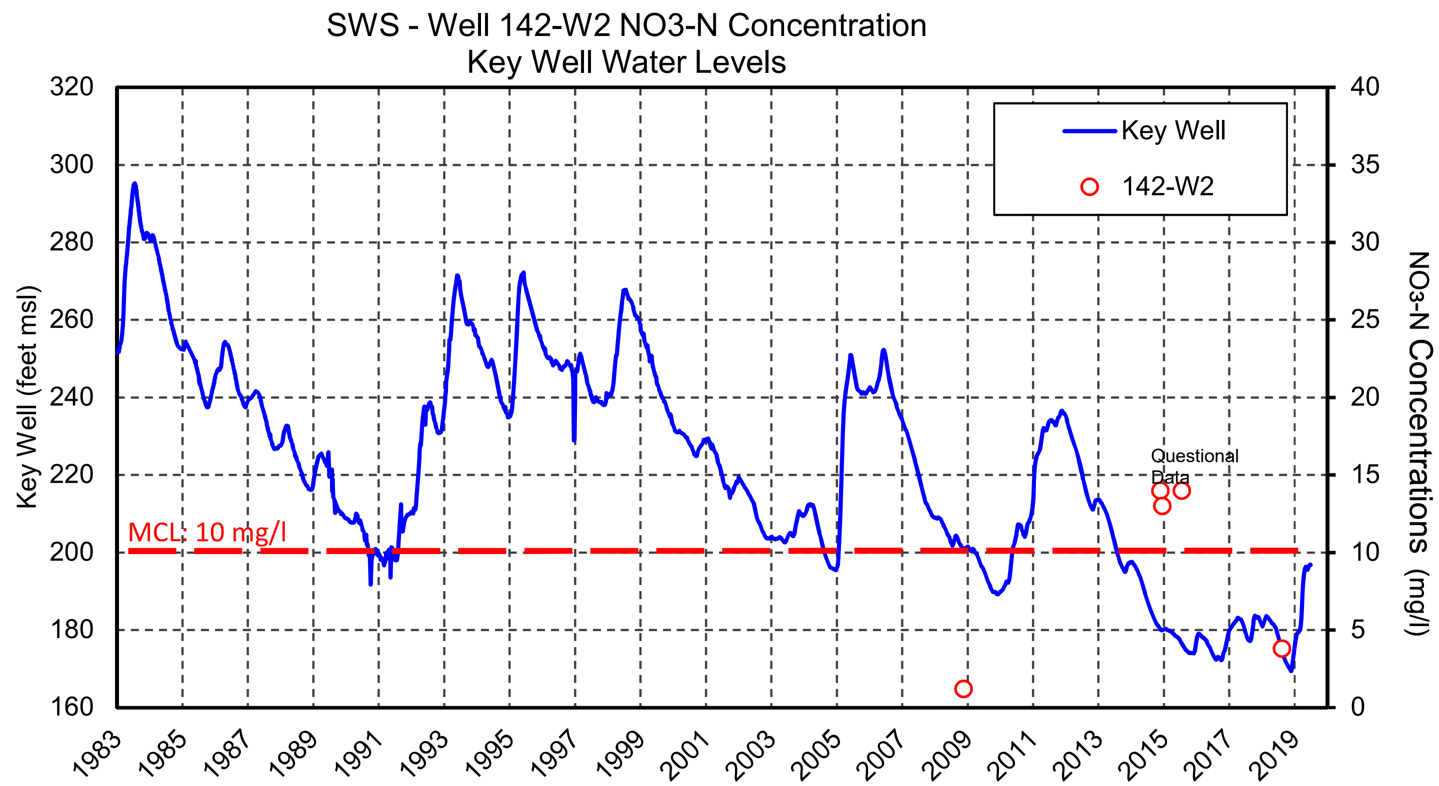
SUBURBAN WATER SYSTEMS
Nitrate Nitrogen Concentrations

MainSanGabrielBasin WATERMASTER



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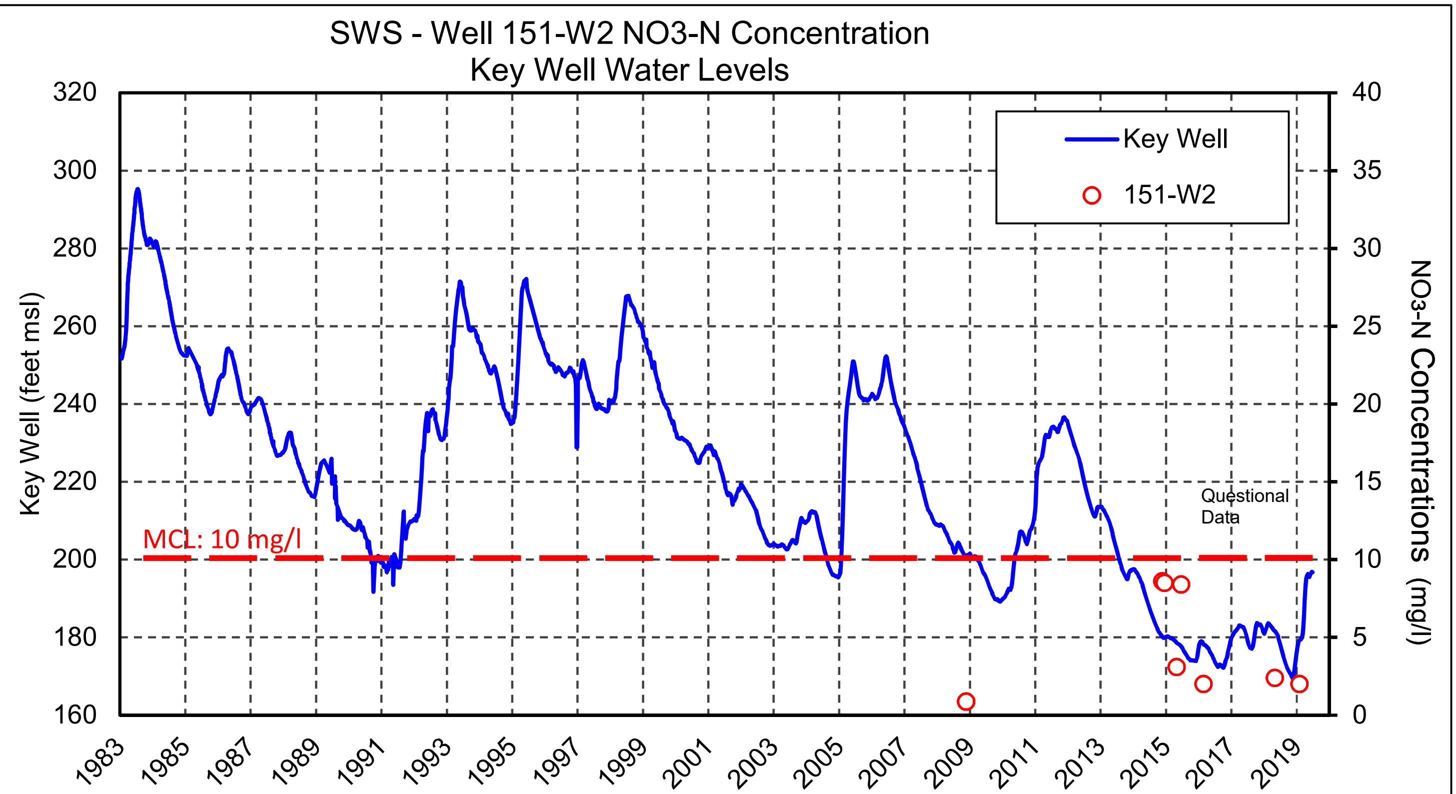

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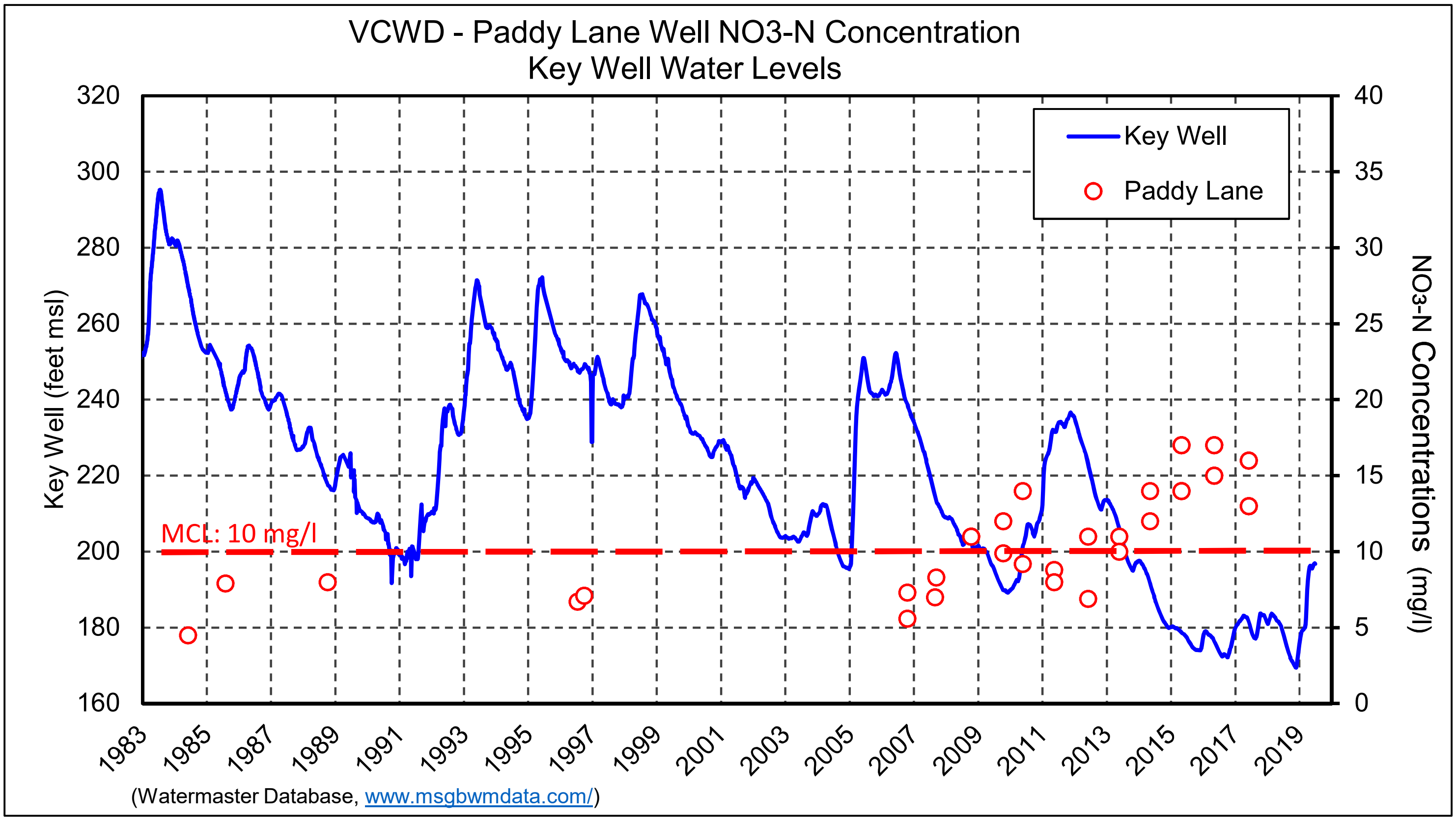
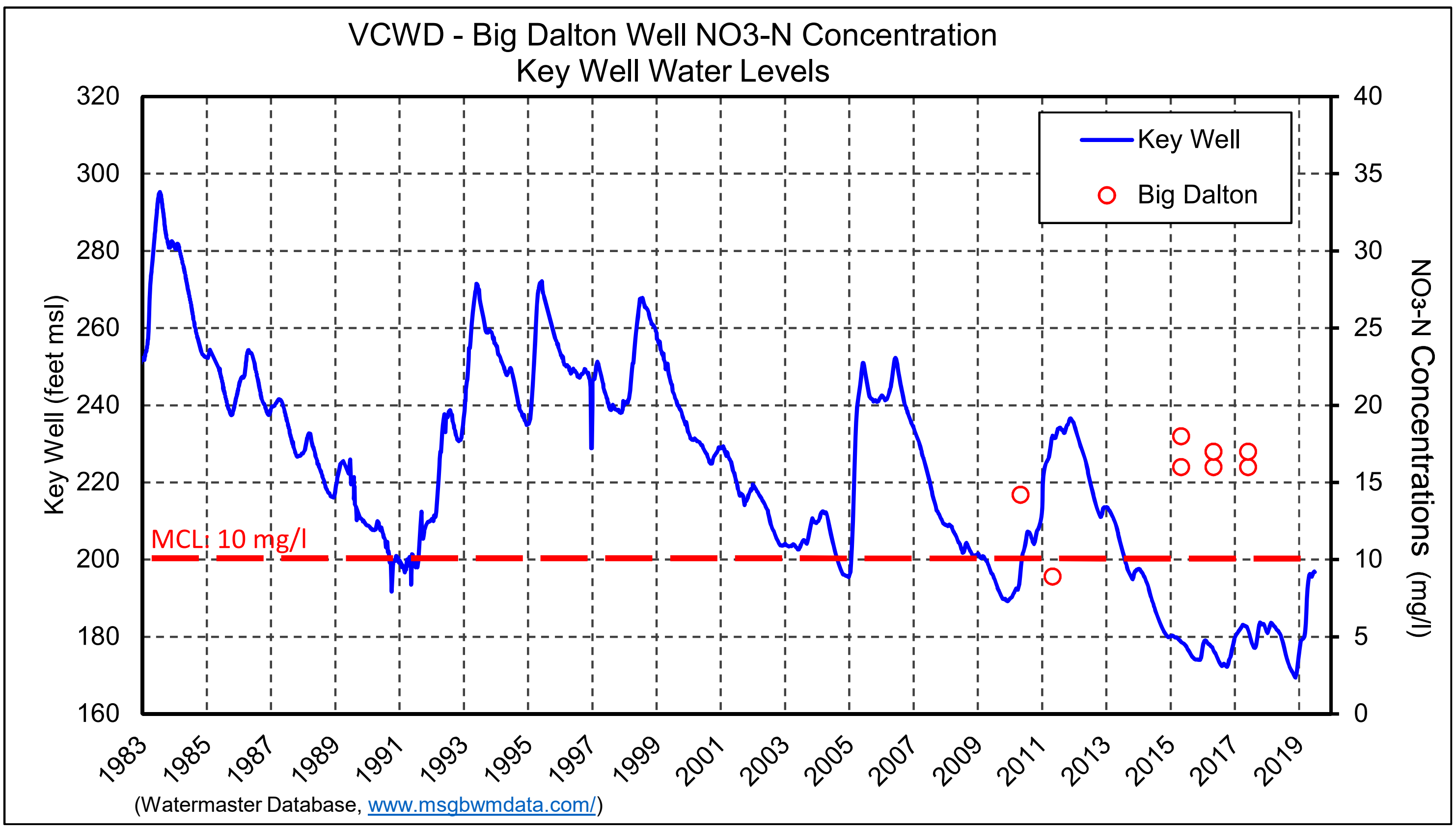
SUBURBAN WATER SYSTEMS
Nitrate Nitrogen Concentrations

MainSanGabrielBasin WATERMASTER





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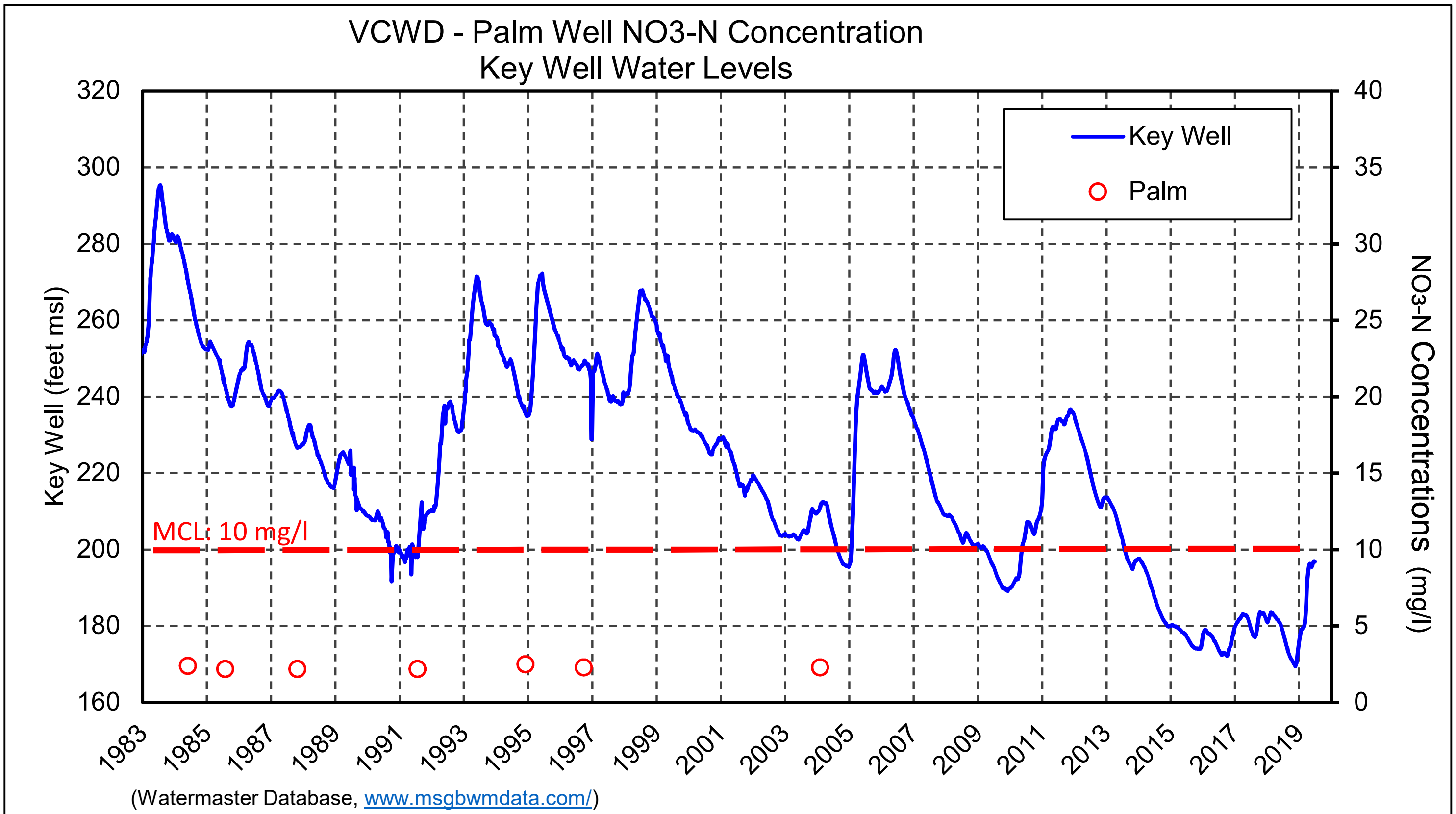
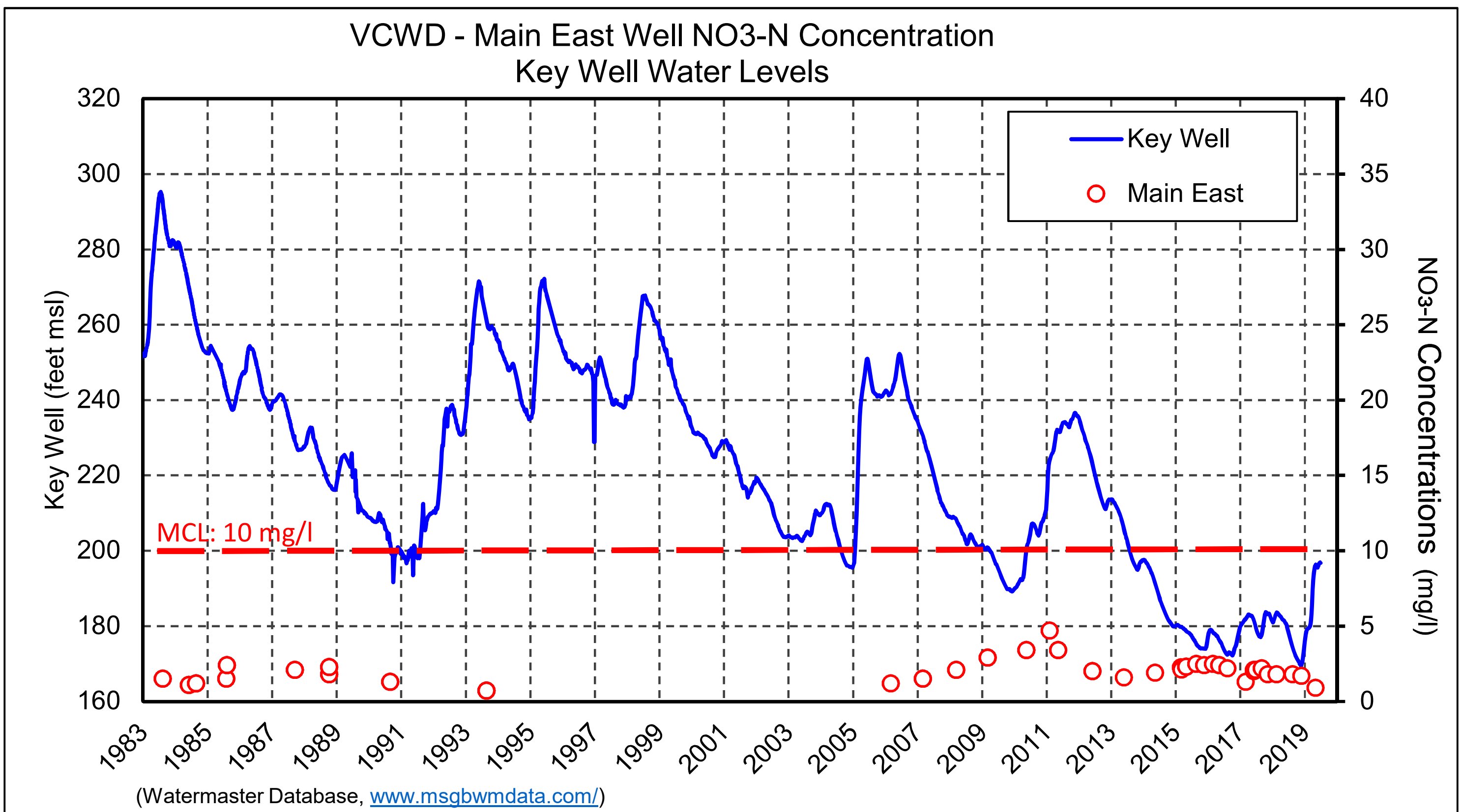
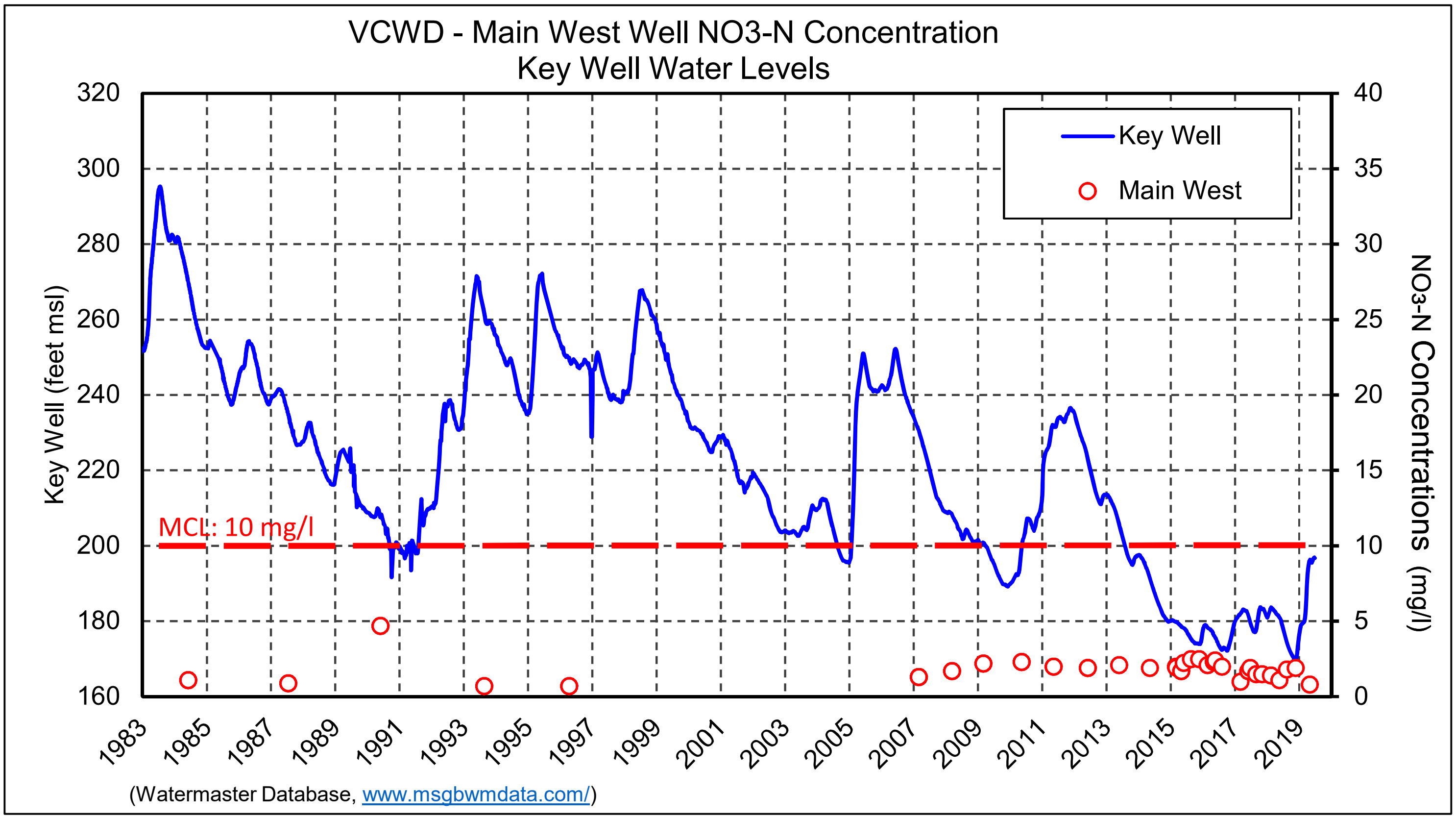
SUBURBAN WATER SYSTEMS
Nitrate Nitrogen Concentrations

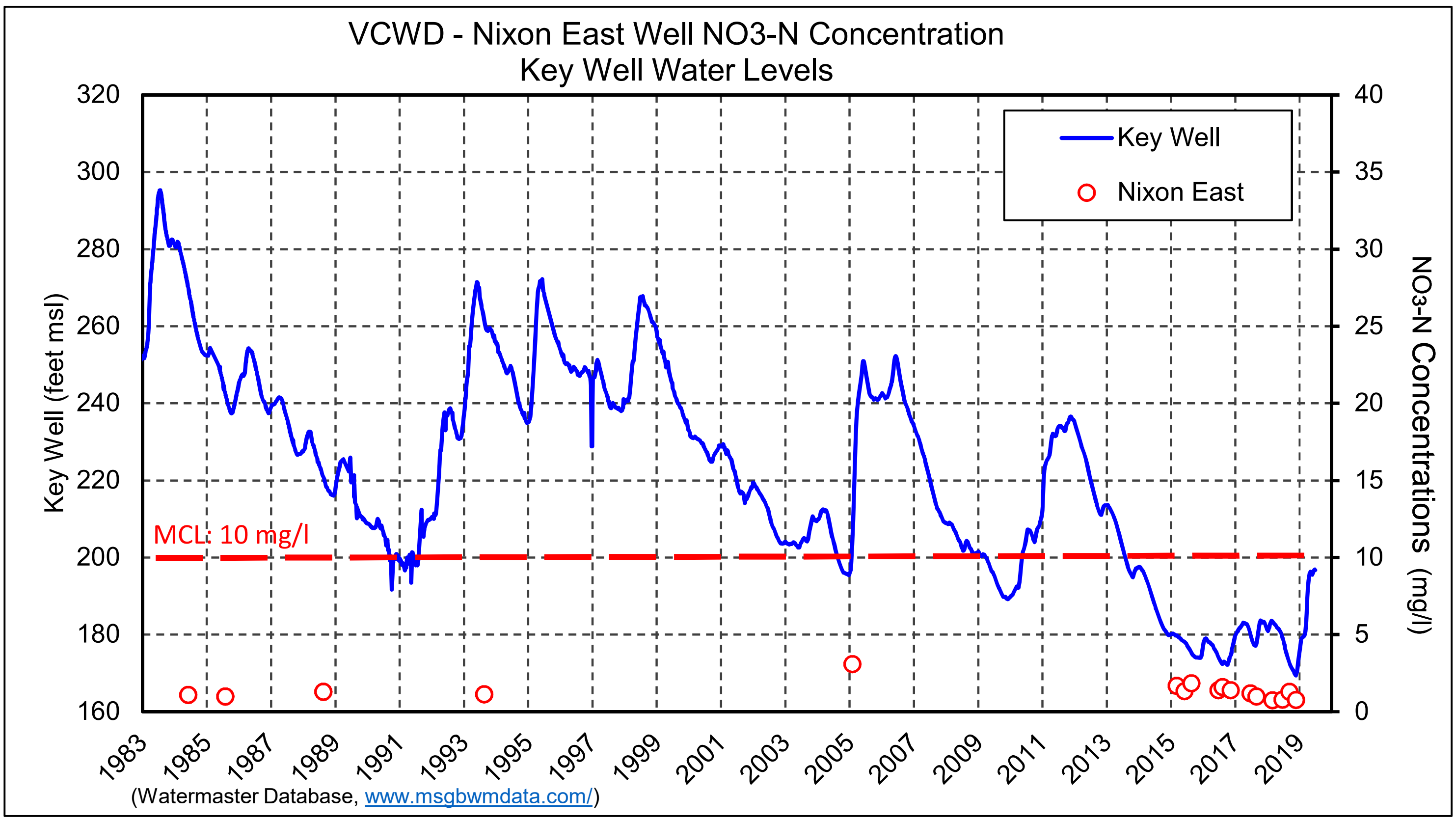
MainSanGabrielBasin WATERMASTER





SUBURBAN WATER SYSTEMS AND VALLEY COUNTY WATER DISTRICT
Nitrate Nitrogen Concentrations





STETSON ENGINEERS INC.

VALLEY COUNTY WATER DISTRICT
Nitrate Nitrogen Concentrations

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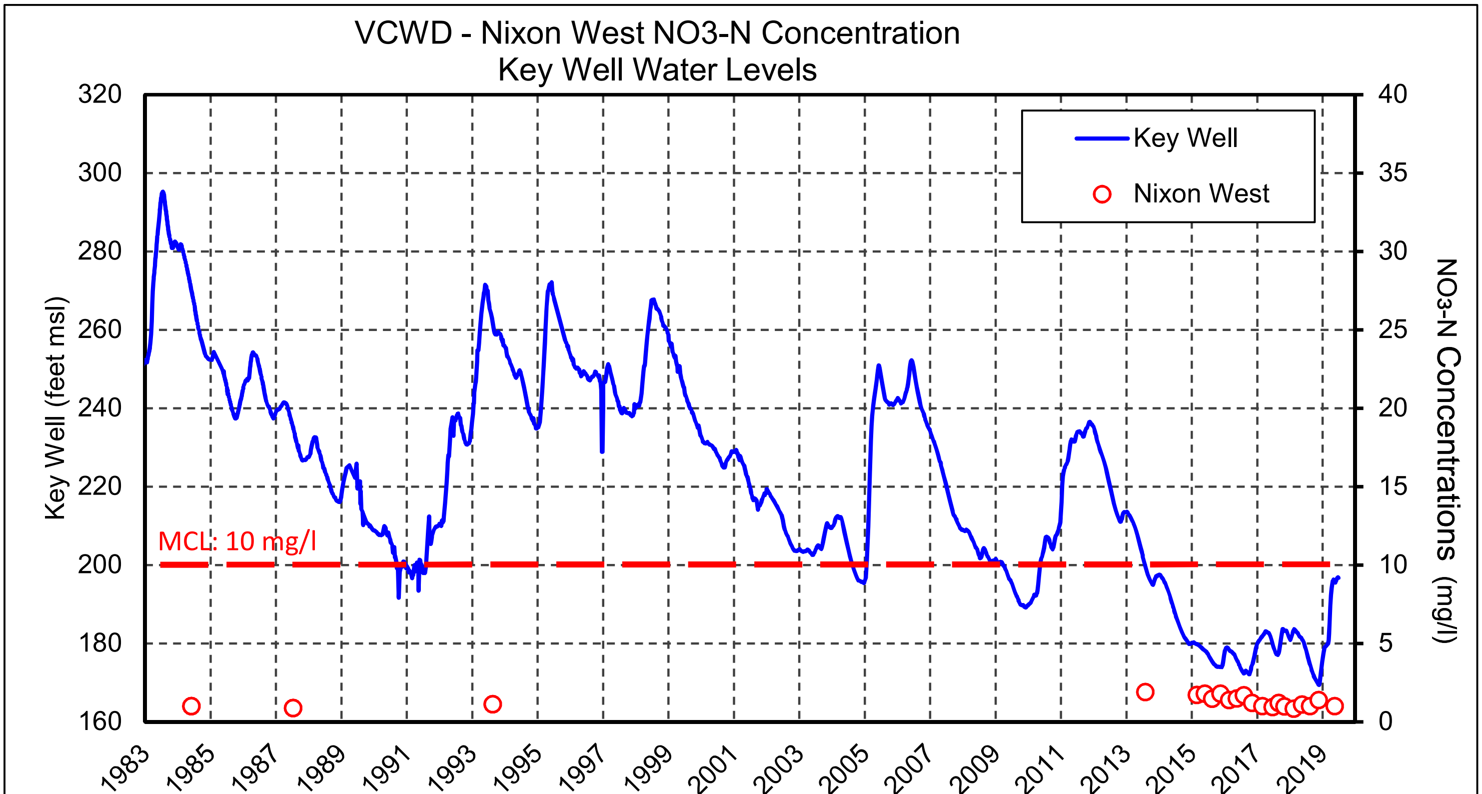

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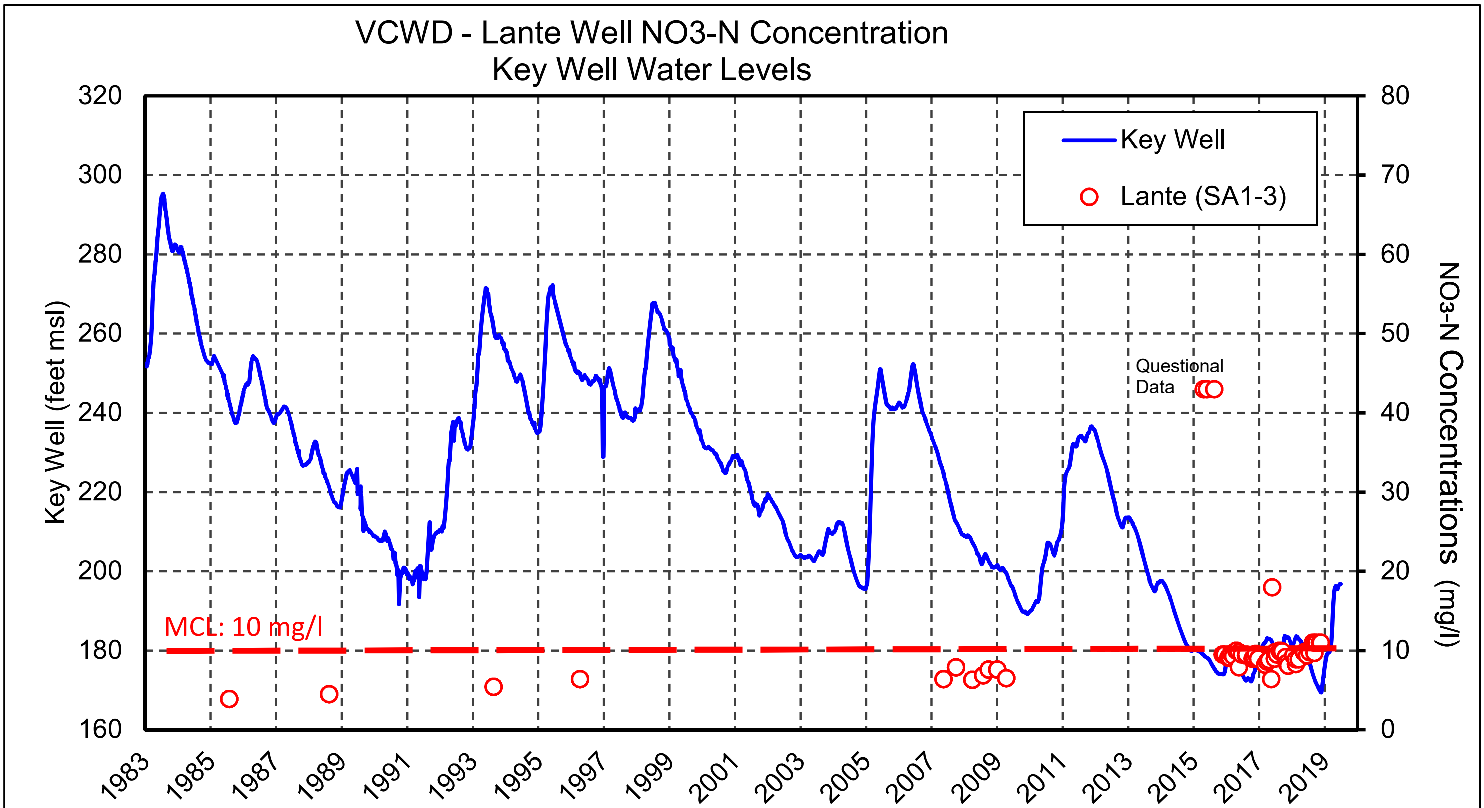

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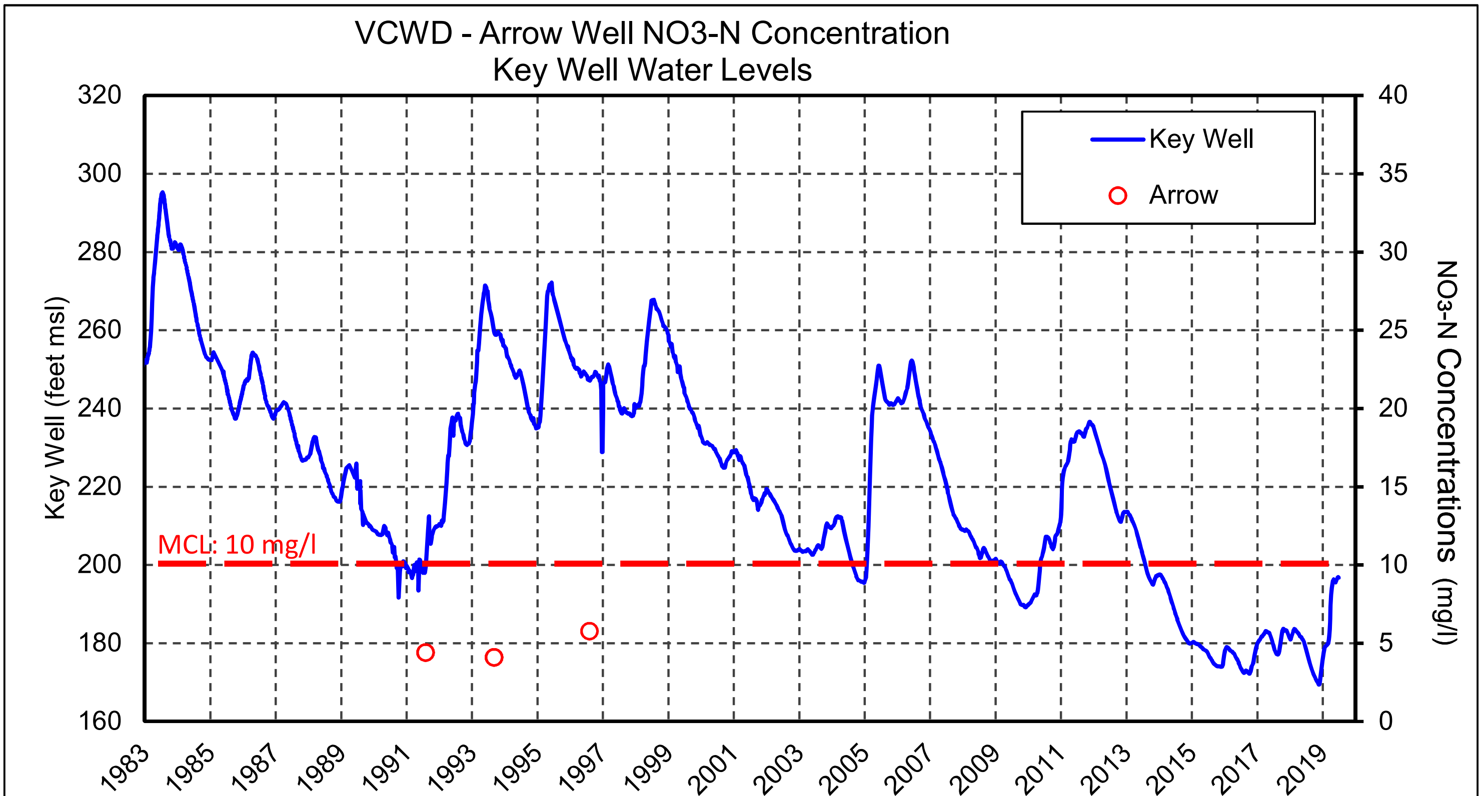
STETSON ENGINEERS INC.

VALLEY COUNTY WATER DISTRICT
Nitrate Nitrogen Concentrations

MainSanGabrielBasin WATERMASTER



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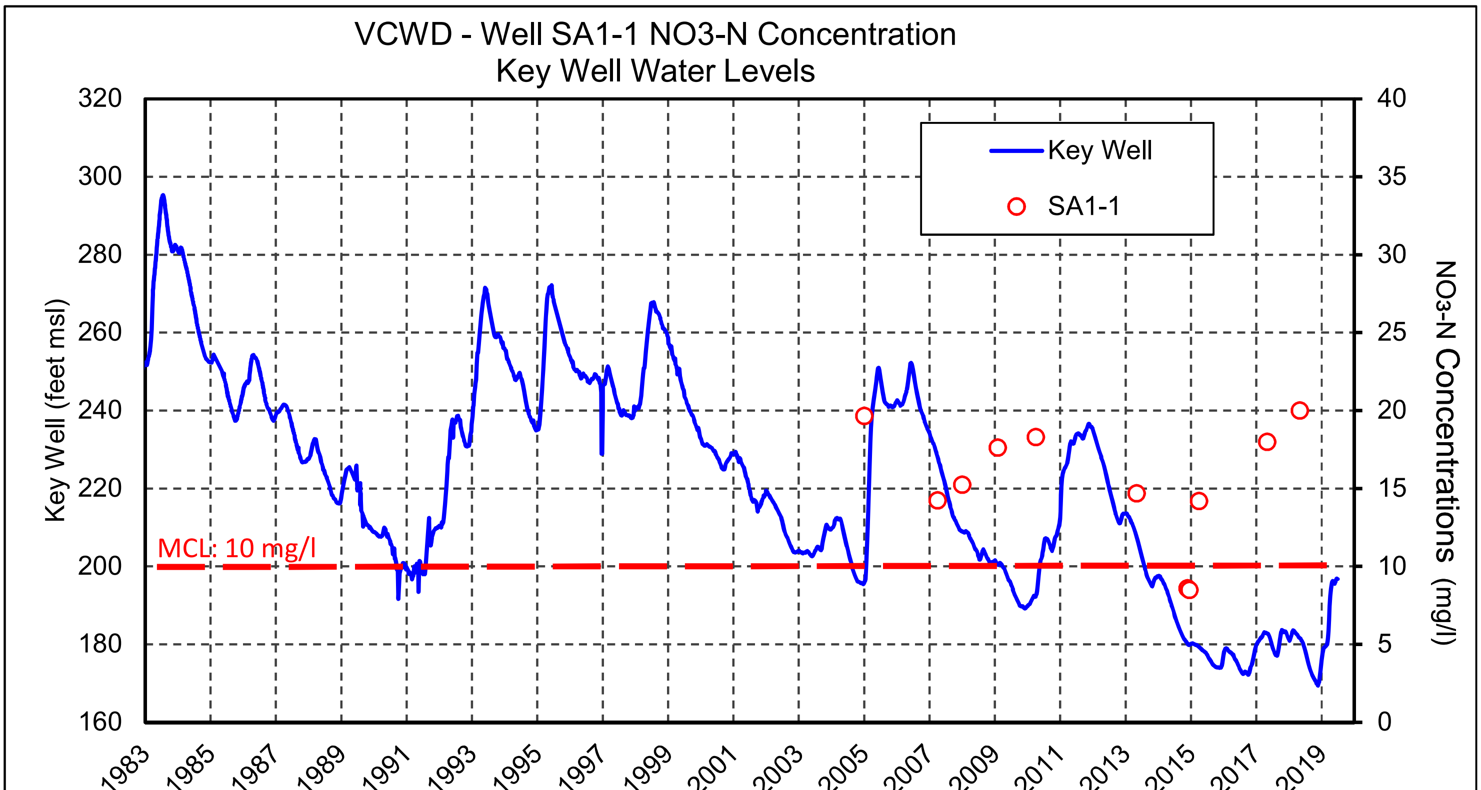

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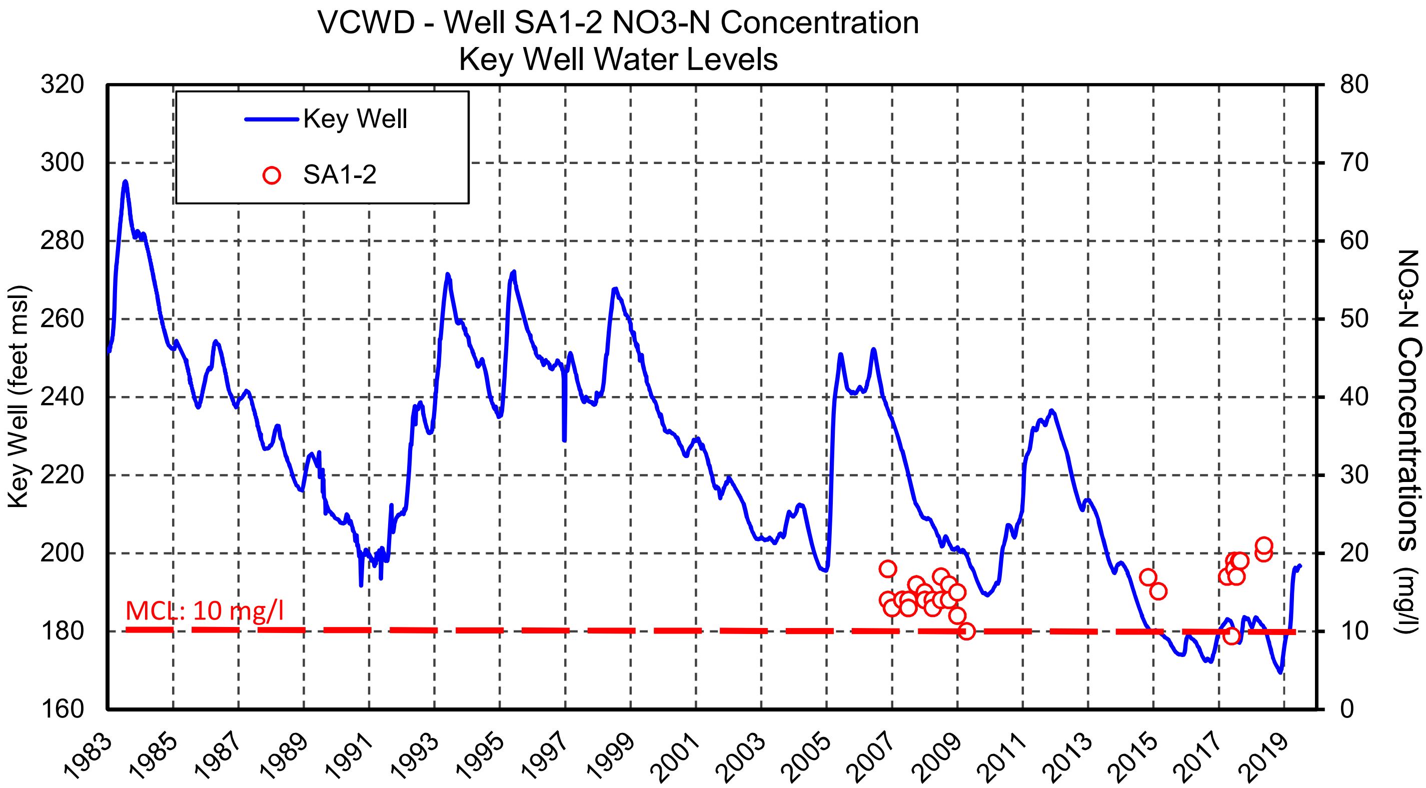
SUBURBAN WATER SYSTEMS AND VALLEY COUNTY WATER DISTRICT
Nitrate Nitrogen Concentrations

MainSanGabrielBasin WATERMASTER



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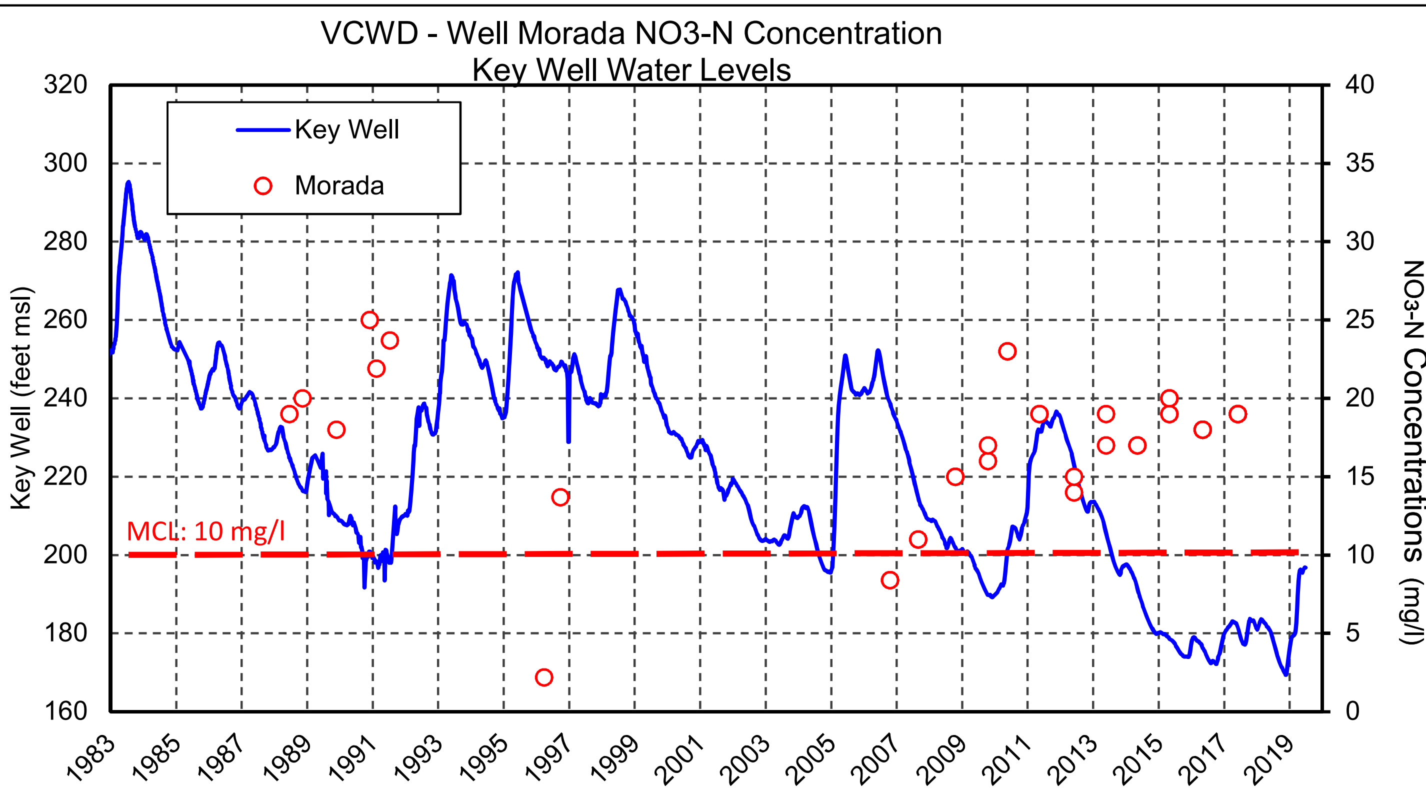

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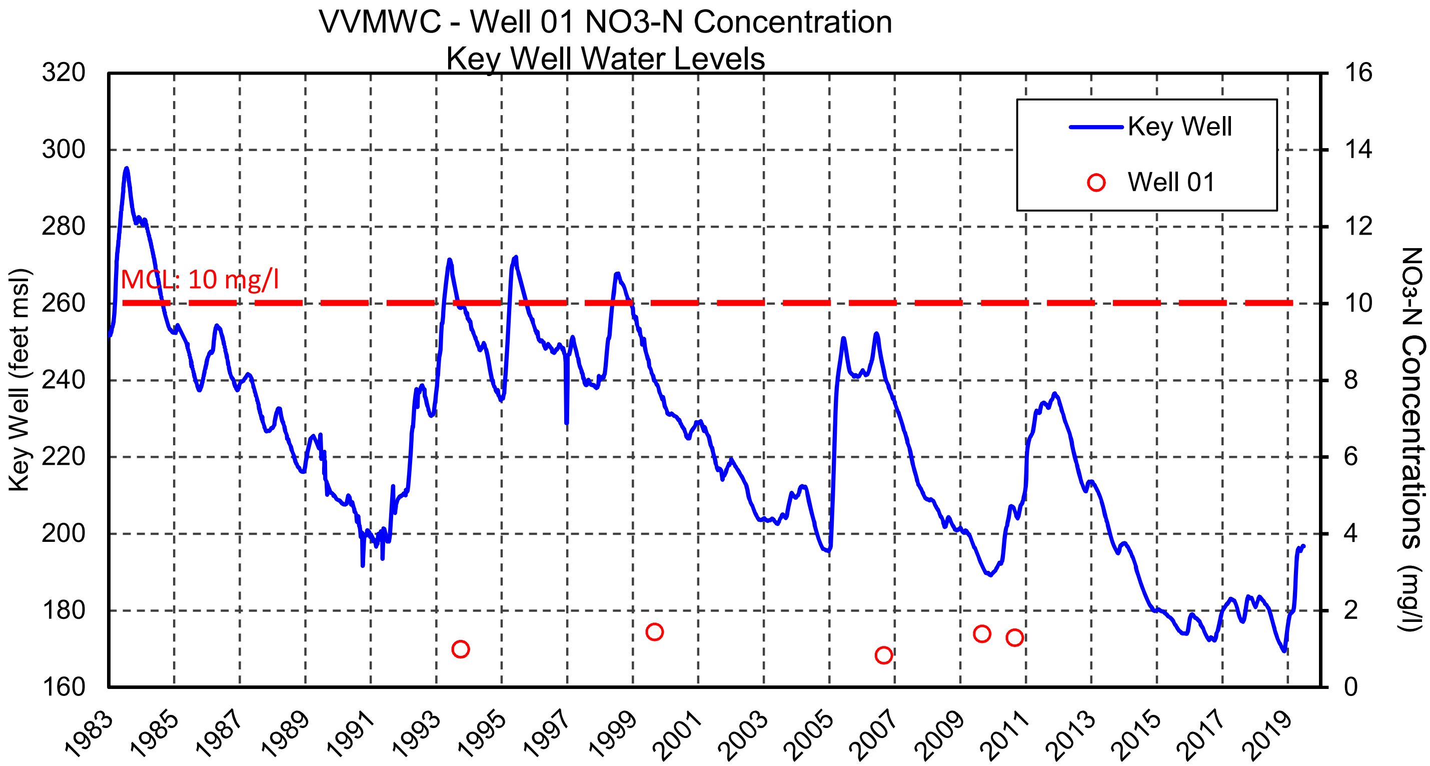
STETSON ENGINEERS INC.

VALLEY COUNTY WATER DISTRICT
Nitrate Nitrogen Concentrations

MainSanGabrielBasin WATERMASTER



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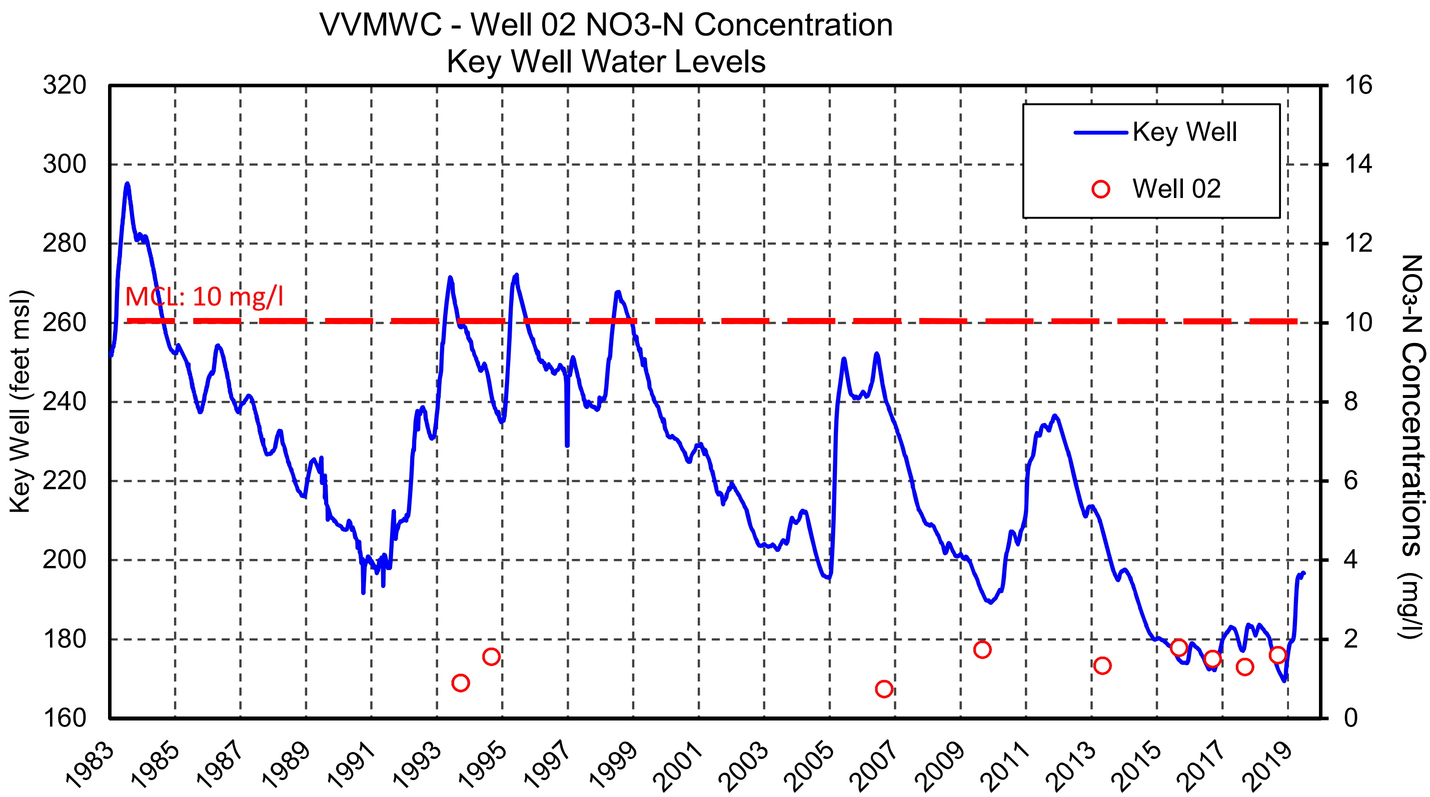

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STETSON ENGINEERS INC.

VALLEY COUNTY WATER DISTRICT
Nitrate Nitrogen Concentrations

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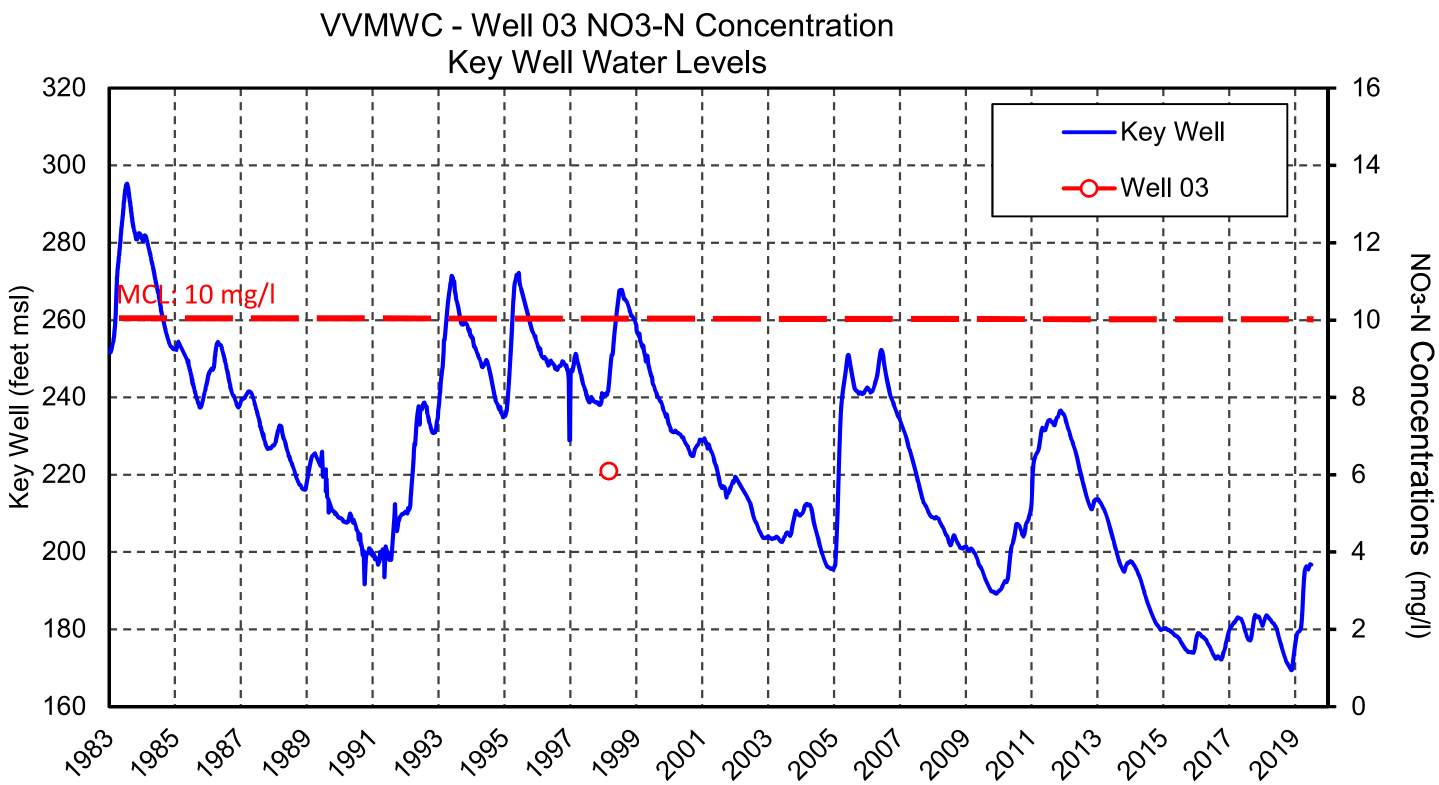

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STETSON ENGINEERS INC.

SUBURBAN WATER SYSTEMS AND VALLEY VIEW MUNICIPAL WATER COMPANY Nitrate Nitrogen Concentrations

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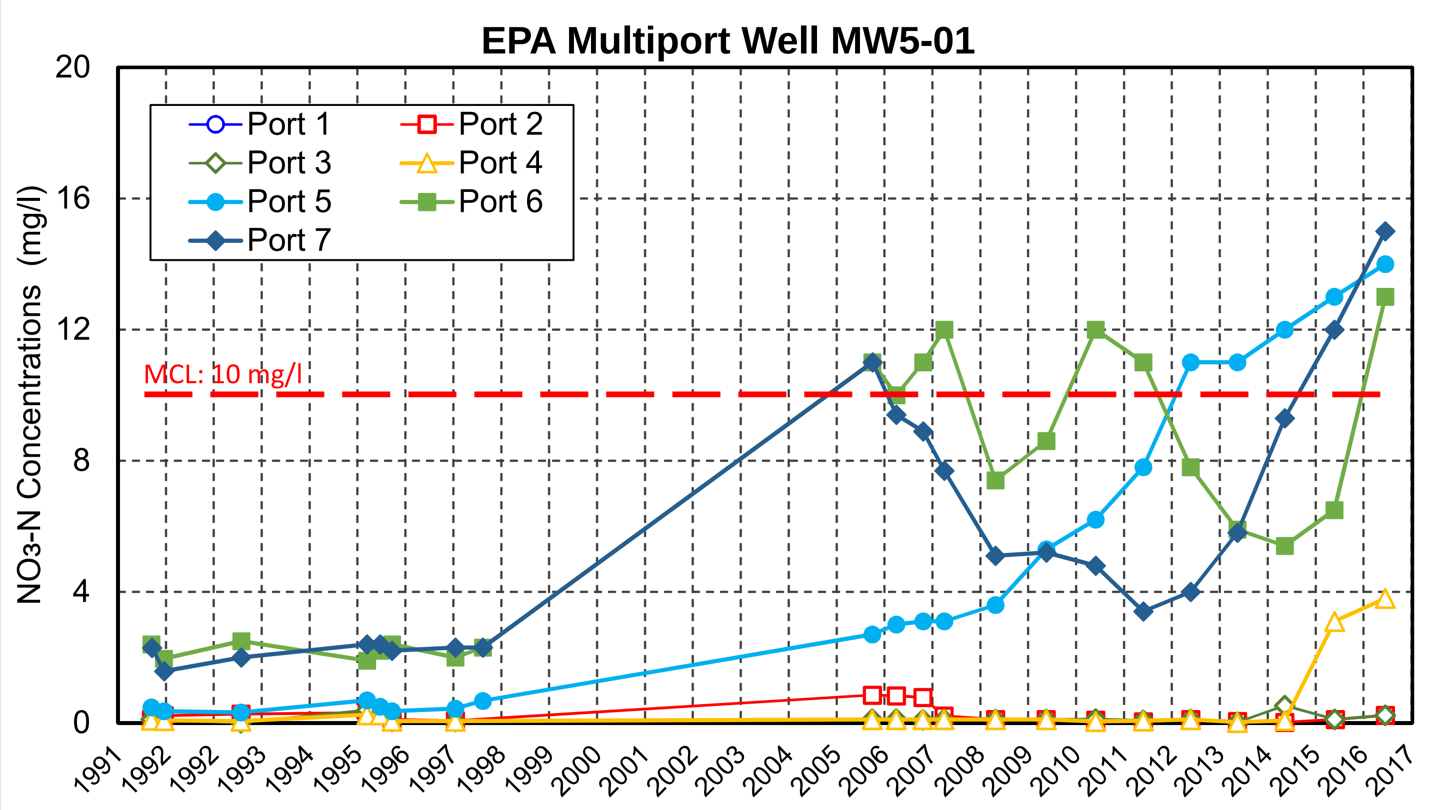

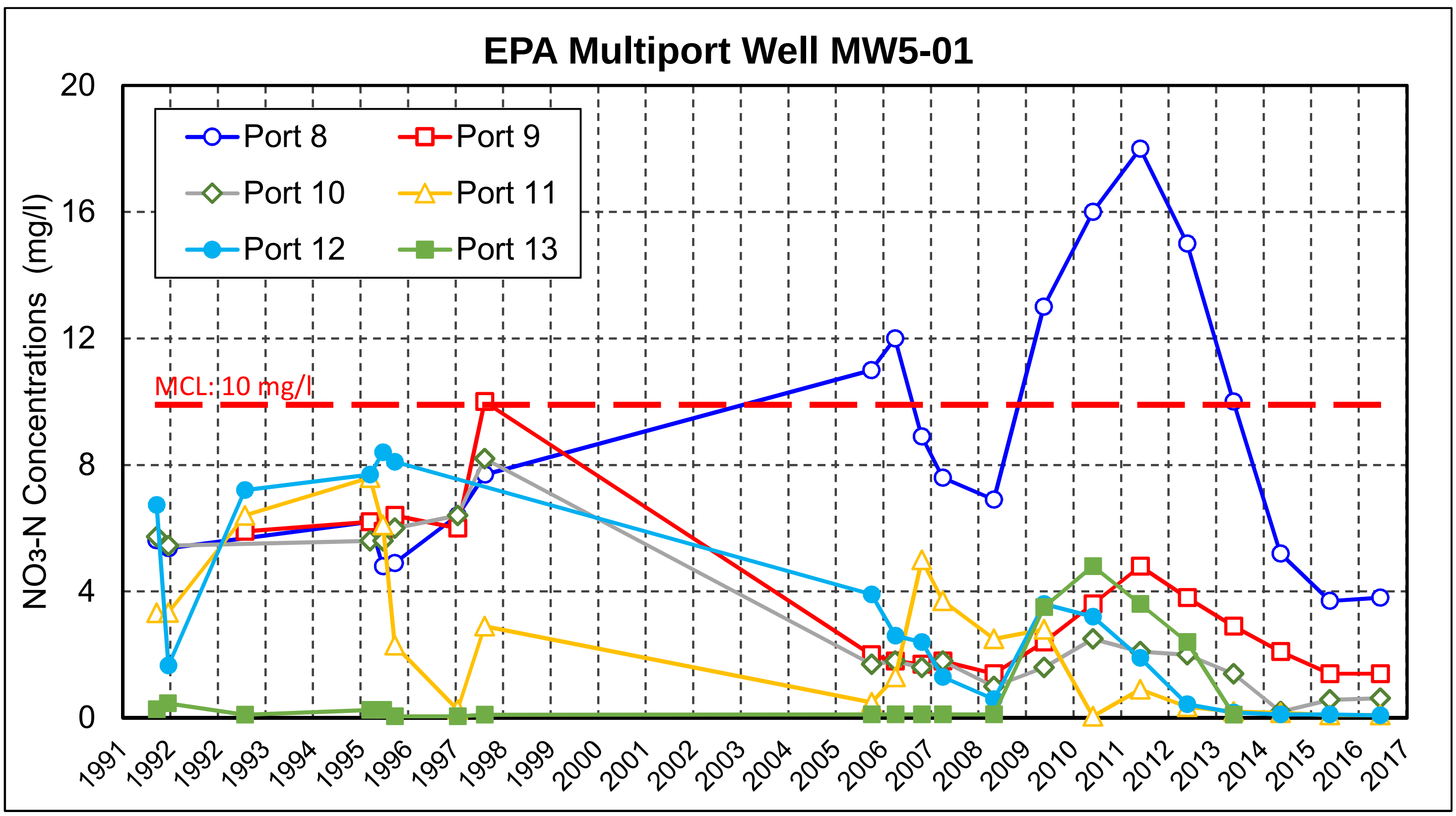

STETSON ENGINEERS INC.

EPA MULTIPORT WELL MW5-01
Nitrate Nitrogen Concentrations

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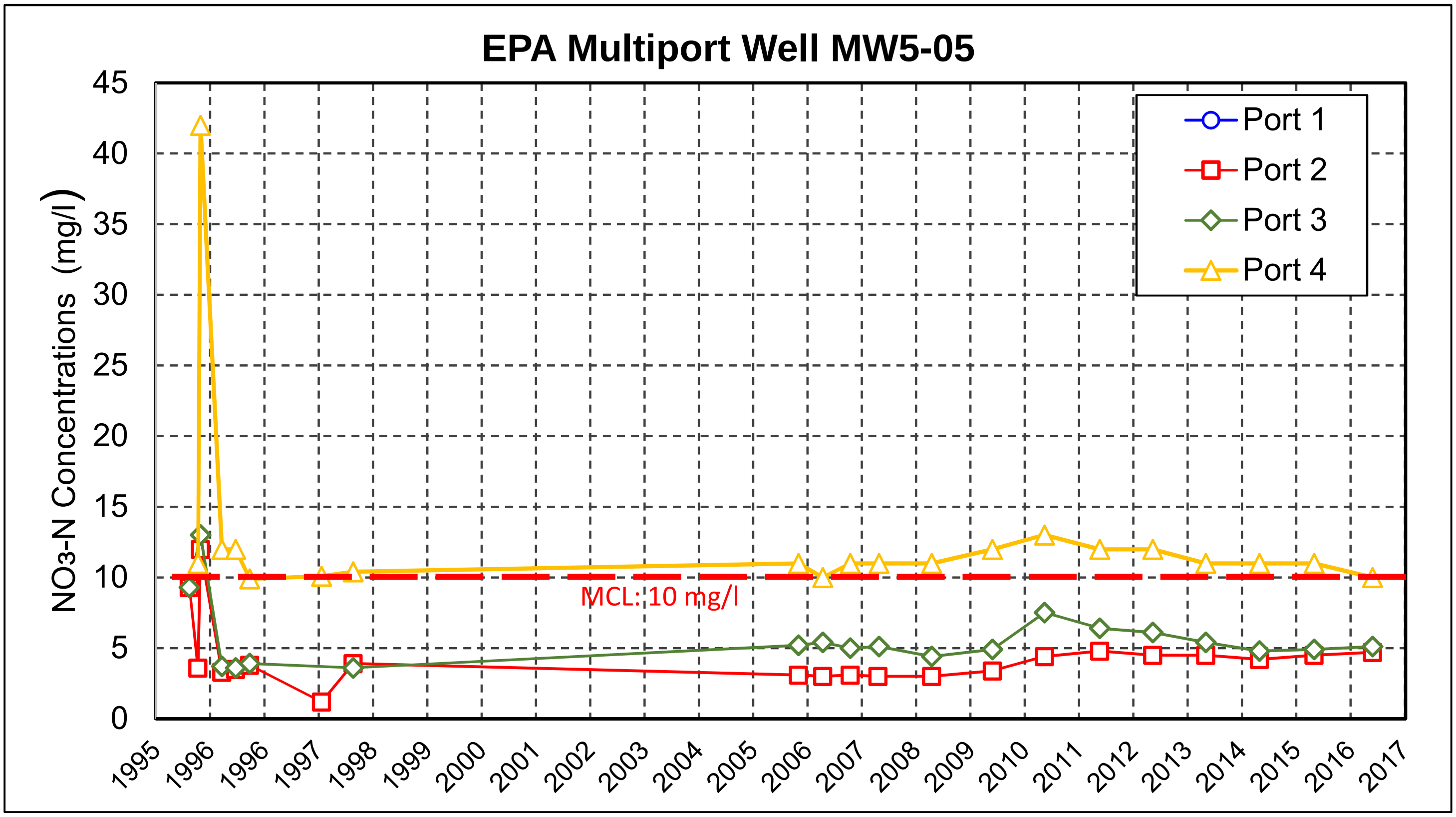

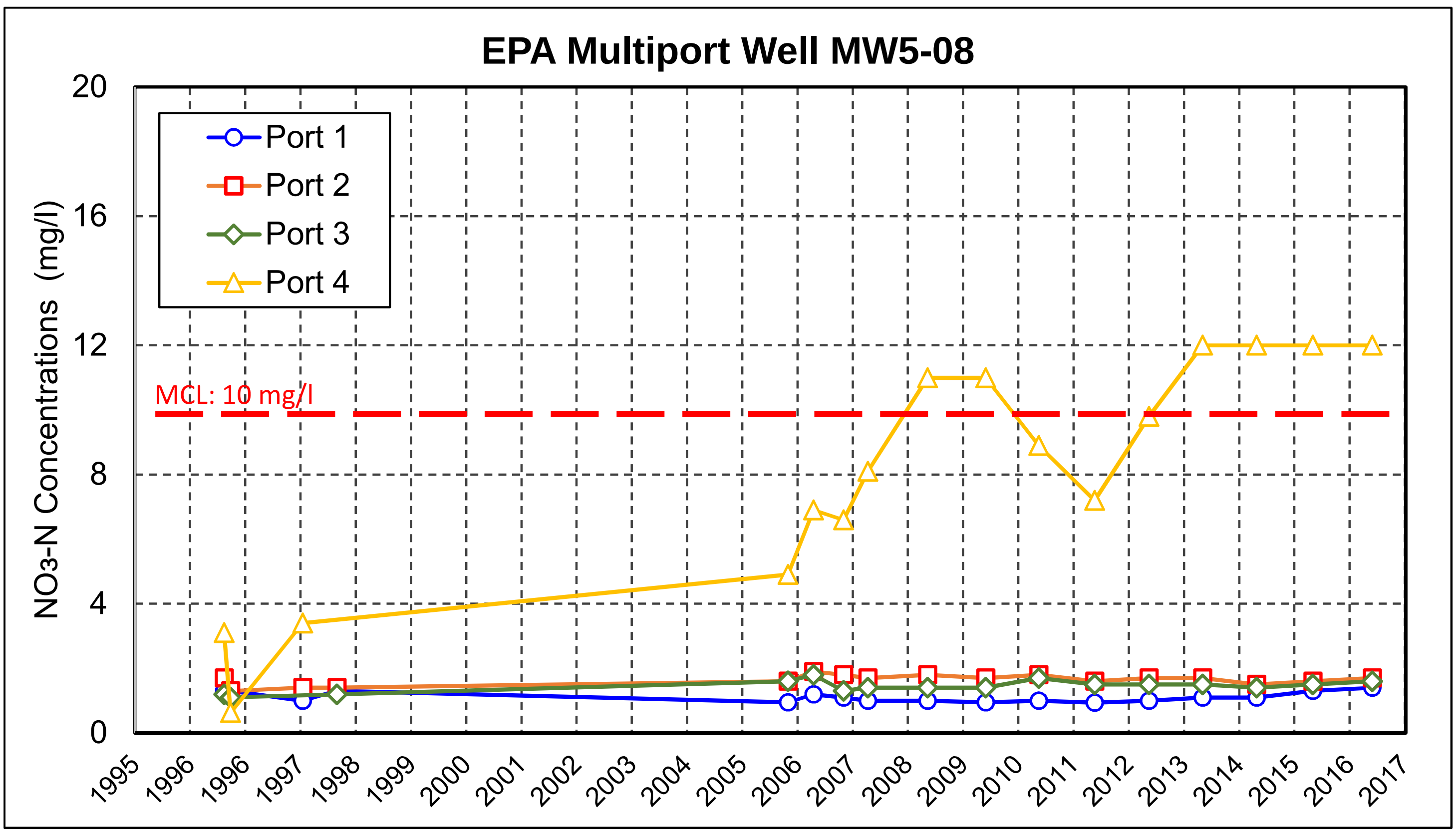

STETSON ENGINEERS INC.

EPA MULTIPORT WELLS MW5-01 & MW5-08
Nitrate Nitrogen Concentrations

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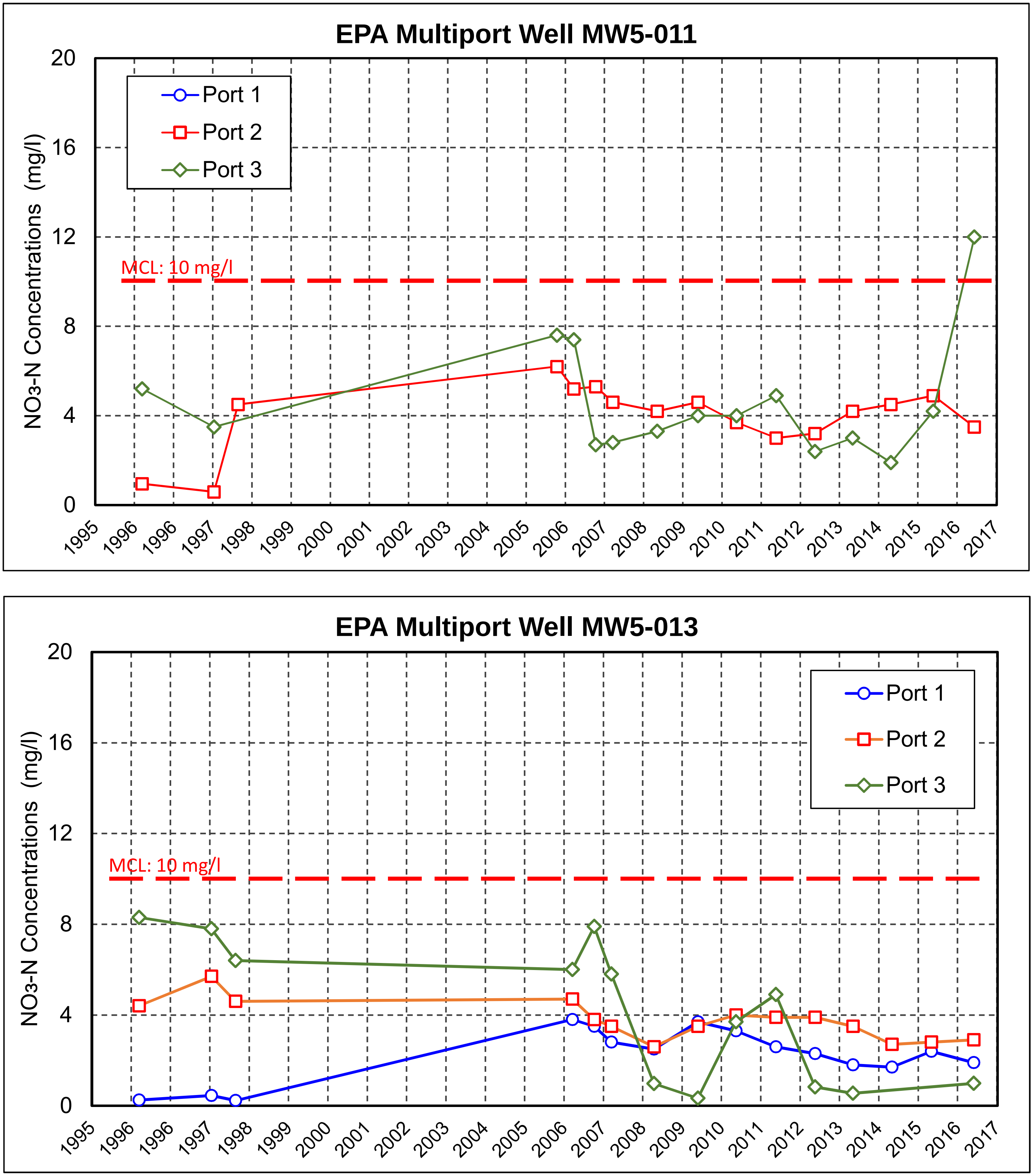
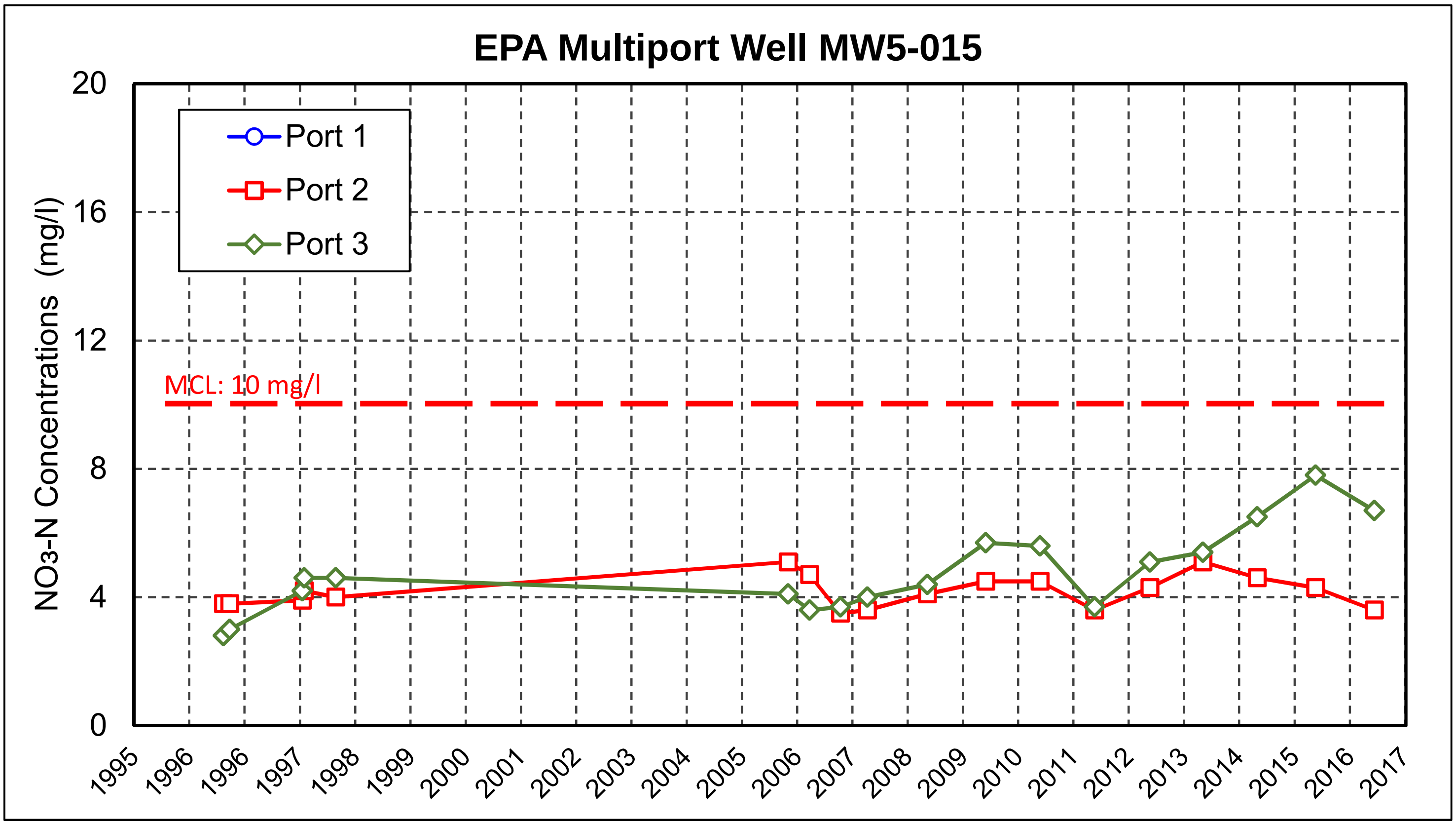
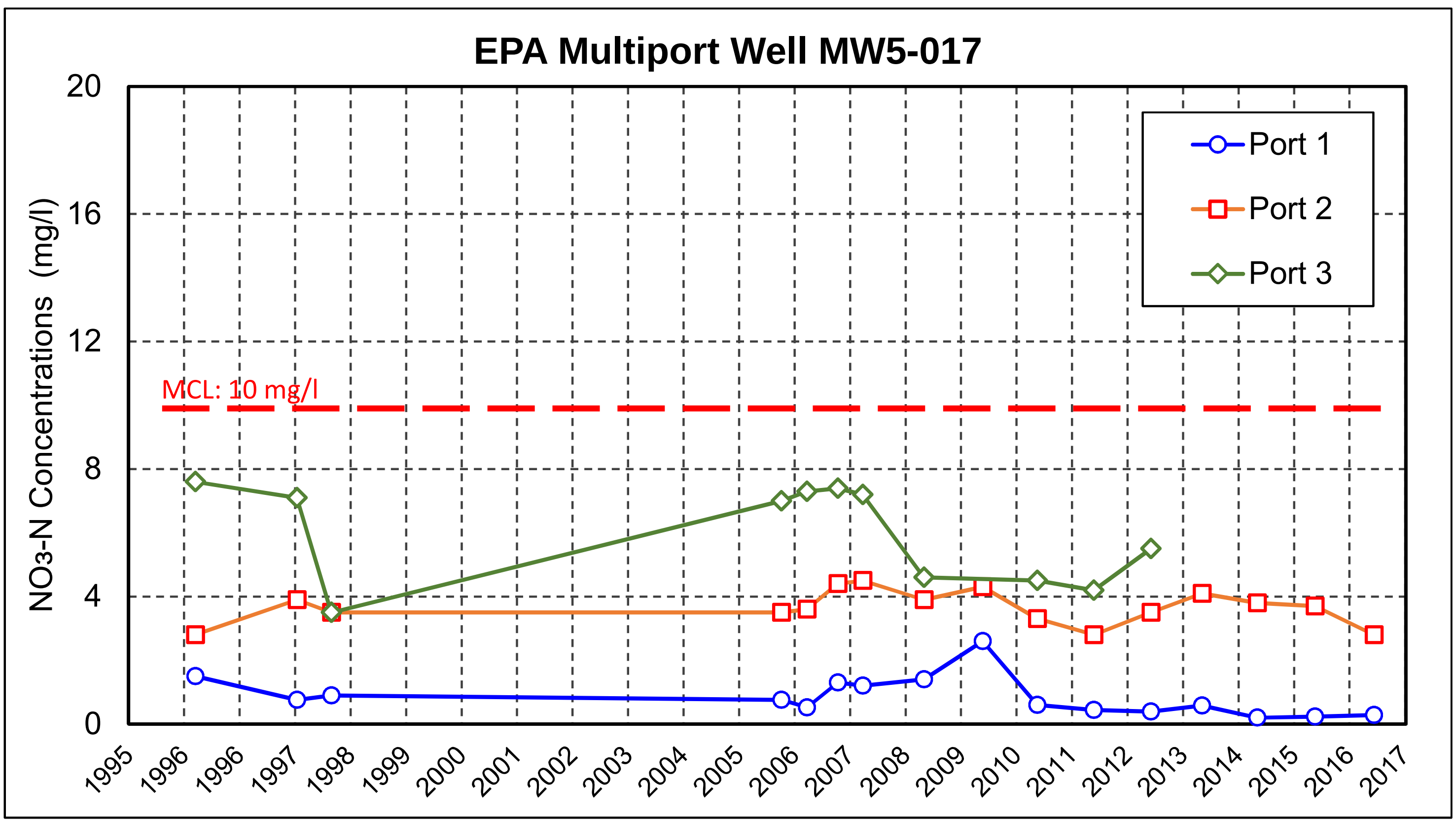


EPA MULTIPORT WELLS MW5-11 & MW5-13
Nitrate Nitrogen Concentrations

STETSON ENGINEERS INC.

MainSanGabrielBasin WATERMASTER





STETSON ENGINEERS INC.

EPA MULTIPORT WELL MW5-15 & MW5-17
Nitrate Nitrogen Concentrations

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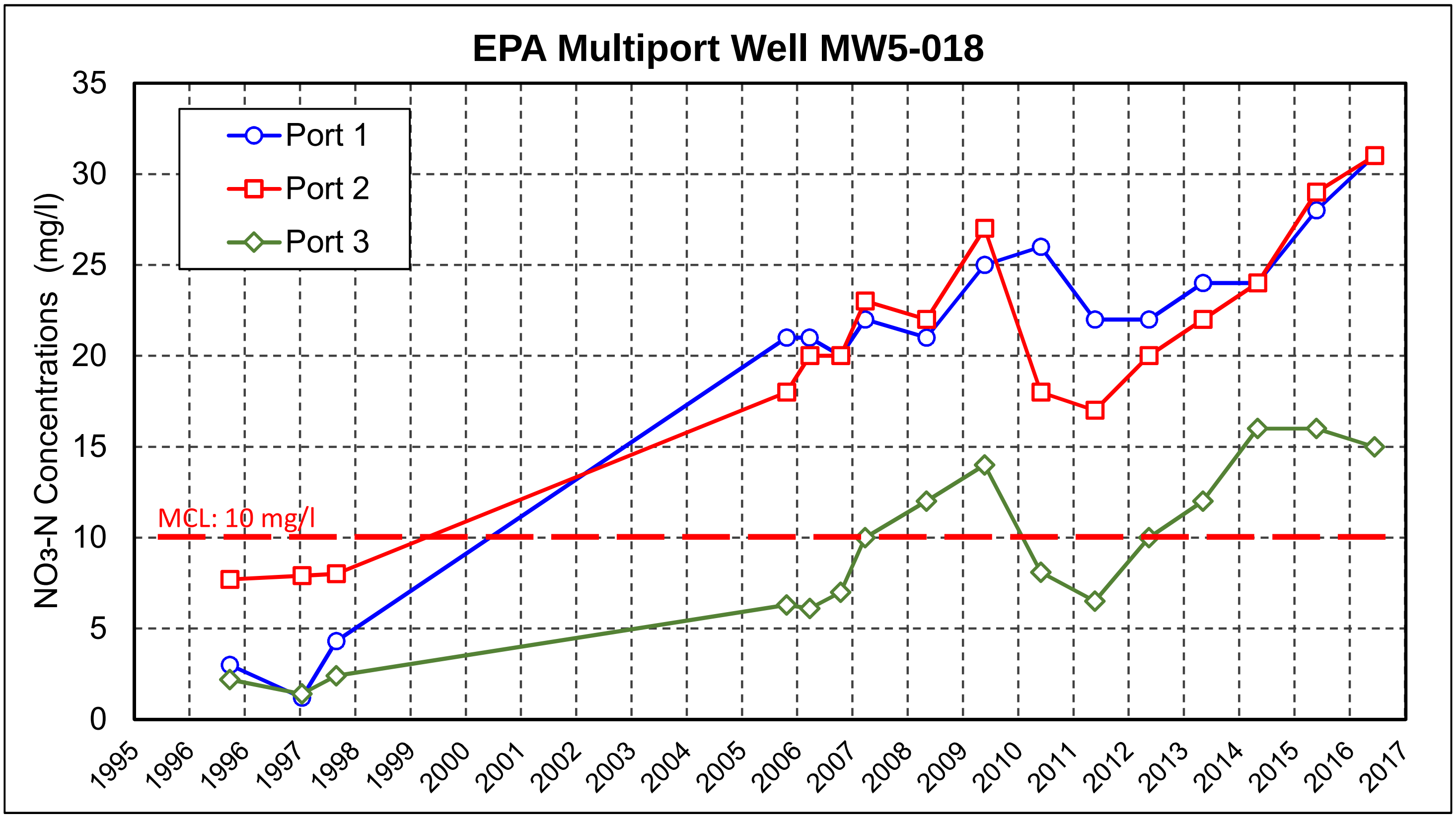

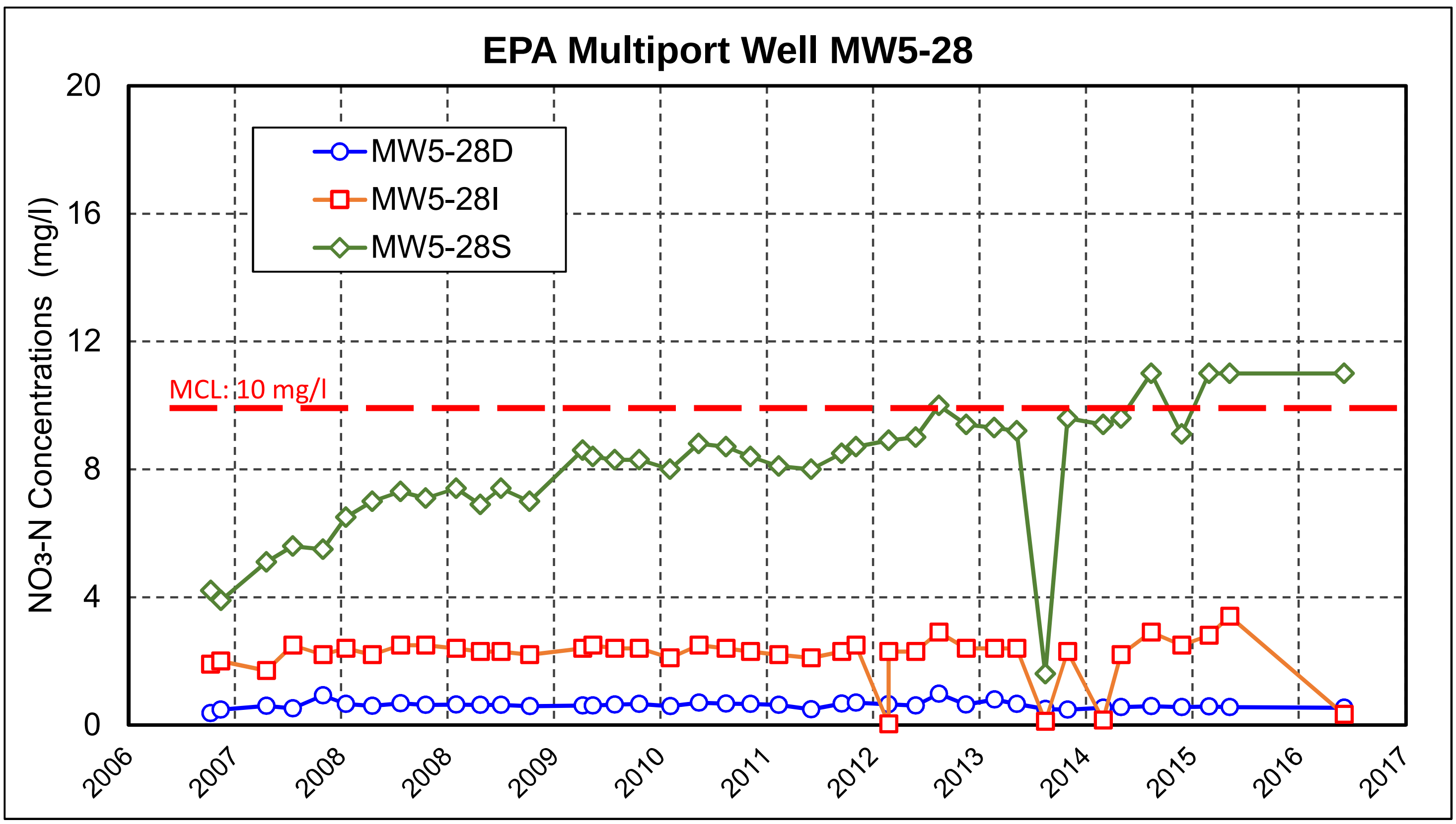

STETSON ENGINEERS INC.

EPA MULTIPORT WELLS MW5-18 & MW5-28
Nitrate Nitrogen Concentrations

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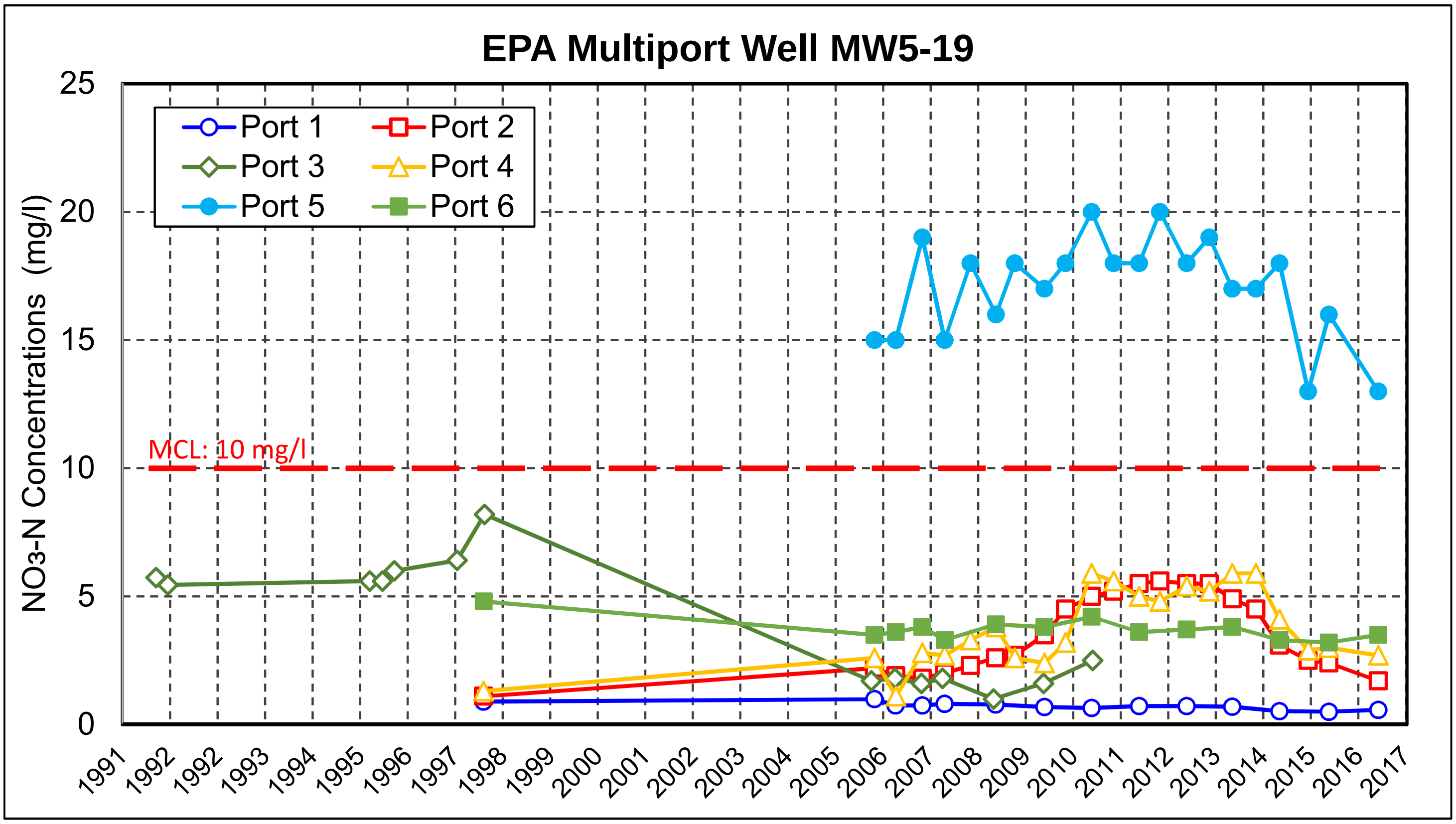
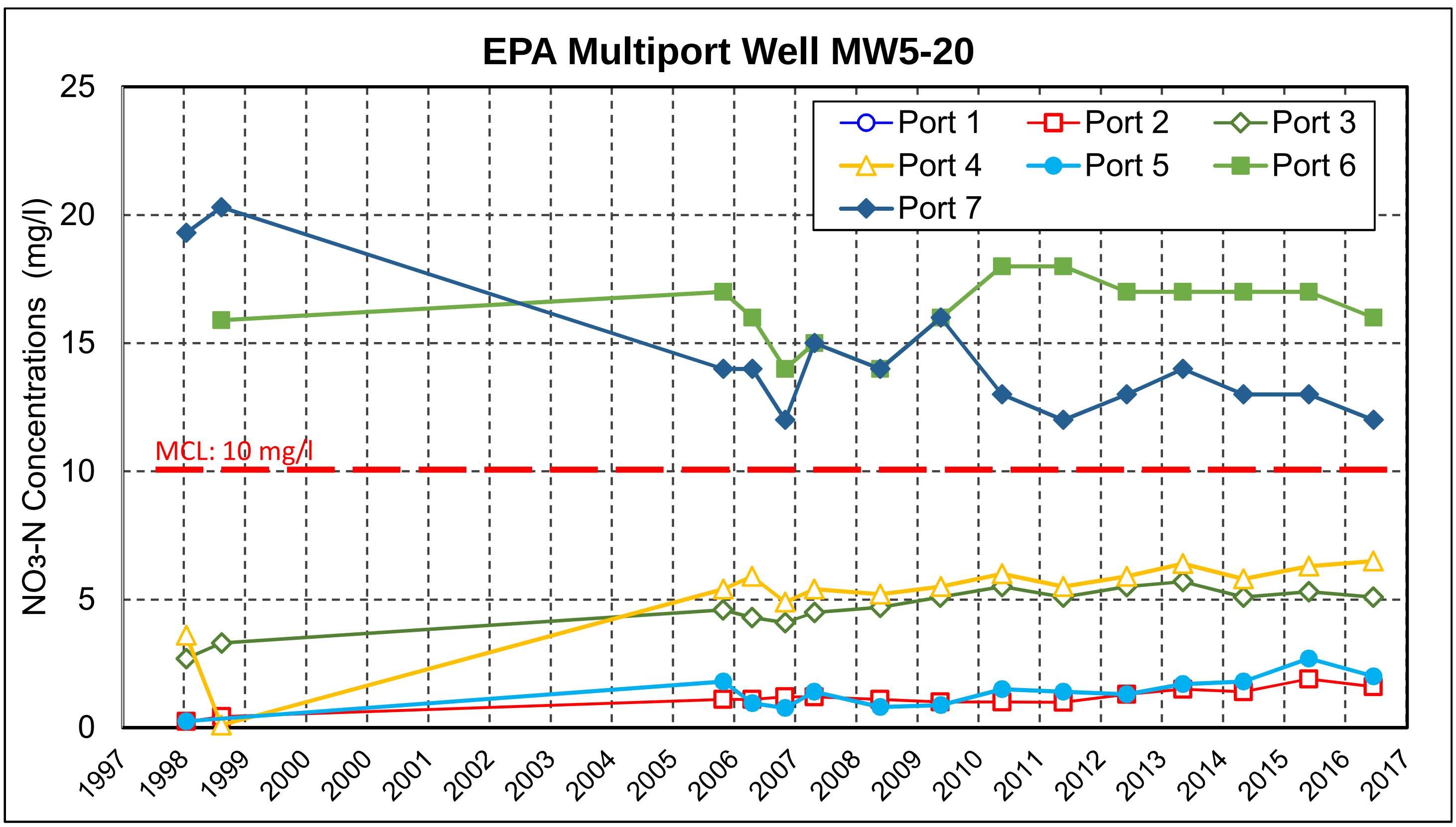
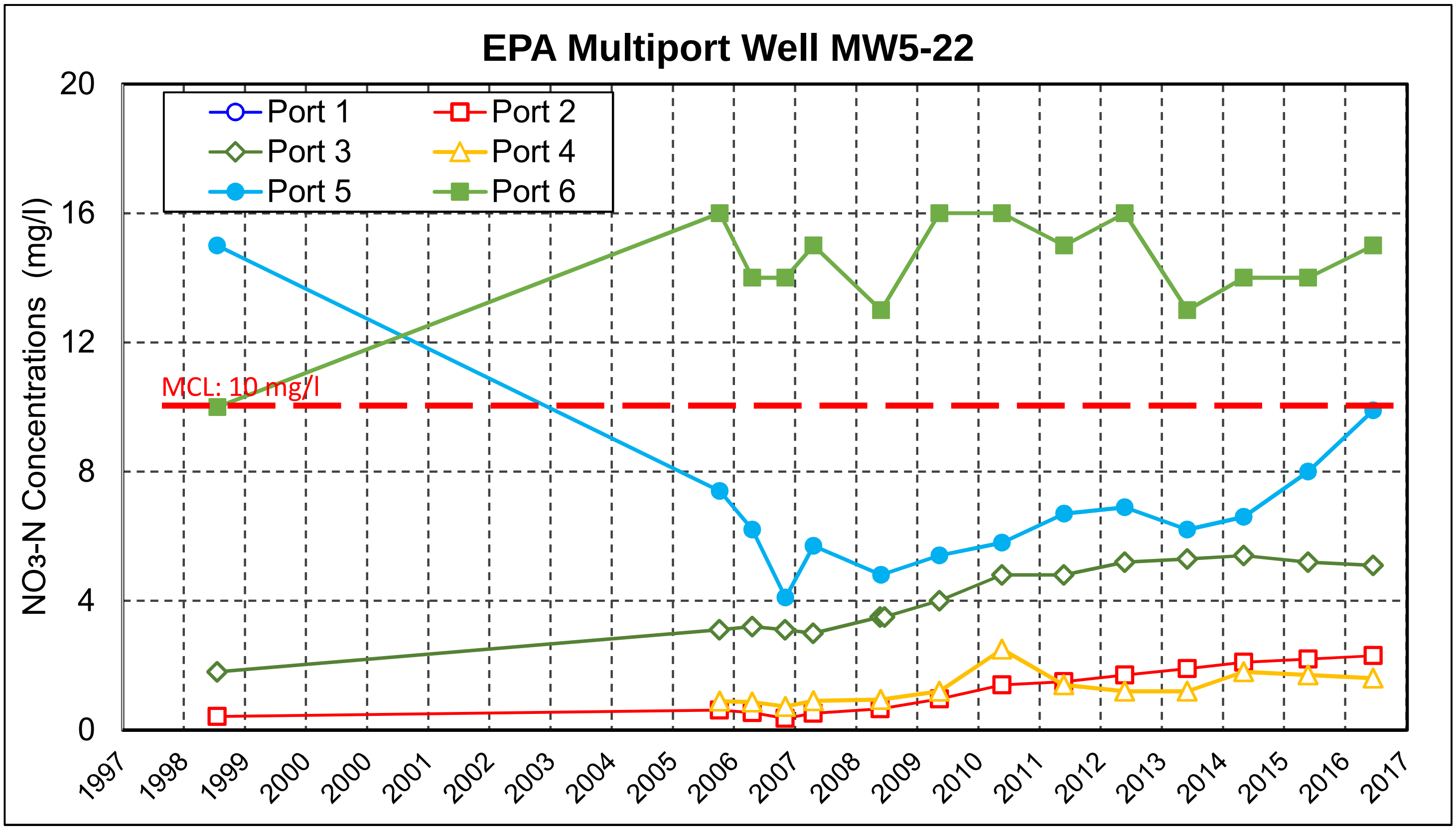


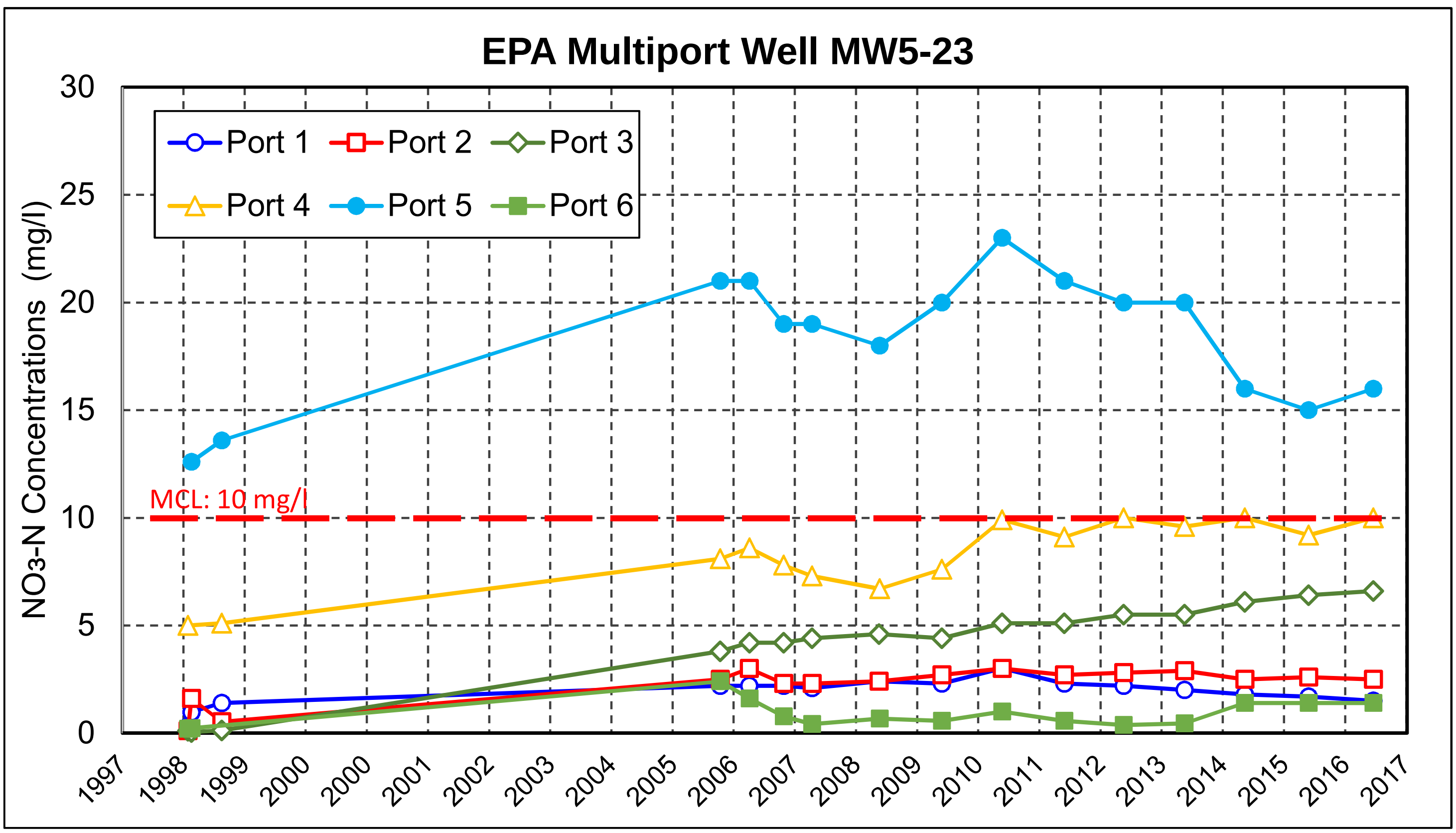


STETSON ENGINEERS INC.

EPA MULTIPORT WELLS MW5-19 & MW5-20
Nitrate Nitrogen Concentrations

MainSanGabrielBasin WATERMASTER

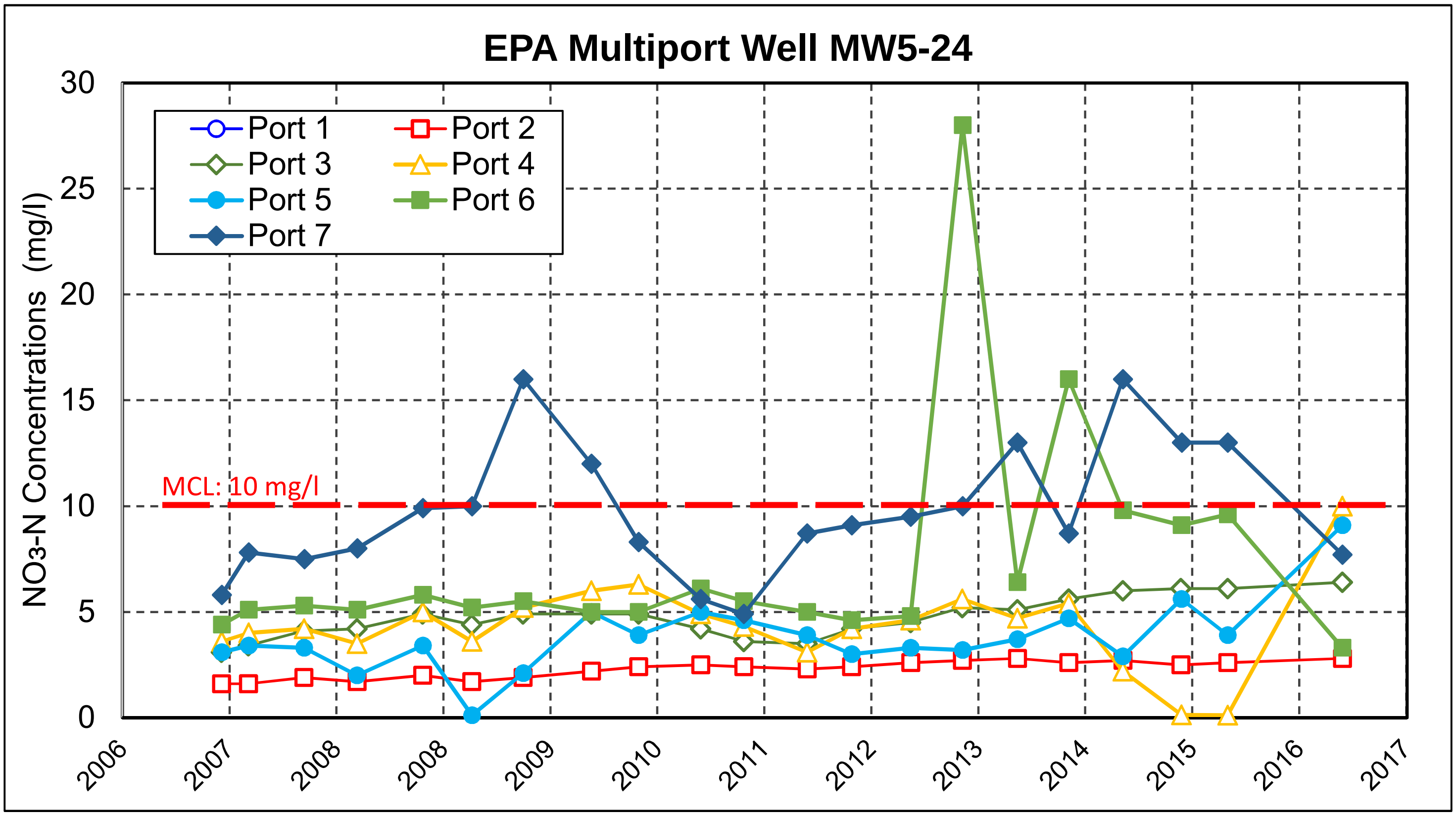


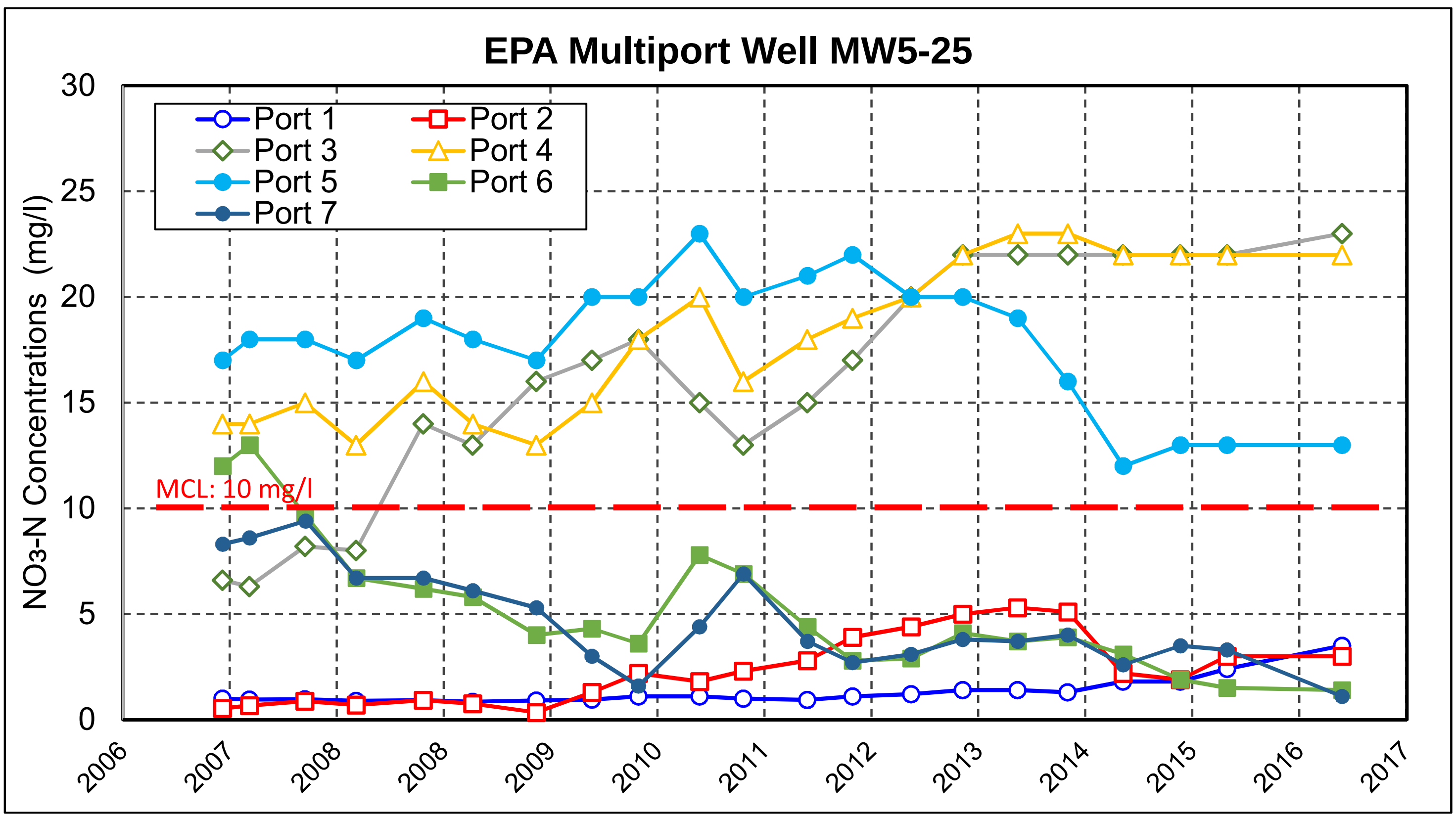


STETSON ENGINEERS INC.

EPA MULTIPORT WELL MW5-22 & MW5-23
Nitrate Nitrogen Concentrations

MainSanGabrielBasin WATERMASTER

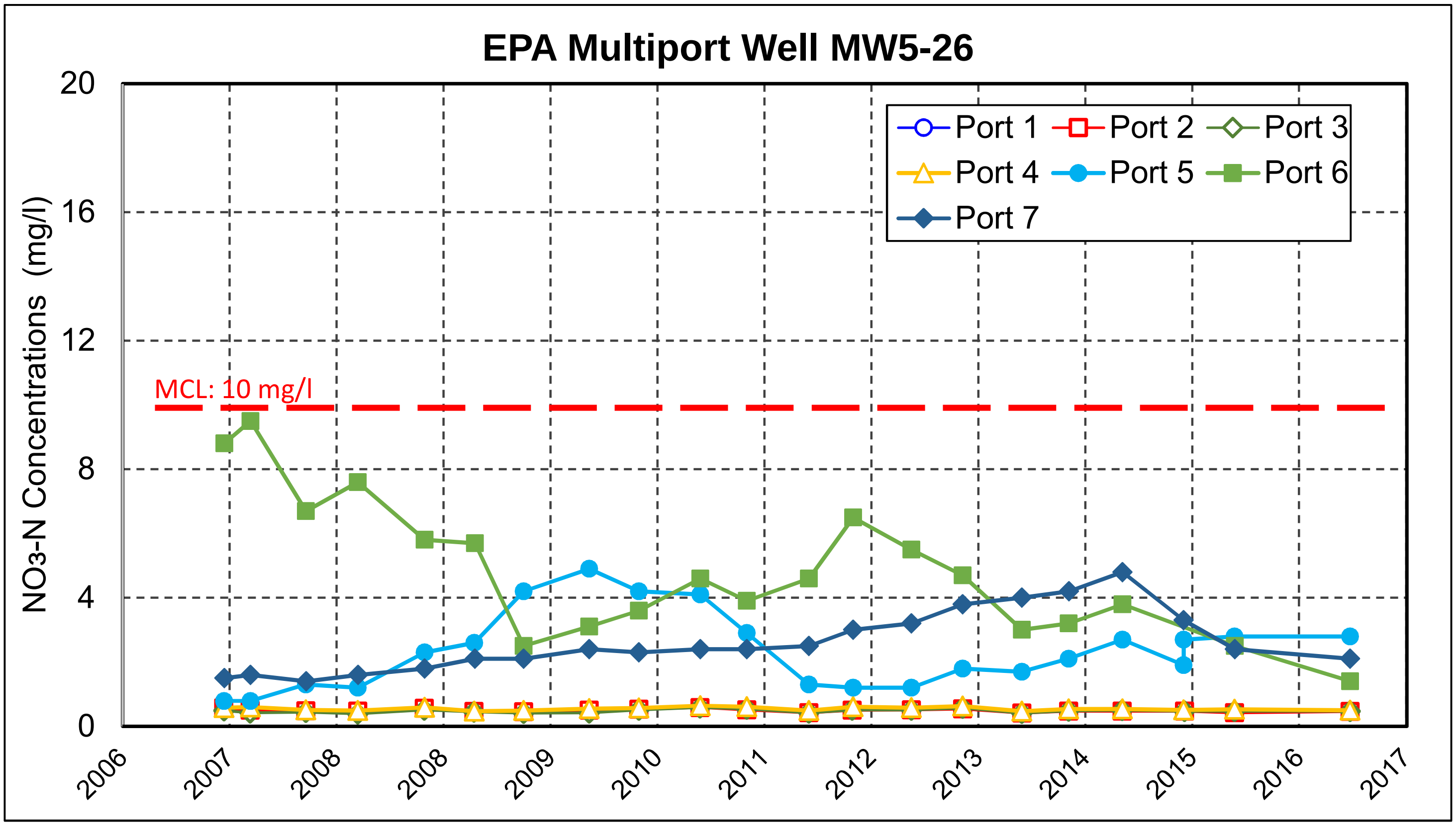


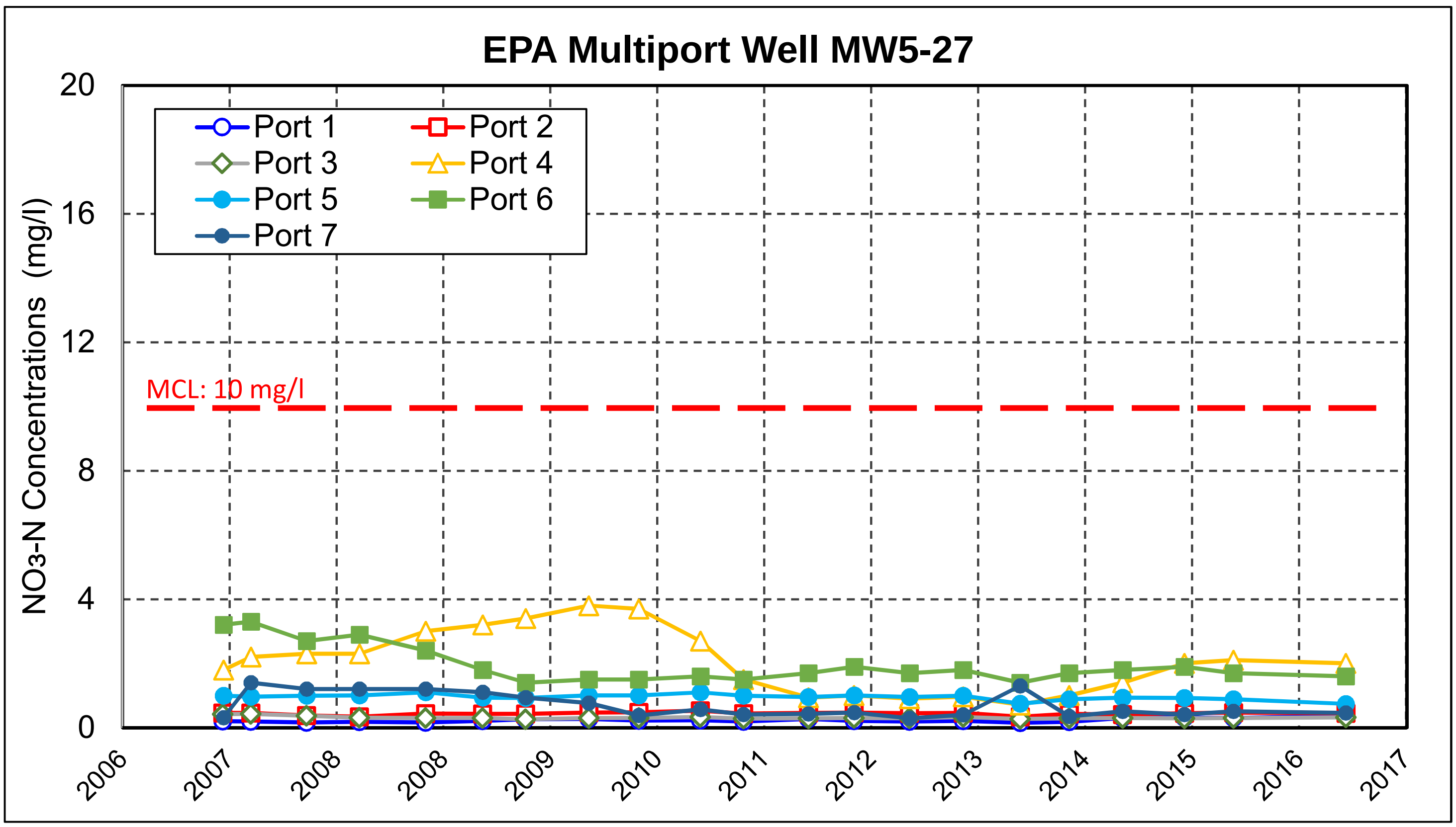


STETSON ENGINEERS INC.

EPA MULTIPORT WELLS MW5-24 & MW5-25
Nitrate Nitrogen Concentrations

MainSanGabrielBasin WATERMASTER

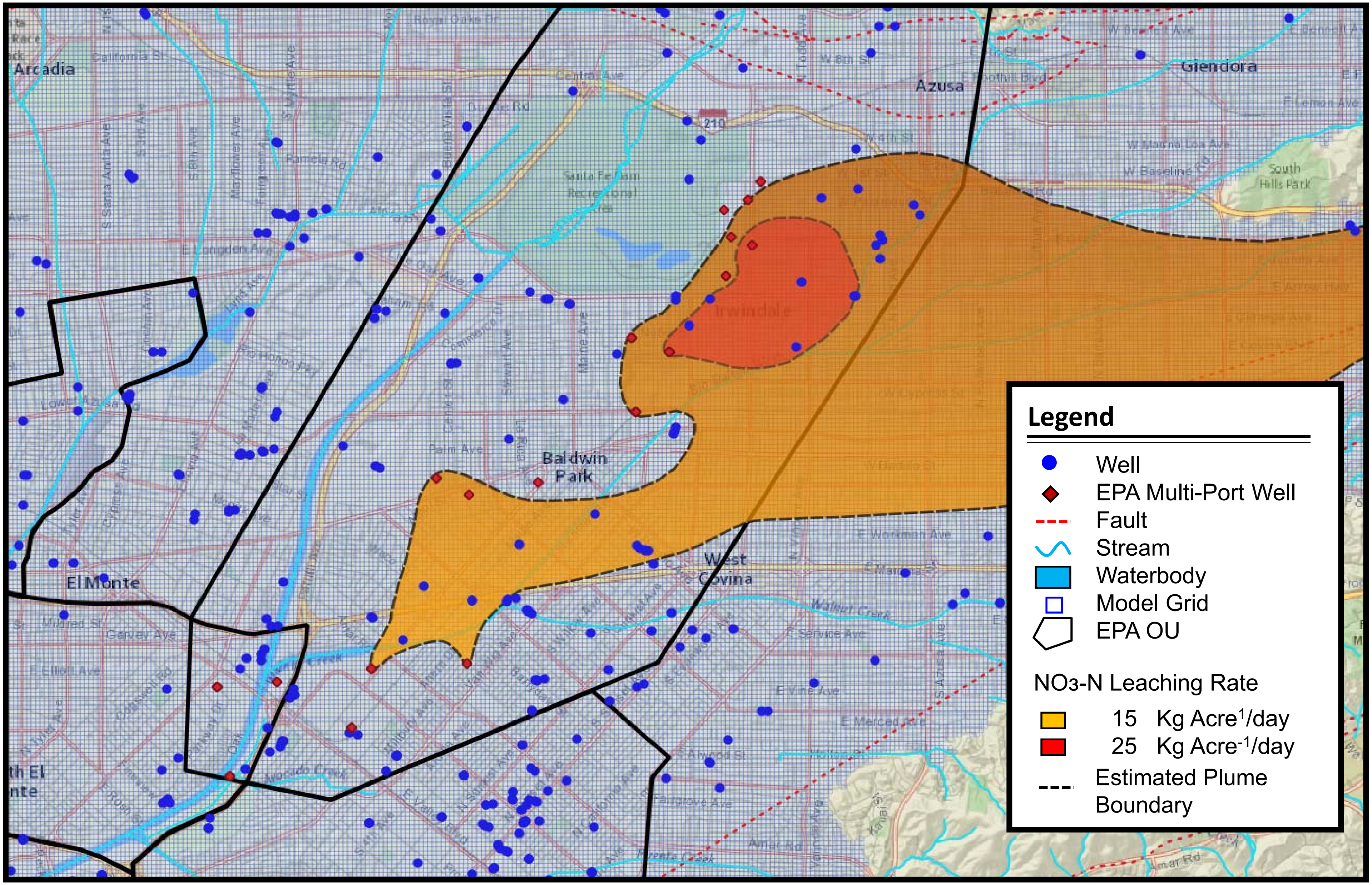




STETSON ENGINEERS INC.

EPA MULTIPORT WELLS MW5-26 & MW5-27
Nitrate Nitrogen Concentrations

MainSanGabrielBasin WATERMASTER



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Estimated Nitrate Nitrogen Loading Rates In Study Area

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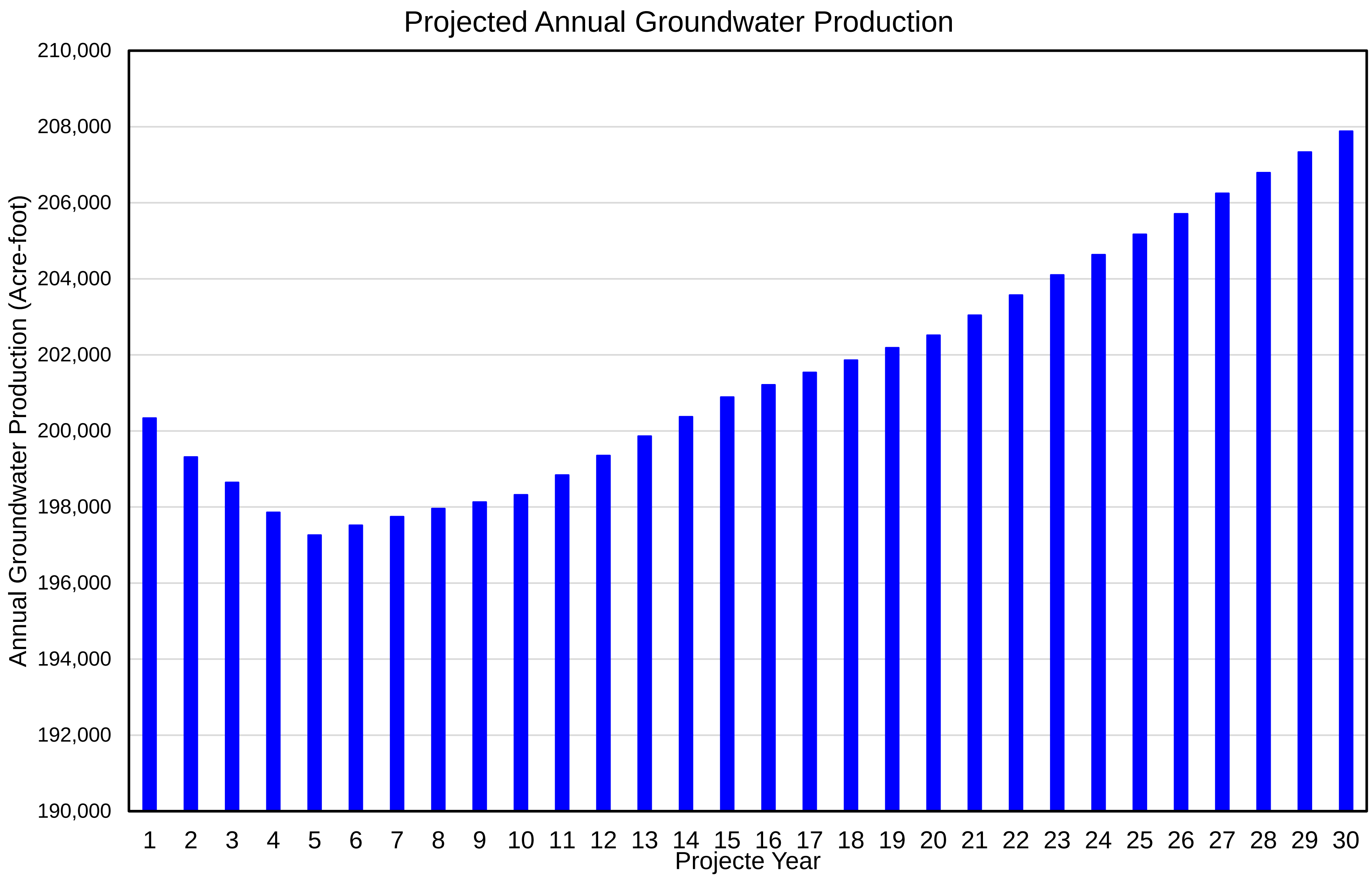
Figure 8

J:\2721\Report\Table & Figures\Figure 8 - Estimated Nitrate Leaching Map.pdf



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MAIN SAN GABRIEL BASIN WATERMASTER

30-Year Projected Annual Groundwater Production

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FIGURE 9

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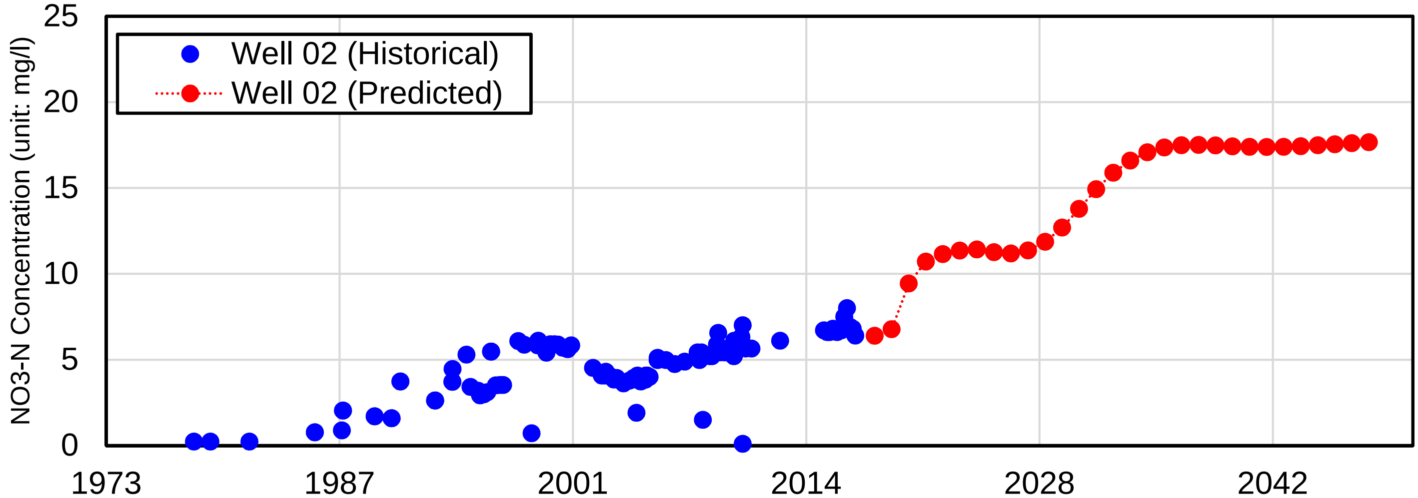
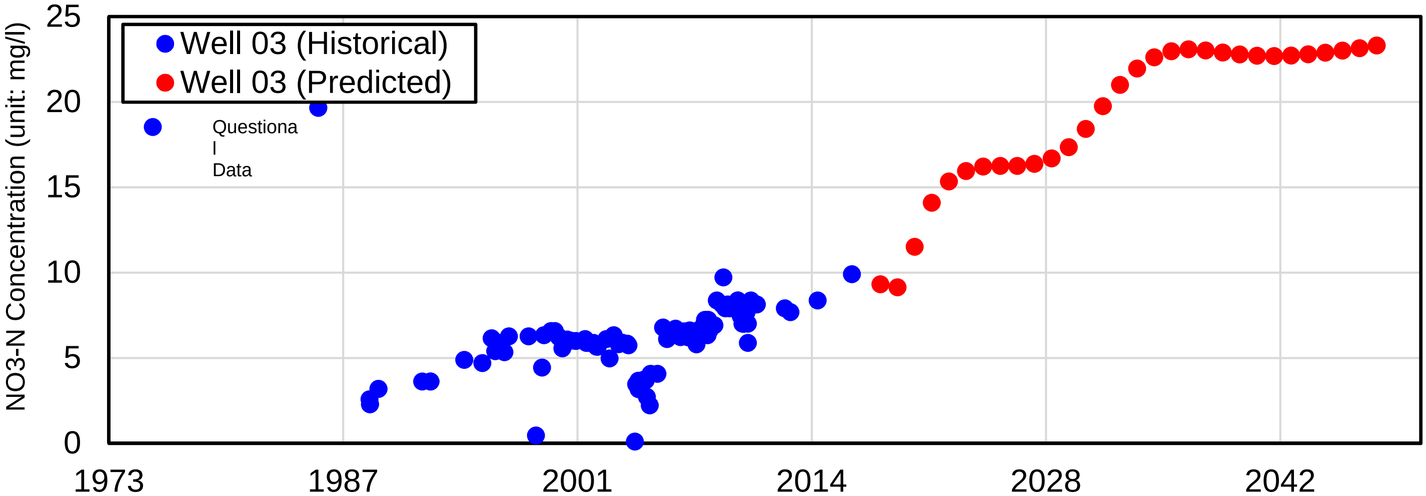
FIGURE 10

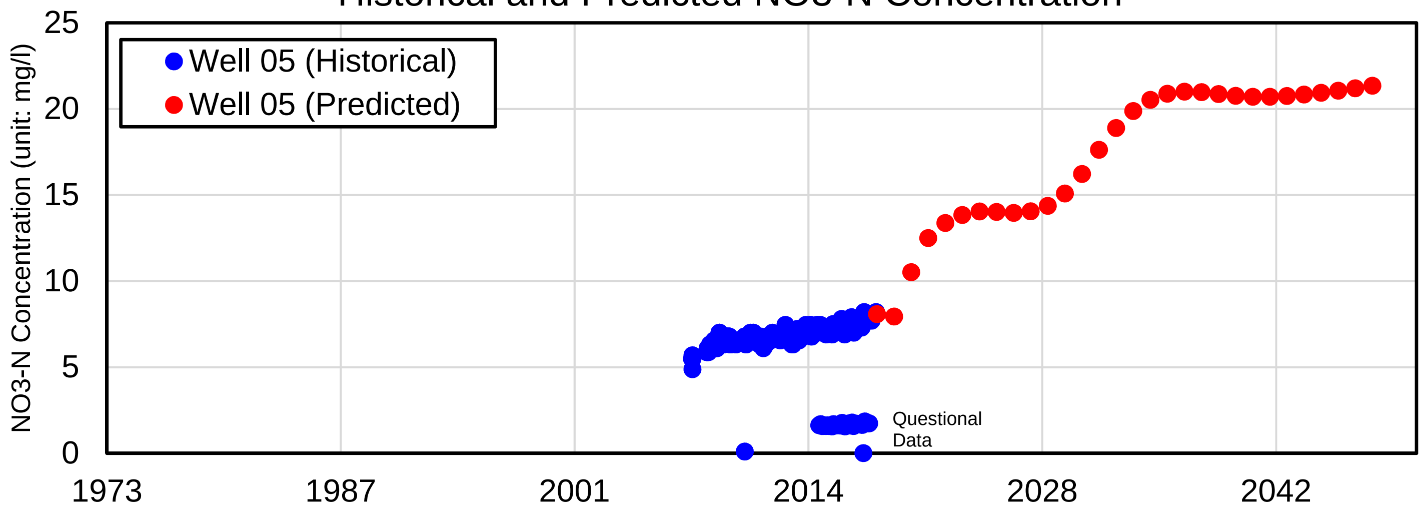
LPVCWD Well 2
Historical and Predicted NO3-N Concentration



LPVCWD Well 3
Historical and Predicted NO3-N Concentration



LPVCWD Well 5
Historical and Predicted NO3-N Concentration



STETSON ENGINEERS INC.

LA PUENTE VALLEY COUNTY WATER DISTRICT
Historical and Model Simulated Nitrate Nitrogen Concentrations

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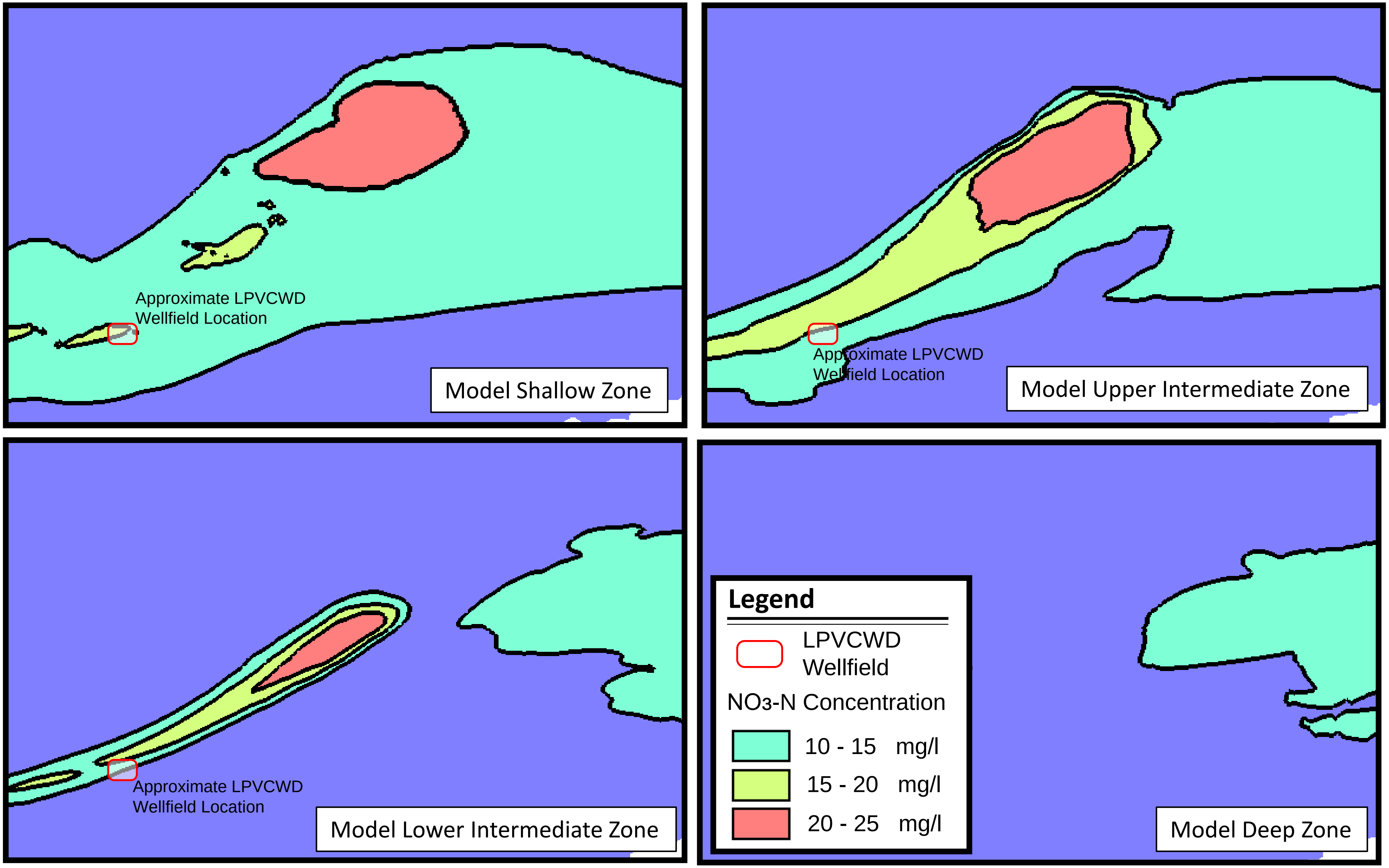

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20-Year Model Simulated Nitrate Nitrogen Contour Map

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Figure 11

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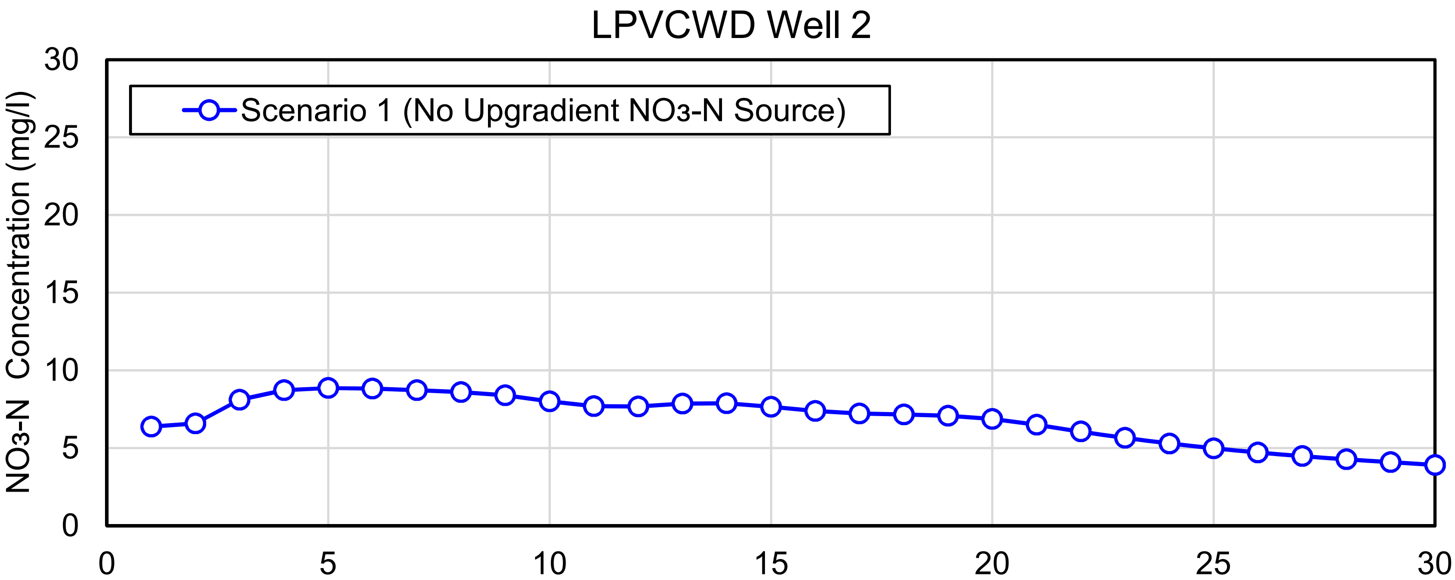
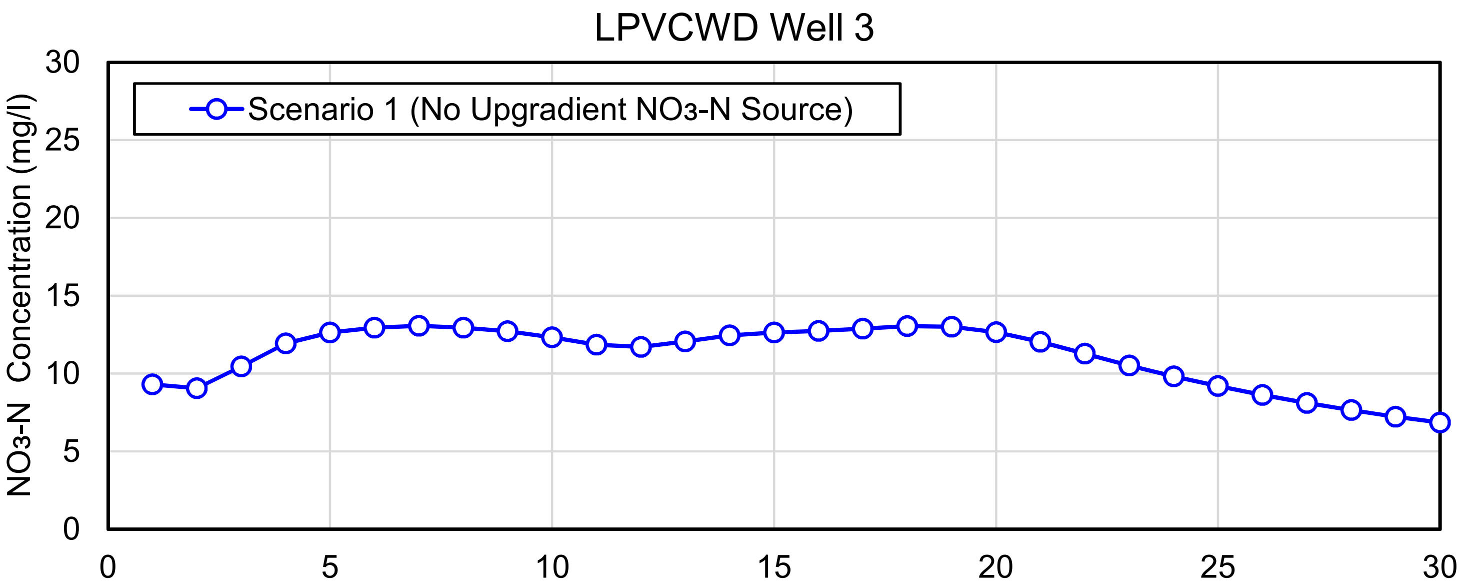
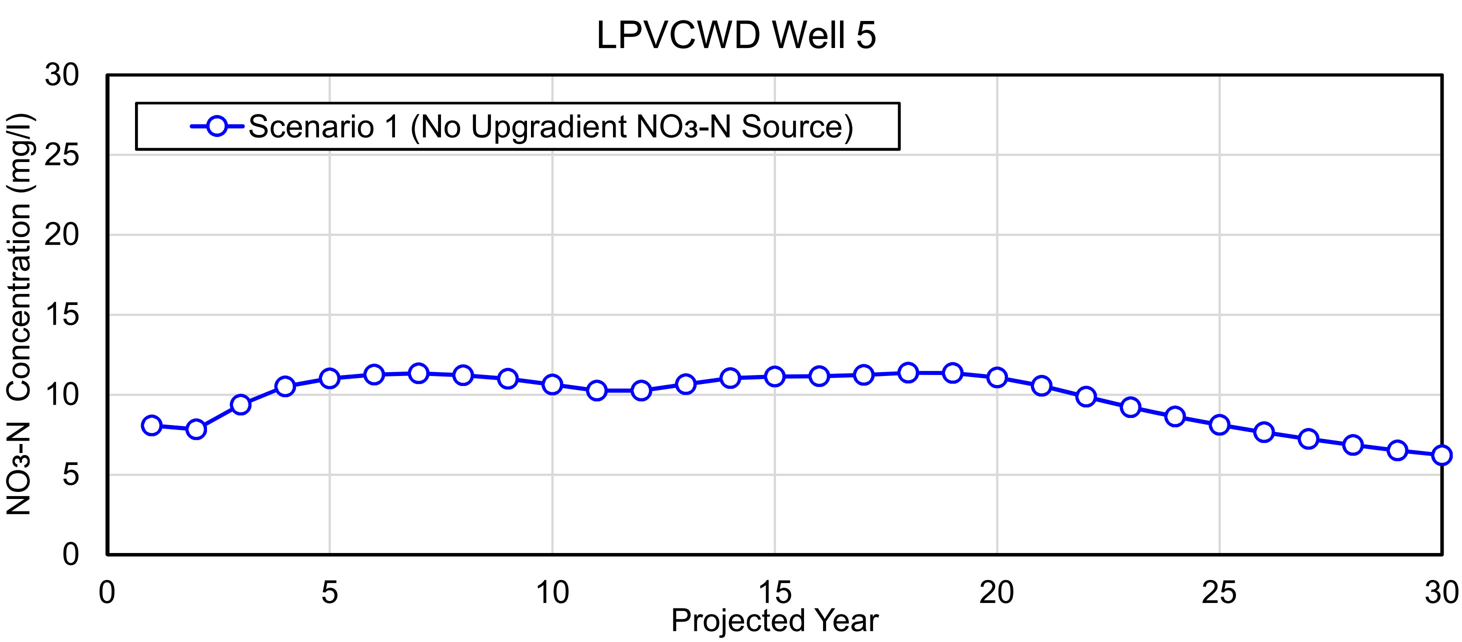
APPENDIX A







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Appendix A
Projected 30 Years Nitrate Nitrogen Concentrations (unit: mg/l)

Year	LPVCWD Scenario 2 Simulation		
	Well 2	Well 3	Well 5
1	6.39	9.31	8.08
2	6.59	9.07	7.84
3	8.12	10.47	9.37
4	8.74	11.94	10.51
5	8.87	12.65	11.02
6	8.83	12.96	11.26
7	8.74	13.07	11.34
8	8.61	12.95	11.22
9	8.41	12.72	10.99
10	8.02	12.34	10.64
11	7.71	11.87	10.26
12	7.69	11.72	10.25
13	7.88	12.07	10.66
14	7.90	12.45	11.03
15	7.66	12.64	11.14
16	7.39	12.75	11.16
17	7.24	12.88	11.24
18	7.18	13.05	11.37
19	7.09	13.01	11.36
20	6.88	12.66	11.07
21	6.51	12.05	10.55
22	6.08	11.29	9.88
23	5.66	10.53	9.22
24	5.29	9.82	8.63
25	4.99	9.20	8.12
26	4.73	8.63	7.66
27	4.50	8.12	7.23
28	4.29	7.67	6.86
29	4.10	7.23	6.52
30	3.92	6.86	6.22

ATTACHMENT B-1

Evoqua Treatment Technologies Treatment Alternative Data

TABLE B-1
Evoqua Treatment Technologies Treatment Alternative Data
Ion Exchange Nitrate Treatment System
La Puente Valley County Water District Groundwater Treatment Facility, California

Criteria		Unit	Projected Influent Concentration	
			10 mg/L	15 mg/L
Technical Feasibility	Material Manufactured In	N/A	US (Dupont) or China (Purolite)	
	Lead Time	months	~4-5 [(1)]	
	Pre-Treatment Requirements	N/A	5 micron bag filter between SPIX [(2)] and NO_3 [(2)] vessels, brine made w/ softened water	
	Post-Treatment Requirements	N/A	None	
	Vessel Size/Diameter	ft	8 ft	
	Vessels Active/Standby	N/A	2/2 [(3)]	
	Total Resin Volume	ft^3	4x 300	
	Bed Depth	ft	3	
	Vessel Footprint	ft^2	4x 88 [(4)]	
	Modularity	N/A	Able to design for current specifications; able to add vessels for increased influent concentrations in the future; able to add redundant features to existing system.	
Permitting	Number of systems permitted in California	N/A	2 [(5)]	
Cost	Budgetary Price [(6)]	$	$ 1,800,000	
		N/A	Includes: 4 vessels, control panel, automated valves, NO_3 sensors for automatic regeneration, and softener. Excludes: salt silo, installation, pad, piping, and logic (SCADA).	
	Resin Life	years	5-7	
	Treated / Bypassed Flow	gpm	710 / 1790	1075 / 1425
	Initial Connection Fee (LACSD) [(7)]	$	$ 44,000	$ 88,000
	Annual Surcharge (LACSD)	$	$ 2,000	$ 4,000
	Makeup Water Fee	$	$ 4,000	$ 8,000
	Annual Salt Use Cost [(8)]	$	$ 65,000	$ 130,000
Operability	Brine Waste	gpd	3,993	8,028
	Complexity, flexibility, downtime	N/A	Relatively simple operational needs to operate conventional IX	
	Chemical(s) Used	N/A	Salt	
	Salt Usage	tons/day	2.16	4.35
Project Delivery	Turnkey Delivery	N/A	Resin + Equipment + Post-Procurement Service	
		N/A	Includes: process equipment, water softener, etc.	

Notes:
[1] Evoqua estimates a lead time of approximately 16-20 weeks, or 4-5 months, after design drawings have been approved.
[2] Currently, the facility uses a SPIX system to treat perchlorate.
[3] The system would include a total of four vessels, with two active, one on standby, and one regenerating at all times. When the two active vessels must undergo regeneration, the two on standby and/or in regeneration are switched into an active state.
[4] The estimated footprint does not include any additional piping, tanks, salt silos, etc. It is only an estimate of the are occupied by the four PTIM 96x60 deluxe triplex vessels.
[5] Evoqua currently has two permitted systems in California for the treatment of nitrate: San Gabriel Valley Water Company B6 Plant and Golden State Water in Barstow.
[6] The budgetary price, provided by the vendor, includes only the cost of equipment furnished by the treatment system supplier, and does not include the cost for other ancillary material (e.g., pipes, valves, etc.), engineering, construction, permitting, etc.
[7] LACSD costs are calculated based on the assumption that the average flow is consistent and COD and TSS concentrations are conservatively assumed to be 10 mg/L.
[8] Annual salt use costs are estimated based on the assumption that the unit rate for salt is $82.00 per ton.
Information included in this table is provided by the vendor, excluding calculations for estimated O&M costs.
O&M costs for LACSD connection and surcharge fees, makeup water fee, and annual salt use cost presented above are for planning purposes (-30%, +50%) and no contingency is included.

Abbreviations:
COD - Chemical Oxygen Demand
gpd - gallons per day
gpm - gallons per minute
IX - Ion Exchange
LACSD - Los Angeles County Sanitation District
N/A - Not Applicable
NO_3 - Nitrate
SCADA - Supervisory Control and Data Acquisition
SPIX - Single Pass Ion Exchange
TBD - To be Determined
TSS - Total Suspended Solids

ATTACHMENT B-2

Calgon Carbon Treatment Alternative Data

TABLE B-2
Calgon Carbon Treatment Alternative Data
Ion Exchange Nitrate Treatment System
La Puente Valley County Water District Groundwater Treatment Facility, California

Criteria		Unit	Projected Influent Concentration	
			10 mg/L	**15 mg/L**
Technical Feasibility	Material Manufactured In	N/A	India or Europe	
	Lead Time	months	~6-9 [(1)]	
	Pre-Treatment Requirements	N/A	Water softening for the brine makeup and rinse systems	
	Post-Treatment Requirements	N/A	None	
	Vessel Size/Diameter	inches	3" ISEP-SB valve with 15x (35x72) cells [(2)]	
	Vessels Active/Standby	N/A	10/5 [(3)]	
	Total Resin Volume	ft^3	480	
	Bed Depth	ft	N/A	
	Vessel Footprint	ft^2	≤ 587 [(4)]	
	Modularity	N/A	Unable to add cells for increased influent concentrations in the future; system must be initially designed for higher concentrations; programmable system.	
Permitting	Number of systems permitted in California	N/A	3 [(5)]	
Cost	Budgetary Price	$	$ 1,500,000	
		N/A	Includes: ISEP-SB system, softener, and 1 brine tank. Excludes: cost of potential 2nd brine tank. Considers: reuse of FRP cells.	
	Resin Life	years	5-7	
	Treated / Bypassed Flow	gpm	850/1650	1470/1030
	Initial Connection Fee (LACSD) [(6)]	$	$ 43,000	$ 120,000
	Annual Surcharge (LACSD)	$	$ 2,000	$ 5,000
	Makeup Water Fee	$	$ 4,000	$ 11,000
	Annual Salt Use Cost [(7)]	$	$ 78,000	$ 135,000
Operability	Brine Waste	gpd	3,888	10,944
	Complexity, flexibility, downtime	N/A	Minimal downtime for regeneration; complex piping network.	
	Chemical(s) Used	N/A	Salt	
	Salt Usage	tons/day	1.60	4.50
Project Delivery	Turnkey Delivery	N/A	Resin + Equipment + Post-Procurement Service	
		N/A	Includes: process equipment, brine tanks, pumps, water softener, control, etc.	

Notes:

[1] Calgon estimates a delivery time between 6 to 9 months after the treatment system designs are approved.

[2] Calgon recommends a 15-cell ISEP system with the nitrate-selective CalRes 2105 resin.

[3] The system would include a total of 15 cells, ten of which would be actively treating the influent while the remaining five would be in standby and/or regenerating.

[4] The estimated footprint is based on drawings provided for Calgon's ISEP system for the City of Chino, which treats a total flow of 5,000 gpm. This system will have a total influent flow rate of about 2,500 gpm.

[5] Calgon currently has three permitted systems in California for the treatment of nitrate: two in the City of Chino Hills and one for the Valley County Water District. Calgon has a few other systems in Southern California that are currently in construction.

[6] The budgetary price, provided by the vendor, includes only the cost of equipment furnished by the treatment system supplier, and does not include the cost for other ancillary material (e.g., pipes, valves, etc.), engineering, construction, permitting, etc.

[7] LACSD costs are calculated based on the assumption that the average flow is consistent and COD and TSS concentrations are conservatively assumed to be 10 mg/L.

[8] Annual salt use costs are estimated based on the assumption that the unit rate for salt is $82.00 per ton.

Information included in this table is provided by the vendor, excluding calculations for estimated O&M costs.

O&M costs for LACSD connection and surcharge fees, makeup water fee, and annual salt use cost presented above are for planning purposes (-30%, +50%) and no contingency is included.

Abbreviations:

COD - Chemical Oxygen Demand
gpd - gallons per day
gpm - gallons per minute
IX - Ion Exchange
LACSD - Los Angeles County Sanitation District
N/A - Not Applicable
NO_3 - Nitrate
TSS - Total Suspended Solids

ATTACHMENT B-3

Purolite Corporation Treatment Alternative Data

TABLE B-3
Purolite Corporation Treatment Alternative Data
Ion Exchange Nitrate Treatment System
La Puente Valley County Water District Groundwater Treatment Facility, California

Criteria		Unit	Projected Influent Concentration	
			10 mg/L	**15 mg/L**
Technical Feasibility	Material Manufactured In	N/A	Romania	
	Lead Time	months	~3 [(1)]	
	Pre-Treatment Requirements	N/A	Recommended prefiltration; brine made with softened water	
	Post-Treatment Requirements	N/A	None	
	Vessel Size/Diameter	ft	8 ft	
	Vessels Active/Standby	N/A	2/2 [(2)]	3/1 [(3)]
	Total Resin Volume	ft^3	4x 210	
	Bed Depth	ft	4.17	
	Vessel Footprint	ft^2	TBD [(4)]	
	Modularity	N/A	Able to design for current specifications; able to add vessels for increased influent concentrations in the future; able to add redundant features to existing system.	
Permitting	Number of systems permitted in California	N/A	4 [(5)]	
Cost	Budgetary Price	$	$ 1,670,000	
		N/A	Purolite's general resin costs approximately $170K. Purolite estimates system and equipment costs to be $1.5M.	
	Resin Life	years	5-7	
	Treated / Bypassed Flow	gpm	750/1750	1375 / 1125
	Initial Connection Fee (LACSD) [(6)]	$	$ 49,000	$ 117,000
	Annual Surcharge (LACSD)	$	$ 2,000	$ 5,000
	Makeup Water Fee	$	$ 4,000	$ 11,000
	Annual Salt Use Cost [(7)]	$	$ 45,000	$ 108,000
Operability	Brine Waste	gpd	4,460	10,674
	Complexity, flexibility, downtime	N/A	Relatively simple operational needs to operate conventional IX	
	Chemical(s) Used	N/A	Salt	
	Salt Usage	tons/day	1.51	3.60
Project Delivery	Turnkey Delivery	N/A	Resin Only	
		N/A	Purolite works with equipment vendors.	

Notes:

[1] Purolite estimates a lead time of approximately 3 months to deliver the A600E 9149 general IX resin only.

[2] If designing a system to treat an influent NO_3 as nitrogen concentration of 10 ppm, Purolite recommends having two active vessels and two on standby.

[3] If designing a system to treat an influent NO_3 as nitrogen concentration of 15 ppm, Purolite recommends having three active vessels and one on standby.

[4] The estimated footprint is to be determined based on the vessels and equipment provided by another vendor. Purolite only provides the resin itself.

[5] Evoqua currently has four permitted systems in California for the treatment of nitrate: Golden State Water Service, Crescenta Valley Water District, City of Chino Hills, and Valley County Water District.

[6] The budgetary price, provided by the vendor, includes only the cost of equipment furnished by the treatment system supplier, and does not include the cost for other ancillary material (e.g., pipes, valves, etc.), engineering, construction, permitting, etc.

[7] LACSD costs are calculated based on the assumption that the average flow is consistent and COD and TSS concentrations are conservatively assumed to be 10 mg/L.

[8] Annual salt use costs are estimated based on the assumption that the unit rate for salt is $82.00 per ton.

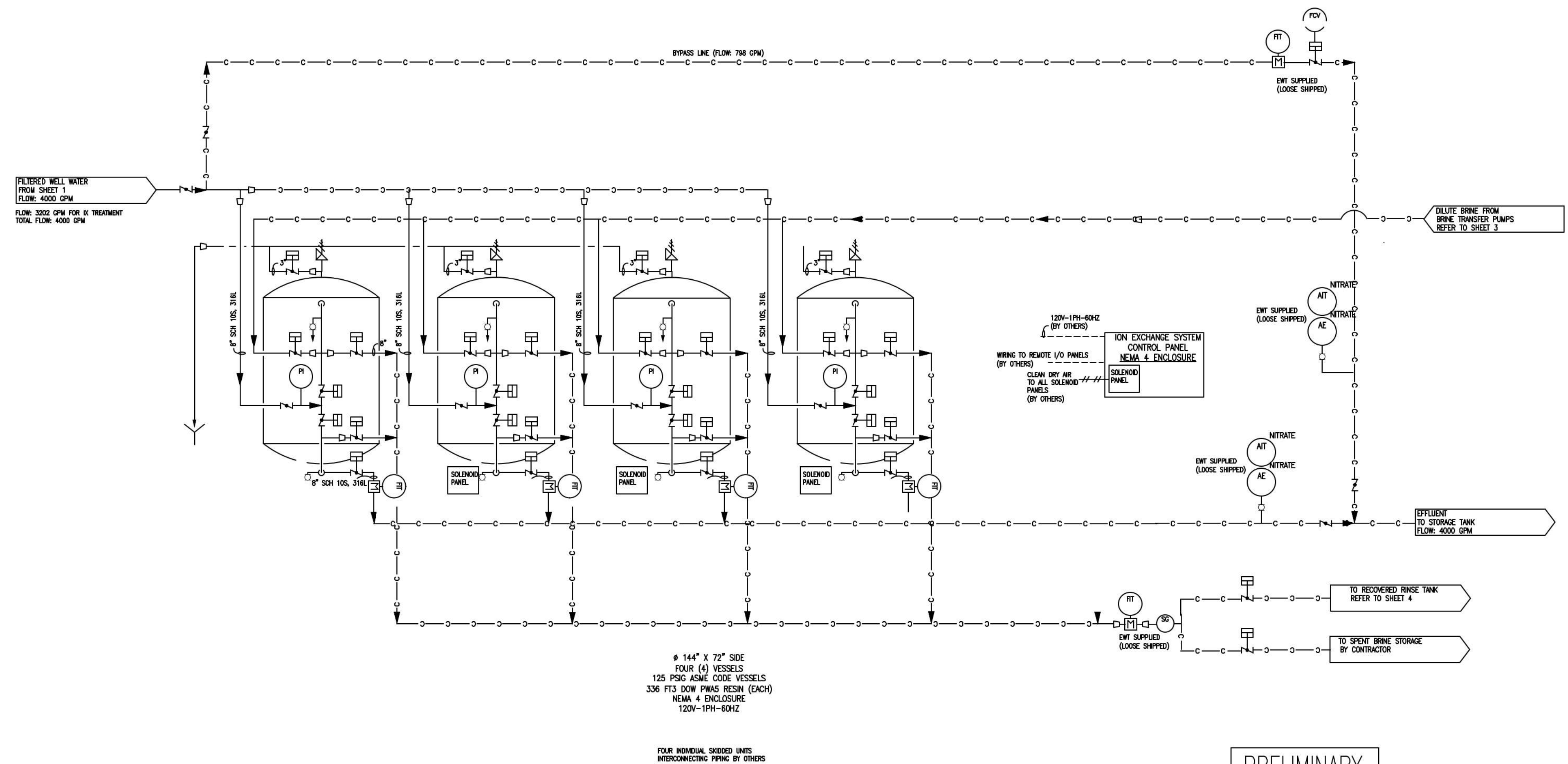
Information included in this table is provided by the vendor, excluding calculations for estimated O&M costs.

O&M costs for LACSD connection and surcharge fees, makeup water fee, and annual salt use cost presented above are for planning purposes (-30%, +50%) and no contingency is included.

Abbreviations:

COD - Chemical Oxygen Demand
gpd - gallons per day
gpm - gallons per minute
IX - Ion Exchange
LACSD - Los Angeles County Sanitation District
N/A - Not Applicable
NO_3 - Nitrate
TBD - To be Determined
TSS - Total Suspended Solids

ATTACHMENT C
Example of Conceptual P&ID of IX Treatment System with Four Vessels



PRELIMINARY
NOT FOR CONSTRUCTION

NOTES:
1. PRESSURE RELIEF VALVE IS SIZED FOR THERMAL RELIEF ONLY.
2. -C-C-C- CUSTOMER FIELD PIPING.
3. TUBING TO BE PE, PRESSURE TESTED TO 80 PSIG.
4. ALL MECHANICAL & ELECTRICAL INSTALLATION & WIRING BY CONTRACTOR

REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN
–	SEE SHEET ONE					

STD: BORDER-0106-24X36D1

INTL REF:

BAR = 1" AT PLOT SCALE

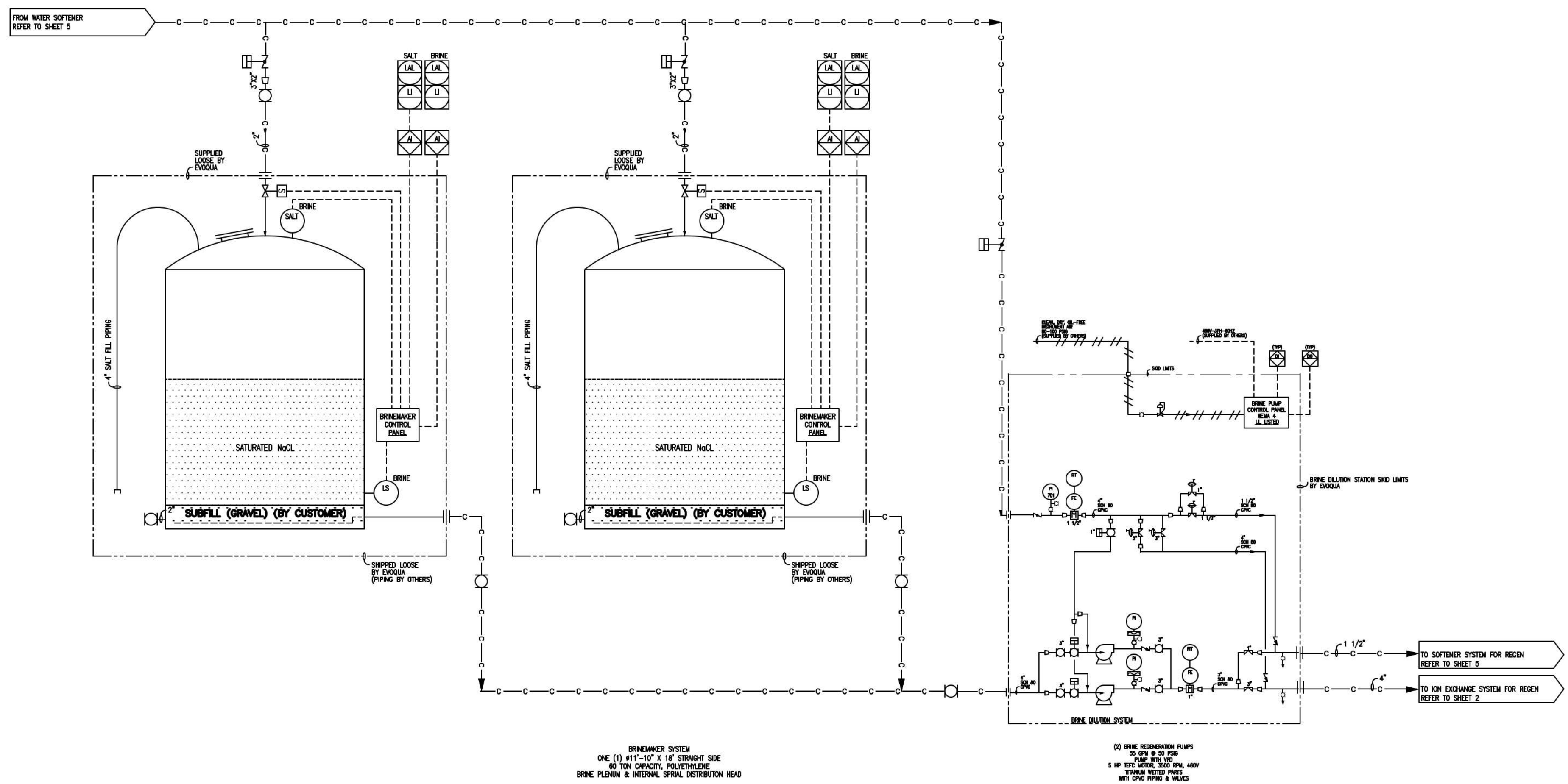
DESIGNER	DATE
CHECKER	DATE
ENGINEER	DATE
MANAGER	DATE
FILE:	
SCALE: NONE	

TITLE PROCESS AND INSTRUMENTATION DIAGRAM- DRAFT

[redacted]

EVOQUA WATER TECHNOLOGIES
WATER TECHNOLOGIES
COLORADO SPRINGS, CO
719-570-9600

PROJECT	CODE	DRAWING	SHEET	REV
1903-212.R0			2 OF 5	0



NOTES:

1. BRINE TANK & PUMP SKID, ARE LOOSE SHIPPED. ALL INTERCONNECTING PIPING, VALVES, FITTINGS, AND INSTRUMENTATION SHOWN IS BY CONTRACTOR
2. ALL MECHANICAL AND ELECTRICAL INSTALLATION & WIRING BY CONTRACTOR.
3. —c——c— CUSTOMER FIELD PIPING

PRELIMINARY
NOT FOR CONSTRUCTION

REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN
–	SEE SHEET ONE					

STD: BORDER-0106-24X36D1

INTL REF:

BAR = 1" AT PLOT SCALE

DESIGNER	DATE
CHECKER	DATE
ENGINEER	DATE
MANAGER	DATE
FILE:	
SCALE: NONE	

TITLE PROCESS AND INSTRUMENTATION DIAGRAM– DRAFT

[redacted]

EVOQUA WATER TECHNOLOGIES
WATER TECHNOLOGIES
COLORADO SPRINGS, CO
719-570-9600

PROJECT	CODE	DRAWING	SHEET	REV
1903-212.R0			3 OF 5	0

ATTACHMENT D-1

LACSD Industrial Waste Surcharge and Connection Programs

Industrial Waste Surcharge and Connection Fee Programs

The Sanitation Districts have implemented two revenue programs to cover capital improvements, operation, and maintenance of the sewerage system. These two programs are known as the Wastewater Treatment Surcharge Program and the **Connection Fee Program**. Each program has its own guidelines and criteria that are associated to the applicability of the discharge company. The following summary is to assist in evaluating the required fee that may be imposed upon your company.

WASTEWATER TREATMENT SURCHARGE PROGRAM

This is an annual fee for wastewater collection, treatment, and disposal services. All industrial companies discharging more than one million gallons of wastewater to the public sewerage system during the fiscal year (July 1 through June 30), or have high strength waste, are required to file and pay an annual Wastewater Treatment Surcharge Statement. There are three forms available:

1. Short Form Surcharge Statement: To be filed by companies discharging from 1 to 6 million gallons of wastewater per fiscal year and the wastewater quality meets required standards.
2. Long Form Surcharge Statement: To be filed by companies discharging more than 6 million gallons of wastewater per fiscal year or having a wastewater quality that exceeds Short Form standards.
3. Hospital User Charge Statement: To be filed by acute care surgical and acute care psychiatric hospitals.

CONNECTION FEE PROGRAM

This fee is used for capital improvements and is levied on all industrial companies who impose a new burden on the sewerage system or those companies who increase their discharge by more than 25 percent. For those companies newly connecting to the Sanitation Districts' sewerage system, this fee must be addressed prior to making the connection. For those companies increasing their burden on the sewerage system, a connection fee is paid at the time of the increase.

If you have any questions concerning the wastewater treatment surcharge or connection fee programs please call the Sanitation Districts' Surcharge Processing Group at (562) 908-4288, extension 2600.

Connection Fee Program

In 1981, a Sanitation Districts-wide Connection Fee Program was implemented to provide funds for future capital expenditures needed to accommodate additional wastewater contributions in the Sanitation Districts' sewerage system. This program requires all new users of the sewerage system, as well as existing users who expand their wastewater discharge, to pay a connection fee to the Sanitation Districts based upon the quantity and the strength of the wastewater discharge. This connection fee applies to residential, commercial and industrial dischargers. For new facilities, the connection fee is to be paid prior to the time the facility is actually connected to the sewer or, in the case of expanding existing facilities, at the time of expansion of the wastewater discharge. A new wastewater discharger may incur a connection fee for an existing facility if the baseline capacity is not sufficient for the new discharge. Industrial users who expand their wastewater discharge, such that the capacity is 25 percent greater than the baseline capacity, will be required to pay a connection fee for the increased discharge thereby establishing a new baseline capacity.

For users obtaining wastewater discharge permits at industrial sites within the Sanitation Districts' service area, baseline capacity may have been established by the previous industrial user. Baseline capacity generally remains with the site regardless of change of ownership. The only exception occurs when a relocation credit is granted under Section 3.08 of the **Connection Fee Ordinances**so as to allow a portion of the baseline capacity to be relocated to another site within the service area.

Connection fee rates for industrial users are determined using the following formula:

Connection Fee = R [(X*Flow/260) + (Y*COD/1.22) + (Z*SS/0.59)]

Where: R = Connection fee rate in dollars for a single capacity unit.

Flow = Average wastewater flow rate in gallons per day (gpd).

COD = Chemical oxygen demand (COD) expressed in pounds per day, to be determined by multiplying the COD concentration in mg/L by the flow in gpd and by the conversion factor 0.00000834.

SS = Suspended solids (SS) expressed in pounds per day, to be determined by multiplying the SS concentration in mg/L by the flow in gpd and the conversion factor 0.00000834.

The R, X, Y, and Z factors used in the connection fee formula are derived annually for each of the active Sanitation Districts. These factors vary according to Sanitation District and to the specific circumstances which may apply to individual dischargers. The R factor has the widest variability and in 2011, ranges from $1,400 to $6,190. The exact factors which pertain to a site can be obtained by contacting the Sanitation Districts or by accessing our **Rates by District** webpage; however, charge determinations for most Sanitation Districts can be approximated using R = $4,400, X = 0.66, Y = 0.13, and Z = 0.21. In order to calculate the actual connection fee, it is necessary to know the specific Sanitation District in which a facility is located and the correct R, X, Y, and Z factors as well as the facility's baseline capacity, if any.

For users applying for a new industrial wastewater discharge permit, any connection fee obligation will be determined after the application has been submitted. If a connection fee is required, an invoice will be forwarded to the official designated as the company's contact on the permit application form. The connection fee payment is due within 45 days from the date of the billing. The permit will not be issued until the connection fee payment has cleared (i.e., up to 10 working days for personal or company checks).

For existing dischargers who intend to significantly modify or expand their facilities, an application for a permit revision must be submitted and approved before any of the proposed changes are actually made. A connection fee determination will be made on the basis of the increase in sewer capacity above the permitted capacity baseline. If it is determined through a permit review process that the existing discharge has exceeded the permitted capacity by more than 25 percent, an invoice will be submitted and issuance of the revised permit will not occur until the connection fee payment has cleared. The connection fee payment is due within 45 days from the date of the billing. Late payments are subject to penalty and interest.

For connection fees triggered by an annual surcharge filing or audit, a preliminary notification letter is first sent to the discharger which addresses the circumstances of the pending charges. The letter establishes a short comment period which allows the discharger time to present additional information or set up a conference with Sanitation Districts' staff to answer questions. The notification letter also advises the discharger of the option to demonstrate a reduction in discharge rather than paying a connection fee, if the discharger believes that modifications to operational procedures or implementation of conservation measures will reduce the discharge to within 25 percent of the existing baseline. Following the comment period, the charges are formalized and an invoice is submitted requiring payment within 45 days. If payment or a complete Election to Demonstrate (which includes a properly executed agreement and the required collateral) is not received by this deadline, an immediate ten (10) percent penalty is imposed and the election to demonstrate option is forfeited. A second invoice which will include the penalty fee is then sent to the discharger. If payment is not received by the stated deadline, additional interest at the rate of one and one-half (1.5) percent per month is assessed on the total delinquent connection fee, including the initial ten (10) percent penalty, until the payment is made.

An industrial user may satisfy the connection fee obligation through extended payments for a period not to exceed six (6) years. Requests for an extended payment plan must be made within the 45 days of the notice of charges and accompanied by a minimum ten (10) percent payment. Interest will accrue on the unpaid balance at a rate based on the prime interest rate in effect at the beginning of the then-current fiscal year. Payment schedules of three years or less are based on the prime interest rate plus one (1) percent. Payment schedules greater than three years are based on the prime interest rate plus three (3) percent.

If a company elects to demonstrate a discharge reduction, notification must be submitted in writing and accompanied by appropriate security such as a surety bond, letter of credit, or certificate of deposit. The amount of the security submitted will be based on the current connection fee multiplied by a growth factor (which accounts for rate changes during the demonstration period) then reduced by 50 percent. A company also has the option of making a non-refundable deposit for a portion of the billed connection fee.

The demonstration period is typically the next full fiscal year which occurs after an election to demonstrate is made. However, the discharger may be allowed to start the demonstration earlier in the fiscal year in which the election is made. The demonstration is to be evaluated on discharge data for the designated 12-month period. Following this period, if the data show that the demonstration was successful (i.e., the capacity units are within 25 percent of the established baseline), the security is returned to the discharger. If the demonstration is unsuccessful, the discharger has the option of electing to make supplemental demonstrations, provided: (1) sufficient security accompanies a timely request, and (2) a non-refundable payment of five percent of the connection fee charge is made. Connection fee charges are based on the rate in effect at the time of billing.

For questions regarding the Connection Fee Program, please refer to the Sanitation Districts' **Connection Fee Ordinance**or contact the Surcharge Processing Group at (562) 908-4288, extension 2600.

ATTACHMENT D-2

Estimated Connection, Surcharge, and Other Fee Calculations

TABLE D-2
Estimated Connection, Surcharge, and Other Fee Calculations
Ion Exchange Nitrate Treatment System
La Puente Valley County Water District Treatment Facility, California

Parameter	Connection Specs[1]	Unit	Connection Fee[2]	Surcharge Specs[1]	Unit	Annual Fees[3]
Flow Rate	3993	gpd	$ 43,210.65	1.457445	MGY	$ 1,345.22
COD	0.3330	lbs/day	$ 156.24	0.1216	10^3 lbs	$ 19.81
SS	0.3330	lbs/day	$ 527.17	0.1216	10^3 lbs	$ 56.05
Peak Flow[4]	N/A	N/A	N/A	2.7729	gpm	$ 338.57
Makeup Water[5]	N/A	N/A	N/A	3993	gpd	$ 4,025.46
Total			**$ 44,000**			**$ 6,000**

Notes:

[1] Calculations for the LACSD one-time connection and annual surcharge fees are based on the average and peak flow rates of 5.575 gpm, and both COD and SS concentrations of 10 mg/L.

[2] Values for the multiplicative factors for average flow rate, COD, and SS, as well as the capacity unit rate R vary per district. Values for District No. 21 were used and are as follows: a factor of 0.6513 for average flow rate, 0.1325 for COD, and 0.2162 for SS are assumed. The capacity unit rate is assumed to be $4,320.

[3] Values for surcharge fee factors vary per district. Values for District No. 21 and the 2020-21 fiscal year were used. A unit rate of $923 per MGY average flow rate, $163 per 103 lbs of COD, $461.10 per 103 lbs of SS, and $122.10 per gpm peak flow rate are assumed.

[4] Calculation assumes discharge flow equalization and 24/7 discharge.

[5] A unit rate of $900 per acre-foot is assumed to calculate the annual cost for purchasing water to makeup the water loss.

Abbreviations:

COD - Chemical Oxygen Demand
gpd - gallons per day
gpm - gallons per minute
lbs - pounds
MGY - million gallons per year
N/A - Not Applicable
Specs - Specifications
SS - Suspended Solids

ATTACHMENT D-3

District 21 LACSD Industrial Wastewater Surcharge Rates

SANITATION DISTRICT NO. 21

INDUSTRIAL WASTEWATER SURCHARGE RATES
FISCAL YEARS 2017-18, 2018-19, 2019-20, 2020-21

PARAMETER	ADOPTED RATES			
	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21
Flow - Dollars per MGY	863.00	883.00	903.00	923.00
COD - Dollars per 1000 lbs.	152.50	156.00	159.50	163.00
SS - Dollars per 1000 lbs.	431.40	441.30	451.20	461.10
Peak Flow - Dollars per gpm	114.30	116.90	119.50	122.10
Short Form Flat Rate - Dollars per MGY	3,661.00	3,745.00	3,829.00	3,913.00

gpm = gallons per minute

MGY = Million Gallons per Year

Memo

To: Honorable Board of Directors

From: Paul Zampiello, Operations & Maintenance Superintendent

Date: February 10, 2020

Re: Operations & Compliance Report – January 2020

The following report summarizes La Puente Valley County Water District (LPVCWD) and City of Industry Waterworks System (CIWS) operational and compliance activities for the month of January 2020. The report also includes the status of various projects for each system.

DISTRIBUTION, SUPPLY AND PRODUCTION

- Monthly Water Production Summary –Total production from the LPVCWD Wellfield for the month of January was 325.32 AF, of which, 103.28 AF was delivered to Suburban Water Systems. CIWS Well No. 5 produced a total of 81.94 AF in the month of January. The January Monthly Production Report is provided as ***Attachment 1***.

- Well Water Levels and Pumping Rates - The latest static water level, pumping water level and pumping rate for LPVCWD and CIWS are as shown in the table below.

Well	Static Water Level (Ft)	Pumping Water Level (Ft)	Drawdown (Ft)	Current GPM Pumping Rate	Specific Capacity
LPVCWD 2	142	199	57	1406	24.7
LPVCWD 3	139	148	9	1009	112.1
LPVCWD 5	138.2	185.5	47.3	2425	51.3
COI 5	93	115	22	1274	57.9

- Monthly Water Conservation – A summary of LPVCWD and CIWS water systems usage for the past 6 months as compared to calendar year 2013 is shown below.

LPVCWD Monthly Water Consumption

Month	2013	2019-20	Difference Current-2013 (%)	Accumulative Difference (%)
August	201.38	167.35	-16.9%	-16.9%
September	187.60	157.58	-16.0%	-16.5%
October	172.74	166.74	-3.5%	-12.1%
November	139.24	122.88	-11.7%	-12.0%
December	133.13	98.39	-26.1%	-14.8%
January	115.58	109.00	-5.7%	-13.3%

CIWS Monthly Water Consumption

Month	2013	2019-20	Difference Current-2013 (%)	Accumulative Difference (%)
August	153.97	136.71	-11.2%	-11.2%
September	151.97	128.67	-15.3%	-13.3%
October	137.36	123.02	-10.4%	-12.3%
November	110.83	104.78	-5.5%	-10.6%
December	99.84	81.00	-18.9%	-12.3%
January	90.55	83.51	-7.8%	-11.5%

WATER QUALITY / COMPLIANCE

- Distribution System Monitoring – District Staff collected all required water quality samples from the distribution system for the month of January; approximately 45 samples were collected. All results met State and Federal drinking water quality regulations.

- Source Monitoring – All water quality samples were collected from all the wells, as required. The table below summarizes LPVCWD's wells current water quality for constituents of concern.

Well Sampled	1,1 DCE	TCE	PCE	Perchlorate	1,4-Dioxane	NDMA	Nitrate
	MC L= 6 ppb	MCL = 5 ppb	MCL = 5 ppb	MCL=6 ppb	NL = 1 ppb	NL= 10 ppt	MCL=10 ppm
LPVCWD 2	ND	39	2.5	24	0.92	85	6.6
LPVCWD 3	ND	3.0	0.58	9.7	ND	5.4	8.1
LPVCWD 5	ND	10	1.1	15	ND	20	7.7

CAPITAL / OTHER PROJECTS

1. LPVCWD Recycled Water Project

    - Staff has issued the Notice to Proceed to W.A. Rasic and has scheduled the Pre-Construction meeting on February 12, 2020. Staff is working with the contractor in preparing for upcoming construction activities.

2. LPVCWD PVOU IZ Project and SZ-South Project

    - Staff assisted Brkich Construction with installation new 14” valves and tie-in to LPVCWD’s distribution system. Also, work was performed to install new 18” valves and tie-in to CWIS’s distribution system
    - Recent construction activity of the IZ plant includes installation of the influent pipeline. Installation of the conduits under the UV equipment foundation, and pouring of the UV foundation and RO equipment pad.

3. LPVCWD Nitrate Treatment Project

    - Geosyntec has completed the Groundwater Nitrate Treatment System Technical Memorandum (TM).
    - Staff will be distributing the TM to all Stakeholders after the Board of Directors receives and files the document.

4. LPVCWD: La Puente Park Pipeline Project – Staff installed two 4” backflow devices, 400 feet of 6” domestic waterline, 200 feet of 4” domestic waterline, and 300 feet of irrigation piping. Staff also worked with City crews to performed reconnection of waterlines to exiting park facilities.

5. LPVCWD: Well No. 5 startup – Staff worked with Tri-County Pump Company to complete the well pump startup and performed the initial water quality sampling and the well was placed back into service on February 5th. Staff also constructed a temporary sound wall around the well pump equipment.

6. LPVCWD: Hudson Booster Repairs – Staff worked with contractors to completed the final wiring of the new motor control starter and motor coupling for Booster No. 1. The booster pump is now in good working order and back in service.

7. CIWS: Well No. 5 – On December 1, 2019 the Well No. 5 shut down unexpectedly. After inspection it was concluded that there was a failure in the motor control panel. The necessary electrical repairs were completed by an electrical contractor and the well was placed back into service on January 17, 2020.

8. CIWS: San Fidel Well Field Treatment Feasibility Study – IPUC authorized Stetson Engineers to complete the groundwater treatment feasibility study. Our District has initiated this work and the first of two tech memos for the City's review should be completed by Stetson in February.

9. CIWS: Starhill Lane and 3rd Avenue Waterline Improvement Project – The 2017 CIWS Water Master Plan recommended improvements to waterlines in Starhill Lane and 3rd Avenue south of Lomitas Avenue. District staff is providing support to City staff and CNC during the design phase of this project.

Attachment 1

La Puente Valley County Water District

PRODUCTION REPORT - JANUARY 2020

LPVCWD PRODUCTION	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2019 YTD	2018
Well No. 2	194.96												**194.96**	**153.22**
Well No. 3	135.90												**135.90**	**54.67**
Well No. 5	2.09												**2.09**	**3463.77**
Interconnections to LPVCWD	2.24												**2.24**	**47.93**
Subtotal	**335.19**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**335.19**	**3719.59**
Interconnections to SWS	222.04												**222.04**	**2108.97**
Interconnections to COI	4.15												**4.15**	**23.23**
Interconnections to Others	0.00												**0.00**	**0.00**
Subtotal	**226.19**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**226.19**	**2132.20**
Total Production for LPVCWD	**109.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**109.00**	**1587.39**
CIWS PRODUCTION														
COI Well No. 5 To SGVCW B5	81.94												**81.94**	**1571.94**
Interconnections to CIWS														
SGVWC Salt Lake Ave	0.51												**0.51**	**9.98**
SGVWC Lomitas Ave	81.07												**81.07**	**1317.18**
SGVWC Workman Mill Rd	0.02												**0.02**	**0.69**
Interconnections from LPVCWD	4.15												**4.15**	**23.23**
Subtotal	**85.75**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**85.75**	**1351.08**
Interconnections to LPVCWD	2.24												**2.24**	**47.75**
Total Production for CIWS	**83.51**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**83.51**	**1303.33**

Upcoming Events

To: Honorable Board of Directors

Date: 02/10/2020

Re: Upcoming Board Approved Meetings and Conferences for 2020.

Day/Date	Event	*Barajas*	*Escalera*	*Hastings*	*Hernandez*	*Rojas*
Wednesday February 12, 2020	SGVWA Quarterly Breakfast Meeting Pomona Valley Mining Co – 8 a.m.		X			X
Wednesday & Thursday February 19 & 20, 2020	American Ground Water AGWA-AGWT Annual Conference Gateway Hotel, Ontario, CA		X		X	
Thursday February 27, 2020	SCWUA Luncheon Sheraton, Pomona Fairplex					
Tuesday -Thursday April 7 – 9, 2020	AWWA CA/NV 2020 Spring Conference Disneyland Hotel, Anaheim, CA					
Thursday April 16, 2020	San Gabriel Valley Water Forum Hilton San Gabriel Hotel, San Gabriel 7:30 a.m – 1:45 p.m.		X			
Saturday April 18, 2020	Kiwani's La Puente Car Show (non-compensable)					
Wednesday - Thursday, May 6 - 7, 2020	ACWA 2020 Spring Conference Monterey Conference Center, Monterey, CA		X	X	X	X
Monday – Wednesday June 15 – 17, 2020	AWWA ACE 2020 Annual Conference Orange County Convention Center, Orlando, FL				X	
Tuessday – Thursday August 25 - 27, 2020	California Special Districts Association CSDA 2020 Annual Conference, Palm Desert, CA					
Wednesday-Thursday Sept 30 – Oct 1, 2020	Watersmart Innovations Conference South Point Hotel and Conference Center, Las Vegas, NV					
Tuesday-Thursday October 27-29, 2020	AWWA CA/NV 2020 Annual Fall Conference Rio Hotel, Las Vegas, NV					
Wednesday - Friday, December 2 -4, 2020	ACWA 2020 Fall Conference **(Location site to be determined)**					