Tahoe-Truckee Sanitation Agency

Special Board Meeting

January 16, 2019

TAHOE-TRUCKEE SANITATION AGENCY
A Public Agency
13720 Butterfield Drive
TRUCKEE, CALIFORNIA 96161
(530) 587-2525 • FAX (530) 587-5840

BOARD OF DIRECTORS
SPECIAL MEETING NOTICE AND AGENDA

Date: January 16, 2019
Time: 9:00 AM
Place: Board Room, Tahoe-Truckee Sanitation Agency, 13720 Butterfield Drive, Truckee, California

All or portions of this meeting will be conducted by teleconferencing in accordance with Government Code section 54953(b). The following are the teleconferencing locations: (1) 3413 Punta Alta, Unit N, Laguna Woods, CA. 92637 and (2) 647 Broadway, Dunedin, FL. 34698. The locations are accessible to the public, and members of the public may listen to the meeting and address the Board of Directors from the teleconference locations.

Members of the public will have the opportunity to directly address the Agency Board of Directors concerning any item listed on the Agenda below before or during consideration of that item. To better accommodate members of the public and staff, some Agenda items may be considered in an order different than listed below.

I. Call to Order, Roll Call, and Pledge of Allegiance

II. Public Comment Discussion items only, no action to be taken. Any person may address the Board at this time upon any subject that is within the jurisdiction of Tahoe-Truckee Sanitation Agency and that does not appear on the agenda. Any matter that requires action may be referred to staff for a report and action at a subsequent Board meeting. Please note there is a five (5) minute limit per person. In addition to or in lieu of public comment, any person may submit a written statement concerning Agency business to be included in the record of proceedings and filed with the meeting minutes. Any such statement must be provided to the recording secretary at the meeting.

III. Introduction of New Agency Staff Opportunity for the Board of Directors to meet new full-time staff members.

IV. Professional Achievements, Awards & Anniversaries Acknowledgement of staff for professional achievements, awards and anniversaries received the previous calendar month or quarter.

V. Consent Agenda Consent Agenda items are routine items that may be approved without discussion. If an item requires discussion, it may be removed from the Consent Agenda prior to action.

1. Approval of the minutes of the regular Board meeting on December 12, 2018.
2. Approval of general fund warrants.

3. Approval of financial statements and status of investments.
4. Approval of progress pay estimate no. 2 for the 2018 Digital Scanning of Sewer Lines project.

VI. Regular Agenda

1. Approval of a budget increase to Bryce Consulting, Inc. for the Agency Compensation and Classification Study.
2. Approval of a budget increase to HDR Engineering, Inc. for the Agency Connection Fee Study.
3. Discussion and award of the Master Sewer Plan.
4. Approval to advertise and solicit bids for the Administration Building Office Remodel project.
5. Approval of the Lucity, Inc. enterprise asset management program proposal.
6. Discussion of improved transparency for Board of Director meetings.

VII. Management Team Report

1. Department Reports.
2. General Manager Report.

VIII. Board of Director Comment Opportunity for directors to ask questions for clarification, make brief announcements and reports, provide information to staff, request staff to report back on a matter, or direct staff to place a matter on a subsequent agenda.

IX. Closed Session

1. Conference with General Manager, as Agency real property negotiator, concerning price and terms of payment relating to potential to real property exchange with Truckee Tahoe Airport District concerning Nevada County APN 019-440-81, APN 049-040-24 and APN 049-040-25 pursuant to Government Code Section 54956.8.
2. Closed Session Conference with Labor Negotiator - Government Code Section 54957.6
    i. Agency designated labor negotiator: General Manager.
    ii. Regarding unrepresented employees: All employee positions, except General Manager.

X. Adjournment

Posted and Mailed, 01/11/19

LaRue Griffin
Secretary to the Board

In compliance with the Americans with Disabilities Act, if you are a disabled person and you need a disability-related modification or accommodation to participate in this meeting, then please contact Roshelle Chavez at 530-587-2525 or 530-587-5840 (fax). Requests must be made as early as possible, and at least one-full business day before the start of the meeting.

Documents and material relating to an open session agenda item that are provided to the T-TSA Board of Directors less than 72 hours prior to a regular meeting will be available for public inspection and copying at the Agency's office located at 13720 Butterfield Drive, Truckee, CA.

TAHOE-TRUCKEE SANITATION AGENCY

MEMORANDUM

Date: January 16, 2019

To: Board of Directors

From: LaRue Griffin, General Manager

Item: I

Subject: Call to Order, Roll Call, and Pledge of Allegiance

Background

Call to Order, Roll Call, and Pledge of Allegiance.

TAHOE-TRUCKEE SANITATION AGENCY

MEMORANDUM

Date: January 16, 2019

To: Board of Directors

From: LaRue Griffin, General Manager

Item: II

Subject: Public Comment

Background

Discussion items only, no action to be taken. Any person may address the Board at this time upon any subject that is within the jurisdiction of Tahoe-Truckee Sanitation Agency and that does not appear on the agenda. Any matter that requires action may be referred to staff for a report and action at a subsequent Board meeting. There is a five (5) minute limit per person.

TAHOE-TRUCKEE SANITATION AGENCY

MEMORANDUM

Date: January 16, 2019

To: Board of Directors

From: Vicky Lufrano, Human Resources Administrator

Item: III

Subject: Introduction of New Agency Staff

Background
Opportunity for the Board of Directors to meet new full-time staff members and be informed of their roles and duties within the Agency.

- Mr. Jaime Garcia – Inventory Control Specialist.

Fiscal Impact
None.

Attachments
None.

Recommendation
No action required.

Review Tracking

Submitted By: _____
Vicky Lufrano
Human Resources Administrator

Approved By: _____
LaRue Griffin
General Manager

TAHOE-TRUCKEE SANITATION AGENCY

MEMORANDUM

Date: January 16, 2019

To: Board of Directors

From: Vicky Lufrano, Human Resources Administrator

Item: IV

Subject: Professional Achievements, Awards & Anniversaries

Background
Acknowledgement of staff for professional achievements, awards and anniversaries received the previous calendar month or quarter.

Achievements and Promotions

- Tobin Fuchs – Received Electrical/Instrumentation Grade 2 Certification.
- Tobin Fuchs – Promoted to I&E Technician I.

Awards

- *Safety Suggestion Awards (4th Quarter 2018)*
  - Dawn Davis – Address the hazards associated with the front gate and signage.
  - Chuy Zarate – Install emergency lighting in the pipe gallery, upgrade the type of emergency lighting in the corridor and paint the I-Beam yellow that obstructs safe entry and exit through the AWT roof hatch.
  - Jim Redmond – Install grip tape on the rungs of the Vactor truck ladder to prevent slippage, install a safety gate at the access to the floating cover for Digester 31 and remove the step in AWT at the 3rd level of the furnace.
  - Robert Holmes – Sump pump control panels need to have the switches and resets moved to the outside of the panel covers to prevent unauthorized access and exposure to live electrical components.
  - Zeb Snider – Cut hatch to access the sump pump float in Building 32 to eliminate exposure to confined space and fall hazards.

1-Year, 5-Year, 10-Year,15-Year, 20-Year, Etc. Anniversaries

- None

Fiscal Impact
Recipients of a Safety Suggestion Award receive 2 hours of administrative leave for each safety suggestion approved by the safety committee.

Attachments
None.

Recommendation
No action required.

Review Tracking

Submitted By: _____ Approved By: _____

Vicky Lufrano
Human Resources Administrator

LaRue Griffin
General Manager

TAHOE-TRUCKEE SANITATION AGENCY

MEMORANDUM

Date: January 16, 2019

To: Board of Directors

From: Roshelle Chavez, Administrative Services Manager

Item: V-1

Subject: Approval of the minutes of the regular Board meeting on December 12, 2018

Background
Draft minutes from previous meeting(s) held are presented to the Board of Directors for review and approval.

Fiscal Impact
None.

Attachments
Minutes of the regular Board meeting on December 12, 2018.

Recommendation
Management recommends approval of the minutes of the regular Board meeting on December 12, 2018.

Review Tracking

Submitted By: _____
Roshelle Chavez
Administrative Services Manager

Approved By: _____
LaRue Griffin
General Manager

BOARD OF DIRECTORS

REGULAR MEETING MINUTES

December 12, 2018

I. Call to Order:

President Lewis called the regular meeting of the Tahoe-Truckee Sanitation Agency Board of Directors to order at 9:00 AM. Roll call and Pledge of Allegiance followed.

Directors Present:
S. Lane Lewis, NTPUD
Dale Cox, SVPSD
Jon Northrop, ASCWD
Dan Wilkins, TCPUD
Blake Tresan, TSD

Staff Present:
LaRue Griffin, General Manager
Roshelle Chavez, Administrative Services Manager
Jay Parker, Engineering Manager
Michael Peak, Operations Manager
Richard Pallante, Maintenance Manager
Bob Gray, Information and Technology Manager
Vicky Lufrano, Human Resources Administrator
Richard P. Shanahan, Agency Counsel
Aaron Carlsson, Engineering Department
Scott Fleming, Engineering Department
Mike Smith, Engineering Department
Michelle Mackey, Administration Department
Emily Pindar, Administration Department
Celeste Graves, Administration Department
Dawn Davis, Administration Department
Angelina Henson, Administration Department
Tiffany Hambrick, Administration Department
Mark Heidelberger, Maintenance Department
Robert Holmes, Maintenance Department
Paul Shouse, Maintenance Department
Jim Redmond, Maintenance Department
Philip Fay, Maintenance Department
Justin Parrish, Maintenance Department

Anthony Salinas, Maintenance Department
Zeb Snider, Maintenance Department
Jesus Zarate, Maintenance Department
Ryan Schultz, Maintenance Department
Dean Haines, Maintenance Department
Tobin Fuchs, Maintenance Department
Laura Mader, Operations Department
Bill Pindar, Operations Department
Kristen Schrandt, Operations Department
Jeff Claussen, Operations Department
Aliou Diallo, Operations Department

Public Present: Rick Thompson, IBEW 1245
Shellie Anderson, Bryce Consulting, Inc.
Shawn Koorn, HDR Engineering, Inc.
Ron Ley, Damore Hamric & Schneider, Inc.
Vera Kis, Damore Hamric & Schneider, Inc.
Sarah Coolidge, Public

II. Public Comment:

Agency staff, Mr. Aaron Carlsson addressed the Board of Directors regarding his presence at the recent NTPUD Board of Directors meeting. Mr. Carlsson shared a statement that he read to the NTPUD Board concerning a memo and further expressed support of the T-TSA Board of Directors and management.

There was no further comment. No action was taken by the Board.

III. Professional Achievements, Awards & Anniversaries

Mrs. Lufrano acknowledged Agency staff whom obtained professional achievements, awards and anniversaries received for the previous calendar month to the Board of Directors.

IV. Consent Agenda

1. Approval of the minutes of the regular Board meeting on November 14, 2018.

2. Approval of general fund warrants.

3. Approval of financial statements and status of investments.

4. Approval of progress pay estimate no. 4 for the TRI MH 81-MH 83 Improvements project.

5. Approval of progress pay estimate no. 1 for the 2018 Digital Scanning of Sewer Lines project.

6. Approval of progress pay estimate no. 1 for the Building 27 Main Service Upgrade project.

MOTION by Director Lewis, **SECOND** by Director Wilkins to approve the Consent Agenda items; unanimously approved.

The Board approved the motion by the following roll call vote:

AYES:	Directors Cox, Northrop, Wilkins, Tresan and President Lewis
NOES:	None
ABSENT:	None
ABSTAIN:	None

Motion passed.

V. Regular Agenda

1. Approval of list of comparable agencies to be utilized in the Compensation and Classification Study.

Ms. Shellie Anderson of Bryce Consulting, Inc. presented the Board of Directors with a list of comparable agencies to be utilized in the Compensation and Classification Study. Agency staff, Bill Pindar, proposed and presented a list of comparable agencies as discussed and agreed by some Agency staff. After further discussion, the Board of Directors amended the list of comparable agencies as presented by Ms. Anderson to include the addition of Truckee Donner PUD, Contra Costa Sanitary District, Dublin San Ramon Services District, Napa Sanitation District, Delta Diablo Sanitation District and Monterey One Water and; substitution of the City of Reno in place of Truckee Meadows Water Reclamation (TRMWF).

MOTION by Director Tresan, **SECOND** by Director Lewis to approve the amended list of comparable agencies to be utilized in the Compensation and Classification Study; unanimously approved.

The Board approved the motion by the following roll call vote:

AYES:	Directors Cox, Northrop, Wilkins, Tresan and President Lewis
NOES:	None
ABSENT:	None
ABSTAIN:	None

Motion passed.

Most of the Agency employees left the meeting following the approval.

2. Presentation of the sewer connection fees.

Mr. Shawn Koorn of HDR Engineering, Inc. provided an overview of the previously discussed sewer connection fee schedule, in which he was asked to evaluate additional residential fee schedules for consideration. After discussion, the option to apply a base fee with a scalable fee based on square footage was desired. Mr. Shawn Koorn will reevaluate the connection fee schedule for the desired option and continue work on the connection fee

study in order to determine recommended new fees for the base fee and square footage unit fee.

3. Presentation of the annual financial audit for fiscal year 2017-2018.

   Mr. Ron Ley of Damore, Hamric & Schneider, Inc. presented the annual financial audit for fiscal year 2017-2018 and addressed questions from the Board of Directors.

4. Approval to receive and file the annual financial audit for fiscal year 2017-2018.

   MOTION by Director Wilkins, **SECOND** by Director Northrop to receive and file the annual financial audit for fiscal year 2017-2018; unanimously approved.

   The Board approved the motion by the following roll call vote:

AYES:	Directors Cox, Northrop, Wilkins, Tresan and President Lewis
NOES:	None
ABSENT:	None
ABSTAIN:	None

   Motion passed.

5. Approval of Task Order No. 31 with CH2M Hill, Inc. for engineering services associated with the Hotel Avery project.

   MOTION by Director Lewis, **SECOND** by Director Northrop to approve Task Order No. 31 with CH2M Hill, Inc. for engineering services associated with the Hotel Avery project; approved.

   The Board approved the motion by the following roll call vote:

AYES:	Directors Cox, Northrop, Tresan and President Lewis
NOES:	Director Wilkins
ABSENT:	None
ABSTAIN:	None

   Motion passed.

6. Approval of Caselle hosted software and services proposal for the administration department.

   MOTION by Director Wilkins, **SECOND** by Director Northrop to approve the Caselle hosted software and services proposal for the administration department; unanimously approved.

   The Board approved the motion by the following roll call vote:

AYES:	Directors Cox, Northrop, Wilkins, Tresan and President Lewis
NOES:	None
ABSENT:	None
ABSTAIN:	None

Motion passed.

Director Tresan left meeting following the approval.

7. Discussion to respond to the Nevada County Grand Jury letter regarding unfunded pension liabilities.

Mrs. Chavez and Mr. Griffin gave an overview of the request from the Nevada County Grand Jury letter regarding unfunded liabilities and the proposed response. After further discussion, response to R2 was amended to read "The recommendation has not yet been implemented, however, the Agency intends to explore the recommendation during its upcoming employee negotiations within the upcoming months."

MOTION by Director Northrop, **SECOND** by Director Wilkins to approve the response to the Nevada County Grand Jury letter regarding unfunded pension liabilities; unanimously approved.

The Board approved the motion by the following roll call vote:

AYES:	Directors Cox, Northrop, Wilkins and President Lewis
NOES:	None
ABSENT:	Director Tresan
ABSTAIN:	None

Motion passed.

VI. Management Team Reports

1. Department Reports.

Mr. Peak provided an update on current and past projects for the operations department and reported that the all waste discharge requirements were met for the month.

Mr. Pallante provided an update on current and past projects for the maintenance department.

Mr. Parker provided an update on current and past projects for the engineering department.

Mr. Gray provided an update on current and past projects for the information and technology department.

Mrs. Chavez provided an update on current and past projects for the administration department.

No action was taken by the Board.

2. General Manager Report

Mr. Griffin provided an update on the status of various ongoing projects, none of which required action by the Board.

No action was taken by the Board.

VII. Board of Director Comment

Director Wilkins addressed the Board of Directors and informed them he was not re-elected to the NTPUD Board of Directors. He added that there is a planned retirement of another NTPUD Board of Director and there may be a possibility that he be appointed to the NTPUD Board of Directors depending on the action to fill the vacant seat.

No action was taken by the Board.

VIII. Closed Session

The Board went into closed session with legal counsel and Mr. Griffin at 12:35 PM.

1. Conference with General Manager, as Agency real property negotiator, concerning price and terms of payment relating to potential to real property exchange with Truckee Tahoe Airport District concerning Nevada County APN 019-440-81, APN 049-040-24 and APN 049-040-25 pursuant to Government Code Section 54956.8.

The meeting was reopened at 12:50 PM. Nothing to report from closed session.

IX. ADJOURNMENT:

There being no further business, the meeting adjourned at 12:50 PM.

LaRue Griffin
Secretary to the Board

Approved: _____

TAHOE-TRUCKEE SANITATION AGENCY

MEMORANDUM

Date: January 16, 2019

To: Board of Directors

From: Roshelle Chavez, Administrative Services Manager

Item: V-2

Subject: Approval of general fund warrants

Background
Warrants paid and payable for the previous calendar month(s).

Fiscal Impact
Decrease in Agency general fund per the warrant amounts.

Attachments
Report of general fund warrants.

Recommendation
Management recommends approval of the general fund warrants paid and payable.

Review Tracking

Submitted By: _____
Roshelle Chavez
Administrative Services Manager

Approved By: _____
LaRue Griffin
General Manager

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
1978 MICHAEL OLIVER												
76080	MAN	VOID	S/C REFUND	2/08/18	99	000	11021		12.44-		E 16-300-46-100	
				2/14/18		*	CHECK TOTAL		12.44-			12.44-
1989 MARTIS VALLEY EDUCATION FOUNDATION												
76305	MAN	VOID	CF REFUND	4/11/18	99	010	31040		500.00-		P80-270-75-00A	
				4/12/18		*	CHECK TOTAL		500.00-			500.00-
931 AHERN RENTALS												
77320	REG	PAID	19725531-1	11/01/18	99	100	45155	360	1,811.60		BOOM LIFT RENTAL	
				12/12/18		*	CHECK TOTAL		1,811.60			1,811.60
15 AIRGAS USA, LLC												
77321	REG	PAID	9082009481	10/31/18	99	960	45150	140	1,346.47		DRIVERS GLOVES	
77321	REG	PAID	9957489537	10/31/18	99	100	45140	360	184.93		MONTHLY BILLING	
				12/12/18		*	CHECK TOTAL		1,531.40			1,531.40
19 ALPHA ANALYTICAL												
77322	REG	PAID	26641	11/08/18	99	160	45160	290	260.00		4TH QTR SLUDGE METALS	
				12/12/18		*	CHECK TOTAL		260.00			260.00
1900 AMAZON CAPITAL SERVICES												
77323	REG	PAID	1CRP-JTC9-YLQ7	11/08/18	99	100	45150	115	284.37		BACKUP CAMERA,KLEIN TOOL	
77323	REG	PAID	1CRP-JTC9-Y47R	11/08/18	99	100	45150	100	199.90		LED FLASHLIGHTS	
77323	REG	PAID	1GDJ-4GJW-Y4PV	11/08/18	99	100	45150	115	263.98		XTRA BACKUP CAMERA,KLEIN	
77323	REG	PAID	1KPX-73LY-W7MM	11/21/18	99	100	45155	330	605.86		HDMI CORD, FLASH DRIVE	
77323	REG	PAID	1KXN-XV14-WK7M	11/08/18	99	100	45150	115	44.00-		CREDIT FOR KLEIN TOOL	
77323	REG	PAID	1KXN-XV14-WK9K	11/08/18	99	100	45150	115	109.99-		CREDIT FOR BACKUP CAMERA	
77323	REG	PAID	1LTM-9FVV-LDNC	11/02/18	99	100	45150	100	259.20		PRESSURE REGULATOR	
77323	REG	PAID	1PQX-X9WC-1WH6	11/08/18	99	100	45150	115	109.99-		CREDIT FOR BACKUP CAMERA	
77323	REG	PAID	1RRK-M4VW-1H1X	12/08/18	99	100	45155	165	199.96		RAYCHEM HEAT CABLE	
77323	REG	PAID	1WGX-9VHN-RN6F	11/07/18	99	100	45155	165	43.29		FLAG POLE LIGHT	
77323	REG	PAID	17LY-QCHC-WM6F	11/01/18	99	100	45150	135	448.56		TIRES FOR ALL CARTS	
				12/12/18		*	CHECK TOTAL		2,041.14			2,041.14
32 AMERIPRIDE UNIFORM SERVICES												
77324	REG	PAID	1102087820	11/12/18	99	765	45150	407	327.40		UNIFORM/MATS	
77324	REG	PAID	1102087820	11/12/18	99	120	45150	140	14.90		UNIFORM/MATS	
77324	REG	PAID	1102091311	11/19/18	99	765	45150	407	328.90		UNIFORM/MATS	

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
77324	REG	PAID	1102091311	11/19/18	99	120	45150	140	194.72		UNIFORM/MATS	
77324	REG	PAID	1102094860	11/26/18	99	765	45150	407	325.89		UNIFORM/MATS	
77324	REG	PAID	1102094860	11/26/18	99	120	45150	140	14.90		UNIFORM/MATS	
				12/12/18			* CHECK TOTAL		1,206.71			1,206.71
2020 APS WATER SERVICES CORP												
77325	REG	PAID	37788	10/30/18	99	160	45300	290	10,790.47		PURIFICATION SYSTEM	
				12/12/18			* CHECK TOTAL		10,790.47			10,790.47
1885 AT&T ACCT 831-000-6939 380												
77326	REG	PAID	2133845402	11/19/18	99	930	45110	325	1,323.93		MONTHLY BILLING	
				12/12/18			* CHECK TOTAL		1,323.93			1,323.93
1886 AT&T ACCT #171-800-7674 001												
77327	REG	PAID	6864084404	11/19/18	99	930	45110	325	964.15		MONTHLY BILLING	
				12/12/18			* CHECK TOTAL		964.15			964.15
1383 AT&T 530 582-0827 966 5												
77328	REG	PAID	5820827966-1118	11/14/18	99	140	45190	300	378.61		MONTHLY BILLING	
77328	REG	PAID	5820827966-1118	11/14/18	99	140	45190	300	378.61		MONTHLY BILLING	
				12/12/18			* CHECK TOTAL		757.22			757.22
49 AVAYA, INC.												
77329	REG	PAID	2734112889	11/18/18	99	140	45190	300	837.48		QUARTERLY BILLING	
				12/12/18			* CHECK TOTAL		837.48			837.48
58 BARTKIEWICZ, KRONICK & SHANAHAN												
77330	REG	PAID	8502.001OCT2018	11/06/18	99	800	45120	315	4,003.30		MONTHLY BILLING	
				12/12/18			* CHECK TOTAL		4,003.30			4,003.30
2056 BATTERY JUNCTION												
77331	REG	PAID	1278290	11/05/18	99	100	45150	100	64.93		BATTERIES	
				12/12/18			* CHECK TOTAL		64.93			64.93
2058 ROBERT BROOKE & ASSOCIATES												
77332	REG	PAID	146886	11/12/18	99	100	45150	115	1,425.93		DOOR CLOSERS	

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
				12/12/18		* CHECK TOTAL			1,425.93			1,425.93
2072 BRYCE CONSULTING, INC.												
77333	REG		PAID 3036	10/31/18	99	800	45120	325	1,248.97		COMPENSATION STUDY	
				12/12/18		* CHECK TOTAL			1,248.97			1,248.97
97 CALCHAMBER; MEMBERSHIP												
77334	REG		PAID SI381342	11/12/18	99	800	45080	455	849.00		MEMBERSHIP DUES 2019	
				12/12/18		* CHECK TOTAL			849.00			849.00
115 CASHMAN EQUIPMENT CO.												
77335	REG		PAID INPS2862269	11/27/18	99	765	45100	400	483.98		SAFETY STICKERS	
				12/12/18		* CHECK TOTAL			483.98			483.98
1290 CLARK PEST CONTROL												
77336	REG		PAID 23031665	11/28/18	99	120	45110	325	275.00		MONTHLY BILLING	
				12/12/18		* CHECK TOTAL			275.00			275.00
2045 CONSOLIDATED PARTS, INC.												
77337	REG		PAID 5051063	11/08/18	99	100	45155	165	856.16		MOTOR MONITORS	
				12/12/18		* CHECK TOTAL			856.16			856.16
149 CWEA												
77338	REG		PAID 0000214121	11/07/18	99	870	45080	455	184.00		CWEA RENEWS, HEIDELBERGER	
77338	REG		PAID 000032547ICERT	11/07/18	99	870	45080	455	92.00		GRADE 2 CERRT, REDMOND	
				12/12/18		* CHECK TOTAL			276.00			276.00
1722 ALIOU DIALLO												
77339	REG		PAID CERTS/AWARD1018	10/24/18	99	870	45080	455	255.00		GRADE V,OVERCERT, DIALLO	
77339	REG		PAID CERTS/AWARD1018	10/24/18	99	870	45020	410	250.00		GRADE V,OVERCERT, DIALLO	
				12/12/18		* CHECK TOTAL			505.00			505.00
816 DLT SOLUTIONS												
77340	REG		PAID SI413572	11/27/18	99	930	45110	365	2,410.80		AUTO CAD MAINTENANCE PLAN	
				12/12/18		* CHECK TOTAL			2,410.80			2,410.80
1945 EWS- ENVIRONMENTAL WATER SOLUTIONS												
77341	REG		PAID 2820	11/16/18	99	100	45150	150	2,338.71		REPAIR KIT FOR BLOWER	

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
				12/12/18		* CHECK TOTAL			2,338.71			2,338.71
201 FERGUSON ENTERPRISES,INC. #1423												
77342	REG		PAID 6317832	10/23/18	99	100	45150	100	31.54		WAREHOUSE STOCK	
				12/12/18		* CHECK TOTAL			31.54			31.54
203 FISHER SCIENTIFIC COMPANY												
77343	REG		PAID 6214647	11/01/18	99	160	45160	290	439.27		LAB SUPPLIES	
77343	REG		PAID 6719982	11/07/18	99	160	45160	290	995.10		LAB SUPPLIES	
				12/12/18		* CHECK TOTAL			1,434.37			1,434.37
67 FLYERS ENERGY LLC												
77344	REG		PAID 18-797790	11/07/18	99	150	45060	275	470.33		UNLEADED GASOLINE	
77344	REG		PAID 18-797790	11/07/18	99	150	45060	275	1,881.30		UNLEADED GASOLINE	
77344	REG		PAID 18-806082	11/21/18	99	150	45060	270	10,502.71		DYED DIESEL	
				12/12/18		* CHECK TOTAL			12,854.34			12,854.34
225 GRAINGER INC., W.W.												
77345	REG		PAID 9010333574	11/19/18	99	100	45150	100	2,861.05		FIRE HOSE	
77345	REG		PAID 9951419176	10/31/18	99	960	45150	140	1,021.28		JANITORIAL SUPPLIES	
77345	REG		PAID 9953628204	11/02/18	99	960	45150	140	63.50		JANITORIAL SUPPLIES	
				12/12/18		* CHECK TOTAL			3,945.83			3,945.83
742 ROBERT GRAY												
77346	REG		PAID VI111918	11/19/18	99	870	45020	495	212.18		VI REIMB, GRAY	
				12/12/18		* CHECK TOTAL			212.18			212.18
232 HACH CHEMICAL COMPANY												
77347	REG		PAID 11204409	11/01/18	99	160	45160	290	138.97		LAB SUPPLIES	
77347	REG		PAID 11207358	11/05/18	99	160	45160	290	35.93		LAB SUPPLIES	
77347	REG		PAID 11209590	11/06/18	99	160	45160	290	3,507.30		LAB SUPPLIES	
77347	REG		PAID 11216905	11/12/18	99	160	45160	290	389.70		LAB SUPPLIES	
77347	REG		PAID 11233164	11/23/18	99	100	45155	170	2,448.26		DIGITAL PH SENSOR	
				12/12/18		* CHECK TOTAL			6,520.16			6,520.16
2073 TIFFANY HAMBRICK												
77348	REG		PAID VI112018	11/20/18	99	860	45020	495	180.00		VI REIMB, TIFFANY	
				12/12/18		* CHECK TOTAL			180.00			180.00
1993 THE HON COMPANY												
77349	REG		PAID 460773	11/09/18	99	800	45300	340	670.15		MONITOR BRACKET HOLDER	

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
				12/12/18		* CHECK TOTAL			670.15			670.15
2003 HUNT & SONS INC.												
77350	REG	PAID	935562	11/01/18	99	100	45150	125	874.61		NON DETERGENT OIL	
77350	REG	PAID	935566	11/01/18	99	100	45150	125	297.63		MOBIL OIL	
				12/12/18		* CHECK TOTAL			1,172.24			1,172.24
275 J&L PRO KLEEN, INC.												
77351	REG	PAID	27462	11/19/18	99	120	45110	325	2,300.00		JANITORIAL SVC FOR NOV	
				12/12/18		* CHECK TOTAL			2,300.00			2,300.00
2002 VICKY LUFRANO												
77352	REG	PAID	CLASSREIMB1118	11/30/18	99	920	45170	375	199.00		CLASS REIMB, LUFRANO	
77352	REG	PAID	NOV 2018 PHONE	12/12/18	99	140	45190	300	42.80		REIMB CELL PHONE, LUFRANO	
77352	REG	PAID	TRAINING 112018	11/30/18	99	920	45170	375	617.67		TRAINING REIMB, LUFRANO	
77352	REG	PAID	TRAVELREIMB1118	11/09/18	99	920	45170	375	353.06		TRAVEL REIMB, LUFRANO	
				12/12/18		* CHECK TOTAL			1,212.53			1,212.53
969 MARK MESSERSCHMIDT												
77353	REG	PAID	VI092618	9/26/18	99	870	45020	495	400.00		VI REIMB, MESSERSCHMIDT	
				12/12/18		* CHECK TOTAL			400.00			400.00
376 MOUNTAIN HARDWARE												
77354	REG	PAID	N14599	11/07/18	99	120	45150	100	379.86		EXTENSION CORDS	
				12/12/18		* CHECK TOTAL			379.86			379.86
851 MSC INDUSTRIAL SUPPLY												
77355	REG	PAID	37584320	11/29/18	99	765	45100	405	60.53		NITRILE GLOVES	
				12/12/18		* CHECK TOTAL			60.53			60.53
353 NAPA- SIERRA												
77356	REG	PAID	501687	11/15/18	99	150	45150	135	113.98		BATTERY FOR VHCT01FORKLFT	
				12/12/18		* CHECK TOTAL			113.98			113.98
1821 NEWEGG, INC.												
77357	REG	PAID	1301641891	11/07/18	99	930	45150	330	919.68		DESKTOP, REPLACE UPC	

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
77357	REG	PAID	1301662098	11/17/18	99	930	45155	330	3,562.05		DELL DESKTOP COMPUTER	
				12/12/18		*	CHECK TOTAL		4,481.73			4,481.73
407 NORTHERN SAFETY CO., INC.												
77358	REG	PAID	903219026	11/21/18	99	765	45100	405	158.13		KNEE PADS	
				12/12/18		*	CHECK TOTAL		158.13			158.13
734 GREG O'HAIR												
77359	REG	PAID	CERTRENEW112018	11/06/18	99	870	45080	455	150.00		GRADE V RENEW, OHAIR	
				12/12/18		*	CHECK TOTAL		150.00			150.00
1684 O'REILLY AUTO PARTS												
77360	REG	PAID	4426-444840	10/30/18	99	150	45150	135	263.00		PARTS FOR VHCL-06	
				12/12/18		*	CHECK TOTAL		263.00			263.00
959 OFFICE DEPOT												
77361	REG	PAID	228087360001	11/07/18	99	800	45090	335	550.57		OFFICE SUPPLIES	
77361	REG	PAID	232740269001	11/16/18	99	810	45130	355	207.74		END OF YEAR FORMS	
				12/12/18		*	CHECK TOTAL		758.31			758.31
1066 OTIS ELEVATOR CO.												
77362	REG	PAID	SCT0766C18	11/20/18	99	765	45110	325	4,497.00		ANNUAL SVC CONTRACT	
				12/12/18		*	CHECK TOTAL		4,497.00			4,497.00
455 PINNACLE TOWERS INC.												
77363	REG	PAID	26344791	12/01/18	99	752	45140	360	687.61		MONTHLY BILLING	
				12/12/18		*	CHECK TOTAL		687.61			687.61
452 TRUCKEE DONNER PUD												
77364	REG	PAID	1408270025NOV18	11/28/18	99	140	45190	280	42.86		MONTHLY BILLING	
77364	REG	PAID	1408290024NOV18	11/28/18	99	140	45190	280	51.14		MONTHLY BILLING	
77364	REG	PAID	1408310024NOV18	11/28/18	99	140	45190	280	21.99		MONTHLY BILLING	
77364	REG	PAID	500920024-NOV18	11/28/18	99	140	45190	280	63,202.68		MONTHLY BILLING	
77364	REG	PAID	500920024-NOV18	11/28/18	99	140	45190	282	110.10		MONTHLY BILLING	
				12/12/18		*	CHECK TOTAL		63,428.77			63,428.77
1798 ROSHELLE CHAVEZ												
77365	REG	PAID	MEALREIMB1118	11/15/18	99	920	45170	375	20.00		MEAL REIMB, CHAVEZ	

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
77365	REG		PAID NOV 2018 PHONE	12/12/18	99	140	45190	300	42.80		REIMB CELL PHONE, CHAVEZ	
				12/12/18		*	CHECK TOTAL		62.80			62.80
2007	ROY SMITH COMPANY											
77366	REG		PAID 2100038722	11/06/18	99	310	45100	245	3,019.00		LIQUID OXYGEN	
77366	REG		PAID 2100038723	11/06/18	99	310	45100	245	359.42		LIQUID OXYGEN	
77366	REG		PAID 2100065781	11/26/18	99	310	45100	245	3,307.67		LIQUID OXYGEN	
77366	REG		PAID 2100070342	11/27/18	99	310	45100	245	524.60		LIQUID OXYGEN	
				12/12/18		*	CHECK TOTAL		7,210.69			7,210.69
871	SAFETY-KLEEN CORP.											
77367	REG		PAID 78236477	11/14/18	99	100	45150	125	162.62		MOTOR OIL	
				12/12/18		*	CHECK TOTAL		162.62			162.62
565	SAFEWAY INC.											
77368	REG		PAID 106261-1018	11/03/18	99	920	45170	375	345.56		GROCERIES	
				12/12/18		*	CHECK TOTAL		345.56			345.56
1141	SAIA, INC.											
77369	REG		PAID 10160351690	11/01/18	99	100	45150	380	345.10		CRATE PICKUP FOR BLOWER	
				12/12/18		*	CHECK TOTAL		345.10			345.10
1416	KRISTIN SCHRANDT											
77370	REG		PAID WORK PANTS 1118	11/19/18	99	765	45150	405	165.57		WORK PANTS REIMB,SCHRANDT	
				12/12/18		*	CHECK TOTAL		165.57			165.57
2060	SETON											
77371	REG		PAID 9338552822	11/07/18	99	765	45150	400	619.45		NEW SIGNS	
77371	REG		PAID 9338568711	11/08/18	99	765	45150	400	1,128.76		NEW SIGNS	
77371	REG		PAID 9338591240	11/12/18	99	765	45150	400	2,435.47		NEW SIGNS	
				12/12/18		*	CHECK TOTAL		4,183.68			4,183.68
963	SHERWIN-WILLIAMS											
77372	REG		PAID 7511-3	10/23/18	99	100	45150	155	440.77		PAINT SUPPLIES	
				12/12/18		*	CHECK TOTAL		440.77			440.77
1744	SHRED-IT USA											
77373	REG		PAID 8126070827	11/22/18	99	800	45110	325	296.00		MONTHLY BILLING	

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
				12/12/18		* CHECK TOTAL			296.00			296.00
602 SIERRA ELECTRONICS												
77374	REG		PAID AR13559	11/28/18	99	100	45155	165	1,873.01		ELECTRICAL SUPPLIES	
				12/12/18		* CHECK TOTAL			1,873.01			1,873.01
1442 SIERRA OFFICE SOLUTIONS												
77375	REG		PAID IN263554	11/12/18	99	900	45110	365	10.05		MONTHLY BILLING	
				12/12/18		* CHECK TOTAL			10.05			10.05
117 SUDDENLINK PAYMENT CENTER												
77376	REG		PAID 705848301-1218	11/20/18	99	930	45110	325	88.05		MONTHLY BILLING	
				12/12/18		* CHECK TOTAL			88.05			88.05
2054 TEQUIPMENT.COM												
77377	REG		PAID 0733106-IN	11/02/18	99	100	45155	165	159.21		ELECTRICAL SUPPLIES	
77377	REG		PAID 0737636-IN	11/15/18	99	100	45155	165	17.69		ELECTRICAL SUPPLIES	
				12/12/18		* CHECK TOTAL			176.90			176.90
1894 THATCHER COMPANY OF CA, INC.												
77378	REG		PAID 258924	11/07/18	99	310	45100	230	2,544.28		HYDDROCHLORIC ACID 5 %	
77378	REG		PAID 5043328	10/18/18	99	310	45100	215	4,330.00-		CHLORINE EMPTIES	
77378	REG		PAID 5044017	11/15/18	99	310	45100	215	7,520.00		CHLORINE	
				12/12/18		* CHECK TOTAL			5,734.28			5,734.28
815 THOMSON WEST												
77379	REG		PAID 839184802	11/01/18	99	800	45090	335	317.69		MONTHLY BILLING	
				12/12/18		* CHECK TOTAL			317.69			317.69
2053 TOTAL TEMPERATURE INSTRUMENTATION I												
77380	REG		PAID IN549601	11/12/18	99	960	45150	100	112.00		NOSHOK 100 PRESSURE GAUGE	
				12/12/18		* CHECK TOTAL			112.00			112.00
464 TRUCKEE RENTS, INC.												
77381	REG		PAID 120773	11/21/18	99	100	45150	360	71.45		GENERATOR RENTAL	
77381	REG		PAID 411384	11/09/18	99	130	45150	100	523.93		GENERATOR	

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
77381	REG	PAID	411427	11/14/18	99	100	45155	360	469.81		GENERATOR RENTAL	
				12/12/18		*	CHECK TOTAL		1,065.19			1,065.19
2061	TRUCKEE TIRE											
77382	REG	PAID	3591	11/15/18	99	150	45150	135	862.64		TIRES FOR VHCL 20 I&E	
				12/12/18		*	CHECK TOTAL		862.64			862.64
794	ULINE											
77383	REG	PAID	102944108	11/07/18	99	765	45100	400	365.82		SECURITY GATE	
				12/12/18		*	CHECK TOTAL		365.82			365.82
1277	USA BLUE BOOK											
77384	REG	PAID	740471	11/16/18	99	100	45150	150	966.97		FLEXIBLE CONNECTORS	
				12/12/18		*	CHECK TOTAL		966.97			966.97
551	VERIZON WIRELESS											
77385	REG	PAID	9818774700	12/01/18	99	140	45190	300	38.49		MONTHLY BILLING	
77385	REG	PAID	9818774700	12/01/18	99	140	45190	300	611.86		MONTHLY BILLING	
				12/12/18		*	CHECK TOTAL		650.35			650.35
560	VWR SCIENTIFIC, INC.											
77386	REG	PAID	8084260717	11/02/18	99	160	45160	290	3,238.71		GLASS FIBER FILTERS	
				12/12/18		*	CHECK TOTAL		3,238.71			3,238.71
1072	WAGNER PROCESS EQUIPMENT											
77387	REG	PAID	9214137-IN	11/12/18	99	100	45150	100	3,145.40		PTFE BELLOW	
				12/12/18		*	CHECK TOTAL		3,145.40			3,145.40
578	WESTERN NEVADA SUPPLY											
77388	REG	PAID	17664394	11/08/18	99	765	45100	400	242.20		PIPE, CAP	
77388	REG	PAID	17664410	11/12/18	99	765	45100	400	493.92		MIP PLUG, FEMALE ADPT	
				12/12/18		*	CHECK TOTAL		736.12			736.12
927	WESTERN ENV. TESTING LAB.											
77389	REG	PAID	109207	10/25/18	99	490	45110	327	75.40		4TH QTR SLUDGE TESTING	
77389	REG	PAID	109375	10/31/18	99	490	45110	327	75.40		4TH QTR SLUDGE TESTING	

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
77389	REG	PAID	109489	11/06/18	99	490	45110	327	75.40		4TH QTR SLUDGE TESTING	
77389	REG	PAID	109497	11/06/18	99	490	45110	327	75.40		4TH QTR SLUDGE TESTING	
77389	REG	PAID	109501	11/06/18	99	490	45110	327	75.40		4TH QTR SLUDGE TESTING	
77389	REG	PAID	109568	11/08/18	99	490	45110	327	75.40		4TH QTR SLUDGE TESTING	
77389	REG	PAID	109572	11/08/18	99	490	45110	327	75.40		4TH QTR SLUDGE TESTING	
				12/12/18		*	CHECK TOTAL		527.80			527.80
808 SCOTT WILCOX												
77390	REG	PAID	CERTRENEW112018	11/06/18	99	870	45080	455	150.00		GRADE V RENEW, WILCOX	
				12/12/18		*	CHECK TOTAL		150.00			150.00
611 WORK WORLD												
77391	REG	PAID	63342	11/16/18	99	765	45100	405	205.68		BOOTS, DIALLO	
				12/12/18		*	CHECK TOTAL		205.68			205.68
2038 ZORO												
77392	REG	PAID	INV5186368	11/06/18	99	100	45150	100	33.72		NEVER FLAT WHEEL	
77392	REG	PAID	INV5190654	11/07/18	99	100	45155	165	35.19		PILOT LIGHT LENSE	
77392	REG	PAID	INV5233742	11/16/18	99	150	45150	135	111.46		NOZZLE ASSEMBLY	
77392	REG	PAID	INV5251211	11/21/18	99	100	45150	170	91.68		SILICONE TUBING	
77392	REG	PAID	INV5270568	11/27/18	99	765	45100	400	44.88		ELECT GLOVE PROTECTOR	
				12/12/18		*	CHECK TOTAL		316.93			316.93
692 DALE COX												
77393	MAN	PAID	DEC18 HEALTH	11/30/18	99	940	45020	475	179.30		DEC18 HEALTH, DALE	
77393	MAN	PAID	DEC18 PART D	11/30/18	99	940	45020	475	56.30		DEC18 PART D, DALE	
				12/04/18		*	CHECK TOTAL		235.60			235.60
2022 SCHNEIDER ELECTRIC USA, INC												
77394	MAN	PAID	PROG PAY#1	12/04/18	99	615	45110	325	489,093.29		PROGRESS PAY #1	
77394	MAN	PAID	RETENTION	12/04/18	99	000	20410		24,454.66-		RETENTION	
				12/12/18		*	CHECK TOTAL		464,638.63			464,638.63
1433 HOFFMAN SOUTHWEST CORP												
77395	MAN	PAID	PROG PAY # 1	11/30/18	99	720	45110	110	95,238.55		PROGRESS PAY #1	
77395	MAN	PAID	RETENTION	11/30/18	99	000	20410		4,761.93-		RETENTION	
				12/12/18		*	CHECK TOTAL		90,476.62			90,476.62
678 ALLIANT INSURANCE SERVICES												
77396	MAN	PAID	964574	11/28/18	99	800	45070	305	7,657.44		POLLUTION LIABILITY RENEW	

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
				12/12/18		* CHECK TOTAL			7,657.44			7,657.44
2077 NANCY STROM												
77397	MAN	PAID	P93-220-18-00	11/26/18	99	000	11021		150.44		SERVICE CHARGE REFUND	
				12/12/18		* CHECK TOTAL			150.44			150.44
2076 ELIZABETH DAY												
77398	MAN	PAID	P93-430-38-00	11/28/18	99	000	11021		453.00		SERVICE CHARGE REFUND	
				12/12/18		* CHECK TOTAL			453.00			453.00
895 TAHOE SUPPLY COMPANY, LLC												
77399	MAN	PAID	1000438	11/07/18	99	100	45150	140	1,746.18		JANITORIAL SUPPLIES	
				12/12/18		* CHECK TOTAL			1,746.18			1,746.18
619 SIERRA SYSTEMS, INC.												
77400	MAN	PAID	DEC2018SVC	12/01/18	99	800	45110	325	600.00		MONTHLY BILLING	
				12/12/18		* CHECK TOTAL			600.00			600.00
1900 AMAZON CAPITAL SERVICES												
77401	MAN	PAID	1HC6-TPGX-X3DK	11/21/18	99	100	45155	165	39.48		WEATHER PROOF COVER	
				12/12/18		* CHECK TOTAL			39.48			39.48
132 COKER PUMP & EQUIPMENT CO.												
77402	MAN	PAID	0068387	11/20/18	99	100	45150	115	1,092.08		SEAL, SHAFT SLEEVE	
				12/12/18		* CHECK TOTAL			1,092.08			1,092.08
538 IRON MOUNTAIN												
77403	MAN	PAID	AHXY068	11/30/18	99	800	45140	360	293.53		MONTHLY BILLING	
				12/12/18		* CHECK TOTAL			293.53			293.53
560 VWR SCIENTIFIC, INC.												
77404	MAN	PAID	8084451382	11/21/18	99	160	45160	290	468.81		LAB SUPPLIES	
77404	MAN	PAID	8084463550	11/26/18	99	160	45160	290	399.50		LAB SUPPLIES	
				12/12/18		* CHECK TOTAL			868.31			868.31
871 SAFETY-KLEEN CORP.												
77405	MAN	PAID	78231637	11/13/18	99	100	45110	325	478.31		WASHER PARTS SVC 12WK	

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
				12/12/18		* CHECK TOTAL			478.31			478.31
99999 VOID ZERO AMOUNT CHECKS VENDOR												
77406	MAN	PAID	VOID CK00077406	12/05/18	99	000	10010				PRINTING ERROR	
				12/05/18		* CHECK TOTAL						
149 CWEA												
77407	MAN	PAID	000021415I-1118	11/07/18	99	870	45080	455	87.00		INSPECTOR GR1 CERT,BILL	
				12/12/18		* CHECK TOTAL			87.00			87.00
225 GRAINGER INC., W.W.												
77408	MAN	PAID	9008793938	12/04/18	99	100	45150	150	127.00		STRIP HEATER	
77408	MAN	PAID	9008793946	12/04/18	99	100	45150	150	57.80		AXIAL FAN	
77408	MAN	PAID	9008793979	12/04/18	99	100	45150	150	127.00-		CM FOR STRIP HEATER	
77408	MAN	PAID	9015084487	11/27/18	99	100	45150	150	127.00		STRIP HEATER	
				12/12/18		* CHECK TOTAL			184.80			184.80
614 LIBERTY UTILITIES												
77409	MAN	PAID	4185067	12/03/18	99	140	45190	280	23.30		MONTHLY BILLING	
77409	MAN	PAID	4185195	12/03/18	99	140	45190	280	20.13		MONTHLY BILLING	
				12/12/18		* CHECK TOTAL			43.43			43.43
396 TERRYBERRY COMPANY												
77410	MAN	PAID	F51676	11/19/18	99	800	45090	410	819.84		LONGEVITYAWRD,JEFF,KDAVIS	
				12/12/18		* CHECK TOTAL			819.84			819.84
663 SWRCB ACCOUNTING OFFICE												
77411	MAN	PAID	WD-0140606	11/27/18	99	800	45095	435	119,459.00		ANNUAL WD PERMIT FEE	
77411	MAN	PAID	WD-0140865	11/27/18	99	800	45095	435	2,286.00		ANNUAL WD PERMIT FEE	
				12/12/18		* CHECK TOTAL			121,745.00			121,745.00
639 SOUTHWEST GAS CORP.												
77412	MAN	PAID	1098646-0021218	12/05/18	99	140	45190	310	74.74		MONTHLY BILLING	
77412	MAN	PAID	1098646-0021218	12/05/18	99	140	45190	310	672.63		MONTHLY BILLING	
77412	MAN	PAID	10986510021218	12/05/18	99	140	45190	310	460.27		MONTHLY BILLING	
77412	MAN	PAID	10986510021218	12/05/18	99	140	45190	310	4,142.46		MONTHLY BILLING	
				12/12/18		* CHECK TOTAL			5,350.10			5,350.10
1259 LHOIST NORTH AMERICA												
77413	MAN	PAID	1180234825	11/09/18	99	310	45100	205	16,776.39		HYDRATED LIME	

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
77413	MAN	PAID	1180235164	11/14/18	99	310	45100	205	8,548.07-		CM FOR HYDRATED LIME	
77413	MAN	PAID	1180236166	11/23/18	99	310	45100	205	8,633.11		HYDRATED LIME	
				12/12/18		*	CHECK TOTAL		16,861.43			16,861.43
622 PRAXAIR DISTRIBUTION, INC.												
77414	MAN	PAID	86211253	11/21/18	99	100	45140	360	61.65		MONTHLY BILLING	
				12/12/18		*	CHECK TOTAL		61.65			61.65
959 OFFICE DEPOT												
77415	MAN	PAID	234307424001	11/20/18	99	800	45090	335	1,031.93		OFFICE SUPPLIES	
				12/12/18		*	CHECK TOTAL		1,031.93			1,031.93
260 IDEXX LABORATORIES INC.												
77416	MAN	PAID	3039767169	11/26/18	99	160	45160	290	240.56		LAB SUPPLIES	
				12/12/18		*	CHECK TOTAL		240.56			240.56
602 SIERRA ELECTRONICS												
77417	MAN	PAID	AR13567	11/29/18	99	752	45110	185	92.01		RADIOS REPAIR BATTERY	
				12/12/18		*	CHECK TOTAL		92.01			92.01
611 WORK WORLD												
77418	MAN	PAID	63621	12/03/18	99	765	45100	405	205.68		BOOTS, PALLANTE	
				12/12/18		*	CHECK TOTAL		205.68			205.68
149 CWEA												
77419	MAN	PAID	0000031031I	11/07/18	99	870	45080	455	188.00		CWEA RENEW, WILCOX	
77419	MAN	PAID	0000338034I	11/07/18	99	870	45080	455	188.00		CWEA RENEW, DENHAM	
				12/12/18		*	CHECK TOTAL		376.00			376.00
678 ALLIANT INSURANCE SERVICES												
77420	MAN	PAID	968884	12/04/18	99	800	45070	435	100.00		PUBLIC BOND RENEW,BLAKE	
				12/12/18		*	CHECK TOTAL		100.00			100.00
1900 AMAZON CAPITAL SERVICES												
77421	MAN	PAID	1TQG-YP6H-M96H	11/26/18	99	765	45100	405	112.24		WATCH HAT	
				12/12/18		*	CHECK TOTAL		112.24			112.24
1894 THATCHER COMPANY OF CA, INC.												
77422	MAN	PAID	5044018	11/15/18	99	310	45100	215	4,000.00-		CHLORINE-EMPTIES	

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
77422	MAN	PAID	5044406	11/30/18	99	310	45100	215	6,105.30		CHLORINE	
77422	MAN	PAID	506281	11/30/18	99	310	45100	215	465.30-		CHLORINE CM FOR STATE TAX	
				12/12/18		*	CHECK TOTAL		1,640.00			1,640.00
959	OFFICE DEPOT											
77423	MAN	PAID	239674857001	11/30/18	99	800	45090	335	62.47		MONTHLY WALL CALENDAR	
				12/12/18		*	CHECK TOTAL		62.47			62.47
851	MSC INDUSTRIAL SUPPLY											
77424	MAN	PAID	C31169380	11/07/18	99	100	45150	100	270.52		PLASTIC ROUND TUBE	
				12/12/18		*	CHECK TOTAL		270.52			270.52
1277	USA BLUE BOOK											
77425	MAN	PAID	740393	11/16/18	99	310	45100	215	837.35		CHLORINE PIGTAIL	
				12/12/18		*	CHECK TOTAL		837.35			837.35
696	CORELOGIC INFORMATION SOLUTIONS, IN											
77426	MAN	PAID	30399606	11/30/18	99	800	45090	345	450.00		MONTHLY BILLING	
				12/12/18		*	CHECK TOTAL		450.00			450.00
225	GRAINGER INC., W.W.											
77427	MAN	PAID	9008793953	12/04/18	99	100	45150	100	157.56-		CM-SEALANT, AXIAL FAN	
77427	MAN	PAID	9008793961	12/04/18	99	100	45150	100	99.76		THREAD SEALANT	
77427	MAN	PAID	9012448065	11/21/18	99	100	45150	100	157.56		THREAD SEALANT, AXIAL FAN	
				12/12/18		*	CHECK TOTAL		99.76			99.76
681	STANDARD INSURANCE-LIFE											
77428	MAN	PAID	471492-120118	12/01/18	99	000	20760		187.20		LIFE INSURANCE PREMIUMS	
77428	MAN	PAID	471492-120118	12/01/18	99	860	45020	465	205.92		LIFE INSURANCE PREMIUMS	
77428	MAN	PAID	471492-120118	12/01/18	99	870	45020	465	1,774.52		LIFE INSURANCE PREMIUMS	
				12/07/18		*	CHECK TOTAL		2,167.64			2,167.64
786	STANDARD INSURANCE-DENTAL											
77429	MAN	PAID	514558-120118	12/01/18	99	860	45020	485	787.56		DENTAL INSURANCE PREMIUMS	
77429	MAN	PAID	514558-120118	12/01/18	99	870	45020	485	7,139.68		DENTAL INSURANCE PREMIUMS	
77429	MAN	PAID	514558-120118	12/01/18	99	940	45020	485	471.24		DENTAL INSURANCE PREMIUMS	
				12/07/18		*	CHECK TOTAL		8,398.48			8,398.48
1978	MICHAEL OLIVER											
77430	MAN	PAID	S/C REFUND	2/08/18	99	000	11021		12.44		E 16-300-46-100	

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
				12/07/18		* CHECK TOTAL			12.44			12.44
692 DALE COX												
77431	MAN		PAID DALE MED 121218	12/12/18	99	940	45020	475	134.00		MEDICARE REIMB, DALE	
77431	MAN		PAID 121218 MEETING	12/12/18	99	940	45030	385	100.00		DECEMBER BOARD MTG	
				12/12/18		* CHECK TOTAL			234.00			234.00
695 JON NORTHROP												
77432	MAN		PAID CAROL MED 1218	12/12/18	99	940	45020	475	131.00		MED REIMBURSEMENT,CAROLE	
77432	MAN		PAID CAROLE RX 1218	12/12/18	99	940	45020	475	94.50		RX REIMBURSEMENT, CAROLE	
77432	MAN		PAID JON MED 122018	12/12/18	99	940	45020	475	134.00		MED REIMBURSEMENT, JON	
77432	MAN		PAID JON RX 122018	12/12/18	99	940	45020	475	94.50		RX REIMBURSEMENT, JON	
77432	MAN		PAID 121218 MEETING	12/12/18	99	940	45030	385	100.00		DECEMBER BOARD MTG	
				12/12/18		* CHECK TOTAL			554.00			554.00
694 S. LANE LEWIS												
77433	MAN		PAID 121218 MEETING	12/12/18	99	940	45030	385	100.00		DECEMBER BOARD MTG	
				12/12/18		* CHECK TOTAL			100.00			100.00
1967 BLAKE TRESAN												
77434	MAN		PAID 121218 MEETING	12/12/18	99	940	45030	385	100.00		DECEMBER BOARD MTG	
				12/12/18		* CHECK TOTAL			100.00			100.00
1849 DANIEL WILKINS												
77435	MAN		PAID 121218 MEETING	12/12/18	99	940	45030	385	100.00		DECEMBER BOARD MTG	
				12/12/18		* CHECK TOTAL			100.00			100.00
209 USDA FOREST SERVICE												
77436	MAN		PAID BF051757Y0052	11/28/18	99	800	45080	455	10,511.23		SPECIAL USE PERMIT RENEW	
77436	MAN		PAID BF051757Y0084	11/28/18	99	800	45080	455	64.20		SPECIAL USE PERMIT RENEW	
				12/12/18		* CHECK TOTAL			10,575.43			10,575.43
95 CASA												
77437	MAN		PAID 3283	12/06/18	99	800	45080	455	16,711.00		CASA ANNUAL MEMBERSHIP	
				12/12/18		* CHECK TOTAL			16,711.00			16,711.00
1993 THE HON COMPANY												
77438	MAN		PAID 438411	10/24/18	99	800	45300	340	2,044.76		OFFICE FURNITURE	

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
77438	MAN	PAID	440113	10/24/18	99	800	45300	340	420.00		OFFICE FURNITURE	
77438	MAN	PAID	456994	11/07/18	99	800	45300	340	714.99		OFFICE FURNITURE	
77438	MAN	PAID	457338	11/07/18	99	800	45300	340	4,490.28		OFFICE FURNITURE	
77438	MAN	PAID	467274	11/15/18	99	800	45300	340	8,662.19		OFFICE FURNITURE	
77438	MAN	PAID	467398	11/15/18	99	800	45300	340	820.00		OFFICE FURNITURE	
				12/12/18			* CHECK TOTAL		17,152.22			17,152.22
2002 VICKY LUFRANO												
77439	MAN	PAID	OFFICEEXP122018	12/08/18	99	800	45130	335	139.64		OFFICE EXP REIMB, VICKY	
				12/12/18			* CHECK TOTAL		139.64			139.64
734 GREG O'HAIR												
77440	MAN	PAID	VI121018	12/10/18	99	870	45020	495	232.20		VI REIMB, SYDNEY	
				12/12/18			* CHECK TOTAL		232.20			232.20
2078 LASCU VALENTIN												
77441	MAN	PAID	N46-550-33-000	12/04/18	99	000	11021		25.40		SERVICE CHARGE REFUND	
				12/12/18			* CHECK TOTAL		25.40			25.40
99999 VOID ZERO AMOUNT CHECKS VENDOR												
77442	MAN	PAID	VOID CK00077442	12/11/18	99	000	10010				PRINTING ERROR	
				12/11/18			* CHECK TOTAL					
1897 AARON CARLSSON												
77443	MAN	PAID	TRAVELREIMB1218	12/04/18	99	920	45170	375	1,404.48		TRAVEL&MEAL REIMB,AARON	
				12/12/18			* CHECK TOTAL		1,404.48			1,404.48
157 DATCO SERVICES CORP.												
77444	MAN	PAID	61610142	12/01/18	99	800	45110	325	30.00		BACKGROUND CHECK	
				12/12/18			* CHECK TOTAL		30.00			30.00
1738 ILEANA VASSILIOU												
77445	MAN	PAID	822	12/04/18	99	920	45170	375	800.00		MONTHLY BILLING	
77445	MAN	PAID	822	12/04/18	99	920	45170	375	200.00		MONTHLY BILLING	
				12/12/18			* CHECK TOTAL		1,000.00			1,000.00
225 GRAINGER INC., W.W.												
77446	MAN	PAID	9015607469	11/27/18	99	765	45100	400	1,422.48		GASOLINE STORAGE	

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
				12/12/18		* CHECK TOTAL			1,422.48			1,422.48
671 TAHOE TRUCKEE DISPOSAL												
77447	MAN	PAID	0000097477	11/30/18	99	490	45110	325	4,265.57		NOV 18 SLUDGE	
77447	MAN	PAID	0000097478	11/30/18	99	490	45110	325	7,531.37		NOV 18 CENTRIFUGE	
				12/12/18		* CHECK TOTAL			11,796.94			11,796.94
1843 ANTHONY SALINAS												
77448	MAN	PAID	DD111318	11/13/18	99	870	45020	490	25.00		DD REIMB, ANTHONY SALINAS	
				12/12/18		* CHECK TOTAL			25.00			25.00
19 ALPHA ANALYTICAL												
77449	MAN	PAID	26642	11/08/18	99	160	45160	290	950.00		OCT 18 TOC'S	
77449	MAN	PAID	26863	11/16/18	99	160	45160	290	350.00		OCT 18 TOC'S	
				12/12/18		* CHECK TOTAL			1,300.00			1,300.00
396 TERRYBERRY COMPANY												
77450	MAN	PAID	F55603	11/29/18	99	800	45090	410	370.01		LONGEVITY AWARD, BENTLEY	
				12/12/18		* CHECK TOTAL			370.01			370.01
524 UNITED PARCEL SERVICE, UPS												
77451	MAN	PAID	0000886867488	12/01/18	99	800	45090	380	12.41		MONTHLY BILLING	
				12/12/18		* CHECK TOTAL			12.41			12.41
2033 BURDICK EXCAVATING COMPANY												
77452	MAN	PAID	PROG PAY #4	12/12/18	99	720	45110	325	9,718.03		PROGRESS PAY #4	
				12/12/18		* CHECK TOTAL			9,718.03			9,718.03
614 LIBERTY UTILITIES												
77453	MAN	PAID	4189655	12/05/18	99	140	45190	280	20.82		MONTHLY BILLING	
77453	MAN	PAID	4190145	12/05/18	99	140	45190	280	22.31		MONTHLY BILLING	
				12/12/18		* CHECK TOTAL			43.13			43.13
2007 ROY SMITH COMPANY												
77454	MAN	PAID	2100070342.	11/27/18	99	310	45100	245	1.80		LIQUID OXYGEN	
				12/13/18		* CHECK TOTAL			1.80			1.80
2028 SUSAN LINDSTROM, PH.D.												
77455	MAN	PAID	INVOICE # 3	10/18/18	99	800	45120	740	3,861.83		TRI-ARCHAELOGIST 81-83	

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
77455	MAN	PAID	INVOICE # 4	12/10/18	99	800	45120	740	2,925.75		TRI-ARCHAEOLOGIST 81-83	
77455	MAN	PAID	INVOICE #3	10/18/18	99	800	45120	740	4,354.83		TRI-ARCHAELOGIST 81-83	
77455	MAN	PAID	INVOICE #4	12/10/18	99	800	45120	740	3,299.25		TRI-ARCHAELOGIST 81-83	
				12/14/18			* CHECK TOTAL		14,441.66			14,441.66
692	DALE COX											
77456	MAN	PAID	JAN 19 PART D	12/19/18	99	940	45020	475	58.70		JAN 19 PART D	
77456	MAN	PAID	JAN 19 UNITED	12/19/18	99	940	45020	475	179.30		JAN 19 HEALTH	
77456	MAN	PAID	QRTLY A&B DEC18	12/05/18	99	940	45020	475	405.00		DEC 18 MEDICARE REIMB	
77456	MAN	PAID	1218 HEALTH	12/05/18	99	940	45020	475	20.40		DEC 18 MEDICARE REIMB	
77456	MAN	PAID	1218 MEDICARE	12/05/18	99	940	45020	475	152.85		DEC 18 MEDICARE REIMB	
				12/19/18			* CHECK TOTAL		816.25			816.25
603	WILEY, PRICE & RADULOVICH											
77457	MAN	PAID	29255	11/30/18	99	800	45120	315	13,074.50		MONTHLY BILLING	
				12/20/18			* CHECK TOTAL		13,074.50			13,074.50
746	PETTY CASH											
77458	MAN	PAID	PTY 123118	12/28/18	99	920	45170	375	277.65		PETTY CASH REIMBURSEMENT	
77458	MAN	PAID	PTY 123118	12/28/18	99	150	45060	275	15.00		PETTY CASH REIMBURSEMENT	
				12/28/18			* CHECK TOTAL		292.65			292.65
							** FINAL TOTALS		1,007,071.26			1,007,071.26

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
1007 PERS-HEALTH PREMIUM												
1112520	MAN	PAID	120118 HEALTH	11/14/18	99	860	45020	475	8,503.48		HEALTH PREMIUMS FOR DEC	
1112520	MAN	PAID	120118 HEALTH	11/14/18	99	870	45020	475	69,865.93		HEALTH PREMIUMS FOR DEC	
1112520	MAN	PAID	120118 HEALTH	11/14/18	99	870	45020	505	45,420.30		HEALTH PREMIUMS FOR DEC	
1112520	MAN	PAID	120118 HEALTH	11/14/18	99	860	45020	505	2,292.40		HEALTH PREMIUMS FOR DEC	
1112520	MAN	PAID	120118 HEALTH	11/14/18	99	940	45020	505	766.36		HEALTH PREMIUMS FOR DEC	
				12/03/18		*	CHECK TOTAL		126,848.47			126,848.47
1006 PERS-RETIREMENT												
1112521	MAN	PAID	PR 113018	12/03/18	99	860	45020	440	2,669.98		FOR PAYROLL ENDING 113018	
1112521	MAN	PAID	PR 113018	12/03/18	99	870	45020	440	29,301.08		FOR PAYROLL ENDING 113018	
1112521	MAN	PAID	PR 113018	12/03/18	99	000	20780		3.00		FOR PAYROLL ENDING 113018	
1112521	MAN	PAID	PR 113018	12/03/18	99	000	20780		30.00		FOR PAYROLL ENDING 113018	
1112521	MAN	PAID	PR 113018 PEPRA	12/03/18	99	000	20786		657.48		FOR PAYROLL ENDING 113018	
1112521	MAN	PAID	PR 113018 PEPRA	12/03/18	99	000	20786		3,594.79		FOR PAYROLL ENDING 113018	
1112521	MAN	PAID	PR 113018 PEPRA	12/03/18	99	860	45020	440	746.79		FOR PAYROLL ENDING 113018	
1112521	MAN	PAID	PR 113018 PEPRA	12/03/18	99	870	45020	440	4,083.15		FOR PAYROLL ENDING 113018	
1112521	MAN	PAID	PR 113018 PEPRA	12/03/18	99	000	20780		2.00		FOR PAYROLL ENDING 113018	
1112521	MAN	PAID	PR 113018 PEPRA	12/03/18	99	000	20780		16.00		FOR PAYROLL ENDING 113018	
				12/03/18		*	CHECK TOTAL		41,104.27			41,104.27
513 U.S. BANK BANK CARD DIVISION												
1112522	MAN	PAID	5236 120618	12/06/18	99	920	45170	375	3.05		CREDIT CARD PAYMENT	
				12/10/18		*	CHECK TOTAL		3.05			3.05
1532 NAVIA BENEFIT SOLUTIONS												
1112523	MAN	PAID	10172634	12/14/18	99	860	45020	477	17.60		PARTICIPANT FEES	
1112523	MAN	PAID	10172634	12/14/18	99	870	45020	477	259.60		PARTICIPANT FEES	
1112523	MAN	PAID	13850590	12/10/18	99	860	45020	477	984.49		HRA DISBURSEMENTS	
				12/17/18		*	CHECK TOTAL		1,261.69			1,261.69
679 NATIONWIDE RETIREMENT SOLUTIONS												
1112524	MAN	PAID	PR121718	12/17/18	99	000	20735		922.73		DEFERRED COMP DEPOSITS	
1112524	MAN	PAID	PR121718	12/17/18	99	000	20735		2,775.00		DEFERRED COMP DEPOSITS	
				12/17/18		*	CHECK TOTAL		3,697.73			3,697.73
1005 PERS 457 PLAN												
1112525	MAN	PAID	PR121718	12/17/18	99	000	20730		200.00		DEFERRED COMP DEPOSITS	
1112525	MAN	PAID	PR121718	12/17/18	99	000	20730		7,582.18		DEFERRED COMP DEPOSITS	
				12/17/18		*	CHECK TOTAL		7,782.18			7,782.18
1004 FEDERAL TAXES/EFTPS												
1112526	MAN	PAID	PR121718	12/17/18	99	000	20720		4,205.00		FEDERAL TAX DEPOSIT	

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
1112526	MAN	PAID	PR121718	12/17/18	99	000	20720		23,687.62		FEDERAL TAX DEPOSIT	
1112526	MAN	PAID	PR121718	12/17/18	99	000	20770		453.20		FEDERAL TAX DEPOSIT	
1112526	MAN	PAID	PR121718	12/17/18	99	000	20770		453.20		FEDERAL TAX DEPOSIT	
1112526	MAN	PAID	PR121718	12/17/18	99	000	20770		2,890.54		FEDERAL TAX DEPOSIT	
1112526	MAN	PAID	PR121718	12/17/18	99	000	20770		2,890.54		FEDERAL TAX DEPOSIT	
				12/17/18		*	CHECK TOTAL		34,580.10			34,580.10
809 EMPLOYMENT DEVELOPMENT DEPARTMENT												
1112527	MAN	PAID	PR121718	12/17/18	99	000	20725		1,768.17		STATE TAX DEPOSIT	
1112527	MAN	PAID	PR121718	12/17/18	99	000	20725		9,783.87		STATE TAX DEPOSIT	
1112527	MAN	PAID	PR121718	12/17/18	99	000	20727		126.78		STATE TAX DEPOSIT	
1112527	MAN	PAID	PR121718	12/17/18	99	000	20727		1,707.57		STATE TAX DEPOSIT	
				12/17/18		*	CHECK TOTAL		13,386.39			13,386.39
1038 FIRST US COMMUNITY CREDIT UNION												
1112528	MAN	PAID	PR121718	12/17/18	99	000	20740		3,000.00		PAYROLL DEPOSITS	
				12/17/18		*	CHECK TOTAL		3,000.00			3,000.00
1006 PERS-RETIREMENT												
1112529	MAN	PAID	PR 121718	12/18/18	99	860	45020	440	2,669.98		FOR PAYROLL ENDIND 121518	
1112529	MAN	PAID	PR 121718	12/18/18	99	870	45020	440	28,346.40		FOR PAYROLL ENDIND 121518	
1112529	MAN	PAID	PR 121718	12/18/18	99	000	20780		3.00		FOR PAYROLL ENDIND 121518	
1112529	MAN	PAID	PR 121718	12/18/18	99	000	20780		30.00		FOR PAYROLL ENDIND 121518	
1112529	MAN	PAID	PR 121718 PEPRA	12/18/18	99	000	20786		682.50		FOR PAYROLL ENDING 121518	
1112529	MAN	PAID	PR 121718 PEPRA	12/18/18	99	000	20786		3,428.75		FOR PAYROLL ENDING 121518	
1112529	MAN	PAID	PR 121718 PEPRA	12/18/18	99	860	45020	440	775.22		FOR PAYROLL ENDING 121518	
1112529	MAN	PAID	PR 121718 PEPRA	12/18/18	99	870	45020	440	3,894.53		FOR PAYROLL ENDING 121518	
1112529	MAN	PAID	PR 121718 PEPRA	12/18/18	99	000	20780		2.00		FOR PAYROLL ENDING 121518	
1112529	MAN	PAID	PR 121718 PEPRA	12/18/18	99	000	20780		17.00		FOR PAYROLL ENDING 121518	
				12/18/18		*	CHECK TOTAL		39,849.38			39,849.38
1532 NAVIA BENEFIT SOLUTIONS												
1112530	MAN	PAID	13944184	12/26/18	99	870	45020	477	41.61		HRA DISBURSEMENTS	
				12/27/18		*	CHECK TOTAL		41.61			41.61
809 EMPLOYMENT DEVELOPMENT DEPARTMENT												
1112531	MAN	PAID	PR123118	12/31/18	99	000	20725		1,768.54		STATE TAX DEPOSIT	
1112531	MAN	PAID	PR123118	12/31/18	99	000	20725		9,624.65		STATE TAX DEPOSIT	
1112531	MAN	PAID	PR123118	12/31/18	99	000	20727		128.01		STATE TAX DEPOSIT	
1112531	MAN	PAID	PR123118	12/31/18	99	000	20727		1,616.54		STATE TAX DEPOSIT	
				12/31/18		*	CHECK TOTAL		13,137.74			13,137.74
1004 FEDERAL TAXES/EFTPS												
1112532	MAN	PAID	PR123118	12/31/18	99	000	20720		4,205.65		FEDERAL TAX DEPOSIT	

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
1112532	MAN	PAID	PR123118	12/31/18	99	000	20720		24,316.50		FEDERAL TAX DEPOSIT	
1112532	MAN	PAID	PR123118	12/31/18	99	000	20770		468.92		FEDERAL TAX DEPOSIT	
1112532	MAN	PAID	PR123118	12/31/18	99	000	20770		468.92		FEDERAL TAX DEPOSIT	
1112532	MAN	PAID	PR123118	12/31/18	99	000	20770		2,861.39		FEDERAL TAX DEPOSIT	
1112532	MAN	PAID	PR123118	12/31/18	99	000	20770		2,861.38		FEDERAL TAX DEPOSIT	
				12/31/18		*	CHECK TOTAL		35,182.76			35,182.76
1038	FIRST US COMMUNITY CREDIT UNION											
1112533	MAN	PAID	PR123118	12/31/18	99	000	20740		3,000.00		PAYROLL DEPOSITS	
				12/31/18		*	CHECK TOTAL		3,000.00			3,000.00
679	NATIONWIDE RETIREMENT SOLUTIONS											
1112534	MAN	PAID	PR123118	12/31/18	99	000	20735		922.67		DEFERRED COMP DEPOSITS	
1112534	MAN	PAID	PR123118	12/31/18	99	000	20735		2,775.00		DEFERRED COMP DEPOSITS	
				12/31/18		*	CHECK TOTAL		3,697.67			3,697.67
1005	PERS 457 PLAN											
1112535	MAN	PAID	PR123118	12/31/18	99	000	20730		200.00		DEFERRED COMP DEPOSITS	
1112535	MAN	PAID	PR123118	12/31/18	99	000	20730		7,582.13		DEFERRED COMP DEPOSITS	
				12/31/18		*	CHECK TOTAL		7,782.13			7,782.13
513	U.S. BANK BANK CARD DIVISION											
1112536	MAN	PAID	0945 102518 R	10/25/18	99	920	45170	375	857.02-		REVERSAL OVERPAYMENT	
1112536	MAN	PAID	0945 102518 R	10/25/18	99	150	45060	275	45.02-		REVERSAL OVERPAYMENT	
1112536	MAN	PAID	0945 102518 R	10/25/18	99	920	45170	375	438.98-		REVERSAL OVERPAYMENT	
1112536	MAN	PAID	0945 112618	11/26/18	99	920	45170	375	80.24		CREDIT CARD PAYMENT	
1112536	MAN	PAID	0945 112618	11/26/18	99	150	45095	435	15.00		CREDIT CARD PAYMENT	
1112536	MAN	PAID	0945 112618	11/26/18	99	920	45170	375	184.81		CREDIT CARD PAYMENT	
1112536	MAN	PAID	0945 112618	11/26/18	99	920	45170	375	47.80		CREDIT CARD PAYMENT	
1112536	MAN	PAID	0945 112618	11/26/18	99	150	45060	275	125.00		CREDIT CARD PAYMENT	
1112536	MAN	PAID	0952 102518 R	10/25/18	99	920	45170	375	947.00-		REVERSAL OVERPAYMENT	
1112536	MAN	PAID	0952 112618	11/26/18	99	920	45170	375	1,647.40		CREDIT CARD PAYMENT	
1112536	MAN	PAID	0952 112618	11/26/18	99	800	45090	370	6.91		CREDIT CARD PAYMENT	
1112536	MAN	PAID	1065 102518 R	10/25/18	99	100	45155	165	70.22-		REVERSAL OVERPAYMENT	
1112536	MAN	PAID	1065 112618	11/26/18	99	160	45100	160	449.00		CREDIT CARD PAYMENT	
1112536	MAN	PAID	1065 112618	11/26/18	99	100	45150	135	297.56		CREDIT CARD PAYMENT	
1112536	MAN	PAID	1065 112618	11/26/18	99	960	45150	100	65.73		CREDIT CARD PAYMENT	
1112536	MAN	PAID	1065 112618	11/26/18	99	150	45150	145	85.73		CREDIT CARD PAYMENT	
1112536	MAN	PAID	1065 112618	11/26/18	99	130	45150	130	5,473.52		CREDIT CARD PAYMENT	
1112536	MAN	PAID	1065 112618	11/26/18	99	100	45150	100	675.84		CREDIT CARD PAYMENT	
1112536	MAN	PAID	1065 112618	11/26/18	99	150	45150	135	42.28		CREDIT CARD PAYMENT	
1112536	MAN	PAID	1065 112618	11/26/18	99	100	45140	360	181.16		CREDIT CARD PAYMENT	
1112536	MAN	PAID	1065 112618	11/26/18	99	100	45140	360	6.50-		CREDIT CARD PAYMENT	
1112536	MAN	PAID	1065 112618	11/26/18	99	920	45170	375	160.97		CREDIT CARD PAYMENT	

CHECK	TYPE	CK STAT	INVOICE	INV/CHK DATE	CO	DEPT	ACCT	SUB	DISTRIBUTION AMOUNT	DISCOUNT TAKEN	DESCRIPTION	CHECK TOTAL
1112536	MAN	PAID	1065 112618	11/26/18	99	100	45150	120	106.84		CREDIT CARD PAYMENT	
1112536	MAN	PAID	1065 112618	11/26/18	99	100	45150	130	599.53		CREDIT CARD PAYMENT	
1112536	MAN	PAID	1065 112618	11/26/18	99	800	45090	335	61.83		CREDIT CARD PAYMENT	
1112536	MAN	PAID	1065 112618	11/26/18	99	800	45090	355	161.73		CREDIT CARD PAYMENT	
1112536	MAN	PAID	1065 112618 F6	11/26/18	99	930	45150	330	107.93		CREDIT CARD PAYMENT	
1112536	MAN	PAID	6741 102518 F6R	10/25/18	99	120	45095	435	1,348.95-		REVERSAL OVERPAYMENT	
1112536	MAN	PAID	6741 102518 R	10/25/18	99	150	45060	275	11.00-		REVERSAL OVERPAYMENT	
1112536	MAN	PAID	6741 102518 R	10/25/18	99	920	45170	375	68.01-		REVERSAL OVERPAYMENT	
1112536	MAN	PAID	8079 102518 RF6	10/25/18	99	740	45150	175	523.64-		REVERSAL OVERPAYMENT	
1112536	MAN	PAID	8079 112618	11/26/18	99	930	45110	325	1,246.83		CREDIT CARD PAYMENT	
1112536	MAN	PAID	8079 112618	11/26/18	99	900	45090	335	248.96		CREDIT CARD PAYMENT	
1112536	MAN	PAID	8079 112618	11/26/18	99	100	45155	165	134.18		CREDIT CARD PAYMENT	
1112536	MAN	PAID	8709 102518 R	10/25/18	99	100	45150	100	240.28-		REVERSAL OVERPAYMENT	
1112536	MAN	PAID	8997 102518 R	10/25/18	99	920	45170	375	1,333.00-		REVERSAL OVERPAYMENT	
1112536	MAN	PAID	8997 102518 R	10/25/18	99	100	45155	170	1,724.35-		REVERSAL OVERPAYMENT	
1112536	MAN	PAID	8997 112618	11/26/18	99	150	45060	275	295.44		CREDIT CARD PAYMENT	
				12/31/18		* CHECK TOTAL			4,888.25			4,888.25
						** FINAL TOTALS			339,243.42			339,243.42

TAHOE-TRUCKEE SANITATION AGENCY - PAYROLL CHECK REGISTER

CHECK#	CHECK DATE	EMP #	EMPLOYEE NAME	CHECK AMOUNT	DIRECT DEPOSIT
55568	12/7/2018	3359			X
55569	12/17/2018	9906			
55570	12/17/2018	1929			
55571	12/17/2018	1980			X
55572	12/17/2018	4225			X
55573	12/17/2018	9745			X
55574	12/17/2018	3741			X
55575	12/17/2018	6626			X
55576	12/17/2018	7570			X
55577	12/17/2018	671			X
55578	12/17/2018	8897			X
55579	12/17/2018	8710			X
55580	12/17/2018	2133			X
55581	12/17/2018	8400			X
55582	12/17/2018	5982			X
55583	12/17/2018	1352			X
55584	12/17/2018	3464			X
55585	12/17/2018	934			X
55586	12/17/2018	992			X
55587	12/17/2018	3059			X
55588	12/17/2018	612			X
55589	12/17/2018	411			X
55590	12/17/2018	1248			X
55591	12/17/2018	6171			X
55592	12/17/2018	9815			X
55593	12/17/2018	1730			X
55594	12/17/2018	9478			X
55595	12/17/2018	4817			X
55596	12/17/2018	9268			X
55597	12/17/2018	6930			X
55598	12/17/2018	1567			X
55599	12/17/2018	5526			X
55600	12/17/2018	9357			X
55601	12/17/2018	63			X
55602	12/17/2018	65			X
55603	12/17/2018	3328			X
55604	12/17/2018	890			X
55605	12/17/2018	572			X
55606	12/17/2018	2375			X
55607	12/17/2018	3433			X
55608	12/17/2018	743			X
55609	12/17/2018	6715			X
55610	12/17/2018	3359			X

TAHOE-TRUCKEE SANITATION AGENCY - PAYROLL CHECK REGISTER

CHECK#	CHECK DATE	EMP #	EMPLOYEE NAME	CHECK AMOUNT	DIRECT DEPOSIT
55611	12/17/2018	8131			X
55612	12/17/2018	6833			X
55613	12/17/2018	773			X
55614	12/17/2018	1196			X
55615	12/17/2018	7232			X
55616	12/17/2018	1766			X
55617	12/17/2018	9056			X
55618	12/17/2018	5476			X
55619	12/17/2018	4177			X
55620	12/31/2018	9906			
55621	12/31/2018	1929			
55622	12/31/2018	1980			X
55623	12/31/2018	4225			X
55624	12/31/2018	9745			X
55625	12/31/2018	3741			X
55626	12/31/2018	6626			X
55627	12/31/2018	7570			X
55628	12/31/2018	671			X
55629	12/31/2018	8897			X
55630	12/31/2018	8710			X
55631	12/31/2018	2133			X
55632	12/31/2018	8400			X
55633	12/31/2018	5982			X
55634	12/31/2018	1352			X
55635	12/31/2018	3464			X
55636	12/31/2018	934			X
55637	12/31/2018	992			X
55638	12/31/2018	3059			X
55639	12/31/2018	612			X
55640	12/31/2018	411			X
55641	12/31/2018	1248			X
55642	12/31/2018	6171			X
55643	12/31/2018	9815			X
55644	12/31/2018	1730			X
55645	12/31/2018	9478			X
55646	12/31/2018	4817			X
55647	12/31/2018	9268			X
55648	12/31/2018	6930			X
55649	12/31/2018	1567			X
55650	12/31/2018	5526			X
55651	12/31/2018	9357			X
55652	12/31/2018	63			X
55653	12/31/2018	65			X

TAHOE-TRUCKEE SANITATION AGENCY - PAYROLL CHECK REGISTER

CHECK#	CHECK DATE	EMP #	EMPLOYEE NAME	CHECK AMOUNT	DIRECT DEPOSIT
55654	12/31/2018	3328			X
55655	12/31/2018	890			X
55656	12/31/2018	572			X
55657	12/31/2018	2375			X
55658	12/31/2018	3433			X
55659	12/31/2018	743			X
55660	12/31/2018	6715			X
55661	12/31/2018	3359			X
55662	12/31/2018	8131			X
55663	12/31/2018	6833			X
55664	12/31/2018	773			X
55665	12/31/2018	1196			X
55666	12/31/2018	7232			X
55667	12/31/2018	1766			X
55668	12/31/2018	9056			X
55669	12/31/2018	5476			X
55670	12/31/2018	4177			X
				$326,817.81	

TAHOE-TRUCKEE SANITATION AGENCY

MEMORANDUM

Date: January 16, 2019

To: Board of Directors

From: Roshelle Chavez, Administrative Services Manager

Item: V-3

Subject: Approval of financial statements and status of investments

Background
Financial statements and status of investments for the previous calendar month(s).

Fiscal Impact
Decrease in Agency general fund per the warrant amounts.

Attachments
Report of financial statements and status of investments.

Recommendation
Management recommends approval of the financial statements and status of investments.

Review Tracking

Submitted By: _____
Roshelle Chavez
Administrative Services Manager

Approved By: _____
LaRue Griffin
General Manager

	BUDGETED EXPENDITURES	BUDGET CURRENT YEAR	CURRENT MONTH	YEAR TO DATE	BALANCE	BUDGET %
	ADMINISTRATIVE FUND					
45010	SALARIES AND WAGES	825,000.00	53,949.34	299,583.63	525,416.37	36.31
45020	EMPLOYEE BENEFITS	465,000.00	23,707.77	218,716.93	246,283.07	47.04
45030	DIRECTOR FEES	7,000.00	500.00	2,800.00	4,200.00	40.00
45060	TRANSPORTATION GAS AND OIL	6,000.00	94.98	898.62	5,101.38	14.98
45070	INSURANCE	90,000.00	9,488.44	89,685.94	314.06	99.65
45080	MEMBERSHIPS	30,000.00	27,286.43	36,859.43	(6,859.43)	122.86
45090	OFFICE EXPENSE	62,500.00	7,882.38	22,903.66	39,596.34	36.65
45095	FEES, LICENSES & PERMITS	150,000.00	121,474.66	133,392.91	16,607.09	88.93
45110	CONTRACTUAL SERVICES	168,000.00	3,533.30	44,619.69	123,380.31	26.56
45120	PROFESSIONAL SERVICES	265,000.00	(7,470.85)	105,843.09	159,156.91	39.94
45130	PRINTING AND PUBLICATIONS	0.00	139.64	4,110.28	(4,110.28)	0.00
45140	RENTS AND LEASES	0.00	467.19	2,908.79	(2,908.79)	0.00
45170	TRAINING	15,000.00	(505.74)	14,170.64	829.36	94.47
45180	UNCOLLECTIBLE ACCOUNTS	5,000.00	306.00	2,893.02	2,106.98	57.86
45190	UTILITIES	103,000.00	1,043.64	3,788.10	99,211.90	3.68
	TOTAL ADMINISTRATIVE FUND	2,191,500.00	241,897.18	983,174.73	1,208,325.27	44.86
	OPERATIONS AND MAINTENANCE FUND					
45010	SALARIES AND WAGES	4,295,000.00	396,160.37	2,328,150.02	1,966,849.98	54.21
45020	EMPLOYEE BENEFITS	2,815,000.00	201,820.20	2,036,104.05	778,895.95	72.33
45060	TRANSPORTATION GAS AND OIL	42,000.00	2,488.76	42,624.71	(624.71)	101.49
45080	MEMBERSHIPS	15,000.00	1,394.00	7,949.00	7,051.00	52.99
45090	OFFICE EXPENSE	96,000.00	0.00	0.00	96,000.00	0.00
45100	SUPPLIES	550,000.00	95,724.05	537,374.10	12,625.90	97.70
45110	CONTRACTUAL SERVICES	1,655,000.00	18,512.79	212,798.40	1,442,201.60	12.86
45120	PROFESSIONAL SERVICES	100,000.00	0.00	0.00	100,000.00	0.00
45140	RENTS AND LEASES	0.00	1,230.32	7,060.33	(7,060.33)	0.00
45150	REPAIRS AND MAINTENANCE	0.00	44,844.40	192,880.25	(192,880.25)	0.00
45155	INSTRUMENTATION & ELECTRICAL	0.00	8,785.54	51,321.41	(51,321.41)	0.00
45160	RESEARCH & MONITORING	0.00	9,011.28	54,294.57	(54,294.57)	0.00
45170	TRAINING	25,000.00	3,203.89	21,207.40	3,792.60	84.83
45190	UTILITIES	927,000.00	90,210.28	411,216.10	515,783.90	44.36
45210	OTHER EXPENSES	0.00	0.00	1,141.32	(1,141.32)	0.00
45300	EQUIPMENT	0.00	0.00	(539.08)	539.08	0.00
	TOTAL OPERATIONS & MAINTENANCE	10,520,000.00	873,385.88	5,903,582.58	4,616,417.42	56.12
	TOTAL	12,711,500.00	1,115,283.06	6,886,757.31	5,824,742.69	54.18
	SRF DEBT SERVICE					
45105	INTEREST ON SRF LOAN EXPENSE	0.00	0.00	245,058.64	(245,058.64)	0.00

TAHOE-TRUCKEE SANITATION AGENCY
FINANCIAL STATEMENT
PERIOD ENDING 12/31/18

CASH ON HAND	BALANCE
CASH ACCOUNT (US BANK)	3,809.74
CASH - PETTY CASH	1,600.00
CASH - TAX REVENUE (US BANK)	3,157.34
CHK ACCT (WELLS FARGO/PAYROLL)	2,995.80
SERVICE CHARGE MUNI INV(US BANK)	4,631.71
WASTEWATER SAVINGS-WELLS FARGO	724,059.50
CASH - WWCRF (US BANK)	57,238.63
STATE LOCAL AGENCY INVESTMT FUND	46,604,689.38
TOTAL CASH ON HAND	47,402,182.10

CURRENT MONTH	INCOME	EXPENSES	ACCOUNTS PAYABLE
ADMINISTRATIVE	0.01	241,897.18	16,700.84
OPERATION & MAINTENANCE	4,354.97	873,385.88	224,235.37
W.W.C.R.F.	38,759.39	17,372.11	0.00
UPGRADE REHAB	0.00	698,759.70	92,252.72
TOTAL	43,114.37	1,831,414.87	333,188.93

	BEGINNING BALANCE	YEAR TO DATE RECEIVED	YEAR TO DATE EXPENDED	CURRENT BALANCE
ADMINISTRATIVE	50,000.00	374,929.26	4,127,089.78	15,336.68
OPERATIONS & MAINTENANCE	250,000.00	6,245,334.79	6,011,253.97	484,080.82
WASTEWATER CAPITAL RESERVE	19,565,544.32	2,039,786.90	1,771,445.22	17,456,718.05
SRF WASTEWATER CAP RESERVE	2,951,689.60	29,755.96	0.00	2,981,445.56
UPGRADE/REHAB	29,397,504.26	273,393.85	1,865,967.87	26,464,600.99
TOTAL	52,214,738.18	8,963,200.76	13,775,756.84	47,402,182.10

INTEREST INCOME	YEAR TO DATE
00 ADMINISTRATIVE	534.42
01 OPERATION & MAINTENANCE	14,168.51
02 W.W.C.R.F.	112,046.65
04 SRF WCRF	15,692.91
06 UPGRADE/REHAB	151,429.35
TOTAL INTEREST INCOME	293,871.84

FUND INVESTMENTS:	T.C.D.	T-BILLS	L.A.I.F
ADMINISTRATIVE	0.00	0.00	10,476.81
OPERATION & MAINTENANCE	0.00	0.00	472,746.10
W.W.C.R.F.	0.00	0.00	16,675,419.92
SRF WCRF	0.00	0.00	2,981,445.56
UPGRADE REHAB	0.00	0.00	26,464,600.99
TOTAL FUND INVESTMENTS	0.00	0.00	46,604,689.38

	ADMIN	OPERATIONS & MAINTENANCE	WASTEWATER CAP RESERVE	SRF WASTEWTR CAP RESERVE	UPGRADE REHAB	TOTAL
CASH BEG BAL	50,000.00	250,000.00	19,565,544.32	2,951,689.60	29,397,504.26	52,214,738.18
TRANSFERS	3,717,497.20	0.00	2,377,167.95-	0.00	1,340,329.25-	0.00
BEG A/R	214,589.43	491,025.61	120,471.14	14,063.05	121,964.50	962,113.73
INCOME	172,393.83	6,337,922.96	1,951,901.82	15,692.91	151,429.35	8,629,340.87
END A/R	12,054.00-	583,613.78-	32,586.06-	0.00	111,136.97	574,323.89
BEG A/P	28,892,163.18	1,273,012.36	2,982.60	0.00	142,175.94	30,476,179.07
EXPENSES	1,228,233.37	5,903,582.58	1,768,462.62	0.00	1,816,044.65	10,716,323.22
END A/P	25,993,306.77-	1,165,340.97-	0.00	0.00	92,252.72-	27,416,745.45-
CASH END BAL	15,336.68	484,080.82	17,456,718.05	2,981,445.56	26,464,600.99	47,402,182.10

TAHOE-TRUCKEE SANITATION AGENCY
FINANCIAL STATEMENT
Summary
December 31, 2018

SUMMARY OF PAID & PAYABLE

Administrative and General Paid:	$1,346,314.68
Administrative and General Payable:	$333,188.93
Total Administrative and General Paid and Payable:	$1,679,503.61

Total Administrative and General Payroll Paid:	$326,817.81

ACCOUNT NUMBERS INDICATED ON
STATEMENT OF NET ASSETS
TAHOE-TRUCKEE SANITATION AGENCY
PERIOD ENDING 12/31/18

		YEAR TO DATE
	ASSETS	
	CURRENT ASSETS	
	CASH & CASH EQUIVALENTS	
01 10010	CASH U.S.BANK CHECKING	3,809.74
00 10020	CASH WELLS FARGO/PAYROLL	758.56
01 10020	CASH WELLS FARGO/PAYROLL	2,237.24
00 10030	CASH - PETTY CASH	1,600.00
00 10045	CASH - TAX REVENUE U.S. BANK	2,501.31
01 10045	CASH - TAX REVENUE U.S. BANK	656.03
01 10050	CASH - SERV CHARGE MUNI CHECKG	4,631.71
00 10070	CASH - L.A.I.F.	10,476.81
01 10070	CASH - L.A.I.F.	472,746.10
06 10070	CASH - L.A.I.F.	26,464,600.99
	CASH & CASH EQUIVALENTS	26,964,018.49
	ACCRUED INTEREST RECEIVABLE	
	ACCOUNTS RECEIVABLE	
00 11280	A/R BROWN ACT REFORM REIMBSMT	12,054.00
01 11020	A/R SERVICE CHARGES	122,044.01
01 11021	SERVICE CHARGE REFUNDS	4,834.34
01 11029	SERVICE CHARGE PAYMENT PLANS	2.89-
01 11065	A/R LAB FEES	575.00
01 11070	A/R-TEMP DISCHARGE	400.00
01 11080	A/R-OTHER	9,323.06
	ACCOUNTS RECEIVABLE	149,227.52
	INVENTORY	
01 12550	CHEMICAL INVENTORY	78,433.73
01 12560	CHEMICAL INVENTORY	32,703.24
	INVENTORY	111,136.97
01 13060	DUE FROM GOVERNMENT AGENCIES	335,303.29
	DUE FROM GOVT AGENCIES	335,303.29
	TOTAL CURRENT ASSETS	27,559,686.27

		YEAR TO DATE
	RESTRICTED ASSETS	
02 10065	WASTEWATER SAVINGS-WELLS FARGO	724,059.50
02 10066	CASH - WWCRF U.S. BANK	57,238.63
02 10070	CASH - L.A.I.F.	16,675,419.92
04 10070	CASH - L.A.I.F.	2,981,445.56
	CASH & EQUIVALENTS	20,438,163.61
02 11030	A/R CONNECTION FEES PMT PLANS	32,586.06
	A/R CONNECTION FEES	32,586.06
	TOTAL RESTRICTED ASSETS	20,470,749.67
	PROPERTY PLANT & EQUIPMENT	
00 16010	LAND	2,174,726.00
00 16020	PLANT FENCING	244,732.11
00 16040	SEWAGE COLLECTION FACILITIES	14,418,693.59
00 16050	SEWAGE TRMT AND DISP FACILITY	125,447,006.59
00 16060	GEN PLANT & ADMIN FACILITIES	4,190,330.38
00 16090	VEHICLES	1,209,946.21
00 16550	ACCUM DEPRECIATION FACILITIES	58,834,055.80-
00 16580	ACCUM DEPREC- GENERAL PLANT	4,859,020.81-
	NET CAPITAL ASSETS	83,992,358.27
00 16810	DEFERRED PENSION OUTFLOWS	4,325,072.00
00 16811	DEFERRED OPEB OUTFLOWS	582,760.00
	TOTAL ASSETS	136,930,626.21

		YEAR TO DATE
	LIABILITIES	
	CURRENT LIABILITIES	
00 20350	ACCOUNTS PAYABLE	16,700.84-
01 20350	ACCOUNTS PAYABLE	224,235.37-
06 20350	ACCOUNTS PAYABLE	92,252.72-
	ACCOUNTS PAYABLE	333,188.93-
00 20810	ACCRUED LIA FOR COMP ABSENCE	68,413.06-
01 20810	ACCRUED LIA FOR COMP ABSENCE	845,921.47-
	COMPENSATED ABSENCES	914,334.53-
00 20820	ACCRUED LIA FOR HRA	2,304.53-
01 20820	ACCRUED LIA FOR HRA	73,481.40-
	HEALTH REIMB ACCOUNT	75,785.93-
01 22010	CUSTOMER DEPOSITS TEMP DISCHARGE	100.00-
01 22020	CUSTOMER DEPOSITS AVERY HOTEL	17,764.23-
	CUSTOMER DEPOSITS	17,864.23-
	ACCRUED EXPENSES	
01 20760	LIFE INSURANCE	187.20-
00 20780	SURVIVOR BENEFITS/O & M	5.00-
01 20780	SURVIVOR BENEFITS/O & M	45.00-
00 20786	PERS EMPLOYEE PAID CONTRIB	666.25-
01 20786	PERS EMPLOYEE PAID CONTRIB	3,606.30-
	TOTAL ACCOUNTS PAYABLE	4,509.75-
	TOTAL LIAB FROM CURRENT	1,345,683.37-
	CURRENT LIAB FROM RESTRICTED	
00 20410	RETENTION PAYABLE	141,541.58-
	ACCOUNTS PAYABLE RESTRICTED	141,541.58-
	CURRENT LIAB RESTRICTED	141,541.58-
	LONG TERM LIABILITIES	
00 23020	SRF LOAN PAYABLE/LONG TERM	25,763,675.51-
00 24010	NET PENSION LIABILITY	15,830,320.00-
00 24011	OPEB LIABILITY	840,565.00-
01 24011	OPEB LIABILITY	69,513.00

		YEAR TO DATE
	LONG TERM LIABILITIES	42,365,047.51-
	DEFERRED PENSION INFLOWS	
00 24020	DEFERRED PENSION INFLOWS	1,190,187.00-
	TOTAL DEFERRED PENSION INFLOWS	1,190,187.00-
	TOTAL LIABILITIES	45,042,459.46-

ACCOUNT NUMBERS INDICATED ON
STATEMENT OF NET ASSETS
TAHOE-TRUCKEE SANITATION AGENCY
PERIOD ENDING 12/31/18

		YEAR TO DATE
	CAPITAL	
	CAPITAL ASSETS	
00 25050	CONTRIBUTED CAPITAL-CAP GRANTS	28,336,343.44-
00 25051	CONTRIBUTED CAPITAL-LOCAL DIST	1,330,176.82-
00 25052	CONTRIBUTED CAPITAL-US FOREST	223,315.00-
00 25053	CONTRIBUTED CAPITAL-STATE PARK	16,341.91-
00 26020	NET PROFIT AND LOSS	2,661,657.66-
00 26010	RETAINED EARNINGS	12,505,367.35-
	CAPITAL ASSETS	45,073,202.18-
	RESTRICTED FOR WWCR	
02 26020	NET PROFIT AND LOSS	2,193,728.75
02 26010	RETAINED EARNINGS	19,683,032.86-
	RESTRICTED FOR WWCR	17,489,304.11-
	RESTRICTED FOR STATE LOAN	
04 26020	NET PROFIT AND LOSS	15,692.91-
04 26010	RETAINED EARNINGS	2,965,752.65-
	STATE REVOLVING FUND WCR	2,981,445.56-
	UNRESTRICTED	
01 26020	NET PROFIT AND LOSS	434,340.38-
01 26010	RETAINED EARNINGS	462,473.75
06 26020	NET PROFIT AND LOSS	3,004,944.55
06 26010	RETAINED EARNINGS	29,377,292.82-
	UNRESTRICTED	26,344,214.90-
	TOTAL NET ASSETS	91,888,166.75-
	TOTAL LIABILITIES & NET ASSETS	136,930,626.21-

		CURRENT MONTH	YEAR TO DATE
	STATEMENT OF REVENUES & EXPENSES		
	ADMINISTRATION REVENUE		
00 32030	TAX REVENUE CURRENT SECURED	0.00	50,007.03-
00 32031	TAX REVENUE CURRENT UNSECURED	0.00	1,414.66-
00 32032	TAX REVENUE PRIOR YEARS	0.00	233.27-
00 32050	INTEREST INCOME	0.01-	534.42-
00 32065	IN LIEU OF TAX REV OTHER NOTAX	0.00	118,602.00-
00 32070	TAX REVENUE HOPTR	0.00	110.80
00 32090	TAX REVENUE OTHER NON-OPERATIO	0.00	1,713.25-
	TOTAL ADMINISTRATION REVENUE	0.01-	172,393.83-
	ADMINISTRATION EXPENSES		
00 45010	SALARIES AND WAGES	53,949.34	299,583.63
00 45020	EMPLOYEE BENEFITS	23,707.77	218,716.93
00 45030	DIRECTOR FEES	500.00	2,800.00
00 45060	TRANSPORTATION GAS AND OIL	94.98	898.62
00 45070	INSURANCE	9,488.44	89,685.94
00 45080	MEMBERSHIPS	27,286.43	36,859.43
00 45090	OFFICE EXPENSE	7,882.38	22,903.66
00 45095	FEES, LICENSES & PERMITS	121,474.66	133,392.91
00 45110	CONTRACTUAL SERVICES	3,533.30	44,619.69
00 45120	PROFESSIONAL SERVICES	7,470.85-	105,843.09
00 45130	PRINTING AND PUBLICATIONS	139.64	4,110.28
00 45140	RENTS AND LEASES	467.19	2,908.79
00 45170	TRAINING	505.74-	14,170.64
00 45180	UNCOLLECTIBLE ACCOUNTS	306.00	2,893.02
00 45190	UTILITIES	1,043.64	3,788.10
00 45105	INTEREST ON SRF LOAN EXPENSE	0.00	245,058.64
	TOTAL ADMINISTRATION EXPENSES	241,897.18	1,228,233.37
	ADMINISTRATION TRANSFERS		
00 45510	SRF DEBT SERVICE PMT TRANSFER	0.00	3,247,497.20-
00 45540	TRANSFER BETWEEN FUNDS	190,000.00-	470,000.00-
	TOTAL ADMINISTRATION TRANSFERS	190,000.00-	3,717,497.20-
	NET PROFIT/LOSS	51,897.17	2,661,657.66-

		CURRENT MONTH	YEAR TO DATE
	STATEMENT OF REVENUE & EXPENSES		
	OPERATIONS & MAINT REVENUE		
01 31010	INCOME FROM SERVICE CHARGES	3,547.86-	6,314,221.95-
01 31015	NSF RETURN CHECK FEE	0.00	60.00-
01 31020	INCOME FROM TEMP DISCHARGES	500.00-	1,322.50-
01 31040	INCOME-OTHER	300.00-	8,150.00-
01 32050	INTEREST INCOME	7.11-	14,168.51-
	TOTAL OP & MAINT REVENUE	4,354.97-	6,337,922.96-
	OPERATIONS & MAINT EXPENSES		
01 45010	SALARIES AND WAGES	396,160.37	2,328,150.02
01 45020	EMPLOYEE BENEFITS	201,820.20	2,036,104.05
01 45060	TRANSPORTATION GAS AND OIL	2,488.76	42,624.71
01 45080	MEMBERSHIPS	1,394.00	7,949.00
01 45100	SUPPLIES	95,724.05	537,374.10
01 45110	CONTRACTUAL SERVICES	18,512.79	212,798.40
01 45140	RENTS AND LEASES	1,230.32	7,060.33
01 45150	REPAIRS AND MAINTENANCE	44,844.40	192,880.25
01 45155	INSTRUMENTATION & ELECTRICAL	8,785.54	51,321.41
01 45160	RESEARCH & MONITORING	9,011.28	54,294.57
01 45170	TRAINING	3,203.89	21,207.40
01 45190	UTILITIES	90,210.28	411,216.10
01 45210	OTHER EXPENSES	0.00	1,141.32
01 45300	EQUIPMENT	0.00	539.08-
	TOTAL OP & MAINT EXPENSES	873,385.88	5,903,582.58
	OP & MAINT TRANSFERS		
	TOTAL NET PROFIT/LOSS	869,030.91	434,340.38-

STATEMENT OF REVENUES & EXPENSES
* WASTEWATER CAPITAL RESERVE *

		CURRENT MONTH	YEAR TO DATE
	WASTEWATER CAPITAL RES REVENUE		
02 31030	INCOME FROM CONNECTION FEES	37,871.07-	1,819,568.99-
02 31035	INCOME CONN FEE PMT PLANS	0.00	25,500.00-
02 31040	INCOME-OTHER	500.00-	5,213.82
02 32050	INTEREST INCOME	388.32-	112,046.65-
	TOTAL WWCR REVENUE	38,759.39-	1,951,901.82-
	WWCR EXPENSES		
02 45110	CONTRACTUAL SERVICES	9,718.03	1,618,393.64
02 45120	PROFESSIONAL SERVICES	7,654.08	150,068.98
	TOTAL WWCR EXPENSES	17,372.11	1,768,462.62
	WASTEWATER CAP RES TRANSFERS		
02 45510	SRF DEBT SERVICE PMT TRANSFER	0.00	2,377,167.95
	TOTAL WWCR TRANSFERS	0.00	2,377,167.95
	TOTAL NET PROFIT/LOSS	21,387.28-	2,193,728.75

TAHOE-TRUCKEE SANITATION AGENCY
RESERVED FOR STATE LOAN
PERIOD ENDING 12/31/18

		CURRENT MONTH	YEAR TO DATE
	STATEMENT OF REVENUE & EXPENSES		
	STATE LOAN RESERVE REVENUE		
04 32050	INTEREST INCOME	0.00	15,692.91-
	TOTAL STATE LOAN RESERVE REVENUE	0.00	15,692.91-
	STATE LOAN RESERVE EXPENSES		
	STATE LOAN RESERVE TRANSFERS		
	TOTAL NET PROFIT/LOSS	0.00	15,692.91-

		CURRENT MONTH	YEAR TO DATE
	STATEMENT OF REVENUE & EXPENSES		
	UPGRADE REVENUE		
06 32050	INTEREST INCOME	0.00	151,429.35-
	TOTAL UPGRADE REVENUE	0.00	151,429.35-
	UPGRADE EXPENSES		
06 45095	FEES, LICENSES & PERMITS	1,348.95-	1,348.95
06 45110	CONTRACTUAL SERVICES	584,331.84	1,349,062.53
06 45120	PROFESSIONAL SERVICES	6,787.58	133,080.04
06 45150	REPAIRS AND MAINTENANCE	91,837.01	300,298.18
06 45155	INSTRUMENTATION & ELECTRICAL	0.00	41.00
06 45300	EQUIPMENT	17,152.22	32,213.95
	TOTAL UPGRADE EXPENSES	698,759.70	1,816,044.65
	UPGRADE TRANSFERS		
06 45510	SRF DEBT SERVICE PMT TRANSFER	0.00	870,329.25
06 45540	TRANSFER BETWEEN FUNDS	190,000.00	470,000.00
	TOTAL UPGRADE TRANSFERS	190,000.00	1,340,329.25
	TOTAL NET PROFIT/LOSS	888,759.70	3,004,944.55

Tahoe-Truckee Sanitation Agency
Investment Status Report

TO: LaRue

FROM: Michelle

RE: Investments for the Month Ending December 31, 2018

		AVERAGE INTEREST RATE		AMOUNT INVESTED
L.A.I.F.		2.200%		$46,604,689.38
SAVINGS	Wells Fargo Investment	0.0600%	Weighted Yield	$724,059.50
	U.S. Bank Service Charge			$4,631.71
	U.S. Bank Tax Revenue			$3,157.34
	U.S. Bank W.W.C.R.F.			$57,238.63
CHECKING	U.S. Bank General Checking	0.000%		$3,809.74
	Wells Fargo Payroll			$2,995.80
	TOTAL CASH ON HAND			$47,400,582.10

Local Agency Investment Fund
P.O. Box 942809
Sacramento, CA 94209-0001
(916) 653-3001

www.treasurer.ca.gov/pmia-laif/laif.asp
January 02, 2019

TAHOE TRUCKEE SANITATION AGENCY

TREASURER
13720 BUTTERFIELD DRIVE
TRUCKEE, CA 96161

PMIA Average Monthly Yields

Account Number:
70-31-001

Tran Type Definitions

December 2018 Statement

Effective Date	Transaction Date	Tran Type	Confirm Number	Authorized Caller	Amount
12/7/2018	12/7/2018	RW	1591566	DAWN DAVIS	-750,000.00
12/12/2018	12/11/2018	RW	1591801	DAWN DAVIS	-1,000,000.00
12/21/2018	12/20/2018	RW	1592595	DAWN DAVIS	-50,000.00

Account Summary

Total Deposit:	0.00	Beginning Balance:	48,404,689.38
Total Withdrawal:	-1,800,000.00	Ending Balance:	46,604,689.38

TAHOE-TRUCKEE SANITATION AGENCY

MEMORANDUM

Date: January 16, 2019

To: Board of Directors

From: Jay Parker, Engineering Manager

Item: V-4

Subject: Approval of progress pay estimate no. 2 for the 2018 Digital Scanning of Sewer Lines project

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Background
The 2018 Digital Scanning of Sewer Lines project includes the work to digitally scan two schedules (Schedules III and IV) of the Truckee River Interceptor (TRI) between Manhole No. 53 and 98. These reaches span the distance between Bridge No. 6 and the open land to the west of South River Street. The total length to be scanned was reduced by change order from 37,500 feet in length to 34,632.20 feet in length due to construction activities taking place between TRI Manhole Nos. 81 and 83.

All work is now complete. Progress pay estimate no. 2 is for the period through December 12, 2018.

Fiscal Impact
Withholding 5% for retention from progress pay estimate no. 2 would yield a payment to the contractor of 32,900.59.

Attachments
Progress pay estimate no. 2.

Recommendation
Management and staff recommends approval of progress pay estimate no. 2 for the 2018 Digital Scanning of Sewer Lines project.

Review Tracking

Submitted By: _____
Jay Parker
Engineering Manager

Approved By: _____
LaRue Griffin
General Manager

Tahoe-Truckee Sanitation Agency
2018 Digital Scanning of Sewer Lines

Progress Pay Estimate No. 2
Through 12/12/18

OWNER:
Tahoe-Truckee Sanitation Agency
13720 Butterfield Drive
Truckee, CA 96161

CONTRACTOR:
Hoffman Southwest Corp., dba Professional Pipe Services
249 S. Pasea Tesoro
Walnut, CA 91789

ITEM NO.	BID ITEM DESCRIPTION	UNIT PRICE	CONTRACT QUANTITY	UNIT	CONTRACT TOTAL	QUANTITY OR PERCENTAGE	UNIT	TOTAL EARNED
1.	Base Bid: All labor and materials associated with the Digital Scanning of Sewer Lines Project shown and specified, **excluding work** specified in Section 6.01, Technical Specifications, Additive Bid Alternate	$2.75	34,632.20	LF	$95,238.55	34632.20	LF	$95,238.55
2.	Additive Bid Alternate: All labor and materials associated with the Digital Scanning of Sewer Lines Project shown and specified, **only for work** specified in Section 6.01, Technical Specifications, Additive Bid Alternate	$1.00	34,632.20	LF	$34,632.20	34632.20	LF	$34,632.20
TOTAL					**$129,870.75**			**$129,870.75**

TOTAL EARNED TO DATE:	**$129,870.75**
5% TOTAL RETENTION TO DATE:	$6,493.54
TOTAL AMOUNT PREVIOUSLY PAID:	$90,476.62
TOTAL AMOUNT DUE CONTRACTOR:	**$32,900.59**

ACCEPTED BY:
Hoffman Southwest Corp., dba Professional Pipe Services

BY: Steve Powers
DATE: 12-14-18

APPROVED BY:
Tahoe-Truckee Sanitation Agency

BY:
DATE:

TAHOE-TRUCKEE SANITATION AGENCY

MEMORANDUM

Date: January 16, 2019

To: Board of Directors

From: Vicky Lufrano, Human Resources Administrator

Item: VI-1

Subject: Approval of a budget increase to Bryce Consulting, Inc. for the Agency Compensation and Classification Study

---

Background
Bryce Consulting, Inc. was approved to perform an Agency Compensation and Classification Study at the September 12, 2018 Board meeting. As part of the study and as requested by the Board of Directors, a list of comparable agencies is to be prepared and considered for approval prior to finalizing the study.

At the December 12, 2018 Board of Directors meeting, the Board of Directors approved an expanded list of survey agencies to be utilized in the Compensation and Classification Study. The additions will require additional effort on behalf of Bryce Consulting, Inc. as they were not included in the original project scope or budget and are subject to a budget increase.

The budget increase will provide compensation for the comparison of the additional survey agencies.

Fiscal Impact
$5,000.

Attachments
Budget increase proposal to include additional survey agencies.

Recommendation
Management and staff recommends approval of a budget increase to Bryce Consulting, Inc. for the Agency Compensation and Classification Study.

Review Tracking

Submitted By: _____
Vicky Lufrano
Human Resources Administrator

Approved By: _____
LaRue Griffin
General Manager

BRYCE CONSULTING

December 18, 2018

LaRue Griffin, General Manager
Tahoe-Truckee Sanitation Agency
13720 Butterfield Drive
Truckee, CA. 96161

Mr. Griffin,

In response to the Board of Directors' request, I provided an estimate to include additional survey agencies. The survey agencies will include the following:

Bryce Recommendation
City of Placerville
City of Roseville
El Dorado Irrigation District
Incline Village General Improvement District
Mammoth Community Water District
North Tahoe PUD[1]
South Tahoe PUD
Squaw Valley Public Service District[1]
Tahoe City PUD[1]
Truckee Meadows Wastewater Reclamation Facility
Truckee Sanitary District[1]
Employee Recommendation
Truckee Donner PUD
Contra Costa Sanitary District
Dublin San Ramon Services District
Napa Sanitation District
Delta Diablo Sanitation District
Monterey One Water

[1]Member Agency

Bryce will compile the statistics in a variety of ways:

1. A comparison of the comparable classifications using the list recommended by Bryce
2. A comparison of the comparable classifications using the list recommended by the employees
3. A comparison of the comparable classifications using the member agencies that have been included in Bryce's recommendation

The additional agencies will increase the budget by $5,000.

Sincerely,

Shellie Anderson
Principal

TAHOE-TRUCKEE SANITATION AGENCY

MEMORANDUM

Date: January 16, 2019

To: Board of Directors

From: LaRue Griffin, General Manager

Item: VI-2

Subject: Approval of a budget increase to HDR Engineering, Inc. for the Agency Connection Fee Study

---

Background

The Agency entered into an agreement with HDR Engineering, Inc. to perform a connection fee study which includes an assessment of current connection fees and schedules and to provide appropriate recommendations.

Mr. Shawn Koorn of HDR Engineering, Inc. has provided numerous presentations on the sewer connection fee and was asked to perform additional analyses. The additional analyses were not included in the original project scope or budget and are subject to a budget increase.

The budget increase will provide additional analyses and additional public meeting presentations.

Fiscal Impact

$7,985.

Attachments

Connection Fee Study amendment request.

Recommendation

Management recommends approval of a budget increase to HDR Engineering, Inc. for the Agency Connection Fee Study.

Review Tracking

Submitted By: _____

LaRue Griffin
General Manager

January 4, 2019

Mr. LaRue Griffin
General Manager
Tahoe-Truckee Sanitation Agency
13720 Butterfield Drive
Truckee, CA 96161

RE: Tahoe-Truckee Sanitation Agency Sewer Connection Fee Study Amendment Request

Dear Mr. LaRue:

HDR was retained by the Tahoe-Truckee Sanitation Agency (Agency) to complete a comprehensive sewer rate study. In early 2018 HDR and the Agency agreed upon a scope of services for the sewer connection fee study. Since that time, HDR and the Agency have been completing the comprehensive sewer rate study analysis.

During the rate study presentation to the Board, on the development and recommendation of the connection fee update, the Board provided review and comment on the analysis. The Agency requested additional analyses based on this feedback from the Board. This resulted in two additional public meetings and the need to update the draft report based on this additional analyses. This level of effort was not anticipated by the Agency or HDR, nor included within the initial scope of services. This additional, out of scope, level of effort was estimated at approximately 14 hours for Shawn Koorn and 12 hours for Judy Dean at current hourly rates

Given this additional and unanticipated level of effort, HDR respectfully requests an amendment in the amount of $7,985. The amendment will allow for HDR to revise and finalize the analysis given the recent Agency and Board review and comments, provide two (2) additional Board presentations, as well as to finalize the report. Provided below is a summary of the hourly billing rates, estimated hours to complete the analysis, and total requested amendment.

Summary of the Requested Amendment Fee Estimate

Staff	Project Role	Estimated Hours	Hourly Billing Rate	Total Estimated Fee
Shawn Koorn	Project Manager	14	$270.00	$3,780
Judy Dean	Financial Analyst	12	$195.00	2,340
Nicole Koehler	Project Assistance	3	$135.00	405
Plus Expenses				1,460
			Total	**$7,985**

We appreciate the opportunity to provide these services. Should you have any questions about our approach to this project or any information contained herein, please call Shawn directly at (425) 450-6366.

Sincerely,
HDR ENGINEERING, INC.

Shawn W. Koorn
Associate Vice President

TAHOE-TRUCKEE SANITATION AGENCY

MEMORANDUM

Date: January 16, 2019

To: Board of Directors

From: Jay Parker, Engineering Manager

Item: VI-3

Subject: Discussion and award of the Master Sewer Plan

Background

In December 2018, the Agency solicited proposals for a Master Sewer Plan (Plan). The purpose of the Plan is to perform an evaluation of existing T-TSA facilities to include the Truckee River Interceptor (TRI) and water reclamation plant (WRP), to assess existing and future regulatory requirements, assess the condition and capacity of existing facilities, project future flows and loads, develop and evaluate alternatives for upgrades and improvements to meet future conditions through a 25-year planning cycle, and to recommend schedules and cost estimates for selected capital improvements accordingly.

The scope of services for the Plan will require the selected consultant to (1) review background data and information, (2) develop a hydraulic model of the WRP, (3) conduct an evaluation of WRP capacities, (4) develop a biological model of the WRP's liquids and solids treatment plant processes, (5) conduct an evaluation of the WRP operations and treatment processes, (6) develop an updated hydraulic model of the TRI, (7) conduct an evaluation of TRI capacities, (9) identify recommendations to mitigate deficiencies identified for the WRP and TRI, (10) develop cost estimates, (11) prepare a final report and presentation to the Board of Directors, and (12) provide various project management tasks.

Two engineering consulting firms submitted proposals for the work: CH2M ($550,000) and Carollo Engineers ($798,263). Staff has reviewed the proposals against the various work items listed as proposal requirements and found that both consultants are considered responsive with minor irregularities.

Overall, Carollo Engineers' proposal was found to be more comprehensive than CH2M. The apparent combined experience of Carollo Engineers' principal team members in preparing comprehensive master plans seems to exceed that of CH2M's team. Further, with respect to cited comparable projects, Carollo Engineers provided more applicable equivalent projects that provided the type and depth of services required for this project.

With respect to project costs, on the surface it appears that Carollo Engineers' fee significantly exceeds CH2M's; however, the consultants' assumed scope of services were sometimes very different. By removing the various optional services and additional tasks that Carollo Engineers had included, an "apples-to-apples" fee comparison can be made that reveals the estimates are within 5 percent of each other ($575,233 and $550,000 for Carollo Engineers and CH2M, respectively).

The exact fee for each consultant would be a negotiated amount based on actual scope of work selected, so in essence these fees can be considered comparable. The T-TSA proposal team likes some of the proposed optional tasks that Carollo Engineers has presented for potential addition to the project scope should the Agency elect to include (additional workshops, flow monitoring, asset management advice, etc).

As part of the proposal review process, T-TSA staff also reached out to the various client references that the consultants listed in their proposals. All responses received were positive for both consultants.

Overall, T-TSA staff is of the opinion that the proposal prepared by Carollo Engineers is more aligned with the needs of the Agency for development of a comprehensive master sewer plan.

Fiscal Impact
Depends on selection of consultant and negotiation of scope of services.

Attachments
Proposals received from consultants.

Recommendation
Management recommends approval to award the Master Sewer Plan to Carollo Engineers and authorize the General Manager to negotiate an agreement with Carollo Engineers up to $650,000.

Review Tracking

Submitted By: _____
Jay Parker
Engineering Manager

Approved By: _____
LaRue Griffin
General Manager

PROPOSAL

MASTER SEWER PLAN

December 2018

carollo

Engineers...Working Wonders With Water®

carollo
Engineers...Working Wonders With Water®

December 19, 2018

Mr. Jay Parker, P.E.,
Engineering Manager
Tahoe-Truckee Sanitation Agency
13720 Butterfield Drive
Truckee, CA 96161

RE: Tahoe-Truckee Sanitation Agency Proposal for a Master Sewer Plan

Dear Mr. Parker:

As rate payers, local residents, and members of the Truckee community, there cannot be a team more dedicated to the success of the TTSA Master Sewer Plan. We walk the legacy trail, swim with our kids by the Glenshire Bridge, and fish in the lower Truckee River canyon. We are fully invested in the water quality of the Truckee River, because it is a part of our daily life. Beyond the fact that we are connected to the plant as members of the community, we are a team of planning experts that have spent a good portion of our careers mastering the craft of facility and infrastructure planning. We get really excited about projects like this, as we can have a significant impact on the quality of our lives every day. Our team of experts is poised to deliver a strategic plan that is the road map for risk and mitigating capital spending over the next 25-years. We offer TTSA the following benefits:

- **A proven approach provides confidence in recommendations:** Carollo's planning approach is focused on developing an understanding of existing and future capacity needs, current condition of your facilities, future regulatory drivers to develop recommendations for strategic planning, and an optimized treatment and conveyance program that minimizes risk. Carollo has done this effectively for many agencies in California, and we are poised to employ our approach to help develop a 25-year plan for you.
- **Local perspective combined with national expertise builds a realistic and defensible strategic plan:** Local perspective in planning projects can't be substituted. One unique aspect of our team is that we offer local talent that is also some of the best engineers we have at Carollo. **Tim Loper** is our company-wide Chief of Planning Services, and helps clients across the USA develop implementable master plans. **Ryan Orgill** and **Ron Appleton** are nationally recognized wastewater treatment and conveyance modeling experts who have developed Carollo's means and methods for process and hydraulic modeling. **Ricky Gutierrez** has been honing his planning and design craft over the last 17 years working on some of the biggest wastewater projects in California, and is now a Truckee local. This level of expertise and local perspective provides TTSA with access to the most advanced, proven, and defensible planning methods in the industry today, while still offering a realistic and practical plan to serve the wastewater needs of the Truckee/Tahoe region.

We take wastewater planning seriously. It's not something we do on the side between design projects. In that regard, we have provided a detailed scope of work and complete fee estimate in our proposal. We developed the scope of work based on our understanding of the required diligence and technical effort to complete a project of this type. We look forward to the opportunity to discuss, and revise the scope tasks and fee with TTSA staff personally.

At Carollo, water is our passion, it's all we do, and we look forward to leveraging that passion to develop a plan that establishes the road map for TTSA for years to come.

Sincerely,

CAROLLO ENGINEERS, INC.

Tim Loper, PE
Project Manager/Principal-in-Charge

WATER
OUR FOCUS
OUR BUSINESS
OUR PASSION

Carollo Engineers, Inc.
100 West Liberty St., Suite 740
Reno, NV 89501
Phone: 775-324-4427
Website: www.carollo.com

Principal Contact
Tim Loper, P.E. | Vice President
Phone: 775-332-8721
E-mail: TLoper@carollo.com

GENERAL INFORMATION, FIRM DESCRIPTION, AND FIRM QUALIFICATIONS

Water...Our Focus, Our Business, Our Passion

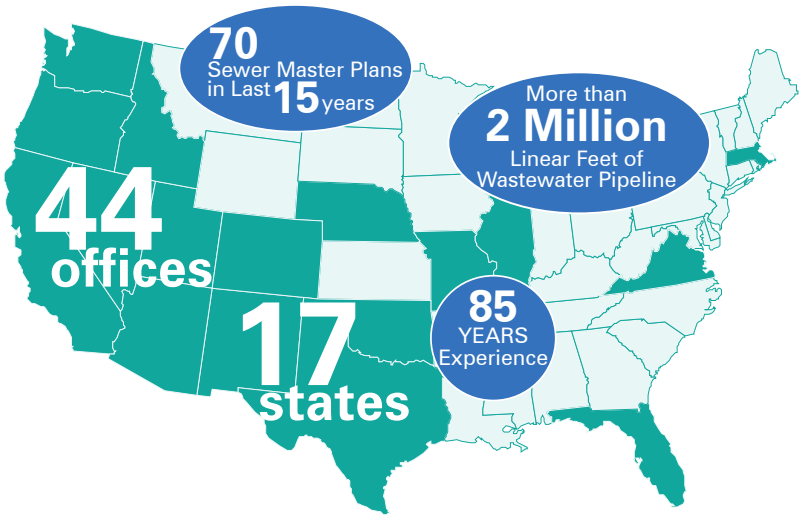
Carollo Engineers is an environmental engineering firm established in 1933 that specializes in the planning, design, and construction of water, wastewater, and reclaimed water facilities and supporting infrastructure. *Engineering News Record* recognizes Carollo as the largest engineering firm in the nation focused solely on water. Firm-wide, we have grown to over 1,090 professionals, including nearly 500 registered engineers. For over 85 years, we have built our reputation on client service and a continual commitment to quality — cornerstones of our business. Our clients count on us to help them address public expectations and navigate the increasingly complex challenges of protecting their valuable resources; cost-effectively sustain and protect public health; and meet local, state, and federal regulatory requirements.

Comprehensive Master Planning Experience Brings Confidence that Carollo is the Best Consultant to Deliver a Robust and Defensible Master Sewer Plan to Support the Agency's 25-Year Planning Cycle

Master planning is an integral aspect of Carollo's experience and has been for more than seven decades. Many of our long-term client relationships began with long-range planning projects. Our numbers speak for themselves. In the past 15 years, we have delivered more than 70 customized sanitary sewer master plans to help our clients plan for system maintenance, and plan timely expansions that are properly sized to accommodate growth. These projects range from small planning studies to comprehensive regional master plans, and focus on:

- Developing realistic growth projections to evaluate existing and future wastewater system capacity.
- Developing accurate, robust, and detailed modeling tools to defensibly determine capital project recommendations.
- Identifying capital improvements to provide for system expansion while optimizing the life of existing treatment and collection system assets.
- Identifying practical, realistic solutions that maximize Agency funds.
- Balancing capital improvements and maintenance programs to maximize taxpayer investment and provide the level of service that ratepayers expect.

Using available local and regional planning data along with system data, Carollo works with each client to strategize the timing, priority, and need for capital improvements projects. We will leverage what we have learned from our vast experience to develop innovative solutions for the Tahoe-Truckee Sanitation Agency.



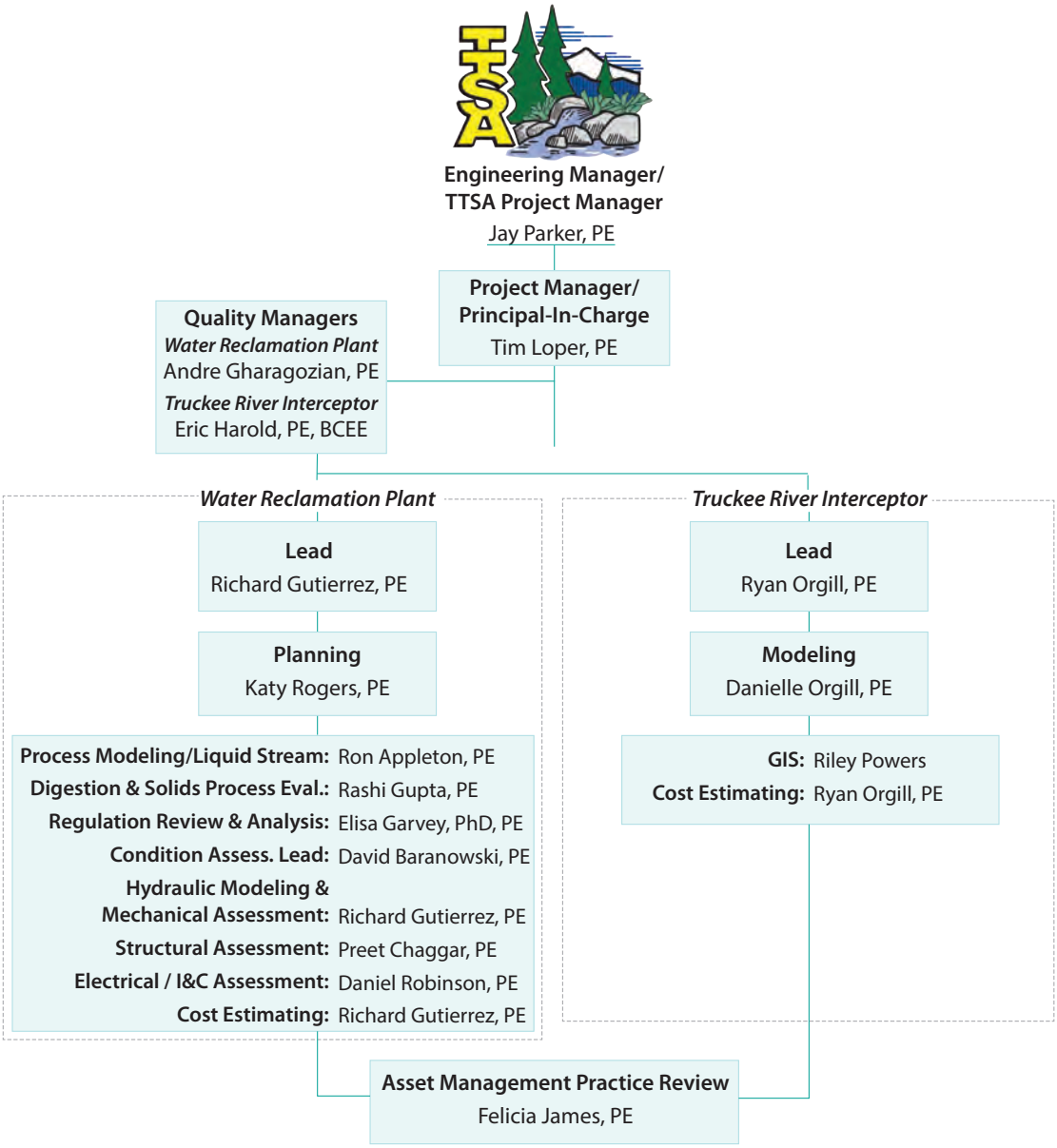
PROJECT TEAM

Our Project Team is Organized to Meet Your Needs

Producing a robust and defensible sewer master plan requires a team that has demonstrated practical and relevant expertise in all aspects of the project; has the experience to develop a well-conceived, proven approach; and is committed to the project goals. Our team meets these criteria and includes planners, wastewater treatment facility and pipeline experts, hydraulic modelers, GIS specialists, and other experts to fulfill the project requirements.

Led by project manager, **Tim Loper,** we assembled a project delivery team of specialists based on a simple but powerful principle—put the most qualified people in the roles essential to meeting project goals. Tim brings effective and proactive project management skills, a focus on client service, and extensive relevant experience managing projects of similar complexity and scope. In this section, we briefly highlight our team's specific capabilities and the benefits each team member brings to the Agency, as well as their experience and responsibilities. Additionally, several of our key project staff including Tim, Richard, Ryan, Elisa, and Danielle are locally based and understand the specific challenges of the region to best meet your needs. Our proposal appendix contains team members' detailed resumes.

Project Organizational Chart



A MINUTE with your PROJECT MANAGER

What is your priority as Project Manager?

"My first priority is always quality client service, and that begins with carefully listening to client stakeholder goals and expectations. As project manager, I will make sure our team members hear the same messages clearly and frequently, and verify all our efforts are focused on those goals and expectations, on time and within budget. This is particularly challenging for wastewater treatment facility and sewer master planning, because of the multiple factors and variables that drive the plan. Projects like this demand leadership that will guide the team in simplifying complex issues; crafting practical alternatives to evaluate, recognize when and how mid-course corrections must take place, and creatively refine evaluation results into practical and adaptable implementation plans.

Additionally, I have learned that project management is not simply a matter of managing the project tasks, schedule, and budget. It is about managing the people who are doing the work — keeping them focused, inspired and engaged. Project leadership also involves collaborating with you, listening to you, and keeping you in the loop every step of the way, so that you have the confidence to make informed decisions that meet your goals. These are the types of complex challenges I enjoy most, and I'm excited at the prospect of working closely with the Agency and your staff in this role, while leading our very strong group of team leaders to address all key aspects of the Master Sewer Plan."

What sets your team apart?

"All of our team leaders are proven professionals, highly regarded by industry peers, and seriously invested in your Master Sewer Plan. Beyond that, Ricky, Ryan, Elisa, Danielle, Riley and myself are all local to the Reno Tahoe region. We are experts but also understand the challenges we face in the Truckee/Tahoe area. With this team at my side, I know there will be lots of smart ideas, enthusiasm, energy, and support for each other — with quality client service as our common culture. This is a key planning effort that will set the course for the Agency's investment priorities for years. There is no room for incompetent technical approaches that lead to unrealistic or costly recommendations. I am confident that you will realize the expertise we offer the Agency as you read through our team's specific capabilities."

Tim Loper, PE - Project Manager / Principal-in-Charge

BENEFITS TO THE AGENCY

- 17 years of experience in master planning and design; serves as Carollo's chief of master planning comany-wide.
- Served as project manager and/or project engineer for more than 40 master plans and modeling projects, including projects for Washoe County, the cities of Reno, Oakland, Fresno, Chico; and West County Wastewater District.
- Hands-on project manager who knows how to collaborate with staff and outside agencies to develop stakeholder buy-in.
- Understands wastewater system planning, and has a proven ability to collaborate with project participants to develop sound planning decisions and clear recommendations that translate into practical, reliable, and implementable Capital Improvement Programs (CIPs).

RESPONSIBILITY

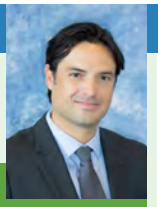
- Serve as the Agency's main point of contact, while ensuring Carollo's resources are available throughout the project.
- Oversee project direction and timely project delivery across varying service areas and disciplines.
- Develop an economical budget and maintain an efficient schedule.
- Listen carefully to your staff to evaluate current and future needs, project drivers and preferences, and incorporate those concepts into a robust, and flexible plan.

RELEVANT EXPERIENCE

- Principal-in-Charge for Truckee Sanitary District, CA - 2017 Hydraulic Model Development
- Project Manager for Washoe County, NV - Pleasant Valley Interceptor Alternatives Analysis and Design
- Principal-in-Charge for the City of Reno, NV - Northwest Reno Sanitary Sewer Capacity Analysis and Master Plan
- Principal-in-Charge for the South Tahoe Public Utility District, CA - On-Call Hydraulic Modeling Contract
- Collection System Lead for the West County Wastewater District, CA - District-Wide Master Plan
- Collection System Lead for City of Modesto 2014 Wastewater Collection and Treatment Master Plans

Key Team Members

Richard Gutierrez, PE - Water Reclamation Plant Lead | Cost Estimating



BENEFITS TO THE AGENCY

- 17 years of experience in treatment plant master planning, design, and construction.
- Complete understanding of WRP planning and design; innate ability to understand how project planning relates to design, project implementation, and contructability.
- Extensive coordination experience with various utilities, municipalities, and regulatory agencies.

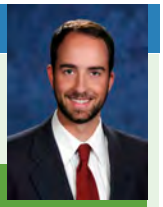
RELEVANT EXPERIENCE

- Project Manager for the Fairfield-Suisun Sewer District, CA - Blower Replacement
- Hydraulic Capacity Analysis for the South Tahoe Public Utility District, CA - WWTP Process and Hydraulic Capacity Evaluation
- Treatment Process Engineer for the City of Modesto, CA - Wastewater Collection and Treatment Master Plans
- Project Manager/Engineer for the Sacramento Regional County Sanitation District, CA - EchoWater Program involving several projects including:
  - Tertiary Treatment Facilities & South County Ag Pump Station Preliminary Design (project engineer)
  - Return Activated Sludge Pumping Project (project manager)
  - Flow Equalization Project (project engineer)
  - Nitrifying Sidestream Treatment (NST) Project (design engineer)

RESPONSIBILITY

- Lead the WRP planning effort team including coordination with team and agency staff.
- Analyze the WRP's existing and future flow conditions.
- Evaluate process alternatives and identify recommendations to mitigate plant deficiencies and maximize quality production.
- Develop and calibrate a process hydraulic model.
- Conduct WRP mechanical condition assessment.
- Develop cost estimates for process alternatives.
- Lead the WRP Master Plan Development.

Ryan Orgill, PE - Truckee River Interceptor (TRI) Lead | Cost Estimating



BENEFITS TO THE AGENCY

- 14 years of experience in infrastructure master planning, design, and construction.
- Company lead for collection system modeling and master planning.
- Expert in multiple modeling software tools (InfoSWMM, InfoWorks, Mike Urban).

RELEVANT EXPERIENCE

- Project Manager for the Truckee Sanitary District, CA - 2017 Hydraulic Model Development
- Project Engineer for the Washoe County, NV - Pleasant Valley Interceptor Alternatives Analysis and Design
- Project Manager for the City of Reno, NV - Northwest Reno Sanitary Sewer Capacity Analysis and Master Plan
- Project Manager for the South Tahoe Public Utility District, CA - On-Call Hydraulic Modeling Contract
- Collection System Project Engineer for the West County Wastewater District, CA - District-Wide Master Plan
- Collection System Project Engineer for the City of Modesto, CA - Wastewater Collection and Treatment Master Plan

RESPONSIBILITY

- Evaluate the TRI to determine existing and projected condition and capacity deficiencies.
- Coordinate with Agency member Districts.
- Recommend innovative and cost-effective solutions to alleviate the identified deficiencies.
- Create short- and long-term recommendations for treatment and conveyance goals.
- Formulate cost estimates for improvement alternatives based on your goals and Carollo recommendations.

Key Team Members (continued)

Katy Rogers, PE - WRP Planning

BENEFITS TO THE AGENCY

- 10 years of experience in the planning, design, and construction of wastewater and recycled water treatment plants, including upgrades to replace aging infrastructure, increase nutrient removal, and increase recycled water production.
- WRP planning and process analysis expert.
- Significant experience in permitting and securing funding assistance.

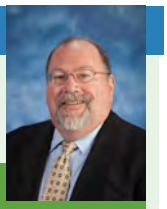
RELEVANT EXPERIENCE

- Project Engineer for the West County Wastewater District, CA - District-Wide Master Plan
- Project Engineer for the West County Wastewater District, CA - State Revolving Fund (SRF) and Programmatic Environmental Impact Report (PEIR) for the District-Wide Master Plan
- Project Engineer for the Sacramento Regional County Sanitation District, CA- Master Plan Advanced Treatment Cost Update
- Project Engineer for the San Francisco Public Utilities Commission (SFPUC), CA- Sewer System Improvement Program Financial Analysis Support Services

RESPONSIBILITY

- Assist with WRP planning to develop process alternatives and program development.
- Develop a CIP Program to match improvement costs to possible available funding.
- Analyze regulatory scenarios over the 25-years planning period.
- Develop capital projects that most effectively address the Agency's level of service goals.

Ron Appleton, PE - Process Modeling



BENEFITS TO THE AGENCY

- Senior wastewater treatment process specialist with over 35 years of experience in process modeling, process evaluations and design, and process mechanical design.
- Focused career on biological, physiochemical, and aqueous chemistry aspects of wasewater treatment, recycled water treatment, and solids handling.
- Expert in "whole plant" simulation using BioWin software and providing client process models and hydraulics analysis software training.

RELEVANT EXPERIENCE

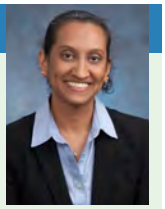
- Process Modeling (BioWin) for Washoe County, NV - South Truckee Meadows WRF Master Plan
- Process Modeling (BioWin) for the City of Reno / City of Sparks, NV - Truckee Meadows WRF Process Optimization Study
- Secondary Treatment Process Modeling (BioWin) for Fairfield-Suisun Sewer Distrcit, CA - Blower Replacement
- Secondary Treatment Process Modeling (BioWin) for South Tahoe Public Utility District, CA - WWTP Process and Hydraulic Capacity Evaluation

RESPONSIBILITY

- Develop sampling plan to calibrate BioWin process model
- Develop a wastewater treatment process model using BioWin, based on data collection and a comprehensive sampling plan.
- Project future flows, load, and effluent requirements to optimize current processes and facilities, while evaluating operations and treatment capacity for system deficiencies.
- Train Agency staff on model use and modifications.

Key Team Members (continued)

Rashi Gupta, PE - WRP Digester and Solids Process Evaluation Lead



BENEFITS TO THE AGENCY

- 15 years of experience in wastewater treatment and biosolids management, specializing in solids thickening, dewatering, and digestion systems.
- Co-authored the Solids Thickening chapter of the recently published WEF Manual of Practice No. 8 and serves as vice-chair of the WEF Residuals and Biosolids - Solids Separation sub-committee.
- Served as project manager, project engineer, or lead design engineer for biosolids facility projects totaling more than $300 million.

RESPONSIBILITY

- Assess solids handling and digestion system processes to recommend improvements.
- Lead digestion system process planning.

RELEVANT EXPERIENCE

- Project Manager for the California State Water Resources Board, CA - Co-Digestion Capacity Analysis
- Project Engineer for the City of Fresno, CA - Wastewater Reclamation Facilities Biosolids Master Plan
- Project Engineer for the Inland Empire Utilities Agency, CA - RP-1 Liquids and Solids Capacity Recovery Project
- Design Manager for the City of Salem, OR - Solids Handling Improvements

Felicia James, PE - Asset Management Practice Review

BENEFITS TO THE AGENCY

- 23 years of of experience in using advanced asset management methods to prioritize capital and operating expenses to reduce risks associated with aging infrastructure.
- 22 years of experience as an Asset Strategy Manager with the Washington Suburban Sanitary Commission, responsible for developing and implementing asset management planning of buried water infrastructure.

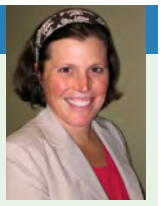
RESPONSIBILITY

- Track performance of TTSA assets and prioritize capital and operating expenses to reduce aging infrastructure risks.

RELEVANT EXPERIENCE

- Project Manager for the Yorba Linda Water DIstrict, CA - Asset Management Plan Update
- Asset Management Advisor for the City of Henderson, NV - Treatment Facility and Effluent Master Plan
- Project Manager for the City of Simi Valley, CA - Asset Reliability Assessment and Financial Plan
- Asset Management Advisor for the Central Contra Costa Sanitary District, CA - Asset Management and Risk Analysis

Elisa Garvey, PhD, PE - Regulation Review & Analysis



BENEFITS TO THE AGENCY

- 17 years of of experience in water resources management, water quality assessments, regulatory and permitting support, master planning, and monitoring plan development/implementation.
- Extensive coordination with multiple agencies, including a project that involved developing a Coordinated Monitoring Program involving 14 agencies.

RESPONSIBILITY

- Coordinate existing and future permitting activities with the Tahoe-Truckee Sanitation Agency and regulatory agencies.
- Develop likely future regulatory scenarios for analysis.

RELEVANT EXPERIENCE

- Project Engineer for the Sacramento Regional County Sanitation District, CA - 2020 Master Plan
- Project Engineer for the San Jose/Santa Clara, CA - Water Pollution Control Plant Master Plan
- Assistant Project Manager for the Inland Empire Utilities Agency, CA - Facilities Balancing and Optimization Model

Support Team

Our key team members will be supported by a local staff with knowledge of your facilities. Team members have specialized expertise in advanced wastewater treatment, facility planning, process modeling, condition assessment, GIS, regulatory review, and cost estimating. They have the capacity and resources to deliver your Master Sewer Plan.

1 Andre Gharagozian, PE | Quality Manager (Water Reclamation Plant)

Benefits to the Agency

- 20 years of experience as a consulting engineer in the water and wastewater field with an emphasis on wastewater treatment.
- Has been responsible for facility and master planning; hydraulic and outfall analysis; process modeling, analysis and design; construction-support services, and operational assistance and training on numerous projects.
- Expert in secondary process analysis and modeling, including BioWin process modeling and hydraulic calculations.
- Served as project manager for the West County Wastewater District District-Wide Master Plan

2 Eric Harold, PE | Quality Manager (Truckee River Interceptor)

Benefits to the Agency

- 26 years of experience and nationally recognized authority on strategic collection system planning and analysis, system-wide master planning, dynamic sewer modeling, hydraulic modeling, and wastewater system flow monitoring.
- Oversaw or participated on more than 60 system-wide master plan and modeling studies of wastewater collection systems throughout the U.S.
- Served as deputy program manager for the Washington D.C. Water and Sewer Authority 5-year, $42 million Sewer Management Program. Provided technical review and oversight of all planning and modeling activities; and managed system-wide metering, regulatory compliance support, and grant applications.

3 Danielle Orgill, PE | Truckee River Interceptor Modeling

Benefits to the Agency

- Five years of experience in hydraulic modeling, planning, asset management, water and wastewater treatment, and infrastructure design.
- Assisted with master planning and evaluation studies for sewer systems, and has experience in data management, analysis, hydraulic modeling, and GIS.
- Has worked with a variety of hydraulic modeling packages that include Sewer GEMS and InfoSWMM.
- Served as project engineer for the Truckee Sanitary District 2017 Hydraulic Model Development and provides the South Tahoe Public Utility District with On-Call Sewer System Hydraulic Modeling Services.

Support Team (continued)

4 David Baranowski, PE | Condition Assessment Lead

Benefits to the Agency

- Extensive knowledge and experience in asset management processes and practices, as well as wastewater infrastructure planning and design, enhances understanding of infrastructure assets to produce meaningful project outcomes.
- Specific asset management expertise includes asset inventory and site assessment, asset register and hierarchy creation, risk analysis, asset useful life determination and renewal modeling, and asset management plan development.
- Skilled in leading engineering teams to visually assess asset conditions, gather and compile asset information, and prioritize recommended project rehabilitation, repair, or replacement timing.
- Served as condition assessment task lead for the City of Riverside Comprehensive Wastewater Master Plan.

5 Preet Chaggar, PE | Structural Assessment

Benefits to the Agency

- 11 years of experience in water and wastewater plant structural design and rehabilitation, seismic vulnerability evaluations, and condition assesessments.
- Served as structural engineer on several master planning projects in California including the Central Contra Costa Sanitary District Wastewater Treatment Plant Master Plan, City of Burlington Wastewater Treatment Facility Master Plan, and the City of Oxnard Public Works Master Plan.
- Served as structural engineer for the Fairfield Suisun Sewer District 2016 Blower Replacement Project.

6 Daniel Robinson, PE | Electrical/I&C Assessment

Benefits to the Agency

- Over 19 years of electrical and control system experience in the water and wastewater industry.
- Knowledge in the design of switchgear, motor control centers (MCCs), PLC panels, and instrumentation, control, and communication systems; creation of interconnection diagrams for power and control wiring; and development of control system descriptions, O&M manuals, and load, thermal, and sizing calculations.
- Served as lead EI&C engineer for multiple Sacramento Regional County Sanitation District EchoWater Projects including FEQ, NST, RAS, and TTF.

7 Riley Powers, PE | GIS

Benefits to the Agency

- Expertise focused on data collection and manipulation, geodatabase creation and maintenance, program interface conversion for map creation, spatial analysis, and cartographic figure creations.
- GIS specialist for numerous wastewater master plans and modeling projects in California, including the Integrated Wastewater Treatment Facilities Master Plan for the City of Riverside; Water, Wastewater, and Sewer Master Plans for the City of Lemoore; Integrated Master Plan for the City of Porterville; and OneWater Wastewater Master Plan for the City of Morro Bay.

The combination of our knowledgeable, highly-motivated, local staff with dedicated, national, firm-wide support ensures that the quality and responsiveness of our services and planning solutions are EXCEPTIONAL.

+200
Comprehensive Master Plans

70 Sewer Master Plans in Last **15** years

SIMILAR WORK EXPERIENCE

Comprehensive Master Planning Experience

Master planning has been an integral aspect of Carollo's experience for more than eight decades. Many of our long-term client relationships began with long-range planning projects. Our numbers speak for themselves. **In the past 15 years alone, we have delivered more collection and reclaimed water master plans and facility master plans than any other firm in California.** We will bring what we have learned from these other systems to develop innovative solutions for the Agency.

The table below highlights several representative projects that are similar in size, scope, and complexity; were completed by our team members; and incorporated many of the same technical components that your project requires. These ten projects are further described on the following pages.

	Key Elements									
Key Projects	Project Management	Data Collection	Treatment Plant Condition Assessment	Flow and Loading Analysis	Treatment Plant Hydraulic Modeling	Wastewater Treatment Process BioWin Modeling	Hydraulic Pipeline Modeling	Model Training	Cost Estimating	CIP Development
District-Wide Master Plan West County Wastewater District, CA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wastewater Collection and Treatment Master Plans City of Modesto, CA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Integrated Master Plan for Wastewater and Treatment Facilities City of Riverside, CA	✓	✓	✓	✓	✓	✓	✓		✓	✓
2017 Hydraulic Model Development Truckee Sanitary District, NV	✓	✓		✓			✓		✓	✓
Pleasant Valley Interceptor Alternatives Analysis and Design Washoe County, NV	✓	✓					✓		✓	✓
South Truckee Meadows Water Reclamation Facility Master Plan Washoe County, NV	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Truckee Meadows Water Reclamation Facility Process Optimization Study City of Reno/City of Sparks, NV	✓	✓		✓	✓	✓			✓	
Northwest Reno Sanitary Sewer Capacity Analysis and Master Plan City of Reno, NV	✓	✓		✓			✓		✓	✓
Blower Replacement Fairfield-Suisun Sewer District, CA	✓	✓	✓	✓		✓			✓	
WWTP Process and Hydraulic Capacity Evaluation South Tahoe Public Utility District, CA	✓	✓		✓	✓	✓			✓	✓

West County Wastewater District, CA - District-Wide Master Plan

Carollo prepared a comprehensive, District-wide Master Plan for West County Wastewater District (WCWD) that included the sanitary sewer collection system; Water Pollution Control Plant (WPCP); and non-process facilities such as administration, laboratory, storage, and maintenance. Work efforts included a condition assessment/capacity assessment, alternatives evaluation, and 20-year capital improvement program (CIP) development. Combining all of WCWD's facilities in one master plan allowed the needs of each to be prioritized in an overall program. The CIP addressed growth, wet weather capacity, aging assets repair and replacement, and process modifications to meet future regulatory requirements.

To prioritize repair and replacement projects, Carollo performed a risk-based analysis for all of WCWD's 12,000 assets. Risk is defined as the product of each asset's likelihood for failure (e.g., vulnerability) and the consequence of failure (e.g., criticality). Carollo used several tools to identify failure likelihood including an asset's age, visual inspections of lift stations and the WPCP, and GIS defect coding from WCWD's CCTV sewer program. The consequence of failure was primarily based on an asset's proximity to environmentally sensitive areas or public facilities (e.g., schools or hospitals) or the environmental or fiscal impact of a failure. The risk analysis results provided a basis for forecasting and prioritizing WCWD's rehabilitation and replacement funding needs for the next 20 years.

To identify growth-driven projects at the 12.5-mgd WPCP, Carollo used dynamic process modeling with BioWin to assess capacity. This involved two weeks of intensive data collection for calibration. The modeling confirmed there was sufficient capacity and that the plant's bottleneck was the secondary sedimentation basins. Accordingly, Carollo performed 3-D computational fluid dynamic (CFD) modeling of the secondary basins to optimize their performance. CFD modeling identified inefficiencies in flow distribution, and the team identified modifications to improve performance and optimize operation.

To assess the need for wet weather capacity improvements, Carollo developed an InfoSWMM model for the 249-mile collection system. The model included all piping down to 6 inches in diameter. Two months of wet weather flow monitoring with 27 flow meters and 3 rain gauges provided a basis for model calibration. The team also simulated the design wet weather storm to identify capacity limitations and recommend improvements. A large component of the recommendations was a targeted reduction of infiltration and inflow in the more problematic service areas.

Based on this system-wide assessment and identification of WCWD's future needs, Carollo developed improvement alternatives using WCWD's evaluation criteria. Due to the age of the WCWD's existing assets and relatively low population growth projections, the CIP primarily addressed projects to replace/rehabilitate aging assets. The CIP also addressed anticipated regulatory changes and process modifications to improve performance and efficiency. Regulatory drivers included ammonia and nutrient regulations and more stringent emission standards for combustion sources. Additionally, other improvements reduced odors, provided more flexibility for biosolids disposal, and generated additional biogas to reduce energy consumption.

Project Elements

Type of Work: Facility and Sewer Collection System Master Planning, Hydraulic Modeling, Flow Monitoring, Condition Assessment/Risk-Based Analysis, CIP Development

Project Dates: 08/2011 - 01/2013

Key Personnel:
Andre Gharagozian, Project Manager
Tim Loper, Collection System Lead
Ryan Orgill, Collection System Project Engineer
Katy Rogers, Project Engineer

Project Size:
20-year Master Plan
Collection System: 249-miles
Treatment Plant: 12.5 MGD

Reference:
E.J. Shalaby, Senior Consultant, 510.222.6700
ejshalaby@gmail.com

City of Modesto, CA - Wastewater Collection and Treatment Master Plans

The City of Modesto retained Carollo to develop its 2015 Wastewater Collection System Master Plan, which built on Carollo's 2007 Master Plan for the City's collection and treatment systems. The City provides sewer service to approximately 200,000 residents within the incorporated city limits, as well as unincorporated areas in Stanislaus County. The City's collection system conveys approximately 20 mgd of domestic wastewater and provides service to industrial customers through a dedicated 66-inch-diameter cannery waste sewer. The City's domestic system includes gravity sewers of 6 to 66 inches in diameter and 38 lift stations.

Carollo's tasks involved updating the hydraulic model to include capital projects that have been completed since 2005. Carollo also simulated pump station controls and created a separate storm drain cross connection system for areas that have direct storm water connections. The team calibrated the hydraulic model to flow monitoring data from 40 temporary flow monitoring stations for both dry and wet weather conditions in the InfoSWMM hydraulic modeling software.

Additionally, Carollo developed revised wastewater flow projections based on land-use types and new wastewater flow factors. The City's wastewater flows had seen a reduction since the installation of water meters over the last 10 years. The team engaged with the City to modify the planning and design criteria; evaluate the existing system for capacity deficiencies; and incorporate major collection system projects that were currently planned or in construction, such as the Emerald Trunk line diversion and the River Trunk Realignment and Pump Station. Carollo developed a CIP and project prioritization plan to provide the City with a road map for collection system projects for the next 10 years.

The project also included the development of a wastewater treatment master plan. The treatment facilities master plan consisted of several components including a treatment plant flood risks evaluation, a vulnerability assessment to incorporate cannery process wastewater flows, creating a water balance and developing effluent management practices for BNR/Tertiary effluent, and updating current and future discharge and solids disposal requirements. The project scope included interviews with City planners and industrial representatives, as well as analyzing individual permits for each food processor in the area to develop a strategy for setting limitations based on actual capacity allocations. For future discharge requirements, Carollo evaluated three separate conditions including (1) assuming year-round discharge to the San Joaquin River, (2) assuming year round discharge to a recycled water customer, (3) discharge of secondary effluent/cannery process water to the City's ranchland. Carollo also assessed the potential for more stringent salinity controls and when/if reverse osmosis (RO) might be required.

Finally, the project included evaluation of potential regulatory changes on biosolids disposal options, including analysis of greenhouse gases resulting from the City's sludge drying beds.

Project Elements

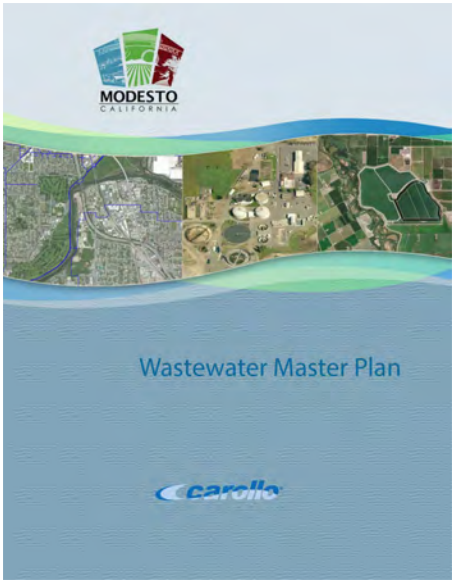
Type of Work: Facility and Sewer Collection System Master Planning, Hydraulic Modeling, Flow Monitoring, CIP Development

Project Dates: 08/2014 - 09/2015

Key Personnel:
Tim Loper, Collection System Lead
Richard Gutierrez, Treatment Process Engineer and Condition Assessment for 2007 Master Plan
Ryan Orgill, Collection System Project Engineer

Project Size:
10-year Master Plan
Collection System: 618 miles
Treatment Plant: 20 MGD

Reference:
William Wong, Utilities Director, 209.571.5801, wwong@modestogov.com



City of Riverside, CA - Integrated Master Plan

In 2008, Carollo completed an Integrated Master Plan for the Riverside Regional Water Quality Control Plant (RWQCP) and Collection System. The City has an extensive wastewater collection system, which includes over 800 miles of gravity sewer lines, 200 miles of sewer lateral, and 19 sewer lift stations divided into five basins. The plan proposed a long range financial plan and a two phase expansion/ equipment replacement plan to rehabilitate the RWQCP and increase capacity to 46 MGD (Phase 1) and 52 MGD (Phase 2).

By 2016, the City was facing challenges posed by aging facilities, stricter regulations, and finite resources. As a result, the City retained Carollo to update the 2008 Master Plan and complete a new, comprehensive collection system capacity and condition assessment to develop a well-conceived approach for near- and long-term City goals. Scope of work included:

- Collection system flow monitoring, flow and process modeling, condition assessment, Waste Discharge Requirements GAP Analysis, and CIP development.
- Current and future regulatory environment assessment to determine how these regulations might impact the need for future RWQCP facilities.
- TDS removal facilities analysis to improve cost effectiveness and implement designs to concentrate the Reverse Osmosis (RO) brine stream so that it could be trucked offsite, instead of having to build an expensive pipeline to a brine disposal line.
- Plant capacity increase during drought, and development of separate capacity trigger curves for both flow and loading to refine capacity analysis.

Once the CIP was developed, Carollo collaborated with the City to complete their financial planning and develop their rate and fee structure for the next five year time period. This analysis included development of new Equivalent Dwelling Unit (EDU) values and EDU definitions for the City's commercial categories. The need for revised EDU values was required due to increased loading and reduced flow amounts that customers were discharging to the collection system for treatment at the RWQCP.

Project Elements

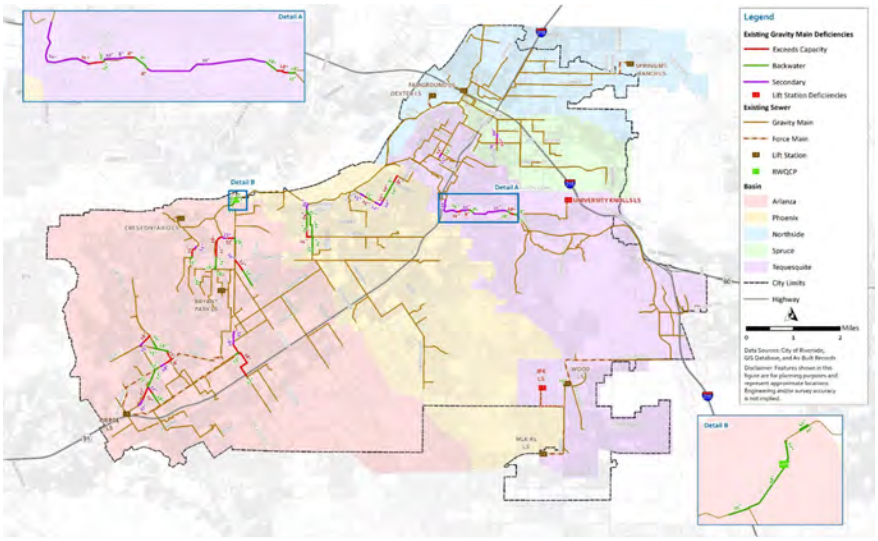
Type of Work: Collection System Planning, Master Planning, CIP Development

Project Dates: 11/2016 - 06/2018

Key Personnel:
Tim Loper, Collection System Planning Lead
Ryan Orgill, Hydraulics/Modeling
Rashi Gupta, Biosolids
David Baranowski, Condition Assessment Lead

Project Size:
20-year Master Plan
Collection System: 800 miles
Treatment Plant: 52 MGD

Reference:
Craig Justice, Deputy Public Works Director,
951.826.5341, cjustice@riversideca.gov



South Tahoe Public Utility District, CA - WWTP Process and Hydraulic Capacity Evaluation

The South Tahoe Public Utility District retained Carollo to provide a wastewater treatment plant process and hydraulic evaluation focusing on the activated sludge unit process, in an effort to help determine near- and long-term process needs to prioritize future capital expenditures. The team evaluated secondary treatment volume and configuration to meet current and future criteria, and evaluated the performance and feasibility of alternative treatment configurations to optimize performance and improve hydraulic capacity at the South Tahoe Public Utility District Wastewater Treatment Plant.

The project's scope of work included process performance data review and process model development using BioWin to predict effluent quality based on parameters such as basin configuration, influent strength, flow rate, and temperature. The District used the process modeling results to assess the criticality and vulnerability of structural assets and prioritize repair and rehabilitation alternatives. Additionally, the team utilized the hydraulic model constructed for the plant's headworks and primary treatment improvements to include characteristics of the activated sludge facilities. Detailed modeling of the aeration basin flow split box, and the aeration basin influent piping manifold was calibrated against the actual plant observations and extended through the secondary clarifiers to the secondary effluent pump station. The model allowed various alternative assessments to eliminate hydraulic bottlenecks that could be efficiently coupled with the rehabilitation improvements.

Project Elements

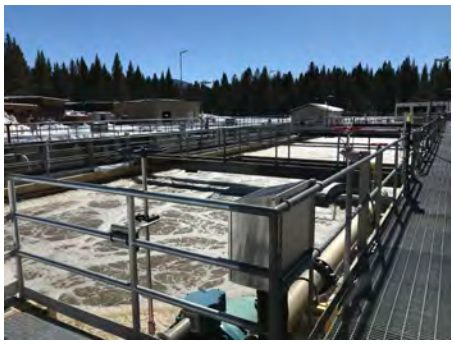
Type of Work: Facility planning, secondary treatment system

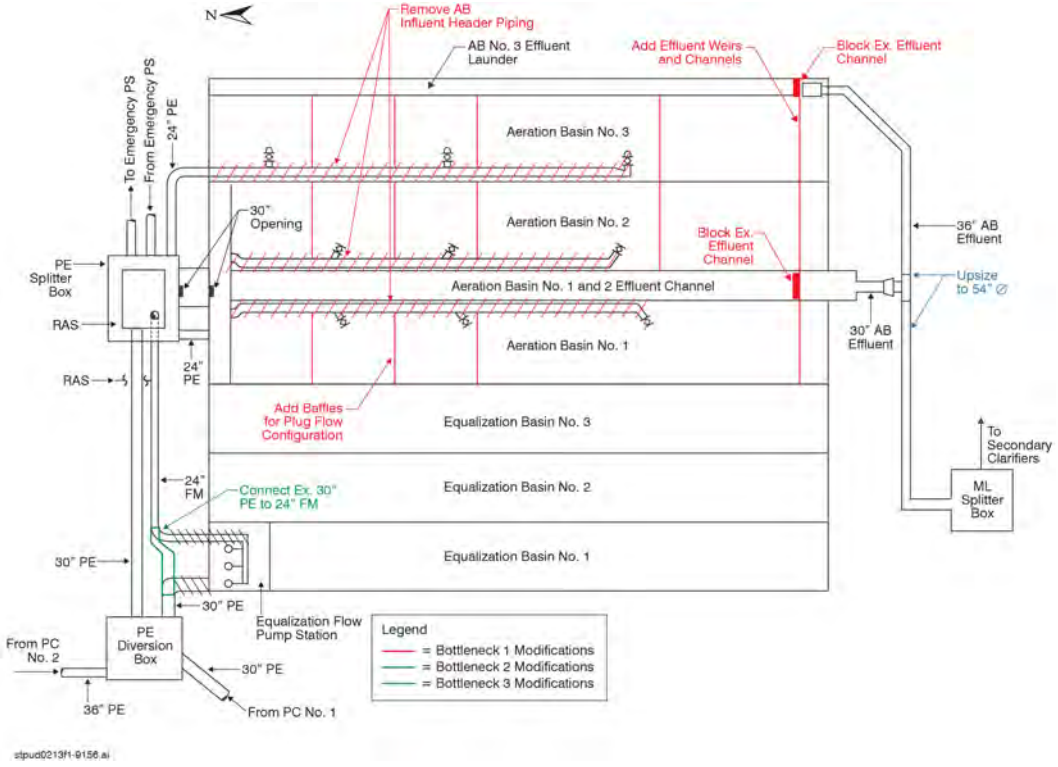
Project Dates: 01/2013 - 02/2013

Key Personnel:
Richard Gutierrez, Hydraulic Capacity Analysis;
Ron Appleton, Secondary Treatment Process Modeling (BioWin)

Project Size:
Treatment Plant: 7.7 MGD

Reference:
Shannon Cotulla, Engineering Manager, 530.544.6474, scotulla@stupd.dst.ca.us





Fairfield-Suisun Sewer District, CA - Blower Replacement Project

The Fairfield-Suisun Sewer District retained Carollo to assess the District's wastewater treatment plant's secondary treatment system and design aeration system improvements. Carollo developed a BioWin process simulation model to assess near-term and long-term aeration needs. The influent load to the wastewater treatment plant is heavily influenced by the amount of pretreatment accomplished by the local Anhueser-Busch brewery. Based on capital improvements planned by the brewery, the team projected future demands and planned a staged aeration improvement project to replace 20- and 40-year-old single-stage aeration blowers that reached the end of their useful lives.

Carollo prepared procurement documents for the new blower technology, assisted the District in awarding a procurement contract, and subsequently designed and replaced the outdated and inefficient aeration blowers with four new 350-hp high-speed turbo blowers. Other improvements included aeration piping repairs; a new 2-MW, 480-V emergency diesel-driven standby generator; and electrical system upgrades. The new 2-MW standby generator replaced the District's unreliable, existing 1,050-kW generator. Carollo retrofitted the existing fuel storage and supply system and designed modifications to the existing blower building to accommodate the new, larger generator. The electrical system upgrades included routing of a new 12-kV dedicated power feed to the blower building, replacement of 4,160-V transformers with new 480-V transformers, new area motor control centers, and PLC upgrades.

Additionally, the team conducted a cost analysis to determine whether the new generator should be located within the building or in an outdoor enclosure.

Carollo also assisted the District with securing SRF loan funding and $4 million in loan principal forgiveness through the Green Project Reserve by demonstrating over 20% energy savings compared to existing conditions.

Project Elements

Type of Work: Facility planning, secondary treatment system

Project Dates: 10/2015 - present (currently in construction)

Key Personnel:
Richard Gutierrez, Project Manager
Ron Appleton, Secondary Treatment Process Modeling (BioWin)
Preet Chaggar, Structural Engineer

Project Size:
23.7 MGD

Reference:
Jordan Damerel, Engineering Manager, 707.428.9155, jdamerel@fssd.com

Washoe County, NV - South Truckee Meadows Water Reclamation Facility (STMWRF) Master Plan

The County's goal was to update the STMWRF's current 6-mgd Facility Plan (completed in 2008) to cost-effectively implement future operations and infrastructure improvements in a timely manner. Focus areas included: flow and loading projections; Infosewer model development; pump station and force main improvements; sewer interceptor extension; treatment process facilities (secondary); condition assessments (structural, mechanical, electrical); treatment operations practices; BioWin process model development; filtration/disinfection facilities; alternatives and recommendations for a 20-year planning horizon; present-value financial analysis; and CIP development.

Specific work efforts included:

- Confirming sufficient capacity in the existing collection system for existing and future conditions, including influent pimping and force mains.
- Determining capacity and phasing plan, and developing a financing plan based on per home contribution for a new backbone sewer interceptor system.
- Completing a condition assessment review and outcomes to develop a prioritized project list.
- Providing for tighter nitrogen; identifying an expansion strategy that maximizes use of existing facilities.
- Enhancing the existing BioWin model to optimize plant operations; evaluating impact recycle streams from new solids handling facility on main stream process; supporting informed process decision making; and identifying process optimization opportunities.
- Identifying operational strategies focused on nutrient management and potential plant-wide cost savings through reduced energy and chemical usage.
- Addressing the issues associated with excessive algal growth in Huffaker Reservoir, which impacts performance and adversely affects the reuse water distribution system.

Project Elements

Type of Work: Facility and Collection System Master Planning, Hydraulic Modeling, BioWin Process Modeling, Condition Assessment, Alternatives Evaluation, Financial Analysis, CIP Development

Project Dates: 03/2015 - 02/2016

Key Personnel:
Ron Appleton, Process Modeling (BioWin)
Tim Loper (QA/QC), Master Planning

Project Size:
20-year Master Plan
Collection System: 300 miles
Treatment Plant: 6 MGD

Reference:
Rick Warner, PE, Senior Engineer,
775.954.4621, rwarner@washoecounty.us

Truckee Sanitary District, NV - 2017 Hydraulic Model Development

The Truckee Sanitary District is responsible for wastewater collection and conveyance within the greater Truckee area. The District's collection system is separated into four major basins: the Martis Valley Basin, the Donner Lake Basin, the Tahoe Donner Basin, and the Glenshire Basin. Due to license size restrictions, the District developed four separate hydraulics models (one for each basin) using the Innovyze InfoSewer® wastewater collection system hydraulic modeling software application. Previously, the District completed model verification, capacity analysis, and model calibration on the Martis Valley hydraulic model. The other three hydraulic models were constructed, but no model verification or system analysis tasks had been completed.

The District retained Carollo to complete the model development of the remaining three basins so that four complete models were ready to analyze the effects of new planned developments. Work efforts included data collection and review; existing hydraulic model review to understand the model development assumptions and methodology, to check for data input errors (pipe sizes, slopes, etc.), and to understand how average dry weather flows and wet weather flows were input into the hydraulic model; hydraulic model update and verification to assure that the modeled dry and peak wet weather flows were well replicated by the hydraulic models; and system evaluation to identify capacity deficiencies within the District's collection system.

After completion of three basins, the District contracted with Carollo to complete and update the Martis Valley Basin model.

Project Elements

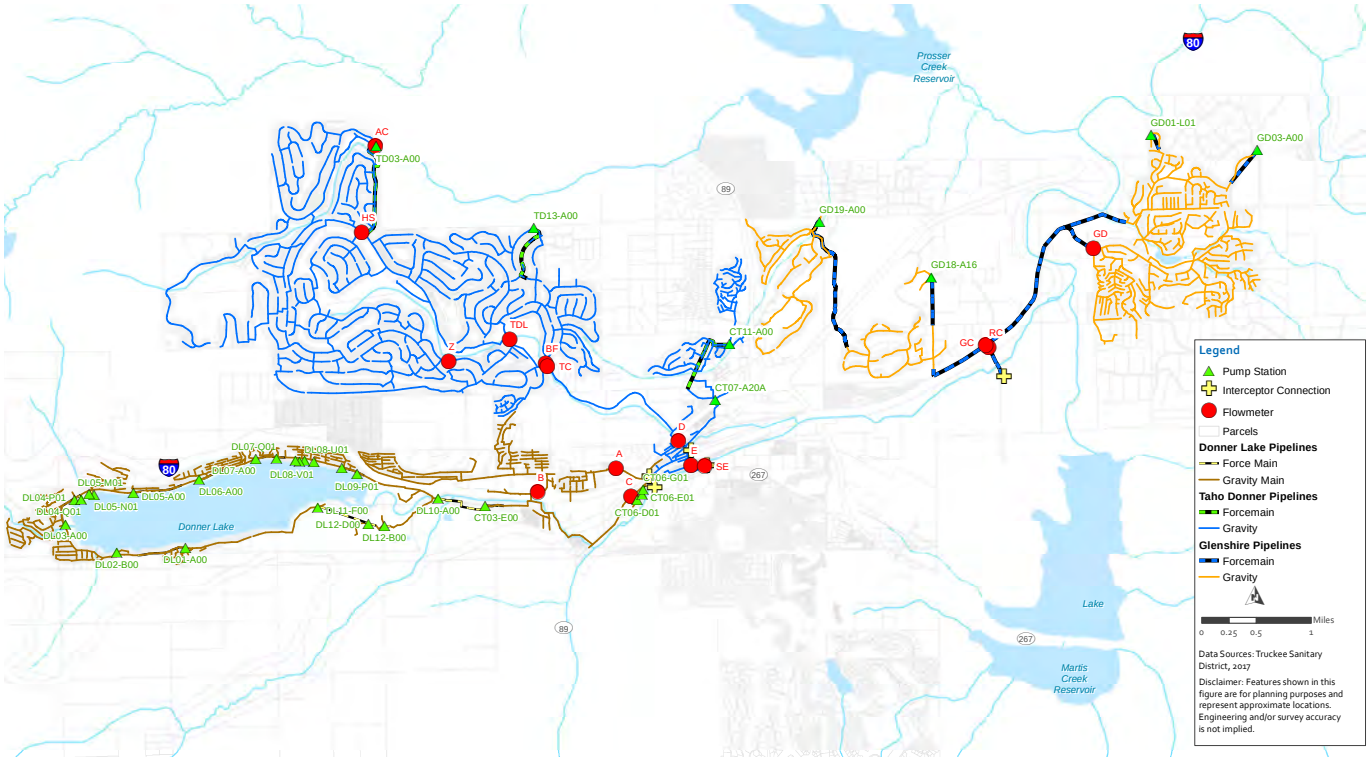
Type of Work: Wastewater collection system planning

Project Dates: 03/2017 – ongoing

Key Personnel:
Tim Loper, Principal-in-Charge
Ryan Orgill, Project Manager
Danielle Orgill, Project Engineer

Project Size:
10-year CIP Master Plan
Collection System: 300 miles

Reference:
Blake Tresan, PE, General Manager, 530.587.3804, btresan@truckeesan.org



Carollo worked with TSD staff to updated the Districts Collection System Models for all four of the service areas.

Washoe County, NV - Pleasant Valley Interceptor Alternatives Analysis and Design

Washoe County envisioned the Pleasant Valley Interceptors (PVI) project to serve the County's southerly portions for the last 30+ years. The PVI was to be constructed in four Reaches: Reach 1 originates at the South Truckee Meadows Water Reclamation Facility (STMWRF); Reach 2 terminates at Damonte Ranch Parkway, just south of Steamboat Parkway. In the early to mid 2000s, work intensified to plan, design, and acquire land for Reaches 3 and 4; however, the economic recession halted all work in late 2000.

The planned alignment for Reach 3 extends from the Reach 2 terminus 2 south to the County's Dorothy Town Lift Station near Towne Drive. The County is taking on the responsibility of Reach 3 construction. The Reach 4 planned alignment continues south from the Dorothy Town Lift Station to Pleasant Valley near Pagni Lane. Reach 4 is intended to provide sewer service to approximately 1,500 homes in World Properties Inc. (WPI) and St. James' Village, with WPI being responsible for design and construction.

Approximately three years ago, WPI renewed interest in building Reaches 3 and 4. WPI designed and obtained permits to locate a force main within the US 395 alignment, originating at the Dorothy Town Lift Station and terminating at Pagni Drive. Because WPI's intent was to start building in 2018, Washoe County needsed to finalize plans for Reach 3.

Reach 3 was planned as a gravity interceptor, with various challenging conditions along the planned alignment. Recent sale of the Station Casino property, the major planned development that would trigger construction of Reach 3, was sold to a developer planning a smaller development, with much lower flow generation anticipated. Additionally, other developers' tributary to Reach 3, Lewis Homes and Damonte Ranch, began investigating developing available land.

Carollo recently completed the STMWRF Facility Plan Update, which included planning and wastewater collection system hydraulic modeling for the STMWRF service areas. Carollo updated the County's InfoSewer hydraulic model and used the model to identify existing capacity restrictions and was familiar with the overall project and impacts. This project further refined the master plan for PVI Reaches 3 and 4 and included the following project scope:

- Convert the County's wastewater collection system hydraulic model from InfoSewer to InfoSWMM.
- Use the InfoSWMM model to develop a master plan for PVI Reaches 3 and 4, using the planned gravity interceptor as a baseline.
- Coordinate with the development community and County staff to gain knowledge of development timing, drivers, and critical success factors.
- Perform alternatives evaluation (high level alignment study) for Reach 3 alignment, considering both gravity and force main systems, soils, corrosion, and odor mitigation.
- Identify solutions for areas that were presently on septic systems, and have no immediate driver to connect to the municipal system.
- Develop cost estimates and cost allocation for selected alternatives.
- Determine phasing and/or interim construction strategies for selected infrastructure.

Project Elements

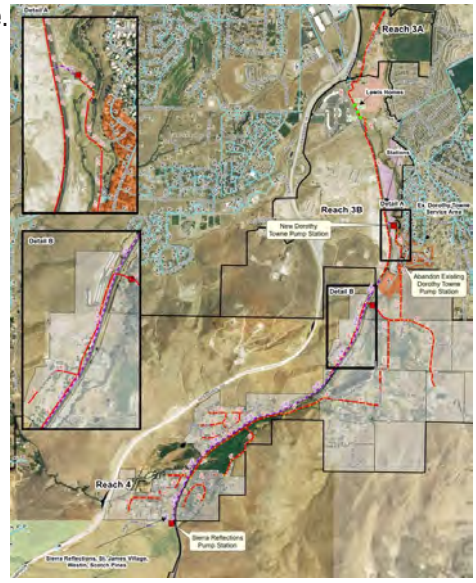
Type of Work: Alignment Alternatives Study, Model Conversion, Cost Estimating, Infrastructure Design and Construction Phasing

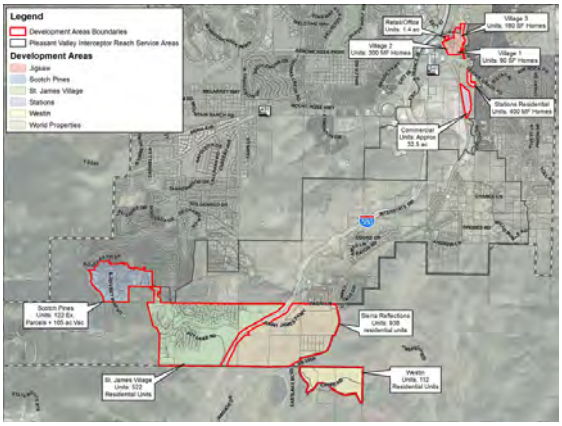
Project Dates: 04/2016 - Ongoing

Key Personnel:
Tim Loper, Project Manager;
Ryan Orgill, Project Engineer

Project Size:
Collection System: 300 miles

Reference:
Rick Warner, PE, Senior Engineer,
775.954.4621, rwarner@washoecounty.us





Subsequently, Carollo provided planning, modeling, force main risk assessment, pump station capacity evaluation; interceptor, pump station, and forcemain preliminary design; detailed design; and prepared construction contract documents for the Pleasant Valley Interceptor Reach 3, which included gravity conveyance and the Geiger Lift Station and associated force main.

City of Reno, NV - Northwest Reno Sanitary Sewer Capacity Analysis and Master Plan

The City of Reno retained Carollo to conduct a sanitary sewer capacity analysis and develop a master plan for the City's Northwest area. Carollo collected and reviewed existing data; conducted site visits to gather additional information on the City's collection system; and interviewed staff to develop a better understanding of suspected operations and maintenance issues, flow diversions, and other collection system hydraulic information. The team developed a temporary flow monitoring program; reviewed the City's existing SewerGEMS model to expand the existing wastewater collection system hydraulic computer model, including nine major trunk lines; calibrated the model using flow monitoring data; reviewed planning documents to determine existing and build-out wastewater flow projections; modeled existing and future system capacity evaluations; and developed prioritized, recommended capacity projects based on deficiencies.

Project Elements

Type of Work: Data Collection and Review, Hydraulic Modeling, Flow Monitoring, GIS Database Update

Project Dates: 01/2018 - 11/2018

Key Personnel:
Tim Loper, Principal-in-Charge
Ryan Orgill, Project Manager
Danielle Orgill, Project Engineer;
Riley Powers, GIS Analyst

Project Size:
20-year Master Plan
Collection System: 475 miles

Reference:
Dustin Waters, PE, Project Manager,
775.321.8352, waterd@reno.gov

City of Reno / City of Sparks, NV - Truckee Meadows Water Reclamation Facility (TMWRF) Process Optimization Plan

The cities of Reno and Sparks selected Carollo to conduct a process optimization study at the Truckee Meadows Water Reclamation Facility (TMWRF). Scope of work included:

- Facility Optimization. Carollo used BioWin to determine most the most efficient use of the expanded TMWRF capacity, particularly in terms of the costly nitrogen removal processes. Carollo also provided training staff to use BioWin to provide long-term benefits for all aspects of the TMWRF operations and permitting processes.
- Digester Gas Production and Use. Carollo updated the digester gas and co-generation study conducted earlier in light of the new acid-phase digester, aeration blowers, heat loop system, and new generator technology.
- Biosolids Management. Carollo analyzed the impact of the new sludge thickening and digestion processes in terms of sludge dewatering and disposal, particularly in light of available new technology and in conjunction with the facility optimization and digester gas use studies.

Project Elements

Type of Work: BioWin Process Modeling, Modeling, Condition Assessment, Alternatives Evaluation, Financial Analysis, CIP Development

Project Dates: 04/2006 - 01/2007

Key Personnel:
Ron Appleton, Process Modeling (BioWin)

Project Size:
Treatment Plant: 42 MGD

Reference:
Michael Drinkwater, PE, Treatment Plant Manager
775.861.4116, mdrinkwater@cityofsparks.us

CLIENT REFERENCES

Just Ask Our Clients

Carollo is known for the large number of clients with whom we have maintained long-term relationships. Our experience shows that open communication, collaboration, and coordination build trust, minimize conflict, and eliminate surprises. Our references can attest to our project team members' technical capabilities, management skills, work quality, and commitment to client service. Our past performance is the best indicator of the level of service we will provide to your Master Sewer Plan, and we encourage you to contact our references.

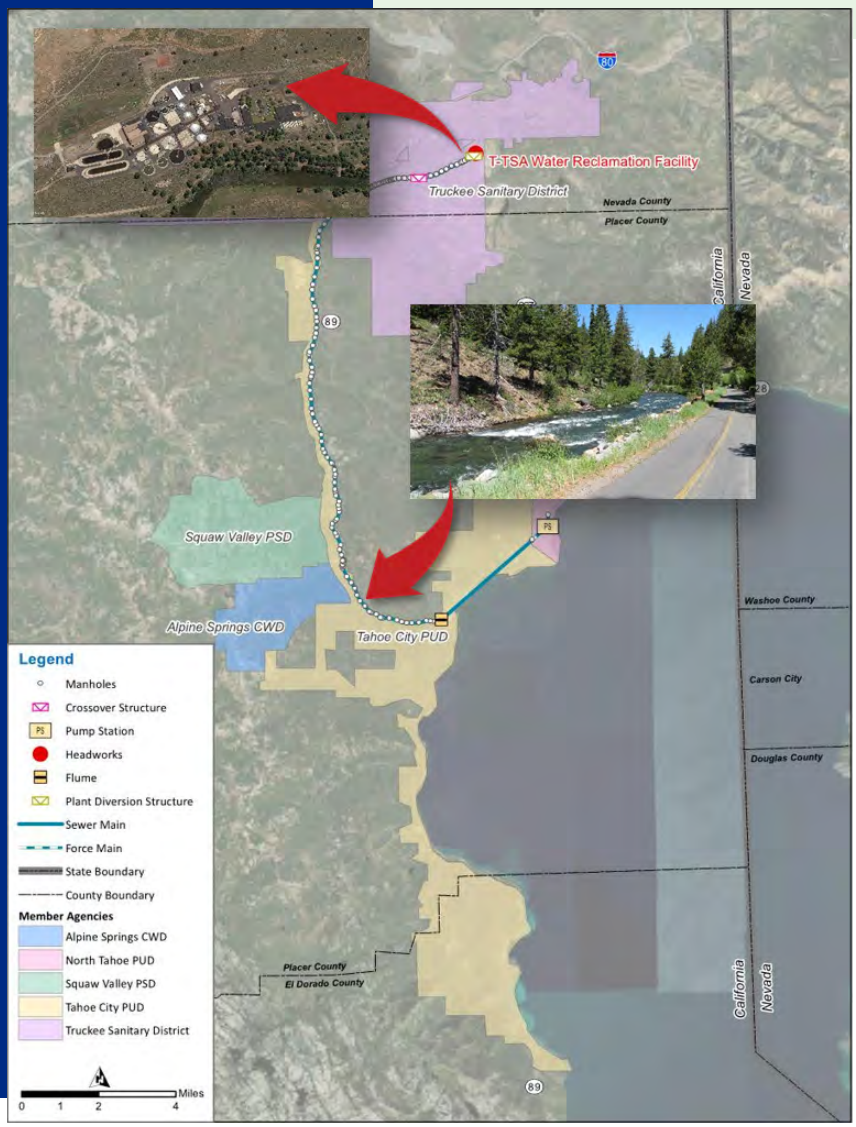
Project	Services	Reference
District-Wide Master Plan West County Wastewater District, CA (2013)	• Sewer collection/pumping evaluation • Performance/capacity study • Flow monitoring projections • Hydraulic modeling • GIS integration • Alternatives analysis, • CIP implementation	• **E.J. Shalaby**, Senior Consultant 2910 Hilltop Drive, Richmond, CA 94806 510.222.6700 ejshalaby@gmail.com • Involved Attorneys: None
Wastewater Collection System and Treatment Master Plan Update City of Modesto, CA (2015)	• Sewer collection/pumping evaluation • Performance/capacity study • Flow monitoring projections • Hydraulic modeling • GIS integration • Alternatives analysis • CIP implementation	• **William Wong**, Utilities Director 1010 Tenth St., Ste. 4600 Modesto, CA 95353 209.571.5801 wwong@modestogov.com • Involved Attorneys: None
Integrated Master Plan City of Riverside, CA (2018)	• Collection system planning • Master planning • Facility flow monitoring and process modeling • Condition assessment • GAP analysis • CIP development	• **Craig Justice**, Deputy Public Works Director 3900 Main St., 4th Fl., Riverside, CA 92522 951.826.5341 cjustice@riversideca.gov • Involved Attorneys: None
WWTP Process and Hydraulic Capacity Evaluation South Tahoe Public Utility District, CA (2013)	• Facility planning (secondary treatment system) • Process model development (BioWin) • Hydraulic modeling to determine capacity and address bottlenecks	• **Shannon Cotulla**, Engineering Manager 1275 Meadow Crest Dr., South Lake Tahoe, CA 96150 530.544.6474 scotulla@stupd.dst.ca.us • Involved Attorneys: None
Blower Replacement Fairfield-Suisun Sewer District (2015)	• Facility planning (secondary treatment system) • BioWin process simulation modeling • Blower replacement • Aeration piping, electrical upgrades	• **Jordan Damerel**, Director of Engineering 1010 Chadbourne Rd., Fairfield, CA 94534 707.428.9155 jdamerel@fssd.com • Involved Attorneys: None

Client References (continued)

Project	Services	Reference
EchoWater Project Sacramento Regional County Sanitation District, CA (2013)	• Business case alternatives evaluations • Equalization facilities planning, design, and construction • Hydraulic Analysis • Process Modeling	• **Vick Kyotani**, Program Manager 8521 Laguna Station Rd., Elk Grove, CA 95758 916.875.9001 kyotaniv@sacsewer.com • Involved Attorneys: None
South Truckee Meadows Water Reclamation Facility (STMWRF) Master Plan Washoe County, NV (2015)	• Facility and collection system master planning • Hydraulic modeling • BioWin process modeling • Condition assessment • Alternatives evaluation • Financial analysis • CIP development	• **Rick Warner**, Senior Engineer 1001 East 9th St., Reno, NV 89512 775.954.4621 rwarner@washoecounty.us • Involved Attorneys: None
2017 Hydraulic Model Development Truckee Sanitary District, NV	• Wastewater collection system planning • Hydraulic modeling • Process performance modeling • Data collection/review	• **Blake Tresan**, General Manager 12304 Joerger Dr., Truckee, CA 96161 530.587.3804 btresan@truckeesan.org • Involved Attorneys: None
Pleasant Valley Interceptor Alternatives Analysis and Design Washoe County, NV (2016)	• Sewer collection/pumping evaluation • Performance/capacity study • Flow monitoring projections • Hydraulic modeling • GIS integration • Alternatives analysis • CIP implementation	• **Rick Warner,** Senior Engineer 1001 East 9th St., Reno, NV 89512 775.954.4621 rwarner@washoecounty.us • Involved Attorneys: None
Truckee Meadows Water Reclamation Facility (TMWRF) Process Optimization Plan City of Reno/ City of Sparks, NV (2007)	• BioWin process modeling • Condition assessment • Alternatives evaluation • Facility optimization, biosolids management, and digester gas production/use • Financial analysis • CIP development	• **Michael Drinkwater,** Treatment Plant Manager 8500 Clean Water Way, Reno, NV 89502 775.861.4116 mdrinkwater@cityofsparks.us • Involved Attorneys: None
Northwest Reno Sanitary Sewer Capacity Analysis and Master Plan City of Reno, NV (2018)	• Data collection/review • Hydraulic modeling • Flow monitoring • GIS database update • Master planning • Capacity analysis	• **Dustin Water**, Project Manager 1 East First St., Reno, NV 89501 775.321.8352 waterd@reno.gov • Involved Attorneys: None

PROJECT UNDERSTANDING

The Truckee Tahoe Sanitation Agency (TTSA, Agency), is seeking to partner with an Environmental Engineering firm to develop a Master Sewer Plan (Master Plan) that will evaluate the capacity, resiliency, and condition of its Water Reclamation Plant (WRP), and Truckee River Interceptor (TRI) system. The planning period for the Master Plan is 25 years. TTSA is a regional provider of wastewater collections and treatment services in the north Lake Tahoe and Truckee areas of the Sierra Nevada Mountains along the Interstate 80 corridor between Sacramento, California and Reno, Nevada. TTSA's service area and member agencies include the North Tahoe Public Utilities District (NTPUD), Tahoe City Public Utilities District (TCPUD), Alpine Springs Community Water District (ASCWD), Squaw Valley Community Services District (SVCSD), and Truckee Sanitary District (TSD). In addition, the Northstar Community Services District discharges wastewater to TSD, and is therefore also served by TTSA.



The extensive and varied nature of the TTSA service area creates challenging conditions for flow projections, and ultimately facility planning. Stringent regulations drive strict effluent limits at the WRP. The narrow corridor along the Truckee and Highway 89 may offer significant TRI expansion challenges. TTSA needs a team with extensive local knowledge and robust flow projection methodologies to create a reliable and justifiable 25-year CIP.

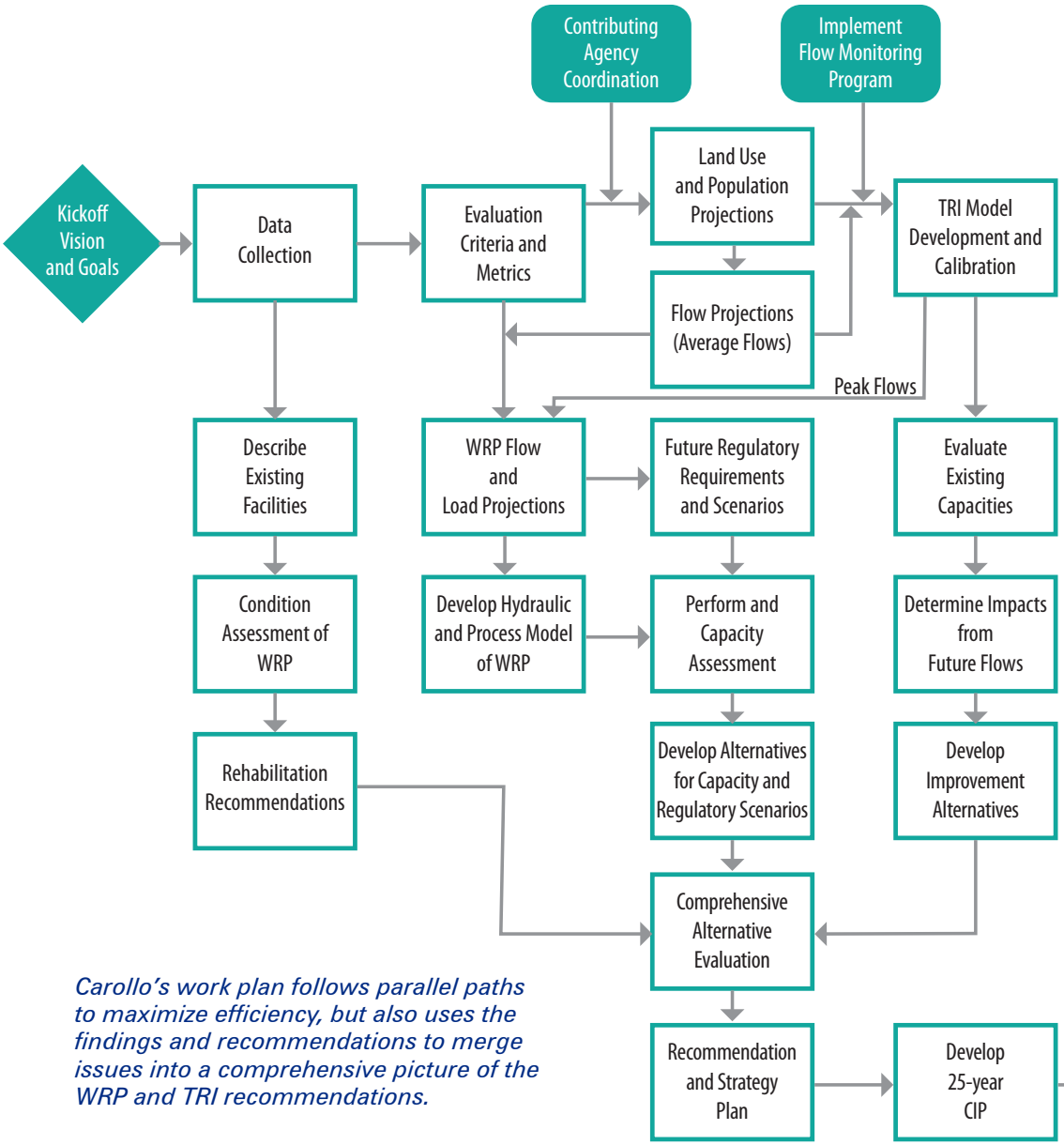
The TRI extends from its southern reach in Tahoe City to the WRP, and runs exclusively along the Truckee River. It ranges in size from an 24" to a 48" gravity sewer and is constructed almost exclusively of reinforced concrete pipe. The corridor is narrow and limited in terms of options for additional conveyance capacity, and construction or rehabilitation is complicated and expensive.

The WRP consists of conventional treatment, advanced biological phosphorus removal (Phostrip), chemical treatment, biological nitrogen removal (BNR), advanced treatment, meso and thermo phillic digestion, solids handling, and land disposal with soil aquifer treatment. The water makes its way into Martis Creek and the Truckee River watersheds through soil aquifer discharge. The treatment processes is highly complex, and the Agency has a staff of experienced engineers and operators that know the plant operations inside and out after 20-plus years of TTSA experience. Up to this point, staff have managed to run the plant efficiently without long term planning efforts. However, with growth in the basin, an aging plant, and potential regulation changes, the Agency is looking to conduct a 25-year planning effort to develop a strategic wastewater plan to mitigate future risks the Agency may face.

Developing a 25-year capital improvement plan has multiple challenges that must be addressed to achieve success. Specific challenges that this plan must address include:

- Developing accurate and realistic flow projections as the basis for all expansion alternatives.
- Developing a reliable, trusted process model as the base for strategic decision making.
- Addressing redundancy and reliability in the digestion and solids handling processes.
- Conducting a WRP condition assessment to identify risks to the Agency from deteriorating assets.
- Understanding how the regulatory picture could drive process and monitoring requirements.
- Developing a user friendly, accurate, and reliable TRI model that accounts for boundary conditions, complex siphon hydraulics, and includes wet weather parameters to account for the intense peak flows that can occur during rain on snow events.

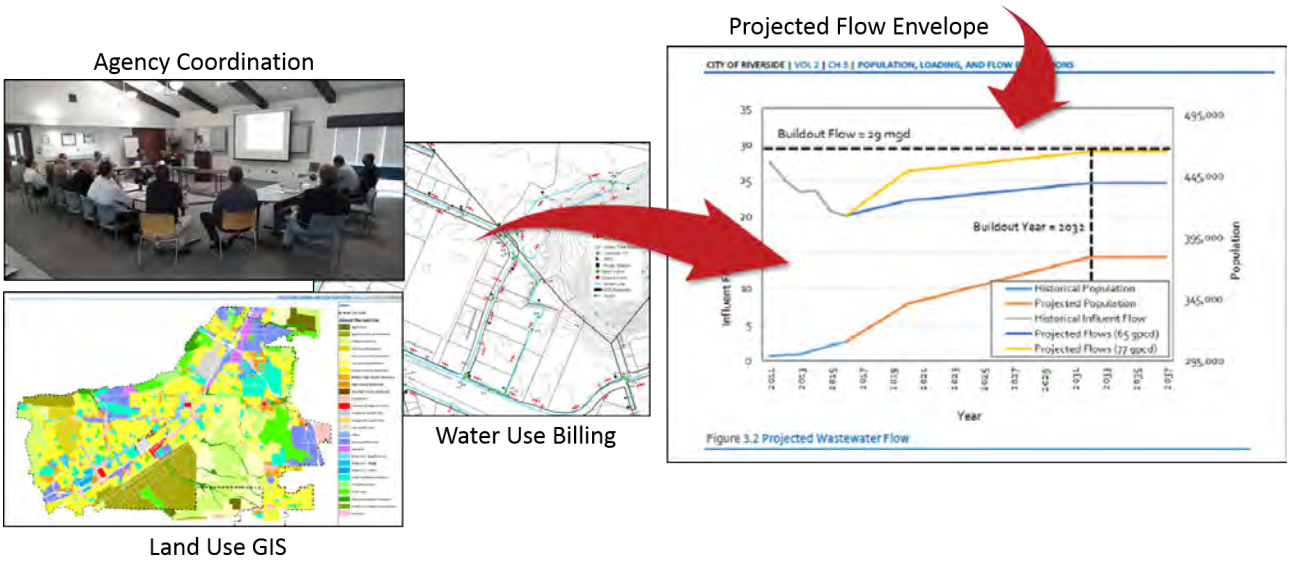
Addressing these challenges and merging the issues and recommendations into a strategic plan is the crux of any comprehensive planning effort. Task coordination and alignment is paramount to develop a strategic plan. As such, we developed a work plan to show how we plan to coordinate tasks in an effort to ensure a nexus related to regulatory, capacity, and process needs. We present some highlighted focus areas of our approach on the following pages.



Carollo's work plan follows parallel paths to maximize efficiency, but also uses the findings and recommendations to merge issues into a comprehensive picture of the WRP and TRI recommendations.

Local knowledge, agency coordination, and a robust land use approach provide a defensible flow projection window for facility planning

Our initial thoughts: We all love looking into the crystal ball. Even if we don't like it, it's a necessity of facility planning. Carollo's planning team has refined their approach to developing population and flow projections over the last 15 years, to the point that its less crystal ball, and more of an exact science. Utilizing GIS, water billing records, agency-specific planning assumptions, and good old fashioned face-to-face coordination, our approach develops a justifiable and realistic window (or envelope) of flow projections that allows for strategic planning of Agency facilities. Our approach accounts for the variability in the dynamics of contributing agency growth and densification, while still allowing the required flexibility to be nimble in capital project implementation.



Using an integrated approach to meld GIS, water meter billing records, and agency coordination to develop a complex and complete understanding of existing flow contributions and regional growth, Carollo develops a realistic projection of future flows that will set the foundation for facility planning over the next 25-years. Accounting for reductions in per-capita wastewater generations as well as the potential rebound, allows us to develop a realistic but conservative estimate of projected flows.

Process modeling combines a robust technical approach with a collaboration approach to build confidence in WRP process simulation

The BioWin wastewater treatment process simulator (EnviroSim Associates, Hamilton, Ontario, Canada), proposed for this project will incorporate a range of biological, physical, and chemical models to simulate the existing TTSA Water Reclamation Plant (WRP) facilities. The figure, on the following page, shows our initial build at the WRP configuration, simulating the existing conventional treatment, chemical treatment, biological nutrient removal (BNR), advanced waste treatment (AWT), sludge thickening, anaerobic digestion, and sludge dewatering processes. Such a "whole plant" process model integrates liquid treatment and solids handling unit processes to account for the impacts of one on the other, especially the impacts of solids handling recycles on liquid treatment nutrient removal processes.

The necessary biokinetic models to simulate the existing WRP facilities include:

- aerobic suspended-growth biodegradable COD removal (high-purity oxygen activated sludge)
- anaerobic phosphorus release from activated sludge (PhoStrip)
- aerobic submerged filter fixed-film nitrification (BioStyr)
- anoxic submerged filter fixed-film denitrification with supplemental methanol addition (BioStyr)
- anaerobic sludge digestion processes (hydrolysis, acetogenesis, and methanogenesis)

The necessary physical models to simulate the existing WRP facilities include:

- sedimentation
- high-purity oxygen dissolution and carbon dioxide stripping in the 3-stage bioreactor
- carbon dioxide transfer in first- and second-stage recarbonation
- oxygen transfer in the granular media fixed film nitrification reactors

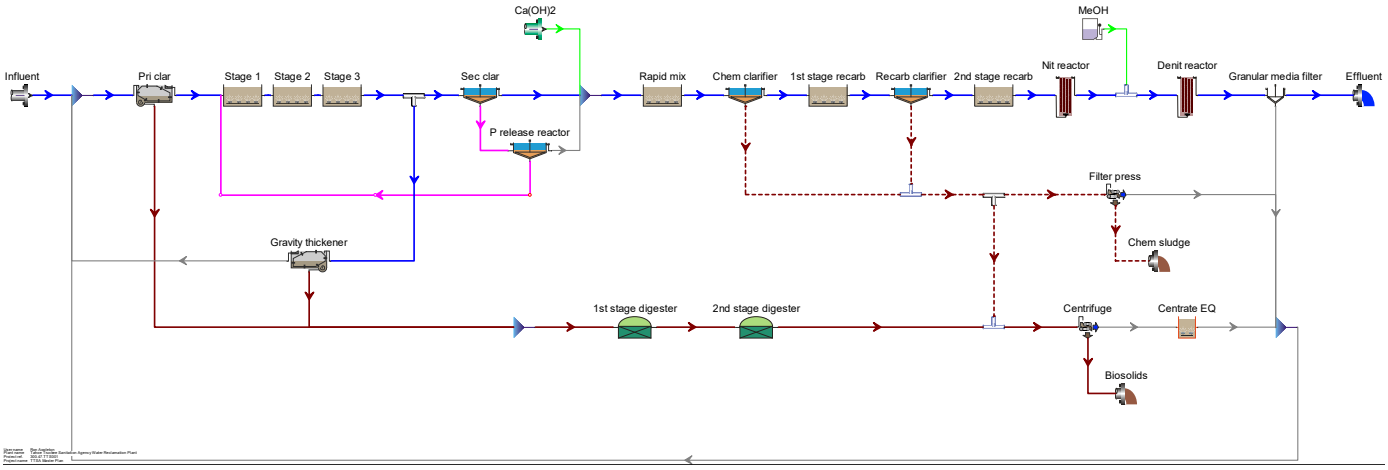
The necessary chemical models to simulate the existing WRP facilities include:

- weak acid/base model to calculate pH in all unit processes
- hydroxyapatite precipitation

BioWin does not include a calcium carbonate precipitation model needed to simulate sludge production from the recarbonation clarifiers, but it includes an advanced capability to develop a "grey box" model using two built-in state variables, calcium (Ca^{2+}) and carbonate (CO_3^{2-}).

Developing the process model of the existing WRP facilities will be a collaborative effort with Agency staff during the configuration, data validation, and calibration, steps. Existing operating procedures will be incorporated into the configured process model based on discussions with plant operators. Any recommended special sampling to provide steady-state and diurnal concentrations for constituents of interest will be developed as part of the data validation step, a critical review of historical operations and performance data that will be used for process model calibration. The calibration and validation steps will demonstrate the ability of the process model to accurately simulate key parameters such as effluent nitrogen and phosphorus concentrations, high-purity oxygen demands, nitrification aeration demands, denitrification methanol demands, biological and chemical sludge production, anaerobic digestion volatile solids reduction, digester gas production, and dewatered sludge production.

The calibrated process model will be used to determine the overall process capacity of the existing WRP facilities and which specific unit processes are "bottlenecks" to realizing additional capacity. The calibrated process model will be used as a starting point to evaluate potential performance improvements and/or operating cost reductions of alternative treatment configurations.



A "whole plant" process model will help Agency staff better understand current plant operations, provide a tool to determine overall process capacity and identify bottlenecks, and provide a basis to evaluate alternative liquid treatment and solids handling technologies.

Carollo's initial assessment at the WRP yielded multiple focus areas and will help target the primary areas where optimization can occur using BioWin and collaboration with TTSA Staff

1 Ballast Ponds

2 Methanol Storage Facility

- Evaluate alternatives to methanol as a carbon source for denitrification. Potential low-cost local sources include high-strength waste from craft breweries.

3 BNR Facility

- Evaluate alternatives to minimize dissolved oxygen carryover in the nitrified effluent to minimize supplemental carbon addition in the denitrification reactors.
- Evaluate options for addressing blower turndown limitations, redundancy, and reliability issues.

4 Bentonite Lined Emergency Equalization Basin

- Evaluate lining options to provide additional operational flexibility for equalization of plant flows.

5 Biofilters

- Add odor control for Headworks Building.

6 Dewatering Building

7 Waste Gas Flare

- Potential future air permitting issue.
- Flare has had some operational issues with the igniter.
- Evaluate digester gas production and other potential uses such as cogeneration.

8 Digester Area

- Evaluate alternative digester operating schemes to produce Class B biosolids. These alternatives will include hot water production and heat transfer capacity to provide a reliable robust system.
- Evaluate options for boiler replacement and addressing NFPA 820 issues in existing control building.
- Look at alternatives for optimizing digester heating system.

9 Evaluate recycle of a portion of the nitrified effluent back to the headworks to achieve denitrification using readily biodegradable organics in the raw sewage, instead of with purchased methanol.

10 Chlorine Facility

- Evaluate alternatives to gaseous chlorine to address safety concerns.

11 Headworks Building

- In-house improvements planned to replace screens and washer compactors.
- Currently no method to isolate influent flows from Glenshire. Consider options to provide diversion/isolation capability.

12 Solids Handling Building

- Belt filter press lacks redundancy for chemical storage.
- Consider alternatives for replacing hydrated lime vacuum blower system.

13 Primary Clarifiers

- 3 are 40 years old.
- Scum noted in effluent launders.

14 HPO Activated Sludge Reactors

- Evaluate alternative bioreactor configurations to reduce aeration costs while continuing to produce a well-settling sludge.
- Evaluate alternatives to replace obsolete PSA system as backup to LOX.

15 Secondary Clarifiers

- Structural evaluation required on tanks, spalling of concrete observed on walls.

16 Chemical Clarifiers

- Evaluate biological phosphorus removal alternatives to reduce chemical addition and associated solids handling costs. These alternatives will address potential impacts of BioP sludge on digester struvite formation.

A Multi-disciplined team focused on a technological approach drives meaningful and implementable condition assessment recommendations

Our Initial Thoughts: Condition assessments are a strange animal — a bunch of people walking around, waving their hands at equipment, and drawing conclusions. The struggle is bringing the conclusions and data into a useful and meaningful source of information that can be turned into implementable projects.

Carollo has developed advanced tools to support condition assessments. One such tool is CarolloAM, a web based assessment tool that can run on a tablet. We can configure the tool to accept asset data from the Agency's databases. Carollo's tool captures leading industry best practices outlined in the International Infrastructure Management Manual (IIMM), and harnesses the experience of all of our disciplines in a central location, accessible to our assessment team. The tool also captures discipline observations, photographic support, and asset-specific information which can be integrated with other asset management systems, as needed.

Carollo's multi-disciplined team includes specialists in electrical, instrumentation, controls, mechanical, and structural engineering with extensive experience in condition assessment projects and asset management programs. The team, utilizing the CarolloAM tool, combined with Agency staff coordination, will result in easy to use, implementable rehabilitation recommendations that can be accounted for while developing the 25-year strategic plan.

Our understanding of local conditions and national regulatory drivers builds targeted risk scenarios that will determine capital and monitoring expenditures

There are several site-specific issues that contribute to uncertain future regulatory requirements for TTSA. To help mitigate against future regulatory uncertainty, the master plan alternatives must be evaluated using a range of future regulatory scenarios that capture the bookends of potential regulatory constraints. Defining these regulatory constraints is critical. Carollo brings both local knowledge of the issues that can manifest into regulatory drivers from past projects in the Truckee River Watershed, as well a big picture perspective gained from permit support work in other highly regulated systems throughout the arid west.

Our Initial Thoughts: TTSA's WRP discharges treated effluent to subsurface disposal trenches, which then migrates towards the Truckee River and Martis Creek, a tributary of the Truckee River. TTSA's 2002 Waste Discharge Requirements (WDRs) include treatment plant effluent limits, groundwater well limits, and receiving water limits aimed at protection of the beneficial uses of Martis Groundwater Basin, the Truckee River, and Martis Creek.

Typical of most wastewater master planning processes, we will evaluate attainment of existing and potential future regulations under estimated future flows and loads. While there is always uncertainty associated with predicting future regulatory requirements, TTSA is faced with some unique challenges that contribute to a greater degree of regulatory uncertainty, including:

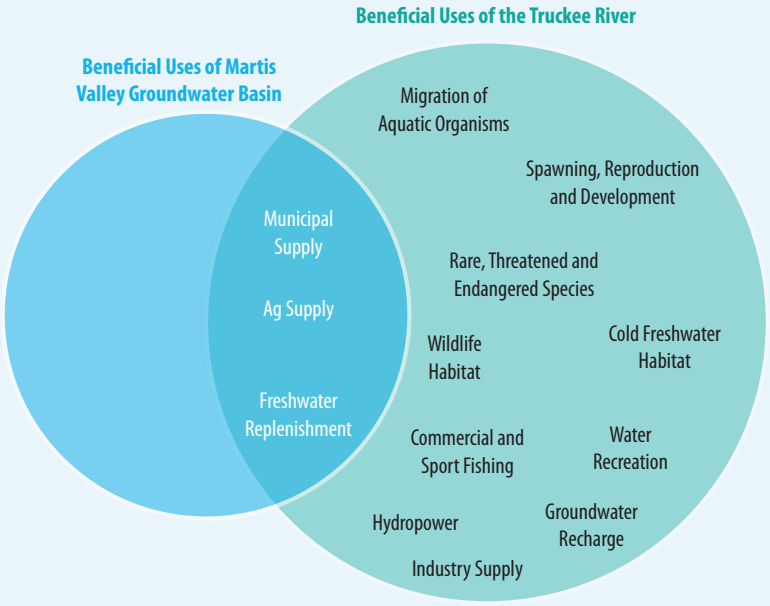
- Potential change in permit from WDRs to a NPDES discharge permit
- Potential changes in receiving water quality standards

Our approach is to develop multiple regulatory scenarios to determine the impact of future changes to evaluate the risk the Agency may face. Ultimately, cost of implementation and associated facilities will play a role in strategic planning.

Two regulatory drivers could impact strategic planning of the WRP

Shifting to a NPDES Permit Impacts Treatment and Monitoring Programs

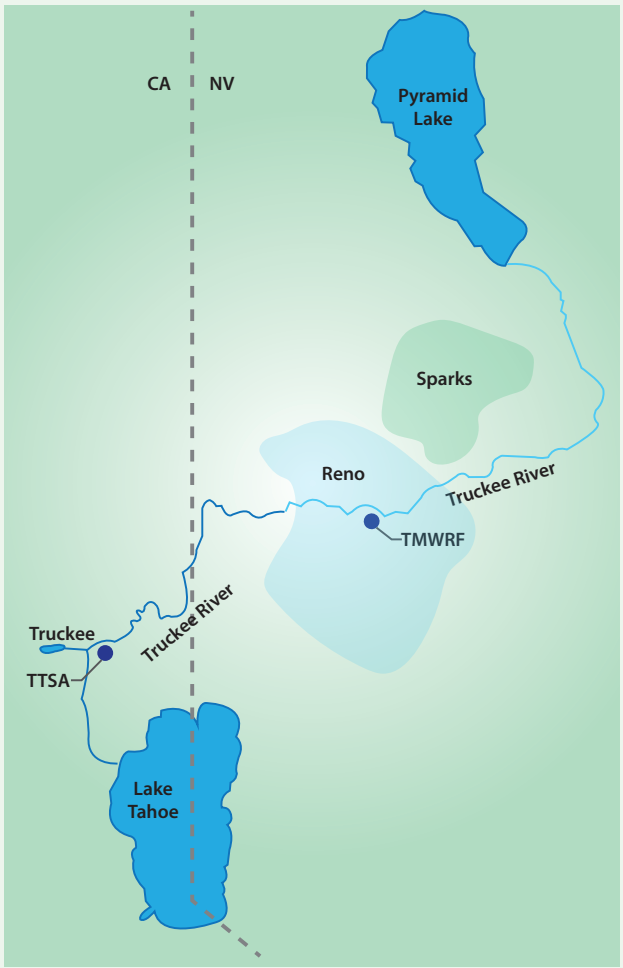
TTSA is well aware of an ongoing legal action against Maui County for violation of the Clean Water Act (CWA). The Maui County wastewater reclamation facility injects effluent into groundwater wells for disposal, with eventual migration to the Pacific Ocean. The current legal opinion finds Maui County in violation of the CWA based on the effluent disposal approach being functionally equivalent to a point source discharge to a navigable water, which requires a NPDES permit. While Maui County is appealing to the US Supreme Court, there is a possibility that current legal findings will hold, setting a precedent for utilities with similar effluent discharge practices, such as TTSA. While TTSA's WDRs consider indirect discharge to Martis Creek and the Truckee River, NPDES permit limits would be based on a point source discharge to these receiving waters. A shift from WDRs to a NPDES permit has potential for an increased number of water quality based effluent limits, more restrictive limits, and increased regulatory oversight.



Changes in Water Quality Standards could be Driven by Downstream Users

The Truckee River is a valued resource that provides multiple beneficial uses including support of threatened and endangered species, municipal water supply, and recreation, to name a few. Water quality standards (WQS) for the river, which ultimately drive permit requirements, are specified by the Lahontan Regional Water Quality Control Board (LRWQCB), the Nevada Division of Environmental Protection (NDEP), and the Pyramid Lake Paiute Tribe (PLPT), depending on river reach. In addition, the lower reaches of the Truckee River are subject to nitrogen, phosphorus, and dissolved solids TMDLs. As the system continues to be researched, there will be ongoing and new water quality issues raised, such as increased nitrate loading downstream of the TTSA plant (LRWQCB, 2002) and the presence of trace organics in downstream drinking water supplies attributed to multiple sources, including WWTP discharges (USGS, 2009). In this complicated regulatory setting, regulatory change in one location has the potential for a trickle-down effect on other locations.

TTSA effluent impacts water quality for downstream users such as Reno, Sparks, Truckee Meadows Water Agency, and the Paiute Tribe who controls the water rights in the Truckee River Watershed.

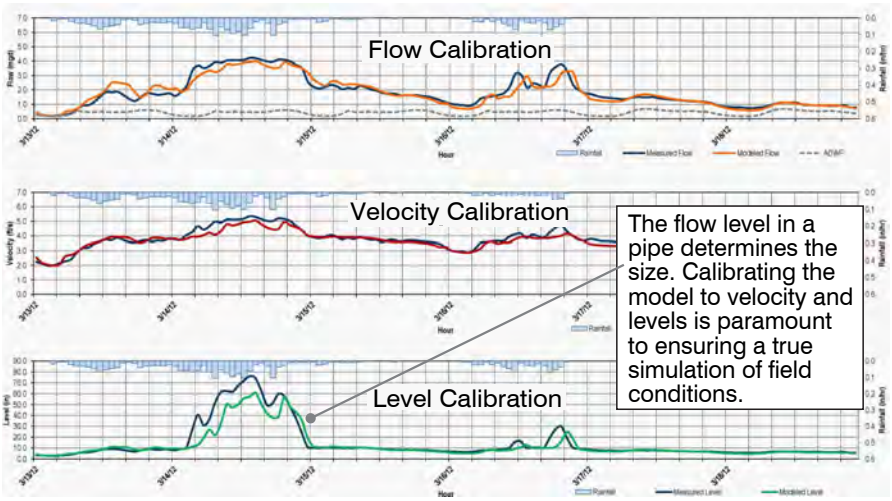


A robust model development and calibration program provides confidence in analysis results

Our Initial Thoughts: Someone once told our team that models are like sausages. Everyone loves them until they find out what's inside. Understanding what's inside is crucial to developing a tool that is defensible and can be trusted. In addition to developing a tool that the Agency can believe in, developing a tool that is user friendly, intuitive, and has associated documentation related to how it is built, modified, and used for development analysis is of highest importance.

Trusted and Reliable

The Agency already has a hydraulic model of the TRI. This project will recommend a potential new software, reallocate flows, and recalibrate the model. The most critical element of this process is the the model recalibration to existing average dry and wet weather flows. But more critical than matching flows, is matching the levels (flow depth) in the interceptor in conjunction with matching the boundary conditions at the headworks of the WRP. Carollo's approach to model calibration is to match flow conditions for average, and peak conditions, but also to match the flow levels in the interceptor. Ultimately, you don't size pipe improvements and determine deficiencies based on flow, you do it based on level, and if you're not matching level in your model, you can't accurately predict necessary improvements or size them correctly.



Carollo's calibration approach matches levels and flow to accurately predict and size improvements to the TRI.

Easy to Use, Intuitive, and Documented

Developing model supporting documentation is a crucial element to any modeling program. Carollo spends considerable time educating our clients, and documenting the construction process, assumptions, and steps to modify and run the models, as well as offering extensive model training sessions to ensure the model can be a fully utilized tool moving forward.

Carollo worked closely with South Tahoe PUD staff to develop model documentation to support the District's wastewater and water modeling programs. Our documents will be the foundation of the modeling programs for years to come and facilitates efficient knowledge transfer.

Carollo's approach focuses on collaboration and technical excellence. We have developed a complete scope of work and detailed the steps required to develop your Master Plan.

SCOPE OF SERVICES

This scope of work includes the following major tasks:

1. Project Management	a. Meetings b. Invoicing c. Monitor Budget, Schedule, and Decision Log d. Subconsultant Management e. Quality Assurance / Quality Control
2. Background and Planning Parameters	a. Gather and Review Existing Information b. Vision / Goals / Objectives c. Evaluation Criteria and Metrics d. Select Modeling Platforms e. Land Use and Population Projections
3. Truckee River Interceptor Master Plan	a. Technical Workshops b. Description of Existing Facilities c. Implement Flow Monitoring and Rainfall Data Collection Plan d. Model Calibration and Flow Projections e. Identify Future Capacity Needs f. Evaluate Alternatives g. Develop 25-year Capital Improvements Plan (CIP)
4. Water Reclamation Plant (WRP) Master Plan	a. Technical Workshops b. Description of Existing Facilities c. Develop Flow and Load Projections d. Condition Assessment e. Performance and Capacity Assessment f. Future Regulatory Requirements and Scenarios g. Evaluate Alternatives h. Develop CIP
5. Asset Management Gap Assessment (Optional)	a. Kick-off and Visioning b. Gap Assessment c. Gap Closure Plan and Gap Assessment Report
6. Master Plan and Executive Summary Report	a. Draft Report b. Final Report
7. Training	a. Collection System Model b. WRP Process Model c. WRP Hydraulic Model

SCOPE

The following scope of services includes the work to be performed for the Master Plan. A detailed list of project deliverables, information needed from the Agency.

1. Project Management

a. Project Management Plan

Prepare a project management plan that covers key Master Plan activities. The plan will define the personnel, project schedule, scope of services, QA/QC control plan, field work safety plan, communication protocol, and other procedures used in performing the Master Plan.

b. Meetings and Workshops

This task includes the preparation of agendas, handouts, presentation material, and minutes for the following meetings:

1. Kickoff Meeting: Organize, prepare and attend the project kickoff meeting. One of the goals of the kickoff meeting will be to establish goals, visions, and objectives for the Master Plan. The Kick-off meeting will be attended by the project manager and the project leads, as well as other critical staff such as the modeling and condition assessment leads.

2. Monthly Progress Meetings: Organize, prepare and attend in-person monthly progress meetings. These meetings will review progress and any deviations from the schedule and budget of the Master Plan. The Project Manager will maintain decision and action logs as well as a critical issue log that will be updated for these monthly meetings. The level of effort for this task is based on an 18-month project duration.

3. Agency Board Meetings (If Required): Organize, prepare and attend up to three (3) Board meetings to support Agency staff in presenting the recommendations and findings from the Master Plan.

c. Invoicing and Progress Reports

Prepare and submit a written monthly progress report to accompany the invoice to the District which shall show the percentage of work completed and the percentage of contract billed, summarize the work completed during the month, and summarize the work to be completed during the following month.

d. Monitor Budget, Schedule, and Decision Log

Monitor and track the overall project scope, budget and schedule, and update on a monthly basis. Maintain a log throughout the project to record the decisions made by the project team. The log shall contain decisions made during technical workshops and project meetings as well as during telephone conversations or by email. The log shall list the date the decision was made, the type of meeting in which it was made (regular design meeting, telephone conversation, etc.), the individual involved making the decision, and the nature of the decision.

e. Subconsultant Management

This is an on-going activity that shall be performed throughout the project, should it be determined during final scope negotiations that subconsultant assistance would be required. Activities shall include the following: provide information on project issues; review/approve work product; integrate work product with the Consultant's work effort; control subconsultant budgets and schedules; keep Agency staff informed of the subconsultant work progress; establish meeting as necessary with subconsultants; and coordinate review of deliverables. Currently, the only potential sub-consultant that could be required would be for temporary flow monitoring. Flow monitoring and other sub consultant services will be discussed during scope development and negotiations.

f. Quality Assurance/Quality Control (QA/QC)

Review and provide general QA/QC of all work products developed by Consultant and subconsultants. All documents delivered to TTSA are considered deliverables, including but not limited to the Master Plan Report and Executive Summary, technical memoranda, agendas, meeting materials and summaries, invoices, progress reports, and other communications.

2. Background and Planning Parameters

The purpose of this task is to gather information needed and establish key assumptions and criteria used for development of the Master Plan. This includes establishing the Agency's vision, goals, and objectives for the Master Plan, identifying evaluation and reliability criteria and metrics, establishing the land use and population projections for TTSA's service area. The major sub tasks and activities are listed below.

a. Gather and Review Existing Information

Gather and review existing information available from TTSA, its member Districts and other sources. Information that will be required includes historical drawings and specifications, previous studies of existing facilities, sewer maps, flow and other facility operating data, pump operating records, sampling records, bid tabulations, and maintenance and inspection records including CCTV videos compiled by the Agency.

b. Vision, Goals, and Objectives

As part of the kickoff meeting, the master planning strategy will be discussed with the Agency staff to understand its mission and goals, as well as the Agency's capital improvement planning framework. The intent of

the Master Plan will be reviewed for agreement among representatives from various parts of the organization, including operations and engineering. Existing levels of service, performance objectives, and reliability criteria and targets will be identified. Level of service criteria identify what Agency customers will be willing to pay for, and can be used to justify the need for capital projects to address growth, repair, and rehabilitation of existing facilities. The team will examine how these existing objectives could be enhanced through the Master Plan effort. Results will be incorporated into the Master Plan and summarized in minutes from the kickoff meeting.

c. Evaluation Criteria and Metrics

As part of the kickoff meeting, identify economic and noneconomic criteria and measurable outcomes (metrics) to compare master planning alternatives, and to assess attainability with the stated goals and objectives. These criteria and metrics shall allow for a relative comparison of the ranking of conceptual alternatives, as well as the ability to measure progress towards master planning goals. The master planning objectives, and associated evaluation criteria will be further developed to identify performance parameters and units of measure (metrics) and organized into a 2-phase evaluation criteria process. The first phase will be an initial screening that will occur in a workshop setting. The second phase will be a more rigorous evaluation based on the criteria and metrics developed in this task. The pairings of parameters and units of measurement for a given objective will form the basis for assessing any alternatives developed during the master planning process. Results will be incorporated into the Master Plan and summarized in minutes from the kickoff meeting.

d. Land Use and Population Projections

This task consists of collecting land use information from the most recent planning documentation for TTSA's five service area wastewater contributors (TCPUD, TSD, SVPSD, ASCWD, and NTPUD). Develop a summary/description of current and projected land use from the various planning documents and coordination with member districts. Provide current and future land use map graphics, if available. Focus will be on descriptions of projected or potential changes in land use and potential impact on wastewater generation. Using the projected buildout density for each district's land use designations and the estimated number of residents per dwelling unit, the buildout population projections will be developed, based on assumptions of occupancy rates and high flow periods (July 4th, or Christmas/New Years Week). Estimates for current and historic populations for the service area will be derived from census data and information available from Placer, and Nevada counties.

3. Truckee River Interceptor Master Plan

The purpose of this task is to perform an evaluation of the Agency's collection system with the main objective being the development of a CIP for the 25-year planning period. Evaluation will include the agency's Truckee River Interceptor System including siphons. Key tasks include: describing the existing facilities; reviewing condition assessment data; collecting flow monitoring and rainfall data for calibrating the collection system hydraulic model; making flow projections; and developing a CIP for the collection system. The CIP will include necessary projects to repair and replace aging facilities (if necessary) as well as increase system capacity to accommodate anticipated growth.

a. Technical Workshops

Organize, prepare and perform up to three (3) technical workshops to discuss critical information relevant to the Master Plan Development. It is anticipated that workshops will be held to discuss the model development, capacity evaluation, improvement alternatives and CIP development.

b. Description of Existing Facilities

Prepare a description of existing collection system facilities that will be incorporated into the Master Plan.

c. Review TRI Condition Assessments and Rehabilitation Recommendations

Review the Agency's existing video inspection data of the TRI, and develop recommendations related to the anticipated capital projects. Prioritize TRI rehabilitation projects based on coordination with Agency staff, and develop annual capital cost expenditures as part of the overall CIP costs.

d. Implement Flow Monitoring and Rainfall Data Collection Plan (Optional Task)

Carollo will develop a flow monitoring plan to install temporary flow monitors and rain gauges in various locations of the sanitary sewer collection system. The flow monitor stations will monitor depth of flow, velocity, and pressure should the sewer becomes surcharged. The rain gauges will be the tipping bucket type automatic gauges. Both the rain and flow monitoring stations record and store data. Field data will be used to calibrate the sanitary sewer collection system hydraulic model. Results will be summarized in a technical memorandum. Flow monitoring locations could be places along the interceptor at member agency connection point to capture contributing flows. It is known that contributing agencies may have flow monitoring equipment at the connections, but some meters are unreliable, and may not capture depth of flow, or could be influenced by hydraulic grade in the TRI.

e. Model Software Evaluation and Recommendations

Carollo will work with Agency staff to identify available modeling software that would be applicable to modeling the TRI. Carollo will develop an evaluation of the available software related to a number of factors, including:

- Ease of Use
- Hydraulic Engine
- GIS Compatibility
- Technical Support
- Flow allocation (dry and wet)
- Cost

A memorandum will be developed to document the criteria for software selection and a recommendation. A meeting to discuss the findings will be conducted to show each software package to agency staff and review the criteria before making a recommendation.

f. Model Calibration and Flow Projections

Using the flow and rainfall data collected in a previous task, or historical flow data, the hydraulic model will be calibrated to a set of standards developed by the project team. The Agency's collection system model will be built using the recommended software and will include all elements of the TRI, as well as the boundary conditions at the WRP:

1. Calibrate Existing Average Dry Weather Flow (ADWF): Adjust previously developed sewer basin hydrographs for existing ADWF conditions based on updated dry weather flow data.

2. Calibrate Peak Wet Weather Flow (PWWF) Hydrographs: Adjust and calibrate the PWWF unit hydrographs to the updated peak wet weather flow monitoring data. PWWF calculations and generation will be developed based on discussions and analysis of rain fall flow, vs. rain on snow events to determine the prescribed design storm.

3. Develop Buildout ADWF Projections: Using project land use and population information developed under a previous task, develop buildout ADWF projections.

4. Identify Design Storm: Working closely with Agency staff, review design storms previously used for planning, and identify appropriate criteria based on having an acceptable level of system reliability and risk for overflows. Based on Agency input, a recommendation will be made on specific design storms and potentially rain on snow events. It should be noted that WRP equalizations. Per the WDR, is to be sized based on a 100-year rain fall event.

5. Develop Projected Peak Wet Weather Flows: The calibrated collection system model will be used to determine projected PWWF based on the selected design storm events.

g. Identify Future Capacity Needs

Using the calibrated TRI model, analyze the hydraulics under current and buildout peak flow conditions. Identify flow restrictions and capacity deficiencies based on the evaluation criteria determined as part of Task 2.c.

h. Evaluate Alternatives

Alternatives to mitigate identified capacity projects will be developed in coordination with Agency Staff. Considering the constraints associated with the TRI alignment, mitigation alternatives could be developed that involve flow equalization in upstream service areas, peak flow reduction related infiltration and inflow mitigation, or other flow reduction measures. Alternatives will be evaluated and ranked based on an alternative evaluation scoring system collaboratively developed with Agency staff. Final recommendations will be developed and discussed at an interceptor workshop.

i. Develop 25-year CIP

Develop a CIP for near term and long term projects that have been identified through the review of condition assessment data and capacity analysis of the collection system. Identify and prioritize improvements to facilitate incorporating into the Agency's CIP process. Project phasing will be incorporated into the CIP as part of this subtask. Preliminary capital cost estimates (AACE Class 5, order-of-magnitude) associated with the CIP recommendations will also be developed.

4. Water Reclamation Plan (WRP) Master Plan

The purpose of this task is to perform an evaluation of the Agency's WRP with the main objective being the development of a CIP for the 25-year planning period. Key tasks include: describing the existing facilities; performing a condition assessment of WRP facilities; making flow and load projections; developing a performance and capacity assessment; reviewing regulatory scenarios; performing an alternatives analysis; and proposing a CIP for the WRP. The CIP will include necessary projects to repair and replace aging facilities as well as increase system capacity to accommodate anticipated growth, and mitigate risk of failure to meet WDR reporting requirements.

The WRP Master Plan will also consider potential regulatory scenarios that may occur beyond the 25-year planning horizon so that space is reserved and considerations are made for future needs and to minimize the risk of implementing projects that may result in stranded assets.

a. Technical Workshops

Organize, prepare and perform up to four (4) technical workshops to discuss critical information relevant to the Master Plan Development. It is anticipated that workshops will be held to discuss the condition assessment, regulatory scenarios, alternatives screening, and development, and CIP development.

b. Description of Existing Facilities

Prepare a description of existing WRP facilities that will be incorporated into the Master Plan.

c. Flow and Load Projections

Five years of daily flow and loading data for the Agency will be reviewed and flow and loading projections will be confirmed for the Master Plan buildout condition based on population projections developed in a previous task. Average dry weather and peak hour flow projections will be coordinated with projections developed from the collection system modeling. Flow and load projections for other conditions will be developed based on historical peaking factors. Using the TRI model, hourly hydrographs will be developed for current and future design conditions so that flow equalization requirements can be evaluated as part of the capacity analysis. Results of the analysis will be summarized in a technical memorandum.

d. Condition Assessment

1. A review of the Agency's asset inventory will be conducted to develop a list of condition assessment targets within the WRP. The asset inventory will be used to populate digital assessment tools and record keeping processes to be used during the condition assessment.

2. Pre-assessment workshops will be conducted to review plant facilities, develop a target list of priorities, and review and gather data and input from plant operations and maintenance staff.

3. A comprehensive team of three to four professionals will tour the plant and conduct a visual condition assessment of the WRP. The team will include structural, electrical, and mechanical engineers as well as an assessment lead who will coordinate data records, assessment write-ups and development of recommendations.

4. Rehabilitation and repair recommendations and costs will be developed based on the field assessment and interviews with Agency Staff. Cost estimates for the recommendations will be developed and incorporated into the overall 25-year capital improvement program.

e. Performance and Capacity Assessment

This task consists of evaluating the performance and the hydraulic and process capacity of the WRP facilities. The capacity analysis will be based on the BioWin wastewater treatment process simulator that integrates biological, physiochemical, and chemical process models to enable integrated evaluation of liquid treatment and solids handling processes. If actual capacities are larger than the original design capacity or permit capacity, this analysis can be used to re-rate the WRP with the Regional Water Quality Control Board. Key activities in this task include:

1. Review WRP Unit Process Performance.

2. Review last two (2) years of historical WRP operation and performance data and compare to original design criteria. Review performance, hydraulic, and solids loadings for each major unit process and associated reliability criteria. Review and summarize effluent and biosolids quality and quantity data. Results of the performance assessment will be incorporated into the Master Plan Report.

3. Capacity Assessment. The objective of this task is to determine the current capacity of existing facilities. Each process will be assigned a hydraulic and/or process capacity based on recommended operating and reliability criteria. The overall plant capacity is the lesser of the hydraulic and/or process capacity. Key activities for the capacity assessment are summarized below. Results of this task will be summarized in technical memoranda and incorporated into the Master Plan Report.

a) Hydraulic Profile Analysis

A hydraulic profile model will be developed using non-proprietary software. A review of software options will be conducted to support a recommended software solution. This analysis will use the model to assign a maximum hydraulic flow capacity for each process. The capacity will be based on maintaining a minimum freeboard for process tanks and a free discharge for flow splitting weirs. The hydraulic analysis will identify hydraulic restrictions and provide recommendations for alleviating them. Additionally, pump performance curves for all pumped systems within the WRP will be reviewed to confirm hydraulic capacities for pumped systems.

b) Equalization Basin Analysis

This task consists of using the design influent flow hydrographs developed from another task to estimate the required flow equalization volume assuming that flow through the plant is limited to the permitted instantaneous peak flow rate of 15.4 mgd. The second part of the analysis will consider the feasibility of increasing the hydraulic flow through the plant to above the permitted capacity, which will reduce the required flow equalization volume. Results will be updated using hydrographs generated from the updated collection system model. The feasibility and

cost associated with the construction of new flow equalization facilities will also be evaluated as part of this task. It should be noted that the current WDR specifies that equalization basins shall be sized to handle a 100-year event.

c) Wastewater Characterization Sampling Plan

A sampling plan will be prepared that will summarize recommended data collection that is in addition to data normally collected by operations staff. The primary purpose of collecting additional data is to have sufficient information to properly calibrate a BioWin process model. It is intended that the additional data collection and laboratory analysis will be performed by Agency staff over a two-week period during the Master Planning effort.

d) Process Model Development

A steady-state solids balance and process model of the WRP will be developed and will be used for estimating the capacities of the conventional treatment, advanced biological phosphorus removal, chemical treatment, biological nutrient removal (BNR), and solids handling facilities. This task includes the development of a dynamic model of the WRP using a commercially available software, BioWin. The process model will include both liquid treatment and solids handling processes so the impact of sludge thickening and dewatering recycles can be accounted for.

Building on the information collected as part of the sampling program, and the previously-calibrated steady-state model, this task includes the development of a dynamic BioWin model. The benefits of developing a dynamic BioWin model are that secondary treatment process oxygen demands and effluent nutrient concentrations are more accurately predicted than with a steady-state model. The model will be used to evaluate primary, secondary, and chemical sludge production and predict effluent ammonia and phosphorus concentrations to determine the capacity of the existing liquid treatment and solids handling facilities. The model will also be used to establish design and sizing information for alternative operating and treatment scenarios for the liquid treatment and solids handling facilities.

e) Support Facilities Capacity

Determine the capacity of key support facilities needed for capacity expansion. This includes the electrical, instrumentation and control facilities, standby generator, digester sludge heating equipment (boilers and heat exchangers), energy management and digester gas handling facilities, and plant water and chemical systems with respect to expandability and reliability.

f. Regulatory Requirements and Scenarios

The purpose of this task is to summarize regulatory requirements for the WRP and identify any existing and potential future regulations that may require a change in overall plan for the Agency's treatment facilities. Regulations to be evaluated include those affecting effluent, percolated groundwater, and receiving water quality, biosolids regulation and air quality regulations. A range of probable regulatory scenarios will be developed to determine the effect of different effluent requirements on treatment facilities, including descriptions of what regulations will likely change and what will be promulgated. Although some of the regulatory scenarios identified may not take effect until after the 25-year planning period, it is beneficial to consider them as part of this Master Plan for the following reasons: 1) to ensure that projects implemented in the 25-year horizon are consistent with future requirements, reducing the risk of stranded assets; and 2) to ensure sufficient area is reserved by the WRP to accommodate anticipated future changes in the regulations.

The existing and potential future regulations will be summarized in the Master Plan Report. Anticipated regulatory scenarios for effluent discharge will consider nitrogen and phosphorus species, metals and other priority pollutants, and emerging contaminants.

g. Evaluate Alternatives

Based on information developed in previous tasks, alternatives will be developed and evaluated for the different regulatory scenarios identified. The alternatives analysis will have a development and screening step followed by an evaluation step, which is described further below. Results of the analysis will be summarized in a technical memorandum and incorporated into the Master Plan Report.

1. Alternative Identification and Screening: The purpose of this task is to identify alternatives for consideration in the Master Plan and subsequent screening to a shorter list of viable alternatives for further evaluation. The development and screening of alternatives will be conducted in a workshop setting with active participation from Agency staff. Efforts will focus on developing alternatives for key areas of the WRP that will require a capacity expansion, replacement of aging assets, and optimization of WRP operation (i.e. reduction of energy or chemical use). The goal of the screening process will be to identify up to three (3) plant-wide viable alternatives that will be further developed and evaluated in subsequent tasks. Criteria to be used in the screening process will be established in Task 2 of this scope.

2. Plant-Wide Alternatives Comparison: In this task, up to three (3) viable, plant-wide alternatives selected in the screening workshop will be further developed. The alternatives will reflect necessary modifications to provide needed capacity for Agency growth, replace aging assets and meet the current, or minimum levels of service established as part of Task 2. It is anticipated that the minimum levels of service will consist of meeting current WDR constituent limits and agreed-upon potential future effluent limits.

Development of each alternative will include preparing simple process schematics and establishing design criteria and preliminary sizing, conceptual site plans, an AACE Class 5 (order of magnitude) capital cost estimate, and operation and maintenance costs. The alternatives will then be evaluated and compared to the others based on the evaluation criteria identified in Task 2. Criteria for comparison are likely to include: capital and operational costs, flexibility to meet existing and future regulations, flexibility to accommodate future regionalization scenarios, reliability, environmental impacts and energy and resource usage (sustainability). The evaluation will include a compliance risk assessment of the selected alternatives and a preliminary cost benefit (sensitivity) analysis. One of the three alternatives will be recommended for implementation based on meeting the current levels of service.

3. Develop Strategic Plan: The purpose of this task is to develop the recommended alternative and strategic plan for the Agency to move forward to meet regulatory requirements now and in the future. The strategic plan will identify tracks and trigger points to be included in the Master Plan. Trigger points are events such as growth or regulatory changes that would require Agency action such as adding treatment units or making other modifications to the WRP. In this task, those triggers will be more clearly defined. It is anticipated that the strategic plan will consider up to four (4) potential regulatory scenarios.

Development of each regulatory scenario will include preparing simple process schematics and basic sizing information, conceptual site plans, future monitoring plans, and an AACE Class 5 (order of magnitude) capital and operation and maintenance costs. An emphasis will be placed on ensuring that recommended improvements do not result in stranded assets as more stringent regulations take effect. The strategic plan will be summarized in the Master Plan report.

h. Develop CIP

Develop a CIP for near term and long term projects that have been identified through the condition assessment and alternatives evaluations. Identify and prioritize improvements to facilitate incorporating into the Agency's CIP process. Project phasing will be incorporated into the CIP as part of this subtask. Preliminary capital cost estimates (AACE Class 5, order-of-magnitude) associated with the CIP recommendations will also be developed. A detailed CIP will be developed for meeting the current levels of service only.

5. Asset Management Gap Analysis (Optional Task)

a. Kick-off and Visioning

1. Asset Management Kick-off: Carollo will conduct an initial kick-off and orientation meeting with the Agency. The goal of the meeting will be for Carollo to gain detailed understanding of the Agency's Asset Management (AM) objectives, the Agency's infrastructure and operational environment, and the current overview of asset management practices and staff alignment with the overall effort. Carollo will also work with the Agency to identify the staff who will maintain the responsibility of managing the program moving forward. These staff will be identified as the Asset Management Team (AMT).

The AMT should include a cross-section of staff from the various affected departments including staff that are knowledgeable about current business practices related to capital budgeting, capital improvement plan development, acquiring/retiring assets, maintenance procedures, the use of or plan for software enhancements (specifically financial information systems, computerized maintenance management systems and geographic information systems) and the data that the Agency collects and maintains.

The kick off meeting will have three primary objectives:

- Identify the goals and objectives for the project.
- Establish basic business protocols including approach, schedule, and communication.
- Provide an initial orientation on AM and how it may impact the Agency.

2. Develop Strategic Vision for Asset Management: Carollo will begin the task with an AM Strategic Vision workshop with key staff which will include "Asset Management 101"and the development of a defined future state of AM at the Agency. The purpose of this workshop is to establish a common language of understanding around what AM is based on industry best practices. Along with the basic concepts of AM, Carollo will introduce our Asset Management Assessment Framework Tool, which was developed internally for use with our clients. Our Asset Management Assessment Framework Tool is based on industry best practices and standards of AM as identified by the International Infrastructure Management Manual (IIMM), the definitive resource for AM best practices. The Asset Management Framework Tool summarizes each of the elements of AM necessary for successful AM and helps identify the gaps between the vision and current

state which will be used in the subsequent Gap Assessment tasks.

Following the AM 101 content, we will move to a visioning exercise which will help identify the Agency's objectives with implementing an AM program. This vision will formalize the future desired state of AM at the Agency and define the asset management vision, goals and desired outcomes, and drivers for the program as well as committing the members of the Agency to the direction established through the visioning process. It will also serve as a reference to guide and direct the team during subsequent phases of the program's implementation, helping to reinforce the drivers, goals, and anticipated outcomes.

b. Gap Analysis

Carollo will identify and detail gaps between desired future state of AM and the current state, using our Asset Management Assessment Framework Tool and will evaluate the state of each of the key AM attributes at the Agency. The key AM attributes which will be evaluated include:

- Organizational Capability
- Information Systems
- Computerized Maintenance Management System (CMMS)
- Geographic Information Systems (GIS)
- Asset Inventory and Hierarchy
- Condition Assessment and Likelihood of Failure
- Criticality Rating
- Maintenance Strategy
- Renewal and Replacement Prioritization
- Long Term Financial Plan
- Human Resources

The gap assessment will take place through a review of requested data, site visits, up to three (3) 1-hour interviews with key stakeholders, and up to two (2) small group workshops. For certain key procedures, Carollo proposes to do some business mapping (up to 10 processes) both to illustrate the relative efficiency of the procedures as well as to identify consistencies and inconsistencies across functional areas.

Some examples of the areas we will be evaluating using the Framework Tool are:

1. Asset Inventory and Registry: Carollo will review and assess the current inventory of assets which may reside in multiple sources. Carollo will review data regarding the assets, meet with key operational and maintenance staff to understand the risks and problems with the existing infrastructure, and inspect a cross section of assets to get a sense of overall condition.

2. Business Processes and Software: Carollo will evaluate at a minimum the following key processes:

- The process used to record asset information (financial, nameplate, etc.).
- The decision process regarding whether to repair or replace an asset, how a Work Order is triggered and how the corresponding information is tracked and retained, and how staff currently assesses asset condition.
- The process for connecting financial records to its physical asset information, O&M costs, and rehabilitation information.
- The steps involved in Capital Improvement Plan (CIP) assembly and prioritization.
- The procedures for corrective and preventive maintenance scheduling and prioritization.
- The interactions across the various divisions and what information is being captured and how it is shared and reconciled.

3. Software and Data: Carollo will evaluate completeness of the asset information. This will include review and analysis of asset data from multiple sources, including the fixed asset records, financial systems, and maintenance programs, as well as any other data sources currently used. This analysis will focus on organization, structure, and assessment of whether redundant and/or contradictory information is being housed and tracked in different data sources.

With this information Carollo will determine the quality of the asset data, sources of information, and procedures for updating and modifying the data.

Key activities in this assessment include:

- Conduct up to five interviews with the primary users of any software that is used to track existing assets. These interviews will be followed by a review of data extracts from each system to understand the accuracy of the information, functionality of the systems, and role of the software in business practices. The goal is to understand the types of asset attributes that are recorded, and how the data is managed and reconciled with other data sources.
- Conduct investigation to identify known sources of asset inventory, condition and criticality assessment data not in the primary software systems (spreadsheets, paper records, etc.). Carollo will work with staff to gauge the completeness and accuracy of the information.

Upon completion, Carollo will hold a validation workshop to review our findings and ensure that the AMT and other stakeholders are in agreement with what Carollo has concluded. Once validated, Carollo will incorporate the identified gaps into the Gap Closure Plan and Gap Assessment Report in Task 3.

c. Gap Closure Plan and Gap Assessment Report

At the end of this task, Carollo will detail the necessary steps that must be taken to close these identified gaps and begin to implement a full asset management program at the Agency. This gap closure plan will detail the tasks and will be quantified with level of staff effort estimates to help prioritize tactical actions. In a review meeting with the AMT, Carollo will review the gap closure plan for input and finalization. This closure plan along with key findings regarding the strengths and weaknesses of the Agency's organization and staff, information systems and business processes relative to the asset management vision will subsequently be documented in a Gap Assessment Report and final Gap Closure Plan.

The Draft Gap Assessment Report will be delivered to the AMT for review and comment. Upon receipt of comments, suggested changes will be incorporated into the Final Gap Assessment Report and Gap Closure Plan.

6. Master Plan and Executive Summary Report

The Master Plan will include a list of frequently-asked questions intended for the public, an executive summary intended for the Board and other interested parties, and a summary report which will combine pertinent results from all tasks in this effort. A prioritized CIP table that incorporates all of the Agency-wide projects will be presented to assist in budget preparation. This will provide the basis for shifting the focus of CIP's between the collection system, and the treatment plant from one year to the next. Previously prepared technical memoranda will be included as appendices to the Master Plan.

a. Draft Report

Deliver draft Master Plan in electronic (pdf) format and hard copy (10 copies) for review.

b. Final Report

Finalize Master Plan based on comments received by the Agency. Deliver final report in electronic (pdf) format and hard copy (5 copies).

7. Training

The objective of this task is to provide the Agency with the collection system hydraulic model and the WRP process model and data sets for their use and incorporation into Agency operations. This task includes assisting the Agency in initial set up of the software at

Agency offices and initial training on the system software. It is highly recommend that the Agency obtain outside software training from the software manufacturer prior to the training under this task.

a. Collection System Hydraulic Model

Provide the Agency with two (2) days (4 hours each) of software training on the collection system hydraulic model. The Agency will identify and provide two (2) staff members for the training sessions.

b. WPCP Process Model

Provide the Agency with two (2) days (4 hours each) of software training on the WRP process model. The Agency will identify and provide two (2) staff members for the training sessions.

c. WPCP Hydraulic Model

Provide the Agency with two (2) days (4 hours each) of software training on the WRP hydraulic model. The Agency will identify and provide two (2) staff members for the training sessions.

Deliverables

Project deliverables will include:

1. Project Management Plan

2. Monthly Progress Reports

3. Agenda, presentation material, and minutes from project meetings

    a. 18 monthly meetings

    b. 3 board meetings

    c. 8 technical workshops

4. Draft (10 copies and pdf) and Final Technical Memoranda (5 copies and pdf), see Master Plan Table of Contents for Complete List

5. Draft (10 copies and pdf) and Final (5 copies and pdf) Master Plan with Executive Summary Report

6. Model Training Sessions

Services/Information to be Provided by Agency

Services and information to be provided by the Agency are provided below. Some of this information has already been provided to Carollo:

1. All available drawings for collection system, WRP, and Agency facilities
2. Historical flow, load, and performance data at WRP
3. Sewer maintenance and inspection records and overflow history
4. Historical pump station flow and run time records as well as pump curves for existing pumps
5. Updates to GIS and collection system model

Master Plan Table of Contents

Volume 1 - Executive Summary Report

1. Background and Planning Parameters
2. Collection System
3. Water Reclamation Plant
4. Agency Facilities
5. Recommended Agency CIP

Appendices

A. Meeting and Workshop Minutes
B. Land Use and Population Projections Technical Memorandum
C. Agency CIP Summary

Volume 2 - Collection System Master Plan

1. Description of Existing Facilities
2. Condition Assessment and Asset Management
3. Flow Monitoring
4. Model Development and Flow Projections
5. Future Capacity Needs
6. Alternatives Analysis
7. Recommended CIP

Appendices

A. Glossary
B. Condition Assessment Technical Memorandum
C. Flow Monitoring Technical Memorandum
D. Hydraulic Model Input Data and Results
E. Detailed Collection System CIP and Cost Estimates

Volume 3 - Water Reclamation Plant Master Plan

1. Description of Existing Facilities
2. Flow and Load Projections
3. Condition Assessment
4. Performance and Capacity Assessment
5. Regulatory Requirements
6. Alternatives Development and Screening
7. Alternatives Analysis
8. Recommended CIP

Appendices

A. Glossary
B. Flow and Load Technical Memorandum
C. Condition Assessment and Asset Management Technical Memorandum
D. Hydraulic Capacity Technical Memorandum
E. Wastewater Characterization Sampling Plan
F. Process Capacity Technical Memorandum
G. Support Facilities Capacity Technical Memorandum
H. Alternatives Evaluation Results
I. Detailed WRP CIP and Cost Estimates

Volume 4 - Asset Management GAP Assessment (Deliverables)

1. AM 101 and Vision Workshop
2. Strategic Vision for Asset Management at the Agency
3. Preliminary findings of Gap Assessment
4. Presentation to AMT on Findings
5. Draft Gap Closure Plan
6. Draft Gap Assessment Report
7. Final Gap Assessment Report and Gap Closure Plan

PROPOSED FEES

Carollo's fee estimate is provided on the following pages. The fee was developed based on the scope of work included in this proposal. We are happy to discuss and negotiate the scope and fee estimate to match the visions, and the goals of TTSA, and its Board of Directors. The fee includes several assumptions.

1. We include an optional flow monitoring task to conduct a temporary flow monitoring program. We included this task, as our experience working with Truckee Sanitary District indicates that some of the meters on tributary lines may not provide data in the format required for flow and level calibration. In addition, we would like to monitor flow and level at other locations along the interceptor system to develop a complete understanding of system hydraulics.

2. We included a complete condition assessment of the WRP. Carollo would conduct three days of assessments with TTSA staff, as well as pre-assessment meetings, asset inventory coordination, and electronic reporting and documentation, and development of rehabilitation recommendations.

3. We included an Asset Management Gap Analysis task where we conduct an evaluation and review of the Agency's data collection, software and internal process related to asset management practices. The result will be a report that highlights strengths weaknesses, and implementable next step.

4. We assumed an 18-month schedule, and associated progress meetings, management for a contract of that length.

5. Carollo's 2019 billing rates were used, and we included our standard Project Equipment, and Communication Expense (PECE) per hour fee of $12 per hour.

Carollo is excited to provide you with our best team, and look forward to discussing the scope of work and fee estimate with you personally to come to a mutually agreed upon scope of work.

Task	Job Code	Task Description	CAROLLO																Other Direct Costs	TOTAL
			Tim Loper	Richard Gutierrez	Katy Rogers	Ryan Orgill	Ron Appleton	Danielle Orgill	Elisa Garvey	Rashi Gupta	David Baranowski	Preet Chaggar	Daniel Robinson	Felicai James	Riley Powers	Staff Engineer	WORD PROCESSING / CLERICAL	TOTAL LABOR HOURS	SUBTOTAL LABOR COST	
		Billing Rate	**283**	**222**	**222**	**222**	**263**	**181**	**263**	**262**	**222**	**222**	**222**	**222**	**137**	**181**	**120**			
1		**PROJECT MANAGEMENT**	**107**	**45**	**0**	**26**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**35**	**213**	**$50,243**	**$3,056**	**$53,299**
	1AX	Project Management Plan	5	1	0	0	0	0	0	0	0	0	0	0	0	0	4	10	$2,117	$120	$2,237
	1BX	Meetings (18 progress)	18	18	0	18	0	0	0	0	0	0	0	0	0	0	9	63	$14,166	$1,256	$15,422
	1CX	Invoicing	20	18	0	0	0	0	0	0	0	0	0	0	0	0	18	56	$11,816	$672	$12,488
	1DX	Monitor Budget, Schedule and Decision Log	20	8	0	8	0	0	0	0	0	0	0	0	0	0	0	36	$9,212	$432	$9,644
	1EX	Subconsultant Management (if nessesary)	4	0	0	0	0	0	0	0	0	0	0	0	0	0	4	8	$1,612	$96	$1,708
	1FX	QA/QC	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	$11,320	$480	$11,800
2		**BACKGROUND AND PLANNING PARAMETERS**	**28**	**34**	**26**	**52**	**0**	**56**	**8**	**0**	**0**	**0**	**0**	**0**	**26**	**8**	**12**	**250**	**$51,478**	**$3,000**	**$54,478**
	2AX	Gather and Review Existing Information	2	8	8	8	0	0	0	0	0	0	0	0	8	8	0	42	$8,438	$504	$8,942
	2BX	Vision, Goals, and Objectives	6	6	6	4	0	0	4	0	0	0	0	0	0	0	2	28	$6,542	$336	$6,878
	2CX	Evaluation Criteria and Metrics	8	16	8	12	0	0	4	0	0	0	0	0	0	0	2	50	$11,548	$600	$12,148
	2DX	Land Use and Population Projections	12	4	4	28	0	56	0	0	0	0	0	0	18	0	8	130	$24,950	$1,560	$26,510
3		**COLLECTION SYSTEM MASTER PLAN**	**56**	**0**	**0**	**150**	**0**	**226**	**0**	**0**	**0**	**0**	**0**	**0**	**122**	**0**	**80**	**634**	**$116,368**	**$12,308**	**$170,676**
	3AX	Technical Workshops (3)	18	0	0	18	0	18	0	0	0	0	0	0	16	0	12	82	$15,980	$984	$16,964
	3BX	Description of Existing Facilities	2	0	0	8	0	12	0	0	0	0	0	0	12	0	16	50	$8,078	$1,100	$9,178
	3CX	Review TRI Condition Assessments and Develop Rehab Recommendations	2	0	0	8	0	16	0	0	0	0	0	0	8	0	4	38	$6,814	$456	$7,270
	3DX	Collect Flow Monitoring and Rainfall Data (Optional)	2	0	0	4	0	8	0	0	0	0	0	0	12	0	4	30	$5,026	$4,560	$51,586
	3EX	Modeling Software Evaluation and Recommendations	2	0	0	8	0	0	0	0	0	0	0	0	2	0	8	20	$3,576	$240	$3,816
	3FX	Model Calibration and Flow Projections	6	0	0	24	0	60	0	0	0	0	0	0	16	0	4	110	$20,558	$1,320	$21,878
	3GX	Identify Future Capacity Needs	8	0	0	24	0	40	0	0	0	0	0	0	16	0	8	96	$17,984	$1,152	$19,136
	3HX	Evaluate Alternatives	8	0	0	24	0	32	0	0	0	0	0	0	16	0	8	88	$16,536	$1,056	$17,592
	3IX	Develop CIP	8	0	0	32	0	40	0	0	0	0	0	0	24	0	16	120	$21,816	$1,440	$23,256
4		**WRP MASTER PLAN**	**64**	**182**	**276**	**0**	**152**	**0**	**90**	**60**	**92**	**42**	**46**	**0**	**118**	**292**	**130**	**1,544**	**$323,732**	**$23,528**	**$347,260**
	4AX	Technical Workshops (4)	16	16	24	0	18	0	4	4	4	0	0	0	12	16	12	126	$27,110	$3,012	$30,122
	4BX	Description of Existing Facilities	2	4	8	0	0	0	0	0	0	0	0	0	8	8	4	34	$6,254	$908	$7,162
	4CX	Flow and Load Projections	2	8	16	0	0	0	0	0	0	0	0	0	0	24	4	54	$10,718	$648	$11,366
	4DX	Condition Assessment																			
		Review Asset Inventory	2	2	0	0	0	0	0	0	4	2	2	0	0	0	0	12	$2,786	$144	$2,930
		Pre-assessment Workshop	2	2	0	0	0	0	0	0	8	4	4	0	0	4	2	26	$5,526	$1,312	$6,838
		Conduct Visual Condition Assessment	4	8	0	0	0	0	0	0	24	24	24	0	0	0	4	88	$19,372	$3,056	$22,428
		Rehabilitation and Repair Recommendations and Costs	2	24	8	0	0	0	0	0	40	8	8	0	2	16	8	116	$24,232	$1,392	$25,624
	4EX	Performance and Capacity Assessment																			
		Review Process Performance	4	8	8	0	8	0	4	4	0	0	0	0	0	24	8	68	$14,192	$816	$15,008
		Capacity Assessment																			
		Hydraulic Profile	2	20	8	0	2	0	0	0	0	0	0	0	2	20	4	58	$11,682	$696	$12,378
		Equalization Basin	2	8	12	0	8	0	0	0	0	0	0	0	4	16	2	52	$10,794	$624	$11,418
		Wastewater Characterization Sampling Plan	2	2	8	0	8	0	6	2	0	0	0	0	4	4	6	42	$8,984	$504	$9,488
		Process Model Development	2	4	40	0	60	0	0	12	0	0	0	0	2	24	16	160	$35,796	$1,920	$37,716
		Support Facilities	2	8	24	0	0	0	4	4	0	0	4	0	4	24	0	74	$15,550	$888	$16,438
	4FX	Regulatory Requirements and Scenarios	4	8	16	0	8	0	24	6	0	0	0	0	8	24	8	106	$22,848	$1,272	$24,120
	4GX	Evaluate Alternatives																			
		Alternatives Identification and Screening	4	16	24	0	16	0	16	8	0	0	0	0	16	16	12	128	$27,052	$1,536	$28,588
		Plant-Wide Alternatives Comparison	4	12	32	0	16	0	16	8	0	0	0	0	24	24	16	152	$30,964	$1,824	$32,788
		Develop Strategic Plan	4	16	24	0	4	0	8	8	0	0	0	0	8	24	12	108	$22,144	$1,296	$23,440

ESTIMATED LEVEL OF EFFORT AND FEE - PRELIMINARY

Task	Job Code	Task Description	CAROLLO																	Other Direct Costs	TOTAL
			Tim Loper	Richard Gutierrez	Katy Rogers	Ryan Orgill	Ron Appleton	Danielle Orgill	Elisa Garvey	Rashi Gupta	David Baranowski	Preet Chaggar	Daniel Robinson	Felicai James	Riley Powers	Staff Engineer	WORD PROCESSING / CLERICAL	TOTAL LABOR HOURS	SUBTOTAL LABOR COST		
		Billing Rate	**283**	**222**	**222**	**222**	**263**	**181**	**263**	**262**	**222**	**222**	**222**	**222**	**137**	**181**	**120**				
	4HX	Develop CIP	4	16	24	0	4	0	8	4	12	4	4	0	24	24	12	140	$27,728	$1,680	$29,408
5		**ASSET MANAGEMENT GAP ANALYSIS (OPTIONAL TASK)**	**8**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**64**	**0**	**76**	**16**	**164**	**$32,148**	**$2,668**	**$34,816**
	5AX	Kick-off and Visioning	4	0	0	0	0	0	0	0	0	0	0	24	0	16	4	48	$9,836	$1,076	$10,912
	5BX	Gap Closure Plan and Gap Assessment Report	4	0	0	0	0	0	0	0	0	0	0	40	0	60	12	116	$22,312	$1,592	$23,904
6		**MASTER PLAN AND EXECUTIVE SUMMARY REPORT**	**24**	**40**	**84**	**48**	**32**	**76**	**20**	**12**	**40**	**10**	**10**	**0**	**56**	**24**	**64**	**540**	**$108,568**	**$7,980**	**$116,548**
	6AX	Draft Report	16	24	60	32	24	60	16	8	24	8	8	0	32	16	40	368	$74,716	$5,916	$80,632
	6BX	Final Report	8	16	24	16	8	16	4	4	16	2	2	0	24	8	24	172	$33,852	$2,064	$35,916
7		**TRAINING**	**6**	**24**	**0**	**24**	**24**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**12**	**90**	**$35,398**	**$1,080**	**$21,186**
	7AX	Collection System Hydraulic Model	2	0	0	24	0	0	0	0	0	0	0	0	0	0	4	30	$6,374	$360	$6,734
	7BX	WRP Process Model	2	0	0	0	24	0	0	0	0	0	0	0	0	0	4	30	$7,358	$360	$7,718
	7CX	WRP Hydraulic Model	2	24	0	0	0	0	0	0	0	0	0	0	0	0	4	30	$6,374	$360	$6,734
		TOTAL ALL TASKS	**293**	**325**	**386**	**300**	**208**	**358**	**118**	**72**	**132**	**52**	**56**	**64**	**322**	**400**	**349**	**3,435**	**$717,935**	**$53,620**	**$798,263**

INSURANCE

Carollo maintains insurance to protect both our client and our firm against the types of claims that may be alleged to result from our services. Carollo carries the following insurance and will provide certificates upon notice to proceed:

Coverage	Limits	Carrier
General Liability	$1,000,000	Continental Insurance Company
Workers' Compensation	Statutory	American Casualty Company of Reading, PA and Valley Forge Inurance Company
Employer's Liability	$1,000,000	American Casualty Company of Reading, PA and Valley Forge Inurance Company
Automobile	$1,000,000	Continental Insurance Company
Professional Liability	In excess of $5,000,000	Continental Casualty Company
Umbrella	In excess of $1,000,000	Continental Insurance Company

Contact Information (All Policies)

Risk Strategies Co.
2040 Main Street, Suite 580
Irvine, CA 92614
P: 949-242-9240
F: 949-596-0866

Attn: Ms. Sherry Young

Education

MS Environmental Engineering, University of California, Berkeley, 2005

BS Civil Engineering, California State University, Fresno, 2003

Licenses

Civil Engineer, California, Nevada

Professional Affiliations

Nevada Water Environment Association

American Water Works Association

Timothy J. Loper, P.E.

Timothy Loper has 17 years of experience in wastewater collection system modeling, water distribution system modeling, water system feasibility studies, wastewater treatment facilities planning, and infrastructure master planning.

Relevant Experience

→ Principal-in-Charge for the ongoing Truckee Sanitary District, California, 2017 Hydraulic Modeling Assistance. The District hired Carollo provide assistance with the development and calibration of three of their four existing wastewater collection system models. The models are being calibrated to peak dry and peak wet weather flow conditions using flow monitoring data from the 2016 and 2017 storm season.

→ Project manager for the Washoe County, Nevada, Pleasant Valley Interceptor (PVI) Alternatives Evaluation Study. The PVI was to be constructed in four Reaches, ultimately connecting the South Truckee Meadow Water Reclamation Facility (STMWRF) to Damonte Ranch Parkway, Dorothy Town Lift Station and Pleasant Valley. Reach 3 was planned as a gravity interceptor and Reach 4 will provide sewer service to approximately 1,500 homes. The STMWRF Facility Plan Update included planning and wastewater collection system hydraulic modeling for the STMWRF service areas. Additional work efforts included updating the County's hydraulic model to InfoSWMM; providing a force main risk assessment, and pump station capacity evaluation; interceptor, pump station, and forcemain preliminary design; detailed design; and preparing construction contract documents for the Pleasant Valley Interceptor Reach 3, which included gravity conveyance and the Geiger Lift Station and associated force main.

→ Principal-in-charge for the South Tahoe Public Utility District, California, Sewer System Hydraulic Model. This is an ongoing project. No changes or updates have been made to the District's wastewater collection system model that was created 10 years ago using Innovyze InfoSewer hydraulic modeling software. In the last decade, additional infrastructure construction and collection system changes have been made. This contract allowed for on-call hydraulic modeling support to evaluate the existing model, identify potential improvements, and convert the model to InfoSWMM.

→ Project engineer for the City of Modesto, California, Wastewater Collection System and Treatment Master Plan Update. Responsible for construction of the wastewater collection system hydraulic computer model using the City's existing plat maps and GIS database. Also responsible for collection system analysis to determine appropriate flow monitoring locations and sewer basin determination and assistance with the collection system condition assessment. Performed GIS data verification and updated existing databases to reflect current conditions. These responsibilities required the application of GIS and hydraulic modeling software.

→ Collection system lead for the West County Wastewater District (WCWD), California, District-Wide Master Plan. The project included the sanitary sewer collection system; Water Pollution Control Plant (WPCP); and non-process facilities such as administration, laboratory, storage, and maintenance. Work efforts included a condition assessment/capacity assessment, alternatives evaluation, and 20-year capital improvement program (CIP) development. All of WCWD's facilities were combined in one master plan, allowing the needs of each to be prioritized in an overall program. Other work efforts included a risk-based analysis of all 12,000 assets to identify failure likelihood, BioWin modeling to assess capacity, 3-D computational fluid dynamic (CFD) modeling of secondary basins to optimize performance, and a wet weather capacity improvements assessment of the 249-mile collection system.

→ Project manager for City of Tulare, California, Matheny Soultz Water System Improvements. Tim was responsible for development of required improvements to mitigate existing system deficiencies, as well

as provide water service to the Matheny and Soultz water service areas. The project developed improvement alternatives for consolidated and distributed water storage tank sites. Carollo developed recommended cost estimates for selected alternatives, as well as a project technical memorandum to support the City's efforts in negotiations with the State of California and the Matheny and Soultz water system providers.

→ Project manager for the City of Millbrae, California, Water System Master Plan. Carollo was contracted by the City to complete a water master plan that provided a capital improvement program to help mitigate storage deficiencies and hydraulic constraints caused by the separation of their four pressure zones. Tim was responsible for the update and calibration of the hydraulic model that was developed in InfoWater. The City's primary concern was lack of storage in its lower pressure zone and the potential for emergency outages in the event of a large earthquake. Carollo conducted a seismic evaluation of the water storage tanks and the optimization of the storage needs of the lower zone and rehabilitation of existing tanks.

→ Collection system project manager for the Central Contra Costa Sanitary District, California, Comprehensive Wastewater Master Plan. The project included conducting a pump station condition assessment, developing a force main inspection program, and a large-diameter condition and rehabilitation plan. The project also included creation of a collection system Asset Management Plan. The master plan focused on the pump stations, force mains, and collection system assets and summarized the District's assets in detail.

→ Project manager for the City of Oakland, California, Administrative Order Assistance. Carollo is assisting the City with meeting the requirements of the U.S. Environmental Protection Agency's administrative order to eliminate the City's contribution to discharges of untreated wastewater from the East Bay Municipality Utility District's (EBMUD) wet weather facilities. The project included construction and calibration of the City's first-ever collection system model. The project utilized data from 140 flow meters and data from two years of wet weather flow monitoring. The modeling effort also utilized gauge adjusted radar rainfall data to accurately simulate the infiltration/inflow response during the calibration effort. The hydraulic model incorporated the EBMUD interceptor model and the hydraulic model developed for the Port of Oakland to develop a citywide hydraulic model of the entire collection system. Carollo also developed an asset management implementation plan and a sewer pipe inspection and cleaning program.

→ Project manager for Marin Municipal Water District, California, Water System Improvements Storage Tank Sizing Project. Tim was responsible for development and analysis of project documentation to support the District's environmental review of recommended tank improvements to support the District's, Water System Improvement Program (WSIP). Carollo worked closely with the District to update the District's InfoWater hydraulic model and analyze multiple alternatives for the sizing of the Ross Valley and Five corners tank sites. Carollo worked closely with the District to develop alternatives that were acceptable for environmental and political considerations.

→ Project manager for City of Tulare, California, Sewer, Water, and Storm Drain Master Plans. This project developed master planning documents for planning infrastructure improvements to serve rapid growth within the City. Responsible for coordination of the water, sewer, and storm drain computer models that integrate GIS databases into the modeling platform. The City's wastewater collection system included industrial and domestic collection systems with separate treatment facilities. The storm drain project required coordination with Tulare Irrigation District for discharge of storm water from the City's drainage facilities. This project also developed the City's Sewer System Management Plan.

Education

MS Civil and Environmental Engineering, University of California, Davis, 2006

BS Civil Engineering, California State University, Fresno, 2004

Licenses

Civil Engineer, California

Certification

10-Hour Construction Safety and Health, Occupational Safety and Health Administration, California, 10/18/2007

Professional Affiliations

California Water Environment Association

Water Environment Federation

American Water Works Association

Hydraulic Institute Canvassing Committee

Richard L. Gutierrez, P.E.

Ricky Gutierrez joined Carollo Engineers in 2001 and has been involved in a broad range of projects, including planning, design, and construction of wastewater treatment facilities, water treatment facilities, pipelines (including trenchless technology evaluations), river outfalls and diffusers, and pump stations. His experience also includes research and evaluation of disinfection technologies such as UV, pasteurization, and ozone for water reuse projects.

Relevant Experience

→ Project engineer for preliminary design of the South County Ag Pump Station for the Sacramento Regional County Sanitation District, California, EchoWater Project Tertiary Treatment Facilities Project (TTF). TTF will provide filtration and disinfection of secondary effluent to a level equivalent to Title 22 requirements for tertiary disinfected recycled water for unrestricted reuse. Tertiary facilities include a 330-mgd filter influent pump station, 217 mgd of granular media filters, backwash equalization and treatment, chemical feed systems, covered disinfection contact basin, and a new area control center. The South County Ag Pump Station consists of an 80-mgd recycled water pump station to distribute recycled water for use within the unincorporated areas of south Sacramento County. The design consists of six vertical turbine pumps in cans, a meter vault structure, surge tanks, and a 54-inch diameter discharge pipeline.

→ Project engineer for the Sacramento Regional County Sanitation District, California, EchoWater Project Return Activated Sludge Pumping Project (RAS). This $32 million project will replace existing return activated sludge pumps with new pumps designed to deliver the higher flow and head conditions required by the new biological nutrient removal (BNR) process. RAS will have a capacity of over 200 mgd and includes 48 pumps located at 24 secondary sedimentation tanks. Carollo completed preliminary design of the system including hydraulic modeling, recommendations on pump selection, an electrical load study that recommends changes to the existing power distribution system, and an instrumentation and control systems review that recommends changes for improved control and monitoring. The design also incorporated replacement of the coarse bubble channel aeration system in the mixed liquor channels. The preliminary design also included an in-depth construction implementation plan to allow construction of improvements while minimizing the impact on the operation of the existing plant and a completion schedule that would allow timely commissioning of the new BNR facility.

→ Project engineer for the Sacramento Regional County Sanitation District, California, EchoWater Project Flow Equalization Project (FEQ). The $130 million FEQ will provide an additional 110 MG of storage capacity for the facility. Additional features include roller-compacted concrete lined basins, spillways and interconnections structures, an 84-inch diameter final effluent distribution pipeline, underdrain pump station, and a basin washdown system. The washdown system consists of manual and automated water cannons for efficient washdown of the over 60 acres of basin.

→ Project engineer for the Sacramento Regional County Sanitation District, California, EchoWater Project Nitrifying Sidestream Treatment Project (NST). This $50 million project will use nitrifying sequencing batch reactors to reduce ammonia in the solids treatment system supernatant necessary to meet interim permit conditions. It will also produce nitrate-rich effluent for odor control. NST includes influent and effluent pumping and lime addition. The project was accelerated to save $1.1 million per year in avoided sodium hypochlorite costs.

→ Project manager for the Fairfield-Suisun Sewer District, California, Blower Replacement, which enhanced the reliability and efficiency of the secondary treatment process aeration system. The project consists of a secondary treatment process evaluation of the activated sludge process, replacement of the existing 600-hp aeration

blowers with new high-speed turbo blowers, aeration piping repairs, and electrical system upgrades.

→ Project engineer for design of the Sausalito-Marin City Sanitary District, California, Main Street Pump Station Reliability Improvements. This project involved design of additional wet weather capacity for the pump station including forcemain connections and specifications for a 5,200-gpm portable diesel engine pump, replacement of a 3,000-gallon diesel storage tank, and portable pump connections at multiple lift station forcemains throughout the District.

→ Project engineer for design of the Fairfield-Suisun Sewer District, California, Central/Suisun Forcemain Equalization. Interconnection of two existing sanitary sewer forcemains and modifications to the existing wet weather equalization system to allow for increased capacity at the Suisun Pump Station. The project also included development of new controls and standard operating procedures for the District's Wet Weather Diversion System.

→ Design engineer for the Fairfield-Suisun Sewer District (FSSD), California, Ledgewood Creek Outfall, which involved design of a 25-mgd pump station, 42-inch HDPE outfall pipeline, and outfall structure. Worked on all aspects of design including hydraulic modeling, pipeline design, pump station design, and coordination with utilities (Kinder Morgan Petroleum, PG&E, and SBC) and agencies (Solano County, City of Fairfield, and FSSD).

→ Project engineer for the City of Porterville, California, Wastewater Treatment Plant Influent Pump Station Equipment Replacement. Provided design and engineering services during construction for the project, which involved replacing four existing line-shaft pumps with immersible dry pit pumps to provide 14 mgd of firm capacity. Existing pumps had exceeded their useful life and had become unreliable, putting the City at risk for sewer system overflows. Due to schedule constraints, which required fast tracking of the project to replace the pumps prior to the wet weather season, pumps and VFDs were procured prior to bidding the project. A cost-benefit analysis was performed on pump alternatives and procurement documents were prepared. Sequencing of the work required careful planning to keep the facility operational throughout construction as it is the only means the City has for getting wastewater flows to the treatment plant and preventing sanitary sewer overflows.

→ Engineer for the City of Modesto, California, Wastewater Collection System Master Plan Update. The project involved a condition assessment of existing facilities including pump stations and interceptor sewers from 18-66 inches in diameter, development of a CIP based on condition assessment and sewer system modeling, and development of relief sewer projects from 18-54 inches in diameter. Worked to develop pipeline construction and rehabilitation costs including trenchless technologies.

→ Design engineer for the City of Chico, California, Water Pollution Control Plant Outfall Replacement. The project included design of an 84-inch diameter reinforced concrete pipeline, a 63-inch diameter HDPE pipe with diffusers for installation in the Sacramento River using the float and sink method, junction structures, and an outfall gate structure. Worked on all aspects of design including hydraulic modeling, pipeline design, and coordination with agencies and utilities.

→ Project engineer for the South Tahoe Public Utility District, California, Process and Hydraulic Analysis. Project involved a process and hydraulic evaluation of the Wastewater Treatment Plant, focusing on the activated sludge unit process. District was interested in the near-term and possible long-term process needs to set appropriate priorities for future capital expenditures. Carollo's analysis provided recommendations to meet current and future peak plant flow demands and prioritize these capital improvements. Also evaluated performance and feasibility of alternative treatment configurations intended to optimize plant performance and improve hydraulic capacity.

Education

BS Civil Engineering, California State University, Fresno, 2006

Licenses

Civil Engineer, Nevada, California

Professional Affiliations

American Water Works Association

California Water Environment Association - Central San Joaquin Section

Ryan F. Orgill, P.E.

Ryan Orgill joined Carollo in 2005 and has experience in master planning, hydraulic modeling, sewer system management planning, urban water management planning, and geographic information systems (GIS).

Relevant Experience

→ Project manager for the South Tahoe Public Utility District, California, Sewer System Hydraulic Model. This is an ongoing project. No changes or updates have been made to the District's wastewater collection system model that was created 10 years ago using Innovyze InfoSewer hydraulic modeling software. In the last decade, additional infrastructure construction and collection system changes have been made. This contract allowed for on-call hydraulic modeling support to evaluate the existing model, identify potential improvements, and convert the model to InfoSWMM.

→ Project manager for the ongoing Truckee Sanitary District, California, 2017 Hydraulic Modeling Assistance. The District hired Carollo provide assistance with the development and calibration of three of their four existing wastewater collection system models. The models are being calibrated to peak dry and peak wet weather flow conditions using flow monitoring data from the 2016 and 2017 storm season.

→ Hydraulic modeling lead for the ongoing City of Modesto, California, Wastewater Collection System Master Plan. The hydraulic model was originally constructed in H2OMap Sewer as part of the previous master plan. In advance of the wastewater collection system master plan update, the City contracted with Carollo to convert the hydraulic model from H2OMap Sewer to the more advanced InfoSWMM platform. Responsibilities as part of the master plan update included updating and recalibrating the hydraulic model, which involved more sophisticated simulation of storm drainage system cross connections within the InfoSWMM model. Other responsibilities include development of existing and future wastewater flow projections, improvement alternatives to mitigate existing capacity deficiencies and to service future growth, and a capital improvement plan.

→ Project engineer for the Washoe County, Nevada, Pleasant Valley Interceptor (PVI) Alternatives Evaluation Study. The PVI was to be constructed in four Reaches, ultimately connecting the South Truckee Meadow Water Reclamation Facility (STMWRF) to Damonte Ranch Parkway, Dorothy Town Lift Station and Pleasant Valley. Reach 3 was planned as a gravity interceptor and Reach 4 will provide sewer service to approximately 1,500 homes. The STMWRF Facility Plan Update included planning and wastewater collection system hydraulic modeling for the STMWRF service areas. Additional work efforts included updating the County's hydraulic model to InfoSWMM; providing a force main risk assessment, and pump station capacity evaluation; interceptor, pump station, and forcemain preliminary design; detailed design; and preparing construction contract documents for the Pleasant Valley Interceptor Reach 3, which included gravity conveyance and the Geiger Lift Station and associated force main. Responsible for using the County's collection system hydraulic model to develop alternatives for Reach 3 and 4 of the proposed PVI.

→ Hydraulic modeling lead on the City of West Sacramento, California, Water System Master Plan Update. Responsible for development and calibration of a water system hydraulic model, system evaluation under existing and year 2035 demand conditions, and development of a staged capital improvement plan for the City.

→ Hydraulic modeling lead for the City of Santa Barbara, California Water Model Update. Responsible for update and calibration of the City's water system hydraulic model using the InfoWater modeling software application, development of a system specific diurnal pattern for the City, and custom hydraulic model training for City staff.

→ Project engineer for the City of Cotati, California, Sewer and Water System Master

Ryan F. Orgill, P.E.

Plans. Responsible for hydraulic model development and calibration, existing and build out analysis of the water and sewer systems, increase capital improvements to mitigate existing deficiencies and to service future growth, development of a staged capital improvement plan, and development of the final Sewer and Water System Master Plan reports.

→ Collection system engineer for the West County Wastewater District, California, District-Wide Master Plan. Responsible for preparation and calibration of a dynamic collection system model to evaluate wet weather storm events to simulate existing flow conditions.

→ Project engineer for the City of Tulare, California, Water System Master Plan. The project included the sanitary sewer collection system; Water Pollution Control Plant (WPCP); and non-process facilities such as administration, laboratory, storage, and maintenance. Work efforts included a condition assessment/capacity assessment, alternatives evaluation, and 20-year capital improvement program (CIP) development. All of WCWD's facilities were combined in one master plan, allowing the needs of each to be prioritized in an overall program. Other work efforts included a risk-based analysis of all 12,000 assets to identify failure likelihood, BioWin modeling to assess capacity, 3-D computational fluid dynamic (CFD) modeling of secondary basins to optimize performance, and a wet weather capacity improvements assessment of the 249-mile collection system. Responsible for hydraulic model creation and calibration, development of analysis criteria, evaluation of the City's existing water system, development of improvement projects to mitigate existing deficiencies and to serve future growth, and development of a staged capital improvement plan.

→ Project engineer for the City of Oakland, California, Sanitary Sewer Collection System Master Plan. Responsible for construction of the City's hydraulic computer model using the InfoSWMM modeling software package, model calibration, capacity analysis, development of improvement projects to mitigate capacity deficiencies, capital improvement cost estimate, and preparation of a technical report documenting the results of the analysis for submission to the U.S. Environmental Protection Agency in accordance with the City's Stipulated Order. Construction of the model included digitization of the major collection system facilities into the InfoSWMM hydraulic modeling software program, with several complex overflow structures and connections to the East Bay Municipal Utility District (EBMUD) interceptor. Calibration was at 140 flow monitoring locations for both dry and wet weather flow conditions, approximately half of which recorded flow at City connection points to the EBMUD interceptor system.

→ Project engineer for the City of Tulare, California, Sewer, Water, and Storm Drainage Master Plans and Sewer System Management Plan. Tasks included creation and calibration of a dynamic hydraulic sewer system model to evaluate flow monitoring data, development of flow routing criteria, and evaluation of the existing sanitary sewer system to mitigate deficiencies to serve future growth.

→ Project engineer for the City of Chico, California, Sanitary Sewer Master Plan Update. Responsible for conversion and update of the City's previous HYRDA collection system model to the InfoSWMM hydraulic modeling software application. Current average and peak wet weather flows were developed based on the City's historical flow data, as well as the results of the temporary flow monitoring projects. Build out average and peak flows were projected for future land use areas, as identified in the City's General Plan Update. The project was calibrated to dry and wet weather flow conditions, and the collection system was analyzed under current and build out peak flow conditions. Several pipeline improvement routing options were considered and analyzed based on costs and other non-cost factors, and the preferred improvement alternatives were included in the master plan report.

Education

MS Civil and Environmental Engineering, Stanford University, 2008

BS Civil Engineering, University of California, Davis, 2007

Licenses

Civil Engineer, California

Professional Affiliations

Water Environment Federation

Kathryn E. Rogers, P.E.

Kathryn Rogers joined Carollo in 2008. She specializes in the planning, design and construction of wastewater and recycled water treatment facilities. Her project experience includes upgrading wastewater treatment plants to replace aging infrastructure, increase nutrient removal, and increase recycled water production. She brings expertise in permitting and CEQA compliance, and securing funding assistance through the State of California Clean Water State Revolving Fund (CWSRF).

Relevant Experience

→ Project manager for the City of Richmond WWTP Critical Improvements Project. The project features major process upgrades that improve the overall reliability and condition of the WWTP. Elements include a new 40 mgd screening and grit removal facility and 15 mgd aeration and secondary clarifier upgrades. Two designs were developed for the grit removal facility for competitive bidding of two different grit removal technologies. The aeration upgrades include replacing an existing surface aerator system with a more efficient diffused aeration system comprised of membrane diffusers and high-speed turbo blowers. The secondary clarifier design included CFD modeling to optimize the secondary clarifier configuration and mechanism design. The total project delivery cost is approximately $30 million.

→ Project engineer for the West County Wastewater District, Recycled Water Reliability Upgrades Project. This project included biological nutrient removal (BNR) upgrades to the District's 12.5 mgd conventional activated sludge (CAS) process. Objectives to eliminate ammonia breakthroughs and high effluent solids, that increase the reliability of water suitable for treatment and reuse at the Chevron refinery. Also, the project reduced the nutrient loads in effluents deposited into the SF Bay. While there are no current nutrient limits for the bay, the District took addressed future limits. Carollo's chief responsibilities were engineering services during construction and design documents. Construction costs for the plant improvements were approximately $24M.

→ Project manager for the City of Richmond WWTP Facility Plan. Prepared a Facility Plan for the City's 16 mgd WWTP, which included a $120 million 10-year CIP, and a $600 million 30-year CIP. The plan was an update to the City's WWTP Master Plan and provided a focused approach to addressing aging infrastructure in the near-term. Also, gave high-level recommendations to allow for growth and anticipated long-term nutrient removal requirements. Included feasibility analysis for producing disinfected secondary effluent to neighboring reclamation facilities for reuse. To meet California Environmental Quality Act (CEQA) requirements, a declaration of exemption for the critical improvement projects and a mitigated negative declaration (MND) for the remaining near-term WWTP improvements were made. To secure a low-interest loan, a Clean Water State Revolving Fund (CWSRF) application was developed for the critical improvements identified in the Facility Plan.

→ Project engineer for the City of Sunnyvale Water Pollution Control Plant Master Plan. The Master Plan was a comprehensive assessment of the City's WWTP, which has a rated capacity of 29.5 mgd. The Master Plan includes a 30-year, $1 billion Capital Improvement Program (CIP) that addresses aging infrastructure, anticipated regulatory requirements, anticipated growth, and increased recycled water production. Key elements of the master plan were the identification of a secondary treatment expansion process, detailed site layout considerations, and preparation of a capital improvement program. Improvements identified for implementation within the next 15± years largely include replacing aging infrastructure and implementing new conventional activated sludge (CAS) facilities that will operate in parallel with the existing oxidation pond system. To comply with California Environmental Quality Act (CEQA) requirements, the project effort included a Programmatic Environmental Impact Report

(PEIR). Chief responsibilities included site layout development, hydraulics design, CIP development, and CEQA efforts.

→ Treatment analysis engineer for the West County Wastewater District (WCWD), California, District-Wide Master Plan. The project included the sanitary sewer collection system; Water Pollution Control Plant (WPCP); and non-process facilities such as administration, laboratory, storage, and maintenance. Work efforts included a condition assessment/capacity assessment, alternatives evaluation, and 20-year capital improvement program (CIP) development. All of WCWD's facilities were combined in one master plan, allowing the needs of each to be prioritized in an overall program. Other work efforts included a risk-based analysis of all 12,000 assets to identify failure likelihood, BioWin modeling to assess capacity, 3-D computational fluid dynamic (CFD) modeling of secondary basins to optimize performance, and a wet weather capacity improvements assessment of the 249-mile collection system.

→ Project Engineer for the West County Wastewater District State Revolving Fund (SRF) and Programmatic Environmental Impact Report (PEIR) Project for the District-Wide Master Plan. Leading a multi-disciplinary team to complete a Programmatic Environmental Impact Review (PEIR) of the District's $300 million 20-Year Capital Improvement Plan. Developed a strategy to secure low interest loans from the California State Water Resources Control Board (SWRCB) through the Clean Water State Revolving Fund (SRF) Program. Assisted the District with completing an SRF loan application, which would fund capital improvement projects totaling $75 million that occur in the first five-years of the District's 20-year CIP.

→ Engineer for the City of Palo Alto Long Range Facility Plan, which considers facility needs over the next 50 years to accommodate regulatory changes, service area growth, and aging infrastructure. Responsibilities were analysis and development of regulatory scenarios that may occur over the planning period.

→ Engineer for the San Francisco Public Utilities Commission (SFPUC), California, Sewer System Improvement Program Financial Analysis Support Services. Responsibilities were updating the existing Sewer System Improvement Program $7 billion budget to reflect on-going changes to project scopes and schedules, development of several program alternatives that were used to determine rate increase scenarios, and development of summary graphics and materials for commission meeting presentations.

→ Engineer for the San Francisco Public Utilities Commission (SFPUC), California, Urban Watershed Framework Informational Interview project. The purpose was to canvas SFPUC staff, City staff, and public stakeholders to determine their economic, social, and environmental values and goals regarding the City's wastewater treatment and collection system. Responsibilities included developing the interview approach; analyzing and summarizing interview data; identifying the common and primary goals of the various parties interviewed; and providing recommendations for how the identified goals can be addressed through the implementation of the SFPUC Sewer System Improvement Program (SSIP).

→ Engineer for the City of Modesto, California, Engineer's Report Update. The report provides a justification and cost allocation of proposed wastewater collection and treatment plant improvements. Responsibilities included updating the 2007 Engineer's Report to reflect recent changes in City's CIP, and evaluating rate impacts for existing and future ratepayers. Also, capital cost estimating, adjusting cost estimates due to bidding climate, and adjusting project schedules to meet rate increase constraints.

Education

MS Civil Engineering, Stanford University, 1981

BS Civil Engineering, Stanford University, 1981

Licenses

Civil Engineer, California

Professional Engineer, Maryland, Virginia

Professional Affiliations

American Chemical Society

American Society of Civil Engineers

International Water Association

Sigma Xi

Water Environment Federation

A. Ron Appleton Jr., P.E.

Ron Appleton has 36 years of civil engineering experience emphasizing biological, physicochemical, and aqueous chemistry aspects of municipal and industrial wastewater treatment, recycled water treatment, and solids handling. He specializes in process modeling, process evaluation and design, hydraulic analysis and design, and process mechanical design. Since 2011 he has taught a class he developed for the graduate Environmental Engineering and Science program at Stanford University, CEE271D – Introduction to Wastewater Treatment Process Modeling. He has provided company-wide training in the use of treatment plant hydraulics analysis software and subsequent assistance in modeling specific process configurations. He is expert in "whole plant" simulation using BioWin™, SUMO, and GPS-X software to integrate liquid and solids treatment train operations and performance.

Relevant Experience

→ Secondary Treatment Process Modeling (BioWin) for the Fairfield-Suisun Sewer District, California, Blower Replacement, which enhanced the reliability and efficiency of the secondary treatment process aeration system. Conducted a secondary treatment process evaluation of the activated sludge process, replacement of the existing 600-hp aeration blowers with new high-speed turbo blowers, aeration piping repairs, and electrical system upgrades.

→ Process Modeling (BioWin) for the Washoe County, Nevada, South Truckee Meadows Water Reclamation Facility (STMWRF) Master Plan. Updated the current 6-mgd Facility Plan to cost-effectively implement future operations and infrastructure improvements in a timely manner. Focus areas included: flow and loading projections; Infosewer model development; pump station and force main improvements; sewer interceptor extension; treatment process facilities (secondary); condition assessments (structural, mechanical, electrical); treatment operations practices; BioWin process model development; filtration/disinfection facilities; alternatives and recommendations for a 20-year planning horizon; present-value financial analysis; and CIP development.

→ Process Modeling (BioWin) for the City of Reno/City of Sparks, Nevada, Truckee Meadows Water Reclamation Facility (TMWRF) Process Optimization Study. Three studies were conducted in tandem; Facility Optimization, Digester Gas Production and Use, and Biosolids Management. Work efforts included BioWin modeling to determine most the most efficient use of the expanded TMWRF capacity and staff training to use BioWin to provide long-term benefits for all aspects of the TMWRF operations and permitting processes. The impact of the new sludge thickening and digestion processes were analyzed and the digester gas and co-generation study was updated in light of the new acid-phase digester, aeration blowers, heat loop system, and new generator technology.

→ Secondary Treatment Process Modeling (BioWin) for the South Tahoe Public Utility District, California, Process and Hydraulic Analysis. The project involved process and hydraulic evaluation of the Wastewater Treatment Plant, focusing on the activated sludge unit process. District staff was interested in determining the near-term and possible long-term process needs to set appropriate priorities for future capital expenditures. Carollo's analysis provided recommendations for meeting current and future peak plant flow demands and prioritized capital improvements. The project evaluated the performance and feasibility of alternative treatment configurations to optimize plant performance and hydraulic capacity.

→ Process engineer for the City of Sparks Alkalinity Evaluation Project for the Truckee Meadows Water Reclamation Facility in Reno, NV. Performed assessment of historical influent and effluent nitrogen data for the plant's nitrifying trickling filters. Analyzed the addition of ferric chloride and alum to the centrate phosphorus removal stream to evaluate impacts of these chemicals have on the alkalinity

concentration needed to promote nitrification in the nitrifying trickling filters.

→ Technical support for the Sewer Rehabilitation Project, City of Reno, Nevada. Support for evaluating impacts of impact of constituents in spent cure water (esp. styrene) from cured in place pipe (CIPP) sewer rehabilitation projects on biological treatment facilities at the 40 mgd Truckee Meadows Water Reclamation Facility.

→ Process engineer for the City of Sparks Process Operation Assistance for the Truckee Meadows Water Reclamation Facility in Reno, NV. Weekly review of plant process performance data and providing guidance to plant staff on process data collection and changes needed to improve operation of the plant's secondary treatment process and advanced treatment.

→ Project manager for the Livermore Water Reclamation Plant Master Plan, City of Livermore, California. The master plan was to increase capacity from 8.5 to 11.1 mgd. Calibrated BioWin process simulator using wastewater characterization data (including VFA analyses) and historical operations and performance data. Determined capacity of existing high-rate activated sludge system using calibrated simulator and state-point analysis to simulate secondary clarifier performance. Developed secondary treatment modifications to provide future capacity (SRT control, anaerobic selector modifications, DO control, primary effluent equalization, sludge re-aeration) using calibrated simulator and state-point analysis. Determined capacity of existing solids handling facilities using simulated sludge production. Developed alternatives to increase sludge thickener and anaerobic digester capacity and to provide biosolids disposal/reuse alternatives.

→ Technical advisor for the City of Sparks Sidestream Treatment Evaluation Project for the Truckee Meadows Water Reclamation Facility in Reno, NV. Performed independent review of influent data analysis, design criteria development, and nutrient removal sidestream treatment alternatives to reduce energy consumption of the wastewater treatment plant. Evaluated effects of secondary effluent quality on tertiary filter operations (esp. coagulant and polymer dose) and performance. Evaluated operations and performance of existing recycled water chlorine disinfection system.

→ Process engineer for the Regional Water Reclamation Plant (RWRP) Upgrade, City of Lompoc, California. The plant upgrade project was for the design of an expansion of the Lompoc RWRP to 5.5 mgd and modifications to meet new discharge limits for nitrate, copper, and molybdenum. Conducted bench-scale testing of complexing polymers for metals removal. Calibrated BioWin process simulator using wastewater characterization data. Created design criteria for staged (anoxic/aerobic) oxidation ditch with mixed liquor recycle to meet 10 mg/L monthly average nitrate discharge limit with provisions for future phosphorus and/or additional nitrate removal. Oxidation ditch design included pumps for mixed liquor recycle, fine bubble diffusers w/aeration air DO control, submersible mechanical mixers, and mixed liquor wasting for SRT and foam control.

Developed hydraulic simulation of new facilities to handle an unequalized PWWF rate of 15.0 mgd through preliminary treatment, an equalized PWWF rate of 9.5 mgd through secondary treatment (15.0 mgd peak mixed liquor flow rate), and an equalized PWWF rate of 5.5 mgd through tertiary treatment.

→ Technical support for the District of Columbia Water and Sewer Authority (DCWASA) Blue Plains WWTP Enhanced Nutrient Removal Program, Washington, DC. Technical support for evaluating post-denitrification aeration requirements at the 370 mgd WWTP. Developed a MathCAD worksheet to calculate nitrogen stripping at specified temperature and flow rates (up to 1,260 mgd peak mixed liquor flow rate) following a 34-ft SWD denitrification tank to mitigate potential nitrogen sludge flotation in denitrification clarifiers. Compared calculated results against BioWin gas-transfer model simulation.

Education

MS Environmental and Water Resources Engineering, University of Texas, Austin, 2001

BS Civil and Environmental Engineering, University of California, Davis, 1999

Licenses

Civil Engineer, California

Professional Affiliations

California Water Environment Association (CWEA)

Santa Ana River Basin Section of CWEA (SARBS):

- Past-President, Board of Directors
- Professional Development Committee

Southern California Alliance of Publicly Owned Treatment Works

Water Environment Federation

- -Member, Residuals and Biosolids Committee
- -Vice-Chair, Solids Separation Sub-Committee
- -Member, Municipal Resource Recovery Design Committee

Rashi Gupta, P.E.

Rashi Gupta, an associate vice president and project manager with Carollo Engineers, has specialized in delivering sustainable solutions for biosolids management and wastewater treatment throughout her career. Her responsibilities as project manager and project engineer have taken her from the initial planning phases of projects through design to start-up after construction.

Ms. Gupta is the co-chairperson of Carollo's biosolids community-of-practice, which allows her to remain current on leading technologies and changes within the biosolids management field. Through her involvement with this group and her responsibilities on various design projects, Ms. Gupta has become a leader in solids thickening, dewatering, and digestion systems and serves as Carollo's Biosolids Lead in California. A summary of her experience includes:

Relevant Experience

→ Technical reviewer for the Truckee Meadows Water Reclamation Facility ECM 6- Dewatering Project for the City of Reno, Nevada. Ms. Gupta provided the technical check for the dewatering facility design which included two new centrifuges, associated polymer make down systems, and dedicated piston-style cake pumps.

→ Project manager for the CLARTS Impacts Study for the City of Los Angeles' Hyperion Treatment Plant. Focus on the impacts at the treatment plant of organic waste conveyed from the CLARTS facility to the plant by sewer. Study includes an assessment of existing solids processing capacity, including centrifuge thickening, thermophilic digestion system, sludge screening, centrifuge dewatering, and dewatered cake loading systems. Impacts of increased load from the organic waste on the existing solids systems and ancillary processes will be determined and recommendations to mitigate those impacts will be made.

→ Technical advisor and reviewer for the Five Year CIP Projects and Digester Cover Replacement Project for the Sewerage Agency of Southern Marin, California. Her responsibilities included collaboration with Agency personnel to highlight impacts of potential regulatory changes on the plant's solids processes, review of digester cover evaluation, and advising project team on digester heating system design parameters.

→ Project engineer for the Biosolids Master Plan for the Fresno Clovis Wastewater Reclamation Facilities. This project includes a capacity assessment of solids treatment processes, evaluations of technologies to achieve a diverse portfolio of biosolids, investigation of local markets for different classes of biosolids, and determination of potential regulatory changes that could affect the plant. Ms. Gupta is responsible for solids system capacity assessment and evaluations of solids processing technologies.

→ Project manager for the Dewatering and Digester System Assessment Project at the JB Latham Treatment Plant for the South Orange County Wastewater Authority, California. This project includes capacity and condition assessment of the existing digester heating and dewatering processes. Ms. Gupta is managing the project.

→ Project manager for the Dewatering System Assessment Project at the Regional Treatment Plant for the South Orange County Wastewater Authority, California. This project includes capacity and condition assessment of the existing dewatering equipment and processes..

→ Project manager for the Package B Improvements project at the JB Latham Treatment Plant for the South Orange County Wastewater Authority, California. This project includes capacity and condition assessment of the existing liquid treatment trains, evaluation of effluent management options, cost modeling, process modeling, hydraulic modeling, and preliminary and final design of solids thickening and digestion processes. Ms. Gupta is managing the project and will be responsible for the solids system design.

Awards

Induction into Select Society of Sanitary Sludge Shovelers (5S) by the California Water Environment Association

Spotlight Volunteer Award from the Santa Ana River Basin Section of CWEA

Other Accomplishments

National Science Foundation Fellow - University of Texas, Austin

Regents Scholar - University of California, Davis

Recipient of University of California, Davis M.S. Ghausi Medal for the College of Engineering

Rashi Gupta, P.E.

→ Project manager for the Plant Solids System/Capacity Assessment (Phase 1) project at the Alvarado Wastewater Treatment Plant for the Union Sanitary District, California. This project includes a loadings-based capacity assessment of all solids treatment processes, optimization of existing processes to improve operations and increase capacity, and planning-level recommendations for additional solids processes required to reach the plant's permitted capacity of 33 mgd. The project also includes evaluations of technologies to achieve Class A biosolids, investigation of options to achieve energy neutrality, and determination of potential regulatory changes that could affect the plant. Some of the focus areas of the project include codigestion, high solids digestion with recuperative thickening, chemically-enhanced primary treatment, solids drying, low-temperature thermal hydrolysis, and high-temperature thermal hydrolysis. Ms. Gupta is responsible for project management, solids optimization and capacity assessment, analyses of digestion options, and overall technical oversight.

→ Project engineer for the Facilities Master Plan for the Central Marin Sanitation Agency. Ms. Gupta is responsible for an assessment of current digester capacity, estimation of additional FOG and food waste that could be accommodated at the facility, projections of additional digester gas production, planning level modifications to add capacity at the existing FOG/Food Waste Receiving Facility, and recommendations for modifications to the current dewatering system.

→ Project engineer for the Palm Springs Wastewater Treatment Plant Upgrade operated by Veolia Water NA for the City of Palm Springs. This project includes much-needed upgrades to both the liquid and solids treatment systems necessary to maintain the plant's treatment capacity and reduce odors. Ms. Gupta is responsible for the work associated with the solids treatment systems including rehabilitation of two gravity thickeners and one anaerobic digester as well the evaluation of a new mechanical sludge dewatering facility. The preliminary design included an evaluation of sludge dewatering technologies including belt filter presses, screw presses, and centrifuges. Final design for the facilities is based on the decisions made during the preliminary design phase.

→ Project engineer for the Comprehensive Wastewater Master Plan for the City of Riverside, California. Carollo was retained to develop a master plan for all wastewater facilities owned and operated by the City. The master plan included projections of the impacts of regulatory changes, and recommendations for future projects to address those regulatory changes as well as the increasing loads experienced at the City's treatment facility. The plan covered both liquid and solids treatment processes and Ms. Gupta was responsible for the solids system work.

→ Project engineer for the Facilities Master Plan 2017 for the Orange County Sanitation District, California. Carollo was retained to develop a facilities master plan for all wastewater facilities owned and operated by the District. The master plan included documentation of existing facilities, determination of operation issues that must be addressed, and recommendations for future projects to address those issues. The plan covered both liquid and solids treatment processes and Ms. Gupta was responsible for the solids system work.

→ Project engineer responsible for preparation of bid-phase documents for a new 9.9-mgd wastewater treatment facility in Darsait, Sultanate of Oman. The project includes influent pumping, headworks, fine screening, and membrane bioreactors (MBRs) followed by tertiary effluent pumping and solids handling facilities.

Education

MSE Civil Engineering, University of Texas, Austin, 2001

BS Civil Engineering, Stanford University, 1995

Licenses

Civil Engineer, California, Texas

Professional Engineer, Maryland

Certification

Stanford Advanced Project Management Certificate (2014)

George Washington University, School of Business Master's Certificate in Government Contracting (2012)

USEPA Advanced Asset Management Training Certificate (2010)

Professional Affiliations

American Water Works Association

Felicia James, P.E.

Felicia James is an Asset Management Lead in Carollo's Strategic Management Group. She has 22 years of experience, including as an Asset Strategy Manager with the Washington Suburban Sanitary Commission prior to joining Carollo in 2015. Ms. James had been with the Commission for more than nine years and was responsible for development and implementation of asset management planning related to buried water infrastructure (water mains, valves, hydrants, water meters, and service connections). This included tracking the condition and performance of underground assets and the effectiveness of asset management strategies, all in an effort to improve the Commission's level of service. Ms. James uses advanced asset management methods to prioritize capital and operating expenses in order to reduce risks associated with aging infrastructure.

Relevant Experience

→ Asset management lead for the City of Sugarland, Texas, Wastewater Treatment Plant Improvements. Developed a risk-based asset management framework, performing condition assessments of wastewater treatment facilities previously privately managed, and building an interactive dashboard reporting tool.

→ Asset management best practices advisor for the City Aurora, Colorado, Griswold Water Purification Facility Asset Management Plan. The goal is to develop levels of service and key performance measures and establish the business risk exposure profile for the facility's assets based on the U.S. Environmental Protection Agency's ten-step framework and five core questions. The asset management plan will include business improvement initiatives along with funding and optimization strategies for both capital and operations and maintenance needs.

→ Asset management advisor for the City of Chico, California, Strategic Planning and Sewer Rate Support Review Support. This project is to develop short-term and long-term needs for the City's Water Pollution Control Plant (WPCP), in order to provide a basis for future sewer rate increases. Supported a multidiscipline condition assessment of existing facilities using Carollo's mobile condition assessment and asset management application. Condition results were imported into an asset management risk model to develop prioritized rehabilitation, repair, and replacement options. The project also involves evaluation of future hydraulic and capacity needs at the WPCP with master planned facility upgrades needed for each; analysis of future potential regulatory-driven requirements, planning for facility improvements; and development of a 20-year capital improvement program to implement all recommended upgrades. The project also includes a staffing evaluation aimed at reviewing current and staffing needs at the WPCP based on scheduled facility upgrades and improvements.

→ Quality assurance/quality control for the Union Sanitary District, California, Alvarado Wastewater Treatment Plant Asset Condition Assessment Update Study. This study will update the asset condition and refine asset replacement costs from the 2006 Master Plan and 2009 Master Plan Update for the Alvarado Wastewater Treatment Plant facilities. The project will set the course for managing asset risk and optimizing asset investment into the future.

→ Engineer for the City of Colton, California, Water and Wastewater System Master Plan Update. The Water System Master Plan (WMP) is part of a larger effort to produce an Integrated Water Master Plan for the City's water and sewer systems. The WMP will update the previous plan and aid the City in planning, development, and financing of water system facilities to provide reliable, enhanced service for customers. Also, to serve anticipated land use changes and growth, and considers existing conditions, as well as future plans presented in the City's General Plan.

→ Asset management lead for the City of Dallas Water Utilities, Texas, Water Delivery Comprehensive System Assessment and

Felicia James, P.E.

Update. This project contains distribution and transmission systems, pump stations, storage facilities, and associated supporting assets. In addition to condition and risk analyses, the assessment includes hydraulic modeling and calibration, surge and pressure analyses, and water quality modeling. Results will inform a risk-based prioritization of capital, operational, and maintenance strategies for achieving the Utility's management goals for the water delivery system.

→ Project manager for the City of Sacramento, California, Accelerated Water Meter Program. The project provides services for management, development, and implementation of the program to install over 40,000 water service meters and approximately 60 miles of water main replacements or relocations. The program condenses the water service meter installation effort from eight years to four years. Program activities include public outreach, alternative project delivery options, and rigorous project controls for monitoring the program's progress.

→ Asset management lead for the Contra Costa Water District, California, Treated Water Renewal and Replacement Study (TWRR) and Asset Management Implementation Plan (AMIP). The AMIP developed an asset management framework, level of service and risk management, asset register and hierarchy, and five-year roadmap for implementation. Framework integrated the U.S. Environmental Protection Agency's ten-step framework and five core questions with the fundamentals of Effective Utility Management. Also included condition assessment of several reservoirs and pump stations and application of the AMIP recommendations to develop prioritized capital improvement projects.

→ Asset management advisor for the Central Contra Costa Sanitary District, California, Asset Management and Risk Analysis. Project included a new collection system asset management plan and master plans for the District's collection system and treatment plant. Also included maintenance and capital planning, on-site condition assessments, business process mapping, and development of the risk assessment and prioritization model for the District's collection system using InfoMaster®.

→ Asset management advisor for the City of Henderson, Nevada, Wastewater Treatment Facility Effluent Master Plan. Developed an implementation road map with recommended improvements, implementation schedule, cost estimates, and capital funding requirements for the treatment facilities that incorporates level of service with failure mode risk analyses for prioritization and timing of project recommendations.

→ Asset management advisor for development of the Orange County Utilities, Florida, Asset Management Framework and Condition Assessment Integration. Project includes establishing condition assessment protocols for integration with the Utility's Maximo® maintenance management system, updating the asset registry, and establishing an asset management model for prioritizing capital, operational, and maintenance needs based on risk.

→ Asset management advisor providing technical support for the Sacramento Regional County Sanitation District, California, EchoWater Project Tertiary Treatment Facilities.

→ Asset management advisor for the City of West Sacramento, California, Water System Master Plan. Project provides services to review and update the water distribution system; a current hydraulic model update; review and guidance for the water meter program; and recommendations for short-range and long-range capital improvement projects to improve system reliability and allow flexibility for growth, including fire demands and water supply shortages or disruptions.

→ Asset management advisor for the City of Oceanside, California, Utility Efficiency Study. Responsible for advising on study development to optimize the City's operations, maintenance, and capital planning efforts and maintain acceptable service levels while managing the total life-cycle investments of the utility.

Education

PhD Environmental Engineering, University of Massachusetts, 2000

MS Environmental Engineering, University of Massachusetts, 1995

BS Mechanical Engineering, Johns Hopkins University, 1993

Licenses

Civil Engineer, California

Professional Affiliations

International Water Association

Water Environment Federation

Elisa A. Garvey, Ph.D., P.E.

Dr. Elisa Garvey's experience includes water resources management, water quality assessments, regulatory and permitting support, master planning, and monitoring plan development/implementation. Recent projects include:

Relevant Experience

→ Engineer for the Cities of Reno and Sparks and Washoe County, Nevada, Phase I, II, and III permitting/non-structural program. Responsibilities included identifying non-structural alternatives aimed at water quality benefits that will form a basis for a watershed trading program for the Truckee Meadows Water Reclamation Facility (TMWRF). Also identified and quantified pollutant loads from point and non-point sources (including stormwater runoff). The estimates were incorporated into the watershed and water quality models to simulate river water quality and compliance with an existing TMDL.

→ Assistant project manager for the Inland Empire Utilities Agency (IEUA), California, Facilities Balancing and Optimization Model. The IEUA system consists of liquids treatment at four reclamation plants and solids treatment at two treatment plants. Responsible for overall development of an optimization model designed to help IEUA better understand how the plants work as a system and to identify opportunities for improvements in operations and planning capital improvements.

→ Project engineer for evaluation of the biological availability of dissolved organic nitrogen (DON) for the Cities of Reno and Sparks, Nevada, Regional Wastewater Facilities Design Phase III. The project's goal was to evaluate the bioavailability of DON to develop a range of percent DON availability, which would be removed from the permit total nitrogen compliance calculation. Analysis of the data included statistical analysis and a mass balance evaluation. Determined a conservative estimate of the amount of non-bioavailable DON in the treatment plant effluent and prepared a final summary report.

In addition, development of a Coordinated Monitoring Program involved 14 agencies. The CMP program was developed by identifying the past and current monitoring activities in the region and evaluating the data needs associated with the watershed and water quality models, and compliance with water quality standards. Development of the monitoring program required extensive coordination with resource agencies including the USEPA, NDEP, Lahonton RWQCB, the U.S. Geological Survey, the U.S. Bureau of Reclamation, the Department of Water Resources (DWR), the nature conservancy, the cities of Reno and Sparks, Washoe County, and the Pyramid Lake Paiute Tribe.

→ Engineer for the San Jose/Santa Clara Water Pollution Control Plant Master Plan for the City of San Jose, California. Responsible for statistical evaluation and future predictions of historical flows, conventional pollutant loads, and non-conventional pollutant concentrations.

→ Project manager on a study of influence wastewater flows and loads from residential and commercial sources, for a confidential client. Responsibilities include leading the development of a literature review and experimental plan. The first phase of the experimental plan will involve flow and strength sampling at over 10 sites, and statistical analysis of resulting data.

→ Project engineer for the City of Ventura, California, Special Studies as required by its NPDES permit. The Special Studies included an Estuary Subwatershed Study, Recycled Water Market Study, and Wetlands Feasibility study. The Estuary Study focused on determining if the existing wastewater treatment plant discharge provide an enhancement to the receiving water (Santa Clara River Estuary) under current or alternative discharge flow conditions. As the allowable discharge flow will eventually be written into the City's NPDES permit, coordination and communication with the Regional Water Quality Control Board and resource agencies were involved.

Elisa A. Garvey, Ph.D., P.E.

→ Project engineer for the 2020 Master Plan for Sacramento Regional County Sanitation District, California, Sacramento Regional Wastewater Treatment Plant. Responsible for providing technical support services for the 2020 Master Plan Environmental Impact Report (EIR), permitting process, and updates to the 2020 Master Plan technical documents. Types of services included preparing responses to EIR comments on a variety of issues from components of the source control program to estimates of filtration costs; and conducting feasibility study on the efficacy of advanced treatment processes for removal of priority pollutants.

→ Project manager for the cities of Oxnard and Pleasant Valley, California, Salt and Nutrient Management Plan (SNMP). Lead the project team to develop the SNMP (ongoing), which involves groundwater basins characterization, groundwater quality assessment, evaluation of assimilative capacity, identification of sources of salts and nutrients, fate/transport modeling, management measures identification, anti-degradation analysis, and environmental review.

→ Project engineer for the Bay Area Clean Water Agencies (BACWA), California, Storm Water Diversion White Paper and Analysis. The driver for the project was interest amongst regulators in implementing stormwater diversion projects in northern California for the purpose of reducing concentrations of mercury and PCBs in stormwater runoff to San Francisco Bay. The objective of this White Paper is to identify the challenges and opportunities associated with diversions of flow from stormwater systems to a publically owned treatment works. Carollo developed the White Paper using published and grey literature and case studies from several agencies, including the City of Los Angeles, Orange County Sanitation District, City of Ventura, City of Santa Cruz, and East Bay Municipal Utility District. The final white paper documents the institutional, technical, and economic challenges and the opportunities associated with stormwater diversions.

→ Project engineer for developing comment letters to the U.S. Environmental Protection Agency (EPA) on behalf of the Bay County Utilities Services Department, Florida. Responsible for developing comment letters to the EPA for (1) comments on the Florida Statewide Mercury TMDL, (2) comments on the Water Quality Standards for the State of Florida's Estuaries, Coastal Waters, and South Florida Inland Flowing Waters (Coastal Rule), and (3) comments on Water Quality Standards for the State of Florida's Streams and Downstream Protection Values for Lakes: Remanded Provisions (Inland Rule). The comment letters addressed the rulemaking process, technical basis, and potential impacts on the regulated community.

→ Project engineer for technical review of the Military Point Lagoon (MPL) Transparency Study. The Bay County Utilities Services Department, Florida, was required by a Florida Department of Environmental Protection (FDEP) Administrative Order to complete a Transparency Study in St. Andrews Bay to assess the impact of the MPL discharge on transparency within the bay and how transparency may be impacting seagrasses within the bay. Responsible for providing a technical review of the transparency study, with particular attention on the approach used to demonstrate attainment of FDEP standards.

→ Project manager for the City of Bakersfield, California, Stormwater Management Plan (SWMP) Update. Per requirements of a new Phase 1 Stormwater Permit, the City was required to update its SWMP, which involved a significant expansion in stormwater management scope and responsibility. Responsibilities included leading two workshops with City and County staff to outline new SWMP components, identify responsible parties, and establish an implementation schedule. Provided technical oversight and responsibility for updating the SWMP, which was approved by the Central Valley Regional water Quality Control Board.

Education

MS Civil and Environmental Engineering, University of California, Los Angeles, 1998

BS Physics, University of California, Los Angeles, 1993

Licenses

Civil Engineer, California

Professional Engineer, Washington

Professional Affiliations

California Water Environment Association

Water Environment Federation

Andre Gharagozian, P.E.

Andre Gharagozian, an associate with Carollo Engineers, has more than 20 years of experience as a consulting engineer in the water and wastewater field with an emphasis on wastewater treatment.

Mr. Gharagozian's expertise is in secondary process analysis and modeling and nitrogen removal with an emphasis on trickling filter/activated sludge and activated sludge systems. Specific process design experience includes several types of aeration systems and activated sludge basin reactors, sequential batch reactors, clarifiers, microfiltration, cloth-media filtration, UV and chlorine disinfection, solids thickening, anaerobic digestion, and various chemical, storage, and conveyance facilities associated with treatment facilities.

During various planning and preliminary design efforts, he has conducted Biowin process modeling and been responsible for plant hydraulic calculations for several projects and conducted outfall modeling using EPA model PLUMES. He has also participated or led studies ranging from a United Nations Environment Programme best management practices report for the wider Caribbean region, a recent Manual of Practice for the design of membrane bioreactors, comprehensive wastewater system master plans, and feasibility studies for evaluating various water or wastewater projects. Specific project experience includes:

Relevant Experience

→ Project manager for the West County Wastewater District (WCWD), California, District-Wide Master Plan. The project included the sanitary sewer collection system; Water Pollution Control Plant (WPCP); and non-process facilities such as administration, laboratory, storage, and maintenance. Work efforts included a condition assessment/capacity assessment, alternatives evaluation, and 20-year capital improvement program (CIP) development. All of WCWD's facilities were combined in one master plan, allowing the needs of each to be prioritized in an overall program. Other work efforts included a risk-based analysis of all 12,000 assets to identify failure likelihood, BioWin modeling to assess capacity, 3-D computational fluid dynamic (CFD) modeling of secondary basins to optimize performance, and a wet weather capacity improvements assessment of the 249-mile collection system.

→ Project manager for the West County Wastewater District's hydrothermal oxidation project. Primary responsibilities included assessing biosolids to energy technology at the 15 wet ton per day facility, evaluating feasibility of supercritical water oxidation of thickened waste activated sludge, and providing preliminary engineering for plant integration including dewatering, cake conveyance, and heat recovery facilities, as well as providing application support for low interest loans and grants through the Clean Water State Resolving Fund.

→ Project engineer for a comprehensive master plan of the Rodeo Sanitary District's collection and treatment facilities. Like many communities in the area, the wastewater system experiences high levels of infiltration and inflow (I&I). The Master Plan evaluated whether it would be more cost-effective to expand the WWTP and provide treatment of the I&I, or invest in reducing I&I in the collection system. Currently working with the District to submit an SRF application to the state and obtain low-interest loan financing for some of the early projects.

→ Process engineer for the City of San Mateo's Wastewater Master Plan. performed process modeling to assess unit process capacity and develop nutrient reduction alternatives for the 15.7 mgd wastewater treatment plant. As many agencies in SF Bay, the WWTP site has little room for expansion, so nutrient reduction alternatives considered included high-rate, compact technologies such as IFAS.

Andre Gharagozian, P.E.

→ Process engineer for the Richmond Wastewater Treatment Plant Master Plan, Richmond, California. Developed and conducted process modeling for this 10 mgd activated sludge process to estimate the plant secondary process capacity and develop design criteria for various expansion alternatives with and without nitrification. Assisted with trouble shooting the periodic episodes of poor settleability.

→ Project manager for the Royal Gorge, L.L.C. Phase 2 Wastewater Treatment and Effluent Disposal Alternatives Study, Donner, California. The project studied two wastewater treatment and disposal alternatives with a goal of developing approximately 3,000 acres in the Donner Summit area of Lake Tahoe. Evaluated and developed design criteria for both treatment and disposal alternatives, developed capital and O&M cost estimates, and guided the owner through permitting, jurisdictional issue, and the challenges of implementing a new treatment facility. Alternatives consist of: building a new treatment plant with effluent storage in the winter and spray irrigation in the summer; and expanding an existing wastewater plant which discharges to a river in the winter and spray irrigation in the summer. Conducted modeling to develop secondary process sizing for both options. Anticipated treatment requirements include full nitrification and denitrification to total nitrogen limit of 10 mg/L and California Title 22 standards for recycled water.

→ Prepared a capacity evaluation of an existing 6.4-mgd nitrification-denitrification wastewater treatment plant for the City of Avondale, Arizona. Documented design criteria of existing facilities, preparing a hydraulic profile for the plant, rating the capacities of various processes based on industry standards, and conducting Biowin process modeling to evaluate the secondary process capacity. Implemented an intensive two-week sampling program to characterize the influent wastewater and calibrate the process model.

→ Staff engineer for a wastewater facilities plan for the Town of Coupeville, Washington. Primary author evaluation report on hydraulic and process capacity for a 250,000-gpd oxidation ditch wastewater treatment plant. Recommended upgrading the effluent pumps, adding UV disinfection, and a second oxidation ditch and clarifier. Also performed simulations using the dilution model PLUMES to predict required effluent permit limitations for ammonia and residual chlorine to meet water quality goals outside the outfall mixing zone.

→ Project manager for the Marina Development Sewer Improvements, Rodeo Sanitation District, California. Responsibilities include the permitting and final design of approximately 1,200 lf of an 8-inch gravity sewer line. The proposed alignment will pass under railroad tracks and will utilize a bore and jack technique. Due to challenging soils and a high groundwater, the majority of the alignment will use pilot tube microtunneling as it is more cost effective than traditional open cut for this application.

→ Partial author of the City of Snoqualmie, Washington, Comprehensive Sewer Plan. Snoqualmie planned for rapid growth and development to occur on recently annexed land. The sewer plan summarized previous planning work and developed upgrade alternatives to increase the capacity of the collection system. The plan also summarized results of an infiltration and inflow (I&I) evaluation, which consisted of a pump station flow data evaluation, as well as one week of smoke testing. Work included preparing a performance evaluation for the wastewater treatment plant and making recommendations about future improvements and related costs.

→ Project manager for Dublin San Ramon Services District's Bay Area Regional Biosolids to Energy Facility. Assessed biosolids to energy technology at the 80 wet ton per day facility and evaluated feasibility of supercritical water oxidation of digested sludge at DSRSD and dewatered cake from SFPUC facilities. Other work involved providing preliminary engineering for plant integration including dewatering, sludge unloading facilities, cake conveyance, and heat recovery facilities, and developing Class 4 construction cost estimates.

Education

MS Public Policy and Administration, George Mason University, 2008

BS Civil Engineering, University of Cincinnati, 1991

Licenses

Professional Engineer, Virginia, Maryland, North Carolina

Civil Engineer, Washington, DC

Certification

Certified, Board Certified Environmental Engineer

Professional Affiliations

Chesapeake Water Environment Association, Collections System Committee

Virginia Water Environment Association

Water Environment Federation, Collection Systems Committee (Modeling Technical Practice Group)

Eric M. Harold, P.E., BCEE

Eric Harold is a nationally recognized authority on strategic collection system planning and dynamic sewer modeling. For 25 years, he has participated or overseen more than 60 system-wide master plan and modeling studies of wastewater collection systems throughout the U.S. In addition, he has been part of the leadership or technical teams for five significant sewer program management programs. Mr. Harold has been actively involved in the development of a number of technical guidance documents, including the Task Force Chair for the Water Environment Federation's recently published update of Manual of Practice No. FD-17 Prevention and Control of Sewer System Overflows. He has significant expertise in wastewater collection system strategic planning and analysis, system-wide master planning, inflow/infiltration (I/I) control plans, green infrastructure planning and analysis, hydrologic and hydraulic modeling, and wastewater system flow monitoring. Mr. Harold has spent his career leading or supporting various collection system master planning, sanitary sewer overflow, and collection system design efforts throughout the US. He provides technical review and coordination for numerous efforts, quality assurance and quality control, technical planning and scope development, master planning, and alternatives evaluation.

Previous Experience

→ Deputy program manager for the DC Water and Sewer Authority, District of Columbia, Sewer Management Program. Mr. Harold managed day-to-day operations for a 5-year $42M sewer system management program, supporting the development of annual work plans, weekly and monthly reporting to DC Water, and overall day-to-day functioning of the program. As lead for Strategic Initiatives and Special Assignments, responsibilities included providing technical review and oversight of all planning and modeling activities, and managing system-wide metering, regulatory compliance support, grant applications, and other projects and studies in support of the sewer system. Developed a system-wide flow and rainfall monitoring system to provide wet weather characterization and system operational data for DC Water and SPM staff, and developed an inflow/infiltration characterization and control plan.

→ Task leader and technical advisor for the New Castle County, Delaware, Brandywine Hundred Sewer Rehabilitation and Capacity Assurance Program. Mr. Harold led the development and application of a system-wide model of the Brandywine Hundred sewer system to support the County's Consent Order compliance program and to provide a tool for the Program Management Team to complete system-wide capacity and rehabilitation planning. Using the first few years of flow monitoring data, the system-wide hydraulic model was calibrated and applied to screen potential SSO locations (subsequently checked with field inspections) and identify interceptor capacity constraints and strategies for capacity improvements and source reduction throughout the 420 mile sewer system. The model was used to support design projects, rehabilitation effectiveness planning and consent order compliance. Recently, this model was updated to provide more detail on the system and to modify the system to account of recently completed rehabilitation and capacity improvement projects. Using additional flow/rainfall metering data, the model was recalibrated and used to show significant improvements in system operation since the original calibration was completed in 2008, and to provide the County with the technical backing that it is achieving its regulatory compliance goals.

→ Technical advisor for the Emerald Coast Utility Authority (ECUA), Pensacola, Florida, Sewer System Rehabilitation Program. Led the on-going development and of the System Evaluation and Capacity Assurance Plan (SECAP), as part of ECUA's CMOM Program. Oversaw the development of detailed models for ECUA's separate sanitary sewer systems, including approximately 3,000 pipes and 113 of 360

pump stations, and significant manifolded force main systems. This model is now being applied for SECAP and other capacity assessments of the existing system (gravity sewers and pump stations), evaluations of impacts from future flow or system changes, and the development of alternatives to increase capacity, reduce I/I, and improve system operations. Mr. Harold also managed the characterization of existing system conditions, development of future population projections, alternatives development and evaluation, and SECAP.

→ Technical director for the City of Santa Rosa Utilities Department, California, Sanitary Sewer System Master Plan Update. The goal of this project was to expand and recalibrate the previously developed skeletal hydraulic model to support a comprehensive Sanitary Sewer Master Plan Update. Using this recalibrated modeling tool, a knee of the curve analysis was performed to select an appropriate minimum level of service (5-feet of freeboard) that will be provided for the maximum level of control event (10-year storm). Using these agreed upon level of service and control criteria, conveyance upgrades were sized and cost and a prioritized Capital Improvement Plan (CIP) was developed for the City. This project included developing population and flow projections for future (2035) conditions.

→ Technical advisor for the City of Greensboro, North Carolina, System Master Plan and Sanitary Sewer Model. This comprehensive collection system master plan developed a dynamic tool that helps proactively plan for community growth in a streamlined, coordinated way. This project used existing data and GIS information and built a detailed system-wide model using InfoWorks. The system-wide model included all pipes and manholes in the system, and used parcel-level data to provide the base units for flow generation in the model. The model was calibrated to over 30 flow meters for four storm events, and was then applied to assess existing and future development pressures, I/I concerns, and overall system operation to develop a framework for future planning, capital improvements development, and rate assessments. Model calibration guidelines and training was provided to the City, and the City now uses the tool to assist in long-term capacity planning as well as supporting ongoing design projects (implementing the master plan) and answering questions for new developments.

→ Technical advisor and quality assurance for the City of Fort Myers, Florida, Sanitary Sewer Master Plan. Master planning and modeling support for the City of Fort Myers Wastewater Master Plan, which used a system-wide hydraulic model of the City's major pump stations and manifolded force main system. The plan also consisted of analyzing projected development for two planning horizons to develop capital improvements for the wastewater system.

→ Technical oversight for the Butler County, Hamilton, Ohio, Sewer System Master Plan Update. Provided senior technical oversight for the separate sanitary sewer collection system master plan, particularly the development of capital improvements for the long-term master plan, including conveyance and storage alternatives for five planning horizons. Also assisted in the development of master plan scenarios, model application and analysis methods, and long-term strategic planning.

→ Deputy project manager for the Montgomery County and City of Dayton, Ohio - Wastewater Collection System Model and Master Plan. Led the development of future population projections and alternatives evaluation to develop a 20-year CIP. This master plan included a detailed hydraulic collection system model using InfoWorks (over 2000 pipes/nodes), flow monitoring (over 50 locations), data management, future development projections, and master plan analysis.

→ Technical advisor for the City of El Mirage, Arizona, El Mirage Wastewater Master Plan. The project involved preparation of the Wastewater Master Plan for El Mirage, reviewing model development and calibration results and provided support for master planning analyses.

Education

BS Civil & Environmental Engineering, University of South Florida, 2012

BS Microbiology, University of South Florida, 2006

Licenses

Civil Engineer, California

Professional Affiliations

American Society of Civil Engineers

- Truckee Meadows Branch YMF Director at Large 2016 - 2017

Florida Water Environment Association

- Manasota Chapter YP Coordinator 2013 – 2014
- Students and Young Professionals Committee Chair 2014 – 2016

ACE Mentors of Sarasota

Treasurer 2014 -2015

Danielle M. Orgill, P.E.

Danielle Orgill joined Carollo in 2014. Her experience includes hydraulic modeling, planning, asset management, water and wastewater treatment, and infrastructure design.

Relevant Experience

→ Project engineer for the South Tahoe Public Utility District, California, Sewer System Hydraulic Model. This is an ongoing project. No changes or updates have been made to the District's wastewater collection system model that was created 10 years ago using Innovyze InfoSewer hydraulic modeling software. In the last decade, additional infrastructure construction and collection system changes have been made. This contract allowed for on-call hydraulic modeling support to evaluate the existing model, identify potential improvements, and convert the model to InfoSWMM. Responsibilities include developing a comprehensive permanent flow monitoring program, evaluating flow monitoring data, providing recommended changes to the flow monitoring program.

→ Project engineer for the Truckee Sanitation District, California, Hydraulic Model Updates. This is an ongoing project. Responsibilities include evaluating and updating three separate sanitary sewer hydraulic models (InfoSewer), model calibration under dry and wet weather conditions, evaluating the collection system under existing and build-out flows, and identifying the improvements necessary to mitigate capacity deficiencies.

→ Project engineer for the Collier County, Florida, Wastewater Collection System Model Update. This is an ongoing project. Responsibilities include converting the existing SewerGEMS (Bentley) model to InfoSWMM (Innovyze), calibrating the model under dry and wet weather conditions, evaluating the existing collection system, and developing future scenarios (to be evaluated under separate work assignment).

→ Project engineer for the City of Tulare, California, DWWTP Capacity Evaluation and Matheny Tract Capacity Evaluation. Responsibilities included hydraulic model update and calibration under dry and wet weather conditions, evaluation of an existing sewer trunk to serve a development that would like to tie into the City's collection system, and recommended improvements needed to correct existing deficiencies and to serve the known development.

→ Project engineer for the City of King City, California, Wastewater Collection System Master Plan. Responsibilities included hydraulic model development and calibration under dry and wet weather conditions, evaluation of existing infrastructure, development of a capital improvement plan to mitigate existing deficiencies and to serve future growth, and development of the master plan report.

→ Modeler for the City of Riverside, California, Comprehensive Wastewater Master Plan. The Master Plan included both treatment and wastewater collections. Carollo built the City's collection system model using Innovyze's InfoSWMM modeling software.

→ Project engineer for the City of Reedley, California, October 27, 2016 Sanitary Sewer Overflow Event. Responsibilities included development of a hydraulic model scenario that mimicked a power failure at the influent pump station and subsequent overflow events that occurred in October 2016. Wastewater treatment plant influent flow data and photographs taken during the spill event were used to estimate the total overflow volumes.

→ Project engineer for the Manatee County, Florida, Wastewater Collection System Master Plans. Responsibilities included coordinating field testing with subcontractor (to install temporary flowmeters and pressure loggers), updating and calibrating complex collection system models for three service areas in SewerGEMS software (each with 150 or more active lift stations), and determining future infrastructure requirements for the 2020, 2025, 2035, and build out planning

periods based on model results. Assisted project manager in preparing recommended capital improvement projects and completing the final master plan report.

→ Project engineer for the West County Wastewater District, California, Inflow and Infiltration Reduction Evaluation. Responsibilities included evaluation and classification of January 2017 rainfall events, development of an estimate of the influent flow hydrograph for the January 2017 rainfall events using the District's hydraulic model, reviewing the current status of the ongoing flow monitoring program, and estimation of the potential reduction in peak flow that could be achieved through the District's ongoing I/I reduction program.

→ Project engineer for the City of Cotati, California, Sewer System Master Plan Addendum. Responsibilities included flow monitoring data review, hydraulic model update and calibration, evaluation of previously identified improvements under existing, near-term, and build-out conditions, update of the capital improvement plan, and development of a technical report.

→ Project engineer for the City of Boynton Beach, Florida, Utilities Management Optimization Plan. Responsibilities included constructing and calibrating the wastewater collection system hydraulic model, evaluating existing infrastructure, identifying future infrastructure improvements, and developing a capital improvement plan.

→ Assistant project engineer for the Manatee County, Florida, Wastewater Collection System Master Plan Cost Estimate. Responsible for evaluating utility infrastructure in GIS and hydraulic models to identify existing, major infrastructure improvements (transmission force mains and master lift stations) for a planning level cost estimate.

→ Project engineer for the Lee County, Florida, Water and Wastewater Engineer of Record Annual Report. Responsibilities included condition assessments of wellfields, lift stations, and treatment plants, review of discharge monitoring reports (DMRs) and monthly operating reports (MORs) for compliance with Florida Department of Environmental Protection permit requirements, update GIS maps, and preparation of the annual report.

→ Assistant project engineer for the Manatee County, Florida, Force Main and Valve Asset Management Program. Responsibilities included the analysis of utility infrastructure using GIS and hydraulic models to identify and evaluate high-risk force mains. The County's system consists of 1,000 miles of gravity sewer collection pipelines, 870 lift stations, and 400 miles of force main pipelines ranging from 1 to 48 inches in diameter. High-risk force mains and valves were grouped into recommended capital improvement program projects.

→ Project engineer for the Manatee County, Florida, Electronic Operations and Maintenance (O&M) Manual. Responsible for creating a comprehensive electronic-based O&M manual for the Southwest Water Reclamation Facility, including detailed standard operating procedures, alarms and alarm responses, design criteria, equipment/instrument descriptions, and process flow diagrams for process areas.

→ Project engineer for the Manatee County, Florida, Southwest Water Reclamation Facility Upgrades to Existing Chlorine Feed Lines. Assisted in the design of this project, which involved replacing existing buried chlorine feed lines to the chlorine contact chambers, which were prone to damage, the installation of new sample pumps and piping from the chlorine contact chambers, and installation of additional residual chlorine analyzers. Also assisted in preparing specifications and responsible for reviewing shop drawings and RFIs.

→ Project engineer for the Sarasota County, Florida, Central County Water Reclamation Facility Expansion Phase 3. Assisted in the design of a sodium hypochlorite storage containment area and a sludge holding tank blower building. Also responsible for reviewing shop drawings and RFIs.

Education

BS Mechanical Engineering, University of California at Berkeley, 2008

Licenses

Civil Engineer, California

David C. Baranowski, P.E.

David Baranowski is an asset management analyst with Carollo Engineers' Utility Advisory Services. He has extensive knowledge and experience in asset management processes and practices, as well as experience in the design of water and wastewater infrastructure. His combination of experience in asset management and detailed design provides enhanced understanding of infrastructure assets to produce meaningful results for an organization. His asset management experience includes asset inventory and site assessment, asset register and hierarchy creation, risk analysis, asset useful lives and renewal modeling, and development of asset management plans.

Previous Experience

→ Project manager for the Utility Asset Accounting Analysis for the South Orange County Water Authority (SOCWA), California. David is currently assisting SOCWA with an evaluation of the asset records to determine the value of all wastewater collection and treatment assets to feed a financial audit.

→ Assistant project manager for the Asset Management Plan Update for the Yorba Linda Water District, California. David is currently leading the effort to gather and analyze asset data to produce a long-term funding projection for the water and wastewater infrastructure assets to build upon the work completed in the 2010 Asset Management Plan. The project includes a risk analysis, facility condition assessments, and financial planning.

→ Project engineer for the Primary Clarifier Process Rehabilitation Projects, Inland Empire Utilities Agency (IEUA), California. David performed a visual condition assessment and used precious IEUA reports to evaluate the repair, rehabilitation, and replacement needs of the two primary clarifiers at Regional Plant No. 4.

→ Project engineer for the Facilities Master Plan for the Orange County Sanitation District (OCSD), California. David developed the renewal and replacement model for OCSD's collection system pipes using the InfoMaster software. David was responsible for creating the model and setting up a risk-based analysis to prioritize pipelines for renewal. David was part of a team that performed a quality check on OCSD CCTV data by watching inspection videos and checking the accuracy of CCTV scoring. David combined with information with other OCSD data and staff input to identify specific projects to be included in the Facilities Plan. The projects consisted of a map of the proposed alignment, project scope, estimated costs, and recommended timing for roughly 20 projects.

→ Condition assessment task lead for the Integrated Master Plan, City of Banning, California. David led a team of engineers to visually assess City water and wastewater sites to determine the near-term and long-term funding needs based on the condition of the facilities. The project included the determination of project timing and costs to be included in the water and sewer master plan portions of an integrated master plan to guide the City with the budgeting and implementation of CIPs.

→ Condition assessment task lead for the Comprehensive Wastewater Master Plan, City of Riverside, California. As part of the comprehensive plan, David led a team of engineers to assess six lift stations and the Regional Water Quality Control Plant. David developed a list of projects to be included in the master plan based on asset conditions and field observations. These projects included cost estimates and recommended timing to be included in the overall master plan financial planning rate and fee structure for the next five years.

→ Condition assessment task lead for the Woodridge and Knollwood Wastewater Treatment Plants Facility Plan, DuPage County Public Works, Illinois. Led a team of engineers to visually assess two wastewater treatment plants to develop projects and costs to be included in the overall Facility Plan (master plan). David led the effort to assess asset conditions and gather information from the engineering team and

DuPage staff to determine the priority and timing of projects to repair and rehabilitate treatment plant assets.

→ Condition assessment task lead for the Facilities Master Plan, Central Marin Sanitation Agency (CMSA), California. Led a team of engineers to visually assess two wastewater treatment plants to develop improvement projects for the Agency's 30-mgd wastewater treatment plant to be included in the master plan. David led the effort to assess asset conditions and gather information from the engineering team and Authority staff to develop a risk framework to determine the priority of identified projects to repair and rehabilitate treatment plant assets.

→ Project engineer for the Odor Control Asset Management Plan for the Albuquerque Bernalillo County Water Utility Authority (ABCWUA). David completed site visits and coordinated with odor testing contractors to evaluate the condition of ABCWUA's collection system odor control facilities. The evaluation included looking into the CMMS inventories and identifying new assets to be added to the inventories. The resulting Asset Management Plan analyzed the condition, risk, and improvement needs for each of the 25 facilities.

→ Project engineer for the Sewer System Infrastructure Renewal Forecast for the East Orange County Water District, California. David prepared a financial forecast for the rehabilitation and replacement of the sewer system. The renewal forecast considered different methods of rehabilitation, various pipe materials, and shifted resources to accommodate the District's limited budget. The forecast was used by the District to win its bid to take over the sewer system over a neighboring agency. The developed model became the basis for the District's financial stewardship of these sewer system to set rates and establish appropriate reserve funds.

→ Project engineer for the Recycled Water System Condition Assessment for the Moulton Niguel Water District. He performed field inspections of recycled water booster station and reservoir sites. He prepared a condition assessment report that noted poor condition equipment, site issues, and upgrade recommendations for each of the sites and prepared a CIP budget for the next 20 years. The project included a review of well pump and motor efficiencies.

→ Project engineer for Sewer System Valuation and Condition Assessment for a confidential client, California. David prepared a system valuation and projected the future replacement needs of the system assets. David visited the wastewater treatment plant and lift stations to assess the condition of the assets. These conditions were used in the calculation of current value and to project when the assets will need to be replaced. David also prepared a valuation and replacement projection of the collection system pipelines based on GIS data and input from City staff. The results of David's analysis were used to determine the financial outlook for the system based on the existing rates being charged by the City.

→ Project engineer for the Collection System Master Plan, Central Contra Costa Sanitary District, California. Project. David performed the risk analysis for the District's sewer pipes and created the updated collection system Asset Management Plan. The Plan included individual analyses for the sewer pipes, force mains, and pump stations including an updated asset inventory, results from recent condition assessment, risk results, projected funding needs, and recommendations to advance the Asset Management Program. David worked closely with the District to set up the risk analysis and delivering a working model to the District for future use.

→ Project manager for the Union Sanitary District Alvarado WWTP Asset Condition Assessment Update Study, Union City, California. This study will update the asset condition and refine asset replacement costs from the 2006 Master Plan and 2009 Master Plan Update for the Alvarado Wastewater Treatment Plant facilities. The project will set the course for managing asset risk and optimizing asset investment into the future.

Education

MS Civil and Environmental Engineering, University of California, Berkeley

BS Civil Engineering, San Jose State University, CA

Licenses

Civil Engineer, California

Certification

LEED Accredited Professional, Green Building Certification Institute

Professional Affiliations

American Society of Civil Engineer

Chi Epsilon (National Civil Engineering Honor Society)

American Institute of Steel Construction

American Concrete Institute

Inderpreet K. Chaggar, P.E.

Inderpreet Chaggar has over ten years of experience in structural design of industrial, heavy construction, blast resistant, and water and wastewater engineering projects. Since joining Carollo, she has completed the structural design of numerous projects ranging from water and wastewater treatment plant construction to seismic retrofits. Under the guidance of senior structural engineers, Inderpreet also has extensive experience in condition assessment, seismic vulnerability assessments, and rehabilitation of existing water and wastewater plants.

Master Planning

→ Discipline engineer for Central Contra Costa Sanitary District, California, Wastewater Treatment Plant Master Plan. Major project elements include on-site structural/electrical/mechanical condition assessment, and rehabilitation recommendations for seven pump stations and plant's critical treatment facilities.

→ Discipline engineer for City of Burlingame, California, Wastewater Treatment Facility Master Plan. Major project elements include on-site structural, electrical, and mechanical condition assessments, seismic evaluation, and rehabilitation recommendations for the plant's critical treatment facilities. Concerns were identified, recommendations were made, and overall strategy for implementing the rehabilitation recommendations was developed for a 5-10-year outlook.

→ Discipline engineer for City of Oxnard, California, Public Works Master Plan Project. Major project elements included on-site structural/electrical/mechanical condition assessment, detailed seismic evaluation, and rehabilitation recommendations for the plant's twenty five plus critical treatment facilities. Concerns were identified, recommendations were made, and overall strategy for implementing the rehabilitation recommendations was developed for a 15-20-year outlook.

Wastewater

→ Discipline engineer for the Fairfield-Suisun Sewer District 2016 Blower Replacement, Fairfield, California. Carollo assessed the District's secondary treatment system and provided recommendations and design for improvements to the existing aeration system.

→ Discipline engineer for City of South San Francisco, California, Water Quality Control Plant, and Pump Station Condition Assessment Project. Major project elements include on-site structural condition assessment of metallic assets throughout the WQCP and ten plus Pump Stations, and prioritization of rehabilitation recommendations.

→ Lead Discipline l engineer for the City of Salem Solids Handling Improvements, Salem, Oregon. The design included rehabilitation of the existing thickening and dewatering facilities with new modernized facilities that would provide process redundancy.

→ Discipline engineer for Delta Diablo Sanitation District, California, Coating Maintenance Planning Project. Major project elements include on-site structural and coating condition assessment, and rehabilitation recommendations for the Trickling Towers, and the Secondary and Primary Clarifiers.

→ Project engineer for the Digester No. 2 and Digester No. 3 Rehabilitation and inspection Services, Porterville, California.

→ Discipline engineer for City of South San Francisco, California, Wet Weather and Digester Improvements Project. Major project elements included replacement of two 0.8-MG reinforced concrete tanks, modification of an existing concrete tank, replacement of a reinforced masonry building, and various structural modifications to existing facilities.

→ Discipline engineer for the Secondary Clarifier No. 5 and Denitrification Project, Turlock, California. The project included planning, design, construction management, bidding services, and engineering services during construction for

a new (fifth) secondary clarifier at Turlock's Regional Water Quality Control Facility to increase capacity and improve secondary treatment performance. This $18 million project also converted seven existing aeration basins to achieve denitrification of the plant effluent to meet the new discharge permit limit for nitrate plus nitrite of 10 mg/L.

→ Discipline engineer for design and construction of the Clark Regional Wastewater District, Washington, Discovery Corridor Wastewater Transmission System Project. Major project elements included design of five pump stations and review of construction documents.

→ Discipline engineer for Monterey Regional Water Pollution Control Agency, California, Seismic Retrofits Project. Project elements included seismic retrofit of the Trickling Filter Electrical and Digester Electrical Buildings at the wastewater treatment plant.

→ Discipline engineer for City of West Sacramento, California, Gaseous Chlorine to Liquid Hypochlorite Conversion Project. Major project elements include the design of a containment structure for the hypochlorite conversion storage and process.

→ Staff engineer for the City of Modesto Phase 2 Biological Nutrient Removal/Tertiary Treatment Facility ESDC. Provided engineering services during construction for the construction of a new buildings and treatment facilities.

Infrastructure

→ Discipline engineer for the City of Modesto River Trunk Realignment, Modesto, California. The project included design and construction of a 40-mgd pump station and development of alternatives to address flow capacity deficiencies and aging infrastructure for the River Trunk, Sutter Trunk, CSL, and Beard Brook Siphon facilities.

→ Discipline t engineer for the North Valley Regional Recycled Water Program Pipeline Design, Turlock, California. This project includes the procurement of a design-build team to construct six miles of 36-inch pipeline (2,500 feet of which will be horizontally directionally drilled below the San Joaquin River) and the retrofit of a pump station.

→ Discipline engineer for the Livermore Dalton Tank Replacement Project, Livermore, California.

Education

BS Mechanical Engineering Technology, California State University, Sacramento, 2000

Licenses

Electrical Engineer, California

Daniel S. Robinson, P.E.

Daniel Robinson has over 14 years of electrical and control systems experience in the water and wastewater industry. His experience includes supervising engineering teams, training new engineers, and developing engineering standards. Along with proficiency in AutoCAD Electric, Excel, Access, and SharePoint, Mr. Robinson's engineering skills include 480VAC electrical distribution systems; variable frequency drives (VFDs), reduced voltage soft starter (RVSS), and full-voltage (FV) motor control design; programmable logic controller (PLC) and industrial control panel design; control system architecture; serial, Ethernet, and radio communication; process instrumentation requirements; water/wastewater treatment processes; project management; UL, NEC, NEMA, and NFPA 70E requirements; and relay and ladder logic.

Mr. Robinson's primary responsibilities have included review of contractor plans and specifications and development of equipment packages to meet requirements; negotiation of changes, schedules, and equipment with customers, vendors, and end users; design of switchgear, motor control centers (MCCs), PLC panels, and instrumentation, control, and communication systems; creation of interconnection diagrams for power and control wiring between project equipment; creations of input/output (I/O) lists, loop diagrams, training documents, and factory and field test documentation; and development of control system descriptions, operations and maintenance (O&M) manuals, and load, thermal, and sizing calculations.

Mr. Robinson managed a design team to create, implement, and train an entire engineering department for transitioning to an electronic submittal process. He has been responsible for hundreds of projects as an engineering manager/supervisor.

Relevant Experience

→ Project manager for the City of Reno, Nevada, Reno/Stead Water Reclamation Facility Expansion. Including headworks, oxidation ditch, aeration basin, secondary clarifier, tertiary filters, chlorine contact basin, and effluent structure. The project included 15KV main switchgear, 5KV switchgear with ATS and power distribution, 480V power distribution with SPD and power monitors; MCCs with 18-pulse VFDs, 6-pulse VFDs, and non-reversing starters with electronic overload and smart relay controls; control panels with Modicon Quantum PLCs and Modicon HMI; MB+ fiber optic ring communications to a new Wonderware SCADA system; field instrumentation including flow, level, pressure, dissolved oxygen, oxidation reduction potential, and hazardous gas monitoring; coordination of intrinsically safe requirements; and power, control, and communication interconnection diagrams, testing, training, and final documentation.

→ Project manager/supervisor for the City of West Sacramento, California, Lift Stations Upgrade, which consisted of rebuilds or refurbishment of all 11 sewer lift stations in the City and installation of a new SCADA system. Included 480V and 240V utility switchboards with ATS, SPD, and power monitors; MCCs with VFDs and RVSS motor controls; control panels with TESCO L2000 PLCs and Ethernet radio communications to a new Allen-Bradley RSView SCADA system; field instrumentation including flow, level, pressure, O2 and H2S gas monitoring; coordination of intrinsically safe requirements; and power, control, and communication interconnection diagrams, testing, training, and final documentation.

→ Electrical/instrumentation engineer for the City of Martinez, California, 2014 Electrical Power Distribution Upgrades. Including replacement of major electrical distribution equipment, also PG&E main service transformer and associated service conductors on the transformer secondary, main switchboard, four in-plant MCCs and associated feeder conductors and conduit, 100-kVA transformer, and feeder conductors and conduit between the main

switchboard and downstream MCCs and equipment. The project also includes implementation of a load-shedding scheme and complex sequencing to reduce facility downtime and ongoing coordination.

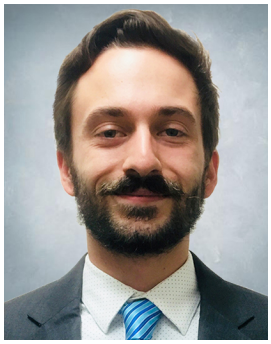
→ Electrical/instrumentation engineer for Clean Water Services, Rock Creek Advanced Wastewater Treatment Facility Gravity Thickeners. The project involved construction of four new gravity thickeners in an operating plant and included relocation of an existing major 480V ductbank, addition of sections to an existing MCC for new VFD and FV motor controls, addition of a new control panel with an Allen-Bradley ControlLogix PLC, integration into the existing plant SCADA, and instrumentation for flow, level, pressure, and temperature. The project also included modifications to existing solids processes and systems with complex sequencing of installation and startup to not interrupt treatment plant operation.

→ Electrical/instrumentation engineer for design and engineering services during construction for the City of San Mateo, California, Wastewater Treatment Plant Process Control System Upgrade and Collection System SCADA Integration. Includes replacing most PLC control panels with a modern Allen-Bradley ControlLogix PLC control system, replacement of the existing SCADA system with a new SCADA system that includes remote view nodes located in all of the major process areas of the plant, and installation of a new fiber optic backbone communication network extending the PLC network, SCADA network, and business network throughout the entire plant. The installation of the new control system will be done in phases with complex sequencing to reduce facility downtime and ongoing coordination.

→ Instrumentation and controls engineer for the Sacramento Regional County Sanitation District, California, EchoWater Project Return Activated Sludge Pumping Project (RAS). This $32 million project will replace existing RAS pumps with new pumps designed to deliver the higher flow and head conditions required by the new BNR process. The RAS pumping system will have a capacity of over 200 mgd and includes 48 pumps located at 24 secondary sedimentation tanks. Preliminary design with hydraulic modeling, recommendations on pump selection, electrical load study that recommends changes to the existing power distribution system, and instrumentation and control systems review to recommends changes for improved control/monitoring.

→ Project manager the City of Hughson, California, Wastewater Treatment Plant Expansion, consisting of a main lift station, headworks, oxidation ditch, and secondary clarifier. Also included, 480V utility metering switchboard with an automatic transfer switch (ATS), surge protective device (SPD), and power monitor; MCCs with VFDs, active harmonic filter, RVSS, and both reversing and non-reversing starters; control panels with Allen-Bradley ControlLogix PLCs, Ethernet, fiber optic, and radio communications to a new Wonderware supervisory control and data acquisition (SCADA) system; field instrumentation including flow, level, pressure, dissolved oxygen, and total suspended solids monitoring; coordination of intrinsically safe requirements; and loop diagrams, uninterruptible power supply load calculations, testing, training, and final documentation.

→ Project manager/supervisor for the National Park Service EI Portal Wastewater Treatment Plant Upgrade in Yosemite National Park, which included design services, construction, and field installation for rebuilding the main control and filter control panels, fiber optic communications, and a new SCADA system. Also included, field investigation of existing site conditions, design proposals, and cost estimates; coordination meetings to facilitate detailed design documentation including field installation of components into existing enclosures, PLC I/O and control interface schematics, and communication and conduit routing diagrams; construction of new control, communication, and SCADA systems for field installation; coordination of shutdown and cutover procedures, field installation, and startup; and testing, training, and final documentation.



Education

BS Environmental Studies, Northern Michigan University, 2017

Certifications

Geographic Information Systems, Northern Michigan University

Riley C. Powers

Riley Powers joined Carollo during the summer of 2017 as a Geographic Information Systems (GIS) Analyst after graduating from Northern Michigan University. Prior to joining Carollo, he worked in water and wastewater infrastructure mapping with the City of Marquette, Michigan, Engineering Department. His skills focus on the collection and manipulation of data, creation and maintenance of geodatabases, conversion between program interfaces and data types for map creation, spatial analysis, and creation of cartographic figures.

Relevant Experience

→ GIS analyst for the City of Lemoore, California, Water, Sewer, and Wastewater Treatment Plant Master Plans. To help the city fill gaps in its wastewater network pertaining to elevation data and determine flow monitoring locations, Riley located and entered important elevation data and created cartographic figures for verification of flow monitoring locations.

→ GIS analyst for the City of Porterville, California, Integrated Master Plan. Riley created cartographic figures showing the surrounding irrigations districts in proximity to the City of Porterville and how they intersect.

→ GIS analyst for the City of Morro Bay, California, OneWater Water and Wastewater Master Plan. Riley aided in the addition of important invert elevation data in areas with data gaps so a model could be generated. Along with maintenance of Morro Bay's database, Riley created cartographic figures for display of pipeline and facility alternatives.

→ GIS analyst for the City of Riverside, California, Integrated Wastewater and Treatment Facilities Master Plan. Riley provided cartographic figures showing the collection service area, study area, overall topography, existing and buildout land use, temporary flow monitoring program, and rain gauge locations. He also provided technical support through manipulation of data for use in modeling.

→ GIS analyst for the Santa Cruz County Sanitation District, California, Phase 1 Inflow/Infiltration Mitigation Program. Riley is creating cartographic figures for the overall system and flow monitoring locations for overview and verification by the District.

→ GIS analyst for the City of Tacoma, Washington, Downtown Wastewater Model. To aid in the development of the downtown wastewater model, Riley performed various joins based on spatial location, along with geocoding addresses and other important information to be included in parcel shapefiles. These layers, created and altered by Riley, went into the creation of figures showing important project locations, noted roof drainage areas, vacant and historical parcel locations, missing invert and rim elevations, basins, and zoning and land use.

→ GIS analyst for the City of Banning, California, Capital Improvement Plan. To help the City anticipate existing and future deficiencies and how they will be resolved, Riley developed figures showing overall systems, locations of capital improvement projects, scheduled phasing of pipeline updates, and locations of important facilities.

→ GIS analyst for the Contra Costa County Sanitary District, California. To assist the project manager and graphics design department, Riley developed an overall system map with locations of key facilities, pipe information, and city boundaries to show the distribution of the District's sanitary sewer network.

→ GIS analyst for the Clackamas River Water District, Oregon. To help the client determine its existing service area, urban growth boundary, and planning area for current water customers, Riley developed cartographic figures in cooperation with key Clackamas County professionals. Figures were developed and refined to determine accurate boundaries. Along with the creation of cartographic figures, Riley performed data alterations and joins based on the locations of features, and data needs

for modeling and accurate analysis of the overall system requirements.

→ GIS analyst for the City of Renton, Washington, Water System Master Plan Update. Riley created a cartographic figure showing the City's overall system, its pressure zones, and potential annexation zones to help Carollo's project engineers get an overall understanding of the system and key areas in a spatial setting.

→ GIS analyst for the Dallas Water Utilities, Texas, White Rock Creek Ash Creek Line. To help the client determine a feasible alternative for its water network, Riley created cartographic figures showing proposed alignments, along with important attributed information to help the client understand the proposed updates and alternatives moving forward.

→ GIS analyst for the City of Shelton, Washington, Water System Comprehensive Plan Update. Riley created an overall system map for City confirmation of pipe diameters throughout its water network.

→ GIS analyst for the Soquel Creek Water District, California, Groundwater Replenishment Recycled Water Feasibility Study. To aid in development of cartographic figures, Riley created data relating to the locations of important water purification facilities, based on previous documents, and their relation to the region's water districts and recharge wells. He also created cartographic figures of the potential Pure Water Soquel pipeline alternatives.

→ GIS analyst for the City of Tumwater, Oregon, Comprehensive Water System Plan Update. To assist with the RUL analysis of the current Tumwater Water Pipe Network, Riley updated the pipe network with pipe installation years along with their material with information provided by the City. The updated pipe information was used for creation of cartographic figures showing the updates, which were then sent to the City for verification. This information was used to determine the remaining life of the current pipes and to help determine what would need to be updated by Tumwater's Comprehensive Water System Plan.

→ GIS analyst for the City of Ukiah, California, Phase 1 and 2 Water Pipeline Final Design. To assist in the determination of irrigable acreage along the proposed water pipeline alignment, Riley recalculated the acreage based on new data provided by the City and crop type changes to parcels along the proposed alignment. The updated acreages and irrigation types were used to determine the overall demand by the current and new customers. The updated information was also used to create a cartographic figure displaying the ownership of each parcel and its irrigation type along the proposed alignments.

December 19, 2018

Proposal to Prepare

Master Sewer Plan for the Tahoe-Truckee Sanitation Agency

Developing an Integrated Wastewater Management Roadmap:

A Holistic Approach Addressing Today's Needs while Positioning for Tomorrow's Challenges

ch2m

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December 19, 2018

Tahoe-Truckee Sanitation Agency
Attention: Mr. Jay Parker, PE
Engineering Manager
13720 Butterfield Drive
Truckee, CA 96161

Subject: Proposal to Provide a Master Sewer Plan for the Tahoe-Truckee Sanitation Agency

Dear Mr. Parker,

For more than 45 years, the Tahoe-Truckee Sanitation Agency (T-TSA) has delivered on its mission to protect the public health and preserve the pristine environment of the Lake Tahoe and Truckee River basins. You have been successful in meeting stringent discharge requirements through an unwavering commitment to water quality and a willingness to implement innovative wastewater treatment technologies. CH2M was there at the beginning, and we look forward to working with you to develop a 25-year roadmap that leaves a strong, sustainable legacy for your organization. Our proposed team is one you know, and one that is familiar with the Service Area, the needs of your department, and the facilities that serve the Lake Tahoe area communities. We offer considerable benefits to the Agency in delivering this project, including:

- **Proven Project Management** – Our project manager, Brad Memeo, PE, will continue to serve as your day-to-day point of contact for the duration of the project and will work with you directly to develop a plan that achieves your vision.
- **Efficient Master Planning Tools** – Our suite of industry-leading integrated modeling and cost estimating tools provides efficient and effective analysis of alternatives for upgrading the Truckee River Interceptor (TRI) and the Water Reclamation Plant (WRP) to meet future capacity and regulatory compliance needs.
- **In-depth Knowledge of your WRP** – Our 45-year partnership with T-TSA demonstrates our commitment to the Agency and our understanding of all aspects of your conveyance and treatment systems, ensuring we will hit the ground running from Day 1 of this project minimizing ramp-up time.
- **Global Expertise Delivered Locally** – Our team members Dr. Glen Daigger and Dr. Dave Parry are world-class experts in liquids and solids treatment processes, respectively. Their expertise and experience in innovative technologies provides T-TSA access to the latest approaches in cost-effective and energy neutral solutions extending our work with you to successfully implement cutting-edge technologies such as BAF, PhoStrip and BioStyr filters.

Please find enclosed our approach for a comprehensive planning process that includes assessing existing and future regulatory requirements; evaluating the capacity of existing facilities; projecting future flows and loads; developing and evaluating alternatives for upgrades and improvements to meet future conditions through a 25-year planning cycle; and recommending a schedule and cost estimates for selected capital improvements.

CH2M is now a wholly-owned subsidiary of Jacobs Engineering Group (Jacobs), a global firm providing design, engineering, construction, and technical services to clients in the government, infrastructure, industrial, and commercial sectors worldwide. Our focus on the Lake Tahoe region and the Truckee River corridor remains as strong as ever, and our top priority is to provide exceptional service to T-TSA and your stakeholders. We look forward to working with you on this exciting project.

Sincerely,

Brad Memeo, PE
Project Manager
(530) 229-3430
brad.memeo@jacobs.com

Ken Gilbreth, PE
Vice President / Client Account Manager
(702) 953-1207
ken.gilbreth@jacobs.com

Qualifications and Approach

1 | Qualifications and Approach

Since 1973, our California team has delivered wastewater treatment and sewer infrastructure planning and design projects for the Tahoe-Truckee Sanitation Agency (T-TSA) and the communities you serve. Our local knowledge, combined with our global resources, qualifies our team to offer an informed, comprehensive Master Plan that meets your organization's short-term goals and achieves its long-term legacy.

Specialized Local Experience

In December 2017, CH2M joined Jacobs, expanding our technical capabilities in wastewater planning and design and resulting in a depth and breadth of resources unprecedented in the industry. With these additional capabilities, we continue to be committed to providing T-TSA with the level of service you have come to expect from our team.

CH2M has been pushing boundaries with innovative solutions since our founding in 1946 when four passionate problem solvers came together to identify new ways to tackle water resource challenges. This dedication to technical excellence has driven every project we have delivered. We are pioneers in developing innovative treatment technologies and processes, establishing the firm as an industry leader responsible for the design of hundreds of wastewater treatment facilities that span the globe, a majority of which are located in North America, including many in California.

California has been the focus of much of CH2M's portfolio since the founding of the firm. Our reputation for engineering solutions in the water and wastewater industry resulted in our selection to design the first full-scale advanced wastewater treatment facility in the U.S. This plant in South Lake Tahoe set the benchmark for effluent quality and

Our California Roots

From our office in Redding, CH2M delivered North America's first advanced wastewater treatment facility at the South Lake Tahoe WWTP in the 1960s. A decade later we designed and implemented the nation's first 0.1-milligram per liter (mg/L) phosphorus limit plant for T-TSA. Throughout our history, we've partnered with numerous California clients to solve their most difficult capacity and regulatory compliance challenges. These partnerships include:

- San Francisco Public Utilities Commission: 1971 to Present
- Tahoe-Truckee Sanitation Agency: 1973 to Present
- City of Oroville/Sewerage Commission-Oroville Region: 1974 to Present
- City of Tracy: 1975 to Present
- City of San Jose: 1977 to Present
- City of Los Angeles: 1977 to Present
- City of Redding: 1979 to Present
- Inland Empire Utilities Agency: 1987 to Present
- City of Sunnyvale: 1993 to Present
- City of Thousand Oaks: 1993 to Present
- Eastern Municipal Water District: 1993 to Present
- City of San Diego: 1995 to Present
- City of Palo Alto: 1998 to Present
- City of San Mateo: 2014 to Present

transformed CH2M from a small regional firm into a world-recognized leader in advanced wastewater treatment. Today, we have 20 locations throughout the state dedicated to developing and implementing sustainable wastewater solutions that provide a secure water supply for the future. We also maintain an office in Reno, Nevada, from which we deliver projects throughout Washoe County and the Tahoe Basin.

The bedrock of our approach for T-TSA's Master Plan is to evaluate your infrastructure holistically to optimize existing assets and operations and invest appropriately. Our team's in-depth knowledge of the Water Reclamation Plant (WRP) and the Truckee River Interceptor (TRI) qualifies us to provide the rigorous data and cost analysis required to inform a credible long-term plan that considers impacts to sewer processes and efficiently meets near- and long-term effluent and regulatory requirements. We recognize upgrades must consider other criteria, including life-cycle costs, sustainability, compliance, the age and condition of equipment, and the impact on your customers and community.

While there are specific components of the T-TSA system that clearly require detailed analysis and planning, the entire system is the true focus of our approach. No component will be disregarded, as each has an impact on the system as a whole. Our team will focus on integration and deliver analysis of the seemingly disparate parts in one unified vision.

Project Approach

CH2M applies a whole system approach to turn sustainability into action. We use thoughtful leadership, creativity, technical innovation, and business acumen to answer the question: How can we use our resources and technology to improve conditions such that they are better at the end of a project than at the start?

Our History as a Trusted Advisor to T-TSA

CH2M has served as a wastewater planning and design consultant to T-TSA for 45 years. We designed the original WRP and subsequent expansions, and have provided studies, evaluations, and designs of periodic upgrades in response to changing requirements. Because of its location in the pristine Lake Tahoe-Truckee River area, the plant is required to meet some of the most stringent discharge requirements in the U.S. As a condition for renewal of the WRP's discharge permit, T-TSA engaged CH2M to analyze and evaluate alternatives for reducing future nitrogen discharges to the Truckee River, including all forms of nitrogen removal in the plant, increased nitrogen removal in the soil, and even exporting the treated plant effluent out of the Truckee River Basin. T-TSA selected the biologically activated filter (BAF) biological nutrient removal (BNR) technology. This biological process reduces nitrogen concentrations in the plant effluent by about 90 percent without increasing the total dissolved solids (TDS) of the plant effluent. As a result, the WRP can treat more wastewater and still comply with all water quality objectives in the Truckee River and Martis Creek.

The strength of our relationship with T-TSA is based on the technical expertise we bring to the Agency, our large in-house staff, our ability to meet even the most stringent deadlines when required, and our ability to develop creative, cost-effective solutions. Even though the WRP is one of the most sophisticated advanced treatment plants in the U.S., we have developed processes and facilities that have consistently kept rates and charges at a reasonable level.

Since 1973, CH2M has also provided most of the permitting assistance and environmental documentation required by T-TSA. Regulatory agencies we have successfully worked with during implementation of your projects include the Lahontan Regional Water Quality Control Board, California Department of Health Services, Nevada County, Northern Sierra Air Quality Management District, California Department of Fish and Game, U.S. Fish and Wildlife Service, and the Tahoe Regional Planning Agency.

More recently, our work for T-TSA has focused on improvements to the TRI in the form of in-situ rehabilitation and conventional open-cut pipe replacement. CH2M performed design, bid services, and construction management and inspection services for two recent and critical TRI improvement projects.

Our goal is to develop a clear path forward for T-TSA, one that will leave a legacy the Agency can be proud of. By integrating sustainability principles into each step of a project, we develop creative ways to solve complex challenges, maximize value, and enable T-TSA to better serve its Tahoe Basin communities for the long term.

What will truly make a difference to the outcome of this project is the team we have assembled – a team with a successful history dedicated to T-TSA, who have proven their ability to deliver high-quality design, responsive service, and an unwavering commitment to exceeding expectations. Our team's resources and our specific credentials demonstrating our ability to deliver this project to your complete satisfaction are included throughout this proposal and summarized in Section 2.

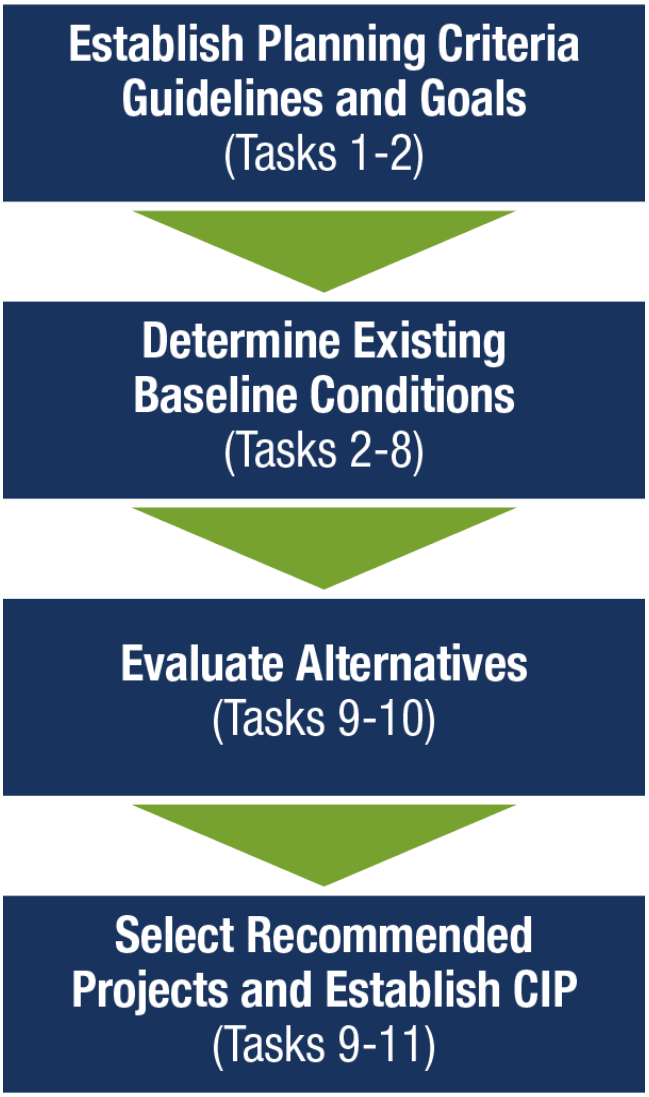
Our master planning process is outlined below according to the tasks specified in your Request for Proposals (RFP). We've added details to each of these tasks to elaborate on how we will deliver a comprehensive, yet practical Master Sewer Plan. While we are confident we can produce an outstanding Master Sewer Plan according to this approach, our team is agile enough to expand or contract our final scope of services to match any evolving project requirements and desired level-of-effort.

Project Management (Task 1)

Our goal is to collaborate with T-TSA to establish a common vision and diligently implement a comprehensive work plan for successful project implementation. Development of this proposal accomplishes the first step in our project management approach, which is to form a team that has all the qualifications and experience needed to successfully deliver T-TSA's objectives.

Project Manager Brad Memeo and Master Plan Lead Ted Couch will function as an extension of T-TSA management by understanding and responding to your goals, expectations, and critical success factors.

Figure 1-1. Master Sewer Plan Approach



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The management activities presented in Figure 1-1 and detailed below provide an outline of their approach to foster a partnership among our team and T-TSA, and to keep delivery of the Master Sewer Plan on schedule and on budget.

Project Vision and Initiation

Brad and Ted will arrange a kickoff meeting with T-TSA's management team to review the project scope, schedule, and to define the key project issues, goals, milestones and critical success factors. Brad will develop and circulate an agenda for the kickoff meeting, arrange for the appropriate individuals to attend, and prepare and distribute meeting notes. A clear vision will be established.

Furthermore, to efficiently deploy our team, Brad will prepare written project instructions that will be disseminated to the project team. The project instructions will identify project-specific guidelines to be used, particularly as they relate to coordinating with T-TSA staff, and procedures the team will use to independently check, revise, and backcheck all project documents. Project instructions are a proven tool used to align our technical efforts with the established vision and critical success factors.

The instructions will establish communication links among the team members so everyone has the necessary information in a timely manner. The project instructions are an important tool for keeping team members informed and directed, and for managing scope, schedule, and budget throughout the project.

Effective and Efficient Technical Analysis

Brad is accountable to both T-TSA and CH2M management for project success. Ted Couch, with support from Glen Daigger and Dale Gabel, will oversee and coordinate the technical team to verify analyses are efficient and effectively support development of the Master Sewer Plan, including:

- Data development and modeling consistent with best management practices and the most up-to-date software and statistical analysis, resulting in high quality models that will be invaluable tools for current and future planning.
- Process/facility leads will consider the full range of optimization options for both the WRP and TRI; from minute changes to operations, to the most novel technologies.
- Analysis will incorporate the principal of efficiency, seeking to right-size solutions first, before attempting sweeping, complex change.

Schedule and Budget Management

Brad will lead project coordination meetings with T-TSA to review project status, to discuss and resolve critical issues, and develop action items to facilitate efficient

Our assessments will provide recommendations and costs for infrastructure improvements

project completion. We will develop and distribute meeting agendas, facilitate meetings, and record and distribute meeting notes.

In preparation for these meetings we will summarize budget and schedule controls to assess key performance indices. These will be presented in a brief, written monthly status report and include invoices to document work performed in that period.

Anticipated activities for the coming month will be identified fo allow T-TSA to independently assess overaII progress. Brad will continuously assess our progress relative to expenditure levels and schedule milestones. Brad and the project team appreciate the necessity of delivering this project on budget.

Communication Plan

Brad will serve as CH2M's primary point of contact with T-TSA. He will charter our internal team members so that all participants have a clear understanding of their roles and responsibilities, and he will encourage collaboration with you and with stakeholders to facilitate decision making and build consensus.

Review Background Data and Information (Task 2)

Objective: Summarize all relevant information to guide informed decisions for the next 25 years for the TRI and WRP.

Approach: Our team will work with T-TSA and its five member districts to gather and analyze the necessary data to define the key elements of your planning strategy. This will include an initial data request and kick-off meetings with key personnel to set our technical analysis on the best path from the start. These key personnel include Glen Daigger to gain an understanding and provide guidance on overall wastewater treatment, Dale Gabel on regulations and holisitic WRP optimization, Dave Parry on solids and energy, and John Simonds on facility design. We have extensive experience asking the right questions with the most relevant level of detail to streamline the effort and provide the most comprehensive background to best inform critical decisions moving forward. Gathering background data and information includes a condition assessment of T-TSA's high-level assets. Our experts provide a thorough determination of the life expectancy and reliability of major processes and pieces of equipment. This condition assessment will work with the existing condition assessment program at T-TSA to the best extent possible, to avoid overlap, and inefficient use of human and programmatic resources.

Our global experts on energy recovery will develop a plan to modernize the existing boiler system, with a clear understanding of all current code requirements.

CH2M will thoroughly evaluate options for optimization of the BAF blower system.

Task List:

- Conduct kickoff meeting with T-TSA.
- Obtain and compile 25-year flow and load projections from the five member districts.
- Collect and review prior studies, reports, and analyses.
- Obtain and review design drawings, as-built drawings, and hydraulic profiles.
- Obtain and review historical WRP performance data.
- Establish TRI conveyance goals.
- Review existing discharge regulations and identify high-level potential changes.
- Establish WRP reliability and treatment goals and objectives.
- Conduct condition assessments of all major facilities.
- Identify data gaps, initiate additional sampling needs, and document data required for Tasks 3 through 9.
- Deliver a Basis of Analysis Technical Memorandum.

WRP Integrated Modeling and Analysis (Tasks 3, 4, 5, 6)

Objective: Use our integrated hydraulic, process, and operational simulation expertise to achieve the following:

- Deliver accurate, calibrated hydraulic and process models of the WRP in BioWin.
- Evaluate the capacities and limitations of the existing solids and liquid treatment processes.
- Transfer calibrated models developed on commercially available platforms to T-TSA staff, and instill confidence in model understanding and operation.

Approach: Using the information collected in Task 2, we will conduct a detailed assessment of current liquid and solid unit process treatment and hydraulic capacities using process simulation (modeling) tools.

CH2M has been effectively conducting hydraulic and process assessments for wastewater treatment plants around the world for decades. We are not only experts in hydraulic and process simulations for wastewater treatment plants using commercially available modeling software (Visual Hydraulics for WWTP hydraulic analyses, BioWin for WWTP process performance, among others), we have the unique distinction in the industry of having developed proprietary tools in-house that are integrated ***with each other***, because we understand how critically interrelated process, hydraulics, and cost are. As an option per discussion with T-TSA, we can use these in-house tools first to rapidly evaluate the WRP process performance using our detailed process simulation tool (Pro2D), adding in hydraulics and operational strategies using our plant simulator tool (Replica, which is linked to Pro2D), and finally considering cost with our costing tool (CPES, which is also linked to Pro2D).

Our suite of tools allows us to quickly identify the most efficient strategies to consider process, hydraulics, and cost. We'll then translate the most promising alternatives to commercially available software packages (Visual Hydraulics, BioWin) for dissemination to T-TSA for use and review. Alternately, we can work exclusively in any of the of commercially available wastewater process or hydraulic simulation software packages from beginning to end.

Regardless of the simulation tools we use, our process assessment strategy critically considers solids treatment and liquid treatment, because these systems are

CH2M BioWin Simulation Use

CH2M has extensive experience using BioWin to plan, design and expand the rated capacity of facilities around the world.

Cold Springs Water Reclamation Facility, Washoe County, Nevada. The service area for the Cold Springs Water Reclamation Facility (CSWRF) includes a significant number of permitted future developments. As part of the facility Master Plan, CH2M produced a calibrated BioWin model of the facility to assess plant capacity, and modeled alternatives to the existing treatment processes to determine the most cost-effective way to expand the capacity of the treatment plant while maintaining compliance with the existing effluent permit limits.

City of Loveland Wastewater Treatment Plant, Loveland, Colorado. To address changing nutrient discharge limits and increased load to its WWTP, CH2M developed a dynamic BioWin model to evaluate the existing capacity and proposed upgrades. This model allowed for a "check" on the steady-state Pro2D model, and for a comparison to previous dynamic modeling using BioWin.

Eastern Treatment Plant, Melbourne, Australia. CH2M employed BioWin to develop conceptual design of nitrification/denitrification upgrades and expansion of this existing plant. CH2M later used BioWin in detailed design and support during commissioning. The dynamic model was refined based on initial operating results to predict effluent quality variations so that that data could be used in the design of a tertiary treatment plant.

Pine Creek Wastewater Treatment Plant, Calgary, Canada. CH2M used BioWin for preliminary design and detailed design of this new treatment plant. The project was completed at a cost of $350M. CH2M later used BioWin, calibrated with existing operational data, to enable plant re-rating with an additional 10 percent capacity.

integrally coupled–changes to one impact the other. Our modeling requirements will inform our efforts throughout Task 2 to verify all necessary data is acquired and prepared, thereby creating a streamlined and efficient modeling process.

The hydraulic modeling and assessment (Tasks 3 and 4) will begin with initial model build, inputting WRP physical dimensions, materials and hydraulic properties. Next we will require calibrating water surface elevations to flow rates at different influent and/or operating conditions, using data, and information from operations staff. The next step involves determining hydraulic capacities of the various unit processes, channels, weirs, and pipes according to industry standards and considering future flows.

The final model will be produced in Visual Hydraulics, and transferred to T-TSA for future use. Task 3 includes a half-day in-person staff training on the calibrated model, with commitment from CH2M staff to be available to answer questions on model operation after the training. Task 4 includes production of a WRP Hydraulic Capacities TM, describing the model production, as well as identified capacities and definciencies in accommodating projected future flow rates, with reliable regulatory compliance.

The process modeling and assessment (Tasks 5 and 6) also begins with initial model build, followed by calibrating to current performance regarding parameters such as solids removal, mixed liquor suspended solids concentration, aeration demand, biogas production, and effluent quality. The next step involves establishing the treatment capacities of these unit processes according to industry standards and determining where there are surpluses or deficiencies, and considering future needs for flow, load, and regulatory compliance.

Regardless of the modeling software used during the initial analysis, the final model will be produced in BioWin, and transferred to T-TSA for future use. Task 5 includes a half-day in-person staff training on the calibrated model, with commitment from CH2M staff to be available to answer questions on model operation after the training. Task 5 includes production of a WRP Process Capacities TM, describing the model production, as well as identified capacities and definciencies in meeting future projected influent flows and loads, with reliable regulatory compliance.

CH2M Parametric Cost Estimating System (CPES)

CPES is a conceptual design and cost estimating tool built on a Microsoft Excel platform that generates detailed conceptual designs with material quantification. From a menu, a model user chooses the unit processes that apply, then inputs facility design criteria, such as treatment capacity and unit process loading rate, to “right-size” the general arrangement for the project in question. This information, combined with published unit construction pricing, is then used to develop project-specific facility designs, construction costs, and life-cycle cost estimates.

Outputs from the design and life-cycle analyses are then used as inputs to the CPES Environmental Calculator. Outputs generated from this model supply information on critical evaluation metrics including greenhouse gas emissions, truck traffic, facility sizing/footprint, expendable usage, residuals, labor requirements, and more.

Preview uses algorithms to pull design parameters from the CPES files to automatically create accurate 3D renderings in Google Sketch-Up. These files can then be geo-located in Google Earth, allowing a preview of future facilities.

Benefits to T-TSA:

The single CPES model produces capital, operational, and environmental outputs. Outputs generated from this model supply information on critical evaluation metrics including facility sizing/footprint, expendable usage, residuals, and labor requirements. The library of models includes municipal and solids models.

Preview takes CPES files and generates to scale 3D renderings of process structures, allowing for realistic siting and stakeholder visualizations.

Models are straightforward to set up and to refine with additional data throughout the project.

Task 9 will employ WRP information in the TMs from Tasks 4 and 6, as well as these calibrated models, to develop alternative process configurations, operational strategies, and retrofits or upgrades to assess process and hydraulic impacts, and the effect on capital and operating costs.

Task List:

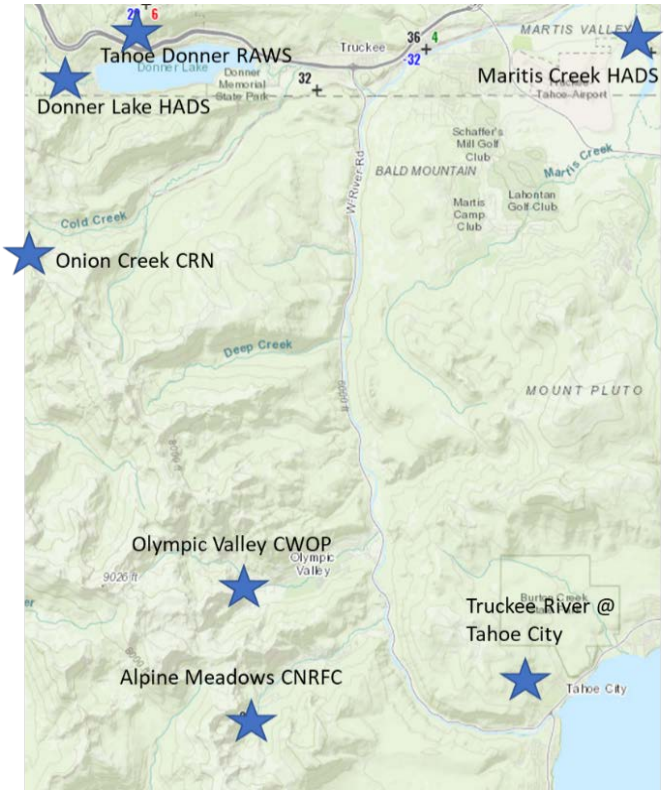
- Determine modeling platforms and approach with T-TSA during project kickoff.
- Establish hydraulic and process models of the WRP.
- Calibrate models using existing plant performance data and supplemental sampling data if required.
- Determine true WRP hydraulic and process capacities.
- Identify WRP deficiencies in treating projected future flows and loads.
- Produce final Visual Hydraulics and BioWin models, and transfer to T-TSA.
- Conduct in-person trainings on models, and provide on-going support.

TRI Hydraulic Modeling (Tasks 7, 8)

The primary factors affecting the performance of the TRI and the accuracy of the current model to assess its capacity are:

- **Effects of Dollar Hill Pump Station:** This variable speed pump station is operated by North Tahoe PUD. This pump station is located at the top of the TRI; therefore, its flow affects the TRI in its entirety to the WRP. CH2M suggests verifying the current operation and potential to expand this pump station. If needed, CH2M can facilitate a drawdown test to verify flows into the TRI under their different forcemain/ operational configurations or compile any flow data available to assess the impact.
- **Current flow conditions may have varied significantly from the baseline conditions:** Previously, the dry- and wet-weather flow conditions used to assess the TRI's performance were based on July 2014 (peak tourism) and the "New Years Eve Storm in 2005/06." CH2M proposes compiling available flow data, including WRP influent flow data in the smallest time increments (e.g., 15-minute) and rain data. In addition, input from O&M staff to assess potential impacts of sediment, odor, and fats, oils and greases (FOG) or other maintenance hot spots will be helpful. See Figure 1-2 for National Oceanic and Atmospheric Administration (NOAA) rain gauges that can be accessed to supplement any T-TSA-maintained gauges. CH2M can quantify the relative depth and frequency of the storms for the area and their impact on flows in the TRI and into the WRP. This information will be helpful in prioritizing any needed upgrades should any hydraulic restrictions be noted.
- **Buildout:** T-TSA is prudent to assess the potential impacts from development within their jurisdiction and from contributing districts. Our team can assist in compiling the available data (e.g., traffic analysis zone-based, pending projects) and converting this information to wastewater loads on the system to incorporate for future scenarios, and for determining future flows and loads to the WRP in 25 years.

Figure 1-2. NOAA Rain Guages

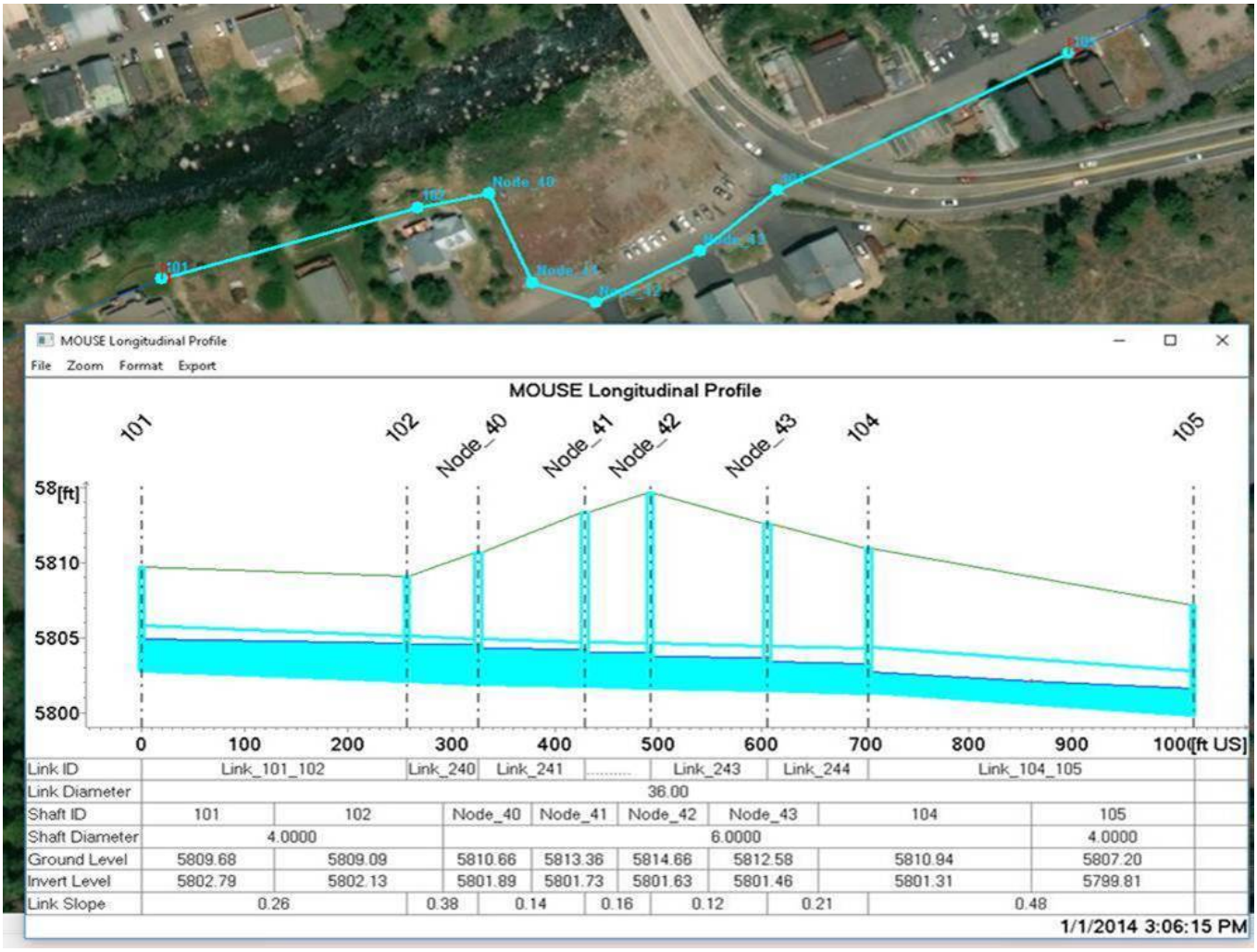


Considerations for the 2019 Wastewater Master Plan Update

Modeling Platform: Figures 1-3 and 1-4 show the current hydraulic model in MIKE URBAN v.2016 in plan view and as a pipe profile. CH2M is aware that T-TSA is open to converting their current MIKE URBAN model to another platform. We have experience in converting platforms and can advise T-TSA on the merits and risks for migration. An example is any hydraulic software under consideration be deemed a “fully dynamic engine.” This capability is needed to simulate the flow conditions common to the TRI and sewer collection systems including the effects of backwater, flow diversions, and subcritical and supercritical flow. CH2M owns and maintains multiple licenses of the common software used in the industry and

Figure 1-3. MIKE URBAN Model of the TRI

Figure 1-4. Pipe Profile of the TRI under a Wet-Weather Flow Condition



will apply the software ultimately selected by T-TSA. Dynamic software available for consideration includes InfoWorks ICM, PCSWMM, and SewerGEM. Like MIKE URBAN, the SEWERGEMS engine can also be toggled to use SWMM.

Climate Change: The current model is based on fixed-flow loads. Rainfall is not used to as a variable in the model. This approach is valid to review static flow conditions; however, should T-TSA want to simulate the effects of rehabilitation to reduce inflow/infiltration into the system or the effects of climate change, converting the model to use catchments with rainfall loading would likely be necessary. Should this approach be deemed necessary by T-TSA, we have experience delineating the contributing drainage areas in GIS and calibrating models to flow/depth data.

Task List:

- Establish models of TRI
- Calibrate models using existing plant performance data and supplemental sampling data as needed
- Update population and effluent flow projections as needed
- Identify existing and projected processes/deficiencies
- Deliver model calibration to include hydraulic profiles of peak, average, and low flow conditions of the TRI
- Provide staff training
- Develop TM on capacity of the TRI

Alternatives Development and Screening, Analysis, and Selection (Tasks 9, 10)

Objective: Based upon tiered screening and evaluation, develop a recommended approach to meeting T-TSA's needs in the 25-year planning horizon.

Approach: A comprehensive and deliberate consideration of the process and condition assessments made by our team will drive the content and recommendations of Task 9. It will highlight opportunities to consolidate assets or take units offline, determine if the existing treatment and conveyance strategy should be expanded or if T-TSA should pivot to new but proven technological alternatives, and validate how operational changes could minimize operating cost.

Most importantly, the condition, hydraulic, and process assessments will be used to strategically prioritize infrastructure for upgrade or replacement. Based on preliminary research and our knowledge of the WRP and TRI, the areas shown in Figure 1-5 will receive specific focus. This will allow T-TSA to make informed decisions on how best to optimize plant configuration and operation to plan for the future.

Regulatory Requirements: The first task is to create a regulatory compliance TM, based upon information reviewed during Task 2. This will include interviews with state and local regulators, a review of discharge

Figure 1-5. Staff Assignments for Alternatives Analysis

	WRP						TRI
	WET WEATHER	LIQUIDS			SOLIDS		
Facility		Secondary Treatment	Biological Nutrient Removal (BNR)	Disinfection	Digestion and energy recovery	Dewatering and loadout	
Level of Analysis	Optimization	Optimization	Detailed Analysis, Optimization	Evaluation of select new processes	Comprehensive Evaluation	Optimization	Assessment
Number of Workshops	2 remote	2 in-person	2 in-person	2 remote	2 in-person	1 in-person	1 remote
Lead	John Siczka	Cory Lancaster	Cory Lancaster	Matt Noesen	Dave Parry	Ted Couch	Dan O'Leary

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regulations of similar facilities, a discussion of the current trends occurring in regards to specific contaminants and permitting, and what, if any, will be the specific impacts of a possible NPDES permit on the facility.

The results of this TM will help set the guidelines for the following alternatives evaluation.

Task List:

- Conduct interviews with regulators
- Analyze similar facility requirements, changes to regulations
- Develop future regulatory compliance TM

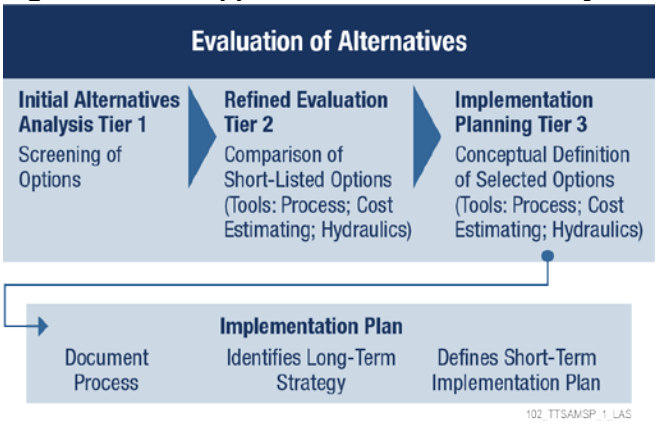
Alternatives Evaluation

While the TRI and WRP are in need of a forward-thinking Master Plan to define their future, both currently function well in meeting the needs of T-TSA. During our facility kickoff meetings in Task 2, we will employ our experts' extensive wastewater treatment and conveyance knowledge to begin a list of the primary facilities exhibiting definciencies, and/or opportunities for optimization. Using the information and tools generated in Tasks 2 through 8, and in collaboration with T-TSA, we will solidify the appropriate level of effort required to evaluate each facility, as shown in Figure 1-6. We will modify our approach following initial discussions with T-TSA and site evaluations.This approach assumes the following facility analyses, and relative levels of effort, to be confirmed with T-TSA during scoping and Tasks 1 and 2.

Tiered Decision Process

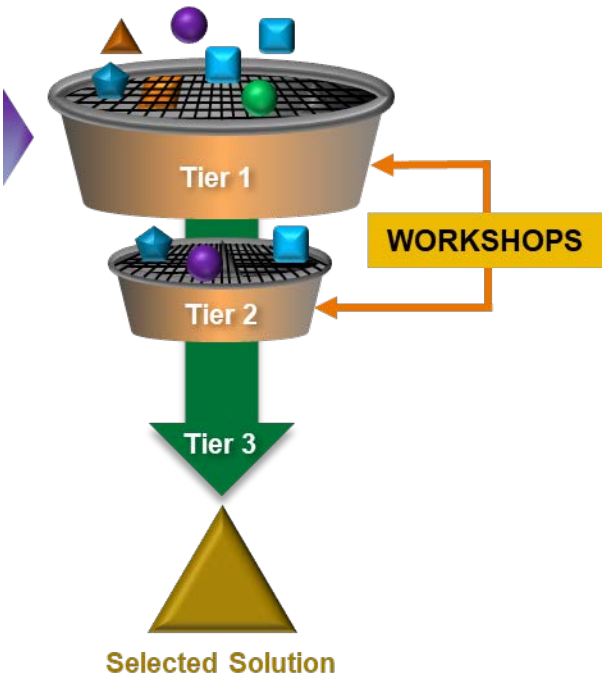
In our proposed tiered decision process, see Figure 1-7, we will first identify alternatives for each facility that could meet T-TSA's long term goals for inclusion in Tier 1. The preliminary list of alternatives is screened using key criteria endorsed by T-TSA, and short-listed alternatives move into Tier 2 (Additional process, or hydraulic modeling may be required to evaluate alternatives). Next, we perform a Multi-Objective Decision Analysis (MODA) to score each short-listed alternative based on economic, and non-economic criteria developed with T-TSA.

Figure 1-6. Our Approach to Alternatives Analysis



We will use CPES, our parametric cost estimating tool, to rapidly generate life-cycle costs for the shortlisted alternatives. The scores and life-cycle costs are then used to generate a benefit-cost rating for each alternative. Using T-TSA's input, we rank the alternatives and recommend the final alternative for consideration in Tier 3. Depending upon the complexity and significance of each facility, in-person or remote workshops are required between Tiers 1 and 2, and between Tiers 2 and 3 to verify T-TSA agreement with the screening

Figure 1-7. Our Tiered Decision Process



process. The results of this task, workshops, and final selected alternatives, will be documented in the final Master Plan Report in Task 11.

Task List:

- Develop analysis methodology and screening criteria
- Develop future regulatory compliance requirements
- Summarize existing and planned supply sources and demands
- Identify other potential beneficial uses for resource recovery
- Formulate potential conveyance and treatment alternatives
- Assess feasibility of potential treatment and conveyance improvements
- Develop details and models needed to screen alternatives deemed viable
- Short list up to three alternatives in each facility for further evaluation and final selection
- Develop descriptions, advantages, and disadvantages of alternatives
- Screen alternatives in workshops with T-TSA to develop shortlist
- Obtain budget estimates from vendors as needed
- Develop cost estimates using CPES for the short-listed alternatives
- Develop site layouts and site specific considerations for each alternative using the Preview™ tool
- Develop MODA analysis table, and final ranking of each shortlisted alternative
- Conduct final workshop with T-TSA for each defned facility to select preferred alternative for development

Capital Improvement Plan and Final Cost Estimates

Throughout Task 9, careful thought will be given to the required implementation schedule to verify regulatory compliance, and ease of operation for T-TSA staff. The final recommended alternatives will be organized into one capital improvement plan (CIP), with Association for the Advancement of Cost Engineering (AACE) Class 5 costs (+100%/-50%) for specific improvements adjusted due to phasing. The CIP and cost estimates will be documented in the final Master Plan Report in Task 11.

Task List:

- Develp individual CPES models of each retained alternative to determine capital, O&M, and life-cycle cost estimates
- Prepare conceptual layouts of estimates
- Prepare roadmap for future capacity and regulatory compliance improvements
- Deliver cost estimates and CIP

Master Plan Report and Presentation (Task 11)

Objective: Combine deliverables from previous tasks into one, unified Master Plan Report, and present principal findings to T-TSA Board of Directors.

Approach: The final report will include deliverables from Tasks 2-9, as well as the written results of the alternatives evaluation, cost estimates and capital improvement plan associated with Tasks 9 and 10. Section introduction, conclusions or connecting paragraphs will be added to convey clear progression to determined outcomes. The final report will provide T-TSA with a roadmap for the future of the WRP and TRI. Brad Memeo and Ted Couch will present major findings to T-TSA Board of Directors.

Task List:

- Combine deliverable TMs from Tasks 2-9
- Develop written summaries from the alterantives evaluation and, cost estimate, and CIP form tasks 9 and 10
- Write executive summary and connecting paragraphs as required
- Submit report
- Develop presentation for T-TSA Board
- Give presentation to T-TSA Board

Project Team

2 | Project Team

Team Organization

As shown in Figure 2-1, the CH2M team will provide T-TSA with best-in-class resources to deliver all services for a successful master plan. The following attributes demonstrate the unique qualifications of our team:

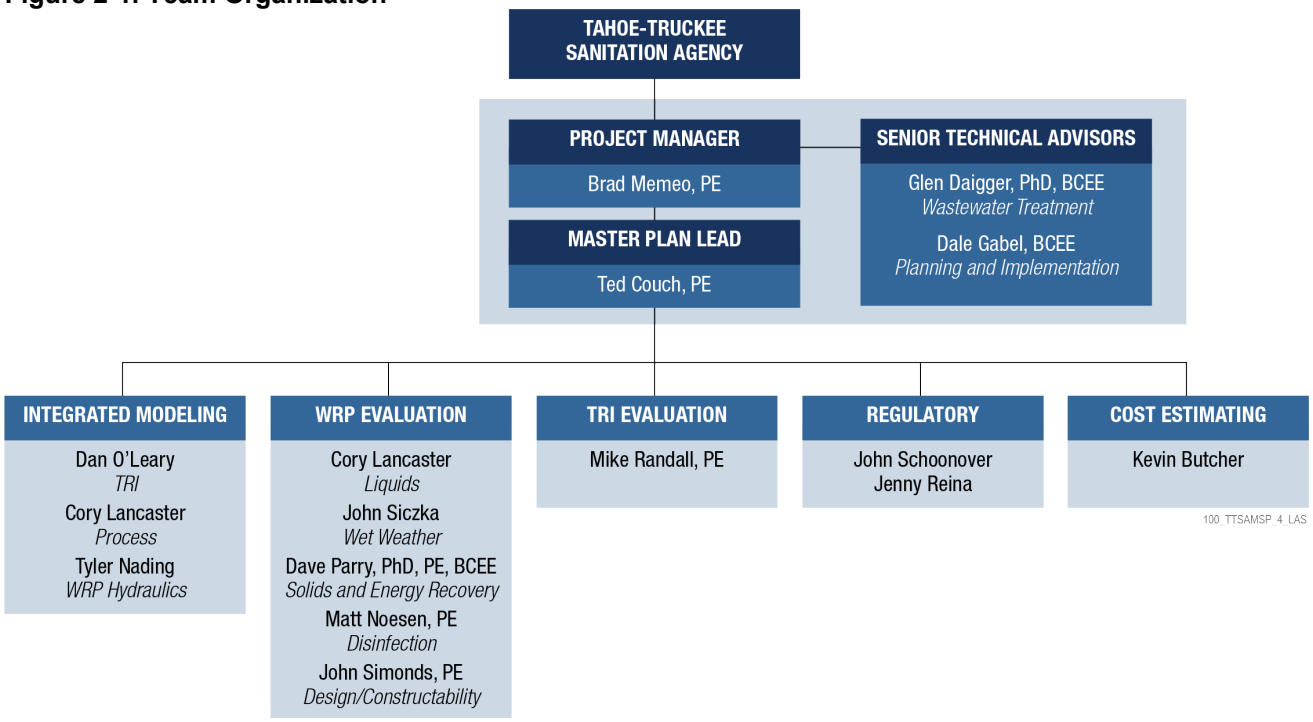
- Technical excellence to develop integrated models and deliver accurate analyses
- An understanding of treatment and conveyance impacts on the T-TSA system
- Experienced personnel empowered to complete their assignments in alignment with project objectives
- Hands-on involvement from senior technical advisors to guide the development and screening of alternatives
- Knowledge of the water resource conditions in the Tahoe and Truckee River basins
- Proven relationships with stakeholder agencies and regulators
- A creative and collaborative process to get to the best combination of options for the Agency

Our project manager, **Brad Memeo**, brings in-depth knowledge of the T-TSA system and facilities, including the WRP and the TRI. He knows your staff and your policies and procedures for working with consultants. Brad is a detailed-oriented project manager who will oversee the hands-on administration of the master plan. He will be responsible for meeting budgets and schedules and for day-to-day communication with T-TSA.

Ted Couch, our master plan lead, brings expertise in wastewater treatment process modeling and design. He will manage the resources and personnel responsible for developing the master plan.

Glen Daigger supported T-TSA with the conversion of the WRP treatment process to a PhoStrip system and the selection of the BioStyr filters during the most recent expansion. His broad, global wastewater expertise and history with T-TSA will guide

Figure 2-1. Team Organization



our technical approach to planning for the future of the WRP.

Dale Gabel has managed and provided technical leadership to complex wastewater master plans across the country. He identifies, evaluates, and implements alternatives for process improvements that meet challenging regulatory requirements. His recent experience includes the Honouliuli WWTP Expansion project in Hawaii, which will help the plant meet the requirements of a USEPA consent decree.

Dale's expertise will augment the local knowledge of **John Schoonover** and the statewide NPDES permitting experience of **Jenny Reina** in the development of the best approach to regulatory compliance for T-TSA through the planning horizon.

Dan O'Leary and **Mike Randall** will apply their technical skills in hydraulic modeling and their recent TRI experience to determine collection system capacity and to develop alternatives that retain integrity and optimal operation. We will integrate the TRI models with the WRP hydraulic and process models created by **Tyler Nading** and **Cory Lancaster**.

John Siczka, CH2M's global lead for wet weather wastewater treatment, brings a nuanced perspective to TRI and WRP upgrades and optimization that will aid T-TSA's management of extreme peak flows in December and July, as well as increased potential for pineapple express storms.

Dave Parry has national expertise in solids processing and energy recovery projects and extensive experience with wastewater planning and design in California.

Experience Working Together and with T-TSA

Our team members have collaborated on numerous successful wastewater planning and design projects in California and across the U.S. They bring lessons learned from this diverse experience that will be leveraged with the hands-on knowledge of the following team members, who have T-TSA experience:

- Brad Memeo, PE
- Glen Daigger, PhD, BCEE
- Dan O'Leary
- Mike Randall, PE
- John Simonds, PE
- John Schoonover
- Kevin Butcher

Matt Noesen brings a specialty in disinfection technologies to the team that will evaluate WRP improvement alternatives.

John Simonds served as a mechanical design lead during the 2004 T-TSA expansion project, and managed services during construction. He will review all identified alternatives for design and constructability considerations, feasibility, and optimal solutions. John's recent experience analyzing the digestion and energy recovery system at the Upper Occoquan Service Authority (UOSA) for upgrades and code compliance is particularly well-suited to T-TSA, as the original design, and current challenges of both facilities are very similar.

Once alternatives are identified, Cory Lancaster and our cost estimator, **Kevin Butcher**, will use CPES, our proprietary parametric cost estimating tool, to provide rapid, accurate cost estimates to aid in evaluations of the identified alternatives.

BRAD MEMEO, PE

PROJECT MANAGER

EDUCATION

BS, Civil Engineering, California State University

LICENSES/REGISTRATIONS

Professional Engineer:

California #81778

AFFILIATIONS

American Society of Civil Engineers

YEARS OF EXPERIENCE

14

Why Brad?

- Manages task orders under CH2M's master services agreement with T-TSA
- Proven project management and design management skills
- Expertise in conveyance system design and preparing contract documents

Brad is a civil engineer with more than 14 years of experience designing and analyzing water conveyance and water resources management facilities. His areas of expertise include pipeline route analysis, pipeline design, hydraulic analysis, hydrology, hydraulic structure design, and fish passage design.

Truckee River Interceptor Manhole 81 to Manhole 83 Improvements; Tahoe-Truckee Sanitation Agency; Truckee, CA. ***Role: Project Manager.*** Project replaced a 24-inch diameter reinforced concrete and ductile iron gravity sewer interceptor pipe (Truckee River Interceptor) with a 36-inch diameter reinforced concrete pipe for approximately 1,810 feet. Managed interdisciplinary team to complete necessary environmental documentation, obtain permits for construction, prepare final design and bid ready documents, and administer construction.

Building 27 Main Service Upgrade Project; Tahoe-Truckee Sanitation Agency; Truckee, CA. ***Role: Project Manager.*** Project consists of replacing 15 circuit breakers in Switchgear 27 and miscellaneous ancillary improvements. Managed interdisciplinary team to deliver bid documents and support T-TSA during construction.

Administration Building Office Remodel; Tahoe-Truckee Sanitation Agency; Truckee, CA. ***Role: Project Manager.*** Project consists of renovating the Administration Building receptionist area and creating office space. Managed internal team to deliver bid documents.

Sack Dam Emergency Retrofit; Henry Miller Reclamation District; Dos Palos, CA. ***Role: Design Manager.*** Managed interdisciplinary team on emergency retrofits to Sack Dam located on the San Joaquin River. Design includes structural stability improvements and provisions to increase the retained water surface elevation upstream of the dam.

Northeast Water Purification Plant Expansion; City of Houston, TX. Role: ***Design Manager/Intake Engineer.*** Managing an interdisciplinary team on the expansion raw water intake pumping plant located in Lake Houston. Design responsibilities include dual 108-inch pipelines and hydraulic sizing of cylindrical screens and facility configuration. The City of Houston's expansion project is a design build project that will add 320 mgd to the existing water plant's capacity.

Lane City Reservoir; Lower Colorado River Authority; Lane City, TX. ***Role: Lead Hydraulic Design Engineer.*** Lead hydraulic design engineer for the Supply Canal (approximately 1.3 miles) and realigned canal (approximately 1 mile) comprised of earthen and concrete lined canal prism. The Supply Canal will be used to convey water to the Lane City Reservoir for storage, for sending water further down the canal system for irrigation and/or industrial demands, and for releasing water from the OCR back to the river to meet irrigation customer demands and accommodate Lane City Reservoir emergency drawdown operational requirements. The design capacity of the Supply Canal is 561 cfs from the Colorado

River to the Lane City Reservoir and 750 cfs back to the Colorado River during emergency drawdown of the Lane City Reservoir. Canal design includes river return structure, overchute spanning Jarvis Creek, and a check structure. Realigned canal capacity is 400 cfs and consists of an earthen canal prism. The design creatively addressed complex hydraulics and sediment management.

Cortina Creek and Sand Creek Revetment Project; Tehama-Colusa Canal Authority; Colusa County, CA. ***Role: Project Manager/Project Engineer.*** The project consisted of design and construction services for revetment improvements aimed at protecting two 18-foot-diameter siphons on the Tehama-Colusa Canal.

Davis Woodland Water Supply Project; Woodland-Davis Clean Water Agency; Davis, CA. ***Role: Design Engineer.*** Lead civil engineer for the final design of 5 miles of 36-inch-diameter welded steel pipe that will convey raw water from the Sacramento River to the proposed Regional Water Treatment Facility. The pipeline design includes two horizontal directional drilling operations beneath the Yolo Bypass levees and a trenchless installation beneath Interstate 5. One of the largest, most complex water supply projects in California, this project replaces deteriorating groundwater supplies with safer, more reliable surface water from the Sacramento River. CH2M provided design, permitting, construction, commissioning, and long-term operation and maintenance for a 30-mgd regional water treatment facility and treated water pump stations, 5.1-mile raw water pipeline, and 9.5-mile finished water distribution pipelines. Challenges included delivering needed capacity within budget on a compressed schedule. The team addressed environmental constraints and conducted significant outreach to land owners adjacent to pipeline alignments and community and state leaders. One unusual construction challenge was the need to work around protected wildlife habitats. Nearly 80 percent of the alignment fell within giant garter snake habitat. To both protect habitat and maintain progress, we developed a schedule to install the pipeline within a 5-month period and delivered within that period. Design-build partnership resulted in significant cost savings and substantial completion was achieved three months ahead of schedule.

Arroyo Canal Fish Screen and Sack Dam Fish Passage Improvement Project; Henry Miller Reclamation District #2131; Los Banos, CA. ***Role: Design Manager/Fish Screen Engineer.*** Responsible for the design of a new 700-cfs fish screen and innovative fish ladder/transport channel. Managed an interdisciplinary team on a fish passage improvement project associated with the San Joaquin River Restoration Program. Design responsibilities included developing rating curves for the San Joaquin River and Arroyo Canal, facility site plan, hydraulic sizing of the project facilities (approach channel, trash rack, V screen, transport channel/fish ladder) and general configuration of pneumatic crest control gate on the San Joaquin River. Project includes a 700 cfs V screen in the Arroyo Canal, trash rack structure, replacing an existing diversion dam on San Joaquin River with a concrete gated structure comprising pneumatic crest control gates approximately 10 feet tall, and a transport channel/fish ladder capable of handling salmon and sturgeon.

Fish Passage Improvement Project at Red Bluff Diversion Dam; Tehama-Colusa Canal Authority (TCCA); Red Bluff, CA. ***Role: Design Engineer.*** Designed fish screen, dredge pipeline, and canal facilities. The $190 million project included a 1,118-foot-long fish screen structure, forebay, site civil improvements, open channel and siphon to convey water from the pumping plant to a settling basin that supplies the Tehama-Colusa Canal, and a 660-foot bridge across Red Bank Creek to provide site access to a 2,500-cfs pumping plant designed by Reclamation. TCCA serves irrigation water to 17-member water districts in the upper Sacramento Valley. The project will enable TCCA to divert water from the Sacramento River without operating the Red Bluff Diversion Dam, which has been identified as a barrier to migration of listed anadromous fish species.

TED COUCH, PE

MASTER PLAN LEAD

EDUCATION

MS, Engineering (Specialization in Water Engineering), California Polytechnic State University, San Luis Obispo

BA, American Studies (Minor Spanish), Pomona College, Claremont, California

LICENSES/REGISTRATIONS

Professional Engineer:

California #85802

YEARS OF EXPERIENCE

7

Why Ted?

- Expertise in process modeling and design for wastewater treatment plants
- Wastewater treatment plant operations assistance and troubleshooting
- Hydraulic modeling experience and proficiency in several modeling software applications including AFT Fathom, Pro2D, BioWIN, AutoCAD, ArcGIS

Ted has worked for municipal, state, federal and private clients in all facets of water engineering, with a focus on municipal wastewater treatment. This includes coordination with clients on conceptual solutions to technical challenges, delivering detailed designs, as well as onsite equipment testing and staff training. Ted has completed various recycled water and wastewater system master plans, and managed teams to deliver pumping and pipeline design projects. He has also planned and conducted trainings with treatment plant staff to instruct them on the operation of new equipment and processes.

Wastewater Treatment Plant Upgrade Design; Sewerage Commission-Oroville Region; Oroville, CA. ***Role: Project Manager.*** Responsible for delivery of 30 percent design for major upgrades to the wastewater treatment plant. Managed client interactions, workshops, and tasks, including field investigations, control system evaluation, permitting, and detailed design. Worked with the client to develop scope and fee for initial contract.

Disinfection Facilities Plans; City of Redding, CA. ***Role: Project Manager/Process Engineer.*** Led the effort to develop disinfection system facility plans for each of Redding's two wastewater treatment plants. Produced detailed alternatives analysis with a triple bottom line approach. Considered established, as well as novel disinfection technologies to produce a recommended alternative for each treatment plant, including system sizing, site layouts, and cost estimates.

Water Reuse Study; City of San Mateo, CA. ***Role: Task Manager.*** Led the long-term strategic planning effort on beneficial reuse of San Mateo Wastewater Treatment Plant effluent. Coordinated with national experts on developing regulations and technologies as well as local potable water agencies on potential partnerships. Analyzed potential treatment trains as well as costs to provide guidance on the most beneficial options for effluent reuse.

Master Plan and Financial Assistance Study; Sewerage Commission-Oroville Region; Oroville, CA. ***Role: Project Manager/Process Engineer.*** Managed delivery of master plan analyzing changes to the wastewater treatment plant over a 20-year horizon. Primary focus on future, more stringent discharge regulations, and the secondary treatment and disinfection upgrades necessary to address these regulations. Recommendations involved aeration system upgrades, as well as a UV disinfection system to replace the existing gaseous chlorine system.

Wastewater Treatment Plant Master Plan; Central Contra Costa Sanitary District; Martinez, CA. ***Role: Deputy Project Manager.*** Managed technical staff writing the 2016 Master Plan. As part of the multi-firm effort, coordinated with the prime consultant staff on schedule, budget, and staffing requirements. Created internal schedules and project instructions for management. Provided support to technical team on cost estimating for WWTP upgrade and expansion alternatives.

Sodium Hypochlorite Conversion Project; Eastern Municipal Water District; Perris, CA. ***Role: Project Engineer.*** Project engineer during the planning and initial design efforts for the conversion of the four wastewater treatment plants from gaseous chlorine to sodium hypochlorite. Efforts involved site visits with

EMWD engineers and operators, workshops, and presentations to arrive at mutually-agreed upon conversion concept for each treatment plant. These required sizing calculations for storage, conveyance, mixing and dosage, as well as life-cycle cost estimates for multiple alternatives at each plant.

Olivehurst Wastewater Treatment Plant Master Plan; Olivehurst Public Utilities District; Olivehurst, CA. ***Role: Project Engineer.*** Wrote major portions of the 2016 Olivehurst WWTP Master Plan, addressing plant expansion from 3 mgd to 8 mgd. Aided in cloth media filtration capacity testing. Researched WWTP energy use and Pacific Gas and Electric Company rate structures to optimize UV system process loads with onsite solar, and natural gas turbine generation. Recommended upgrades and expansion of the existing UV system to address population growth.

San Mateo Wastewater Treatment Plant Facility Plan; San Mateo, CA. ***Role: Task Manager.*** Led effort to plan the facilities and layout for the $900-million upgrade to the San Mateo WWTP and collection system. Involved workshops with mangers, engineers and operators to determine optimal treatment process and configuration, as well as sizing and layout.

South Truckee Meadows Water Reclamation Facility Biosolids Facility Project; Washoe County Community Services Department; Reno, NV. ***Role: Staff Engineer.*** Oversaw performance testing and commissioning of thickening and dewatering equipment at the new biosolids facility. Increased fees for pumping sludge to an offsite facility necessitated onsite stabilization and dewatering of waste activated sludge. The selected process included a thickening with a rotary drum, stabilization with aerobic digesters, and dewatering with screw presses. Work included services during construction to test monitoring equipment, controls, sludge, polymer and dewatered cake conveying equipment, as well as the rotary drum thickener and screw presses. Testing required sample collection and analysis, and modifications to control systems to ensure required polymer dosages, capture rates, and cake percent solids.

Biosolids Digester Facilities Project; San Francisco Public Utilities Commission; San Francisco, CA. ***Role: Design Engineer.*** Process lead for detailed design of digester and biosolids dewatering facilities at the Southeast Water Pollution Control Plant (SEP). Thermally hydrolyzed solids will be anaerobically digested to create Class A biosolids. To reduce the volume of the biosolids hauled offsite for beneficial use, digested solids will be dewatered using belt filter presses. Performed hydraulic and process modeling and calculations to size the solids feed system from digestion to dewatering, and the plant process water used for polymer and sludge dilution. Coordinated with multiple design firms to ensure uniform criteria and equipment across facilities. Specified multiple pump types, including centrifugal, screw-induced centrifugal, and progressing cavity, and solids monitoring equipment, including flow and density meters, and appurtenances.

Temperature Phased Anaerobic Digestion System Operations and Maintenance Manual; San Francisco Public Utilities Commission; San Francisco, CA. ***Role: Staff Engineer.*** Wrote an operations and maintenance manual and standard operating procedures for improvements to the anaerobic digestion system at the Oceanside Water Pollution Control Plant (OSP). The improvements consisted of major process changes to allow the system to conduct temperature phased anaerobic digestion (TPAD), while operating digesters as sequencing batch reactors (SBR). Because the TPAD system is a combination of old and new equipment and procedures, writing the manual required coordination with OSP staff, site visits, and extensive research into existing OSP equipment, data, and operations. This research was integrated with the new operational strategies, automated equipment, and remote controls to provide a manual useful for initial training of operators and as a reference for troubleshooting.

GLEN DAIGGER, PhD, BCEE

SENIOR TECHNICAL ADVISOR: Wastewater Treatment

EDUCATION

PhD, Environmental Engineering, Purdue University

MSCE, Environmental Engineering, Purdue University

BSCE, Environmental Engineering, Purdue University

LICENSES/REGISTRATIONS

Professional Engineer:

Arizona #47312
Indiana #8703092

Board Certified Environmental Engineer, American Academy of Environmental Engineers

AFFILIATIONS

International Co-Chair of the Science and Technology Commission for the 7th World Water Forum

Member of the national Academy of Engineering Sustainability Roundtable

Member of the Water Environment Research Foundation Board of Directors

Member of the Water Council Board of Directors

Member of the Board of Directors for the Environmentally Engineering Foundation

TOTAL YEARS OF EXPERIENCE

40+

Why Glen?

- T-TSA WRP design experience
- More than 40 years of experience in wastewater treatment plant evaluation, troubleshooting, and process design.
- Internationally recognized expert in biological wastewater treatment process design and evaluation

Dr. Daigger is an expert in wastewater treatment technologies who provides guidance and leadership to projects worldwide. His areas of expertise include biological wastewater treatment and treatment process design, biological nutrient removal (both nitrogen and phosphorus), combined trickling filter and activated sludge systems, the use of biological selectors to control activated sludge bulking, and oxygen transfer. He participates in all phases of facility development, from pilot studies to start-up and troubleshooting. Dr. Daigger focuses on ways to provide added value to clients' process and infrastructure designs. He leads value engineering workshops that reduce costs while continuing to achieve project goals. His approach incorporates brainstorming sessions that include critical treatment questions to identify areas for innovation that often translate into cost savings and accelerated schedules. Leveraging his process understanding with a holistic view of wastewater treatment facilities, Dr. Daigger brings innovation to design and process strategies that maximize value, enhance process performance, and achieve both short- and long-term project goals.

Water Reclamation Plant Expansion; Tahoe-Truckee Sanitation Agency; Truckee, CA. ***Role: Senior Process Engineer.*** Facilitated process technology workshops and provided input into the procurement process for proprietary process equipment. The project expanded plant capacity to 9.6 mgd with the addition of include biological aerated filters for nitrification and denitrification, and high solids centrifuges for solids dewatering.

Secondary Treatment and Dewatering Process; City of Sunnyvale, CA. ***Role: Senior Consultant.*** This aging plant has a unique configuration consisting of influent pumping, preliminary treatment, conventional primary treatment, lagoon-based secondary treatment followed by dissolved air flotation, nitrifying trickling filters, effluent filtration, and disinfection. Solids processing consists of conventional anaerobic digestion and air drying. While in compliance with effluent discharge standards, the facility requires upgrades to comply with future requirements and to reduce operating costs. Peer review of a master plan prepared by others revealed several alternatives that could reduce cost, facilitate phased construction, address liabilities associated with sea level rise and long-term use of the lagoon area for wastewater treatment and biosolids management, and create more sustainable outcomes. Glen led this review, which resulted in significant redirection and to a plan that is currently being implemented.

Low Level Nitrogen Study - East Shore Water Pollution Abatement Facility; Greater New Haven Water Pollution Control Authority; New Haven, CT. ***Role: Senior Consultant.*** Developed and evaluated alternatives to upgrade an existing 40-mgd secondary treatment plant to biological nitrogen removal using existing tankage. The upgrade included conversion of the existing complete-mix activated sludge system to create an initial anoxic zone with mixed liquor recirculation and conversion from mechanical surface aeration to diffused aeration. Although the existing plant was not designed to nitrify, the improves sludge settleability resulting from this conversion, along with increased

heat retention due to the change in aeration systems allowed for year-round nitrification and biological nitrogen removal to an average total nitrogen less than 8 mg-N/L. The project also included upgrading to process 187 mgd of wet weather flow, which was accomplished by a combination of secondary and primary treatment. This upgrade was accomplished using only existing process tankage.

Columbia Boulevard Wastewater Treatment Plant Secondary Process Improvements Project; City of Portland Bureau of Environmental Services; Portland, OR. ***Role: Process Design Lead/Senior Consultant.*** Has served as senior consultant and lead process design engineer for improvements to the CBWTP secondary treatment system for 20+ years. Originally constructed as a complete mixed activated sludge system that experienced severe sludge bulking problems, in the 1990s the facility was converted within the existing bioreactor volume to a plug flow configuration with an initial anoxic selector. While this conversion improved sludge settleability, implemented further improvements in the early 2010s to increase the peak wet weather capacity of the secondary system. This was accomplished again within the existing bioreactor volume by adding further flexibility to operate in step feed and sludge reaeration modes under wet weather conditions, and to adjust the anaerobic selector configuration as needed. Extensive evaluation of the existing relatively shallow square (squircle) peripheral feed secondary clarifiers were conducted, including field testing and computational fluid dynamics analysis. Extensive modifications were also implemented to the RAS system to thoroughly blend the individual RAS streams to allow the facility to operate as a "single" biological process rather than eight parallel systems. These modifications allowed the reliable peak wet weather capacity to be increased from approximately 100 mgd to as much as 140 mgd. Also provided significant process support to staff during the first wet weather season of operation. Currently, serving as lead process engineer for further plant upgrades, including the addition of two new secondary clarifiers to further increase plant wet weather secondary treatment capacity.

Liquid Processes; R2E2 Project; NEW Water; Green Bay, WI. ***Role: Technical Advisor.*** Technical advisor for this project consisting of digesting waste activated and primary sludges, followed by dewatering and incineration. These processes will generate and recover significant energy. Engines powered by biogas from the digesters will generate electricity, and heat recovered from the engines and incineration will be used for power generation, plant building heating, and digester heating. As the technical advisor for liquid processes, assisted with the analysis of the existing system, development of alternatives to be evaluated, and evaluation criteria. Senior technical advisor for the conceptual design of the R2E2 nutrient recovery system and aeration basin improvement – two key parts of NEW Water's plan to reduce phosphorus effluent.

Rock Creek Advanced Wastewater Treatment Facility; Hillsboro, OR. ***Role: Senior Process Consultant.*** Continuously involved as senior process consultant since 1985. Began with development of master plan that led to construction of the initial "East Side" facilities and represents, in concept, the master plan for expansion and up-grade of the facility from its original 15-million-gallon-per-day (mgd) capacity to an ultimate capacity goal of 100 mgd. Notable technology upgrades include: (1) conversion from high purity oxygen-activated sludge (the original treatment process at Rock Creek) to the anoxic selector diffused air process with nitrification that is currently used, and (2) development of the tertiary treatment system that has demonstrated the capability to routinely produce an effluent with a test pit concentration less than 0.05 milligram per liter.

Regional Water Reclamation Plant; Upper Occoquan Sewage Authority; Centreville, VA. ***Role: Chief Process Engineer and Senior Consultant.*** Since 1984, projects included process optimization and capability assessments, and upgrade and construction of new facilities. Built in 1978 with an initial capacity of 12 mgd, operational testing (supervised by Dr. Daigger) increased the capacity to 15 mgd. Construction phases have subsequently increased capacity from 22 to 32 and ultimately to 54 mgd. Most recent projects involve increasing the nitrogen removal capacity of this facility.

Water Resources Recovery Facility; Alex Renew Enterprises; Alexandria, VA. ***Role: Process Design Lead/Strategic Advisor.*** Strategic advisor since 1992, this 72-mgd WRRF has been rehabilitated and sequentially upgraded to meet stringent Chesapeake Bay discharge standards of 8 mg/L total nitrogen (TN) and then 3 mg/L TN while maintaining consistent compliance with stringent effluent total phosphorus (TP) requirement of 0.18 mg/L. A building block approach facilitated sequential upgrade of the facility, which is located on a highly constrained site. A master plan for further improvement to the facility anticipated potentially more restrictive future effluent standards while achieving increased sustainability. This master plan identified a side-stream partial nitritation/Anammox facility (first purpose-built facility operational in North America), resulting in substantial energy and supplemental carbon addition savings. Further application of partial nitritation/Anammox to the mainstream process is being implemented. In all, more than $500 million in capital improvements have been successfully implemented. Recently served as technical advisor to update the existing long-range plan to anticipate future more restrictive regional biosolids management options, and currently serving as technical advisor for wet weather treatment upgrades and implementation of mainstream partial nitritation/Anammox.

DALE GABEL, BCEE

SENIOR TECHNICAL ADVISOR: Planning and Implementation

EDUCATION

MS, Civil Engineering, University of Colorado

BS, Civil Engineering, South Dakota State University

LICENSES/REGISTRATIONS

Professional Engineer (Civil):

Colorado #18702
Nebraska #E 10584
Kansas #17132
Alaska #9272
New Mexico #13328
Hawaii #15602

AFFILIATIONS

American Society of Civil Engineers

Water Environment Federation

American Academy of Environmental Engineers

TOTAL YEARS OF EXPERIENCE

41

Why Dale?

- Broad expertise in liquid and solids wastewater treatment technologies, project management, planning, process engineering, design, and construction management
- Extensive experience in wastewater and biosolids master and facility plans and CIP development gained in directing over 25 such planning projects
- Expert in grease management, codigestion, biosolids processing, biogas utilization, and cogeneration systems

Dale serves as CH2M's Wastewater Practice Lead for the Western United States. He has extensive experience in the full suite of engineering services for WWTF and WWTP facilities and a strong background in facilities planning and process engineering for municipal and industrial treatment plants. Dale has coordinated extensively with local, state, and federal regulatory agencies and has participated in numerous public meetings as a technical expert. His expert technical and proven management skills allow him to solve complex challenges and offer solutions that improve overall performance, efficiency, and quality in all areas.

Clean Water Program; Water Reclamation Facility Value Engineering Study; City of San Mateo, CA. ***Role: Value Engineering Lead.*** A critical component of the Clean Water Program is the expansion of the water reclamation facility to add future capacity and nutrient removal capabilities. Following completion of the 30% design, Dale lead a collaborative VE review of the project that included the owner, program management team, design team, and CMAR contractor. The review evaluated 70 individual cost savings items and identified over $15 million in construction cost savings.

Wastewater Facilities Plan; Lander Street Water Renewal Facility; City of Boise, ID. ***Role: Senior Consultant.*** As Senior Consultant, Dale led the decision analysis to compare collection and treatment scenarios to expanding the City's current system and meet future regulatory requirements. Key alternatives evaluated included consolidating the City's two wastewater plants into one or upgrading both and installation of multiple water reclamation facilities in the collection system to provide reuse water near potential customers. The project also evaluated numerous sustainability options such as the "mining" the phosphorus from the upgraded wastewater treatment plants to be sold as a fertilizer and installation of biogas cogeneration systems.

Liquids and Biosolids Master Plans; Nelson Wastewater Treatment Complex; Johnson County, KS. ***Role: Project Manager.*** The 15-mgd Nelson Complex consists of two separate, but co-located WWTPs. Following physical and biological treatment, the effluents from the two plants are combined prior to receiving UV disinfection. The Liquids Master Plan evaluated the technical and financial feasibility of incorporating nutrient removal into the treatment process. Triple bottom line sustainability criteria considered the environmental, societal, and economic impacts of eight different treatment approaches. Alternatives were compared using whole-plant computer process models that incorporated nitrogen and phosphorus nutrient removal technologies. The project team identified the advantages, disadvantages, carbon footprints, and costs (capital, operating, and life-cycle) of treatment scenarios to meet three different nutrient goal levels that were established by the State of Kansas. For the Biosolids Management Plan, the team evaluated upgrades to the solids handling systems including anaerobic digestion and dewatering, effective management of trucked in TWAS, possible inclusion of a FOG waste receiving station, and beneficial use of digester gas.

Honouliuli Wastewater Treatment Plant Secondary Treatment Expansion Project; City and County of Honolulu, HI. ***Role: Project Manager.*** Directing the planning and design of a $450-million upgrade to the Honouliuli WWTP to meet the requirements of a USEPA-mandated consent decree and increase the plant capacity to 40 mgd. Key elements of the project include phased conversion of the existing trickling filter/solids contact biological treatment process to an activated sludge system that can be converted to a BNR system in the future when nutrient removal requirements are implemented and upgrading the solids processing facilities to a regional biosolids processing and drying facility to support five additional WWTPs and eliminate landfilling of treated biosolids. With extremely high utility costs on the island, achieving net energy neutrality is a key driver of the project. To support this objective, the design includes carbon diversion from the A-B process and thermal hydrolysis process (THP) pre-treatment prior to upgraded high-solids anaerobic digestion to maximize biogas production. All biogas will be fed to the new combined heat and power (CHP) facility to maximize electricity production with waste heat from the CHP facility used for direct drying of the biosolids in a low temperature belt dryer and for digester heating. A FOG waste receiving facility will also be constructed to support co-digestion and additional biogas production.

Tomahawk Creek Wastewater Treatment Plant Trickling Filter Improvements and Nutrient Removal Master Plan; Johnson County, KS. ***Role: Project Manager.*** Dale directed the facilities study for a $250 million upgrade to the 10-mgd trickling filter WWTP to meet capacity needs and future total nitrogen and total phosphorus limitations of 3 and 0.3 milligrams per liter, respectively. A preliminary list of 28 alternatives was screened to eight using a multi-attribute analysis approach. The retained alternatives were further developed using the Pro2D whole plant computer simulator to determine performance and sizing and 20-year capital improvement and operation and maintenance cost estimates. Selection of the recommended alternative was based on a triple-bottom line comparison of costs and nonmonetary benefits. Also directed the design and construction of interim process improvements installed to meet the requirements of an Administrative Order issued by the Kansas Department of Health and Environment. Key elements of the project included replacing the trickling filter distributors with programmable hydraulic drives and adding a ferric chloride feed.

Biogas Utilization Study and Facilities Plan Update; Metropolitan Wastewater Management Commission; Eugene, OR. ***Role: Senior Consultant/Biogas Study Lead.*** A key focus of the project was determining the best options for long-term utilization of the WWTP's biogas and whether to upgrade or replace the existing 800kW internal combustion engine and other key components of the cogeneration system, which were nearing their end of their service lives. We analyzed a broad range of the potential options including increasing digester gas production and various digester gas cleaning systems. Biogas utilization options included expanded cogeneration, cleaning up the biogas for use by vehicles or injecting into a natural gas pipeline, and selling the biogas to a local industry.

Feasibility Study of Digester Grease/Food Waste Injection System; Gresham Wastewater Treatment Plant; Portland, OR. ***Role: Consultant.*** Dale served as senior consultant for the feasibility study of a co-digestion and cogeneration system at the Gresham WWTP using FOG and food waste from restaurants and a variety of food processing wastes from the Portland area. The study determined that the Gresham WWTP could produce up to 395 kW of additional electrical power from the FOG related biogas and hot water containing 60 million Btu/day of additional heat.

Papillion Creek WRRF Trickling Filter Improvement Project; City of Omaha, NE. ***Role: Project Manager and Master Plan Lead.*** Dale led the development of a master plan that created a roadmap for the City to plan for phased improvements with implementation triggers for the 72.5-mgd treatment facility over the next 30 years to address capacity needs and projected regulatory requirements. The plan identified options for performance improvement and included a robust plan for incorporating nutrient removal that is flexible on timing and actual effluent requirements. Key project elements included a detailed condition assessment and development of a Pro2D whole-plant simulator, calibrated using plant data and used to model future performance under both annual average and maximum month conditions. Nine nutrient removal alternatives were identified and evaluated. A long-term odor assessment and control plan was also developed. The development of a flexible phasing plan for implementing the conversion to an activated sludge system was key because the timing of the nutrient removal requirements and specific effluent limits to be enacted by the state were uncertain. Dale also led the design and services during construction of Phase 1 improvements that addressed significant operational issues with the trickling filters and extended the life of this critical process another 20 years, resulting in significant capital cost savings.

Odor Control Master Plan Study; Metro Wastewater Reclamation District; Denver, CO. ***Role: Project Manager.*** Conducted extensive field sampling and odor modeling of the 200-mgd Robert W Hite Treatment Facility and associated collection system to identify sources of odors and develop a phased long-term plan for odor control.

DAN O'LEARY

INTEGRATED MODELING: TRI

EDUCATION

BS, Mechanical Engineering, Montana College of Mineral Science & Technology

YEARS OF EXPERIENCE

24

Why Dan?

- Modeled TRI for T-TSA
- Senior reviewer and expert in MIKEURBAN modeling supporting hydraulic analysis
- Troubleshoots DHI-related modeling problems and issues
- Negotiates CH2M's annual contracts and service agreements with software vendors
- Lead modeler for a technology initiative comparing the use of three industry standard dynamic wastewater conveyance models (XP SWMM, MOUSE, and INFOWORKS) to evaluate a pump station network with dual force mains
- Project Manager for sewer system master plans and hydraulic wastewater conveyance system modeling projects

Dan is a senior project engineer specializing in wastewater operations. His recent experience includes sewer conveyance evaluations using hydraulic models, sewer flow monitoring, rainfall dependent inflow/infiltration (RDI/I) analysis, and pump station design; hydrologic modeling to size combined sewer overflow facilities; developing GIS data for a sewer and water system; and evaluating wastewater systems for cost effective rehabilitation.

Combined Sewer Overflow Reduction Plan; Seattle Public Utilities; Seattle, WA. ***Role: Modeling Lead.*** Ongoing project within the Genesee Basin to reduce the volume and frequency of overflows. Project includes installation and maintenance of 27 flow monitors in a combined system, development of an INFOWORKS hydraulic model to support alternatives evaluation, drafting a modeling plan to guide the model development, and calibrating the model using the client's probabilistic uncertainty analysis process.

Wastewater Master Plan Update; City of Springfield, OR. ***Role: Modeling Lead.*** Project included model development, inflow/infiltration rehabilitation cost effective analysis, and sizing new pipes to service future landuse areas using DHI's MIKEURBAN hydraulic model with RDI module.

Flow Monitoring Equipment Acquisition; City of Lewiston, ID. ***Role: Project Manager.*** Project included procurement and installation of flow monitoring equipment to monitor City's progress in inflow/infiltration removal through system rehabilitation. Data to support hydraulic modeling update.

Mercer Corridor Improvements Project; Seattle Department of Transportation; Seattle, WA. ***Role: Modeling Lead.*** Project included developing an INFOWORKS model in South Lake Union CSO area to evaluate applicability of Denny/Lake Union CSO Exception Policy for project stormwater requirements.

Fort Irwin Wastewater System Master Plan; Fort Irwin, CA. ***Role: Technical Reviewer.*** This project established the annual improvement funding needed to rehabilitate and upgrade the fort's wastewater conveyance system.

Mill Bay Lift Station; City of Kodiak, AK. ***Role: Modeling Lead.*** This project was a study and preliminary design of alternatives available to the City to improve the conveyance capacity of the lift station. Project included hydraulic modeling of the common force main between two lift stations, pump selection, and improvement recommendations.

Delridge Basin CSO Tank Evaluation; Seattle Public Utilities; Seattle, WA. ***Role: Modeling Lead.*** This project updated and analyzed the hydrological and hydraulic conditions in CSO Tanks #2 because overflows were observed when tank was not yet full. Performed the hydrological modeling and reviewed data analysis to assess the performance of the tank with current basin conditions and recent precipitation.

On Call Engineering Services for Drainage, Water, and Wastewater Infrastructure: CSO Reduction Plan for Genesee Basin; Seattle Public Utilities; Seattle, WA. ***Role: Modeling Lead.*** Project included installation and maintenance of 27 flow monitors in a combined system, development of an InfoWorks hydraulic model to support alternatives evaluation, drafting a modeling plan to guide the model development, and calibrating the model using SPU's probabilistic uncertainty analysis process. After calibration, performed modeling to develop alternatives reducing CSO discharges to comply with regulatory limits.

Inflow and Infiltration Analysis Report; City of Kodiak, AK. ***Role: Modeling Lead.*** The analysis identified and prioritized basins of inflow and infiltration. Hydraulic model was updated, and capital improvement projects developed to convey peak flows within accepted performance standards.

Collection System Planning and Comprehensive Sewer Plan; City of Everett, WA. ***Role: Technical Reviewer and Modeling Lead.*** Hydraulic modeling lead on the long-term simulation of 50 years of precipitation records to quantify volume and frequency of combined sewer overflows and develop cost effective combined system conveyance alternatives.

Storm Drainage Master Plan; Oakland, CA. ***Role: Senior Reviewer.*** Senior reviewer of hydraulic model used to evaluate and develop storm drainage conveyance alternatives. Plan incorporated inventory and GIS maps, hydraulic modeling, condition assessment, capital improvement project descriptions, and maintenance needs.

Collection System Planning - Sewer Master Plan and Hydraulic Modeling; City of Arcadia, CA. ***Role: Technical Reviewer.*** Senior technical reviewer of a master plan project that included GIS mapping, flow monitoring, and hydraulic modeling of sanitary sewer system. Project included the coordination with the Los Angeles County District and representing specific condition assessment (fat, oil, grease, root intrusion) data on pipe-by-pipe segment in the hydraulic model.

Wastewater Facilities Master Plan; City of Lewiston, ID. ***Role: Collection System Planning and Modeling Task Leader.*** This facility plan updated the 1995 Wastewater Facilities Master Plan. The facility plan will address liquid and biosolids waste stream treatment process upgrades, liquid disposal options including reuse, solids disposal options including composting, industrial pretreatment issues, and collection system planning. Currently serving as collection system planning and modeling task leader on this planning effort.

Comprehensive Wastewater Control Plan, Modeling and Flow Monitoring; City of Tuscaloosa, AL. ***Role: Project Manager****.* Project manager of the flow monitoring, infiltration/inflow analysis, and hydraulic modeling of wastewater conveyance system. Applied gage adjusted radar rainfall to more accurately capture temporal and spatial distribution of rainfall for use in the hydraulic model.

Wastewater Conveyance System; Augusta Utilities District; Augusta, GA, ***Role: Technical Reviewer.*** Reviewed the wastewater conveyance system plan models for Augusta Utilities District and for Clayton County Water Authority in Clayton County, Georgia.

Sewer Evaluation and Capacity Analysis Plans; City of Montgomery, AL. ***Role: Project Manager.*** Managed plans for the Towassa and Catoma basins for the Water Works and Sanitary Sewer Board of the City of Montgomery.

Sanitary Sewer Segment Evaluations; City of Tuscaloosa, AL. ***Role: Project Engineer.*** Evaluated 340 miles of sanitary sewer in the City of Tuscaloosa to determine sewer segments with excessive inflow and infiltration (I/I). Flow monitoring devices recorded the sewer system's flow and relationship to rainfall. Subsequent activities involved locating specific I sources in the system using techniques such as flow isolation, dye water, manhole inspections, and internal television inspection of selected sewers. Documented the findings of the flow monitoring effort, field evaluations, and recommended pipe or manhole rehabilitation methods for achieving the I/I reduction goals. Assisted government and private sector clients in preparing major and synthetic minor operating permit applications; EPCRA Tier I, Tier II, and Form R reporting; storm water pollution prevention plans (SWP3s); and hazardous waste handling procedures.

CORY LANCASTER

INTEGRATED MODELING: Process / WRP PROCESS EVALUATION: Liquids

EDUCATION

MS, Civil and Environmental Engineering, Washington State University

BS, Environmental Science, Rutgers University

YEARS OF EXPERIENCE

17

Why Cory?

- Expert in process optimizations
- Specialist with life-cycle assessments
- Champion of whatever works best for the lowest cost

Cory is a systems thinker with a knack for creative problem solving. He is an expert in crunching through complex data sets to develop elegant solutions. He specializes in wastewater process simulation software to design and optimize biological, physical and chemical wastewater treatment processes with a focus on nutrient removal. His work also focuses on innovative technologies that provide better treatment within smaller footprints while using less energy and comparing alternatives with life-cycle assessment tools. With a background in environmental engineering, Cory has helped to develop proprietary wastewater treatment applications and process designs, conducted laboratory experiments with bench-scale reactors, pilot studies, and written grant proposals and reports. He has tested hydraulic parameters of physical models of water/wastewater/cooling water pump stations, spillways, dam intakes, and fish passages, and designed and fabricated practical and custom model modifications to improve hydraulic conditions. In his role as a research scientist he contributed to four patents in the field of wastewater treatment and algal production for biofuels.

Honouliuli Wastewater Treatment Plant Facility Plan; Honouliuli, HI. ***Role: Process Lead and Wastewater Technologist.*** As the process lead and wastewater technologist, Cory conducted whole-plant process simulations that incorporated four implementation phases over a 25-year period for upgrading the existing 30 mgd primary treatment facility to secondary treatment and expanding for future conditions of 45 mgd. This work helped establish the basis of design for all solids handling process. He conducted alternatives analyses in consideration of thermal hydrolysis and struvite mitigation strategies. Comparisons include life-cycle cost assessments for the planning period of the project, and the impact on energy balance, solids production, and nutrient removal.

MSD Comprehensive Facility Plan; Louisville and Jefferson County, KY. ***Role: Technologist.*** As a contributing technologist, Cory evaluated whole-plant process alternatives using process simulations for relocating the existing facility to a new site and sizing for 110 mgd future conditions. Processes were to meet low nitrogen and phosphorus limits. A primary objective was to develop planning level costs for the different alternatives to compare via life-cycle assessment. Process alternatives included both liquid, solid, and sidestream treatment options.

Elk River Wastewater Treatment Plant Facilities Plan; Eureka, CA. ***Role: Process Lead.*** As the process lead and wastewater technologist, Cory conducted whole-plant process simulations for four alternatives to meet new ammonia limits for a 4.3 mgd facility while accommodating extreme wet-weather events with a tidally restricted bay discharge. Alternatives evaluated included the Nereda granulation process and intensified nitrification treatment wetlands, both to complement existing overflow wetlands and storage ponds.

Wastewater Treatment Plant Nutrient Removal Study; City of Newark, OH. ***Role: Technologist.*** Provided process simulations comparing the impact of nitrogen removal sidestream treatment alternatives on future mainstream treatment designs via life-cycle assessment and evaluating a novel process intensification strategy incorporating granulation.

Chorley Wastewater Treatment Works Upgrade; Chorley, UK. ***Role: Technologist.*** As a contributing technologist, Cory evaluated whole-plant process design for a 7-mgd facility using process simulations for compliance with client design criteria. He reviewed aeration sizing calculations and secondary clarifier design under different flow conditions.

Experience Prior to CH2M

PARC, a Xerox Company; Palo Alto, CA. ***Role: Member of the Technical Staff.*** Contributed to various research, technology development, and technology transfer projects related to PARC's clean water group and energy systems and materials group. Principal investigator for a two-year, $1.4M California Energy Commission PIER (Public Interest Energy Research) research grant related to hydrodynamic separation of organics from primary effluent in wastewater treatment. In his role as inventor, he contributed to four patent applications:

- Integrated hydrodynamic separator structure, effluent channel for separating MLSS in wastewater treatment. Ser No. 14/844,416. Filed September 3rd, 2015
- Dual-compartment bioreactor for use in wastewater treatment and algal production. Ser. No. 14/533,426. Filed November 5th, 2014. Granted November 8, 2016 (#9,487,748 B2)
- Recycling activated sludge by hydrodynamic separator (HDS) to enable high MLSS bioreactor to process high influent flow and/or high strength wastewater. Ser. No. 14/136,46. Filed December 23rd, 2013. Granted September 12, 2017 (# 9,758,407)
- Hydrodynamic separation (HDS) for removing protist predators from algal crops. Ser No. 15/219534. Filed July 16th, 2016

Microvi Biotech; Hayward, CA. ***Role: Senior Environmental Engineer.*** Developed proprietary wastewater treatment applications and process designs, conducted laboratory experiments with bench-scale reactors, lead pilot studies, and wrote grant proposals and reports.

JOHN SICZKA

WRP PROCESS EVALUATION: Wet Weather

EDUCATION

MS, Environmental Engineer, Virginia Polytechnic Institute and State University

BS, Civil Engineering, Virginia Polytechnic Institute and State University

LICENSES/REGISTRATIONS

Professional Engineer:

Wisconsin #34038-006

AFFILIATIONS

Water Environment Federation

YEARS OF EXPERIENCE

11

Why John?

- Wet weather treatment technology and pilot testing expertise
- Wastewater treatment plant and collection system odor modeling, and odor design expertise
- Experienced in TOXCHEM+, INTERCEPTOR Powered by WATS, INTERCEPTOR, SCREEN3, AFT Fathom, WinHydro, Pro2D, BioWin

John is a Senior Technologist and Wet Weather Treatment Global Technology Leader. His responsibilities include project design, studies, and planning, and leading our wet weather treatment service team. He has expertise in wet weather treatment technology evaluation, pilot testing, and design. He also has expertise in municipal wastewater collection system and treatment plant odor control modeling, studies, technology evaluation, testing, and design. He has significant expertise in process mechanical design, managing environmental operations at an industrial facility, regulatory review, and permit negotiations.

Clean Water Program; City of San Mateo, CA. ***Role: Senior Technologist and Lead Engineer.*** Leading a system-wide odor control study for a $900 million program to upgrade San Mateo's sanitary sewer collection and wastewater treatment systems. The study includes sampling the collection system and developing a system-wide odor model. The model is being used to identify and confirm areas with high odor complaints and select technologies to mitigate odors. The study also includes mitigating off-site odor complaints at the WWTP and complying with fence-line regulatory hydrogen sulfide criteria.

Jones Island and South Shore Water Reclamation Facilities Capacity Analysis; Milwaukee Metropolitan Sewerage District; Milwaukee, WI. ***Role: Project Manager.*** Managed a capacity analysis project to determine hydraulic and process capacities of two WRFs, to identify hydraulic and process bottlenecks, and to make recommendations to increase capacity. Tasks included field surveys, hydraulic surveys, secondary clarifier stress tests, settling column tests, hydraulic modeling, process modeling, and operations review. Performed a separate biosolids settleability study that identified opportunities to improve sludge settleability such as maintenance dose RAS chlorination to prevent filament growth and provide more reliable treatment capacity.

Miami-Dade County Ocean Outfall Legislation (OOL) Program; Miami-Dade County Water and Sewer Department; Miami, FL. ***Role: Senior Engineer and Process Lead.*** This $3.3 billion program will eliminate dry weather discharges and significantly reduce wet weather discharges to ocean outfalls from three WWTPs by 2025 to comply with the state of Florida's ocean outfall regulations. The program includes an evaluation to maximize the capacity of existing treatment processes, repair and rehabilitation of existing facilities, and new equalization tanks to eliminate the need for wet weather treatment technologies**.**

Water Pollution Control Station Step Feed Phase 1; City of Akron, OH. ***Role: Process Engineer.*** Developed a secondary treatment process model using BioWin to identify improvements necessary to increase wet weather capacity. Both steady-state and dynamic simulations were performed. Various step feed distributions were modeled under different temperature and loading conditions to meet TSS, BOD, nitrogen, and phosphorus permit limits. Also assessed the impact of proposed phosphorus and nitrogen discharge permit limits on the facility.

Ohio River Force Main Odor Study; Louisville Metropolitan Sewerage District; Louisville, KY. ***Role: Senior Technologist.*** Developed odor model using CH2M's INTERCEPTOR Powered by WATS to quantify sulfide generation and release of vapor phase hydrogen sulfide from the ORFM's air release valves and corrosion of the downstream ORI. The ORFM is an 8.5-mile dual barrel force main. The ORFM's long detention time generates significant dissolved sulfide which is released from air release valves. Residents have complained of odorous emissions from the air release valves and measures to treat the odors have been ineffective due to the large area and high cost of treatment. Air dispersion modeling was also conducted to assess off-site impact of odorous air discharged from air release valves.

City of Waukesha East Moreland Boulevard Odor Control Study; WI. ***Role: Project Manager and Senior Technologist.*** Developed odor model using our INTERCEPTOR Powered by WATS to quantify sulfide generation in the Ruben Drive force main and the release of hydrogen sulfide from the East Moreland Boulevard interceptor. Used sampling results to calibrate model. Developed Air dispersion models to assess off-site impact of hydrogen sulfide emissions. Analysis and discussions with the City indicated shortening the length of the force main significantly and discharging to a closer gravity sewer was possible. Developed an odor model of shortened force main and downstream collection system. Conducting sampling to calibrate the model. Modeling proved that shortening the force main mitigated off-site sulfide emissions.

Combined Sewer Overflow Long-Term Control Plan; Philadelphia Water Department, Philadelphia, PA. ***Role: Senior Technologist.*** Provided direction, guidance, and expertise in developing wet weather treatment alternatives for three Water Pollution Control Plants. Treatment alternatives included vortex/swirl concentrators, conventional clarifiers, chemically enhanced primary treatment with conventional clarifiers and plate settlers, and ballasted flocculation for flows ranging from 80 mgd to 1.2 bgd. Directed preparation of site layouts and cost estimates for the three plants. Prepared and presented treatment alternatives to client staff.

Georgetown Wet Weather Treatment Station; King County, WA. ***Role: Senior Technologist.*** Evaluated chemically enhanced primary treatment with lamella plate clarifiers versus ballasted sedimentation for final process selection for the design of a 70 mgd remote wet weather treatment facility. The evaluation included preparation of life cycle costs. Based on the evaluation, the client chose to move forward with ballasted sedimentation. This project is part of King County's Long-Term Control Plan to reduce combined sewer overflows as required by a federal consent decree.

High Rate Treatment Technology Evaluation and Preliminary Engineering; Milwaukee Metropolitan Sewerage District; Milwaukee, WI. ***Role: Task Lead.*** Evaluated the effectiveness of using ballasted sedimentation processes with ferric chloride, aluminum sulfate, and polyaluminum chloride as coagulants during actual and simulated wet weather events and applying UV disinfection to the treated wastewater. Led preparation of conceptual design report with site recommendations, process diagrams, facility layout, and cost estimates.

Engleside CSO - Outfall Disinfection Feasibility Study; City of Lancaster, PA. ***Role: Senior Technologist.*** Evaluation of disinfection alternatives for a combined sewer overflow outfall including dosing. Evaluation disinfection options, dosing, and contact times to comply with regulatory requirements. Serving as a technical expert and quality control reviewer for the analysis of alternatives.

Facility Upgrades to the Atherton Wastewater Treatment Plant; Little Blue Valley Sewer District, MO. ***Role: Project Engineer.*** Upgrades increased plant capacity from 80 mgd to 400 mgd. Lead the design effort to convert a screening building to a chemical building. Designed the chemical feed systems to provide ferric chloride and polymer for chemically enhanced primary treatment during wet weather flows. Developed building layout for headworks building and solids dryer building for plant's Facility Plan. Performed hydraulic analysis for plant's peak flow clarifier and outfall. For plant's low-pressure sludge oxidation system, preliminarily sized ductwork and thermal oxidizer for odor control. Assisted in developing an air dispersion model for plant odor control and obtained operating data for existing biofilter installations. Prepared recommendation for odor control at the plant.

1700-mgd Wastewater Treatment Plant's capacity and performance as part of the Comprehensive Wastewater Master Plan; Detroit Water & Sewerage Department; Detroit, MI. ***Role: Project Engineer.*** DWSD's Wastewater Treatment Plant is the largest single-site wastewater treatment facilities in the United States. Reviewed the plant's NPDES permit, analyzed the capacity and performance of the liquid treatment process, and developed a plant flow diagram for both liquid and solids processes.

TYLER NADING

INTEGRATED MODELING: WRP Hydraulics

EDUCATION

BS, Civil Engineering, Washington University in St. Louis

LICENSES/REGISTRATIONS

Professional Engineer:

Colorado #48889

AFFILIATIONS

American Water Works Association

YEARS OF EXPERIENCE

10

Why Tyler?

- Performs hydraulic modeling of treatment plants and conveyance systems
- Expertise in treatment plant process control strategies
- Extensive experience developing flight simulators of hydraulic systems
- Experience with advanced treatment technology and process design

Tyler has a wide variety of experience, including design, analysis, simulation, pilot plant operation, construction, and startup in the water and wastewater treatment, reuse water treatment, and water conveyance systems, specializing in Replica and treatment plant process control strategies.

Northwater Treatment Plant; Denver Water; Denver, CO. *Role: Hydraulics and Startup Lead.* Led the development of a dynamic hydraulic model that includes pressure and gravity hydraulics, control operations, and water quality mass balance equations for a 75-mgd greenfield water treatment facility. Coordinated the water and residuals management plan for startup.

Northern Treatment Plant; Metro Wastewater Reclamation District; Brighton, CO. *Role: Hydraulics and Simulation Lead.* Led the hydraulic design of a 150-mgd greenfield treatment plant using Replica. Developed a dynamic simulation model that included hydraulics, controls, and water quality parameters to evaluate overall system performance under a variety of different operational conditions. The model is intended to be used as a flight simulator and operator training tool.

Columbia Boulevard Wastewater Treatment Plant Secondary Process Improvements Project; City of Portland Bureau of Environmental Services; Portland, OR. *Role: Hydraulics and Simulation Lead.* Led the hydraulic design effort to evaluate options to split flow to new secondary clarifiers while avoiding a new pump station. Evaluation included verifying the intended control strategy using Replica as a dynamic simulation model.

Biosolids Digester Facilities Project; San Francisco Public Utilities Commission; San Francisco, CA. *Role: Hydraulics and Simulation Lead.* Managed the development of an integrated hydraulics and controls model for the major upgrade to the solids handling facilities at the Southeast WPCP. Tested and optimized control strategies for gravity belt thickeners, sludge screens, centrifuges, thermal hydrolysis process, anaerobic digesters, and BFP dewatering using Replica dynamic simulation software.

Lee Tunnel Project; Thames Water; London, UK. *Role: Lead System Modeler.* Generated a hydraulics and controls model in Replica to simulate the performance of the CSO system in London that has been designed to reduce the amount of sewage flows into the River Thames. This project resulted in a revised control strategy for the pumps, valves, and gates in the system due to the increased system understanding.

Wes Brown Water Treatment Plant Operational Evaluation; City of Thornton, CO. *Role: Project Engineer.* Performed onsite troubleshooting for a membrane filtration system and diagnosed hydraulic and controls operational problems and limitations. Improved the performance of the system by reducing train cycling and flow inconsistencies.

Master Plan; City of Longmont, CO. *Role: Project Engineer.* Generated alternatives for the client to meet future treated water quality requirements and demand projections. Set up a testing plan for the client to test for taste and odor removal using different powder activated carbon (PAC) products.

Eastern New Mexico Rural Water System Conveyance and Distribution Systems; Eastern New Mexico Rural Water Authority; Clovis, NM. ***Role: Hydraulics and Simulation Lead/Project Engineer.*** Developed a Replica hydraulic and controls model of both the conveyance and distribution pipelines to a new water treatment plant. Identified a new WTP location that reduces overall energy load by utilizing optimization within simulation model.

West Boise Wastewater Treatment Plant; Boise, ID. ***Role: Hydraulics Lead.*** Developed a model to evaluate the hydraulic flow split going to aeration basins at the WWTP. The model analysis recommended plant improvements that have enhanced performance. Additional simulation work was performed to evaluate how the plant would respond during power failures and other critical failures and has been used to enhance the plant control system.

Sugar Land Surface Water Treatment Plant; City of Sugar Land, TX. ***Role: Resident Engineer.*** Worked on the construction and startup team of a 9-MGD surface water treatment plant with membrane filtration and GAC adsorption. Primary responsibilities during construction were submittal review, RFI coordination, and startup planning. Participated on the startup team by coordinating equipment testing, assisting in refining the plant control strategy, and helping in plant operation during the performance testing period.

Sustainable Water Initiative for Tomorrow; Hampton Roads Sanitation District; Virginia Beach, VA. ***Role: Project Technologist.*** Assisted with the development of HRSD's innovative SWIFT program. Tasks included reviewing strategic goals and program progress, assisting in development of regulatory objectives and compliance documents, developing basis of design report for 1 MGD Research Center, developing facility layouts and costs estimates for full-scale facilities, participating as owner's consultant in design review and startup support of Research Center, and reviewing alternatives for treatment optimization.

Toowoomba Regional Wastewater Treatment Plant; Toowoomba, Australia. ***Role: Hydraulics Lead/Project Engineer.*** Developed a Replica hydraulic and controls model for the WWTP and used the model to coordinate the final design.

DAVE PARRY, PhD, PE, BCEE

WRP PROCESS EVALUATION: Solids and Energy Recovery

EDUCATION

PhD, Mechanical Engineering,
University of Illinois

ME, Mechanical Engineering,
Brigham Young University

BS, Mechanical Engineering,
Brigham Young University

LICENSES/REGISTRATIONS

Professional Engineer (Civil):

Washington #32087
California #53539
Oregon #78402

Professional Mechanical Engineer:

California #M22340
Alberta, Canada #M66388

Professional Environmental Engineer:

Utah #176598-2202
Manitoba, British Columbia #152160

AFFILIATIONS

International Water Association

Water Environment Federation – Residuals and Biosolids Committee (Past Chair) and Bioenergy Technology Subcommittee

Pacific Northwest Clean Water Association

YEARS OF EXPERIENCE

35

Why Dave?

- Global experience in wastewater treatment, solids processing, and energy projects
- Experienced in effluent heat recovery, anaerobic digestion, codigestion, pyrolysis, gasification, and combustion

Dr. Parry has a national and international reputation for providing innovative solutions in wastewater, biosolids, and energy. He has 35 years of experience in planning, designing, researching, and providing construction and operation assistance for wastewater treatment, solids processing, and energy projects. He has been principal investigator for research on effluent heat recovery, anaerobic digestion, codigestion, pyrolysis, gasification, and combustion. He recently served as the principal investigator for the Water Environment Research Foundation's co-digestion project. He was the lead author of the chapter on anaerobic digestion in the recently published WEF/EPA/WERF Solids Process Design and Management Manual. He has authored more than 40 technical papers, given numerous presentations, and has conducted workshops on wastewater collection and treatment, solids processing and anaerobic digestion, and energy management.

Biosolid Digester Facilities Project; San Francisco Public Utilities Commission; San Francisco, CA. ***Role: Technical Advisor.*** Providing technical leadership for the design of a new thermal hydrolysis process digestion facility for the South East Plant including sludge screening, pre-dewatering, digestion, and post dewatering.

Clean Water Program; Sunnyvale, CA. ***Role: Technical Advisor.*** Led an evaluation of the existing cogeneration system and recommended solutions to improve reliability without significant capital investment. The plant uses digester gas, landfill gas, and air blended natural gas to fuel the cogeneration system, which consists of two 800kW CAT engine generators. Due to declining landfill gas, increased digester gas production, and lack of automatic controls on the gas blending, the engines have been experiencing issues with stable operation. The project also includes replacement of the influent pumping, preliminary treatment, and primary treatment facilities and improvements to the secondary treatment, reclaimed water, and biosolids processes.

Energy Plan and Cogeneration Design; Silicon Valley Clean Water; Redwood City, CA. ***Role: Project Director.*** Led a team providing energy management planning and a plant cogeneration design. A biogas fueled combined heat and power (CHP) system using internal combustion engines was recommended; increasing biogas production through codigestion of food waste, building upon SVCW's already successful fats, oils, grease (FOG) codigestion program; and improving electrical reliability by upgrading the existing electrical system. Directed the design of the new 600 kW CHP system that has been constructed and commissioned.

Energy Management Strategic Plan; San Jose/Santa Clara Water Pollution Control Plant; San Jose, CA. ***Role: Project Director.*** Directed this project to build upon the 2010 Plant Master Plan. Provided detailed analysis of existing energy system at the WPCP, evaluate ongoing or future plans that impact the energy system, and develop an energy management plan that meets both short term and long-term objectives. The plan recommended building a new 14 MW cogeneration facility with four 3.5 MW units.

Anaerobic Digestion of the Organic Fraction of Municipal Solid Waste to Energy Facility; CA. ***Role: Waste to Energy Technical Advisor.*** For confidential clients in Southern California, led the team in the assessment of the potential use of waste streams for anaerobic digestion and biogas recovery from grocery store organic waste and organics from a mixed materials recovery facility. He worked with the client in the design of a pilot system, review of operating data, and the conceptual design for full scale facilities.

DC Water Biosolids Management Program Main Process Train Upgrade; Washington, DC. ***Role: Technical Advisor.*** Identified key goals for the Authority to reduce operating costs, save energy, and produce a Class A biosolids product for beneficial use. Provided design-build services to implement a major upgrade of the biosolids management system at the District's Blue Plains Advanced Wastewater Treatment Plant. This is the first THP installation in North America and is the largest THP installation in the world. This process results in a pathogen free and pasteurized Class A biosolids product, as well as biogas that will be utilized for conversion into power for plant operations. Construction is complete and the THP digestion system is processing all the biosolids from the plant.

Central Regional Wastewater System; Trinity River Authority of Texas, Arlington, TX. ***Role: Lead Practitioner.*** Providing technical review for the design of solids management improvements that will convert the solids treatment process from 150 dry tons per day of lime stabilization to a thermal hydrolysis process followed by anaerobic digestion. A conceptual design report and a preliminary design report have been completed that explain the basis of design, and adherence to governing codes, standards and project requirements.

Residual Management Facilities and Codigestion Evaluation; Massachusetts Water Resources Authority; Boston, MA. ***Role: Technical Advisor.*** Served as technical advisor for an evaluation of solids processing improvements at the Deer Island Treatment Plant. Led a feasibility study for implementing a codigestion program using the available capacity in the 12 existing 2.8 million-gallon egg-shaped digesters. The impacts of the codigestion facility on the digestion system, biogas production, dewatering and drying systems, and sidestreams were determined. A CHP study was conducted that recommended phasing in a new gas turbine CHP system that would be more efficient that the existing aged steam turbine power plant.

Digester Improvement, Organic Waste Receiving and Bioenergy Master Plan; Des Moines Metropolitan Wastewater Reclamation Authority; Des Moines, IA. ***Role: Technical Advisor.*** The Bioenergy Master Plan assessed the current anaerobic digestion and biogas utilization facilities at the Des Moines WWTP and develop plans for future facilities. Guided a team to examine advanced digestion and digestion enhancements, biomethane production, capture of the primary scum for feed to the anaerobic digestion, and to design and implement improvements to the plants organic waste receiving stations. Additionally, a biogas production and codigestion model for Des Moines was provided which allowed the City to plan for increases additional organic waste feedstocks and adjust the operation of their biogas utilization equipment to best respond to market conditions. The Des Moines Metropolitan Wastewater Reclamation Facility is a now a fully commissioned codigestion operation and multiple benefits of these improvements are being realized, these include: collecting of revenue from tipping fees, selling biogas to local industry as well as savings on electricity at the facility.

Columbia Boulevard Wastewater Treatment Plant Cogeneration Facilities; Portland Bureau of Environmental Services; Portland, OR. ***Role: Principal in Charge.*** Led the effort to provide pre-design, design, and construction phase services for the development of wastewater treatment plant related cogeneration facilities, which centers on two 850 kW internal combustion engine generators, equipped with the latest in lean burn technology and heat recovery. A comprehensive biogas treatment system was designed to remove hydrogen sulfide, moisture, and siloxane to protect and reduce the maintenance costs on the engines.

Digester Upgrade; Chambers Creek Wastewater Treatment Plant; Tacoma, WA. ***Role: Principal in Charge.*** Led the pre-design, preliminary design, and detailed design effort to identify and select the appropriate digestion process and equipment technologies for anaerobic digestion upgrades. The chosen design was for anaerobic digester upgrades with provisions to accommodate future conversion to temperature phased anaerobic digestion in the future. The feeding, mixing, and heating systems of three existing anaerobic digesters were upgraded, enabling Pierce County to save several million dollars by curtailing the construction of a new digester. Two floating cover, low rate digesters were converted to submerged fixed cover, high rate digesters. Provisions for implementing a temperature phased (thermophilic/mesophilic) digestion process were built into the design.

Cogeneration Peaking Facility Design; Santa Clara Valley Water District, San Jose, CA. ***Role: Project Director.*** Responsible for designing a 900-kW natural gas fueled internal combustion engine cogeneration facility at the Almaden Campus. Heat recovered from the engine is used to supplement the existing heating system and as a heat source for an absorption chiller to supplement building cooling needs. The cogeneration system includes state of the art automatic controls to optimize its economic benefit while minimizing operator attention.

MATT NOESEN, PE

WRP PROCESS EVALUATION: Disinfection

EDUCATION

MS, Environmental Engineering, University of California at Berkeley

BS, Electrical Engineering, Carnegie-Mellon University

LICENSES/REGISTRATIONS

Professional Engineer:

Oregon #18184
California #C50366
North Carolina #040949
South Carolina #31211
Washington #54064

YEARS OF EXPERIENCE

28

Why Matt?

- Expertise in developing award-winning facilities plans for municipal wastewater agencies that focus on just-in-time delivery to minimize the impact on existing and future rate payers
- Extensive experience with studies and designs for retrofits to operating municipal treatment plants
- Responsible for developing CH2M's wastewater UV Disinfection Design Guidelines for use by CH2M staff. The purpose of the document is to provide unified UV disinfection design guidelines; establish best design practices firm-wide; disseminate current state of knowledge on UV disinfection; and empower staff to make informed decisions

Matt has specific expertise in disinfection, particularly using UV technology. He has provided engineering and management services for a range of municipal wastewater treatment projects, including master planning, predesign, final design, construction oversight, startup, and training services. He has conducted or overseen numerous alternative disinfection studies, equipment procurements and designs, as well as construction oversight and start-up and testing services of UV disinfection projects.

UV Disinfection Upgrade at the Meridian WWTP; Meridian, ID. ***Role: Senior Technology Consultant.*** Completed a detailed alternatives evaluation to identify the optimal approach to upgrade an existing low pressure, low output UV system. Numerous options were evaluated including upgrading to medium pressure technology, upgrading to LPHO technology, and various hybrid approaches which involved retaining the existing system to reduce upfront costs. CH2M also developed an equipment preselection package for the City, assisted with the evaluation and selection of a UV vendor, and then completed the design with the selected vendor's UV system. CH2M provided construction management and commissioning services for this project.

Alternative Disinfection Study; Marysville, TN. ***Role: Principal Investigator.*** Conducted an alternative disinfection study for both the water and wastewater facilities. Conducted a preliminary screening of alternatives followed by a detailed life cycle monetary and non-monetary evaluation of selected options including delivered sodium hypochlorite, onsite generated sodium hypochlorite, and UV as well as combination or hybrid options involving more than one technology.

Woodburn WWTP Upgrade/Expansion; Woodburn, OR. ***Role: Senior Technology Consultant.*** Senior technology consultant for the disinfection portion of this project. As part of an overall project to expand and upgrade the existing WWTP, CH2M designed improvements to the existing UV disinfection system. The project is addressing several hydraulic, flow measurement, electrical and control system deficiencies associated with the existing medium pressure UV system as well as expanding the capacity of the system.

Water Pollution Control Facility Master Plan and UV Design; The Metropolitan District; Hartford, CT. ***Role: Senior Technology Consultant.*** As part of the overall master planning effort, led the effort to evaluate several options for replacing chlorine gas including UV, sodium hypochlorite, and peracetic acid. A dual approach of disinfecting base flows with UV and peak flows with sodium hypochlorite was selected by the utility. CH2M was retained to provide design, construction management, and commissioning of a new 120-mgd UV disinfection system. A formal preselection process was conducted to identify the UV supplier. CH2M then developed contract documents based on the selected vendor's equipment. Also assisted the team during construction and commissioning, including operator training and startup assistance.

Oak Lodge WWTP Expansion; Oak Lodge Sanitary District; Oak Lodge, OR. ***Role: Senior Technology Consultant - Disinfection.*** CH2M tailored its preselection documents to assist the District with preselecting the UV disinfection equipment. After vendor selection, CH2M completed the design of the new UV disinfection system. CH2M also provided construction management, control software programming, and commissioning services for this project. Provided operator training for the UV disinfection system.

UV Disinfection Upgrade at the Twin Falls WWTP; Twin Falls, ID. ***Role: Senior Technology Consultant.*** CH2M conducted a life cycle cost alternatives comparison to assist the City in how to best upgrade their existing UV system. The City opted to replace the existing medium pressure with LPHO technology. As an early out design task, CH2M developed a request for proposals from UV vendors. A vendor was selected by the City and CH2M proceeded with the design using this vendor's UV disinfection system. CH2M also provided services during construction, programming and commissioning services for this project.

Wilsonville WWTP; Wilsonville, OR. ***Role: Senior Technology Consultant.*** Developed an innovative, cost-effective approach to expand the capacity of the disinfection unit process. The existing facility has a medium pressure (Trojan UV4000). The approach involves constructing a new channel that will utilize LPHO technology. This new channel will disinfect the base flows while the existing medium pressure channel will be retained and utilized to disinfect peak flows. This approach lowers the upfront cost relative to replacing the entire system with a multi-channel LPHO system and is more cost effective from an annual cost basis (i.e., electricity costs) compared to expanding the existing medium pressure system which is less efficient. The design effort included extensive hydraulic analysis to ensure proper flow split between the two systems.

Brownsville WWTP Expansion; City of Brownsville, TX. ***Role: Senior Technology Consultant - Disinfection.*** This project expanded the plant from 10 to 14.5 mgd using a progressive design-build delivery model. The existing facility utilized chlorine for disinfecting final effluent in chlorine contact basins. UV disinfection was selected by the owner to replace the chlorine-based system. CH2M evaluated vendor bids for providing the UV equipment and selected a horizontal, LPHO vendor. CH2M also designed the new UV channels to accommodate the selected equipment. The system is designed to meet Texas Type 2 reuse requirements as well as meet surface water discharge requirements. The project was recently commissioned.

Hartford WPCF Master Plan and UV Design; The Metropolitan District, CT. ***Role: Senior Technology Consultant.*** Initially, as part of the overall master planning effort, led the effort to evaluate several options for replacing chlorine gas including UV, sodium hypochlorite, and peracetic acid. A dual approach of disinfecting base flows with UV and peak flows with sodium hypochlorite was selected by the utility. CH2M was retained to provide design, construction management, and commissioning of a new 120-mgd UV disinfection system. A formal preselection process was conducted to identify the UV supplier. CH2M then developed contract documents based on the selected vendor's equipment. Also assisted the CH2M team during construction and commissioning, including operator training and startup assistance.

Adams Street WWTP; North Hudson Sewerage Authority; Hoboken, NJ. ***Role: Senior Technology Consultant.*** CH2M evaluated options for replacing an existing low-pressure UV system that had several significant hydraulic deficiencies that jeopardized permit compliance. Retrofitting the existing channels with a LPHO system while making modifications to reduce head loss and address hydraulic constraints was recommended. Before proceeding with the final design, CH2M developed an RFP for preselecting UV equipment. After proposals were received and a UV vendor was selected a detailed design was developed. Provided start-up assistance during the commissioning phase of the project. CH2M provided construction management and commissioning services. CH2M is also the contract operator for this facility.

Southside WRF UV Disinfection Project; Albuquerque Bernalillo County Water Utility Authority; Albuquerque, NM. ***Role: Senior Advisor.*** CH2M evaluated MP and LPHO lamp technologies. Various site layouts alternatives were also evaluated including retrofitting into existing chlorine contract basins, retrofitting into existing reaeration basins, and a new UV facility. The owner opted to proceed with LPHO technology to be installed in a new, enclosed facility and retained CH2M to conduct the design. To facilitate and streamline the design process, the UV equipment was selected competitively before performing the design. Services provided by CH2M included study/alternatives evaluation, design, services during construction management, and full commissioning support.

Facilities Plan Update and Preliminary Design; Bend, OR. ***Role: Senior Technology Consultant.*** Advised preliminary design team with assessing multiple options for upgrading the existing gaseous chlorine system for two flow streams – secondary effluent that is discharged to percolation ponds and filtered secondary effluent that is reused on a nearby golf course. Evaluated alternatives included sodium hypochlorite (both delivered and generated onsite), medium pressure UV, and LPHO UV. The City selected CH2M to design an LPHO UV system for disinfection of secondary effluent for reuse.

JOHN SIMONDS, PE

WRP EVALUATION: Design/Constructability

EDUCATION

MS, Mechanical Engineering, Oregon State University

BS, Mechanical Engineering, Oregon State University

LICENSES/REGISTRATIONS

Professional Engineer:

Oregon #16087
California #32039
Maryland #35534
Virginia #45565

YEARS OF EXPERIENCE

25

Why John?

- Background in design/engineering management and combined mechanical and control system design and startup
- Extensive experience with studies and designs for retrofits to operating municipal treatment plants
- Field experience in troubleshooting process/mechanical/control systems
- Extensive experience with the T-TSA facilities

John's technical background is in both mechanical and control system technologies and includes municipal and industrial water and wastewater design and construction; incorporating the design and selection of piping systems and components; control valve sizing; pump station design; instrumentation and control engineering; control system software engineering; hydraulic analysis; and computer-aided engineering application and development. His experience and training include mechanical and control system design and startup, control system software configuration, installation, testing, and startup, process control troubleshooting, and industrial energy analysis, including thermodynamics, heat transfer, cogeneration, and energy conservation techniques.

Wastewater Treatment Plant Expansion Services During Construction; Tahoe-Truckee Sanitation Agency; Truckee, CA. ***Role: Engineering Manager.*** Responsibilities included day-to-day interactions with the construction manager, weekly meetings, review and coordination of RFIs, contract modifications, change orders, and overall coordination between our group, owner, design engineers, and construction manager.

Biological Nitrogen Removal System Facility and Waste Activated Sludge Thickening Modifications, and Water Reclamation Facility Expansion Final Design; Tahoe-Truckee Sanitation Agency; Truckee, CA. ***Role: Facility Lead.*** Responsibilities included assisting the Agency in the selection and procurement of the nitrogen removal treatment technology and the subsequent facility design to incorporate the selected technology into the plant - included eight nitrification cells and four denitrification cells, blower room, piping galleries, electrical room and backup engine generator, sampling stations, and a backwash waste tank and associated pumping system. Also responsible for design of a second WAS thickening centrifuge and cake pumping system, to be located in existing facilities at the plant.

Testing, StartUp, and Commissioning of the Southerly Renewable Energy Facility; Southerly Wastewater Treatment Plant, Northeast Ohio Regional Sewer District; Cleveland, OH. ***Role: I&C Specialist.*** Supported the startup, testing, and commissioning activities for this project, helping to coordinate the efforts of the District's three major contracts for the work; C-28, C-28B, and PSIM. Duties included review of the contractors' coordination and execution plans for the project-specific testing, start-up, and commissioning of the facilities, witnessing factory control system testing, and assisting the District with potential change order reviews and cost estimating. Other tasks included assisting in contract compliance, inspections, and contract closeout paperwork.

Ballenger-McKinney Enhanced Nutrient Removal Upgrade and Expansion; Frederick County, MD. ***Role: Lead Process Engineer.*** As part of a consultant team, designed the MBR system for this 15-mgd (average flow) treatment plant. Specific design responsibilities included modification to the BNR basins and blower

building, conveyance of mixed liquor to a new membrane building, preselection and negotiation of the membrane system, design of the new membrane building, and design of a new SCADA system for the entire facility. The design included implementing high-efficiency, high speed turboblowers for all air needs for the MBR process.

Testing, Startup, and Commissioning of Headworks and Primary Treatment Improvements; Willow Lake Water Pollution Control Facility; Salem, OR. ***Role: Lead Instrumentation and Control Engineer.*** Supported all startup, testing, and commissioning activities for this $92 million project. Duties included the coordination and execution of the project-specific testing, startup, and commissioning management plan and detailed mechanical, electrical, instrumentation and control (I&C) and software test procedures and schedules for the project. Witnessed and documented all such project activities. Supported preparation of final TSC documents for submission to the design engineer and the City of Salem.

Wastewater Reclamation Plant Disinfection Facilities; City of Corvallis, OR. ***Role: Lead I&C Engineer.*** Led I&C design of disinfection facilities at the City's wastewater reclamation plant. Responsibilities included design and specification of controls for sodium bisulfite storage, transfer, and feed, and disinfection process monitoring and control. Responsibilities also included software and hard-wired interlocks for process control, and integration and coordination of all automated process control functions into the existing plant control system. The existing control system consists of a Bailey Controls DCS integrated with PC workstations running the man-machine interface software (WonderWare). Provided construction inspection and startup support.

SCADA System Improvements and Taylor WTP Automation System Upgrade; City of Corvallis, OR. ***Role: Project Manager.*** Managed $1.9 million design-build project to provide a variety of hardware and software improvements for the City at their primary water treatment facility, as well as to their remote lift/booster station SCADA system. The project consisted of two primary tasks; a 2-year task to provide improvements (primarily software) at the Taylor WTP, and a 5-year conversion of the lift/booster station SCADA system from a Motorola RTU-based system to a Siemens PLC-based system using Ethernet Radios. Responsibilities included overall budget and schedule management, coordination of all design, construction, and startup tasks with the City and subcontractors, and software development team.

Wastewater Treatment Plant Design Upgrade; City of Alexandria, VA. ***Role: Lead I&C Engineer.*** The treatment processes include fine screening; grit separation, removal, and disposal; UV disinfection; a new plant water system; and miscellaneous building services modifications. The upgrade also includes a PLC-based plant control system for process monitoring and control. Responsibilities included development of the process and instrumentation diagrams, control valve selection and sizing, instrument selection, development of necessary interlocks for proper process control, multidiscipline coordination for installation details of instruments, and specification of all instrumentation.

Solids Handling Facility Design; City of Corvallis, OR. ***Role: Lead I&C Engineer.*** The facilities are located at, and integrated with, the City's wastewater reclamation plant (WWRP). Responsibilities included design and specification of the controls for sludge thickening, thickened sludge pumping, digester mixing, and primary and secondary hot water distribution. The design also included software and hard-wired interlocks for process control, and integration and coordination of package system controls into the existing plant control system. The existing control system consists of a Bailey Controls DCS integrated with PC workstations running the man-machine interface software.

Combined Sewer Overflow Facilities Design; City of Corvallis, OR. ***Role: Lead I&C Engineer.*** The facilities are also located at, and integrated with, the City's WWRP. Responsibilities included design and specification of the controls for the influent pump station, primary clarifiers, storage lagoons, and the disinfection system. The design also included software and hard-wired interlocks for process control, and integration and coordination of package system controls into the existing plant control system. The existing control system consists of a Bailey Controls DCS integrated with PC workstations running the man-machine interface software. The new facilities are entirely automated for startup and shutdown during significant wet weather events.

Design, Installation, and Startup, Control System Software, Compound Chlorination Loop, Unified Sewerage Agency's 40-million gallon per day (mgd); Rock Creek Advanced Wastewater Treatment Plant; Portland, OR. ***Role: Lead I&C Engineer.*** The control strategy allows for both flow pacing and chlorine residual control, including a flow averaging routine to minimize flow spiking. Responsibilities included the design, development, and testing of the software prior to installation and startup. The software runs on a programmable logic controller (PLC)-based system with supervisory control/operator interface.

MIKE RANDALL, PE

TRI EVALUATION

EDUCATION

BS, Civil Engineering, California Polytechnic State University

LICENSES/REGISTRATIONS

Professional Engineer:

California #81192

AFFILIATIONS

American Society of Civil Engineers

California Water and Environment Association

American Water Works Association

Environmental and Water Resources Institute

YEARS OF EXPERIENCE

10

Why Mike?

- Conveyance system design experience
- Water and wastewater project construction and condition assessment
- HEC-RAS modeling and GeoRAS
- Floodplain analysis and modeling

Mike has broad experience in public works projects with a focus on water distribution system and wastewater collection system design, utility management, and construction management. His water experience includes water system operation and maintenance, conveyance and distribution facilities design, hydraulic modeling, instrumentation and control design and startup, disinfection system design, construction management, and reverse-osmosis water treatment plant startup. His wastewater experience is centered on wastewater collection systems including sewer system condition assessment; modeling, design, and rehabilitation; lift station design and operation; collection system operation and maintenance; instrumentation and control system design and startup; construction management; and field design services. He also has extensive experience with water reporting through California Department of Public Health, State Water Resources Control Board (SWRCB) Division of Water Rights, Regional Water Quality Control Board (RWQCB) National Pollutant Discharge Elimination System (NPDES) Program, DWR, and additional local agencies.

Sacramento Valley Groundwater Integrated Resource Water Management Program Well Implementation Projects; Northern California Water Association; Sacramento, CA. *Role: Project Manager.* Managed and administered a $160,000 Program Management contract for Proposition 50 grant funding from the Department of Water Resources to the Sacramento Valley Groundwater IRWMP to construct 11 water supply improvement projects. Conducted program management for grant administration program. Assisted in grant funding administration and coordination with DWR. Preformed client service management and business development tasks.

Floodplain Modeling; California Department of Water Resources; Sacramento, CA. *Role: Staff Engineer.* Conducted HEC-RAS modeling of a 60-mile reach of the Sacramento River. Assisted in combining multiple river models into a complex HEC-RAS model of the Northern California Valley to assess flood risk and consequences of failure.

EchoWater Primary Effluent Pumping Station; Sacramento Regional County Sanitation District; Sacramento, CA. *Role: Project Manager/Engineer Representative.* This $40 million project is part of a program to upgrade the existing wastewater treatment plant. The 400-mgd pumping plant is intended to lift the hydraulic profile of the plant mid-process stream to provide increased head to feed the expanded treatment technologies of the upgraded wastewater treatment facility. Responsible for assisting in project management tasks such as resource management, performance and schedule tracking, coordinating with design staff during design and construction phases.

Temecula Regional Water Reclamation Facility Design; Eastern Municipal Water District; Temecula, CA. *Role: Staff Engineer.* Provided engineering design support for instrumentation and control elements of a new water reclamation facility. Worked with electrical and mechanical engineers to incorporate project elements into control design. Selected control system instruments and control equipment and coordinated design with package system vendors.

Kaiser Pond Fish Screen and Shinn Pond Rediversion No. 2 Design-Build Project; Alameda County Water District; Fremont, CA. *Role: Resident Engineer*. This $5 million design-build project was constructed on the Alameda Creek and consisted of two gravity diversions through the creek embankments to divert water in to large percolation pounds to recharge local groundwater. The design build project was a successful delivery strategy for this fast-paced project. Responsible for day to day supervision of subcontractors, reviewing project submittals, requests for information, and change orders. Conducted construction management oversight and general construction inspection.

Fish Passage Improvement Project at Red Bluff Diversion Dam; Tehama-Colusa Canal Authority (TCCA) and Bureau of Reclamation; Tehama County, CA. *Role: Staff Engineer and Inspector.* This $190 million project is being constructed on the Sacramento River and consists of a 1,100-foot fish screen, forebay, 2,500-cfs pumping plant, canal, siphon, and bridge. Teamed with Reclamation to provide instrumentation and controls support during construction and startup of the facility. The project provides TCCA with a pumping system to convey water to its canal system, independent of the Red Bluff Diversion Dam, to distribute to its 17-member water districts to irrigate 150,000 acres of high-quality farmland. Responsible for reviewing project submittals, requests for information, and change orders. Conducted general construction inspection and facility instrumentation and controls startup support.

Arroyo Canal Fish Screen and Sack Dam Fish Passage Improvement Project; Henry Miller Reclamation District #2131; Los Banos, CA. *Role: Staff Engineer.* Provided engineering support on $1.5 million design project consisting of a low-head dam across the San Joaquin River and 700-cfs fish screen. Developed hydraulic and site civil plans and specifications. Performed HEC-RAS modeling of projects alternatives. The project includes a 700-cfs V-screen in the Arroyo Canal, trash rack structure, replacement of an existing diversion dam on San Joaquin River with a 110-foot-wide concrete gated structure comprising five pneumatic crest control gates approximately 5 feet high, and a transport channel/fish ladder capable of handling salmon and sturgeon. Construction cost is currently estimated at $25 million at the 90 percent design stage.

JOHN SCHOONOVER

REGULATORY

EDUCATION

BS, Environmental Science (Watershed Science Option), California State University

AFFILIATIONS

Association of Environmental Professionals

YEARS OF EXPERIENCE

14

Why John?

- Expertise in permitting processes and NEPA and CEQA environmental documentation
- Expertise in environmental mitigation and monitoring program support
- Experienced in environmental permitting 401/404, DFG 1600 LSAA, Section 10, State Lands Commission, DWR Reclamation Board, NMFS and USFWS Section 7 consultations, SHPO, and Section 106

John is an environmental scientist and water resources planner with 14 years of experience with large, integrated regional water resource planning projects and watershed management plans. He has led permitting efforts for projects throughout California and worked with numerous permitting agencies statewide. He manages all aspects of state and federal permitting (USACE 404, CDFG 1600, CESA/ESA, RWQCB 401 Certifications, and Section 106 consultations) and environmental documentation for CEQA and NEPA compliance. He has strategic permitting experience for major water and wastewater infrastructure projects, fish screens, pumping plants, wastewater outfalls, and bridges.

San Mateo Clean Water Program; City of San Mateo, CA. ***Role: Environmental and Permitting Functional Lead.*** Environmental and permitting function lead for the City of San Mateo Clean Water Program. Spanning 10 years valued at $900 million in capital costs, the project includes construction of a new wastewater treatment plant adjacent to the San Francisco Bay and improvements to aging collection system infrastructure under Cease and Desist order from RWQCB. Leads a team of six environmental professionals on behalf of the City and co located with City staff to manage the environmental work of numerous contract consultants. This team is responsible for the permitting review and preparation of all permit documents and CEQA, CEQA Plus for SRF funding, and permit tracking for the entire program. Supports air quality and NPDES permitting, 404, 401, and CDFW consultations on numerous project elements.

Modesto Irrigation District; Modesto, CA. ***Role: Project Manager, PEIR.*** Managed the Modesto Irrigation District Programmatic EIR. The District initiated a capital improvement project that included numerous upgrades to the existing system that were the subject of the in progress Programmatic Environmental Impact Report. This project included water balance modeling, irrigation system analysis, and environmental review of project alternatives.

Woodland-Davis Water Supply Conveyance and Treatment Plant; Woodland-Davis, CA. ***Role: CVFPB Permitting Support.*** Led the CVFPB Floodplain Encroachment permitting effort for this design build project to supply new water supply/intake conveyance for the Cities of Woodland and Davis.

Crowley Gulch Siphon Project; Anderson-Cottonwood Irrigation District; Anderson, CA. ***Role: Permitting/Planning Lead.*** Wrote and completed CEQA documentation for new siphon to be installed in potentially anadromous waters. Submitted and negotiated all permits for the project, including USACE, RWQCB Section 401 certification, CDFG 1600 Lake and Streambed Alteration Agreement, and Section 106 consultation with SHPO. The project was permitting and ready to bid on schedule.

North Side Regulating Reservoir; Oakdale Irrigation District; Oakdale, CA. ***Role, Permitting/Planning Lead.*** Directed the permitting and planning for a 40-acre regulating reservoir. This project included a direct vernal pool impact and known California tiger salamander habitat. Coordinated with USACE

(including individual permit negotiation). Obtained RWQCB Section 401 Water Quality Certification, facilitated USFWS Section 7 Endangered Species Act (ESA) consultation, prepared least environmentally damaging practicable alternative analysis with EPA, and facilitated Section 106 of the National Historic Preservation Act consultations. Expedited permitting resulted in approximate savings of $2 million because the project schedule was revised to allow immediate bidding in a favorable bidding climate. The District received an ASCE award related to the environmental permitting for this project.

Sankey Diversion; Natomas Mutual Water Company; Sacramento, CA. ***Role: Project Planner/Permitting.*** Coordinated permitting for the $40 million Sankey fish screen project and worked with SAFCA and other consultants to permit the Prichard Lake Fish Screen/Pumping Plant on the Sacramento River. Permits included USACE 404/10 (Individual Permit), LEDPA analysis with EPA, RWQCB Section 401 certification, CDFG 1600 LSAA and 2081 CESA take authorization, CVFPB Encroachment Permit (concurrent with RD 1000 approval and USACE review), and USFWS and NMFS Biological Opinions. Wrote and negotiated mitigation/monitoring plans for fish screen and new canal section located in critical salmon, giant garter snake, and Swainson's hawk habitat adjacent to Natomas Basin Conservancy.

Two-Mile Bar Tunnel Project; Oakdale Irrigation District; Oakdale, CA. ***Role: Permitting/Planning Lead.*** Directed permitting and planning for a 5,270-foot tunnel to bypass a high-hazard area of the main canal system. The project is directly below sensitive vernal pool habitat with known CTS and vernal pool fairy shrimp habitats and very close to the pristine Stanislaus River fly water near Goodwin Dam. Project included wetland delineation, rare plant surveys, and CTS negotiations with USFWS under Section 10.

Cape Horn Tunnel Rehabilitation Project; Oakdale Irrigation District; Oakdale, CA. ***Role: Permitting/ Planning Task Manager.*** Directed permitting and planning for a 2,600-foot tunnel rehabilitation near sensitive vernal pool habitat with known CTS and vernal pool fairy shrimp habitats and Valley elderberry longhorn beetle. Project included wetland delineation, rare plant surveys, and CTS negotiations with USFWS. This project required the negotiation of an exemption from USACE 404 and RWQCB 401, LSAA permit from DFG, and local and regional construction, air quality, and SWPPP/ NOI permits. Project included CEQA compliance document preparation (IS/MND).

Red Bluff Diversion Dam Fish Passage Improvement Project; Tehama-Colusa Canal Authority; Willows, CA. ***Role: Project Permitting Lead/Project Planner.*** Directed completion of EIS/EIR for this $230 million project that included a new state-of-the-art fish screen and pumping facility to replace the Red Bluff Diversion Dam and improve fish passage. The project involved significant impact analysis of landfill/hazardous waste, economic impacts, and siting locations. Responsible for response to more than 1,000 public comments received from the DEIS/EIR. Also involved extensive coordination with Reclamation, TCCA, and representative from Senators Feinstein and Boxer and Congressman Herger.

Main Canal Modernization Project; Anderson-Cottonwood Irrigation District; Anderson, CA. ***Role: Permitting/Planning Lead.*** Managed permitting support. Permits included a California Department of Fish and Game Streambed Alteration Agreement, USACE Section 404 (Clean Water Act) Permit (pending), Regional Water Quality Control Board Section 401 (Clean Water Act) Water Quality Certification, and General Construction National Pollutant Discharge Elimination System (NPDES) Permit. The firm also prepared a mitigated negative declaration to comply with the requirements of the CEQA.

Clear Creek Wastewater Treatment Plant Rehabilitation and Expansion Project; City of Redding, CA. ***Role: Project Planner/Permitting Task Manager.*** Task manager for environmental permitting efforts for this $25 million upgrade. Project included 18-month negotiation with NMFS, USACE, DFG, State Lands Commission, and RWQCB to obtain clearance for in-river construction of a new outfall structure in this biologically sensitive section of the Sacramento River. Project included a temporary river diversion of approximately two-thirds of the river, and a real-time turbidity buoy system uploaded to a website for live monitoring by regulating agencies.

Cottonwood Creek Watershed Strategic Plan; Cottonwood Creek Watershed Group; Sacramento, CA. ***Role: Planner.*** Directed a series of watershed stakeholder meetings and completed a strategic plan for the 938-square-mile Cottonwood Creek Watershed, the largest undammed tributary on the west side of the Sacramento Valley. Assisted in strategic planning for an upcoming watershed management plan.

Redding Basinwide Water Resources Management Plan; Shasta County Water Agency and U.S. Bureau of Reclamation; Redding, CA. ***Role: Water Resource Planner.*** Created a series of technical memoranda to analyze various conjunctive-use and water-use efficiency alternatives for developing an EIS/EIR for the Plan. The TMs included current and future water demand and supply projections for all water purveyors in the Redding Basin as well as potential impact analysis from interbasin transfer alternatives.

JENNY REINA

REGULATORY

EDUCATION

MS, Environmental Systems International Development Technologies, Humboldt State University

BS, Chemical Engineering, Universidad Pontifica Bolivariana (Colombia)

YEARS OF EXPERIENCE

18

Why Jenny?

- Extensive experience with WWTP NPDES permitting in California
- Continuous engagement with regulatory agencies, professional societies and industry experts on changing trends in discharge regulations
- Experienced in planning and regulatory studies of current and future requirements for surface water discharge, biosolids land application, and recycled water use
- Actively involved in the CASA Regulatory Workgroup, CASA Science and Research Workgroup for Constituents of Emerging Concern, and the Water Reuse Legislative and Regulatory Committee

Jenny has more than 18 years of experience in environmental engineering with a focus on water and wastewater treatment. Her experience includes water quality evaluations, planning, permitting, industrial and municipal treatment process modeling and design, hydraulic modeling, and pilot-scale design and operation. For the past 11 years she has worked side-by-side with staff from the City of Tracy, CA, as a deputy project manager and wastewater engineer for facility planning, regulatory, and design projects.

San Mateo Clean Water Program; City of San Mateo, CA. ***Role: San Francisco Bay Regional Water Quality Control Board Liaison****.* Responsibilities include coordinating communications and periodic updates with the Regional Board on the status of compliance with the WWTP NPDES permit and the City of San Mateo Cease and Desist Order. Currently, assisting the CWP with coordination with other agencies for the preparation of grant applications.

Tracy Wastewater Treatment Plant Facility Planning Project; City of Tracy, CA. ***Role: Deputy Project Manager and Permitting Lead.*** The project consisted of identifying infrastructure requirements to maintain adequate treatment capacity, based on future wastewater flows and future regulations that would impact permitted discharge limits as well as biosolids disposal requirements.

Tracy Wastewater Treatment Plant NPDES Permit Studies; City of Tracy, CA. ***Role: Deputy Project Manager and Permitting Lead.*** The project consists of preparing and updating 14 different planning studies. This project also included preparation of the application for renewal of the NPDES for two consecutive years, preparation of reasonable potential analysis, and antidegradation analysis for the Tracy WWTP discharge. Coordinated communications with the RWQCB and provided assistance to the City of Tracy during negotiation of different compliance strategies.

Water Recycle Pump Station Project; City of Tracy, CA. ***Role: Lead Project Engineer and Permitting Lead.*** Prepared Title 22 Engineering Report for the new water recycle facilities at the City of Tracy. This engineering report is prepared for all new recycled water projects and it is submitted to the State Water Resources Control Board, Division of Drinking Water for approval before recycled water can be distributed to the users.

Keddie Resort Wellhead Treatment and Transmission System Conceptual Design; Plumas County, CA. ***Role: Lead Project Engineer and Permitting Lead.*** Conducted groundwater water quality evaluations and identified water demand requirements, developed conceptual design schematics and layout of the wellhead treatment and distribution system, and prepared Order of Magnitude cost estimates for the construction of the treatment and distribution facilities. Prepared a permitting summary for implementation of the new water supply system for the resort.

Pittsburg Generating Station Units 5 and 6 Cooling System Conversion Effluent Water Quality Analysis; Pittsburg, CA. ***Role: Project Engineer.*** Prepared water quality analysis for discharge conditions expected after the conversion project.

Sausalito Marin City Sanitary District Ongoing Operating Assistance; Sausalito, CA. *Role: Lead Project Engineer and Permitting Lead.* Preparing a solids handling overview and management plan to assist plant operators maintaining plant operation in compliance with NPDES permit requirements. Project includes preparation of Standard Operating Procedures for sampling, gravity thickener operation, and dewatering system operation. Additionally, this project includes the analysis of monthly operating reports data to aid in the District's ongoing testing and process validation procedure as required by the EPA.

Evaluation of the Sausalito Marin City Sanitary District Solids Treatment Process; Sausalito, CA. *Role: Lead Project Engineer.* Performed analysis of the plant influent characteristics and performed mass balances and modeling of the solids handling processes at the wastewater treatment plant. Prepared final report to summarize the wastewater process modeling results and include recommendation for improvements.

Preliminary Design of the CMSA Effluent Disposal Facilities; San Rafael, CA. *Role: Lead Project Engineer.* Performed hydraulic analysis of the effluent disposal facilities required to identify effluent discharge requirements at high and low tide. Conducted subsequent preliminary design of the effluent pump station facilities and coordinated with different disciplines for the preparation of the preliminary design report.

Central Contra Costa Sanitation District WWTP Mercury Emissions Basis of Design Report; Martinez, CA. *Role: Project Engineer.* Evaluated various treatment alternatives for the liquid and gas waste streams generated at the solid incineration process at the District's WWTP. Worked with senior staff to develop mercury mass balances, prepare process flow diagrams, and generate preliminary layouts for the treatment alternatives. Prepared a planning-level pre-design report that included an alternatives cost analysis for the installation and operation of new and existing facilities. Treatment technologies evaluated for the liquid phase included chemical precipitation, membrane filtration/ion exchange, and granular activated carbon adsorption. Alternatively, treatment technologies evaluated for the gas phase included dry carbon injection and wet carbon injection. Additionally, with the alternatives evaluation of included the implementation of new emissions control and incineration equipment.

Sewer System Management Program; Sacramento Regional Sanitation County Wastewater Treatment Plant; Elk Grove, CA. *Role: Lead Project Engineer.* The program contains three major phases: the development phase, the implementation phase, and the ongoing maintenance phase. For the initial phase, conducted a gap analysis and completing WDR compliance readiness report, developed plans and documentation of the Sewer System Management Plan program elements, and provided training to SRCSD staff for the SSO Response Plan.

KEVIN BUTCHER

COST ESTIMATOR

EDUCATION

Construction Technologies, Shasta College, Redding

AFFILIATIONS

Association for Advancement of Cost Engineering (AACE)

Water Environment Federation

California Water Environment Association

Chemical Engineering

YEARS OF EXPERIENCE

18

Why Kevin?

- Provides accurate and workable cost estimates for large, complex, high-profile water infrastructure projects in California and throughout the Southwest
- Clients include, municipalities and agricultural districts both with and without Reclamation involvement
- Extensive experience in the use of Success Estimator and Excel Estimating Systems

Kevin is a cost engineer with 18 years of experience in the design and construction of water and wastewater conveyance and treatment facilities. He develops project costs for facility planning reports and capital improvement studies, and for design and construction of new facilities and expansion/retrofit projects. He has extensive experience in the use of Timberline, Success Estimator and Excel Estimating Systems, and develops cash flow schedules to support engineering services during construction.

Water Reclamation Plant Expansion; Tahoe-Truckee Sanitation Agency; Truckee, CA. *Role: Lead Cost Estimator.* Provided cost estimates for this project to expand plant capacity to 9.6 mgd with the addition of include biological aerated filters for nitrification and denitrification, and high solids centrifuges for solids dewatering.

Pure Water San Diego Program; Metropolitan Biosolids Center Improvements; City of San Diego, CA. *Role: Lead Cost Estimator*. Provided cost estimates for this project to upgrade existing thickening centrifuges, centrifuge feed pumps, centrifuge polymer pumps, thickened sludge transfer pumps, the anaerobic digester mixing process, and the biogas system; add new sludge feed pumps, centrate pumps, and ferrous chloride pumps; and provide site utility improvements.

Air Treatment System for the Water Reclamation Facility; City of Henderson, NV. *Role: Lead Cost Estimator.* Provided cost estimates from 60 percent design to bid. Project consists of new odor control facility, new electrical building for the facility, upgrades to the existing sweeper cleaning facility, and various demolition work and modifications at the existing WRF.

City of Bloomfield Wastewater Treatment Plant Upgrade Alternatives; NM. *Role: Lead Cost Estimator.* This ongoing project is nearing the 60 percent design level and includes repairs to existing facilities and four alternatives for different process facilities utilizing existing facilities as well as the construction of new process facilities to bring the plant up to current standards and technologies.

North Valley Wastewater Treatment Plant Improvements Project; Douglas County, NV. *Role: Lead Cost Estimator.* This ongoing project is nearing 100 percent design level and consists of an expansion and modification of an existing plant including new headworks, new sequencing batch reactor basins, new chlorine contact basin, new pre-equalization basin, new process building, and various modifications to the site and existing facilities.

Walnut Creek Wastewater Treatment Plant Secondary Improvements Project; Austin, TX. *Role: Lead Cost Estimator.* Providing cost estimates from preliminary to final design for this project to improve an existing plant. The project includes new alkalinity feed facility, aeration basins/flocculation basins, diffuser replacements, multiple clarifier mechanism replacements, multiple hydraulic gate and operator replacements, extensive electrical and control upgrades to the facility, as well as miscellaneous repairs and modifications to existing structures and processes.

Centrate Equalization; Temecula Valley Regional Water Reclamation Facility; Eastern Municipal Water District; Temecula, CA. ***Role: Lead Cost Estimator.*** Provided cost estimates from 90 percent design to bid for work at the existing facility including a new centrate return pump station, new centrate transfer pump station, and piping modifications at the existing digesters and yard piping as required to tie-in the new pump stations.

Houston West District Wastewater Treatment Plant Improvements; Houston, TX. ***Role: Lead Cost Estimator***. Providing preliminary design condition assessment cost estimates for various structural repairs and process replacements at the existing WWTP.

West Area Water Reclamation Facility Gate Replacement Project; Glendale, AZ. ***Role: Lead Cost Estimator.*** Provided cost estimates from 90 percent design to bid. Project consists of the replacement of existing hydraulic gates and miscellaneous modifications to the existing WRF.

Temecula Valley Regional Water Reclamation Facility Expansion; Eastern Municipal Water District; Temecula, CA. ***Role: Cost Estimator.*** Project included design and permitting of a 23 mgd expansion (utilizing membrane bioreactor and chlorine disinfection) as well as an upgrade of the existing wastewater treatment facilities.

Water Reclamation and Integrated Water Resources Plan; Lake Arrowhead Community Services District; Lake Arrowhead, CA. ***Role: Lead Cost Estimator.*** Project included the design and permitting of the water reclamation facilities (denitrification filters, membrane filtration, UV disinfection, and reclaimed water distribution) for LACSD's Grass Valley Wastewater Treatment Plant and expansion of the existing wastewater treatment facilities.

Perris Water Filtration Plant (PWFP) Expansion; Eastern Municipal Water District; Perris, CA. ***Role: Lead Cost Estimator.*** The PWFP upgrade/expansion was completed in two phases: the addition of 10 mgd capacity and subsequent expansion to 24 mgd.

Loveland Wastewater Treatment Expansion and Capital Improvements Plan, CO, ***Role: Lead Cost Estimator.*** Provided cost estimates for the wastewater treatment plant expansion and capital improvements plan.

Wilson Creek Regional Wastewater Treatment Plant Solids Management Optimization and Controls Project; Lucas, TX. ***Role: Lead Cost Estimator.*** Provided cost estimates from 90 percent design to bid. Project consisted of adding a new polymer system, new plant monitoring/security system, and modifications to the plants existing pump stations for the North Texas Municipal Water District.

Metro Wastewater Reclamation District, Denver, CO Denver Metro Anaerobic Digestion Facilities Upgrade, ***Role: Lead Cost Estimator.*** Provided cost estimates for the expansion of an existing wastewater facility.

City of Parsons, KS Membrane Filtration Upgrade, ***Role: Lead Cost Estimator.*** Provided cost estimates for a membrane filtration upgrade to the Parsons Water Treatment Plant.

Southeast Regional Wastewater System Improvements and Geysers Effluent Pipeline Project; Lake County Sanitation District; Lakeport, CA. ***Role: Cost Estimator.*** Developed engineer's cost estimate for construction of improvements to this wastewater system. The project included a new 6.0-mgd regional wastewater collection system and treatment facility, and construction of the 26-mile-long, 20- and 24-inch-diameter Geysers Effluent Pipeline.

Rochester Water Reclamation Plant, Rochester, MN. ***Role: Cost Estimator.*** Assisted in developing engineer's estimate on both the $27 million expansion and the $25 million upgrade to the existing water reclamation plant.

Olivehurst Wastewater Treatment Plant; Olivehurst, CA. ***Role: Cost Estimator.*** Assisted in developing engineer's estimate on the $23 million Phase 1A expansion and upgrade to the existing wastewater treatment plant.

Southeast Regional Wastewater System Improvements and Geysers Effluent Pipeline Project; Lake County Sanitation District; Lakeport, CA. ***Role: Cost Estimator.*** Developed engineer's cost estimate for construction of improvements to this wastewater system. The project included a new 6-mgd regional wastewater collection system and treatment facility, and construction of the 26-mile-long, 20- and 24-inch-diameter Geysers Effluent Pipeline.

Santa Rosa Subregional Water Reclamation System; Santa Rosa, CA. ***Role: Cost Estimator.*** Assisted in developing engineer's estimate on the $160 million Geysers Recharge Project, which is part of the Subregional Water Reclamation System. The project involved the design of 41 miles of 30-inch to 48-inch-diameter steel pipelines and pump stations to deliver reclaimed water to the Geysers Geothermal Steamfield, which recharges declining steam reserves.

Experience and References

3 | Experience and References

CH2M is a leader in wastewater collection system and treatment facility master plans. We offer T-TSA unmatched expertise in integrated hydraulic and process modeling, a proven record of evaluating and implementing innovative treatment technologies, and a demonstrated ability to address challenging regulatory requirements. Members of our team have made significant contributions to the following projects, which include many of the services required by T-TSA.

SUNNYVALE CLEAN WATER PROGRAM – WPCP SECONDARY TREATMENT PROJECT, Sunnyvale, California

KEY TEAM MEMBERS

Glen Daigger
Cory Lancaster
Dave Parry

TYPE OF WORK

Project Management
Data Collection/Validation
Hydraulic Modeling
Process Modeling
Capacity Analysis
Regulatory Analysis
Alternatives Analysis
Facility Planning
Process Design
Cost Estimating

START DATE / COMPLETION DATE

Start Date: 2017

End Date: Ongoing

PROJECT SIZE

$136 Million Plant Upgrade

ATTORNEY INVOLVEMENT

None

CLIENT REFERENCE

City of Sunnyvale
Bhavani Yerrapotu
WPCP Division Manager
Environmental Services
221 Commercial Street
Sunnyvale, CA 94085
408.730.7268
wpcp@sunnyvale.ca.gov

The master plan for the Sunnyvale Clean Water Program addresses aging infrastructure, changes in regulatory requirements, and increases in population, flows, and loads. Because the city's aging secondary treatment process of oxidation ponds, fixed growth reactors (FGRs), and air flotation tanks (AFTs) was unable to meet anticipated stringent nitrogen limits, this project includes a new conventional activated sludge (CAS) system in MLE configuration with step-feed flexibility to operate in parallel with the existing secondary treatment system through 2035. The phased approach will reduce effluent nitrogen concentrations while delaying the need for a total replacement of the existing system.

In addition to liquid treatment improvements, a new solids dewatering facility will thicken the additional secondary sludge (produced by the CAS facilities) and dewater digested biosolids produced by the anaerobic digestion process. DEMON sidestream treatment, first in the Bay Area, will provide ammonia load reduction from dewatering to ensure compliance and provide the City with an opportunity to gain operational experience with granulation, should this process be selected for mainstream intensification for the next phase of secondary treatment expansion.

CH2M is a member of the team providing engineering services, with responsibility for leading the liquid/solids process design through the preliminary design phase, and the detailed design of the solids facilities and sidestream treatment. CH2M played a pivotal role in challenging, verifying, and building on the concepts developed in the master plan. Our independent review enabled the team to better leverage technology, manage costs, and respect key site constraints. We developed treatment scenarios to provide future flexibility to incorporate new technologies, while saving money both in building and operating the upgrades.

The design incorporates in-DENSE selective wasting from the MLE combined with DEMON sidestream treatment. The in-DENSE technology retains denser sludges and granules from sidestream process, lowering the sludge volume index (SVI) and increasing the capacity of the system. The added benefit is the opportunity for plant staff to gain operational experience and confidence with new technologies.

To meet the construction budget, we integrated design-build team members early in the project to provide real-time cost modeling using location-specific pricing to mitigate cost escalation risks. We leveraged our construction experience to review budgetary cost estimates, update them to reflect current construction climate and constructability challenges. We also performed constructability reviews early in the project to address constrained site issues and to optimize a challenging construction sequence to minimize impact on operations.

CLEAN WATER PROGRAM, San Mateo, California

KEY TEAM MEMBERS

Ted Couch
Dale Gabel
Dan O'Leary
Cory Lancaster
John Siczka
Dave Parry
John Simonds
John Schoonover
Jenny Reina
Kevin Butcher

TYPE OF WORK

Program Management
Data Collection/Validation
Hydraulic Modeling
Process Modeling
Capacity Analysis
Regulatory Analysis
Facility Planning
Cost Estimating and Tracking

START DATE / COMPLETION DATE

Start Date: 2014
End Date: Ongoing

PROJECT SIZE

$900 Million Capital Improvement Program

ATTORNEY INVOLVEMENT

None

CLIENT REFERENCE

City of San Mateo
Cathi Zammit
330 West 20th Avenue
San Mateo, CA 94403
650.522.7306
czammit@cityofsanmateo.org

The City of San Mateo collects, conveys, and treats wastewater for residents and surrounding communities. The city has partnered with CH2M to plan and implement the Clean Water Program (CWP) to replace aging infrastructure and facilities, increase wet weather collection and treatment system capacity, and meet current and future regulatory requirements. Our team reviewed existing treatment capacity, redundancy, performance, and condition, and worked with the City to identify necessary improvements. We provided an integrated suite of treatment and collection system process, hydraulic, and odor modeling to support pre-design, process layout, and permitting activities and to verify effluent discharge attainment. We also provided economic and financial advice and tools to identify revenue sources to fund the program.

This $900 million capital improvement program is being implemented over a 10-year period, and initial construction has begun. Our team has accomplished the following tasks since the start of the CWP in 2014:

- Developed a program management plan establishing the policies, procedures, governance, and standards for the CWP.
- Completed validation studies for the wastewater treatment plant and collection system, which revised the CWP master plan to be in better alignment with the City's goals, mission, and vision.
- Initiated a combined facility plan for the collection system and wastewater treatment plant that balances costs, technical feasibility, interactions between conveyance and receiving treatment plant operations, and discharge permit requirements.
- Completed comprehensive treatment plant and collection system process, hydraulic, and odor modeling to promote a better understanding by designers of needs to meet CWP goals, discharge permits, and air quality requirements. These tools are also used to QA/QC detailed designers' work, process layouts, and effluent discharge attainment.
- Completed a certified CEQA Programmatic Environmental Impact Report (PEIR) with several project-specific environmental assessments and permitting analyses.
- Developed a financial model and a cost loaded schedule to establish funding requirements specific to City's current rate and funding approaches.
- Established a performance tracking tool to monitor program costs and schedule baseline, staging, construction, commissioning, and operations timelines to monitor and proactively address any cost or schedule issues before they have significant impacts.
- Completed detailed State Revolving Funds Applications for the CWP that includes detailed environmental, engineering design, economic analysis, and general loan application packages.

PURE WATER SAN DIEGO, San Diego, California

KEY TEAM MEMBERS

Dale Gabel
Ted Couch
Tyler Nading
Dave Parry
John Simonds
John Siczka
Kevin Butcher

TYPE OF WORK

Project Management
Data Collection/Validation
Hydraulic Modeling
Process Modeling
Capacity Analysis
Regulatory Analysis
Alternatives Analysis
Facility Planning
Process Design
Cost Estimating

DATES OF SERVICE

Start Date: 2016

End Date: Ongoing

PROJECT SIZE

$1 Billion Program

ATTORNEY INVOLVEMENT

None

CLIENT REFERENCE

City of San Diego
Amer Barhoumi
Senior Project Manager
Public Utilities Department
9192 Topaz Way
San Diego, CA, 92123
858.292.6364
ABarhoumi@sandiego.gov

Pure Water San Diego is a phased, multi-year program that will provide up to one-third of the City of San Diego's potable water supply by 2035. The $1 billion program, which is anticipated to be constructed and in operation by the 2021, includes system-wide modeling, the expansion of an existing wastewater reclamation plant, upgrades to an existing biosolids treatment facility, a new advanced water treatment plant, a new wastewater pump station, a new purified water pump station, and nearly 30 miles of wastewater and purified water conveyance infrastructure. CH2M is involved in the following aspects of the program.

Pure Water Dynamic System Model

- Development of the system-wide model replicating the hydraulics, controls, and process performance of the Pure Water system.
- Incorporates all program elements from upstream wastewater conveyance, through the wastewater and advanced treated water processes, to downstream reservoir discharge.
- Development and verification of system control schemes and specific facility control strategies for all treatment plants and pump stations, to verify various operational scenarios.
- Provides predictive process modeling including water chemistry simulation, RO scale potential, finished water stability indices, and adjusted chemical feed rates to meet water quality goals.

North City Water Reclamation Facility Expansion

- Planning activities included validation and revisions to an existing 10 percent design and development of updated pre-design documentation.
- Final design for process modifications and upgrades to increase plant capacity from 30 mgd to 42.5 mgd.
- Improvements include new influent screens, new primary clarifiers, new bioreactor basins, the retrofit of existing aeration basins for first stage bioreactor basins, the retrofit of existing secondary clarifiers for second stage bioreactor basins, new filters, new circular secondary clarifiers, and new chemical facilities.

Metropolitan Biosolids Center (MBC) Improvements

- Design engineer for upgrades to increase the treatment capacity of the City's central solids handling facility from an original design capacity of 0.89 mgd to a peak capacity of 4.2 mgd.
- Includes improvements to thickening centrifuges, centrifuge feed pumps, centrifuge polymer pumps, thickened sludge transfer pumps, the anaerobic digester mixing process, the biogas system, new sludge feed pumps, new centrate pumps, new ferrous chloride pumps, and site utility improvements.

North City Pure Water Facility

- Project partner in the design and delivery of a new 34 mgd advanced water treatment plant to produce purified water from tertiary treated effluent for reservoir augmentation.
- Treatment processes include ozone, biologically active carbon filtration, microfiltration, reverse osmosis, UV-AOP, and chemical treatment.

SEWERAGE COMMISSION-OROVILLE REGION MASTER PLAN AND FINANCIAL ASSISTANCE STUDY, Oroville, California

KEY TEAM MEMBERS

Ted Couch
Kevin Butcher

TYPE OF WORK

Project Management
Data Collection/Validation
Hydraulic Modeling
Process Modeling
Capacity Analysis
Regulatory Analysis
Alternatives Analysis
Master Planning
Process Design
Cost Estimating

DATES OF SERVICE

Start Date: 2017

End Date: Ongoing

PROJECT SIZE

$638,000 Master Plan and Schematic Design Fee

ATTORNEY INVOLVEMENT

None

CLIENT REFERENCE

Sewerage Commission-Oroville Region
Scott Koch
2880 South 5th Avenue
Oroville, CA 95965
530.594.0353
skoch@sc-or.org

The Sewerage Commission-Oroville Region (SC-OR) owns and operates a wastewater treatment plant that serves three-member agencies (Thermalito Irrigation District, Lake Oroville Area Public Utilities District, and the City of Oroville). SC-OR also owns and operates a small portion of the collection system that conveys the wastewater from the member agencies to the plant. The agency partnered with CH2M to update its 2009 Master Plan and evaluate potential improvements necessary for the plant to handle anticipated future flow and loading while also meeting expected future effluent limitations over a 20-year period. CH2M also evaluated connection fees and user fees necessary to fund improvements, and continued operation of the facilities.

Our team used a previously developed process model of the plant to confirm average dry weather and peak month capacity of the plant. In addition, we reviewed current flows, projected growth future flows and loads, historical population, and flow rate data for the service area considering economic constraints and requirements. Our staff reviewed effluent limitations and developed an anticipated future nitrogen limitation using past communications with the Regional Water Quality Control Board. Our staff also interviewed control board staff, engaged with CH2M personnel who had previously worked for the control board, and reviewed permits/regulations applied to similar local facilities. To assess the condition and capacity of the SC-OR facilities, we conducted site visits and considered historical recommendations, site staff preference, cost, operational complexity, regulatory compliance robustness, and safety when developing and screening alternatives for upgrades and improvements.

We developed a wastewater treatment process model using Pro2D, our proprietary treatment plant process modeling software. We modeled the entire treatment plant to address deficiencies in meeting future regulatory requirements, and created a new model incorporating proposed upgrades to confirm the upgrades would meet requirements. Our recommendations included changing from the current completely mixed and surface aerated basins to a baffled MLE system incorporating fine bubble diffused aeration. This system would allow for complete nitrification and partial denitrification necessary to address future regulatory requirements.

Our team developed a Class V cost estimate and one-phase and five-phase implementation options using CPES, our proprietary parametric cost estimating tool. We planned the implementation of new treatment processes and components to comply with future regulations. We submitted a final master plan and a financial assistance study report that included process modeling, influent flow rate analysis, future regulatory analysis, a process evaluation, and recommended upgrades. We also held workshops with the client to incorporate site staff insight and opinion. Based on the recommendations we made, we have seamlessly transitioned from the master planning stage and into schematic design of upgrades to the plant's odor control, UV disinfection, and tertiary filtration systems.

ELK RIVER WASTEWATER TREATMENT PLANT WET WEATHER IMPROVEMENTS PLAN, City of Eureka, California

KEY TEAM MEMBERS

Cory Lancaster
John Siczka

TYPE OF WORK

Project Management
Data Collection/Validation
Hydraulic Modeling
Process Modeling
Capacity Analysis
Alternatives Analysis
Facility Planning
Cost Estimating

DATES OF SERVICE

Start Date: 2016
End Date: 2017

PROJECT SIZE

$100,000 Subcontract Fee

ATTORNEY INVOLVEMENT

None

CLIENT REFERENCE

City of Eureka
Jesse Willor
City Engineer
531 K Street
Eureka, CA 95501
707.441.4194
jwillor@ci.eureka.ca.gov

CH2M conducted process simulations for the Elk River Wastewater Treatment Plant to evaluate alternatives for meeting new ammonia limits for the 4.3-mgd facility while accommodating extreme wet-weather events with a tidally restricted bay discharge. Treatment options included the Nerada granulation process and intensified nitrification treatment wetlands, both to complement existing overflow wetlands and storage ponds. Tasks included:

- Data acquisition and preliminary analysis
- Validation of the lateral repair plan's current and future influent conditions and regulations
- Analysis of the existing hydraulic and treatment capacity
- Identifying treatment alternatives
- Fatal flaw screening and non-monetary evaluation
- Cost analysis of preferred alternatives
- Implementation plan for selected treatment improvements

The plant adopted several of the short-term improvements recommended in the report, including chemically enhanced primary treatment to boost BNR in the trickling filters and increase the solids removal performance in the primary clarifiers and biogas production in the anaerobic digesters. The trickling filter recirculation rates were also increased to encourage greater nitrification rates in the trickling filters. The long-term solutions, which recommended a switch from trickling filters to aeration basins, introduced the plant to the concept of changing the secondary system to better control and achieve complete ammonia treatment. The options presented are under further study from the plant and form the basis of their long-term expansion planning to increase BNR performance.

MASTER PLAN FOR THE OLIVEHURST WASTEWATER TREATMENT PLANT, Olivehurst, California

KEY TEAM MEMBERS

Ted Couch
Kevin Butcher

TYPE OF WORK

Project Management
Data Collection/Validation
Process Modeling
Capacity Analysis
Alternatives Analysis
Master Planning
Cost Estimating

DATES OF SERVICE

Start Date: 2015
End Date: 2016

PROJECT SIZE

$163,000 Master Plan Fee

ATTORNEY INVOLVEMENT

None

CLIENT REFERENCE

City of Olivehurst
John Tillotson
General Manager
1970 9th Avenue / PO Box 670
Olivehurst, CA 95961
530.743.4657
jtillotson@opud.org

CH2M completed a master plan that provided information on future facilities required to meet growth projections at this wastewater treatment plant. We completed model runs using PRO2D, our proprietary whole plant simulation model, to verify the capacity of the existing plant infrastructure. We also modeled the solids process to evaluate proposed upgrades and to select the recommended implementation plan. The master plan outlined phased improvements that will incrementally increase plant capacity from 3.0 mgd to 5.625 mgd as growth is realized. One of the goals of the implementation plan was to mitigate power usage increases and maintain loads within the lower cost tier structure for as long as possible. The master plan included cost estimates for those future improvements were prepared and used to determine proposed capital connection fees.

HONOULIULI WWTP FACILITY PLAN AND DESIGN, Honolulu, Hawaii

KEY TEAM MEMBERS

Dale Gabel
Cory Lancaster

TYPE OF WORK

Project Management
Data Collection/Validation
Hydraulic Modeling
Process Modeling
Capacity Analysis
Regulatory Analysis
Alternatives Analysis
Facility Planning
Process Design
Cost Estimating

START DATE / COMPLETION DATE

Start Date: 2014

End Date: Ongoing

PROJECT SIZE

$450 Million Plant Upgrade

ATTORNEY INVOLVEMENT

None

CLIENT REFERENCE

City and County of Honolulu
Raj Rath, Project Manager
Mission Memorial Building
550 South King Street
Suite 102
Honolulu, HI 96813
808.768.8767
rrath@honolulu.gov

CH2M is a member of the team responsible for providing master planning and design services to upgrade the Honouliuli WWTP to meet the requirements of a USEPA mandated consent decree and increase the plant capacity to 45 mgd. The upgraded facility will use a treatment process that can readily be converted to meet future nutrient removal regulations. An upgraded biosolids facility and anaerobic digestion system will maximize biogas production (carbon diversion and pre-treatment). Utility costs on the island are extremely high, so achieving net energy neutrality was a key driver of the project.

CH2M conducted whole-plant process simulations that incorporated four implementation phases over a 25-year period for upgrading the existing 30-mgd primary treatment facility to secondary treatment and expanding for future conditions of 45 mgd. This work helped establish the basis of design for all solids handling process. We conducted alternatives analyses in consideration of thermal hydrolysis and struvite mitigation strategies. Comparisons include life-cycle cost assessments for the planning period of the project, and the impact on energy balance, solids production, and nutrient removal.

Key elements of the project include phased conversion of the existing tricking filters/solids contact biological treatment process to an activated sludge system that can be converted to a BNR system in the future when nutrient removal requirements are implemented and upgrading the solids processing facilities to a regional biosolids processing and drying facility to support five additional WWTPs and eliminate landfilling of treated biosolids. With extremely high utility costs on the island, achieving net energy neutrality is a key driver of the project. To support this objective, the design includes carbon diversion from the A-B process and thermal hydrolysis process (THP) pre-treatment prior to upgraded high-solids anaerobic digestion to maximize biogas production. All biogas will be fed to the new combined heat and power (CHP) facility to maximize electricity production with waste heat from the CHP facility used for direct drying of the biosolids in a low temperature belt dryer and for digester heating. A FOG waste receiving facility will also be constructed to support co-digestion and additional biogas production.

LAHAINA WASTEWATER RECLAMATION FACILITY MODIFICATIONS, PROCESS EVALUATION AND STAGE 1A FINAL DESIGN, Maui, Hawaii

KEY TEAM MEMBERS

John Simonds

TYPE OF WORK

Project Management
Data Collection/Validation
Hydraulic Modeling
Process Modeling
Capacity Analysis
Regulatory Analysis
Alternatives Analysis
Facility Planning
Process Design
Cost Estimating

START DATE / COMPLETION DATE

Start Date: 2007

End Date: Ongoing

PROJECT SIZE

$44 Million Plant Upgrade

ATTORNEY INVOLVEMENT

None

CLIENT REFERENCE

County of Maui
Juan Riviera, PE
2200 Main Street
Suite 610
Wailuku, Maui, HI 96793
808.270.7468
juan.rivera@co.maui.hi.us

The Lahaina Wastewater Reclamation Facility (WWRF) is one of three wastewater treatment and reclamation facilities owned and operated by the County of Maui. The plant consists of two major treatment process trains, generally referred to as the “1975 Plant” and the “1985 Plant” based on the approximate dates of construction. The 1975 Plant comprises the “original” activated sludge and related facilities, most of which are currently not in service. Major facilities added in the 1985 plant upgrade include a new oxidation ditch and two new secondary clarifiers. Further expansion and modifications were implemented in the early to mid-1990s, including additional aeration volume, a third secondary clarifier, effluent filters, and UV disinfection.

CH2M conducted a process evaluation of this facility in two major phases to develop a long-term process and capacity improvement “roadmap.” Phase 1 involved a review of existing facilities and information, setup and calibration of a steady-state process model, and preliminary screening of various process alternatives. Phase 2 involved a detailed development and evaluation of screened alternatives, including process and equipment sizing, hydraulic profiling, capital and operational cost estimation, and an analysis of non-cost factors.

Based on the Phase 2 evaluation, a preferred alternative was identified for upgrades that will improve the reliability of the facility at the rated 9-mgd design capacity, accommodate maintenance of individual process basins, meet current discharge permit limitations, and provide flexibility to adapt to possible future permit limits. Modifications include the integration of several new facilities – a headworks effluent flow splitting structure, step feed aeration basin with a new secondary clarifier, and a new RAS/WAS pump station.

GRESHAM WASTEWATER TREATMENT PLANT MASTER PLAN UPDATE, Gresham, Oregon

KEY TEAM MEMBERS

Dale Gabel
John Siczka
Matt Noesen
David Parry

TYPE OF WORK

Project Management
Data Collection/Validation
Hydraulic Modeling
Process Modeling
Capacity Analysis
Alternatives Analysis
Facility Planning
Cost Estimating

START DATE / COMPLETION DATE

Start Date: 2016
End Date: 2017

PROJECT SIZE

$205,000 Master Plan Fee

ATTORNEY INVOLVEMENT

None

CLIENT REFERENCE

City of Gresham
Alan Johnston
Senior Supervising Engineer
1333 NW Eastman Parkway
Gresham, OR 97030
503.618.3454
alan.johnston@greshamoregon.gov

The purpose of this master plan update was to build on previous planning efforts to identify additional studies and capital projects that need to be conducted and/or implemented at the WWTP in the next 5 years, while anticipating projected growth and regulatory requirements over the next 20 years. Specific work efforts included updating flow and load projections, developing a liquids treatment plan that has the flexibility to adapt to a variety of potential regulatory scenarios, evaluating alternatives for providing additional solids stabilization capacity, investigating how to achieve Class A biosolids, and assessing options for utilizing excess biogas and/or heat generated from the existing combined heat and power system. CH2M conducted all the worked performed under this contract.

CH2M also completed a study for the City that assessed the feasibility of receiving and feeding polar FOG and potential food waste feedstocks directly into the anaerobic digesters for co-digestion. The study included a market assessment of waste haulers in the region as well as a sampling characterization effort. The market survey was conducted to provide data regarding strength and availability of FOG and food waste. Site visits and telephone interviews were conducted with FOG pumpers, restaurants, and food processors. Sampling was conducted to validate assumptions about the quantity and strength of FOG available in the Portland metropolitan area. Using the data collected during the market study and FOG characterization study, an economic model was developed. CH2M concluded that the project was feasible, and that the City should proceed with the project in phases – a pilot receiving station in Phase 1 and a full-scale system with cogen improvements in Phase 2.

METROPOLITAN WASTEWATER MANAGEMENT COMMISSION FACILITIES PLAN UPDATES, Eugene/Springfield, Oregon

KEY TEAM MEMBERS

Dale Gabel
Matt Noesen

TYPE OF WORK

Project Management
Data Collection/Validation
Hydraulic Modeling
Process Modeling
Capacity Analysis
Alternatives Analysis
Facility Planning
Cost Estimating

START DATE / COMPLETION DATE

Start Date: 2013
End Date: 2015

PROJECT SIZE

$361,000 Master Plan Fee
$200 Million Capital Improvement Plan

ATTORNEY INVOLVEMENT

None

CLIENT REFERENCE

Metropolitan Wastewater Management Commission
Josh Newman, Supervising Civil Engineer
225 Fifth Street
Springfield, OR 97477
541.744.4154
jnewman@springfield-or.gov

CH2M developed this comprehensive 20-year facilities plan for wastewater services in the Eugene/Springfield metropolitan area. The document provided updates to the facilities plan initially prepared by our team in 2005. Highlights of the plan included an innovative approach addressing peak wet weather flows by operating the primary and secondary unit processes in parallel, selecting projects that maximize the use of existing facilities to reduce capital investment, and developing effluent reuse to address multiple water quality and community benefits including addressing Willamette River temperature issues.

For the Eugene facility, a workshop approach was used to update flows and loads while accounting for growth variability; review future regulations; update the wet weather flow management strategy; develop a capacity, management, operation, and maintenance (CMOM) program; and assess unit process capacity/performance so that the CIP phasing could be revised as necessary. Work included a capacity assessment using a process model focused on anaerobic digestion to refine when a fourth digester would need to be placed online.

For the Springfield facility, a digester gas utilization study was performed to screen alternatives including offsite sale of gas, upgrading the existing cogeneration system to convert more gas to electricity, and converting gas to heat for drying biosolids. A key focus of the project was determining the best options for long-term utilization of the WWTP's biogas and whether to upgrade or replace the existing 800kW internal combustion engine and other key components of the cogeneration system, which were nearing their end of their service lives. We analyzed a broad range of the potential options including increasing digester gas production and various digester gas cleaning systems. Biogas utilization options included expanded cogeneration, cleaning up the biogas for use by vehicles or injecting into a natural gas pipeline, and selling the biogas to a local industry. The study recommended installation of a larger internal combustion engine.

NELSON WASTEWATER TREATMENT COMPLEX, LIQUIDS AND BIOSOLIDS MASTER PLAN, Mission, Kansas

KEY TEAM MEMBERS

Dale Gabel
John Siczka
Dave Parry

TYPE OF WORK

Project Management
Data Collection/Validation
Hydraulic Modeling
Process Modeling
Capacity Analysis
Alternatives Analysis
Facility Planning
Cost Estimating

START DATE / COMPLETION DATE

Start Date: 2017
End Date: Ongoing

PROJECT SIZE

$392,000 Master Plan Fee

ATTORNEY INVOLVEMENT

None

CLIENT REFERENCE

Johnson County Wastewater
Dan Ott, Project Manager
4800 Nall, Suite 2500
Mission, KS 66202
913.715.8544
dan.ott@jcw.org

The Myron K. Nelson Wastewater Treatment Complex (Nelson Complex) consists of two separate, but co-located treatment plants. Following physical and biological treatment, the effluents from the two plants are combined prior to receiving disinfection through a UV disinfection system. The Liquids Master Plan study evaluated the technical and financial feasibility of incorporating nutrient removal into the 15-mgd Nelson Complex.

Alternates were evaluated based the triple bottom line of environmental, societal, and economic sustainability criteria. Eight different treatment approaches were compared using whole-plant computer process models that incorporated nitrogen and phosphorus nutrient removal technologies. The project team identified the advantages, disadvantages, carbon footprints, and costs (capital, operating, and life-cycle) of the different treatment scenarios to meet three different nutrient goal levels that were established by the State of Kansas. Working with the client, the project team recommended preferred treatment scenarios to meet each of the three goal levels and completed business case analyses of the preferred scenarios.

For the Biosolids Management Plan, the team evaluated upgrades to the solids handling systems including anaerobic digestion and dewatering, effective management of trucked in TWAS, possible inclusion of a FOG waste receiving station, and beneficial use of digester gas.

Fee Proposal

4 | Fee Proposal

Compensation

An explanation of our technical approach and services is included in Section 1 of this proposal. Our rate schedule is detailed below, as well as our proposed fee:

CH2M HILL 2019 Rate Schedule / Hourly Billing Rates for Professionals and Technicians*		
Classification	**Representative Staff**	**Rate Range**
Senior Technologist/Sr. Project Manager	Glenn Daigger, Dale Gabel	$280
Engineer Specialist*/Project Manager	Cory Lancaster, Brad Memeo	$195 to $240
Project Engineer*	Jenny Reina, Ted Couch	$155 to $190
Associate Engineer*	Keving Butcher, Celest Brandt	$130 to $145
Staff Engineer*	Pratyusha Reddy Reddy, Cathy Ferrarese	$100 to $110
Office/Clerical/Accounting	Nancy Horrick, Susan Stultz	$90 to $105

Notes:

1. Rate Schedule subject to annual revision to reflect current rates.

*Includes engineering, consulting, planner, and scientist disciplines

CH2M HILL Proposed Fee Estimate		
Task	**Description**	**Budget**
1	Project Management	$35,000
2	Review Background Data and Information	$72,000
3	Develop Hydraulic Model of WRP	$24,000
4	Conduct Evaluation of WRP Capacities	$19,000
5	Develop BioWin Model of Liquids and Solids Treatment Plant Process	$43,000
6	Conduct Evaluation of WRP Process	$43,000
7	Develop Model of the TRI	$17,000
8	Conduct Evaluation of TRI Capacities	$13,000
9	Identify Recommendations	$175,000
10	Develop Cost Estimates for WRP and TRI Improvements	$30,000
11	Develop WRP and TRI Evaluation Report and Presentation	$79,000
	TOTAL	$550,000

CH2M will deliver to the Agency monthly status reports with monthly invoices. Compensation by Agency to CH2M for services rendered will be based on a cost-reimbursable multiplier (time and expenses) consisting of CH2M raw labor costs multiplied by a factor of 3.0 plus direct expenses, plus a charge of 5 percent for direct expenses.

Direct Expenses are those necessary costs and charges incurred for the Project including, but not limited to: (1) the direct costs of transportation, meals and lodging, mail, subcontracts, and outside services; special Agency-approved Project-specific insurance, letters of credit, bonds, and equipment and supplies; (2) Consultant's current standard rate charges for direct use of Consultant's vehicles, computing systems, laboratory test and analysis, word processing, printing and reproduction services, and certain field equipment; and (3) Consultant's standard project charges for special health and safety requirements of Occupational Safety and Health Administration (OSHA) and telecommunications services. Consultant's current standard rates for direct expenses shall be used. These rates are subject to change following internal audits and reviews.

It is recognized that actual costs required to complete the work may vary from the estimate provided due to additional or unforeseen requirements. Consultant will provide periodic progress reports to the Agency and the scope and/or fee will be adjusted as necessary to complete the work required. The authorized budgetary fee estimate amount will not be exceeded without prior authorization from the Agency's Board of Directors.

When any budget has been increased, Consultant's excess costs expended prior to such increase will be allowable to the same extent as if such costs had been incurred after the approved increase.

Our policy for billing and payment for services is based on the Agreement dated June 14, 1995, including subsequent Amendments dated December 11, 2002, March 25, 2003, January 1, 2009, and January 1, 2014, between T-TSA and CH2M HILL, Inc. which may be amended during contract negotiations.

Insurance Coverage

5 | Insurance Coverage

CH2M maintains the following insurance coverage:

- General Liability: $1,000,000
- Automobile Liability: $1,000,000
- Professional Liability: $1,000,000

We have attached a copy of our certificate of insurance.

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 12/04/2018

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER LIC #0437153 1-212-948-1306 Marsh Risk & Insurance Services CIRTS_Support@jacobs.com 633 W. Fifth Street Los Angeles, CA 90071	CONTACT NAME: PHONE (A/C, No, Ext): FAX (A/C, No): 1-212-948-1306 E-MAIL ADDRESS:
INSURED CH2M Hill, Inc. 9191 South Jamaica Street Englewood , CO 80112-5946	INSURER(S) AFFORDING COVERAGE — NAIC # INSURER A : ACE AMER INS CO — 22667 INSURER B : INSURER C : INSURER D : INSURER E : INSURER F :

COVERAGES **CERTIFICATE NUMBER:** 54696279 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY			HDO G71096750	07/01/18	07/01/19	EACH OCCURRENCE	$ 1,000,000
	CLAIMS-MADE X OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 500,000
	X CONTRACTUAL LIABILITY						MED EXP (Any one person)	$ 5,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						PERSONAL & ADV INJURY	$ 1,000,000
	POLICY PRO-JECT LOC						GENERAL AGGREGATE	$ 1,000,000
	OTHER:						PRODUCTS - COMP/OP AGG	$ 1,000,000
								$
A	AUTOMOBILE LIABILITY			ISA H25158684	07/01/18	07/01/19	COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
	X ANY AUTO						BODILY INJURY (Per person)	$
	OWNED AUTOS ONLY / SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	HIRED AUTOS ONLY / NON-OWNED AUTOS ONLY						PROPERTY DAMAGE (Per accident)	$
								$
	UMBRELLA LIAB OCCUR						EACH OCCURRENCE	$
	EXCESS LIAB CLAIMS-MADE						AGGREGATE	$
	DED RETENTION $							$
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY			WLR C6479033A (AOS)	07/01/18	07/01/19	X PER STATUTE OTH-ER	
A	ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y / N: N	N / A		WCU C64789533 (LA, OH, TX)	07/01/18	07/01/19	E.L. EACH ACCIDENT	$ 1,000,000
A	(Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below			SCF C64789570 (WI)	07/01/18	07/01/19	E.L. DISEASE - EA EMPLOYEE	$ 1,000,000
							E.L. DISEASE - POLICY LIMIT	$ 1,000,000
A	PROFESSIONAL LIABILITY "CLAIMS MADE"			EON G21655065 009	07/01/18	07/01/19	PER CLAIM/PER AGG AGGREGATE DEFENSE INCLUDED	1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

RE: Master Services Agreement - First Signed June 14, 1995. CONTRACT END DATE: 12/31/2018. SECTOR: Public. *$2,250,000 SIR FOR STATES OF: LA, OH, TX. Tahoe-Truckee Sanitation Agency, its directors, officers, employees and agents are added as an additional insured for general liability & auto liability as respects the negligence of the insured in the performance of insured's services to cert holder under contract for captioned work. Coverage is primary and certificate holder's insurance is excess and non-contributory. Waiver of subrogation is hereby granted in favor of Tahoe-Truckee Sanitation Agency, its directors, officers, employees and agents for WC. General Liability coverage includes the severability of interests/Cross Suits Liability provision in favor of the holder. *THE TERMS, CONDITIONS,

CERTIFICATE HOLDER	CANCELLATION
Tahoe-Truckee Sanitation Agency 13720 Joerger Drive Truckee, CA 96161 USA	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE

Brad Memeo, PE, Project Manager
2525 Airpark Drive
Redding, CA 96001
(530) 229-3430
Brad.Memeo@Jacobs.com

0064100000bYN6JAAW

TAHOE-TRUCKEE SANITATION AGENCY

MEMORANDUM

Date: January 16, 2019

To: Board of Directors

From: Jay Parker, Engineering Manager

Item: VI-4

Subject: Approval to advertise and solicit bids for the Administration Building Office Remodel project

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Background

The Administration Building Office Remodel project provides additional office space adjacent to the Agency's reception area. The reception area would be reduced in size and the existing storage space immediately adjacent to it would be expanded and converted into an office. As reflected in the attached contract drawings, the remodeling plan includes modifications to the architectural, structural, electrical, and telecommunication features of the existing space. This remodeling work would be performed by a general contractor.

In addition to the work described above, T-TSA will be installing a number of improvements, modifications, and additions to various facilities to improve accessibility for the disabled. This work is shown on the attached ADA Compliance Map.

The project field work is scheduled to occur between June 3, 2019 and August 2, 2019.

Fiscal Impact

The engineer's construction cost estimate for the project is $60,000.

Attachments

Contract drawings and ADA Compliance Map.

Recommendation

Management and staff recommends approval to advertise and solicit bids for the Administration Building Office Remodel project.

Review Tracking

Submitted By: _____
Jay Parker
Engineering Manager

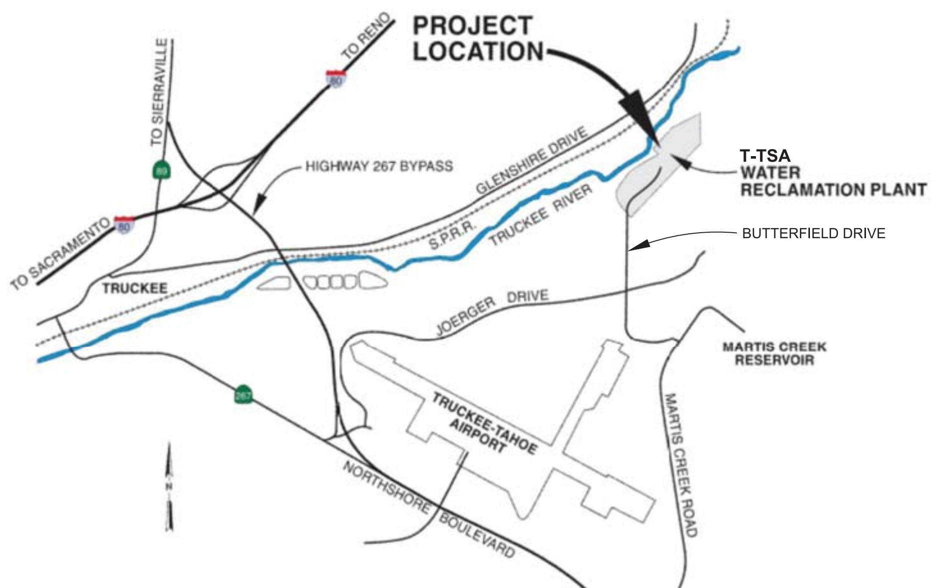
Approved By: _____
LaRue Griffin
General Manager

TAHOE-TRUCKEE SANITATION AGENCY

Tahoe-Truckee Sanitation Agency

REGIONAL WATER RECLAMATION PLANT

ADMINISTRATION BUILDING OFFICE REMODEL



LOCATION MAP
TRUCKEE, CALIFORNIA

INDEX TO DRAWINGS

SHEET	DRAWING	TITLE
1	01-G-0001	COVER SHEET, LOCATION MAP AND INDEX TO DRAWINGS
2	01-G-0002	GENERAL LEGEND
3	01-D-1101	DEMOLITION FLOOR PLAN AND REFLECTED CEILING PLAN
4	01-A-1101	FLOOR PLAN AND REFLECTED CEILING PLAN
5	01-A-2001	FURNITURE PLAN, INTERIOR ELEVATIONS, AND DETAILS
6	01-A-3001	SCHEDULES AND DETAILS
7	01-E-1101	ELECTRICAL PLAN

APPROVED: ______________________________

LARUE GRIFFIN, GENERAL MANAGER
TAHOE-TRUCKEE SANITATION AGENCY
13720 BUTTERFIELD DRIVE
TRUCKEE, CALIFORNIA 96161

JUNE 2018 - BID SET

DIGITALLY SIGNED ON 06/12/2018

NO.	DATE	REVISION	BY	APVD

DSGN B MEMEO | DR C MCCOY | CHK G KIRSTEN | APVD B MEMEO

ch2m:
2525 AIRPARK DRIVE
REDDING, CA 96001
(530) 243-5831

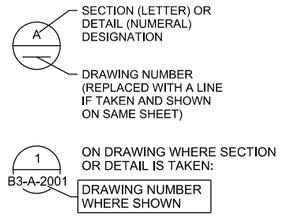
ADMINISTRATION BUILDING OFFICE REMODEL
TRUCKEE, CALIFORNIA
TAHOE-TRUCKEE SANITATION AGENCY

GENERAL
COVER SHEET, LOCATION MAP AND INDEX TO DRAWINGS

AS SHOWN
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JUNE 2018
PROJ	133841
DWG	01-G-0001
SHEET	1 of 7

SECTION / DETAIL DESIGNATIONS



DESIGN DETAIL DESIGNATION

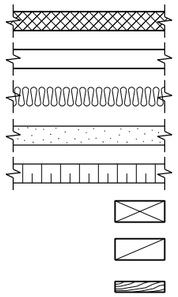
NOTES:

1. ALL DESIGN DETAILS ARE TYPICAL AND MUST BE USED IF DESIGN DETAIL DESIGNATION IS NOT SHOWN.
2. THE TERM STANDARD DETAIL, OR A FORM OF IT, IS SYNOMONOUS WITH DESIGN DETAIL. THE DESIGN DETAILS REPRESENT THE CHARACTER AND NATURE OF THE WORK REQUIRED THROUGHOUT THE PROJECT. ALL ASSOCIATED WORK SHALL BE IN ACCORDANCE WITH THE DESIGN DETAILS SHOWN WHETHER THE DETAILS ARE SPECIFICALLY REFERENCED OR NOT.

GENERAL ARCHITECTURAL NOTES

1. UNLESS OTHERWISE INDICATED, PLAN DIMENSIONS ARE TO NOMINAL SURFACE OF MASONRY, FACE OF STUD WALLS.
2. "FLOOR LINE" REFERS TO TOP ON CONCRETE SLABS. FINISH FLOORING IS INSTALLED ABOVE THE FLOOR LINE.
3. REPETITIVE FEATURES ARE NOT DRAWN IN THEIR ENTIRETY AND SHALL BE COMPLETELY PROVIDED AS IF DRAWN IN FULL.
4. AT WALLS WITH SOUND ATTENUATION BLANKETS, SEAL BOTH SIDES WITH ACOUSTIC SEALANT; TOP, BOTTOM,INTERSECTION, RELIGHT FRAMES, AND OTHER PENETRATIONS.
5. VERIFY ALL ROUGH-IN DIMENSIONS FOR EQUIPMENT PROVIDED IN THIS CONTRACT, OR BY OTHERS.
6. REFER TO ARCHITECTURAL, ELECTRICAL AND OTHER CATEGORIES OR DRAWINGS FOR ADDITIONAL NOTES.
7. VERIFY SIZE AND LOCATION OF, AND PROVIDE REQUIRED OPENINGS THROUGH FLOORS AND WALLS, FURRING, ANCHORS AND INSERTS. PROVIDE ALL BASES AND BLOCKING REQUIRED FOR ACCESSORIES, ELECTRICAL AND OTHER EQUIPMENT.

ARCHITECTURAL / STRUCTURAL MATERIAL SYMBOLS



ARCHITECTURAL LEGEND

SYMBOL	LEGEND
ROOM NAME 101	ROOM IDENTIFIER
R-1	RELIGHT IDENTIFIER
A	WALL TYPE

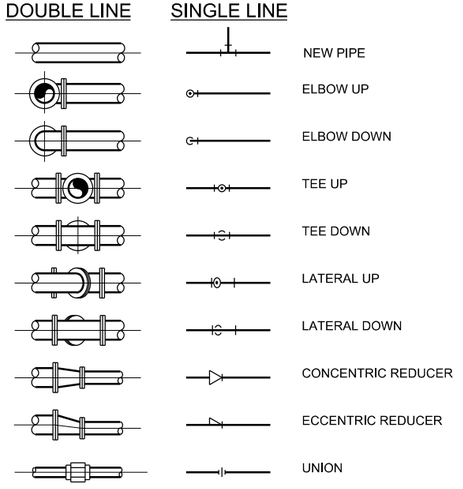
CODE DATA

BUILDING CODE:	2016 CALIFORNIA BUILDING CODE
FACILITY:	OPERATIONS BUILDING
DESCRIPTION OF WORK:	
	INTERIOR ALTERATION - NEW OFFICE ADDED BY EXPANDING STORAGE SPACE WITH NO CHANGE TO OCCUPANCY OR EGRESS.

ABBREVIATIONS

ACT	ACOUSTICAL TILE
APVD	APPROVED
ARWB	ABUSE RESISTANT WALL BAORD
CHK	CHECKED
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
COL	COLOR
CONC	CONCRETE
CPT	CARPET
CT	CERAMIC TILE
DR	DRAWN
DWG	DRAWING
EQ	EQUAL
EXST	EXISTING
GAVL	GALVANIZED
GWB	GYPSUM WALL BOARD
HGT	HEIGHT
HM	HOLLOW METAL
MATL	MATERIAL
MO	MASONRY OPENING
NO.	NUMBER
NTS	NOT TO SCALE
PROJ	PROJECT
RO	ROUGH OPENING
TYP	TYPICAL

HEATING, VENTILATING, AND AIR CONDITIONING PIPE AND FITTING SYMBOLS



NOTES:

1. ONLY FLANGED FITTINGS ARE SHOWN FOR DOUBLE LINE PIPING. FITTINGS WITH OTHER END PATTERNS ARE SIMILAR.
2. EXISTING PIPING AND EQUIPMENT ARE SHOWN LIGHT LINED AND/OR SCREENED AND IS NOTED AS EXISTING. NEW PIPING AND EQUIPMENT ARE SHOWN HEAVY-LINED.-

HVAC EQUIPMENT IDENTIFICATION

AC	AIR CONDITIONING UNIT
CU	AIR-COOLED CONDENSING UNIT

FLOW STREAM IDENTIFICATION

IDENTIFICATION	SERVICE
CD	CONDENSATE DRAIN
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION

HEATING, VENTILATING, AND AIR CONDITIONING SYMBOLS

T	ROOM TEMPERATURE SENSOR
(200)	200 SCFM

ELECTRICAL PLAN

	CONNECTION POINT TO EQUIPMENT SPECIFIED. RACEWAY, CONDUCTOR,TERMINATION AND CONNECTION IN THIS DIVISION.
	PANELBOARD - SURFACE MOUNTED
	PANELBOARD - FLUSH MOUNTED
LPXXA	HOME RUN - DESTINATION SHOWN
or G	EXPOSED CONDUIT AND CONDUCTORS*
- - - - or G	CONCEALED CONDUIT AND CONDUCTORS*

NOTE:
ALL UNMARKED CONDUIT RUNS CONSIST OF TWO NO. 12, ONE NO. 12 GROUND CONDUCTORS IN 3/4" CONDUIT. RUNS MARKED WITH CROSSHATCHES INDICATE NUMBER OF NO. 12 CONDUCTORS. CROSSHATCH WITH SUBSCRIPT "G" INDICATES GREEN GROUND WIRE.

	CONDUIT DOWN
	CONDUIT UP
	CONDUIT, STUBBED AND CAPPED
J	JUNCTION BOX
	DATA OR TELEPHONE OUTLET BOX
30	NONFUSED DISCONNECT SWITCH, CURRENT RATING INDICATED, 3 POLE
XX 2	CONVENIENCE RECEPTACLE - DUPLEX UNLESS NOTED OTHERWISE WP - WEATHERPROOF TL - TWIST LOCK GFCI - GROUND FAULT CIRCUIT INTERRUPTER SUBSCRIPT NUMBER AT RECEPTACLE INDICATES CIRCUIT
L20R 20	RECEPTACLE, SPECIAL PURPOSE-NEMA CONFIGURATION AND AMPERAGE INDICATED
1	LUMINAIRE
$a or 2a	SMALL LETTER SUBSCRIPT AT SWITCH AND LUMINAIRE INDICATES SWITCHING. SUBSCRIPT NUMBER AT LUMINAIRE INDICATES CIRCUIT
$3	WALL SWITCH: 2- DOUBLE POLE 3- THREE WAY 4- FOUR WAY WP- WEATHERPROOF D- DIMMER OC- OCCUPANCY SENSOR

DIGITALLY SIGNED ON 11/29/2018

PROFESSIONAL ENGINEER WILLIAM KURT KOLLMAN No. E016211 ELECTRICAL STATE OF CALIFORNIA

NO.	DATE	REVISION	DR	CHK	BY
DSGN	G KIRSTEN	M COLLINS	S PAYNE	APVD	APVD

B MEMEO

2525 AIRPARK DRIVE
REDDING, CA 96001
(530) 243-5831

ADMINISTRATION BUILDING OFFICE REMODEL

TRUCKEE, CALIFORNIA

TAHOE-TRUCKEE SANITATION AGENCY

ch2m

GENERAL

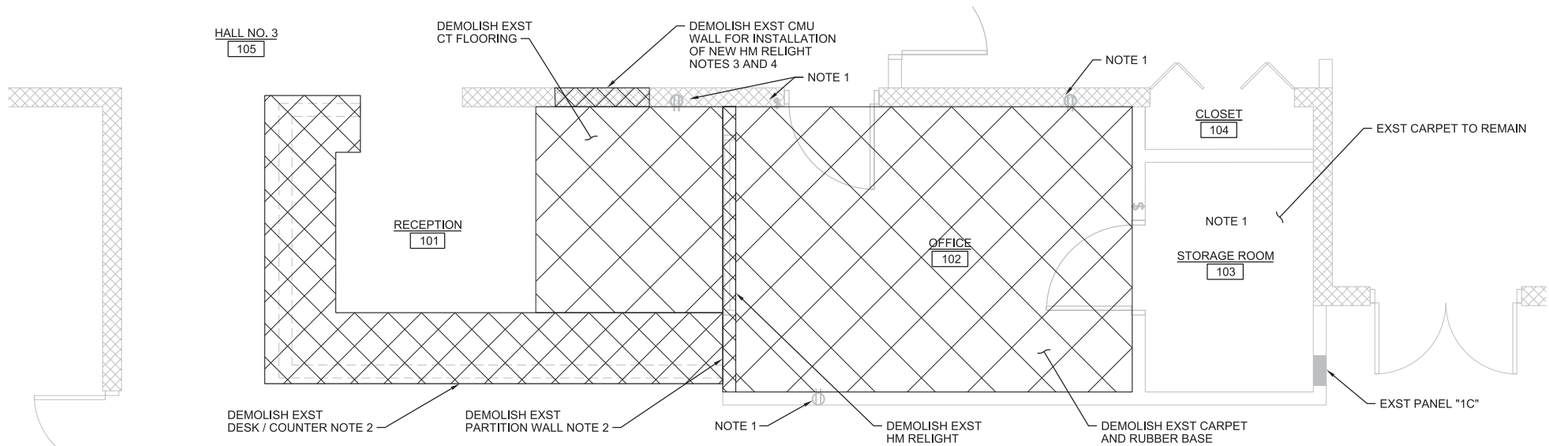
GENERAL LEGEND

AS SHOWN

VERIFY SCALE

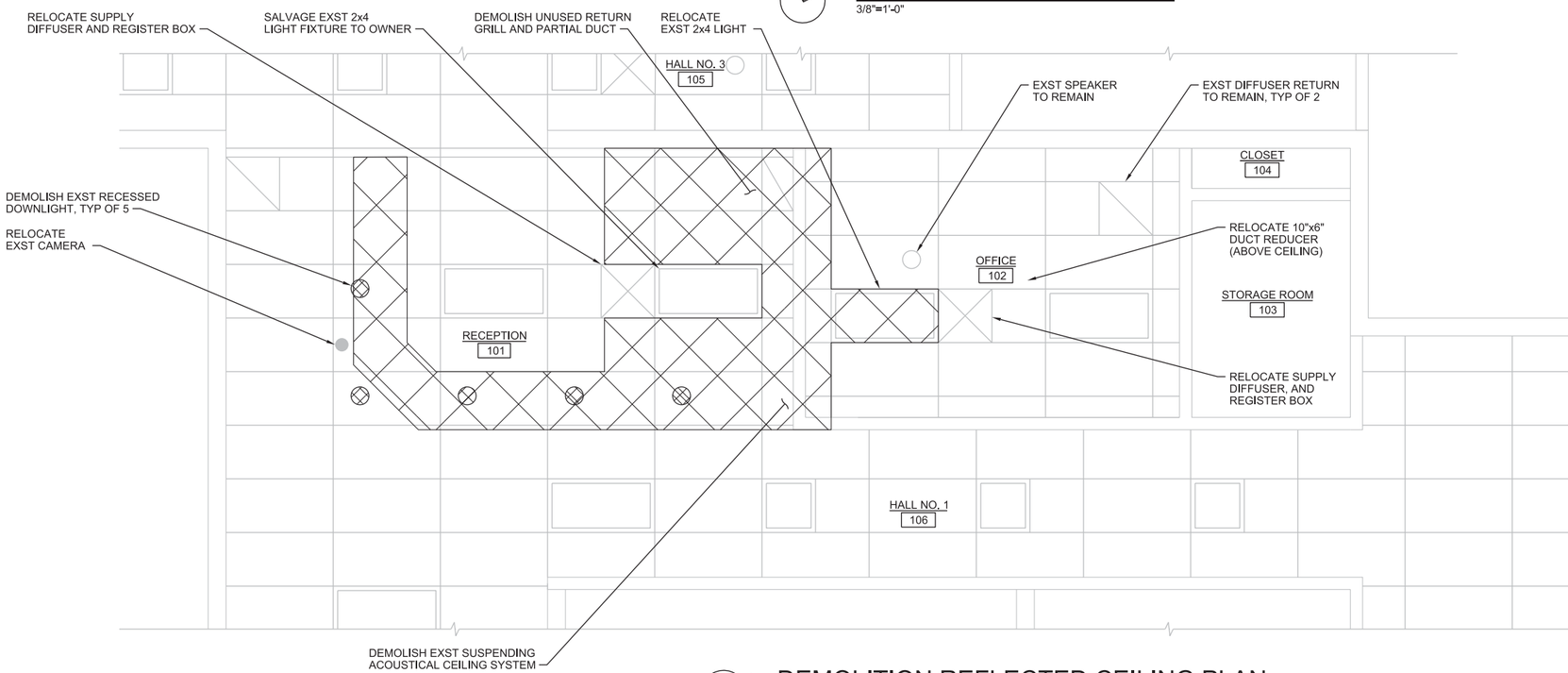
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JUNE 2018
PROJ	133841
DWG	01-G-0002
SHEET	2 of 7



DEMOLITION FLOOR PLAN

3/8"=1'-0"



DEMOLITION REFLECTED CEILING PLAN

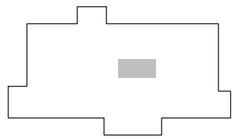
3/8"=1'-0"

EXISTING REFLECTED CEILING PLAN LEGEND

- EXISTING SUSPENDED 2'X4' ACOUSTICAL TILE CEILING SYSTEM
- EXISTING WALL
- EXISTING RECESSED DOWNLIGHT
- EXISTING RECESSED LUMINAIRE,
- EXISTING EXHAUST, RETURN AIR OR TRANSFER GRILLE
- EXISTING SUPPLY AIR GRILLE OR CEILING DIFFUSER

SHEET NOTES

1. EXISTING LIGHT FIXTURES, LIGHT SWITCHES, AND RECEPTACLES TO REMAIN, UNLESS NOTED OTHERWISE.
2. DISCONNECT POWER AND DATA CABLES FROM THE DESK / COUNTER AND WALL. PULL BACK INTO THE CEILING SPACE OR TO THE REMAINING WALL. IDENTIFY POWER CIRCUITS FOR FUTURE USE. PRESERVE AND PROTECT WIRING AND CABLES.
3. ACCORDING TO THE ORIGINAL DRAWINGS, THE EXISTING CMU WALLS ARE SOLID GROUT FILL.
4. THE WALL REINFORCING IN THE VICINITY OF THE NEW WALL CONSISTS OF #4 BARS @ 32" HORIZONTAL AND #5 BARS @ 24" VERTICAL.



KEY PLAN

DIGITALLY SIGNED
ON 06/12/2018

LICENSED ARCHITECT
GEOFFREY B. KIRSTEN
C-33068
REN. 10-31-19
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
RANDALL C. MARK
CIVIL
53004
STRUCTURAL
STATE OF CALIFORNIA

NO.	DATE	REVISION	CHK	APVD
DSGN	M RANDAL G KIRSTEN	M COLLINS	DR	B TAVERNA	APVD	BY	APVD
							B MEMEO

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ADMINISTRATION BUILDING OFFICE REMODEL
TRUCKEE, CALIFORNIA
TAHOE-TRUCKEE SANITATION AGENCY

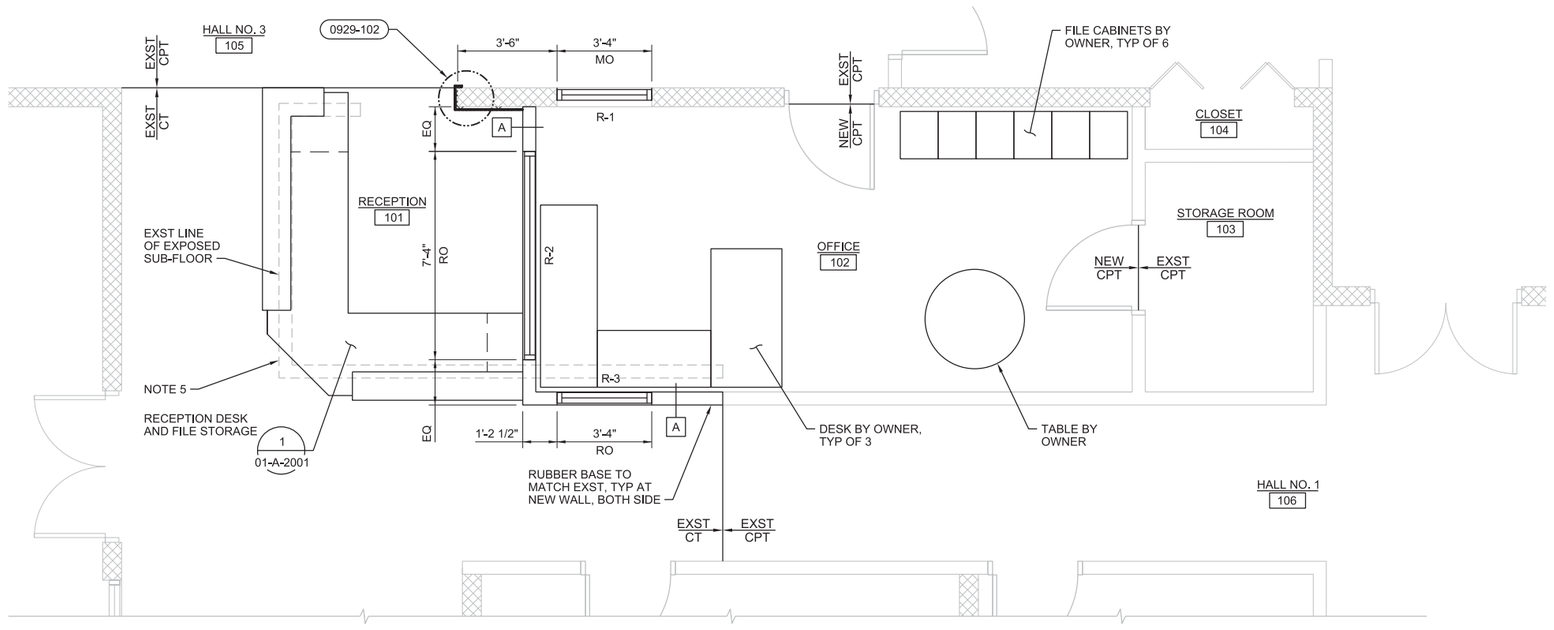
ch2m.

DEMOLITION

DEMOLITION FLOOR PLAN AND REFLECTED CEILING PLAN

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

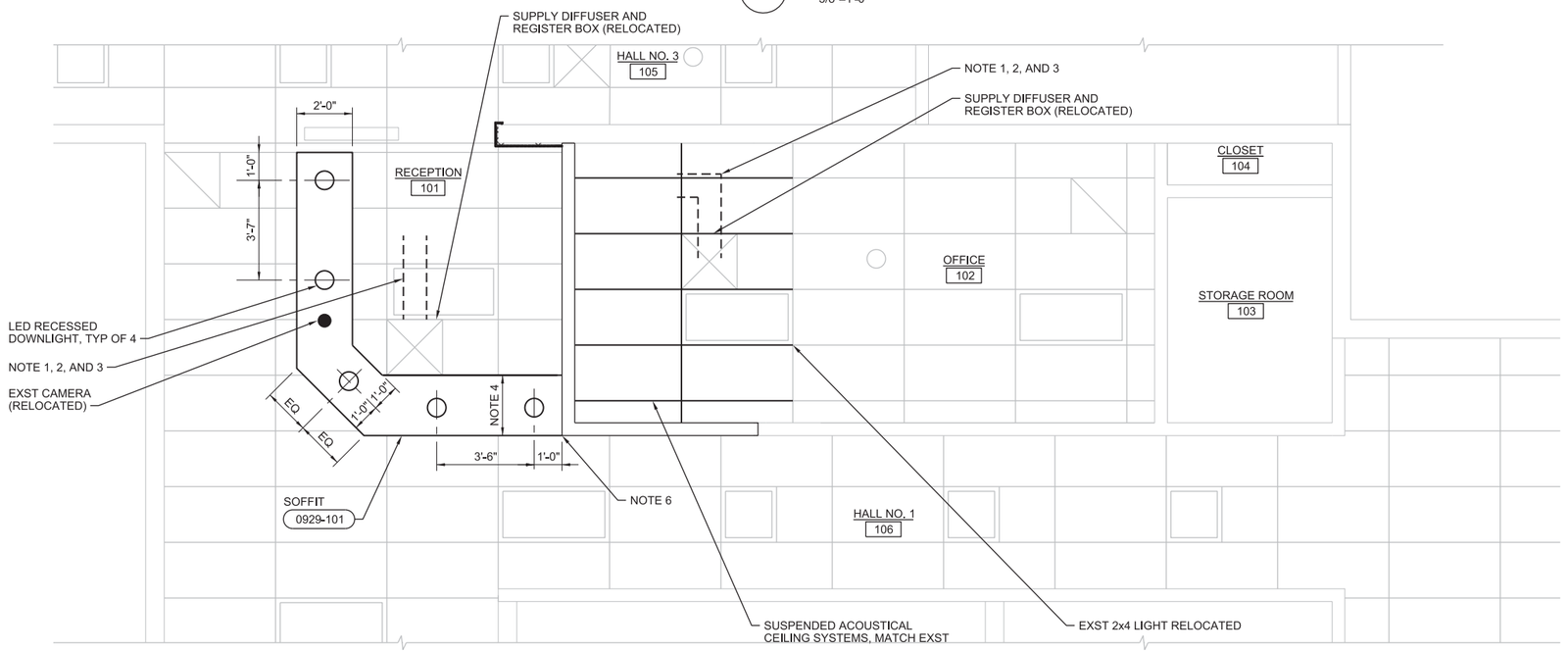
DATE	JUNE 2018
PROJ	133841
DWG	01-D-1101
SHEET	3 of 7



N

FLOOR PLAN

3/8"=1'-0"



N

REFLECTED CEILING PLAN

3/8"=1'-0"

REFLECTED CEILING PLAN LEGEND

- SUSPENDED 2'X4' ACOUSTICAL TILE CEILING SYSTEM
- INTERIOR METAL FRAMED WALLS WITH GWB, EXTEND STUDS TO 6" ABOVE SUSPENDED CEILING AND BRACE TO STRUCTURE
- RECESSED DOWNLIGHT OR SURFACE MOUNTED PENDANT, SEE ELECTRICAL DRAWINGS
- RECESSED LUMINAIRE, SEE ELECTRICAL DRAWINGS
- EXHAUST, RETURN AIR OR TRANSFER GRILLE
- SUPPLY AIR GRILLE OR CEILING DIFFUSER

SHEET NOTES

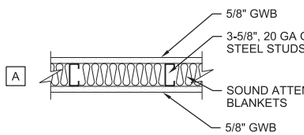
1. CONNECT EXISTING 10" ROUND SUPPLY DUCT TO RELOCATED SUPPLY REGISTER BOX. UTILIZE 10"x8" REDUCER TO MAKE TRANSITION TO ROUND 8" REGISTER BOX.
2. MATERIALS OF CONSTRUCTION SHALL CONSIST OF COMMERCIAL GRADE PRODUCTS AND CONFORM TO THE FOLLOWING:

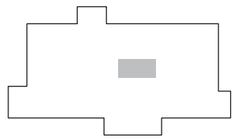
   FLEXIBLE DUCT: UL 181 CLASS 1, NFPA 90A AND NFPA 90B, FIRE RETARDANT REINFORCED METALIZED VAPOR BARRIER OUTER JACKET, TRI-LAMINATE INNER LINER, GALVANIZED STEEL WIRE HELIX REINFORCING, MINIMUM INSULATION VALUE OF R-6, MINIMUM WORKING PRESSURE OF 4-INCH WATER COLUMN.

   ELBOWS: SHALL BE IN ACCORDANCE WITH SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION (SMACNA) MANUAL STANDARDS, SHALL BE SEGMENTED OR PLEATED.

   HANGERS AND SUPPORTS: SHALL BE IN ACCORDANCE WITH SMACNA MANUAL.
3. CONNECTIONS SHALL BE MADE PER MANUFACTURER'S RECOMMENDATIONS.
4. SOFFIT DIMENSION TO EXTEND FROM CORNER OF WALL AND EXISTING CEILING GRID. (APPROXIMATELY 2'-3")
5. PATCH FLOOR WITH TILE TO MATCH EXISTING.
6. PROVIDE VERTICAL CONTROL JOINT WHERE SOFFIT ABUTS FULL HEIGHT WALL

WALL TYPES





KEY PLAN

DIGITALLY SIGNED ON 06/12/2018

LICENSED ARCHITECT GEOFFREY B. KIRSTEN C-33068 REN. 10-31-19 STATE OF CALIFORNIA

NO.	DATE	REVISION	CHK	APVD
DSGN	G KIRSTEN	M COLLINS	DR	B TAVERNA
			BY	APVD
		B MEMEO		

ch2m

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ADMINISTRATION BUILDING OFFICE REMODEL

TRUCKEE, CALIFORNIA

TAHOE-TRUCKEE SANITATION AGENCY

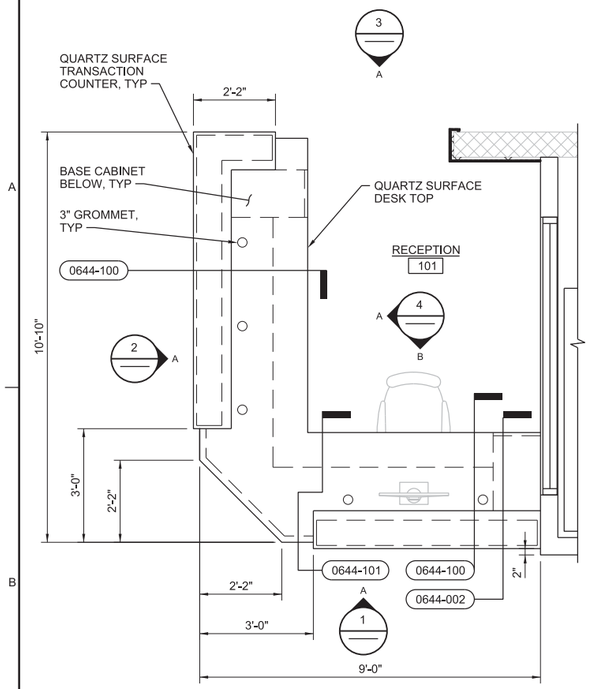
ARCHITECTURAL

FLOOR PLAN
AND REFLECTED CEILING PLAN

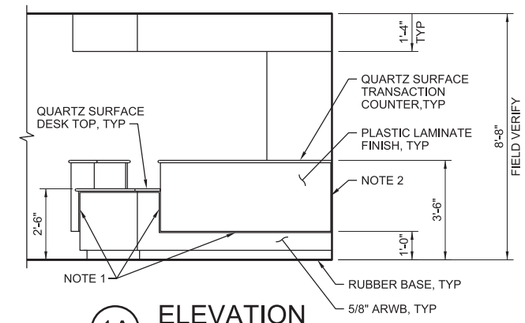
VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

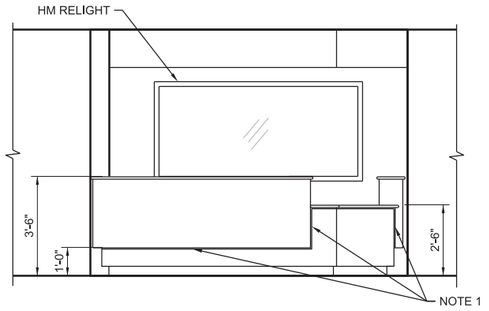
DATE	JUNE 2018
PROJ	133841
DWG	01-A-1101
SHEET	4 of 7



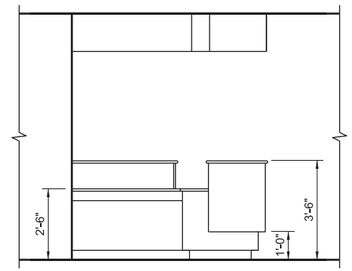
1 FURNITURE PLAN
1/2"=1'-0"
01-A-1101



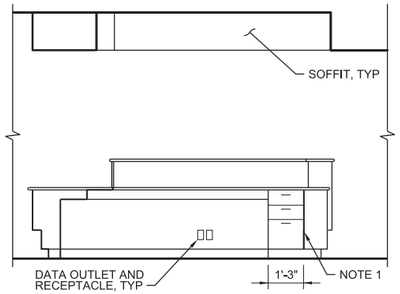
1A ELEVATION
3/8"=1'-0"



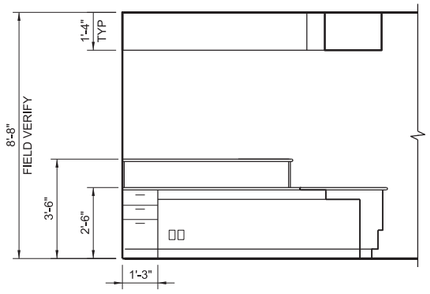
2A ELEVATION
3/8"=1'-0"



3A ELEVATION
3/8"=1'-0"



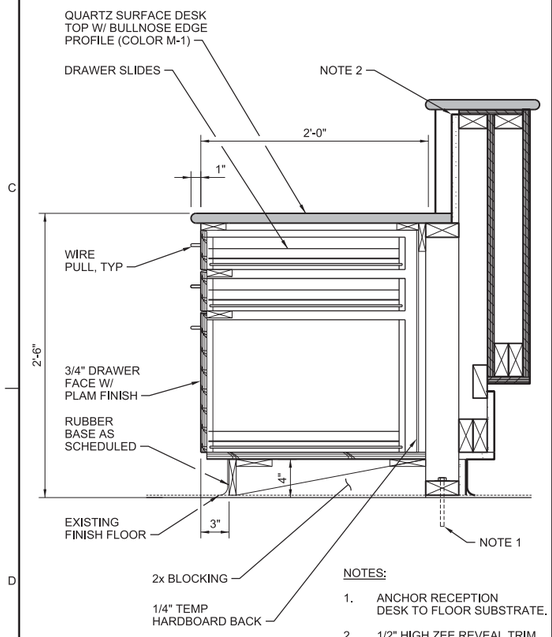
4A ELEVATION
3/8"=1'-0"



4B ELEVATION
3/8"=1'-0"

NOTES:

1. WHERE ARWB ABUTS PLASTIC LAMINATE PROVIDE 1/2" ZEE REVEAL TRIM.
2. WHERE PLASTIC LAMINATE SURFACE OF DESK ABUTS WALL PROVIDE 1/2" VERTICAL REVEAL WITH BLACK COLORED PLASTIC LAMINATE.

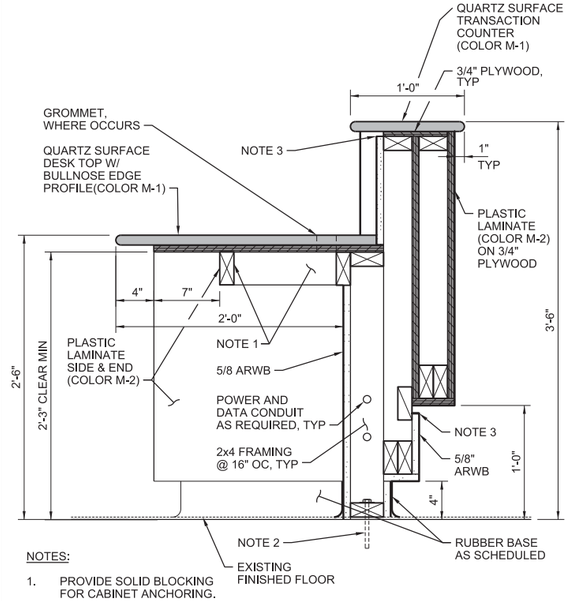


NOTES:

1. ANCHOR RECEPTION DESK TO FLOOR SUBSTRATE.
2. 1/2" HIGH ZEE REVEAL TRIM.

DRAWER CABINET
1 1/2"=1'-0"

0644-002

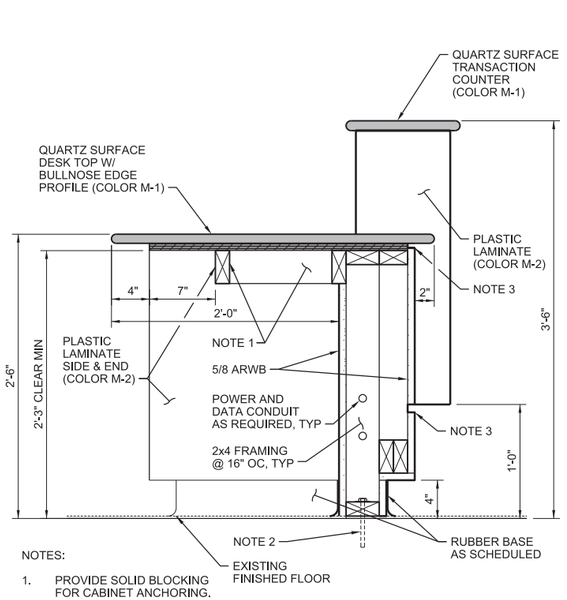


NOTES:

1. PROVIDE SOLID BLOCKING FOR CABINET ANCHORING.
2. ANCHOR RECEPTION DESK TO FLOOR SUBSTRATE.
3. 1/2" HIGH ZEE REVEAL TRIM.

RECEPTION DESK DETAIL
1 1/2"=1'-0"

0644-100

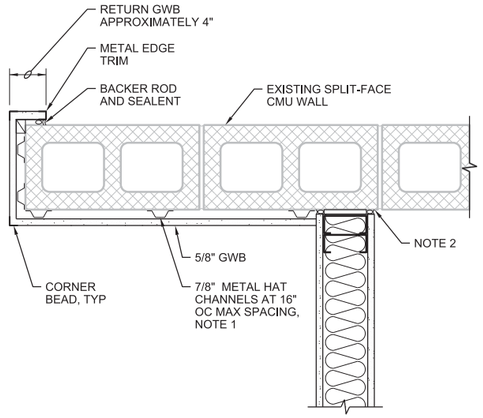


NOTES:

1. PROVIDE SOLID BLOCKING FOR CABINET ANCHORING.
2. ANCHOR RECEPTION DESK TO FLOOR SUBSTRATE.
3. 1/2" HIGH ZEE REVEAL TRIM.

RECEPTION DESK DETAIL
1 1/2"=1'-0"

0644-101



NOTE:

1. SHIM HAT CHANNELS AS REQUIRED FOR PLUMB GWB INSTALLATION.
2. PROVIDE L-BEAD AT NEW GWB TO SPLIT-FACE CMU. HOLD BACK APPROXIMATELY1/4" AND FILL JOINT WITH BACKER ROD AND SEALENT.

WALL TRANSITION
NTS

0929-102

DIGITALLY SIGNED ON 06/12/2018

LICENSED ARCHITECT GEOFFREY B. KIRSTEN C-33068 REN. 10-31-19 STATE OF CALIFORNIA

NO.	DATE	DSGN	REVISION	DR	CHK	APVD	BY	APVD
		G KIRSTEN	M COLLINS		B TAVERNA			B MEMEO

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ADMINISTRATION BUILDING OFFICE REMODEL

TRUCKEE, CALIFORNIA

TAHOE-TRUCKEE SANITATION AGENCY

ch2m.

ARCHITECTURAL

FURNITURE PLAN, INTERIOR ELEVATIONS AND DETAILS

VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JUNE 2018
PROJ	133841
DWG	01-A-2001
SHEET	5 of 7

INTERIOR FINISH SCHEDULE

ABBREVIATIONS:

ACT	ACOUSTICAL TILE	CPT	CARPET	FNSH	FINISH	N	NORTH
AS	AS SELECTED	CT	CERAMIC TILE	GWB	GYPSUM WALL BOARD	QS	QUARTZ SURFACE
CLR	CLEAR	E	EAST	GLZ	GLAZING	PLAM	PLASTIC LAMINATE
CMU	CONCRETE MASONRY UNIT	EXP	EXPOSED STRUCTURE	HGT	HEIGHT	RUB	RUBBER BASE
COL	COLOR	EXST	EXISTING	MATL	MATERIAL	S	SOUTH
CONC	CONCRETE	FCTY	FACTORY	MET	METAL	W	WEST

NOTES:

NO. 1 NUMBERS IN THE FNSH COLUMN REFER TO PAINT SYSTEMS IN SPECIFICATION SECTION 09 90 00.
NO. 2 CODES IN COL COLUMN REFER TO COLOR LIST ON THIS SHEET.
NO. 3 FOR RELIGHT FINISHES, SEE RELIGHT SCHEDULE ON THIS SHEET.
NO. 4 REPLACE EXISTING ACOUSTICAL TILES DAMAGED DURING CONSTRUCTION.
NO. 5 SEE RECEPTION DESK DETAILS FOR ADDITIONAL MATERIAL AND FINISH REQUIREMENTS.

DIGITALLY SIGNED ON 06/12/2018

SPACE		FLOOR			BASE AND WAINSCOT					TYPICAL WALL				OTHER WALL				CEILING				MISCELLANEOUS				OTHER REQUIREMENTS
NO.	NAME	SUB FL	FINISH	COL	HGT	MATL	FINISH	COL	WALLS	MATL	FINISH	COL	WALL	MATL	FINISH	COL	HGT	MATL	FINISH	COL	ITEM	MATL	FINISH	COL	
101	RECEPTION	EXST CONC	EXST CT	--	4"	RUB	FCTY	F-2	E,N	GWB	115	P-1	--	--	--	--	8'-8"	EXST ACT/ ACT/ GWB	FCTY / 115	WHITE / P-2	DESK WORK SURFACE / DESK CABINET/ DESK DRYWALL	QS / PLAM / ARWB	FCTY / FCTY / 115	M-1 / M-2 / P-4	NOTE 4, 5
102	OFFICE	EXST CONC	CPT	F-1	4"	RUB	FCTY	F-2	ALL	EXST GWB	115	P-1	W, S	GWB	115	P-1	8'-8"	EXST ACT/ ACT	FCTY	WHITE					NOTE 4
103	STORAGE ROOM	EXST CONC	EXST CPT	--	--	EXST RUB	--	--	--	EXST GWB	--	--	--	--	--	--	8'-8"	EXST ACT	--	--					NO CHANGE TO ROOM
105	HALLWAY NO. 3	EXST CONC	EXST CPT	--	--	EXST RUB	--	--	--	EXST CMU	109	P-1	--	--	--	--	8'-8"	EXST ACT	--	--					
106	HALLWAY NO. 1	EXST CONC	EXST CT / CPT	--	4"	EXST RUB / RUB	FCTY	F-2	N	EXST GWB	--	--	N	GWB	115	P-1	8'-8"	EXST ACT	--	--					NOTE 4

RELIGHT SCHEDULE

RELIGHT TYPE ABBREVIATIONS:
F FIXED

OTHER ABBREVIATIONS:
AFF ABOVE FINISH FLOOR (AT GROUND LEVEL)
EXST EXISTING
HM HOLLOW METAL
IG-A INSULATING ACOUSTICAL GLASS

NOTES:
NO. 1 FOR FRAME TYPES, SEE RELIGHT TYPES ON THIS SHEET.
NO. 2 FOR FRAME DETAILS SEE DESIGN DETAILS.
NO. 3 CODES IN COL COLUMN REFER TO COLOR LIST ON THIS SHEET.
NO. 4 LOCATE BLINDS ON OFFICE SIDE OF RELIGHT.

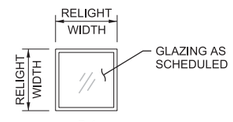
OPENING					FRAME							BLINDS		SILLS			OTHER REQUIREMENTS
NO.	SIZE		RELIGHT						DETAILS								
	WIDTH	HEIGHT	TYPE	GLASS	MATL	TYPE	FINISH	COL	HEAD	JAMB	SILL	Y / N	COLOR	MATL	COLOR	HEIGHT	
R-1	3'-4"	3'-6"	F	IG-A	HM	R-1	106	P-3	0811-010	0811-010	0811-012	Y	O-1	---	---	3'-4"	NOTE 4
R-2	5'-8"	3'-6"	F	IG-A	HM	R-1	106	P-3	0811-036	0811-036	0811-036	Y	O-1	---	---	3'-4"	NOTE 4
R-3	3'-4"	3'-6"	F	IG-A	HM	R-1	106	P-3	0811-036	0811-036	0811-036	Y	O-1	---	---	3'-4"	NOTE 4

COLOR LIST

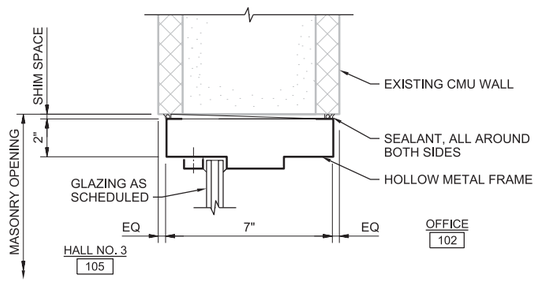
NOTES:
NO. 1 COLOR SELECTIONS FOR THIS PROJECT ARE NOTED IN RELIGHT SCHEDULE, INTERIOR FINISH SCHEDULE, AND ON THE DRAWINGS BY THE LETTER-NUMBER COMBINATION IN THE MARK COLUMN OF THIS LIST.
NO. 2 SOME COLOR SELECTIONS MAY BE MADE IN VARIOUS SPECIFICATION SECTIONS.

MARK	ITEM	MANUFACTURER	COLOR	OTHER REQUIREMENTS
FLOOR				
F-1	CARPET	AS SPECIFIED	AS SELECTED BY OWNER	
F-2	RUBBER BASE	AS SPECIFIED	MATCH EXISTING	
OPENINGS				
O-1	BLINDS	AS SPECIFIED	AS SPECIFIED	
PAINT				
P-1	WALLS	AS SPECIFIED	MATCH EXISTING COLOR	
P-2	CEILING	AS SPECIFIED	MATCH EXISTING COLOR	
P-3	RELIGHT FRAMES	AS SPECIFIED	MATCH EXISTING COLOR	
P-4	RECEPTION DESK DRYWALL	AS SPECIFIED	AS SELECTED BY OWNER	
MISCELLANEOUS				
M-1	QUARTZ SURFACE TOP	WILSONART	AS SELECTED BY OWNER	
M-2	PLASTIC LAMINATE	WILSONART	AS SELECTED BY OWNER	

RELIGHT TYPES



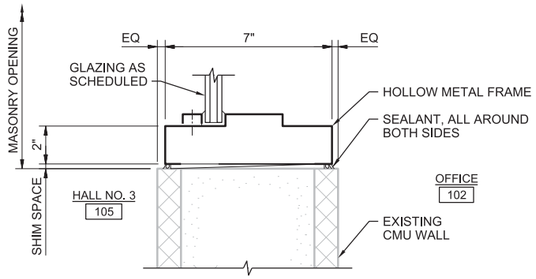
R-1



(JAMB SIMILAR)

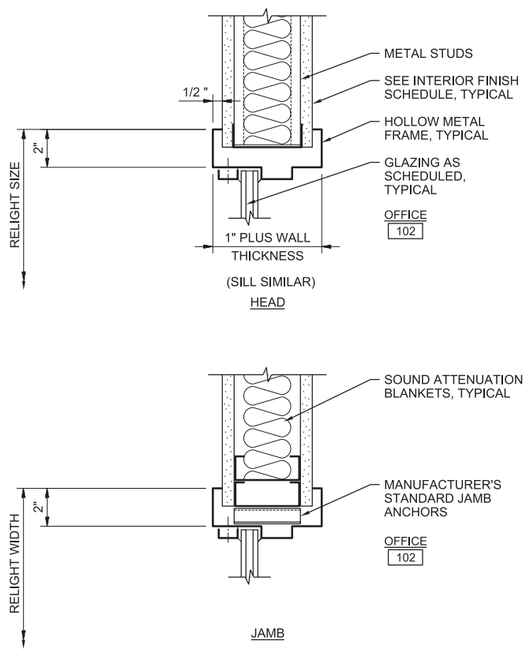
RELIGHT HEAD
NTS

0811-010



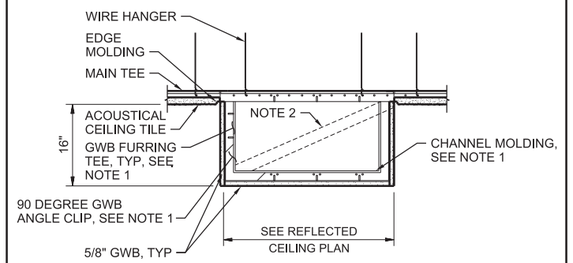
RELIGHT SILL
NTS

0811-012



RELIGHT HEAD AND JAMB
NTS

0811-036



NOTES:

1. INDICATES ITEMS TO BE PROVIDED BY SUSPENDED ACOUSTICAL TILE AND GWB MANUFACTURER.
2. PROVIDE BRACING AS REQUIRED BY SPECIFICATION SECTIONS 09 29 00 AND 09 51 13.

SOFFIT DETAIL
NTS

0929-101

LICENSED ARCHITECT GEOFFREY B. KIRSTEN C-33068 REN. 10-31-19 STATE OF CALIFORNIA

REVISION

NO.	DATE	DSGN	DR	CHK	APVD	BY	APVD
B		G KIRSTEN	M COLLINS	B TAVERNA			B MEMEO

2525 AIRPARK DRIVE
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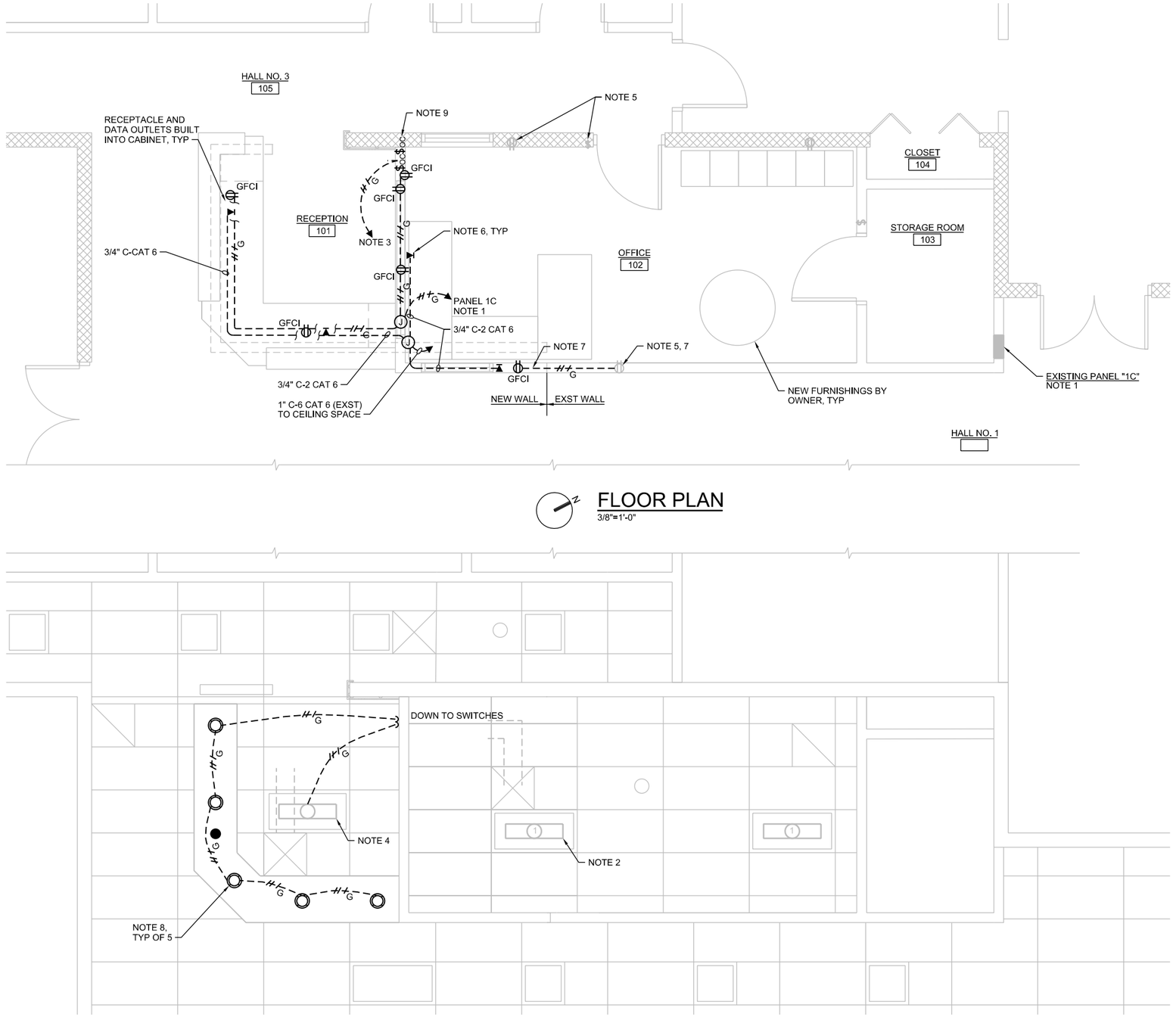
ch2m

ADMINISTRATION BUILDING OFFICE REMODEL
TRUCKEE, CALIFORNIA
TAHOE-TRUCKEE SANITATION AGENCY

ARCHITECTURAL
SCHEDULES AND DETAILS

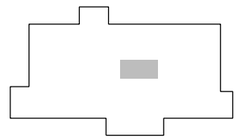
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JUNE 2018
PROJ	133841
DWG	01-A-3001
SHEET	6 of 7



FLOOR PLAN
3/8"=1'-0"

REFLECTED CEILING PLAN
3/8"=1'-0"



KEY PLAN

NOTES:

1. UTILIZE EXISTING SPARE CIRCUIT 29 IN PANEL 1C FOR NEW RECEPTACLE CIRCUIT.
2. RELOCATED EXISTING CEILING FIXTURE. RECONNECT TO EXISTING OFFICE LIGHTING CIRCUIT.
3. CONNECT TO EXISTING RECEPTION AREA LIGHTING CIRCUIT, EXPOSED DURING DEMOLITION. (PANEL 1C-10)
4. EXISTING CEILING FIXTURE. CONNECT TO A NEW OCCUPANCY SENSOR SWITCH AS SHOWN. PROVIDE A SENSOR SWITCH; WSX SERIES, OR APPROVED EQUAL.
5. EXISTING DEVICES. IF DISTURBED BY CONSTRUCTION ACTIVITIES, RE-CONNECT TO EXISTING CIRCUITS AND SWITCHES TO RESTORE ORIGINAL FUNCTION.
6. PROVIDE OUTLET BOX FOR DATA CABLES WHERE SHOWN OR AS DIRECTED BY OWNER. ROUTE EXISTING DATA CABLES TO BOX. PROVIDE SUITABLE RJ45 JACKS AND WALL PLATES.
7. EXTEND EXISTING RECEPTACLE CIRCUIT TO NEW DEVICE AS SHOWN.
8. RECESSED LED DOWNLIGHT MOUNTED IN SOFFIT. COORINATE LOCATIONS WITH SOFFIT SHOWN ON 01-A-1101. PROVIDE A GOTHAM 6" EVO DOWNLIGHT, MODEL: EVO 40/10 6WR MD MVOLT EZ1 OR APPROVED EQUAL.
9. PROVIDE A PUSH BUTTON WALL MOUNTED COMBINATION OCCUPANCY SENSOR/ DIMMING SWITCH COMPATIBLE WITH THE 0-10V DIMMING DRIVER. PROVIDE A SENSOR SWITCH; WSX-D, OR APPROVED EQUAL.

DIGITALLY SIGNED ON 11/29/2018

REGISTERED PROFESSIONAL ENGINEER MARK KURT VOLLMERS No. E056211 ELECTRICAL STATE OF CALIFORNIA

NO.	DATE	DSGN	REVISION	CHK	DR	R STEED	APVD	BY	APVD
		K VOLLMERS							B MEMEO

2525 AIRPARK DRIVE
REDDING, CA 96001
(530) 243-5831

ADMINISTRATION BUILDING OFFICE REMODEL
TRUCKEE, CALIFORNIA
TAHOE-TRUCKEE SANITATION AGENCY

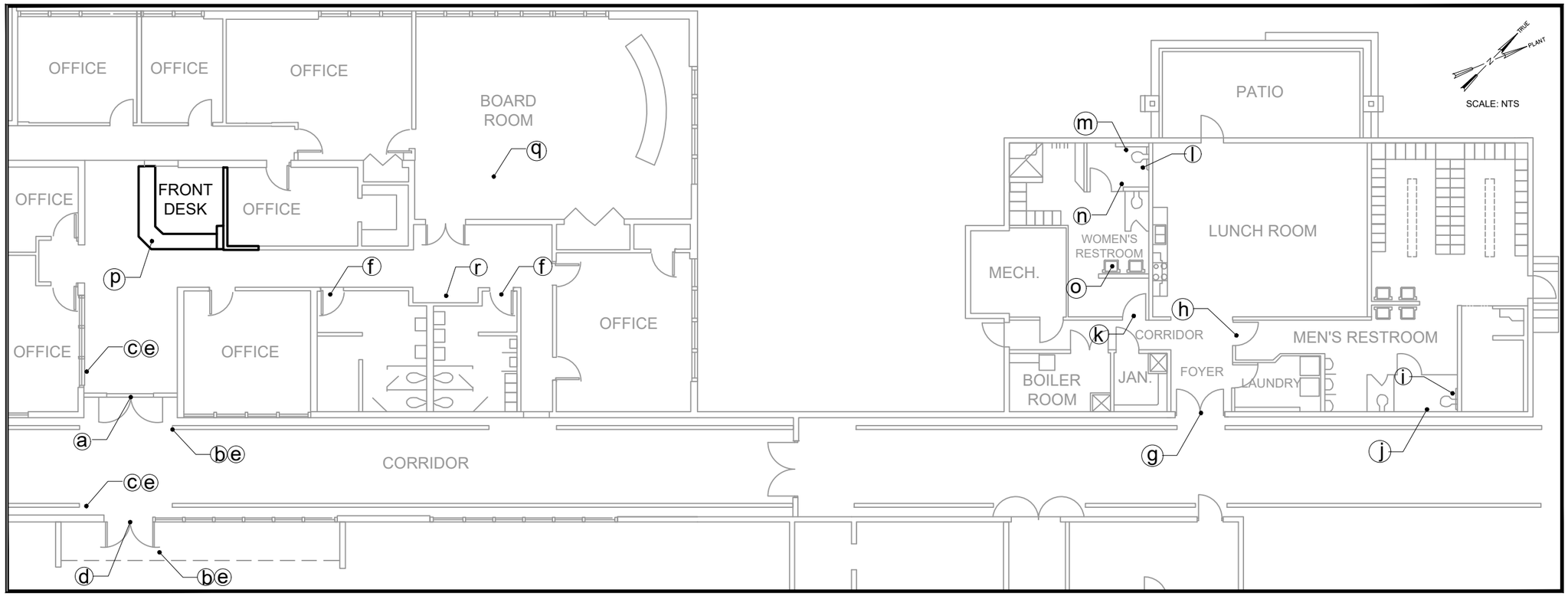
ch2m

ADMINISTRATION BUILDING
ELECTRICAL PLAN

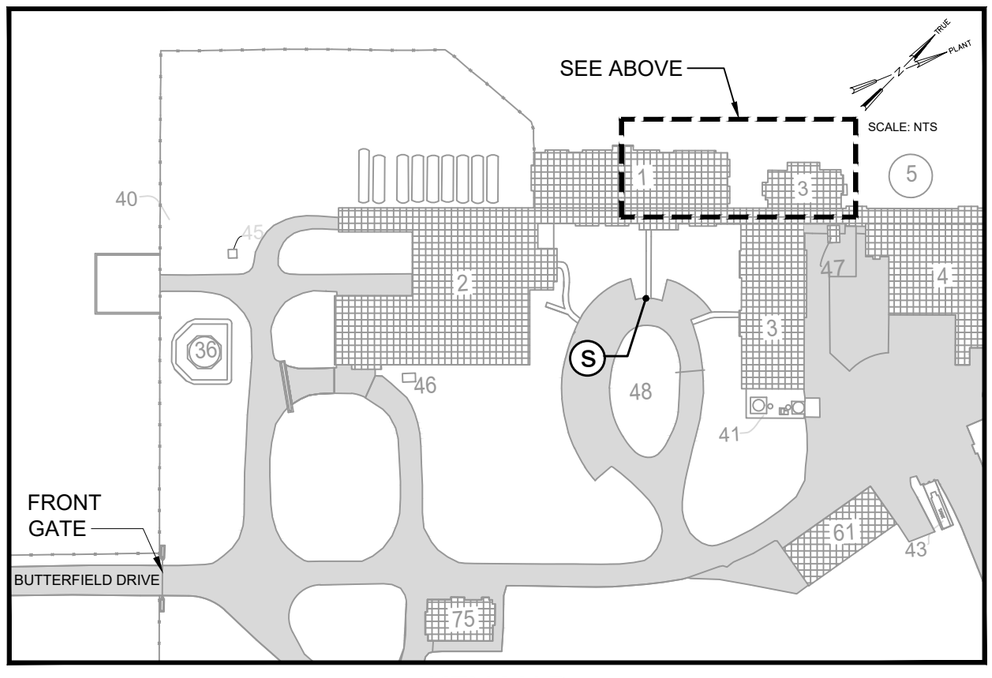
VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JUNE 2018
PROJ	133841
DWG	01-E-1101
SHEET	7 of 7



LOCATION MAP



KEY MAP

Tahoe-Truckee Sanitation Agency (T-TSA)	
Administration Building Office Remodel Project	
ADA Retrofit Schedule	
Location	**Work to Be Performed by T-TSA Maintenance Staff**
a	Install New Auto Closer (1E) and Threshold (1A). Existing Doors (2A), Hardware (1B), Kick Plate (1C), Strike-Side Clearance (1D), and Aluminum Bottom Panels (1H) to remain as-is.
b	Install Landing Placards at Builidng Entrances (1F).
c	Install Tactile Exit Signs (1G).
d	Install New Auto Closer (1E) and Threshold (2B). Existing Exit Doors (2A), Hardware (2D), Kick Plate (2D), Strike-Side Clearance (2E), and Aluminum Bottom Panels (2G) to remain as-is.
e	Install New Signs and Identification (Braille) (2F).
f	Install New Signs and Identification (Braille) (3E).
g	Install New Door Closers Along Route to Bathroom (2G). Existing Doors (3B) to remain as-is.
h	Install New Door Symbols (3D), Signs and Identificatoin (Braille) (3E). Existing Door (3B) and Strike-Side Clearance (3C) to remain as-is.
i	Relocate Grab Bar (Bar and Backing) (3G).
j	Relocate Existing Toilet Paper Dispenser (3H).
k	Install New Door Symbols (3D), Signs and Identificatoin (Braille) (3E). Existing Door (3B) and Strike-Side Clearance (3C) to remain as-is.
l	Relocate Grab Bar (Bar and Backing) (3G).
m	Relocate Existing Toilet Paper Dispenser (3H).
n	Relocate Sanitary Napkin Disposal Unit (3H).
o	Relocate Plumbing Fixtures -Women's Sink (3F).
p	Retrofit Existing Public Telephone - TYY (4A).
q	Install Assisted Listening Devices & Signage (4B, 4C).
r	Replace Drinking Fountain (5A).
s	Install Detectable Warnings (6F).
Notes	
1) Lower case letters correspond with symbols on map.	
2) Upper case letters and numbers correspond with Items shown on the Town of Truckee's Accessbility Worksheet for Existing Commercial & Public Accomodation Buildings' checklist.	

T-TSA ADA COMPLIANCE MAP

TAHOE-TRUCKEE SANITATION AGENCY

MEMORANDUM

Date: January 16, 2019

To: Board of Directors

From: Richard Pallante, Maintenance Manager

Item: VI-5

Subject: Approval of the Lucity, Inc. enterprise asset management program proposal

Background

Over the past 8 years, the Agency has used an in-house developed software, Plant Information System (PIS) to perform work order management and inventory control. While the software has been able to meet past Agency needs, the Agency's transition to true asset management exceeds its current level of development. Additionally, with the procurement of the new financial software (Caselle), the Agency will have the ability to integrate its financials with a fully developed asset management software. This integration provides the Agency with a complete software system that will provide the information necessary to make data driven decisions as the Agency progresses forward with an asset management plan.

Over the past months, staff has researched different asset management software packages in an effort to find a replacement software that best supports the Agency's current and future needs. During this research it was discovered that multiple member districts effectively utilize Lucity, Inc. within their operations. This provides the Agency with a unique ability to network locally which is a substantial benefit, not only to the Agency, but also its member districts.

Lucity, Inc. solely serves municipalities and agencies, similar to T-TSA. Having this focused market makes them well suited to meet the unique needs of a wastewater treatment facility.

After numerous staff meetings, on site demonstrations as well as an offsite demonstration at one of our member districts, Lucity, Inc. was selected as the most beneficial and cost-effective software for the Agency's asset management needs.

Fiscal Impact

Program & integration is a single fee of $127,890.
Reoccurring monthly fees are $2,625.

Attachments

Lucity, Inc. hosted software and services proposal.

Recommendation

Management and staff recommends approval of the Lucity, Inc. enterprise asset management program proposal.

Review Tracking

Submitted By: _____ Approved By: _____

Roshelle Chavez
Administrative Services Manager

LaRue Griffin
General Manager

Lucity, Inc.
10561 Barkley Street, Suite 100
Overland Park, KS 66212
Phone # 913-341-3105

Quotation

Date	1/8/2019
Quote #	88913

Prepared For

Tahoe Truckee Sanitation Agency
Richard Pallante
13720 Butterfield Drive
Truckee, CA 96161

Project

Description	Qty	Rate	Total
Lucity Site License (Work, Assets, Mobile, GIS Web/GIS Desktop, API)	1	50,000.00	50,000.00
Constant Connection Program (Annual Support & Maintenance)		10,000.00	10,000.00
Lucity AM Hosting Fee		14,500.00	14,500.00
Progress (Remote Project Management)	48	150.00	7,200.00
Initiation Meeting (Remote)	2	150.00	300.00
IT and GIS Audit	6	150.00	900.00
Installation	4	150.00	600.00
Kickoff Meeting/Discovery Workshop	16	225.00	3,600.00
Configuration Functional Groups	48	225.00	10,800.00
Configuration (Remote)	24	150.00	3,600.00
Interface GIS Feature Classes - (Sewer MH and Pipes)	28	150.00	4,200.00
Interface SCADA Equipment Wonderware Historian File Export	4	150.00	600.00
Training	48	200.00	9,600.00
Remote Training (per hour)	24	135.00	3,240.00
Direct Expenses		8,750.00	8,750.00
**OPTIONAL additional Test Server Hosting is $7,000.00 Annually			
NOTES:			
- Directs are estimated costs only and will be billed at actual cost.			
- Does not include data conversion.			
- Constant Connection Program * Year 1 fee is twenty percent (20%) of total amount of software license fees for products covered under the Program * Fees in subsequent years subject to annual increase of two and one-half percent (2.5%)			
PURCHASE TERMS: 1. Above quoted prices are good for sixty (60) days from date of quote. 2. Above prices are in U.S. dollars. Sales tax is an estimate only at the time. 3. License fees for any Lucity GIS solutions do not include Esri software. 4. Invoice terms are net due upon receipt. Finance charges at the maximum allowable rate will be incurred 30 days from invoice date. 5. Shipping and handling is included. 6. Solutions that are priced "per install" do not include the cost of the device or any further software that may be required to run the Lucity program.			
Total sales tax calculated by AvaTax		0.00	0.00

Total	$127,890.00

TAHOE-TRUCKEE SANITATION AGENCY

MEMORANDUM

Date: January 16, 2019

To: Board of Directors

From: LaRue Griffin, General Manager

Item: VI-6

Subject: Discussion of improved transparency for Board of Director meetings

Background
In an effort to increase public transparency, the Agency has provided increased information on its website (www.ttsa.net) to include board packets, minutes, annual budgets, financial audits, ordinances, etc. The Agency currently maintains audio recordings of the Board of Director meetings and could increase public transparency by providing video recordings of the Board of Director meetings.

Fiscal Impact
Potential website maintenance fee increases.

Attachments
None.

Recommendation
Management recommends video recordings of the Board of Director meetings be maintained and published to the Agency website for increased public transparency.

Review Tracking

Submitted By: _____
LaRue Griffin
General Manager

TAHOE-TRUCKEE SANITATION AGENCY

MEMORANDUM

Date: January 16, 2019

To: Board of Directors

From: LaRue Griffin, General Manager

Item: VII-1

Subject: Department Reports

Background
Department reports for previous and current month(s).

Fiscal Impact
None.

Attachments
1. Operations Department Report.
2. Maintenance Department Report.
3. Engineering Department Report.
4. Information Technology (IT) Department Report.
5. Administration Department Report.

Recommendation
No action required.

Review Tracking

Submitted By: _____
LaRue Griffin
General Manager

TAHOE-TRUCKEE SANITATION AGENCY
OPERATIONS DEPARTMENT REPORT

Date: January 16, 2019

To: Board of Directors

From: Michael Peak, Operations Manager

Subject: Operations Report

All plant waste discharge requirements were met for the month.

Operations Report:

- Two oxygen basins were put in-service for a total of four in preparation of flow and loading increases.
- Overall, the plant performed well through the Christmas and New Year holidays.

Laboratory Report:

- Staff performed necessary laboratory testing per WDR requirements and operational needs.

Plant Data:

Influent Flow Description	MG
Monthly average daily (1)	3.67
Monthly maximum instantaneous (1)	8.72
Maximum 7- day average	5.32

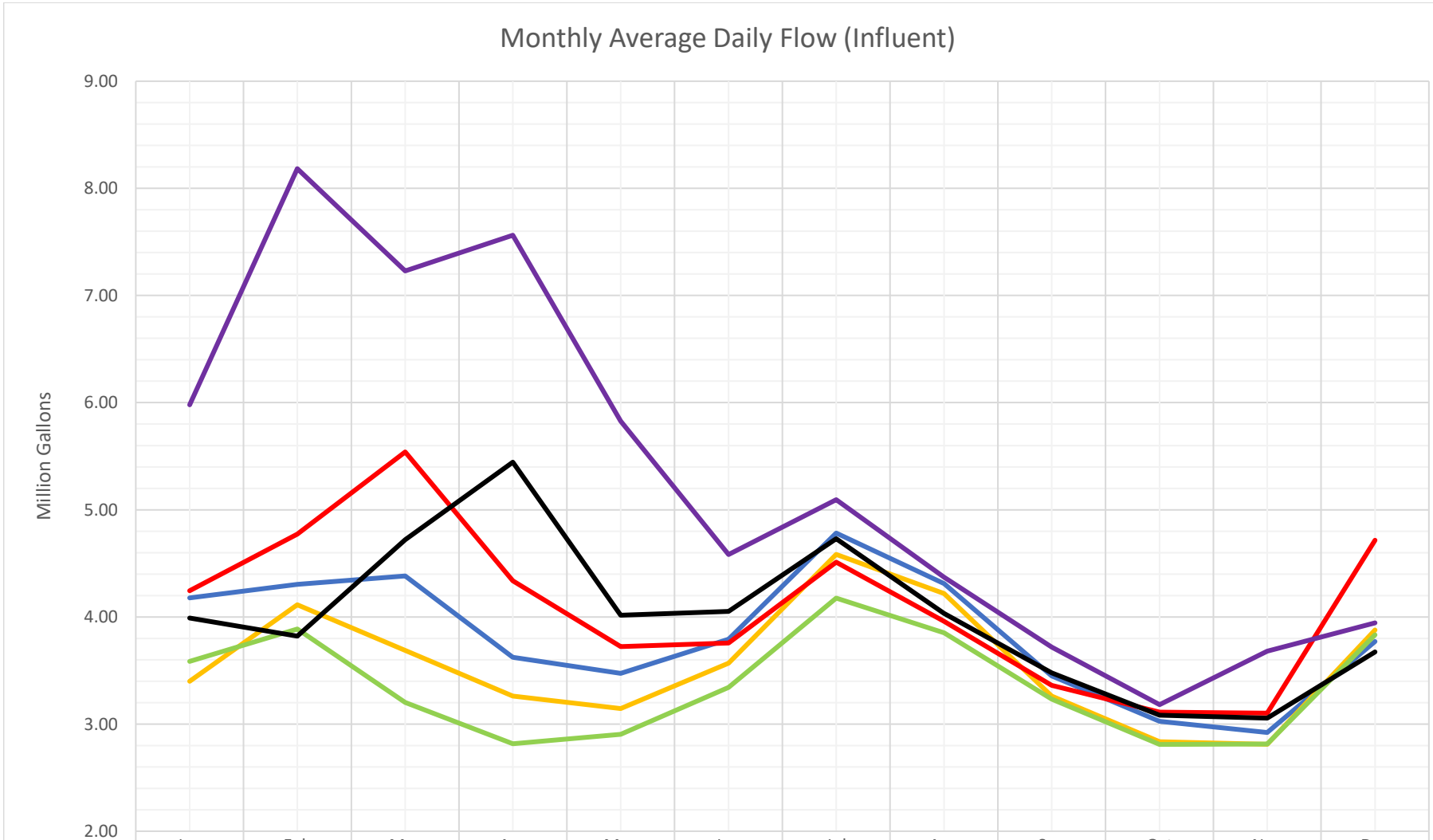
Effluent Limitation Description (2)	WDR Monthly Average		WDR Daily Maximum	
	Recorded	*Limit*	*Recorded*	*Limit*
Suspended Solids (mg/l)	1.6	10.0	3.2	20.0
Turbidity (NTU)	NA	NA	2.0	10.0
Total Phosphorus (mg/l)	0.22	0.80	0.29	1.50
Chemical Oxygen Demand (mg/l)	30.0	45.0	34.0	60.0

Notes:
1. Flows are depicted in the attached graph.
2. Effluent table data per WDR reportable frequency. Attached graphs depict all recorded data

Review Tracking:

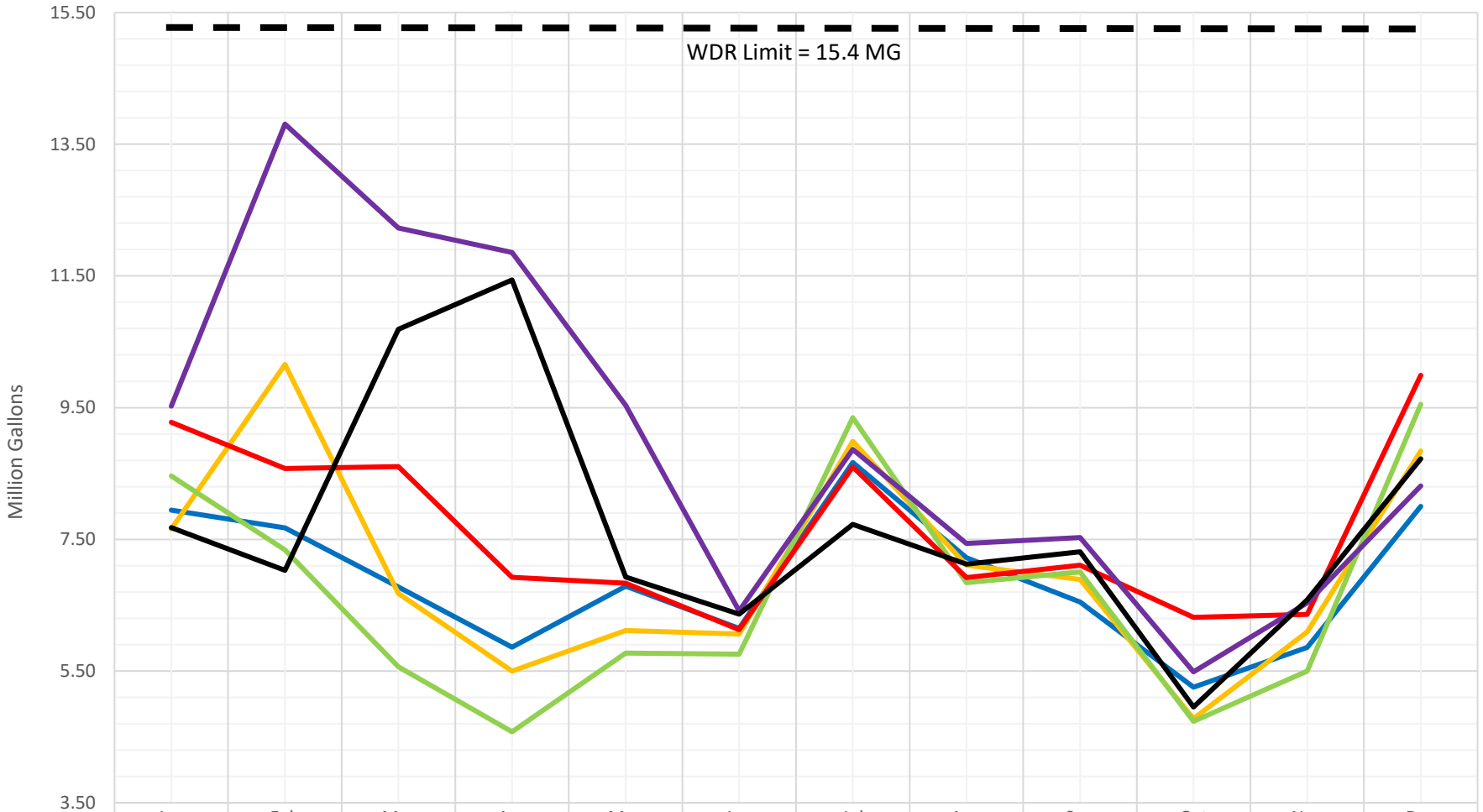
Submitted By: _____
Michael Peak
Operations Manager

Approved By: _____
LaRue Griffin
General Manager

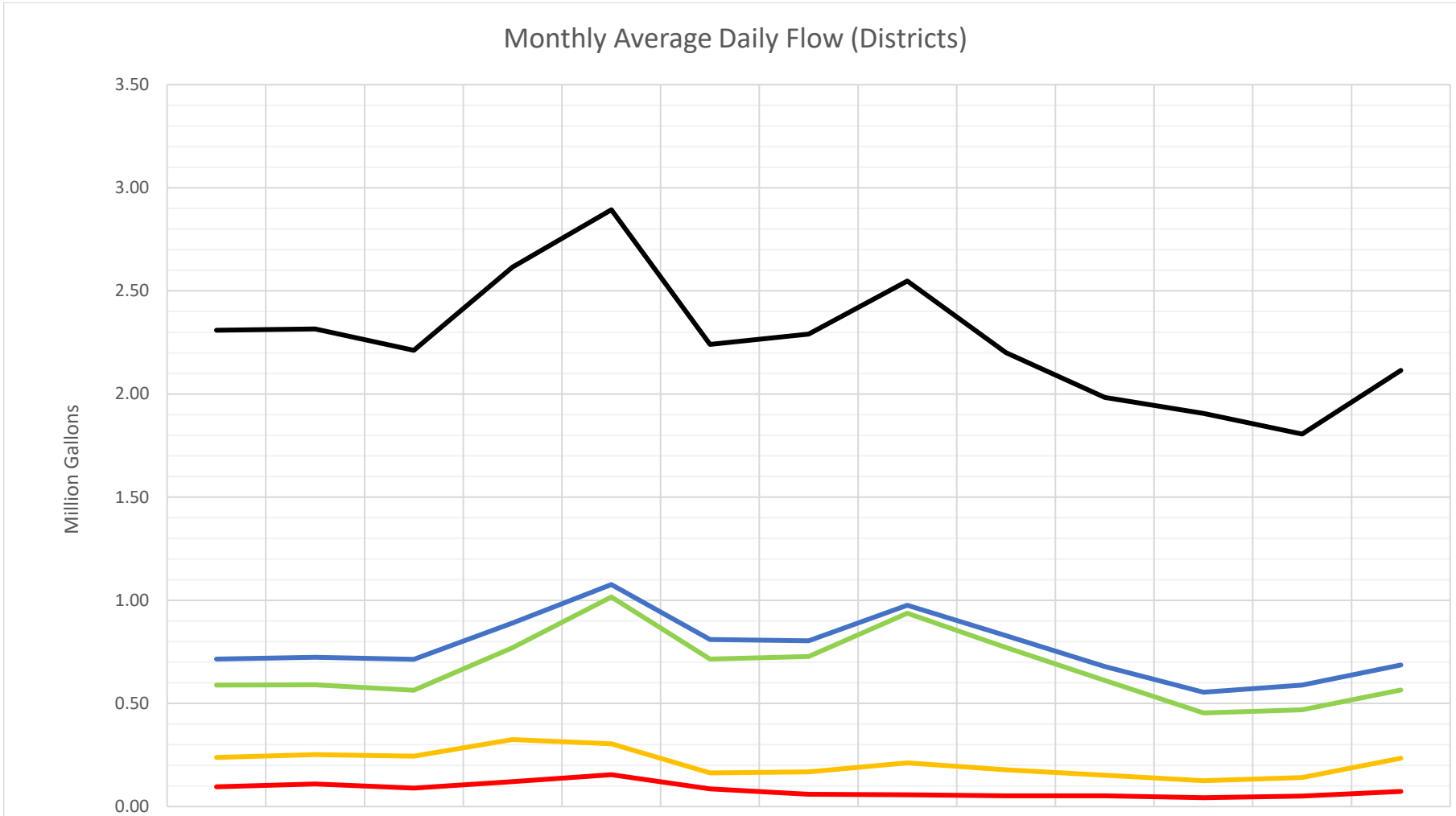


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2013	4.18	4.31	4.38	3.62	3.47	3.79	4.78	4.31	3.45	3.03	2.92	3.77
2014	3.40	4.11	3.69	3.26	3.14	3.57	4.58	4.22	3.26	2.84	2.81	3.88
2015	3.58	3.89	3.20	2.82	2.90	3.34	4.18	3.85	3.23	2.81	2.81	3.83
2016	4.24	4.77	5.54	4.34	3.72	3.76	4.51	3.96	3.36	3.11	3.10	4.72
2017	5.98	8.18	7.23	7.56	5.83	4.58	5.09	4.37	3.72	3.18	3.68	3.95
2018	3.99	3.82	4.72	5.44	4.02	4.05	4.73	4.03	3.48	3.08	3.06	3.67

Monthly Maximum Instantaneous Flow (Influent)

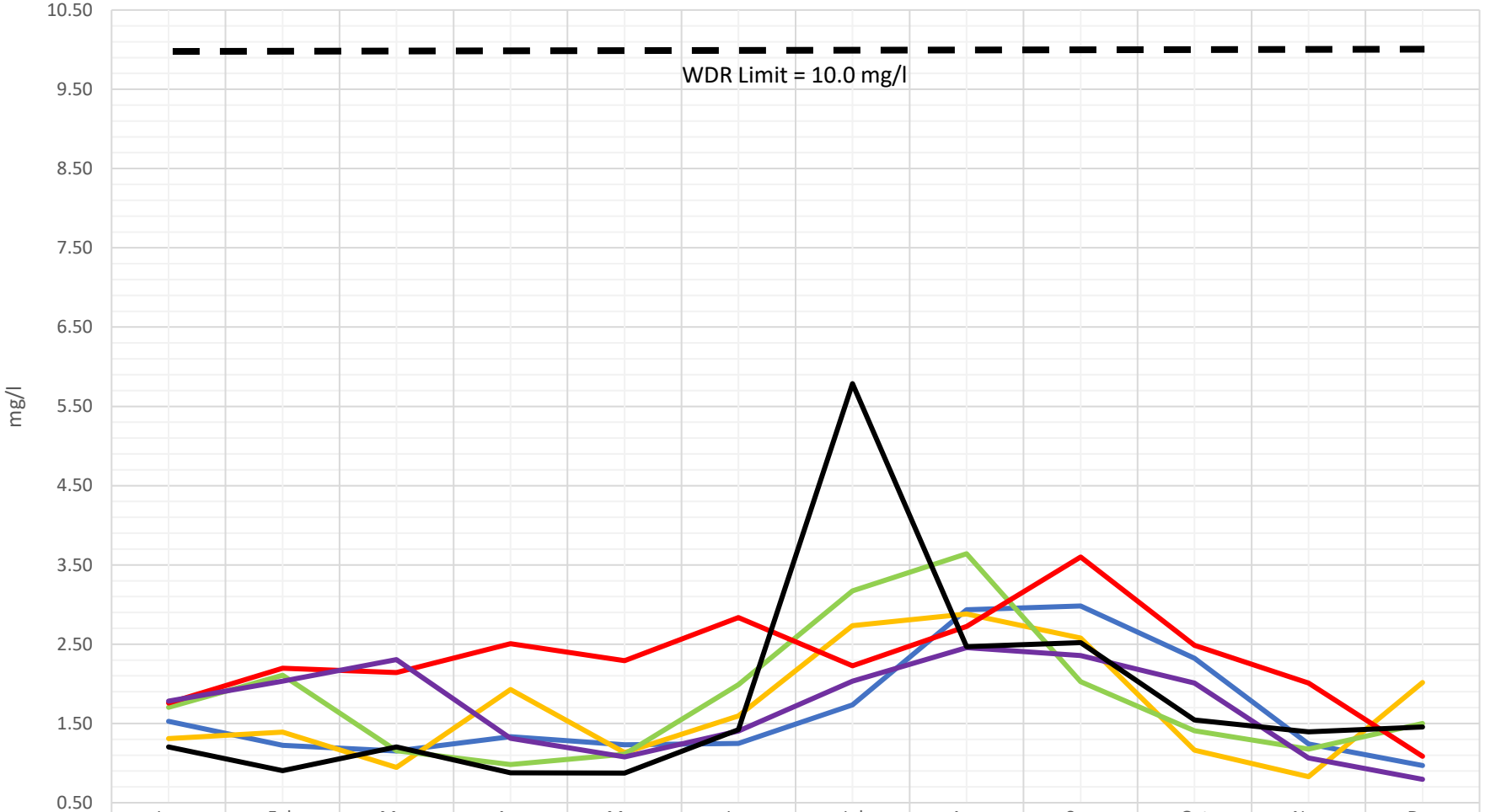


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2013	7.94	7.67	6.78	5.86	6.79	6.15	8.67	7.22	6.55	5.26	5.86	8.00
2014	7.66	10.16	6.68	5.50	6.12	6.06	8.99	7.11	6.89	4.78	6.09	8.84
2015	8.46	7.34	5.56	4.58	5.77	5.76	9.35	6.84	7.00	4.74	5.50	9.55
2016	9.28	8.58	8.60	6.93	6.84	6.13	8.60	6.92	7.11	6.32	6.36	9.99
2017	9.52	13.81	12.23	11.86	9.54	6.41	8.87	7.44	7.53	5.49	6.53	8.31
2018	7.68	7.03	10.69	11.44	6.93	6.37	7.73	7.12	7.31	4.95	6.58	8.72

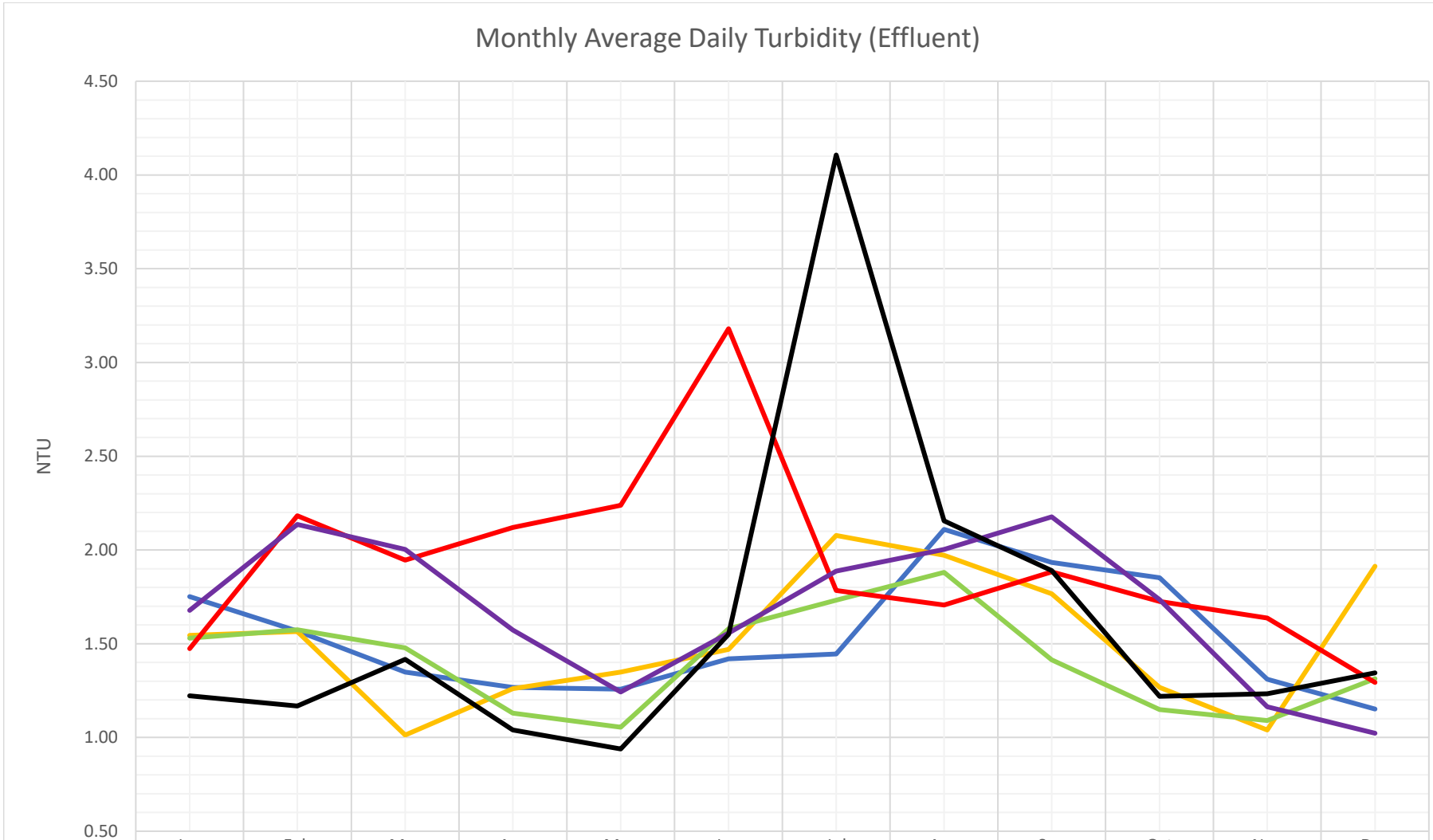


	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
NTPUD	0.72	0.72	0.71	0.89	1.08	0.81	0.80	0.98	0.83	0.68	0.55	0.59	0.69
TCPUD	0.59	0.59	0.56	0.77	1.02	0.72	0.73	0.94	0.77	0.61	0.45	0.47	0.56
ASCWD	0.10	0.11	0.09	0.12	0.15	0.09	0.06	0.06	0.05	0.05	0.04	0.05	0.07
SVPSD	0.24	0.25	0.24	0.32	0.30	0.16	0.17	0.21	0.18	0.15	0.13	0.14	0.23
TSD	2.31	2.32	2.21	2.62	2.89	2.24	2.29	2.55	2.20	1.98	1.91	1.81	2.11

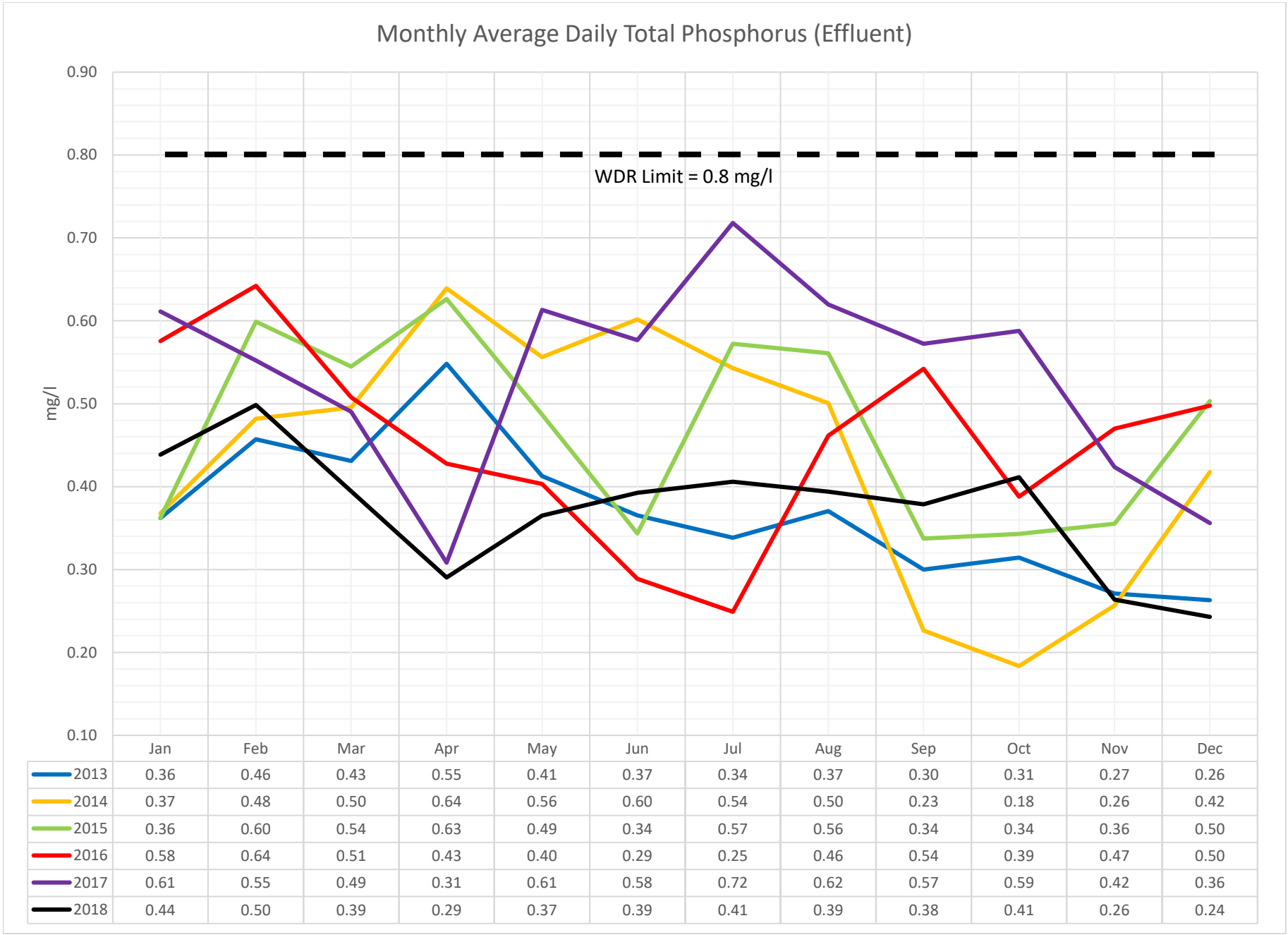
Monthly Average Daily Suspended Solids (Effluent)



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2013	1.53	1.23	1.15	1.33	1.23	1.25	1.73	2.93	2.98	2.32	1.24	0.97
2014	1.31	1.39	0.95	1.93	1.13	1.60	2.73	2.88	2.58	1.16	0.83	2.02
2015	1.70	2.11	1.16	0.98	1.11	1.99	3.17	3.64	2.03	1.41	1.18	1.50
2016	1.76	2.20	2.14	2.51	2.29	2.84	2.23	2.72	3.60	2.49	2.01	1.09
2017	1.78	2.04	2.30	1.31	1.08	1.40	2.03	2.46	2.36	2.01	1.06	0.80
2018	1.20	0.91	1.20	0.88	0.87	1.42	5.79	2.47	2.52	1.55	1.39	1.45

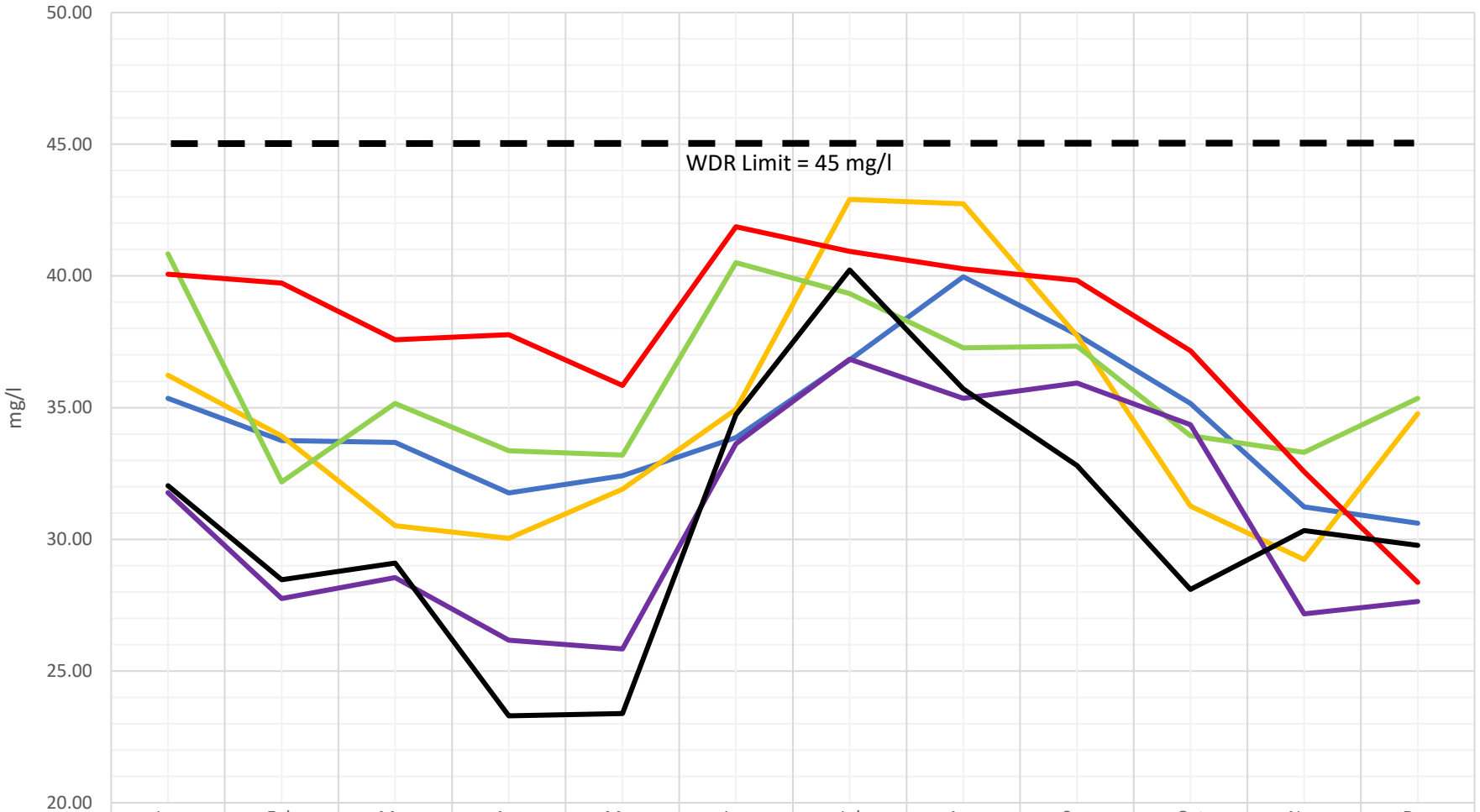


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2013	1.75	1.57	1.35	1.27	1.26	1.42	1.45	2.11	1.93	1.85	1.31	1.15
2014	1.55	1.56	1.01	1.26	1.35	1.47	2.08	1.97	1.77	1.27	1.04	1.91
2015	1.53	1.58	1.48	1.13	1.05	1.58	1.73	1.88	1.41	1.15	1.09	1.31
2016	1.47	2.18	1.95	2.12	2.24	3.18	1.78	1.71	1.88	1.73	1.64	1.29
2017	1.68	2.14	2.00	1.57	1.24	1.56	1.89	2.00	2.18	1.74	1.16	1.02
2018	1.22	1.17	1.42	1.04	0.94	1.55	4.11	2.15	1.89	1.22	1.23	1.35



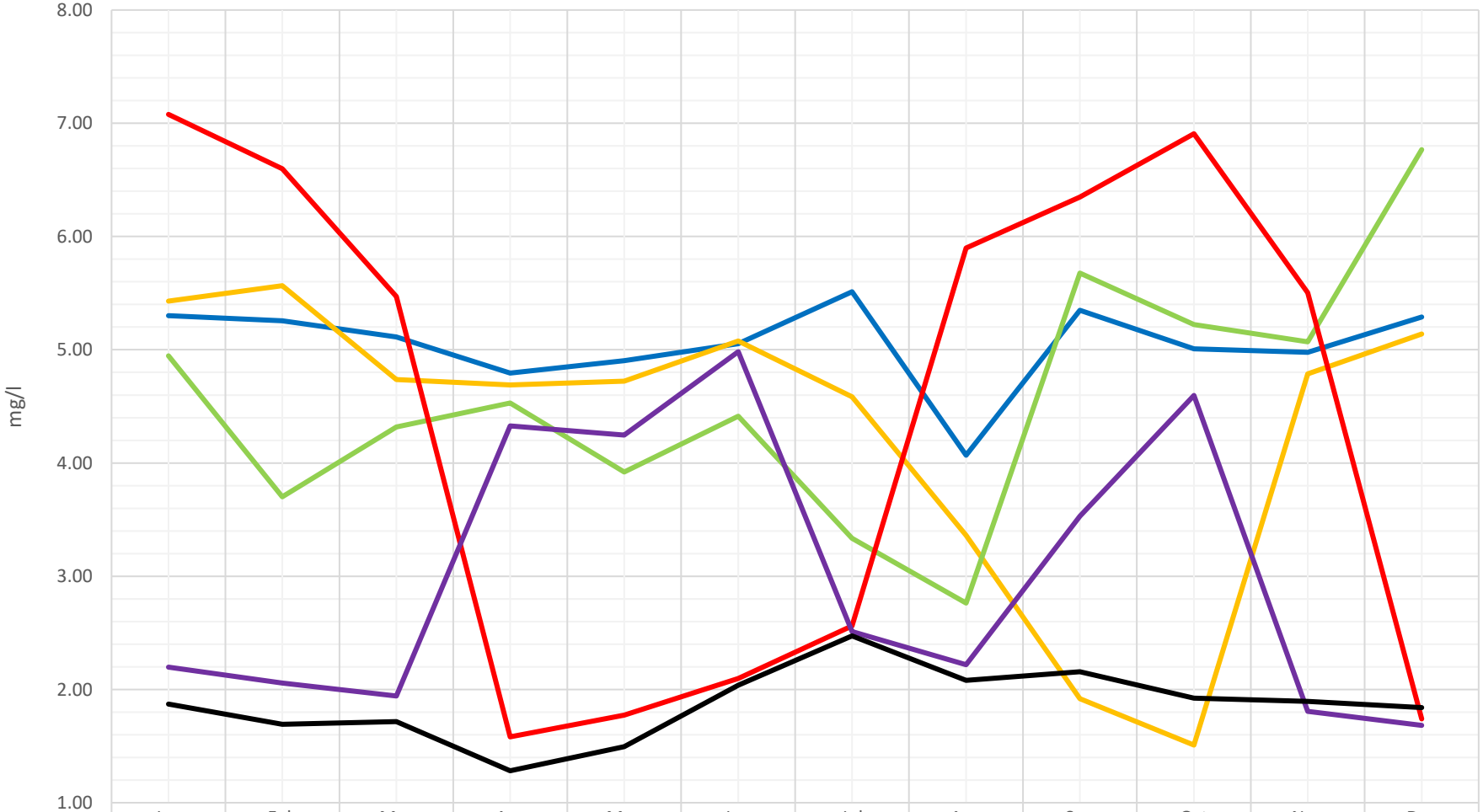
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2013	0.36	0.46	0.43	0.55	0.41	0.37	0.34	0.37	0.30	0.31	0.27	0.26
2014	0.37	0.48	0.50	0.64	0.56	0.60	0.54	0.50	0.23	0.18	0.26	0.42
2015	0.36	0.60	0.54	0.63	0.49	0.34	0.57	0.56	0.34	0.34	0.36	0.50
2016	0.58	0.64	0.51	0.43	0.40	0.29	0.25	0.46	0.54	0.39	0.47	0.50
2017	0.61	0.55	0.49	0.31	0.61	0.58	0.72	0.62	0.57	0.59	0.42	0.36
2018	0.44	0.50	0.39	0.29	0.37	0.39	0.41	0.39	0.38	0.41	0.26	0.24

Monthly Average Daily Chemical Oxygen Demand (Effluent)



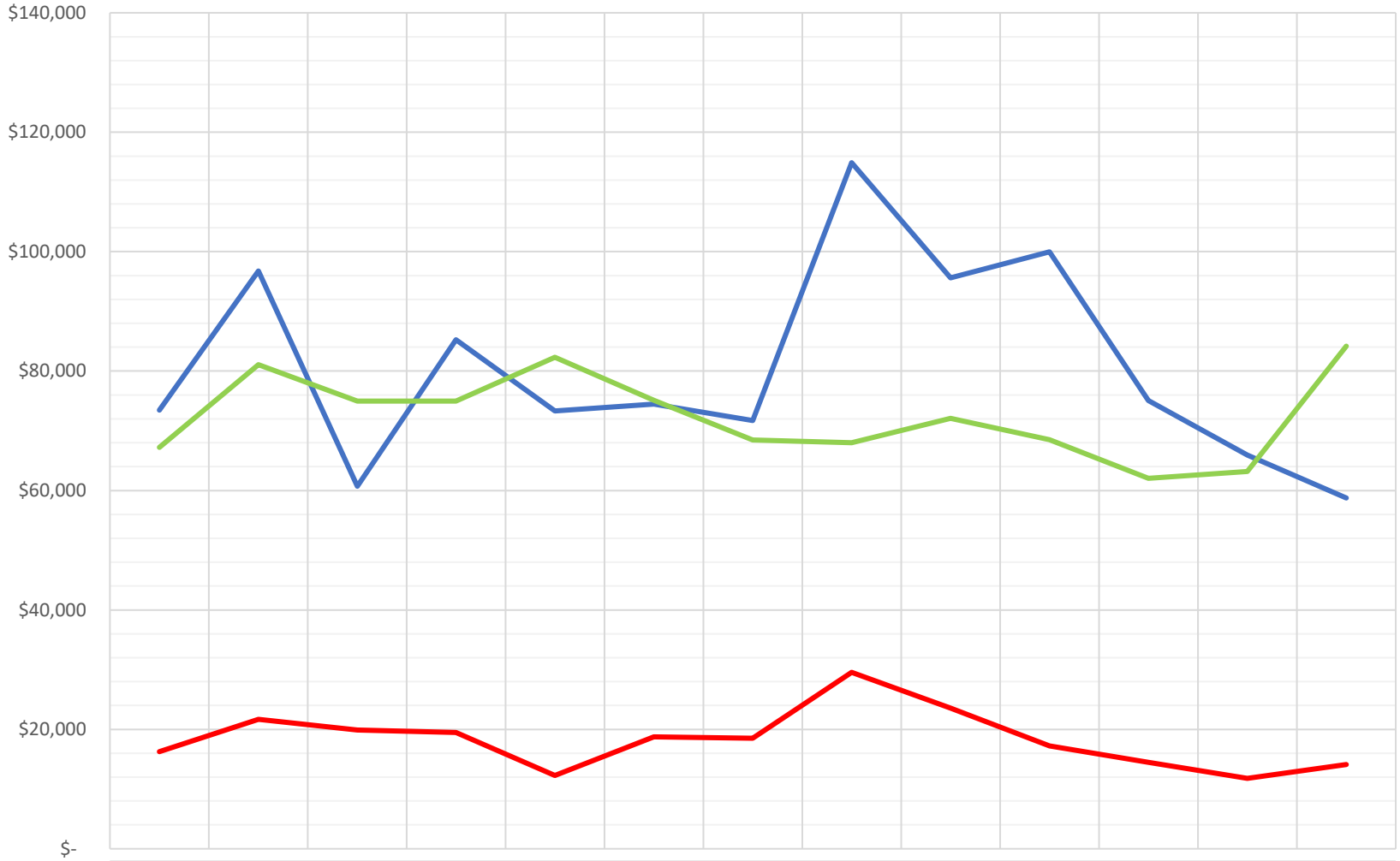
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2013	35.35	33.75	33.68	31.77	32.42	33.87	36.81	39.97	37.77	35.16	31.23	30.61
2014	36.23	33.93	30.52	30.03	31.90	34.93	42.90	42.74	37.73	31.26	29.23	34.77
2015	40.84	32.18	35.16	33.37	33.20	40.50	39.33	37.27	37.33	33.94	33.30	35.35
2016	40.06	39.72	37.58	37.77	35.84	41.87	40.94	40.27	39.83	37.16	32.57	28.37
2017	31.77	27.75	28.55	26.17	25.84	33.63	36.84	35.35	35.93	34.35	27.17	27.65
2018	32.03	28.46	29.10	23.30	23.39	34.73	40.23	35.71	32.80	28.10	30.33	29.77

Monthly Average Daily Total Nitrogen (Effluent)



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2013	5.30	5.26	5.11	4.79	4.90	5.05	5.51	4.07	5.35	5.01	4.98	5.29
2014	5.43	5.57	4.74	4.69	4.72	5.08	4.58	3.36	1.92	1.51	4.79	5.14
2015	4.95	3.70	4.32	4.53	3.92	4.41	3.34	2.76	5.68	5.22	5.07	6.77
2016	7.08	6.60	5.47	1.58	1.77	2.10	2.56	5.90	6.35	6.91	5.50	1.74
2017	2.20	2.06	1.94	4.33	4.25	4.98	2.51	2.22	3.53	4.60	1.81	1.68
2018	1.87	1.69	1.72	1.28	1.50	2.04	2.47	2.08	2.16	1.92	1.90	1.84

Chemical, Power and Sludge Disposal Costs



	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
Chemical	$73,445	$96,752	$60,704	$85,237	$73,330	$74,466	$71,733	$114,902	$95,616	$99,985	$75,081	$65,950	$58,752
Power	$67,239	$81,095	$74,980	$74,980	$82,300	$75,117	$68,486	$68,012	$72,081	$68,530	$62,041	$63,203	$84,179
Sludge Disposal	$16,261	$21,680	$19,869	$19,469	$12,296	$18,752	$18,517	$29,550	$23,564	$17,231	$14,472	$11,797	$14,115

TAHOE-TRUCKEE SANITATION AGENCY
MAINTENANCE DEPARTMENT REPORT

Date: January 16, 2019

To: Board of Directors

From: Richard Pallante, Maintenance Manager

Subject: Maintenance Report

- **Project support:** In the month of December, maintenance staff provided support for the following projects:
  - Received 12 TRI USA Dig- Alert request in support of local community projects.
- **Plant Maintenance activity:** Maintenance staff resources were focused on the following for the month of December:
  - Completed 528 work orders categorized as follows:
    - 369 scheduled preventative maintenance work orders.
    - 159 unscheduled work orders in the following categories: 119 corrective, 17 projects, 14 non-scheduled preventative and 9 safety.
- **Plant Maintenance projects:** Maintenance staff performed tasks on the following ongoing project:
  - Installation of TRI telemetry panel at Dollar Hill.

Review Tracking:

Submitted By: _____
Richard Pallante
Maintenance Manager

Approved By: _____
LaRue Griffin
General Manager

TAHOE-TRUCKEE SANITATION AGENCY
ENGINEERING DEPARTMENT REPORT

Date: January 16, 2019

To: Board of Directors

From: Jay Parker, Engineering Manager

Subject: Engineering Report

- **Projects:** In the month of December, Engineering staff continued working on the following projects:
  - 2019 Concrete Repair Project
  - 2019 Headworks Improvements Project
  - TRI MH 81 to 83 Improvements Project
  - Building 27 Main Service Upgrade Project
  - Administration Building Office Remodel Project
  - Digital Scanning of Sewer Lines
  - Multi-use Digester Pump

- **Project Planning Meetings:** Engineering staff assisted in review of construction documents and/or attended coordination meetings for the following projects:
  - Hotel Avery

Review Tracking:

Submitted By: _____
Jay Parker
Engineering Manager

Approved By: _____
LaRue Griffin
General Manager

TAHOE-TRUCKEE SANITATION AGENCY
IT DEPARTMENT REPORT

Date: January 16, 2019

To: Board of Directors

From: Bob Gray, IT Department Manager

Subject: Information Technology (IT) Report

- T-TSA Plant Information System (PIS)
  - Integration with SIS and SCADA ongoing
  - Development of GIS database integration for equipment
- T-TSA SCADA Information System (SIS)
  - Runtimes being configured for all VFDs, and starters
  - Power Monitoring being programmed for daily totalization upload to PIS and SIS
  - New Schneider Electric switchgear communications being integrated into PIS and SIS
  - Adding Cloud based MODBUS/TCP for data interchange with sister agencies for telemetry panel data
- SCADA HMI Virtual Machine Development and Software Upgrade
  - Virtual Machine (SCADAMAIN10)
    - Current tagname server application loaded and running
    - Development of System Platform on going
- CLINO Automation Equipment/Software Upgrade
  - CPU equipment acquired
  - IO count determined and compiling hardware requirements
- Telemetry Sites Upgrade
  - Squaw Valley Complete
  - Alpine Springs Complete
  - Granite Flats Complete
  - Ramparts Complete
  - Dollar Complete
  - Spare Unit Parts being acquired
- BNR Blower Cabinet Environment Monitoring and Logging
  - Programming of IoT data collector that will monitor the following:
    - Inside ambient cabinet temperature
    - Outside ambient cabinet temperature
    - Non-contact blower housing temperature
    - Thermo-couples and digital thermostats tests complete
  - Remote IO being designed for installation in PLC panel and equipment list being prepared
  - This logged data along with software analysis will provide us with operational efficiency scores along with predictive maintenance data
  - Programming server software that will take data from each of the blowers and distribute to SCADA, SIS, and PIS

Submitted By: _____
Robert Gray
IT Department Manger

Approved By: _____
LaRue Griffin
General Manager

TAHOE-TRUCKEE SANITATION AGENCY

ADMINISTRATION DEPARTMENT REPORT

Date: January 16, 2019

To: Board of Directors

From: Roshelle Chavez, Administrative Services Manager

Subject: Administration Report

Accounting

- Completed monthly A/P, A/R, payroll, general ledger processes, and bank reconciliations.
- Continued coordination with management and consultants Chouinard & Myhre, Inc., regarding the chart of accounts re-structuring for approved 2018/2019 Agency budgets.
- Finalized annual financial audit with Damore, Hamric & Schneider for presentation to Board of Directors.

Billing/Customer Service

- General assistance with billing customer accounts, adjustments, refunds, reduction agreements and plan review.
- Staff attended a Placer County utility district meeting regarding permitting issues.
- Staff continued parcel file scanning project for a total of 1,037 files in December.
- Conducted two (2) commercial inspections and no residential inspections.
- Processed seven (7) new accounts/connections.
    - 1 Commercial / 6 Single Family

Purchasing

- Coordinated purchase of miscellaneous plant O&M supplies and performed miscellaneous Administrative tasks.
- Ongoing updates to recently implemented tracking sheets.
- Coordinated Toys for Tots and Project Manna Food Drive.

General Administration

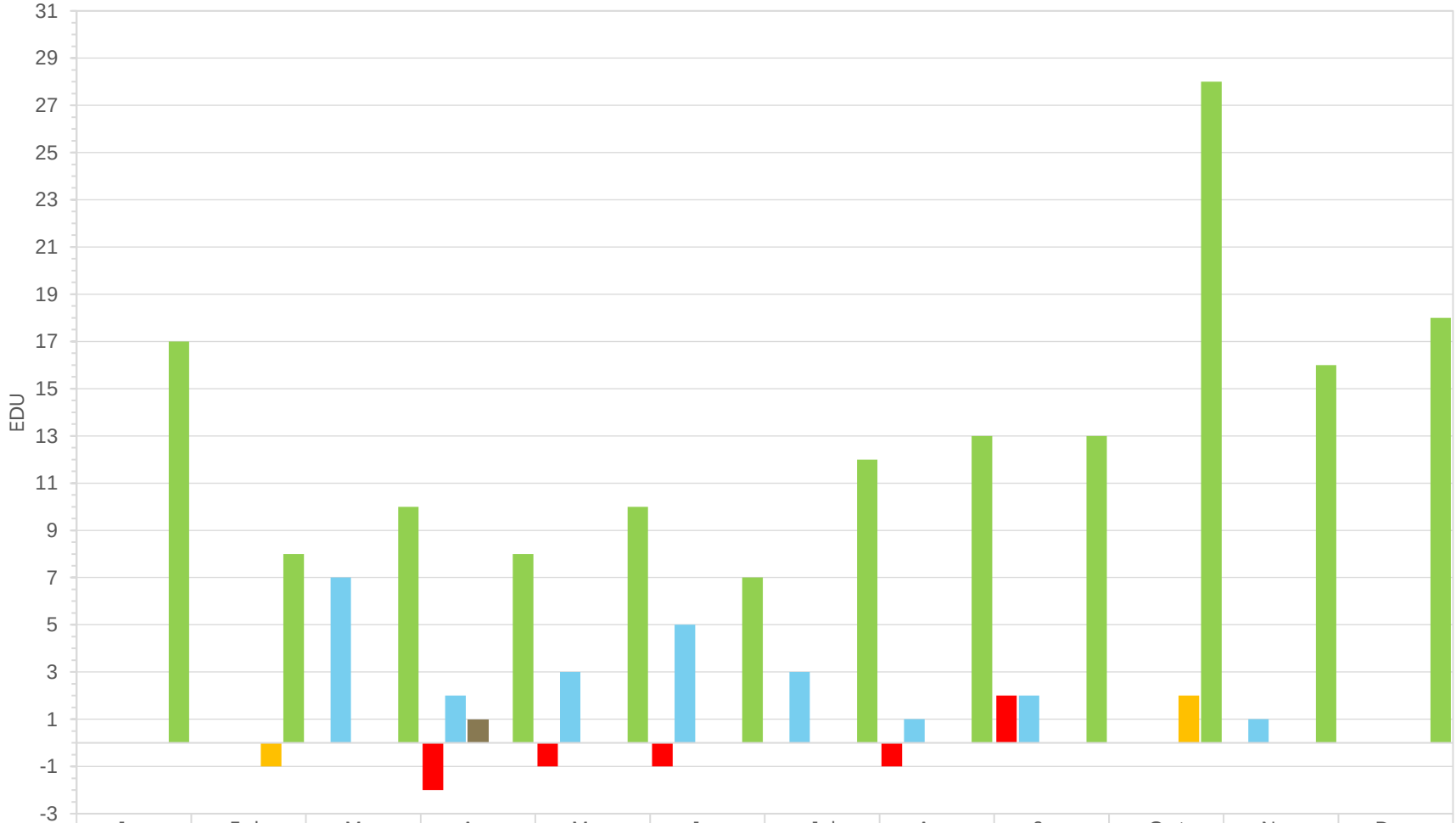
- The Annual Employee Appreciation dinner was held at the Tahoe Dinner Lodge.
- Staff coordinated a successful Holiday potluck luncheon for all staff to celebrate upcoming holidays and December birthdays.
- Staff coordinated a New Year's Eve breakfast potluck held for all staff at first morning break.
- Performed various Administrative duties to assist GM and Board of Directors.
- Performed miscellaneous public records requests.

Review Tracking

Submitted By: _____
Roshelle Chavez
Administrative Services Manager

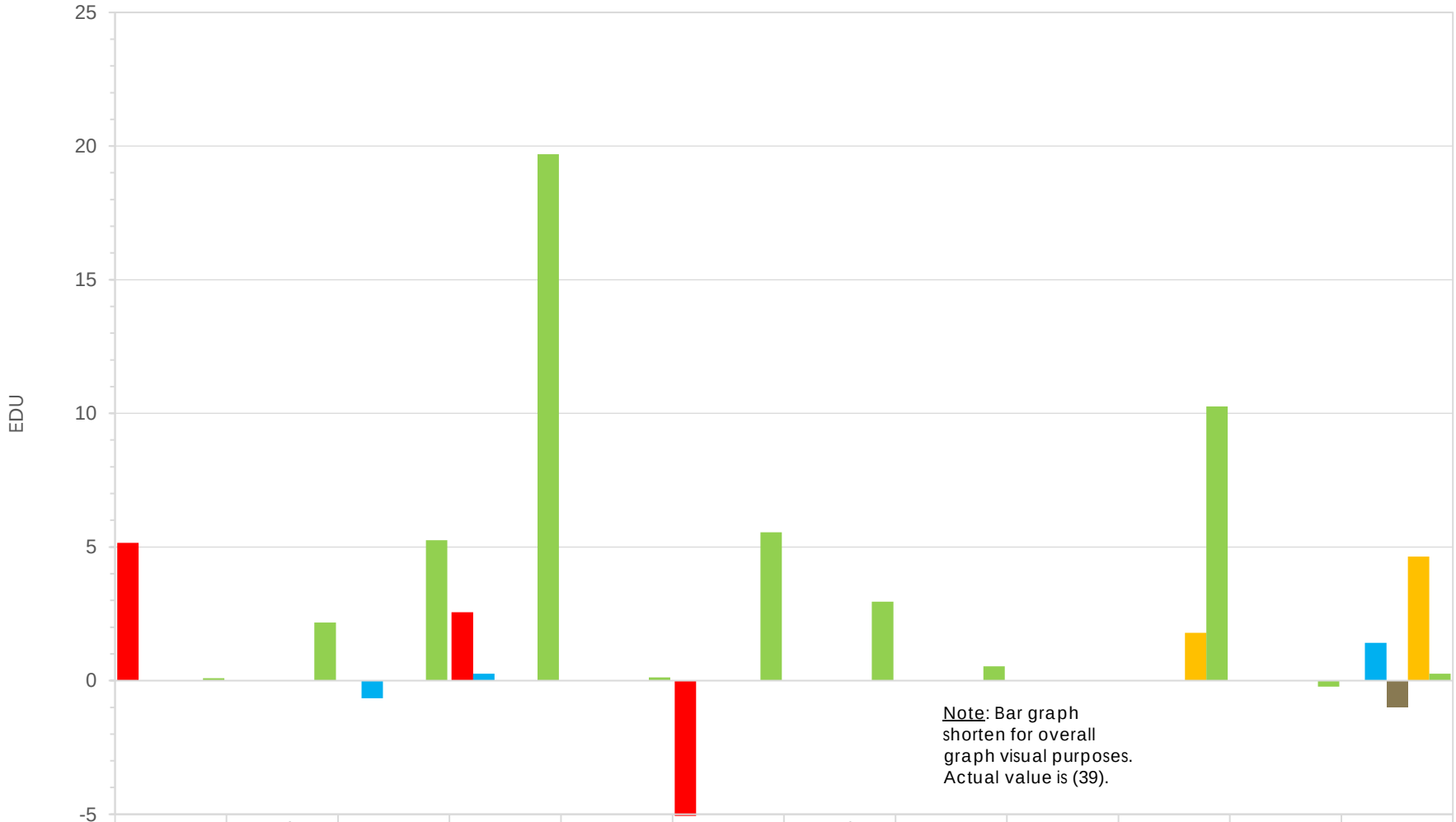
Approved By: _____
LaRue Griffin
General Manager

Residential EDU Summary



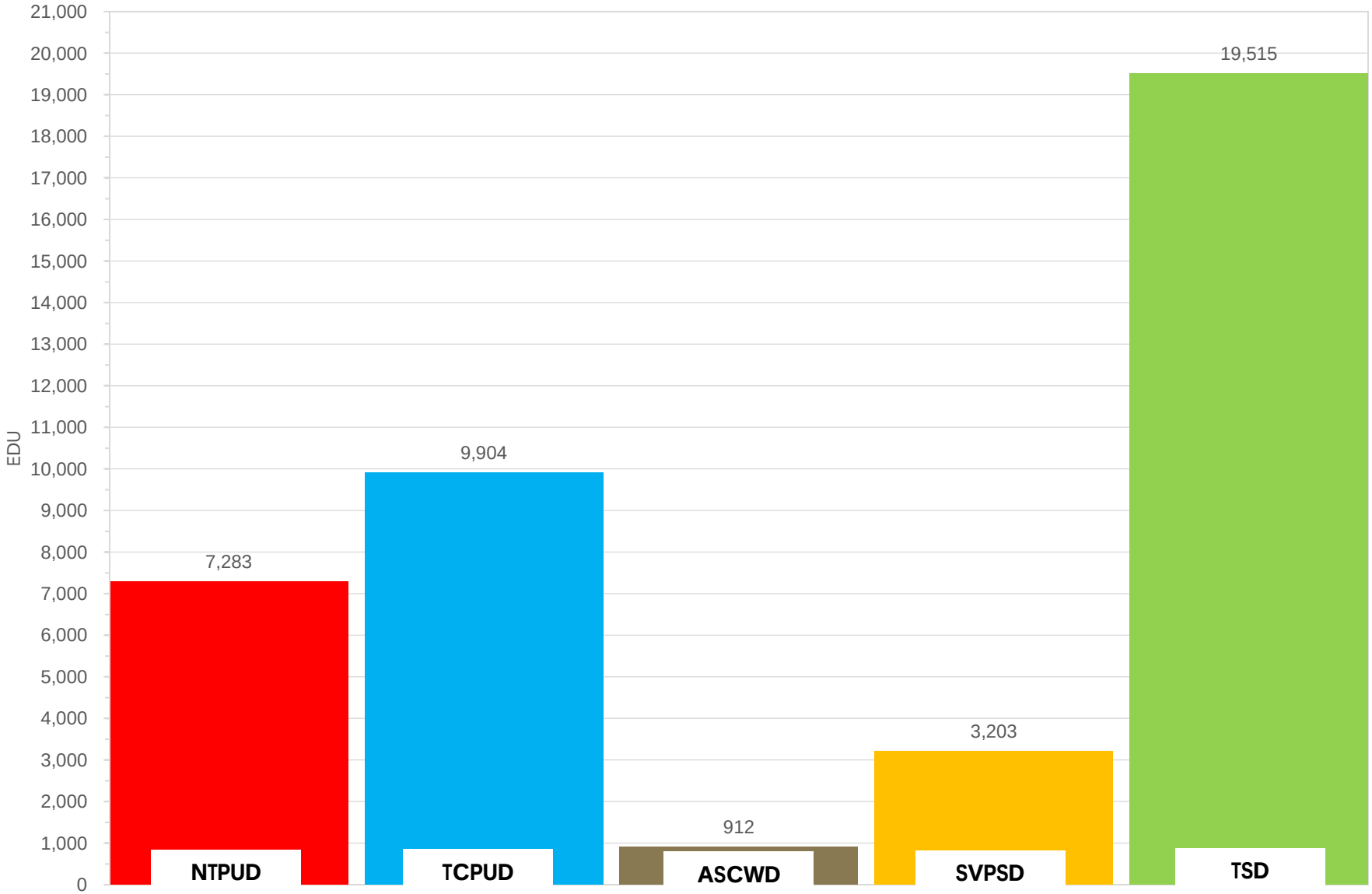
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
NTPUD	0	0	0	(2)	(1)	(1)	0	(1)	2	0	0	0
TCPUD	0	0	7	2	3	5	3	1	2	0	1	0
ASCWD	0	0	0	1	0	0	0	0	0	0	0	0
SVSPD	0	(1)	0	0	0	0	0	0	0	2	0	0
TSD	17	8	10	8	10	7	12	13	13	28	16	18

Other EDU Summary

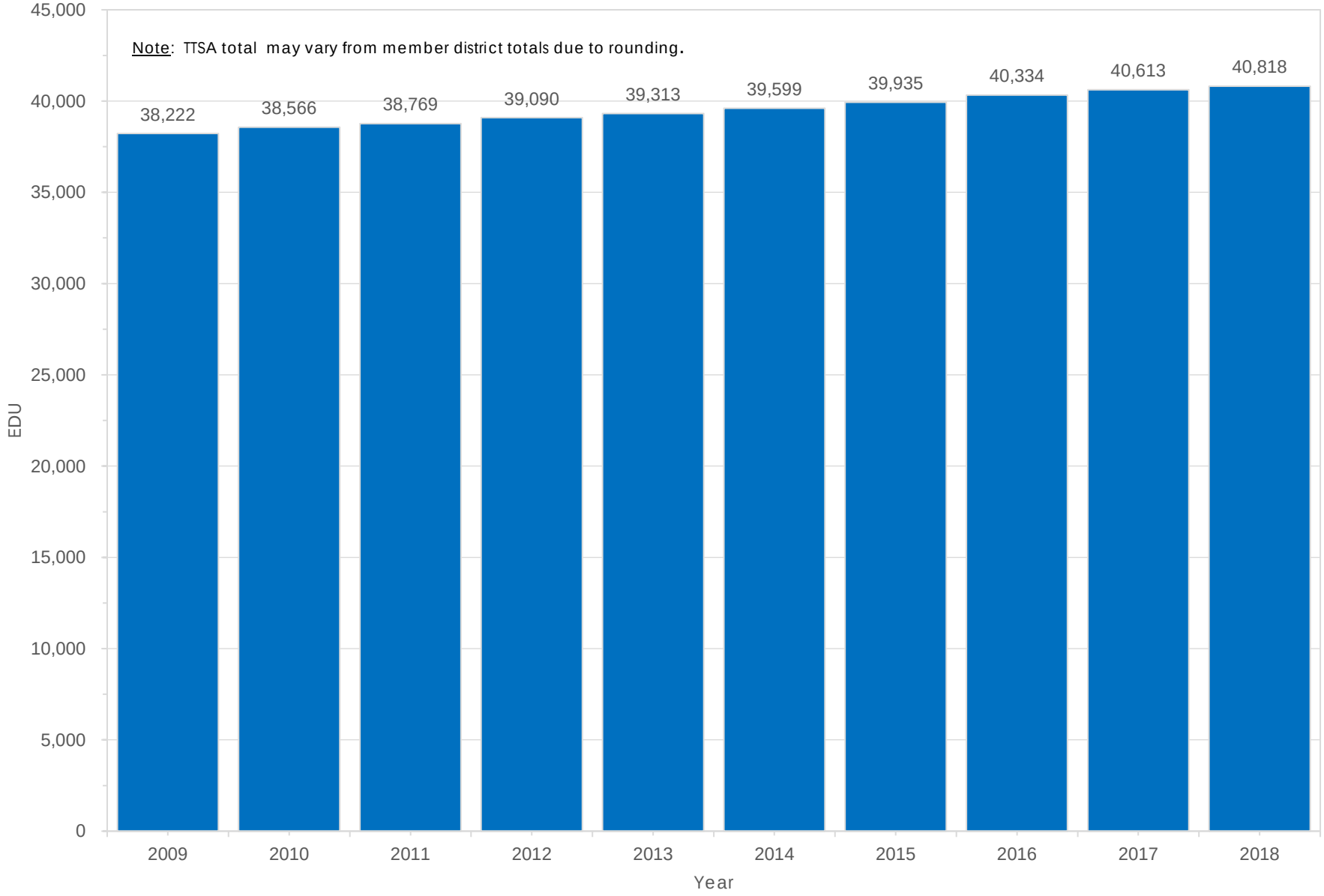


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
NTPUD	5.2	0.0	0.0	2.6	0.0	(39.0)	0.0	0.0	0.0	0.0	0.0	0.0
TCPUD	0.0	0.0	(0.7)	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4
ASCWD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(1.0)
SVSPD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	4.6
TSD	0.1	2.2	5.3	19.7	0.1	5.6	2.9	0.5	0.0	10.3	(0.2)	0.3

Current EDU Summary
By Member District



Historical TTSA EDU Summary



TAHOE-TRUCKEE SANITATION AGENCY

MEMORANDUM

Date: January 16, 2019

To: Board of Directors

From: LaRue Griffin, General Manager

Item: VII-2

Subject: General Manager Report

Continuing Projects/Work

- Management and staff continued to implement PIS.
- Management and staff continued revision of the employee handbook.
- Management and staff continued to assist with the Compensation and Classification Study.

Past Month Projects/Work

- Management attended the monthly member district luncheon.
- Management and staff reviewed the proposals submitted for the Master Sewer Plan.
- Management and staff participated in asset management program presentations from VUEworks and Lucity.
- Management and staff investigated the potential to amend the WWTP operator shift rotation from 8-hour to 12-hour shifts.
- Management discussed the CH2M engineering estimate with Gertrude Holdings, LLC. (Hotel Avery owner).

Review Tracking

Submitted By: _____

LaRue Griffin
General Manager

TAHOE-TRUCKEE SANITATION AGENCY

MEMORANDUM

Date: January 16, 2019

To: Board of Directors

From: LaRue Griffin, General Manager

Item: VIII

Subject: Board of Director Comment

Background

Opportunity for directors to ask questions for clarification, make brief announcements and reports, provide information to staff, request staff to report back on a matter, or direct staff to place a matter on a subsequent agenda.

TAHOE-TRUCKEE SANITATION AGENCY

MEMORANDUM

Date: January 16, 2019

To: Board of Directors

From: LaRue Griffin, General Manager

Item: IX

Subject: Closed Session

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1. Conference with General Manager, as Agency real property negotiator, concerning price and terms of payment relating to potential to real property exchange with Truckee Tahoe Airport District concerning Nevada County APN 019-440-81, APN 049-040-24 and APN 049-040-25 pursuant to Government Code Section 54956.8.

2. Closed Session Conference with Labor Negotiator - Government Code Section 54957.6.
    i. Agency designated labor negotiator: General Manager.
    ii. Regarding unrepresented employees: All employee positions, except General Manager.