



AGENDA

SOUTHERN NEVADA WATER AUTHORITY BOARD OF DIRECTORS

REGULAR MEETING
9:00 A.M. – MARCH 20, 2014

BOARD CHAMBERS, SOUTHERN NEVADA WATER AUTHORITY
100 CITY PARKWAY, SEVENTH FLOOR, LAS VEGAS, NEVADA
(702) 258-3100

Board of Directors

Mary Beth Scow, Chair
Sam Bateman, Vice Chair
Susan Brager
Bob Coffin
Duncan McCoy
Steve Sisolak
Anita Wood

SOUTHERN NEVADA
WATER AUTHORITY

John J. Entsminger,
General Manager

Date Posted: 03/13/2014

The Southern Nevada Water Authority makes reasonable efforts to assist and accommodate persons with physical disabilities who desire to attend the meeting. For assistance, call Katie Horn at (702) 870-2011 at least 24 hours prior to the meeting.

THIS MEETING HAS BEEN PROPERLY NOTICED AND POSTED IN THE FOLLOWING LOCATIONS:

City of Boulder City, City Hall
401 California Street
Boulder City, Nevada

City of Henderson, City Hall
240 Water Street
Henderson, Nevada

City of North Las Vegas, City Hall
2250 Las Vegas Boulevard North
North Las Vegas, Nevada

City of Las Vegas, City Hall
495 South Main Street
Las Vegas, Nevada

Clark County Government Center
500 S. Grand Central Parkway
Las Vegas, Nevada

Clark County Water Reclamation District
5857 E. Flamingo Road
Las Vegas, Nevada

Southern Nevada Water Authority
100 City Parkway, Suite 700
Las Vegas, Nevada

Las Vegas Valley Water District
1001 S. Valley View Boulevard
Las Vegas, Nevada

All items on the agenda are for action by the Board of Directors, unless otherwise indicated. Items may be taken out of order. The board may combine two or more agenda items for consideration, and the board may remove an item from the agenda or delay discussions relating to an agenda item at any time.

CALL TO ORDER

COMMENTS BY THE GENERAL PUBLIC

NO ACTION MAY BE TAKEN: This is a period devoted to comments by the general public pertaining to items on this agenda. If you wish to speak to the Board about items within its jurisdiction, but not appearing on this agenda, you must wait until the "Comments by the General Public" period listed at the end of this agenda. Please limit your comments to three minutes or less and refrain from making comments that are repetitious, offensive, or amounting to personal attacks. No action may be taken upon a matter not listed on the posted agenda.

ITEM NO.

1. *For Possible Action:* Approve agenda with the inclusion of tabled and/or reconsidered items, emergency items and/or deletion of items, and approve the minutes of the regular meeting of January 16, 2014.
2. *For Possible Action:* Receive a presentation from the SNWA Youth Advisory Council and direct staff accordingly.
3. *For Information Only:* Receive a report from General Counsel as to the results of the arbitration between the Authority and the Insurers on Lake Mead Intake No. 3.

CONSENT AGENDA Items 4-6 are routine and can be taken in one motion unless a Director requests that an item be taken separately

4. *For Possible Action:* Approve the First Amendment to Contract No. 14581A, Intergovernmental Agreement for a Joint Study on Nitrosamines, between Denver Water and the Authority to extend the date of completion of work from November 30, 2013, to September 30, 2014.
5. *For Possible Action:* Approve Amendment No. 1 to the existing agreement between FTI Consulting, Inc., and the Authority for forensic accounting services.

AGENDA – SOUTHERN NEVADA WATER AUTHORITY – PAGE TWO – MARCH 20, 2014

6. *For Possible Action:* Approve Amendment No. 4 to the existing agreement between Woods & Aitken and the Authority to provide specialized legal services regarding complex construction issues.

BUSINESS AGENDA

7. *For Possible Action:* Approve an agreement between Carollo Engineers and the Authority for Water Research Foundation Study #4494, "Evaluation of Current and Alternative Strategies for Managing CECs in Water," and accept funds for the Authority's participation costs.
8. *For Possible Action:* Adopt the 2014 Las Vegas Wash Capital Improvements Plan.
9. *For Possible Action:* Approve a professional services agreement with Hobbs, Ong and Associates for services related to future issues presented to the Authority's Integrated Resource Planning Advisory Committee and for other general financial and debt management related services associated with the Authority's overall operations.
10. *For Possible Action:* Approve a new Sales Tax Allocation Resolution and Cooperative Agreement among the Authority and the wastewater agencies of the City of Henderson, the City of Las Vegas, the City of North Las Vegas, and the Clark County Water Reclamation District.
11. *For Possible Action:* Make an appointment to fill a vacancy on the Integrated Resource Planning Advisory Committee.
12. *For Information Only:* Receive an update from staff on water resources including, but not limited to, drought conditions in the Colorado River Basin, the results of the implementation of the Authority's Water Resource and Conservation Plans, activities on the Colorado River, the development of in-state water resources, and the status of the third intake project.

COMMENTS BY THE GENERAL PUBLIC

NO ACTION MAY BE TAKEN: At this time, the Board of Directors will hear general comments from the public on matters under the jurisdiction of the Southern Nevada Water Authority. Please limit your comments to three minutes or less and refrain from making comments that are repetitious, offensive, or amounting to personal attacks. No action may be taken upon a matter not listed on the posted agenda.

Visit our website at www.snwa.com/apps/agenda/snwa/index.cfm
for Southern Nevada Water Authority Agenda Postings and Approved Minutes

**SOUTHERN NEVADA WATER AUTHORITY
BOARD OF DIRECTORS
REGULAR MEETING
JANUARY 16, 2014
MINUTES**

CALL TO ORDER 9:03 a.m., SNWA Board Chambers, Southern Nevada Water Authority
100 City Parkway, Seventh Floor, Las Vegas, Nevada

BOARD MEMBERS PRESENT Mary Beth Scow, Chair
Sam Bateman, Vice Chair
Susan Brager
Bob Coffin
Duncan McCoy
Steve Sisolak (Present for items 1-10)
Anita Wood

BOARD MEMBERS ABSENT None

STAFF PRESENT Pat Mulroy, Greg Walch, John Entsminger, Ron Zegers, Phil Speight, Marc
Jensen, Rick Holmes

OTHERS PRESENT None

Unless otherwise indicated, all members present voted in the affirmative.

COMMENTS BY THE GENERAL PUBLIC

Ed Uehling, Las Vegas, recommended not approving agenda item no. 10 and instead suggested selecting an individual from another member agency such as the City of North Las Vegas. He discussed the Authority's Public Information division and suggested charging more for outdoor water uses versus indoor water uses. He also suggested disbanding the Integrated Resource Planning Advisory Committee (IRPAC) and recommended that the Board not approve agenda item no. 8.

Brian McAnallen, Las Vegas Metro Chamber of Commerce, noted that the Chamber's Government Affairs Committee unanimously endorsed John Entsminger as General Manager of the Southern Nevada Water Authority, noting his experience, efforts to reach out to the business community, and leading the IRPAC process.

Item 10 was taken out of order.

Following approval of the consent agenda, the Board recognized Pat's career with the Southern Nevada Water Authority.

1. For Possible Action: Approval of Agenda & Minutes

FINAL ACTION: A motion was made by Director Brager to approve the agenda for this meeting and consider item number 10 immediately, and the meeting minutes of November 21, 2013. The motion was approved.

10. For Possible Action: Authorize the General Manager of the Las Vegas Valley Water District to serve as General Manager of the Authority, and approve the Amended and Restated Interlocal Contract between the Las Vegas Valley Water District and the Authority.

Director Coffin noted his preference to appoint John Entsminger as the Authority's General Manager, rather than tying the General Manager position to that of the Las Vegas Valley Water District. Director Sisolak asked for Counsel's advice, recognizing that the Water District will reconsider the item at its February 2014 Board meeting. Greg Walch, General Counsel, noted that Director Coffin may frame his motion, contingent upon the Water District selecting a specific person. Councilwoman Wood asked about the details of the General Manager's contract. Chairwoman Scow noted that the General Manager's employment contract will be presented to the Las Vegas Valley Water District's Board for approval at a later date. Pat Mulroy, General Manager, added that the Authority would fund 50 percent of the salary, since the General Manager and many other staff split time between the two agencies.

MINUTES – SOUTHERN NEVADA WATER AUTHORITY – JANUARY 16, 2014 – PAGE TWO

FINAL ACTION: A motion was made by Director Coffin to follow staff's recommendation, but contingent upon the Las Vegas Valley Water District's selection of John Entsminger as the Water District's General Manager. The motion was approved.

CONSENT AGENDA Items 2 - 4 are routine and can be taken in one motion unless a Director requests that an item be taken separately.

2. ***For Possible Action:*** Approve two resolutions authorizing the submission of grant proposals to the Bureau of Reclamation WaterSMART: Water and Energy Efficiency Grant Program.
3. ***For Possible Action:*** Approve a subgrant agreement between the Nevada Division of Environmental Protection and the Authority to accept grant funding for regional water quality activities and related public outreach initiatives.
4. ***For Possible Action:*** Approve an amendment to the Interlocal Agreement between the City of Boulder City and the Authority adjusting Boulder City's share of capital costs.

FINAL ACTION: A motion was made by Director Brager to follow staff's recommendation. The motion was approved.

BUSINESS AGENDA

5. ***For Possible Action:*** Award Contract No. 810U 01 C1, Silver Bowl and Archery Weirs, to Las Vegas Paving Corporation for the amount of \$11,692,000, authorize a change order contingency amount not to exceed \$1,160,000, and authorize the execution of the contract agreement, or take other action as appropriate.

Director Sisolak asked how much the Authority collects in sales tax proceeds. Mr. Entsminger stated that he would provide that information. Ms. Mulroy clarified that these designated sales tax proceeds are separated from the Authority's budget and used exclusively to fund improvements in the Las Vegas Wash.

FINAL ACTION: A motion was made by Director Brager to follow staff's recommendation. The motion was approved.

6. ***For Possible Action:*** Approve the Second Amended and Restated Agreement between the United States Department of the Interior, U.S. Bureau of Reclamation and the Authority for sharing of equipment rental, materials and subcontractors' service costs in the Las Vegas Wash for an amount not to exceed \$900,000.

FINAL ACTION: A motion was made by Director Sisolak to follow staff's recommendations. The motion was approved.

7. ***For Possible Action:*** Approve an agreement between the Colorado River Commission and the Authority for repayment of the Authority's proportionate share of the cost of securities issued by the Colorado River Commission to prepay Hoover power base charges.

FINAL ACTION: A motion was made by Director Sisolak to follow staff's recommendations. The motion was approved.

8. ***For Possible Action:*** Approve an agreement between CDM Smith, Inc., and the Authority for facilitation services in an amount not to exceed \$125,000.

FINAL ACTION: A motion was made by Director Brager to follow staff's recommendation. The motion was approved.

9. ***For Possible Action: Make appointments to fill vacancies on the Integrated Resource Planning Advisory Committee.***

Ms. Mulroy noted that recommendations were made to fill four vacancies left by Kirk Clausen, Mike Forman, Bob Kasner and Scot Rutledge. These recommendations include Brian McAnallen, Terry Murphy, Lester Romero and April Mastroluca.

FINAL ACTION: A motion was made by Director Brager to appoint the individuals noted by Ms. Mulroy. The motion was approved.

11. ***For Possible Action: Receive an update from staff on water resources including, but not limited to, drought conditions in the Colorado River Basin, the results of the implementation of the Authority's Water Resource and Conservation Plans, activities on the Colorado River, the development of in-state water resources, and the status of the third intake project.***

Mr. Entsminger gave a presentation, which is attached to these minutes. Mr. Jensen provided a brief update on Lake Mead Intake No. 3, which is also attached to these minutes.

Ms. Mulroy recognized the careers of retiring staff members, Ron Zegers and Rick Holmes.

NO ACTION NECESSARY.

Public Comment

Richard McCay, Solar Power and Water, discussed a proposal to fund the Salton Sea, which would represent a resource improvement project that he projected to yield additional water resources for the Authority.

Ed Uehling, Las Vegas, requested a copy of the statement made by Chairwoman Scow regarding Ms. Mulroy's career, her comments made at the LVVWD's January meeting regarding Mr. Entsminger's selection to General Manager, and that his letters be included in the minutes. He commented on a remark made by Chairwoman Scow regarding reduced water use.

Adjournment

There being no further business to come before the board, the meeting adjourned at 10:02 a.m.

APPROVED:

Mary Beth Scow, Chair

John J. Entsminger, General Manager

Copies of all original agenda items and minutes, including all attachments, are on file in the General Manager's office at the Las Vegas Valley Water District, 1001 South Valley View Boulevard, Las Vegas, Nevada.

January 16, 2014

Mary Beth Scow, Chairwoman
and Board of Directors
Southern Nevada Water Authority
Las Vegas, NV

Re: Once in a political lifetime opportunities at today's Board Meeting

Dear Chairwoman Scow and Board Members:

Today you have the only chance in the 20 year lifetime of SNWA and in your political life to take control of the agency you are supposed to be controlling because the choice last week of YOUR director by the agency WHICH HAS BEEN CONTROLLING YOU has been ruled invalid.

1. The previous "contract" which you can also change today gives control of the Authority to the District (LVVWD)
2. Even though LVVWD is only one of 7 agencies THOUGHT to be under SNWA
3. If you're going to pick an agency to run yours, then pick City of North Las Vegas or Boulder City
4. Boulder City doesn't even charge its customers for "infrastructure", "fire line pressure", or commodity fees all imposed unnecessarily by SNWA (or is it the District?)
5. The utility department of City of North Las Vegas has returned \$200 millions to the city for its operations with the same charges as LVVWD
6. CNLV utility department spends less than 20% on personnel
7. LVVWD/SNWA have sucked up billions of dollars from the public with meager results
8. Each agency, LVVWD and SNWA, spends 40% for personnel—including ONE-THIRD of ALL the public information professionals in ALL the COMBINED State, County, City, School districts, police departments, and specialized governmental agencies, of which SNWA is merely ONE!!

BTW, I received a response—the second in my year or so of writing—to my letter listing the salaries of those 21 people (out of 67 TOTAL in the entire state): It's worse than I thought—the response said that none or few of those people actually give information to the public. Instead they work on film and other projects!!!

IN OTHER WORDS THEY SUPPORT THE \$4 MILLION CAMPAIGN OF DECEPTION AND LIES OF BILLY VASILLIADIS—YES THE ONE THAT TEACHES PAT MULROY CLONES HOW TO KICK RECALITRANT CUSTOMERS IN THE GONADS AND THAT SIMULTANEOUSLY FAILS TO DISTINGUISH BETWEEN OUTDOOR WASTE OF WATER AND INDOOR RECYCLING.

That is one of the three keys to the future stability and low cost of water in Las Vegas:
**CHARGE OUTDOOR USERS AT LEAST DOUBLE WHAT INDOOR RECYCLERS
PAY**

The other two keys are:

- 1) Encourage indoor consumption so you can sell more water and don't need rate increases. The price is marked up 10 times the cost of pumping and treatment. People can be encouraged to use more water and pay SNWA more voluntarily—not have it ripped out of their pockets by dubious schemes.
- 2) Base charges equally for each family unit—not by pipeline size—so apartment dwellers, the people who create most of our return credits, are no longer compelled to subsidize millionaires like Pat Mulroy and her fawning supporters Sig Rogich (to whom she pays \$100/yr just to come out of the woodwork and pressure you for what Ms. Mulroy wants) and Billy V.

Please appointed John Entsminger as ACTING General Manager with a million dollar bonus for fulfilling his promises to bring non-contaminated water to Las Vegas with the third straw—ON TIME AND ON BUDGET. Draw up your own “Contract”, disband the IRPAC or make it do the job it was supposed to do of evaluating rates, refuse to re-hire the consultant for IRPAC, who is anything but “neutral”, and make it clear that you're looking for a turn-around expert for this very troubled agency.

Thank you.

Ed Uehling

January 14, 2014

Clark County Commission/LVVWD Board
SNWA Board
Las Vegas, Nevada

Re: Item #10 of SNWA agenda January 16 and “emergency” meeting of LVVWD
apparently January 21

Dear Mary Beth Scow, Susan Brager, Steve Sisolak, Lawrence Weekly, Larry Brown,
Tom Collins, Chris Giunchigliani, Anita Brown, Sam Bateman, Duncan McCoy, and Bob
Coffin:

I prepared the attached letters before getting the amazing news that one Commissioner
and Board Member of LVVWD and SNWA actually believes that the
Mulroy/Entsminger water empires should obey the law!!! That is quite a shocker and
affects some of the content of attached letters—although the basic ideas remain valid.

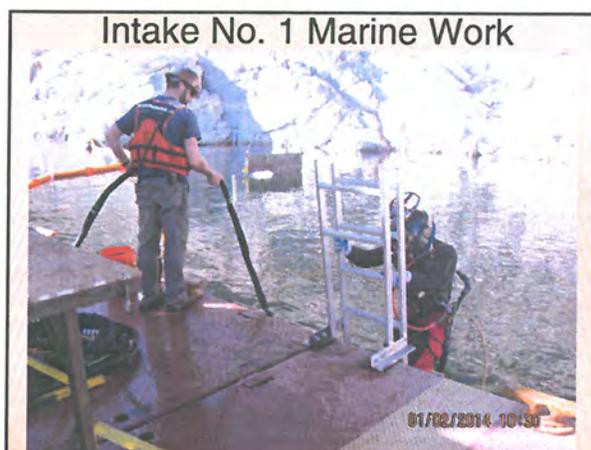
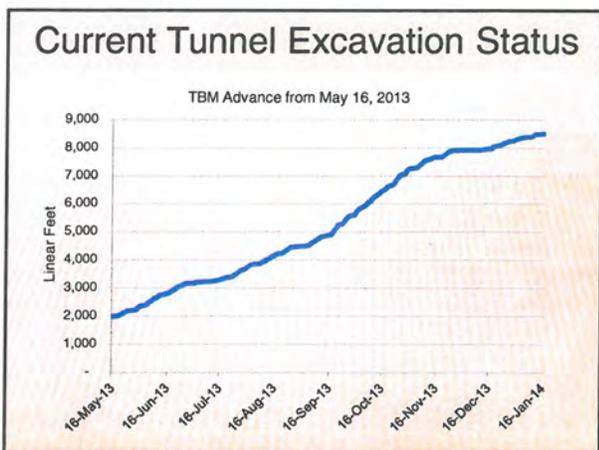
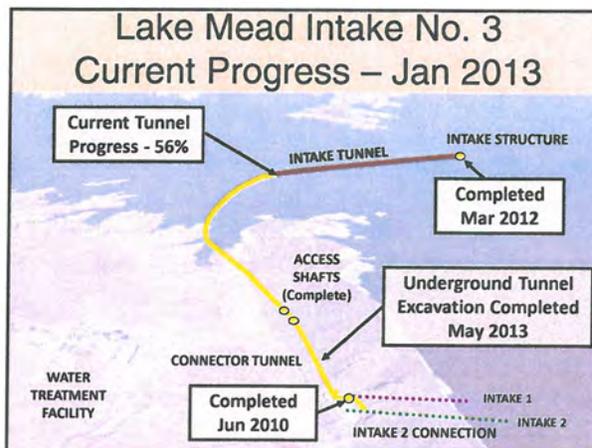
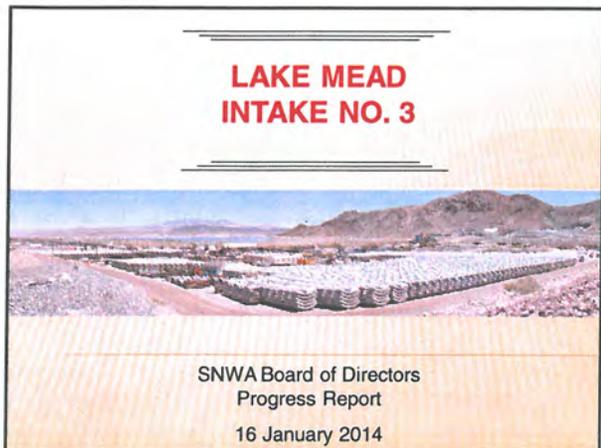
Hopefully, the Board of SNWA will “man-up” at its meeting Thursday (since there won’t
be a new General Manager anointed and glued in place at the time), cease being lapdogs
(in the very appropriate words of John L. Smith) to the RICO-challenged management of
these water mafias, refuse to accept the tortured language of “The Contract” that is being
shoved down your throats, place the SNWA in a position of “Authority” over the “Water
District” as common use of the English language would dictate (among other things),
take control and actually make your own decisions for the first time in 20 years and
actually expect these criminals to obey the law like the rest of us.

I’m really sorry that I don’t have to time to research more and understand the finer details
during the next two days before the SNWA meeting—but that’s not my job anyway. It’s
yours, so please do it. The whole Valley (except Rogich and Vasilliadis and the
pampered cabal at SNWA/LVVWD, whichever or both) will thank you.

VERY sincerely yours,

Ed Uehling

Email: evu2@cox.net
Cell: 702.808.6000



SOUTHERN NEVADA WATER AUTHORITY

Update on Drought Conditions and Water Use

January 16, 2014

Drought Monitor

(January 7, 2014)

Drought threat levels:
 D1: Extreme Drought
 D2: Very Extreme Drought
 D3: Extreme Drought
 D4: Very Extreme Drought
 D5: Extreme Drought
 D6: Very Extreme Drought

Author: Mark A. Mullen, National Drought Mitigation Center

<http://droughtmonitor.unl.edu/>

Seasonal Drought Outlook

(Valid December - March, 2014)

KEY:
 Drought persists or intensifies
 Drought remains but improves
 Drought removal likely
 Drought development likely

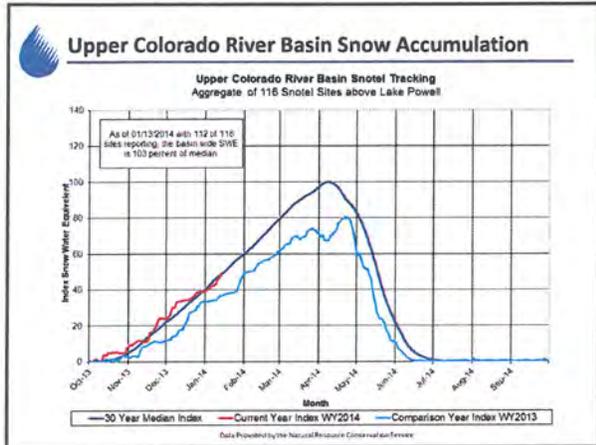
Author: Rich Tinker, Climate Prediction Center, NOAA
http://www.cpc.ncep.noaa.gov/products/precip_mon/seasonal_outlook_drought.html

Source: National Oceanic Atmospheric Administration and the U.S. Department of Commerce

Colorado River Basin Conditions

Seasonal Precipitation, October 2013 - December 2013

- December inflow to Lake Powell: 81% of average
- Snow Pack: 103% of average
- Water Year 2014 Precipitation: 96% of average
- Forecasted Water Year 2014 Inflow to Lake Powell: 93% of average

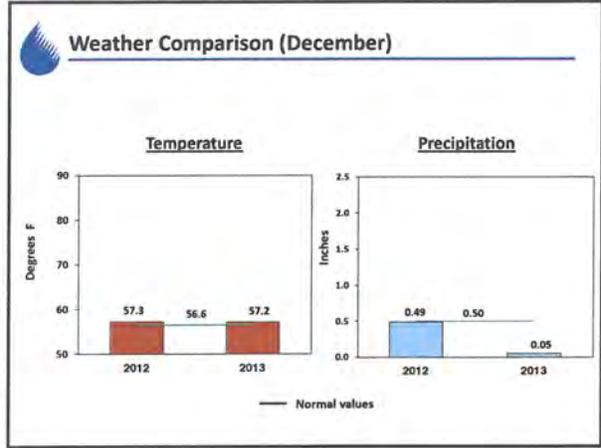


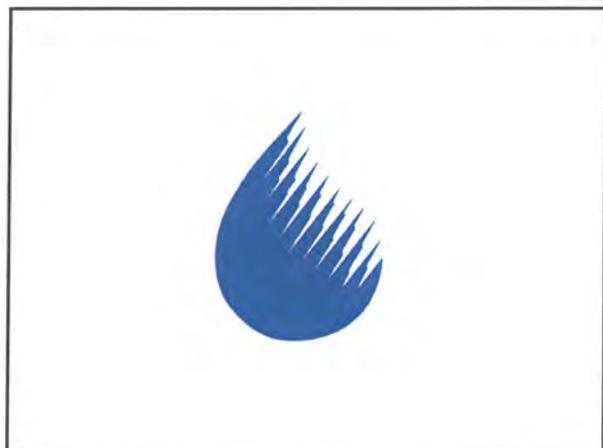
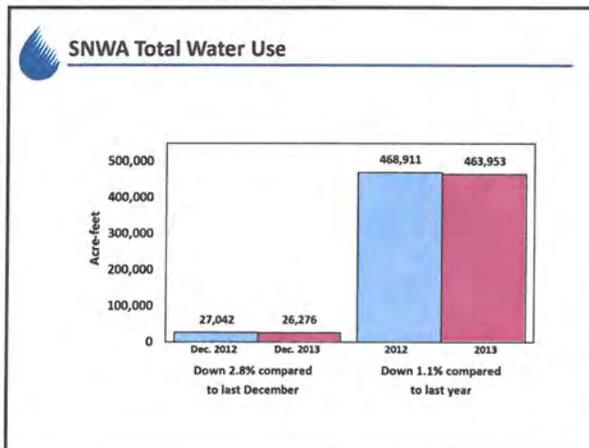
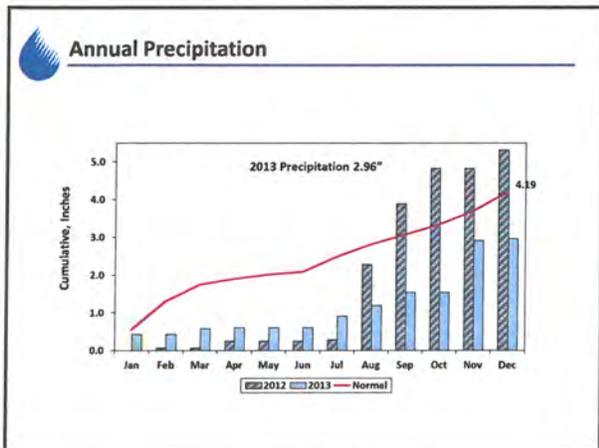
Precipitation and Inflow Forecast – Lake Powell

Month	2013 Water Year		2014 Water Year	
	Actual Precipitation	Inflows Forecast	Actual Precipitation	Inflows Forecast
Jan	72%	61%	96%	93%
Feb	78%	54%		
Mar	76%	49%		
Apr	78%	42%		
May	80%	45%		
Jun	77%	44%		
Jul	80%	41%		
Aug	81%	40%		
Sept	90%	46%		
Actual	91%	47%		

Source: Bureau of Reclamation, Lower Colorado Water Supply Reports

SNWA Water Use





**SOUTHERN NEVADA WATER AUTHORITY
BOARD OF DIRECTORS
AGENDA ITEM**

March 20, 2014

Subject: SNWA Youth Advisory Council	Director's Backup
Petitioner: John J. Entsminger, General Manager	
Recommendations: That the Board of Directors receive a presentation from the SNWA Youth Advisory Council and direct staff accordingly.	

Fiscal Impact:

None by approval of the above recommendation.

Background:

In 1999, the Authority's first Youth Advisory Council (YAC) was formed at the request of the Board of Directors. Now in its 15th year, the YAC provides a forum for Clark County high school juniors and seniors to participate in the planning, policy development, and evaluation of water issues affecting southern Nevada. As part of the program, students are asked to think critically and present recommendations to the Board regarding local and regional water issues and topics.

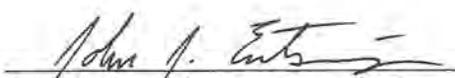
The 2013-2014 YAC is working to create a regional youth committee comprised of high school students across the Colorado River basin, using a model similar to the Authority's youth committee. The YAC made a presentation in December at the Colorado River Water Users Association (CRWUA) conference that was attended by principal water managers from all seven Colorado River Basin states. Held in Las Vegas, the conference provided YAC students valuable networking opportunities with water professionals. It is YAC's intention to build upon these relationships and reach out to high school students in other states, and begin laying the foundation for a basin-wide youth forum to discuss the issues affecting our shared water resource.

Ultimately, it is YAC's goal to create a student committee within CRWUA that will meet annually, discuss opportunities to prepare the next generation of water resource managers, and determine how high school students can be a part of resolving water issues today.

At this time, the Board is being asked to receive a presentation from the 2013-2014 YAC and to direct staff accordingly.

This action is authorized pursuant to Sections 6(p) and 21(5) of the SNWA 1995 Amended Cooperative Agreement. The office of the General Counsel has reviewed and approved this item.

Respectfully submitted:


John J. Entsminger, General Manager
JJÉ:PDS:JAW:AMB:AJF:cm

AGENDA ITEM #

2

SOUTHERN NEVADA WATER AUTHORITY
BOARD OF DIRECTORS
AGENDA ITEM
March 20, 2014

Subject: Lake Mead Intake No. 3 Arbitration Report	Director's Backup
Petitioner: Gregory J. Walch, General Counsel	
Recommendations: That the Board of Directors receive a report from General Counsel as to the results of the arbitration between the Authority and the Insurers on Lake Mead Intake No. 3.	

Fiscal Impact:

None by approval of the above recommendation.

Background:

To address ongoing drought conditions on the Colorado River and declining lake levels in Lake Mead, the Board of Directors authorized construction of Lake Mead Intake No. 3 (Project). On March 20, 2008, the Board awarded the shafts and tunnel contract to Vegas Tunnel Constructors (VTC) and work immediately began.

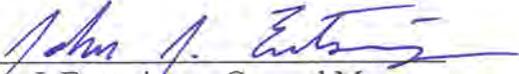
In June and December 2010, VTC experienced three inflow events which inundated the assembly chamber and filled the access shaft with water and debris. The Authority, VTC, and third-party experts worked to recover the tunnel, but ultimately determined that realignment of the tunnel was the safest and most cost-effective method to proceed. The Authority immediately involved the builders risk insurers (Insurers) in the recovery efforts and worked for more than a year with the Insurers to come to an equitable resolution on the Authority's claim. Initially, the Authority was reimbursed for \$14,266,488 of damage. However, the Insurers declined reimbursement of approximately \$34,661,158 of the Authority's claim. Despite the Authority's best efforts, the Insurers refused to provide complete coverage; and, on June 27, 2012, the Authority initiated arbitration proceedings against the Insurers.

After 15 months of discovery, 18 depositions, which included nine experts and the exchange of 33,500 documents, the Authority and the Insurers participated in a ten-day arbitration in March and April of 2013. On January 23, 2014, following another ten months of post-arbitration briefing, the arbitration panel issued its Final Award, which awarded the Authority \$35,086,036.35 above what the insurers had paid to date for the principal claim, costs, expert fees and prejudgment interest.

To date, the Authority has received a total of \$49,352,524.35 for the inflow and recovery events on Lake Mead Intake No. 3. These funds were placed back into the Authority's New Expansion Bond Fund, from which funds were utilized in the interim for the realignment project prior to arbitration.

The office of the General Counsel has reviewed and approved this agenda item.

Respectfully submitted:


John J. Entsminger, General Manager
JJE:PDS:GJW:LEB:tad

AGENDA ITEM #	3
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**SOUTHERN NEVADA WATER AUTHORITY
BOARD OF DIRECTORS
AGENDA ITEM**

March 20, 2014

Subject: Amendment	Director's Backup
Petitioner: David L. Johnson, Deputy General Manager, Engineering/Operations	
Recommendations: That the Board of Directors approve the First Amendment to Contract No. 14581A, Intergovernmental Agreement for a Joint Study on Nitrosamines, between Denver Water and the Authority to extend the date of completion of work from November 30, 2013, to September 30, 2014.	

Fiscal Impact:

None by approval of the above recommendation.

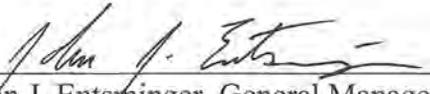
Background:

On November 15, 2012, the Board of Directors approved the Intergovernmental Agreement for a Joint Study on Nitrosamines between Denver Water and the Authority (Contract No. 14581A). Contract No. 14581A provided for the Authority to receive \$50,000 from Denver Water to conduct work in support of a study to resolve the occurrence of nitrosamine formation at Denver Water, as well as provide insight to other utilities experiencing similar issues (Study). Some nitrosamines (i.e. nitrosodimethylamine) are listed as priority pollutants by the U.S. Environmental Protection Agency and may be regulated in the future. Because of its comprehensive expertise in the study of nitrosamines in drinking water systems, the Authority's Water Quality Research and Development Division was requested to participate in the Study to identify sources and conditions of significant nitrosamine formation within a water treatment system to address potential control strategies for the full-scale operation.

The current status of the Study, consisting of comprehensive monitoring of nitrosamines within Denver Water's three water treatment plants and distribution system, requires an extension of Contract 14581A terms in order to complete analysis of the monitoring data. Contract 14581A will be extended for one additional year. No additional costs or compensation will be required in order to fulfill this time extension.

This amendment is being entered into pursuant to NRS Chapter 277 and Section 6(j) of the SNWA 1995 Amended Cooperative Agreement. The office of the General Counsel has reviewed and approved the amendment.

Respectfully submitted:


John J. Entsminger, General Manager
JJE:PDS:DLJ:DJR:ED:jf
Attachment

AGENDA ITEM #	4
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FIRST AMENDMENT TO CONTRACT NO. 14581A

THIS AMENDMENT to Agreement No. 14581A ("Amendment") is made and entered into between Southern Nevada Water Authority ("Contractor"), 1001 S Valley View Blvd., Las Vegas, NV 89153, and the City and County of Denver, acting by and through its Board of Water Commissioners ("Board"), a municipal corporation of the State of Colorado whose address is 1600 W. 12th Avenue, Denver, Colorado 80204.

WHEREAS, the parties entered into Agreement No. 14581A, dated December 12, 2012 ("Agreement"), and wish to amend it; and

WHEREAS, the Agreement needs to be extended to allow more time to complete the work.

NOW, THEREFORE, the parties agree as follows:

1. The date for completion of Work under the Agreement is extended to September 30, 2014. The Contractor agrees to continue all insurance coverage required under the Agreement through the extended completion date of the Agreement.

Except as specifically amended in this Amendment and any previous amendments, the Agreement shall remain in full force and effect. The effective date of this Amendment is November 30, 2013.

CITY AND COUNTY OF DENVER
Acting by and through its
BOARD OF WATER COMMISSIONERS

By: _____
Thomas J Roode
Director of Operations & Maintenance

DATE: _____

REGISTERED AND COUNTERSIGNED:
Dennis J. Gallagher, Auditor
CITY AND COUNTY OF DENVER

By: _____

APPROVED AS TO FORM:

By: 
Legal Division

Southern Nevada Water Authority
By execution, signer certifies that s/he is
authorized to accept and bind Contractor to
the terms of this Amendment

By: _____
John J. Entsminger
Title: General Manager

APPROVED AS TO FORM:

By: 
Legal Division

**SOUTHERN NEVADA WATER AUTHORITY
BOARD OF DIRECTORS
AGENDA ITEM**

March 20, 2014

Subject: Amendment	Director's Backup
Petitioner: Gregory J. Walch, General Counsel	
Recommendations: That the Board of Directors approve Amendment No. 1 to the existing agreement between FTI Consulting, Inc., and the Authority for forensic accounting services.	

Fiscal Impact:

The \$50,000 is available in the New Expansion Bond Fund.

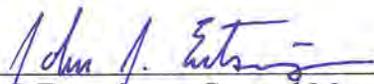
Background:

On September 25, 2012, the General Manager approved an agreement with FTI Consulting, Inc. (FTI), for forensic accounting services in support of the arbitration between the Authority and Great Lakes (UK) PLC, Zurich America Insurance Company, Starr Underwriting Agents Ltd., HDI Gerling Industrial Insurance Company, and General Security Indemnity Company of Arizona concerning an insurance claim arising from an inflow event in the tunnel that is part of the Lake Mead Intake No. 3 Project.

The subject amendment increases the current funding of \$100,000 per fiscal year to an amount not to exceed \$150,000 in any fiscal year. This amendment will fund work done by FTI in light of the arbitration hearings in rendering of the final binding decision.

This amendment is being entered into pursuant to NRS 332.115(1)(b) and Section 6(i) of the SNWA 1995 Amended Cooperative Agreement. The office of the General Counsel has reviewed and approved the item.

Respectfully submitted:



John J. Entsminger, General Manager
JJE:PDS:GJW:LEB:tad
Attachments

AGENDA ITEM #	5
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DISCLOSURE OF OWNERSHIP/PRINCIPALS

Business Entity Type						
<input type="checkbox"/> Sole Proprietorship	<input type="checkbox"/> Partnership	<input type="checkbox"/> Limited Liability Company	<input checked="" type="checkbox"/> Corporation	<input type="checkbox"/> Trust	<input type="checkbox"/> Non-Profit Organization	<input type="checkbox"/> Other
Business Designation Group						
<input type="checkbox"/> MBE	<input type="checkbox"/> WBE	<input type="checkbox"/> SBE	<input type="checkbox"/> PBE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Minority Business Enterprise	Women-Owned Business Enterprise	Small Business Enterprise	Physically Challenged Business Enterprise			
Corporate/Business Entity Name:		FTI Consulting, Inc.				
(Include d.b.a., if applicable)						
Street Address:		777 South Flagler Drive		Website: www.fticonsulting.com		
City, State and Zip Code:		West Palm Beach, FL 33401		POC Name and Email:		
Telephone No:		561-515-1900		Fax No: 561-515-1990		
Local Street Address:		925 4 th Avenue, Suite 1700		Website: www.fticonsulting.com		
City, State and Zip Code:		Seattle, WA 98104		Local Fax No: 206.260.1331		
Local Telephone No:		206.689.4480		Local POC Name Email: paul.ficca@fticonsulting.com		
Number of Clark County, Nevada Residents Employed: 0						

All entities, with the exception of publicly-traded and non-profit organizations, must list the names of individuals, either directly or indirectly, holding more than five percent (5%) ownership or financial interest in the business entity appearing before the SNWA Board of Directors.

Publicly-traded entities and non-profit organizations shall list all Corporate Officers and Directors in lieu of disclosing the names of individuals with ownership or financial interest. The disclosure requirement, as applied to land-use applications, extends to the applicant and the landowner(s).

Entities include all business associations organized under or governed by Title 7 of the Nevada Revised Statutes, including but not limited to private corporations, close corporations, foreign corporations, limited liability companies, partnerships, limited partnerships, and professional corporations.

Full Name	Title	% Owned <small>(Not required for Publicly Traded Corporations/Non-profit organizations)</small>
_____	_____	_____
_____	_____	_____
_____	_____	_____

This section is not required for publicly-traded corporations.

- Are any individual members, partners, owners or principals, involved in the business entity, an SNWA full-time employee(s), or appointed/elected official(s)?
 Yes No (If yes, please note that SNWA employee(s), or appointed/elected official(s) may not perform any work on professional service contracts, or other contracts, which are not subject to competitive bid.)
- Do any individual members, partners, owners or principals have a spouse, registered domestic partner, child, parent, in-law or brother/sister, half-brother/half-sister, grandchild, grandparent, related to an SNWA full-time employee(s), or appointed/elected official(s)?
 Yes No (If yes, please complete the Disclosure of Relationship form on Page 2. If no, please print N/A on Page 2.)

I certify under penalty of perjury, that all of the information provided herein is current, complete, and accurate. I also understand that the SNWA will not take action on land-use approvals, contract approvals, land sales, leases or exchanges without the completed disclosure form.



 Signature

 Senior Managing Director

 Title

Paul S. Ficca

 Print Name

 March 4, 2014

 Date

DISCLOSURE OF RELATIONSHIP

List any disclosures below:
(Mark N/A, if not applicable.)

NAME OF BUSINESS OWNER/PRINCIPAL	NAME OF SNWA EMPLOYEE OR OFFICIAL AND JOB TITLE	RELATIONSHIP TO SNWA EMPLOYEE OR OFFICIAL	SNWA EMPLOYEE'S/OFFICIAL'S DEPARTMENT
N/A			

"Consanguinity" is a relationship by blood. "Affinity" is a relationship by marriage.

"To the second degree of consanguinity" applies to the candidate's first and second degree of blood relatives as follows:

- Spouse – Registered Domestic Partners – Children – Parents – In-laws (first degree)
- Brothers/Sisters – Half-Brothers/Half-Sisters – Grandchildren – Grandparents – In-laws (second degree)

For SNWA Use Only:

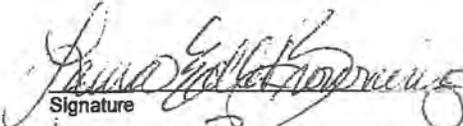
If no Disclosure or Relationship is noted above or if the section is marked N/A, please check this box:

No Disclosure

If any Disclosure of Relationship is noted above, please complete the following:

- Yes No Is the SNWA employee(s) noted above involved in the contracting/selection process for this particular agenda item?
- Yes No Is the SNWA employee(s) noted above involved in any way with the business in performance of the contract?

Notes/Comments:


Signature
Laura Browning
Print Name
Authorized Department Representative

**AGREEMENT FOR PROFESSIONAL SERVICES
AMENDMENT NO. 1**

The August 1, 2012 Agreement for Professional Services (“Agreement”), made and entered into by and between FTI Consulting, Inc., (“CONSULTANT”) and the Southern Nevada Water Authority, a political subdivision of the State of Nevada (“AUTHORITY”), is hereby amended as set forth below:

WITNESSETH:

A. REPLACE Paragraph 4 on Page 4 of 20 of the Agreement with the following Paragraph No. 4.

4. LIMITATION ON COSTS:

The total cost of services provided under this Agreement, as amended, shall not exceed one hundred fifty thousand dollars (\$150,000).

All other terms and conditions of the Agreement between CONSULTANT and AUTHORITY shall remain in full force and effect.

...

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...

IN WITNESS WHEREOF, the Parties have executed this Amendment No. 1 on this _____ day of _____, 2014.

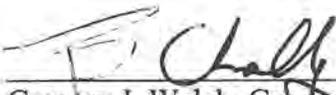
FTI CONSULTING, INC.

SOUTHERN NEVADA WATER AUTHORITY

By: _____
Paul Ficca, Senior Managing Director

By: _____
John J. Entsminger, General Manager

APPROVED AS TO FORM:



Gregory J. Walch, General Counsel

**SOUTHERN NEVADA WATER AUTHORITY
BOARD OF DIRECTORS
AGENDA ITEM**

March 20, 2014

Subject: Amendment	Director's Backup
Petitioner: Gregory J. Walch, General Counsel	
Recommendations: That the Board of Directors approve Amendment No. 4 to the existing agreement between Woods & Aitken and the Authority to provide specialized legal services regarding complex construction issues.	

Fiscal Impact:

The \$100,000 is available in the New Expansion Bond Fund.

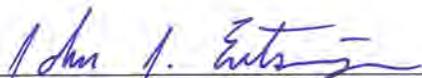
Background:

In February 2011, Woods & Aitken began providing legal services related to the complex arbitration matter involving Contract No. SNWA 070F01C, Lake Mead Intake No. 3 – Shafts and Tunnel Project. The arbitration was between the Authority and Great Lakes (UK) PLC, Zurich America Insurance Company, Starr Underwriting Agents Ltd., HDI Gerling Industrial Insurance Company, and General Security Indemnity Company of Arizona concerning an insurance claim arising from an inflow event in the tunnel that is part of the Lake Mead Intake No. 3 Project.

The subject amendment increases the current funding of \$500,000 per fiscal year to an amount not to exceed \$600,000 in any fiscal year. If approved, the amendment will allow Woods & Aitken's attorneys to continue to provide valuable assistance in complex construction issues.

This amendment is being entered into pursuant to NRS 332.115(1)(b) and Section 6(i) of the SNWA 1995 Amended Cooperative Agreement. The office of the General Counsel has reviewed and approved the item.

Respectfully submitted:



John J. Entsminger, General Manager
JJE:PDS:GJW:LEB:tad
Attachments

AGENDA ITEM #	6
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DISCLOSURE OF OWNERSHIP/PRINCIPALS

Business Entity Type					
<input type="checkbox"/> Sole Proprietorship	<input type="checkbox"/> Partnership	<input type="checkbox"/> Limited Liability Company	<input type="checkbox"/> Corporation	<input type="checkbox"/> Trust	<input type="checkbox"/> Non-Profit Organization
					<input checked="" type="checkbox"/> Other LLP
Business Designation Group N/A					
<input type="checkbox"/> MBE	<input type="checkbox"/> WBE	<input type="checkbox"/> SBE	<input type="checkbox"/> PBE	<input type="checkbox"/>	<input type="checkbox"/>
Minority Business Enterprise	Women-Owned Business Enterprise	Small Business Enterprise	Physically Challenged Business Enterprise		
Corporate/Business Entity Name:		Woods & Aitken LLP			
(Include d.b.a., if applicable)					
Street Address:		301 S. 13th Street, Ste 600		Website: www.woodsaitken.com	
City, State and Zip Code:		Lincoln NE 68508		POC Name and Email:	
Telephone No:		402-437-8500		Fax No: 402-437-8558	
Local Street Address:				Website:	
City, State and Zip Code:				Local Fax No:	
Local Telephone No:				Local POC Name Email:	
Number of Clark County, Nevada Residents Employed: N/A					

All entities, with the exception of publicly-traded and non-profit organizations, must list the names of individuals, either directly or indirectly, holding more than five percent (5%) ownership or financial interest in the business entity appearing before the SNWA Board of Directors.

Publicly-traded entities and non-profit organizations shall list all Corporate Officers and Directors in lieu of disclosing the names of individuals with ownership or financial interest. The disclosure requirement, as applied to land-use applications, extends to the applicant and the landowner(s).

Entities include all business associations organized under or governed by Title 7 of the Nevada Revised Statutes, including but not limited to private corporations, close corporations, foreign corporations, limited liability companies, partnerships, limited partnerships, and professional corporations.

Full Name	Title	% Owned <small>(Not required for Publicly Traded Corporations/Non-profit organizations)</small>
<u>See Attached</u>		

This section is not required for publicly-traded corporations.

1. Are any individual members, partners, owners or principals, involved in the business entity, an SNWA full-time employee(s), or appointed/elected official(s)?
 Yes No (If yes, please note that SNWA employee(s), or appointed/elected official(s) may not perform any work on professional service contracts, or other contracts, which are not subject to competitive bid.)

2. Do any individual members, partners, owners or principals have a spouse, registered domestic partner, child, parent, in-law or brother/sister, half-brother/half-sister, grandchild, grandparent, related to an SNWA full-time employee(s), or appointed/elected official(s)?
 Yes No (If yes, please complete the Disclosure of Relationship form on Page 2. If no, please print N/A on Page 2.)

I certify under penalty of perjury, that all of the information provided herein is current, complete, and accurate. I also understand that the SNWA will not take action on land-use approvals, contract approvals, land sales, leases or exchanges without the completed disclosure form.

Kari Weerts
 Signature
Bookkeeper
 Title

Kari Weerts
 Print Name
3/5/14
 Date

Pamela J. Bourne, Partner	3.800%
Craig C. Dirrim, Partner	4.900%
Terry C. Daugherty, Partner	4.900%
Kent E. Endacott, Partner	5.100%
Robert B. Evnen, Partner	3.800%
Kory D. George, Partner	3.700%
Nathan J. Gurnsey, Partner	3.400%
Joel D. Heusinger, Managing Partner	9.000%
Kerry L. Kester, Partner	2.600%
Andrew B. Koszewski, Managing Partner	4.250%
Michael D. Matejka, Partner	4.200%
Frank J. Mihulka, Partner	2.700%
Thomas J. Moorman, Partner	6.700%
James A. Overcash, Administrative Partner	5.500%
Jeffery T. Peetz, Managing Partner	7.100%
Paul M. Schudel, Managing Partner	8.250%
Bruce A. Smith, Partner	4.700%
Patrick D. Timmer, Partner	4.100%
Edward H. Tricker, Partner	7.500%
Todd W. Weidemann	3.800%

DISCLOSURE OF RELATIONSHIP

List any disclosures below:
(Mark N/A, if not applicable.)

NAME OF BUSINESS OWNER/PRINCIPAL	NAME OF SNWA EMPLOYEE OR OFFICIAL AND JOB TITLE	RELATIONSHIP TO SNWA EMPLOYEE OR OFFICIAL	SNWA EMPLOYEE'S/OFFICIAL'S DEPARTMENT
N/A			

"Consanguinity" is a relationship by blood. "Affinity" is a relationship by marriage.

"To the second degree of consanguinity" applies to the candidate's first and second degree of blood relatives as follows:

- Spouse – Registered Domestic Partners – Children – Parents – In-laws (first degree)
- Brothers/Sisters – Half-Brothers/Half-Sisters – Grandchildren – Grandparents – In-laws (second degree)

For SNWA Use Only:

If no Disclosure or Relationship is noted above or if the section is marked N/A, please check this box:

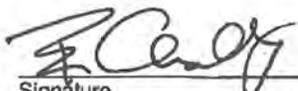
No Disclosure

If any Disclosure of Relationship is noted above, please complete the following:

Yes No Is the SNWA employee(s) noted above involved in the contracting/selection process for this particular agenda item?

Yes No Is the SNWA employee(s) noted above involved in any way with the business in performance of the contract?

Notes/Comments:



 Signature
 Brian Challey

 Print Name
 Authorized Department Representative

**AGREEMENT FOR PROFESSIONAL SERVICES
AMENDMENT NO. 4**

The February 21, 2008 Third Amendatory Agreement for Professional Services (“Agreement”), made and entered into by and between Woods & Aitken (“CONSULTANT”) and the Southern Nevada Water Authority, a political subdivision of the State of Nevada (“AUTHORITY”), is hereby amended as set forth below:

WITNESSETH:

A. REPLACE Paragraph 2(b) on Page 4 of 9 of the Third Amendatory Agreement with the following paragraph 2(b).

2. Compensation:

(b) Both parties understand and agree that all legal fees, costs and expenses must come from within the AUTHORITY’s budget. No compensation in any given fiscal year of the AUTHORITY in excess of \$600,000 overall, including costs and expenses, or in excess of \$600,000 for CONSULTANT’s actual costs and expenses, shall be due to CONSULTANT without prior written approval of the AUTHORITY by and through its Board of Directors.

All other terms and conditions of the Agreement between CONSULTANT and AUTHORITY shall remain in full force and effect.

...

...

...

IN WITNESS WHEREOF, the Parties have executed this Amendment No. 4 on this _____ day of _____, 2014.

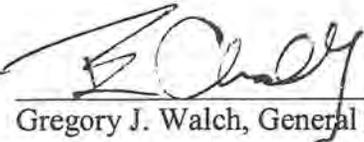
WOODS & AITKEN

SOUTHERN NEVADA WATER AUTHORITY

By: _____
Joel Heusinger, Esq., Partner

By: _____
John J. Entsminger, General Manager

APPROVED AS TO FORM:



Gregory J. Walch, General Counsel

SOUTHERN NEVADA WATER AUTHORITY
BOARD OF DIRECTORS
AGENDA ITEM
 March 20, 2014

Subject: Agreement	Director's Backup
Petitioner: David L. Johnson, Deputy General Manager, Engineering/Operations	
Recommendations: That the Board of Directors approve an agreement between Carollo Engineers and the Authority for Water Research Foundation Study #4494, "Evaluation of Current and Alternative Strategies for Managing CECs in Water," and accept funds in the amount of \$35,000 for the Authority's participation costs.	

Fiscal Impact:

If the above recommendation is approved, funds in the amount of \$35,000 will be accepted by the Authority.

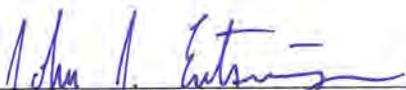
Background:

Nearly all chemicals have the potential to enter the aquatic environment through point source discharges, urban and agricultural run-off, atmospheric deposition, and other entry points. Over the past decade in particular, a tremendous amount of research has focused on the detection, attenuation, and fate of unregulated chemicals of emerging concern (CEC) in water treatment processes. Within the United States, these research efforts have determined that relatively few CECs are detectable in drinking water and essentially none of the CECs at concentrations detected in drinking water would be expected to have human health consequences. Nevertheless, a large amount of concern and uncertainty regarding the presence of CECs in drinking water remains. Even a minimal or no risk categorization of drinking water systems does not alleviate the fact that aquatic ecosystems may be at risk due to the presence of CECs. The goal of this study, Water Research Foundation Study #4494, "Evaluation of Current and Alternative Strategies for Managing CECs in Water," is to aggregate and evaluate CEC management plans, which have been employed or are being considered in North America, Europe, Australia and elsewhere. A comprehensive review of prioritization schemes and management plans, supported by case studies to demonstrate the costs and benefits of each, will be performed. Considering CECs holistically will increase public confidence, while basing decisions on sound scientific data.

Carollo Engineers requested the Authority's Water Quality Research and Development Division to participate in this project to perform a desktop evaluation for the selection of appropriate CECs to support a quantitative assessment of various alternative CEC management strategies. If approved, the attached agreement and task order provide for the Authority to accept \$35,000 from Carollo Engineers to conduct the evaluation for this study.

This agreement is being entered into pursuant to Section 6 (j) of the SNWA 1995 Amended Cooperative Agreement. The office of the General Counsel has reviewed and approved the agreement.

Respectfully submitted:


 John J. Entsminger, General Manager
 JJE:PDS:DLJ:DJR:ED:jf
 Attachments

AGENDA ITEM #	7
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DISCLOSURE OF OWNERSHIP/PRINCIPALS

Business Entity Type						
<input type="checkbox"/> Sole Proprietorship	<input type="checkbox"/> Partnership	<input type="checkbox"/> Limited Liability Company	<input checked="" type="checkbox"/> Corporation	<input type="checkbox"/> Trust	<input type="checkbox"/> Non-Profit Organization	<input type="checkbox"/> Other
Business Designation Group						
<input type="checkbox"/> MBE	<input type="checkbox"/> WBE	<input type="checkbox"/> SBE	<input type="checkbox"/> PBE	<input type="checkbox"/>	<input type="checkbox"/>	
Minority Business Enterprise	Women-Owned Business Enterprise	Small Business Enterprise	Physically Challenged Business Enterprise			
Corporate/Business Entity Name:		Carollo Engineers, Inc.				
(Include d.b.a., if applicable)		N/A				
Street Address:		2700 Ygnacio Valley Road, Suite 300		Website: www.carollo.com		
City, State and Zip Code:		Walnut Creek, CA 94085		POC Name and Email: Tanja Rauch-Williams trauch-williams@carollo.com		
Telephone No:		925-932-1710		Fax No: 925-930-0208		
Local Street Address:		376 East Warm Springs Road, Suite 250		Website: www.carollo.com		
City, State and Zip Code:		Las Vegas, NV 89119		Local Fax No: 702-792-4533		
Local Telephone No:		702-792-3711		Local POC Name Email: N/A		
Number of Clark County, Nevada Residents Employed: 19 (company wide)						

All entities, with the exception of publicly-traded and non-profit organizations, must list the names of individuals, either directly or indirectly, holding more than five percent (5%) ownership or financial interest in the business entity appearing before the SNWA Board of Directors.

Publicly-traded entities and non-profit organizations shall list all Corporate Officers and Directors in lieu of disclosing the names of individuals with ownership or financial interest. The disclosure requirement, as applied to land-use applications, extends to the applicant and the landowner(s).

Entities include all business associations organized under or governed by Title 7 of the Nevada Revised Statutes, including but not limited to private corporations, close corporations, foreign corporations, limited liability companies, partnerships, limited partnerships, and professional corporations.

Full Name	Title	% Owned <small>(Not required for Publicly Traded Corporations/Non-profit organizations)</small>
N/A –no single share holder holds more than 5%		

This section is not required for publicly-traded corporations.

1. Are any individual members, partners, owners or principals, involved in the business entity, an SNWA full-time employee(s), or appointed/elected official(s)?
 - Yes No (If yes, please note that SNWA employee(s), or appointed/elected official(s) may not perform any work on professional service contracts, or other contracts, which are not subject to competitive bid.)

2. Do any individual members, partners, owners or principals have a spouse, registered domestic partner, child, parent, in-law or brother/sister, half-brother/half-sister, grandchild, grandparent, related to an SNWA full-time employee(s), or appointed/elected official(s)?
 - Yes No (If yes, please complete the Disclosure of Relationship form on Page 2. If no, please print N/A on Page 2.)

Carollo Engineers has in excess of 50 shareholders. While we are not aware of any consanguinity or affinity relationships as described on Page 2, we cannot at this point exclude that possibility.

I certify under penalty of perjury, that all of the information provided herein is current, complete, and accurate. I also understand that the SNWA will not take action on land-use approvals, contract approvals, land sales, leases or exchanges without the completed disclosure form.

Tanja Rauch-Williams

Signature

Tanja Rauch-Williams

Print Name

DISCLOSURE OF OWNERSHIP/PRINCIPALS

Principal Technologist/Principal Investigator
Title

February 15, 2014
Date

DISCLOSURE OF RELATIONSHIP

List any disclosures below:
(Mark N/A, if not applicable.)

NAME OF BUSINESS OWNER/PRINCIPAL	NAME OF SNWA EMPLOYEE OR OFFICIAL AND JOB TITLE	RELATIONSHIP TO SNWA EMPLOYEE OR OFFICIAL	SNWA EMPLOYEE'S/OFFICIAL'S DEPARTMENT
N/A			

"Consanguinity" is a relationship by blood. "Affinity" is a relationship by marriage.

"To the second degree of consanguinity" applies to the candidate's first and second degree of blood relatives as follows:

- Spouse – Registered Domestic Partners – Children – Parents – In-laws (first degree)
- Brothers/Sisters – Half-Brothers/Half-Sisters – Grandchildren – Grandparents – In-laws (second degree)

For SNWA Use Only:

If no Disclosure or Relationship is noted above or if the section is marked N/A, please check this box:

No Disclosure

If any Disclosure of Relationship is noted above, please complete the following:

Yes No Is the SNWA employee(s) noted above involved in the contracting/selection process for this particular agenda item?

Yes No Is the SNWA employee(s) noted above involved in any way with the business in performance of the contract?

Notes/Comments: NO KVVWD or SNWA employees were noted

Signature

David J. Rexing

Print Name

Authorized Department Representative

N/A

CAROLLO ENGINEERS, INC.

**WATER RESEARCH FOUNDATION CONSULTANT AGREEMENT
FOR GOVERNMENT OR NOT-FOR-PROFIT ORGANIZATIONS**

AGREEMENT FOR PROFESSIONAL SERVICES

Project No. _____

This AGREEMENT made and entered into this _____ day of _____, 2014 by and between Carollo Engineers, Inc., (hereinafter "ENGINEER"), and the Southern Nevada Water Authority (hereinafter "CONSULTANT").

WITNESSETH:

WHEREAS, the ENGINEER and the CONSULTANT wish to enter into an Agreement (hereinafter "Agreement") for the furnishing of services in connection with the Water Research Foundation (hereinafter "the Foundation" or "WaterRF")

Water Research Foundation Project #4494

Evaluation of Current and Alternative Strategies for Managing CECs in Water
(Owner and Project Description)

(hereinafter "Project"), and

WHEREAS, the CONSULTANT possesses the qualifications to perform the necessary services for the ENGINEER in connection with the Project, and

NOW THEREFORE, in consideration of the mutual promises and covenants of the parties hereto, it is agreed as follows:

SECTION 1 - GENERAL

- 1.1 The services herein required, shall be set forth in the attached Task Order. In performance of these services, the CONSULTANT shall provide qualified personnel. The Task Order shall include designation of a Project Manager and a list of proposed personnel. The CONSULTANT shall promptly notify the ENGINEER of any changes in his initial organization.
- 1.2 It is intended that each additional Task Order sequentially numbered

setting forth the CONSULTANT's Services, Time of Performance, and Payment, or any other conditions, shall become a supplement to and a part of this Agreement.

SECTION 2 - PAYMENT

- 2.1 Compensation for providing services referred to in Section 1 shall be detailed in the attached Task Order.
- 2.2 The CONSULTANT may submit invoices to the ENGINEER once per month. Invoices shall be prepared in

such form and supported by documentation as the ENGINEER may reasonably require. All such invoices shall be reviewed and approved by the ENGINEER before submittal to THE FOUNDATION together with THE FOUNDATION's Progress Billing statement, attached to this Agreement.

- 2.3 The payment schedule will be based on progress increments over the Project life. Following receipt of reimbursement from THE FOUNDATION, payment will be made to the CONSULTANT within 15 days for the value of the partially completed services.
- 2.4 Final payment of any balance will be made upon completion of the CONSULTANT's services and acceptance by THE FOUNDATION.

SECTION 3 - TIME OF PERFORMANCE

- 3.1 The Time of Performance under this Agreement shall be defined in the attached Task Order.
- 3.2 The CONSULTANT shall report from time to time as requested by the ENGINEER, its progress under this Agreement. The CONSULTANT shall plan its performance of services to accomplish its timely completion, and shall promptly notify the ENGINEER of any anticipated delay which may affect the CONSULTANT's Time of Performance.
- 3.3 CONSULTANT shall use all reasonable efforts to complete the proposed work on schedule.

SECTION 4 - LEGAL RELATIONS

- 4.1 The CONSULTANT is for all purposes an independent contractor. In no event shall the CONSULTANT or any personnel retained by the

CONSULTANT be deemed to be an agent or employee of the ENGINEER or engaged by THE FOUNDATION for the account of or on behalf of the ENGINEER. Full control of means and methods of work including provisions for required safety precautions shall be the responsibility of the CONSULTANT.

- 4.2 The CONSULTANT shall not make, sublet or assign any of the services covered by this Agreement, except with the prior written approval of the ENGINEER and in compliance with the terms, provisions and conditions of the Agreement.
- 4.3 The CONSULTANT shall, upon request and without cost, provide ENGINEER and THE FOUNDATION copies of all deliverables and all supporting material.

SECTION 5 - INSURANCE

- 5.1 Business Insurance. ENGINEER acknowledges that CONSULTANT is self-insured. CONSULTANT shall promptly furnish to ENGINEER evidence of self-insurance in a form satisfactory to ENGINEER.

- 5.2 Workers' Compensation Insurance. A current Workers' Compensation and Employer's Liability insurance certificate with limits pursuant to state law is required. ENGINEER acknowledges that CONSULTANT is self-insured. **CONSULTANT shall attach evidence of self-insurance in a form satisfactory to the ENGINEER to the signed Agreement before returning to**

ENGINEER. This Agreement is not final and invoices cannot be paid until an insurance certificate evidencing such policy is received.

SECTION 6 - INDEPENDENT INVESTIGATIONS

- 6.1 The CONSULTANT has reviewed the services required under the Agreement and has made his own investigation concerning services. The CONSULTANT has determined they have sufficient information and qualified personnel to enter into the Agreement and perform the services called for herein. The CONSULTANT agrees and acknowledges that the ENGINEER has made no representations or warranties concerning the services provided and that the CONSULTANT has relied solely upon his own review and investigation prior to entering into this Agreement.

SECTION 7 - TERMINATION OF AGREEMENT

- 7.1 ENGINEER may terminate this Agreement by providing CONSULTANT with ten (10) days written notice thereof and, if the event of default or breach, thereafter, ten (10) days to undertake a cure.. Absent any default or breach of contract, CONSULTANT will be reimbursed for that portion of the work completed prior to termination, including obligations that could not be canceled prior to termination.
- 7.2 In the event termination is the result of breach or default, absent ENGINEER's breach or default, CONSULTANT will be reimbursed for that portion of the work completed prior to termination and such other relief as may be provided by the Funding Agency pursuant to the Funding Agency's project agreement.

SECTION 8 - ENTIRE AGREEMENT

- 8.1 This Agreement including attachments incorporated herein by reference represents the entire Agreement and understanding between the parties and any negotiations, proposals or oral agreements are intended to be superseded by this written Agreement. Any supplement or amendment to this Agreement to be effective shall be in writing and signed by the parties.

SECTION 9 - REQUIRED PROVISIONS

- 9.1 The CONSULTANT shall, in the performance of this Agreement, comply with all federal, state and local laws; and all regulations and orders issued under any applicable law.
- 9.2 The CONSULTANT shall perform all services in accordance with the attached Funding Agency's agreement specifically relating to CONSULTANT. Except for Section 10 of this Agreement, if there is a conflict between this Agreement and the Funding Agency's agreement, the Funding Agency's agreement shall control. To the extent that Section 10 of this Agreement conflicts with the Funding Agency's agreement, this Agreement shall control.

SECTION 10 - GOVERNING LAW

- 10.1 This Agreement is to be governed and construed in accordance with the laws of the state of Nevada.
- 10.2 The venue for any dispute not directly involving the Funding Authority, arising from the terms of this Agreement, shall be Clark County, Nevada.
- 10.3 Except as otherwise set forth in this Agreement, the Parties shall bear their own attorneys' fees and costs

incurred in resolving the claims, as well as on the preparation of this Agreement. In the event that any Party commences an action to enforce or interpret this Agreement, or for any other remedy based on or arising from this Agreement, the prevailing party therein shall be entitled to recover its reasonable and necessary attorneys' fees and costs incurred. For the purposes of this provision, the "prevailing party" shall be that party which has been successful with regard to the main issue, even if that Party did not prevail on all issues.

IN WITNESS WHEREOF, duly authorized representatives of the parties have signed in confirmation of this Agreement, with effective date the day and year first above written.

CAROLLO ENGINEERS, INC.

SOTHERN NEVADA WATER AUTHORITY

By: _____
[Title]

By: _____
John J. Entsminger, General Manager
P.O. Box 99954

Address

By: _____
[Title]

Las Vegas, NV 89193-9954

City State Zip

APPROVED AS TO FORM:

By: *Laura Browning* 2-13-14
Laura Browning, Project Attorney

Date _____

Phone (702) 856-3665

Fax (702) 856-3647

E-mail Eric.dickenson@snwa.com

Fed Tax ID # 88-0278492

Certified _____ Yes, if so which?
MBE, WBE _____ No
or SBE? _____

PROGRESS BILLING

Please submit invoice in one pdf format to: accountspayable@carollo.com

Subject/Project Title: _____
 THE FOUNDATION _____
 Project No. _____
 Carollo Project No. _____

Reimbursement Request for: Period No.: _____
 From: _____ To: _____

To: Carollo Engineers, Inc.
 4600 E. Washington Street, Suite 500
 Phoenix, AZ 85034
 Attention: Accounts Payable

If mailing the invoice, please send to address at left.

From: [Consultant]
 [Address]
 [City, State Zip Code]
 Sent By: _____ Date: _____

Category	Budget		Spent This Period		Spent to Date	
	%	\$	%	\$	%	\$
EXPENDITURES:						
Labor (including benefits and overhead)						
Travel						
Materials and Supplies						
Computer/Phone/Postage						
SUBTOTAL	100%					[A]
IN-KIND CONTRIBUTION RECORD:						
Labor						
Travel						
Materials and Supplies						
Computer/Phone/Postage						
SUBTOTAL	100%					
TOTAL						

CONTRACT AMOUNT
 Less 20% Retainage
 Funds Available [B]

Amount of [A] or [B], whichever is less

Less Previous Payments
Amount Due This Period

TASK ORDER NO. 1
CAROLLO ENGINEERS, INC.

AND

Southern Nevada Water Authority
CONSULTANT

This Task Order is issued by the ENGINEER and accepted by the CONSULTANT pursuant to the mutual promises, covenants and conditions contained in the Agreement between the above named parties dated the _____ day of _____, 20__, in connection with:

**Water Research Foundation Project #4494:
Evaluation of Current and Alternative Strategies for Managing CECs in Water**

PURPOSE

Task Order #1 is intended to cover CONSULTANT's time and expenses to support Phases 1, 2 and 3 project activities as specified in the project scope of work (Exhibit A, page 15 in the Water Research Foundation Funding Agreement) up to a maximum fee of \$35,000. The CONSULTANT's Project Manager, Eric Dickenson (hereinafter "Project Manager"), will lead Phase 2 activities (CEC Selection for Strategy Evaluation/Risk Evaluation). A CONSULTANT's Postdoctoral Researcher and Graduate Intern will support Phase 2 activities. The Project Manager will provide review of Phase 1 (CEC Management Strategies) and Phase 3 (CEC Strategy Evaluations) project activities. The CONSULTANT will provide the site facilities for a workshop to support Phase 1 of the project. CONSULTANT personnel will travel to a project workshop located in the U.S. and a scientific meeting to present research results from this project.

TIME OF PERFORMANCE

The work for this project is scheduled to take place between April 1, 2014 and February 1, 2016.

EFFECTIVE DATE

This Task Order No. 1 is effective as of the _____ day of _____, 20__.

IN WITNESS WHEREOF, duly authorized representatives of the ENGINEER and of the CONSULTANT have executed this Task Order No.1 evidencing its issuance by ENGINEER and acceptance by CONSULTANT.

CAROLLO ENGINEERS, INC.

SOUTHERN NEVADA WATER AUTHORITY

Accepted this ____ day of _____,
20__

By: _____
[Title]

By: _____
John J. Entsminger, General Manager

APPROVED AS TO FORM

By: _____
[Title]

By: 
Laura Browning, Project Attorney

SUBCONSULTANT BILLING INSTRUCTIONS

Note: SUBCONSULTANT invoices come in a wide variety of formats. Very few offer job-to-date information that indicates progress of the job in relation to contract authorizations.

The attached Progress Billing cover sheet has been designed to remedy the problem and provide the needed information in a consistent manner. The SUBCONSULTANT's invoice should be prepared in the normal manner then attached to the Progress Billing cover sheet.

When the Project is being started, the Project Manager needs to fill in some of the information on this form and provide it to the SUBCONSULTANT for their use in preparing the monthly billing to Carollo Engineers.

Address:	Do not edit the mailing address – it is the centralized address for Concur billings.
Subject:	Fill in the name of the Project
Carollo Project Number:	Fill in
Description:	This section is for recording the amounts and hours. Sometimes breakdowns of the consultant's charges will be needed. Usually it will be derived from the Scope of Services. The Project Manager should list the names of the items to be listed separately. The breakdown of the Contract limit should be completed in the "Contract Limits" column. If no breakdown is required, type in "total contract" in the description column and fill in the Contract Limit.



P 303.347.6100 F 303.730.0851

www.WaterRF.org

6666 W. Quincy Ave., Denver CO 80235-3098

November 19, 2013

Tanja Rauch-Williams, Ph.D., P.E.
Senior Technologist
Carollo Engineers
390 Interlocken Crescent Ste 800
Broomfield, CO 80021

Dear Dr. Rauch-Williams:

This document is a signed copy of the Water Research Foundation's Project Funding Agreement (PFA) entitled "Evaluation of Current and Alternative Strategies for Managing CECs in Water," the Foundation's project number 04494.

PLEASE NOTE: In an effort to expedite contracting and reduce mailing costs, the Foundation is now emailing out final signed legal documents in a PDF format.

1. Review document and have a duly authorized representative and the Principal Investigator sign the agreement.
2. Only the signature page is required to be returned to the Foundation.
3. Please **Email** a scanned PDF of the executed signature page to the following:
 - a. Peggy Falor at pfalor@WaterRF.org and
 - b. Corina Santos at csantos@WaterRF.org
4. Do not return the entire agreement, only the signature page.
5. Please return no later than **ten (10) calendar days** from receipt.
6. The Foundation will email a PDF of this fully executed agreement to you for your files.

Thank you for your assistance.

A handwritten signature in black ink, appearing to read "P. Falor".

Peggy Falor
Manager of Contracts and Project Administration

4494:PF

Project Funding Agreement 04494

This Project Funding Agreement (hereafter "PFA") is entered into on _____, 2013, (the "Effective Date") by and among the Water Research Foundation (the "Foundation"), a Delaware non-profit corporation whose principal place of business is located at 6666 W. Quincy Ave., Denver, Colorado 80235, and Carollo Engineers, Inc. ("Sub-recipient"), a Delaware corporation whose principal place of business is located at 390 Interlocken Crescent, Suite 800, Broomfield, CO 80021.

The Foundation has selected said Sub-recipient to receive a research and development grant as more specifically detailed in this PFA. The parties mutually agree as follows:

- I. **DEFINITIONS.** The following defined terms shall apply in this PFA:
 - A. "Cost Share" the portion of allowable costs that the sub-recipient, subcontractor or third-party participant contributes toward completing the Foundation project. Cost share includes any non-federal cash and non-cash contributions from the sub-recipient and subcontractors, and non federal cash contributions from participants. All Cost Share must meet Code of Federal Regulations (CFR) requirements in 2 CFR Part 215.23 or the requirements of OMB Circular A-102.24 as applicable.
 - B. "Foundation Contribution" is that portion of the Project Funds which the Foundation has agreed to contribute to fund the Project under this PFA, as detailed in Exhibit C.
 - C. "IP" is all rights to copyrights, trademarks, service marks, patents, trade secrets, know how, and confidential information, including the right to enforce, divest, license, seek registration, prosecute infringers, and commercially or otherwise exploit such rights.
 - D. "PAC" is the Project Advisory Committee that consists of independent volunteers selected by the Foundation and Co-funders to provide technical review, assistance, and/or expertise related to the Project. The number of volunteers to serve on the PAC will be determined by the Foundation.
 - E. "Principal Investigator" is the Sub-recipient employee identified in Exhibit B, who is primarily responsible for ensuring that all terms and conditions of this PFA are met and to whom the Foundation shall give all notices intended for the Sub-recipient.
 - F. "Project" is the work to be completed by the Sub-recipient, as described more specifically in the Project Proposal attached hereto as Exhibit A.
 - G. "Project Funds" is the aggregate maximum amount of cash award which the Foundation agrees to provide to Sub-recipient to fund its performance of the Project pursuant to this PFA.
 - H. "Project Proposal" is the final and written description of the project to be undertaken by Sub-recipient for which the Project Funds is granted and performance is monitored pursuant to this PFA.

- I. "Proposal Guidelines" is the Foundation's written guidelines, currently maintained at <http://waterrf.org/funding/ProposalDocuments/GuidelinesForFocusAreaProgramProposals.pdf> in which the procedures, criteria and requirements for eligibility, proposal, performance, administration, reporting, and other matters governing the proposal of and performance of a Project are set forth. The Proposal Guidelines were provided to the Sub-recipient prior to its submission of a Project Proposal, and its terms and requirements are incorporated in this PFA by this reference. The terms "Deliverable", "Periodic Report", "Draft Report", and "Final Report" appearing in this PFA shall have the definitions, and be governed by the requirements applicable thereto, as set forth in the Proposal Guidelines.
- J. "Reports" are the Periodic Reports, Draft Report, and/or Final Report, collectively.
- K. "Subcontractor" is any individual or entity identified by Sub-recipient in the Project Proposal as assisting in the performance of the Project under this PFA.
- L. "Work Product" is copyrightable works of authorship created by or on behalf of the Sub-recipient or its Subcontractors in the course of performing under this PFA or the Project, including, without limitation, the Scope of Work, all Deliverables, Periodic Reports, Draft Reports, the Final Report, all interim drafts of the foregoing, and any computer software and related documentation developed under the Project.

II. GENERAL OBLIGATIONS OF THE PARTIES

A. The Sub-recipient.

1. The Sub-recipient agrees to complete the research, prepare written Reports, deliver the Deliverables to the Foundation, and perform such other functions, all in accordance with the schedules and other requirements set forth in the Exhibits and this PFA. The Sub-recipient shall itself, and shall require all of its Subcontractors to, perform the Project and all other activities related thereto in full compliance with all laws, regulations, ordinances, and other requirements governing them.
2. Sub-recipient may not use Project Funds received under this PFA as a match or cost-sharing vehicle to secure U.S. Federal monies or money from any other sources, unless otherwise expressly stated and fully disclosed in the Project Proposal. The Sub-recipient may not use any portion of the Project Funds for any purpose other than as detailed in the Project Proposal, and as is necessary to perform the Project.
3. All disbursements of Project Funds will be paid directly to Sub-recipient. Sub-recipient shall remain solely responsible for payment of its Subcontractors, and for procurement of all equipment, materials, and other resources necessary for performance of the Project hereunder.
4. Focus Area Annual Research Summit

Projects that are funded with the Foundation's Focus Area funds are required to participate in the Focus Area Annual Research Summit. The Summit brings together focus area Technical

Advisory Committee (TAC) members, Focus Area Council (FAC) members, and project PIs on an annual basis to review the technical progress and results of projects funded within an individual focus area. The summits may also include researchers for projects that are related to the Focus Area, but not funded by Focus Area funds. Focus area research summits are held on an annual basis via web conference and are usually held in the fall or winter. PIs for projects funded under a particular focus area will be required to present project information at the Focus Area Annual Research Summit every year. Researchers should include time and resources in the proposal budget to cover the creation and presentation of a 15-30 minute presentation, to be given via webcast, on an annual basis for the duration of the project period.

- B. The Foundation. The Foundation will disburse the Project Funds to the Sub-recipient as detailed in this PFA and Exhibit C. The Foundation's disbursement of the Project Funds may further be subject to the Foundation's receipt of its own funding from appropriate sources.

III. DISBURSEMENT OF PROJECT FUNDS

- A. Advance Payment. All payments of the Project Funds will be disbursed by the Foundation directly to the Sub-recipient. The amount of Project Funds was determined on the basis of the budget submitted by the Sub-recipient, and set forth in Exhibit C. The Project Funds is a "not to exceed" amount and no payments in excess of such amount are authorized or required. Following the Effective Date the Foundation will advance to the Sub-recipient 10% of the Project Funds. All subsequent disbursements of the Project Funds shall be governed by the requirements described in Section III.B below and in Exhibit C.
- B. Invoicing and Payments.
1. Beginning three (3) months after the Effective Date, and every three (3) months thereafter during the term of this PFA, Sub-recipient shall submit to the Foundation a detailed invoice itemizing the expenses actually incurred in the three (3) months prior to the invoice date by the Sub-recipient in the performance of the Project, and identifying all Cost Share and third party in-kind contributions as well as the contributing parties. The invoice shall be sent to the Project Coordinator identified in Exhibit B.
 2. Each invoice should be displayed according to the budget line items in Exhibit A. All invoices must be submitted using the form attached in Exhibit D, must be on the Sub-recipient's letterhead, and must be sent to the Foundation's Project Coordinator identified in Exhibit B. Only out of pocket costs and expenses actually incurred by the Sub-recipient may be invoiced under this PFA.
 3. The Foundation will disburse Project Funds conditioned upon the Sub-recipient timely submitting Reports. No portion of the Project Funds will be disbursed by the Foundation unless and until the Foundation receives and accepts each corresponding invoice and Report. If the invoices and Reports are accepted, the Sub-recipient will be paid as follows:
 - (a) The ten percent (10%) advance payment must be shown on all invoices, including the final invoice, as an advance payment received. Subject to the hold back provision below, invoices will be paid to the extent actual costs incurred exceed the advance payment.

- (b) Regardless of the actual amounts invoiced, the Foundation will at all times during this PFA hold back twenty percent (20%) of the Project Funds, and will only disburse same as follows: Ten percent (10%) of the Project Funds will be disbursed to the Sub-recipient when the Foundation receives and accepts the Draft Report. The remaining held back ten percent (10%) of the Project Funds will be disbursed to the Sub-recipient after the Sub-recipient has completely and adequately responded to editor queries on the Final Report, has made all revisions reasonably requested by the Foundation to finalize the Final Report, submitted a final invoice, and Exhibit E – Assignment of Copyright (if applicable).
- (c) No conditions, notations, acknowledgements, comments, or terms other than the items required to be included and itemized on the Sub-recipient's invoice shall be binding on the Foundation.
- (d) The Foundation may deduct amounts or withhold payments invoiced by the Sub-recipient if the Sub-recipient fails to comply with any Foundation standard and/or Federal Uniform Administrative Requirements of the Sub-recipient's cognitive agency.

IV. COMPLIANCE MONITORING

A. Financial Management System. The Sub-recipient shall maintain an accounting system and accurate and complete accounting records that, at a minimum but without limitation, allow for the identification, tracking, and verification of costs, expenses, Cost Share, in-kind contributions, invoiced items, and funding received, all in a manner that is segregated and allocable solely to performance of the Project. All costs incurred must be supported by original receipts and be made available to the Foundation upon request.

B. Cost Principles. The Sub-recipient represents and warrants that the budget disclosures included in the Project Proposal and presented to the Foundation was prepared by Sub-recipient in full compliance with the cost principles governing determination of reimbursable costs and expenses in Sub-recipient's type of organization. Sub-recipient shall throughout the Project, and in the preparation of every invoice, report, and maintenance of its accounting system, remain in compliance with the cost principles by which it is governed. It shall be Sub-recipient's obligation to determine and comply with its governing cost principles.

- State, local or Indian tribal government, 2 CFR 225.
- Non-profit Organization (NPO), 2 CFR 230.
- Institution of Higher Education, 2 CFR 220.
- Hospitals, 45 CFR 74 Appendix E.
- Commercial (For Profit) and selected Non-Profit Organizations 48 CFR 31.2

C. Indirect Costs and Allocation of Costs:

1. If the Sub-recipient proposes to invoice for indirect costs, substantiation of those charges must be in compliance with the Foundation's "Focus Area Proposal Guidelines," which include compliance with the applicable cost principles referenced in Section IV.B.

D. Record Retention. Sub-recipient shall retain all records pertinent to this PFA and the Project for at least three (3) years from the termination of this PFA.

E. Audit and Monitoring.

1. The Sub-recipient's use of the Project Funds under this PFA may be audited by the Foundation or its designee. Furthermore, the Foundation shall have the right to itself or through a designee visit the Sub-recipient premises to observe, review, and monitor the Sub-recipient's performance of the Project, as well as its application and use of the Project Funds. Accordingly, following a two (2) business day prior notice from the Foundation, the Sub-recipient shall provide the Foundation and its designee access to its premises, technical staff, supervisors, knowledgeable personnel, computer systems and databases, assistance, original documents, including those required to be maintained under this PFA, and any information related to the Sub-recipient's use of the Project Funds and performance under this PFA, to enable the Foundation's audit and monitoring. The Foundation's audit rights shall survive termination of this PFA by three (3) years.
2. The Foundation will keep the Sub-recipient's proposal submittal containing any proprietary technical and/or scientific information reviewed under this Section in confidence provided that such material is appropriately marked as "Confidential," that was not already generally known to the public, is not required to be disclosed as a result of a legal proceeding, or applicable legal requirement, and was not already known to the Foundation or others without a confidentiality obligation.
3. Any deficiencies or non-compliance in Sub-recipient's systems, procedures, record keeping, finances, and performance of other obligations under this PFA discovered in the audit, review or monitoring process, or discovered otherwise, may, at the Foundation's option, require Sub-recipient to take corrective action that has been detailed by the Sub-recipient and approved by the Foundation for the Sub-recipient to remedy the deficiency or noncompliance, or may result in the Foundation exercising its termination rights under Section VII below.
4. If the Foundation approves of the Sub-recipient's proposed corrective action plan, in connection with such approval it may require the Sub-recipient to submit additional periodic written verification that the corrective action plan has been implemented and continues to correct the targeted deficiencies and noncompliance. If the approved corrective action fails to correct the deficiencies within the time set by the Foundation in its sole discretion, the Foundation may exercise its termination rights under Section VII.
5. Nothing herein obligates the Foundation to accept or approve a corrective action or to forbear from exercising its right to terminate this PFA. The Foundation's right to termination shall be in addition to all other rights and remedies available to it at law or in equity.

V. PROCUREMENT STANDARDS

- A. Procurement Standards. It is an express requirement under the Proposal Guidelines and this PFA that the Sub-recipient remain in compliance with the U.S. Federal standards for procurement as are outlined in the U.S. Federal Uniform Administrative Requirements applicable to Sub-recipient's organization type. These standards govern procedures for procurement of supplies, equipment, and other services for which cost is incurred in whole or in part under this PFA. These standards include but are not limited to the following:

1. Sub-recipient procurement policies must adhere to the minimum standards applicable to its organization type;
2. Sub-recipient shall maintain and enforce with its officers, employees, and agents (including Subcontractors) a code of conduct designed to enhance goodwill, ethics, and compliance with laws while performing under this PFA; and
3. Sub-contractor shall conduct all procurement transactions in a manner that maximizes open and free competition.

VI. IP RIGHTS AND PUBLICATION

A. Work Product.

1. The Foundation shall own all worldwide copyrights in all the Work Product, including the Scope of Work, all Periodic Reports, all Draft Reports, the Final Report, and all drafts of these works and reports. Sub-recipient shall and hereby does assign exclusively to the Foundation all right, title, and interest in and to the Work Product and the copyrights embodied therein. The Sub-recipient may use without restrictions all data from the Work Product such as innovations, creations, processes, designs, methods, formulas, plans, technical data and specifications.
2. The Foundation will provide the Sub-recipient with five (5) hardcopies of the Final Report and a PDF. If the Final Report is published in a PDF format only, the Sub-recipient will receive the Final Report in that format. The Work Product may not be copied, published, adapted, posted on an intranet or website, or disclosed in any manner by the Sub-recipient, any Subcontractor or other third party except with the Foundation's prior written approval. The Sub-recipient shall utilize the Foundation's *Material Use Permission Request Form* located at <http://www.waterrf.org/funding/Pages/project-report-guidelines.aspx> for securing the foregoing required permission for the Foundation.
3. The Foundation hereby grants the Sub-recipient a royalty free, perpetual, irrevocable, worldwide, nonexclusive license, without the requirement for any accounting, to utilize Foundation's Intellectual Property solely for educational purposes.

B. Inventions and Patents.

1. All proprietary or patentable ideas, devices, methods, formulations, designs, and other inventions developed or conceived by or on behalf of the Sub-recipient in the course of performing under the Project, including, but not limited to, the right to apply for patent protection thereon (collectively, "Inventions"), shall remain the property of the Sub-recipient.
2. If the Sub-recipient decides to abandon its rights to the Inventions, or not to seek patent protection on its Inventions, or to abandon any pending patent application or patent issued on the Inventions, Sub-recipient shall notify the Foundation of the same and promptly assign all rights in the abandoned Inventions to the Foundation at its request.

3. Sub-recipient shall not withhold any information on or descriptions of Inventions, whether or not patentable, from Work Products or any Report. The Sub-recipient's rights in Inventions shall not limit, delay, restrict, or in any other manner interfere with the Foundation's right to own, publish, and exercise all other copyrights in the Work Product. If information contained in the Work Product owned by the Foundation is considered to be and is treated by the Sub-recipient as confidential information and/or trade secrets, the Sub-recipient shall be solely responsible for marking confidential portions of the Work Product as such, and may request that the Foundation reasonably delay, but in no event by more than one month, publication of a Work Product in order to allow the Sub-recipient to apply for patent protection on Inventions described in the Work Product.
 4. All IP rights that were owned and developed by the Sub-recipient or third parties prior to the Effective Date and outside the scope of the Project (collectively, "Preexisting IP"), and which the Sub-recipient will use in the performance of the Project, or incorporate in whole or in part into any Deliverables, has been fully disclosed and identified by the Sub-recipient in the Project Proposal. The Sub-recipient represents and warrants that all Preexisting IP is used with full authorization and permission from its respective owner, and copies of such permissions and licenses shall be provided to the Foundation by the Effective Date. The Sub-recipient shall obtain all appropriate permissions on the Foundation's behalf to the extent necessary to enable the Foundation to exercise its ownership and publication rights in the Work Product, including the Final Report, such right shall be transferable, sublicenseable, and shall not be subject to any payment or other obligation on the part of the Foundation. Such agreements to procure rights for the Foundation shall be subject to the Foundation's prior approval, in its sole discretion.
 5. The Sub-recipient hereby grants the Foundation a fully paid-up, royalty free, perpetual, irrevocable, world-wide, nonexclusive license, with the right to grant sublicenses, to utilize the Inventions and Preexisting IP for educational or other non-profit purposes.
- C. **Publication.** As the owner of Work Product, all rights to publish, distribute, publicly perform, and publicly present the Reports belong solely to the Foundation. Sub-recipient may publish or present based on the Work Product, in whole or in part, and only with the prior written permission of the Foundation, which may be withheld or conditioned at the Foundation's sole discretion. Any such request for permission from the Foundation must be made to the Foundation at least three (3) weeks prior to the requesting party's proposed date of publication or presentation based on any portion of the Work Product, and the request must be accompanied by copies of the proposed publication or presentation material. The Sub-recipient may in no event publish or present based on or exercise any other copyrights with respect to the Interim Reports or the Draft Report. All copies of or presentations based on the Work Product authorized to be made by the Foundation shall furthermore conspicuously display the following notice:
- Source: Author, Title of Foundation Work
Copyright [year of publication],
Water Research Foundation. Reproduced with permission.*
- D. **Acknowledgement.** Any public presentation or publication by the Sub-recipients, including a student writing a thesis, dissertation, or report, based on the Inventions or any portion of the Work Product, if permitted by the Foundation, shall include a statement substantially as follows:

“Carollo Engineers, Inc. gratefully acknowledges that the Water Research Foundation are funders of certain technical information upon which this publication [manuscript] [presentation] is based. Carollo Engineers, Inc. thanks the Water Research Foundation, for their financial, technical, and administrative assistance in funding the project through which this information was discovered.”

- E. **Return of IP.** The Sub-recipient shall provide to the Foundation legible copies of all Work Product (including source and object code of any computer software program) and all Inventions abandoned by the Sub-recipient, and shall furthermore provide to the Foundation legible copies of all Preexisting IP, all within thirty (30) days of any party’s delivery of a notice of termination hereunder, whether or not a cure period is provided. Further, at the same time, Sub-recipient shall provide copies and shall be delivered in whatever medium and format is reasonably designated by the Foundation. No further payments will be made unless the Sub-recipient fully complies with the foregoing requirements.
- F. **Originality.** The Sub-recipient represents, warrants, and covenants that it, and its Subcontractors, are the sole creator(s) and originator(s) of all Work Product, Inventions, and Preexisting IP; none of those rights have been bargained, sold, encumbered, licensed or otherwise transferred to any other party in a manner that would limit or interfere with the requirements and covenants of the Sub-recipient under this PFA. Further, the Sub-recipient shall ensure that no portion of this Project, including any portion completed by Subcontractors, infringes upon the IP rights of any other person or entity or violates the common law or statutory right, title, or interest of any person or entity. The Sub-recipient, shall execute and deliver to the Foundation, and shall cause its Subcontractors and agents to execute and deliver to the Foundation, all documents and instruments reasonably requested by the Foundation, including, without limitation, the Assignment of Copyright attached hereto as Exhibit E, to further evidence or memorialize the assignment of rights to the Foundation set forth in this PFA.

VII. TERM AND TERMINATION

- A. **Term.** This PFA is effective as of the Effective Date, and shall continue for the duration of the Project, ending on the Foundation’s delivery to the Sub-recipient of the final disbursement of the Project Funds in accordance with Section III.B above, and as further specified in Exhibit C. This PFA may be terminated earlier for the following reasons:
 - 1. The Foundation may terminate this PFA by written notice to the other parties at any time in the event of a breach of this PFA or any requirements of or timelines in the Project by the Sub-recipient or its agents, following Sub-recipient’s receipt of the Foundation’s notice of breach.
 - 2. The Foundation may terminate this PFA effective immediately by written notice to the other parties in the event the Foundation after consultation with the PAC reasonably determines that the Project is no longer feasible or its performance desired, or that if Sub-recipient is not likely to complete the requirements of the Project on time.
 - 3. Upon receipt of any written notice of termination, the Sub-recipient shall cease all work associated with this PFA as of the date of receipt of the notice, but shall continue to prepare

whatever reports, accounting statements, and invoices that are necessary to support receipt of any payments and deliver existing Work Product as required under the PFA.

4. If the Sub-recipient, after reasonable consultation with the Foundation and sufficient exploration of other options and possible mutual agreements to amend this PFA, determines that circumstances beyond its control prevent it from continuing the Project, the Sub-recipient may terminate this PFA at any time by written notice to the Foundation.
5. Any change in legal requirements or entitlements which materially alter Sub-recipient's performance under this PFA, or any change in the availability of funds to the Foundation, shall warrant good faith renegotiation of the provisions of this PFA impacted by such change. If the parties cannot agree to an amendment to this PFA, at the Foundation's option the Sub-recipient's performance of the Project may be suspended, or this PFA may be terminated effective immediately by the Foundation's written notice.
6. If termination occurs under this Section, the Sub-recipient shall prepare and submit to the Foundation a final invoice and accounting of expended and non-cancellable funds as of the date of receipt of the notice of termination. Any portion of the Project Funds that was prepaid to the Sub-recipient but which remains unspent shall be returned to the Foundation with the final invoice. The Foundation shall pay any amount owed under the final invoice, if reasonably accepted by the Foundation. The Sub-recipient shall be entitled to compensation for all satisfactory and authorized work completed as of the termination date, provided that all Work Product corresponding to the invoiced amounts have been delivered to the Foundation, and further provided that funds are available (i.e., a reduction in granted funds as stated above).

VIII. DISPUTE RESOLUTION

- A. In the event of the Sub-recipient's performance, or other acts or omissions in performing the Project or under this PFA, Foundation's final determination, following reasonable consultation with the PAC, shall govern.
- B. All other disputes arising under this PFA by or among the parties shall be resolved by binding arbitration conducted in accordance with the then effective rules of expedited commercial arbitration of the American Arbitration Association ("AAA") in Denver, Colorado U.S.A. There shall be one Arbitrator selected in accordance with such rules. The Arbitrator shall have subpoena powers. Any final binding determination issued by the Arbitrator shall be in writing within thirty (30) days of the final mediation session. Such written decision may be enforced in any court having proper jurisdiction.

IX. STANDARD TERMS AND CONDITIONS

- A. Survival. All terms which by their nature and intent are required to be performed after termination of this PFA shall survive to the extent necessary to enable their fulfillment.
- B. Quality Assurance. The Sub-recipient shall use its best efforts to *provide* all data and test results developed during the course of this PFA and included, or relied upon, in the Final Report are

accurate to the best of its knowledge, information, and belief in accordance with the standard of care delineated in Section IX.C below. In the event the Sub-recipient obtains any data, test results, information derived from such data or test results, or other information to be included in the Project from water utilities or any Subcontractor, the Sub-recipient will utilize reasonable and customary efforts determine the accuracy of the information obtained notwithstanding, Sub-recipient shall be entitled to use and rely upon information, including data and test results, provided by the Foundation, any other Sub-recipients of the Foundation, water utilities or other third parties.

- C. Standard of Performance. At all times, all obligations performed by the Sub-recipient or by any Subcontractors pursuant to this PFA shall be performed in a manner consistent with the professional standards governing such activities. Further, the Sub-recipient shall be responsible for, and shall hold harmless and indemnify the Foundation and their officers, directors, affiliated organizations, employees, agents, volunteers, and publisher, if any, from any and all liability, obligation, damage, loss, cost, claim, lawsuit, cause of action, or demand whatsoever of any kind or nature, including, but not limited to, attorneys' fees and costs, arising from (i) any negligent actions taken by, or negligent omissions of, the Sub-recipient, its officers, directors, Subcontractors, employees independent contractors, agents, or other related entities or individuals, (ii) any use or misuse of IP claimed to be owned by another, or (iii) any material breach of this PFA by the Sub-recipient.
- D. Governmental Entities. If the Sub-recipient or any Subcontractor is a governmental or quasi-governmental entity that is by law prohibited from indemnifying others, Section IX.R is modified to the extent that will impose the maximum available liability and responsibility on Sub-recipient. Sub-recipient shall require all parties involved in the performance of this PFA that are not prohibited from indemnifying others to so indemnify the Foundation through a written agreement acceptable to Foundation.
- E. Insurance. The Sub-recipient shall maintain a financially sound program of self-insurance or commercially purchased liability insurance covering unfair competition claims and all reckless, intentional, knowing, and negligent actions or omissions of any and all of Sub-recipient's officers, directors, employees, agents, and independent contractors and/or Subcontractors in the amount of one million dollars (\$1,000,000.00). Proof of such insurance shall be presented to Foundation pursuant to the schedule detailed by Exhibit B. The proof of insurance document shall clearly specify the Project by number and title on the insurance certificate.
- F. Worker's Compensation. The Sub-recipient and all Subcontractors shall maintain Worker's Compensation Insurance which complies with the applicable state laws. Proof of such insurance shall be presented to Foundation pursuant to the schedule detailed by Exhibit B.
- G. Authority. The individuals executing this PFA on behalf of their respective parties hereby represent and warrant that they have the right, power, legal capacity, and appropriate authority to enter into this PFA on behalf of the entity for which they sign below.
- H. Modifications: No provision, requirement, or term of this PFA may be modified, supplemented or amended, nor may it be waived or discharged, except in writing, signed by all parties. A written

waiver of a breach of one provision in this PFA shall not operate as a waiver of a subsequent breach of the same provision.

1. Examples of items requiring Foundation's prior written approval include, but are not limited to, the following:
 - Deviations from the Project plan.
 - Change in scope or objective of the Project.
 - Change in a key person specified in the application.
 - The absence for more than three months or a 25% reduction in time by the principal investigator.
 - Need for additional funding.
 - Inclusion of costs that require prior approvals as outlined in the appropriate cost principles.
 - Any changes in budget line item(s) as described in Exhibit A of greater than ten percent (10%) of the total.
- I. No Assignment. The Sub-recipient shall not assign this PFA in whole or in part, including by operation of law, merger, reorganization, or change in ownership or control. Any unauthorized assignments shall be void.
- J. Sub-Contracting: The Sub-recipient may only utilize Subcontractors under this PFA that have been disclosed in the Project Plan and are pre-approved by the Foundation.
 1. Sub-recipient shall require any and all Subcontractors to comply with all applicable and material terms of this PFA prior to working on the Project in any manner. All obligations of the Sub-recipient apply equally to the Subcontractor(s). Sub-recipient shall at all times remain primarily responsible and liable to the Foundation for the acts and omissions and performance of this PFA by its Subcontractors.
 2. Payment for services of any and all Subcontractors shall be the Sub-recipient's sole obligation and responsibility. The Sub-recipient hereby indemnifies and holds the Foundation harmless for any liability concerning such payment. In furtherance of the foregoing, and to safeguard the Foundation if Sub-recipient or any Subcontractors is legally prohibited from indemnifying others, Sub-recipient shall in all its Subcontractor agreements specify that the Foundation shall have no liability or obligation to the Subcontractor, and that the Subcontractor agrees to look solely to the Sub-recipient for payment and enforcement of its rights under its agreement with the Sub-recipient.
- K. Integration. This PFA, including all attachments hereto and the documents and requirements referenced herein, contains the entire understanding between the parties relating to this PFA. This PFA supersedes all prior and contemporaneous understandings, representations, negotiations, and agreements between the parties whether written or oral. In the event of a conflict between the terms of an Exhibit or other document referenced herein and this PFA, the terms of this PFA shall control.

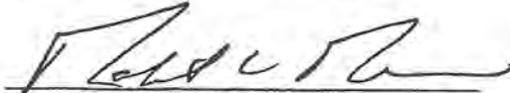
- L. Severability. The provisions of this PFA shall be severable, and the invalidity, illegality or unenforceability of any provision of this PFA shall not affect the validity or enforceability of any other provisions. If any provision of this PFA is found to be invalid, illegal, or unenforceable, such provision shall be modified to the extent necessary to render it enforceable, and as modified, this PFA shall remain in full force and effect.
- M. Foundation Right of Approval. The Foundation shall have the right, in their sole discretion, to refuse to permit any employee of the Sub-recipient, or employee of an approved agent, assignee, or subcontractor of the Sub-recipient, to be located at a Foundation work location, or to provide services to the Foundation pursuant to this PFA.
- N. Notices. Any notice, request, demand, or communication required or allowed under this PFA shall be sent in writing to the addresses and contact information for the parties set forth in Exhibit B, and shall be deemed sufficiently given upon delivery, if delivered by hand (signed receipt obtained), or three (3) days after posting if properly addressed and sent certified mail return receipt requested, or upon receipt if sent via facsimile or email, if delivery can be confirmed by the sender. Notices shall become effective on the date of receipt or the date specified within the notice, whichever comes later.
- O. Captions for Convenience. All captions, fonts, underlining, or footers used in this PFA are for convenience only and shall have no meaning in the interpretation or effect of this PFA.
- P. Construction. This PFA, and any and all amendments to it, shall not be construed against the drafter.
- Q. Force Majeure. None of the parties hereto will be liable for damages for any delay or default in performance during the term hereof if such delay or default is caused by conditions beyond its control, including, but not limited to, acts of God, Government restrictions, continuing domestic or international problems such as wars, threats of terrorism, or insurrections, strikes, fires, floods, work stoppages and embargoes; provided, however, that any party will have the right to terminate this PFA upon thirty (30) days prior written notice if another party's delay or default due to any of the above-mentioned causes continues for a period of two (2) months.
- R. Limitation of Liability. IN NO EVENT SHALL *EITHER PARTY* OR ANY OF *THEIR* OFFICERS, DIRECTORS, EMPLOYEES, AFFILIATES, AGENTS OR REPRESENTATIVES BE LIABLE TO ANY OTHER PARTY, OR ANY THIRD PARTY FOR ANY SPECIAL, INDIRECT, INCIDENTAL, EXEMPLARY OR CONSEQUENTIAL DAMAGES OR LOSS OF GOODWILL OR EXPECTED PROFITS OR REVENUES, IN ANY WAY RELATING TO THIS PFA, INCLUDING, WITHOUT LIMITATION, THE FAILURE OF ESSENTIAL PURPOSE, EVEN IF IT HAS BEEN NOTIFIED OF THE POSSIBILITY OR LIKELIHOOD OF SUCH DAMAGES OCCURRING, AND WHETHER SUCH LIABILITY IS BASED ON CONTRACT, TORT, NEGLIGENCE, STRICT LIABILITY, STATUTE, PRODUCTS LIABILITY OR OTHERWISE. IN NO EVENT SHALL *EITHER PARTY'S* LIABILITY HEREUNDER EXCEED THEIR RESPECTIVE CONTRIBUTION ALREADY MADE UNDER THIS PFA.

- S. Applicable Law/Venue. This PFA is written and shall be construed in accordance with and governed by the laws of Colorado unless U.S. Federal law applies. However, if legal action is taken against Sub-recipient and U.S. Federal or state laws which exist that govern Sub-recipient (as a quasi-public or public entity) exclusively, this PFA shall be construed and interpreted in accordance with such laws to the extent of such exclusivity. Any action under this PFA must be brought in a Colorado State Court or U.S. Federal District Court located in Denver, Colorado.
- T. Counterparts. This PFA may be executed and delivered in counterparts, and by facsimile and email, and each shall be valid as if all parties had executed the same document.
- U. Relationship. The parties are independent contractors, and no agency, employer-employee, partnership, or joint venture relationship is intended or created by this PFA. No party shall have any right or authority to assume or create any obligation, commitment or responsibility for or on behalf of the others except as the other may expressly authorize in writing. No party shall be eligible to participate in another's benefit program. Sub-recipient shall be solely responsible for the performance and compensation of its employees, for withholding taxes and providing unemployment and other benefits.

IN WITNESS WHEREOF, the parties have caused this PFA to be signed and dated as shown below.

Water Research Foundation

Carollo Engineers, Inc.



By: Robert C. Renner, P.E., B.C.E.E.
Title: Executive Director

By: Tanja Rauch-Williams, Ph.D., P.E.
Title: Senior Technologist

Date: 11/21/13

Date: _____

Water Research Foundation

Carollo Engineers, Inc.

for: 

By: Alice E. Fulmer
Title: Senior Research Manager

By: Tanja Rauch-Williams, Ph.D., P.E.
Title: Principal Investigator

Date: 20 Nov 2013

Date: _____

Above signed has read and understands the terms, conditions, and deliverables of this PFA.

Above signed has read and understands the terms, conditions, and deliverables of this PFA.

Signature Page Instructions

1. Review document and have a duly authorized representative and the Principal Investigator sign this page.
2. Only this signature page is required to be returned back to the Foundation.
3. Please **Email** a scanned PDF of the executed signature page to the following:
 - a. Peggy Falor at pfalor@WaterRF.org and
 - b. Corina Santos at csantos@WaterRF.org
4. Do not return the entire agreement, only the signature page.
5. Please return no later than **ten (10) calendar days** from receipt.
6. The Foundation will email a PDF of this fully executed agreement to you for your files.

Title: Evaluation of Current and Alternative Strategies for Managing CECs in Water

Project proposal and all subsequent correspondence.

Proposal Cover Worksheet

RFP # 4494

Title: **Evaluation of Current and Alternative Strategies for Managing CECs in Water**

Organization: (Legal name as it should appear in the contract)

Organization: Carollo Engineers, Inc.

Complete Address (No P.O. Boxes Please): 390 Interlocken Crescent, Suite 800, Broomfield, CO 80021

Personnel: (Separately upload CV or brief resume for PI, Co-PIs and other key research team members)

Principal Investigator: Individual responsible for the technical completion of the proposed work.

Name: Tanja Rauch-Williams, Ph.D., P.E.

Title: Senior Technologist

Organization: Carollo Engineers, Inc.

Complete Address: 390 Interlocken Crescent, Suite 800, Broomfield, CO 80021

Phone: 303-635-1220; FAX: 303-635-1373; E-mail: trauch-williams@carollo.com

Co-Principal Investigators: Individual responsible for the completion of major portions of the proposed work.

Name: Prof. Shane Snyder, Ph.D.

Title: Professor of Chemical and Environmental Engineering

Organization: University of Arizona

Complete Address: 1133 E. James E. Rogers Way, Harshbarger 108, Tucson, AZ 85721-0011

Phone: 520-621-2573; FAX: 520-621-9291; E-mail: snyders2@email.arizona.edu

Name: Prof. Jörg Drewes, Ph.D.

Title: Professor of Urban Water System Engineering

Organization: Technische Universität München

Complete Address: Chair of Urban Water System Engineering, Am Coulombwall 8, D- 85748 Garching, Germany

Phone: +49 89 289 13701; FAX: +49 89 289 13718; E-mail: jdrewes@mines.edu

Name: Eric Dickenson, Ph.D.

Title: Project Manager

Organization: Southern Nevada Water Authority

Complete Address: 100 City Parkway, Suite 700, Las Vegas NV 89153

Phone: 702-856-3668; FAX: 702-856-3647; E-mail: eric.dickenson@snwa.com

Authorized Representative: Original awards and amendments will be sent to this individual for review and acceptance, unless otherwise indicated.

Name: Tanja Rauch-Williams, Ph.D., P.E.

Title: Senior Technologist

Organization: Carollo Engineers, Inc.

Complete Address: 390 Interlocken Crescent, Suite 800, Broomfield, CO 80021

Phone: 303-635-1220; FAX: 303-635-1373; E-mail: trauch-williams@carollo.com

Accounting Contact: *Individual authorized to accept payments.*

Name: Jane M. Anderson

Title: Senior Billing Administrator

Organization: Carollo Engineers, Inc.

Complete Address: 4600 E. Washington Street, Suite 500, Phoenix, AZ 85034

Phone: 602-263-9500; FAX: 602-265-1422; E-mail: jmanderson@carollo.com

Administrative Contact: *Individual from Sponsored Programs office to contact concerning administrative matters (i.e., indirect cost rate computation, rebudgeting requests, etc.).*

Name: Jane M. Anderson

Title: Senior Billing Administrator

Organization: Carollo Engineers, Inc.

Complete Address: 4600 E. Washington Street, Suite 500, Phoenix, AZ 85034

Phone: 602-263-9500; FAX: 602-265-1422; E-mail: jmanderson@carollo.com

Contracting Contact: *Individual responsible for contract administration including contract negotiations.*

Name: Tanja Rauch-Williams, Ph.D., P.E.

Title: Senior Technologist

Organization: Carollo Engineers, Inc.

Complete Address: 390 Interlocken Crescent, Suite 800, Broomfield, CO 80021

Phone: 303-635-1220; FAX: 303-635-1373; E-mail: trauch-williams@carollo.com

Other Personnel - NONE

Name:

Title:

Organization: Carollo Engineers, Inc.

Complete Address:

Phone:; FAX:; E-mail:

All Other Participating Organizations: (not listed above)

Organization	City/State/Country
Bavarian Environment Agency	Augsburg, Germany
BFG (Federal Institute of Hydrology)	Koblenz, Germany
Austrian EPA	Vienna, Austria
EAWAG	Dübendorf, Switzerland
RIWA Rhine Water Works	Nieuwegein, The Netherlands
Umwelt Bundesamt (German EPA)	Dessau-RoBlau, Germany
University of New South Wales	Sydney, Australia
Melbourne Water	Melbourne, Australia
Inter-Industry Network on Microconstituents	Washington, DC, U.S.
Eurofins/Eaton Analytical	Monrovia, CA, U.S.
California Department of Public Health	Sacramento, CA, U.S.
NYC Environmental Protection	Kingston, NY, U.S.
American Water	Voorhees, NJ, U.S.
Suez Environment CIRSEE	Le Pecq, France

United Water
Veolia Environment
Metropolitan Water District of Southern California
Greater Cincinnati Water Works
City of Tucson
Minneapolis Department of Public Works
Orange County Water District
Milwaukee Water Works
Denver Water
Metro Wastewater Reclamation District
Philadelphia Water Department
Aurora Water
City of Boulder Public Works/Utilities
Central Arkansas Water
Snyderville Basin Water Reclamation District
Lake Havasu City
European Commission
German Technical and Scientific Association for Gas and Water (DVGW)

El Segundo, CA, U.S.
Chicago, IL, U.S.
Los Angeles, CA, U.S.
Cincinnati, OH, U.S.
Tucson, AZ, U.S.
Minneapolis, MN, U.S.
Fountain Valley, CA, U.S.
Milwaukee, WI, U.S.
Denver, CO, U.S.
Denver, CO, U.S.
Philadelphia, PA, U.S.
Aurora, CO, U.S.
Boulder, CO, U.S.
Little Rock, AR, U.S.
Park City, UT, U.S.
Lake Havasu City, AZ, U.S.
Ispra, Italy
Karlsruhe, Germany

Project Period: 24 Months

PROJECT ABSTRACT

Nearly all chemicals, both endogenous and anthropogenic, have the potential to enter the aquatic environment through point source discharges, urban and agricultural run-off, atmospheric deposition, and others. Over the past decade in particular, a tremendous amount of research has focused on the detection, attenuation, and fate of chemicals of emerging concern (CEC) in water treatment processes. Within the U.S., these research efforts have determined that relatively few CECs are detectable in drinking water, that many are well attenuated during treatment processes, and that essentially none of the pharmaceuticals and personal care products (PPCPs)/endocrine disrupting chemicals (EDCs) at concentrations detected in drinking water would be expected to have human health consequences. Nevertheless, a large amount of concern and uncertainty regarding the presence of CECs in drinking water remains. Thus, many water agencies remain frustrated that despite numerous, and often repetitive, studies regarding the occurrence and treatment of CECs, management plans for prioritizing and/or taking action remain nebulous. Indeed, continued investigation of additional CECs and/or efficacy of removal of CECs will not move the industry forward and will likely result in more questions than answers. In fact, some water agencies have been duly confused by seemingly disparate lists of compounds prioritized by the U.S. Environmental Protection Agency (USEPA) through the Contaminant Candidate List (CCL) and Unregulated Contaminant Monitoring Rule (UCMR) processes, as compared to the lists of CECs studied by water industry research foundations and/or other federal and state agencies.

Even a minimal or no risk categorization of drinking water systems does not alleviate the fact that aquatic ecosystems may be at risk. Beyond the U.S., regulatory agencies and water research groups in Europe, Asia, and Australia have taken alternative approaches to prioritization and regulatory action around trace organic chemicals. What is immediately needed is a holistic and comprehensive view of CEC management options. As an initial screening, a

prioritization approach is required to determine if any further action is needed for a particular CEC or class/mixture of CECs. If initial screening indicates that exposure (both environmental and human) indicates risk, then an action/management plan will be needed to reduce/eliminate the exposure.

Our proposed research will aggregate and evaluate CEC management plans, which have been employed or are being considered in North America, Europe, and Australia. We will bring together experts intimately familiar with these management plans and will identify the strengths and weaknesses of each, considering a holistic water approach that takes into account environmental and public health. We also will consider alternative approaches that combine the best features of those evaluated. For certain, the water industry is not gaining much traction with the current "shotgun" approach in studying treatment and occurrence of limited numbers of CECs. What is desperately needed now is a comprehensive review of prioritization schemes and management plans, supported by case studies to demonstrate the costs/benefits of each. Only by considering CECs holistically can we best move forward with approaches that will increase public confidence, while basing decisions on sound scientific data. This is a critically important project that holds nothing more but the potential to transform the global scope of water quality regarding managing CECs.

Our primary team members are Prof. Shane Snyder (University of Arizona), Dr. Tanja Rauch-Williams (Carollo Engineers), Prof. Jörg Drewes (Technical University Munich), and Dr. Eric Dickenson (Southern Nevada Water Authority). Our team has successfully solicited the collaboration of major national and international players including water, wastewater, and water reuse agencies, regulators, industries, and policy planning institutes. (Refer to the Contribution Sources in Carollo's Budget form for a detailed list).

WaterRF funding of \$400,000 is requested. Third-party in-kind contributions are \$233,928, and research team cost sharing is \$60,038. The total project budget is \$693,966.

PROJECT DESCRIPTION

Background

Considering that essentially all chemicals, both natural and synthetic, could potentially be detectable in water, the term chemical of emerging concern (CEC) can be difficult to define, since "concern" is subjective depending on the point of view. Since there are neither internationally nor scientifically consistent definition of CECs, the USEPA refers to CECs as those contaminants where "risk to human health and the environment associated with their presence, frequency of occurrence, or source may not be known." Most commonly, the water community considers CECs as those contaminants which are detectable in water, yet no regulation currently exists. Thus, there are no finite lists of CECs nor consensus on prioritization schemes for addressing contaminants which are detectable, yet have limited or incomplete data for public and/or environmental health risks. According to the USEPA, there are more than 84,000 chemicals in commerce, which are listed on the Toxic Substances Control Act (TSCA) inventory. This number continues to evolve as new chemicals are developed and other chemicals are phased out of production. However, what is equally daunting is the number of possible transformation products, which can be formed during engineered and natural water treatment processes. While pharmaceuticals and endocrine disrupting chemicals has caused the greatest amount of public concern, in terms of human exposure from drinking water, no class of chemicals has more potential for exposure to a larger number of people than disinfection byproducts (DBPs). There is no question that an increasing number of chemicals will continue to be detected in water resources and that levels at which chemicals can be detected will continue to drop. Around the planet, water agencies, regulators, and the public struggle to understand the ramifications of increasing detections of chemicals in water resources. While human health impacts often garner the majority of the mounting concerns, empirical evidence has shown that some emerging

chemicals in the environment can impact aquatic wildlife. Management strategies for CECs must consider a comprehensive evaluation that includes ecological and public health, including exposure to transformation products. At current, fragmented and sometimes contradictory programs consider only portions of the overall challenge in CECs.

Most of the regulatory paradigms were developed in the 1970s and were based on legacy contaminants. For instance, existing drinking water regulations do not directly address alternative water resources, such as potable water reuse and ocean desalination. Anti-backsliding language within the Safe Drinking Water Act leads to long-term monitoring requirements for contaminants that may no longer be relevant. While various amendments and "reform" have occurred over the past decades, the process for making regulatory determinations remains slow and inflexible. This has led various states and regions to develop independent CEC prioritization and management programs, with regulations and goals that generally do not align. In addition, federal regulatory programs are often "siloes" having little, if any, interplay and consistence. The most prudent example is the disparity between the Clean Water Act and Safe Drinking Water Act, which ideally would work together to optimize regulations and management options that cohesively protect environmental and public health. ***It is critical in moving forward that CEC management and prioritization programs be evaluated holistically and that new paradigms be considered for future management programs.***

Current State of Knowledge

Water agencies in the U.S. have been proactive in studying CECs and have generated some of the most comprehensive data available on CEC occurrence, analytical methods, and treatment process efficacy. WaterRF funding has been utilized for some of the most comprehensive

studies of CEC occurrence and fate in U.S. drinking water facilities. While numerous aspects of CEC management have been investigated, public perception surrounding CECs remains challenged. In addition, regional, local, and state regulatory agencies struggle to develop CEC prioritization and management plans that provide assurance to the public and elected officials, while balancing often incomplete risk profiles and ever increasing lists of detected compounds. Far too often, CEC management and prioritization efforts are undertaken due to perceived or actual lack of federal guidance and/or regulation. Even more concerning is the common misconception, as to what federal programs do exist and how these programs operate. For instance, some programs consider chemicals at the point of commercial application, whereas others focus on management of chemicals after release to the environment. The proposed research will compile and investigate information on the various national and international programs for CECs, while considering potential new paradigms for best management practices for CECs in water. ***Our team will bring together national and international experts and decision makers to develop consensus documents regarding the best management practices for CECs.*** Our collaboration partners include major national and international CEC policy players (such as the European Commission, the German and Austrian EPA, the Rhine Water Works, University of South Wales, EAWAG, the NYC Environmental Protection, and CDPH) as well as key industry representatives through the Inter-Industry Network on Microconstituents.

Currently, different regulatory requirements exist in the U.S. and abroad for managing CECs in various water bodies. Several agencies are involved nationally and internationally to define criteria for controlling the release and exposure to CECs, including the U.S. Environmental Protection Agency (USEPA), state and local agencies, Centers for Disease Control and Prevention, U.S. Food and Drug Administration, World Health Organization,

the European Commission, and the Australian Environment Protection and Heritage Council. The following sections briefly review some of these different CEC management strategies.

U.S. Approaches to Manage CECs

The majority of wastewater-derived CECs are not regulated in the U.S. Moreover, with more than 80,000 chemicals potentially present in wastewater and even more potential transformation products, compiling a comprehensive list of CECs is not feasible. The TSCA was enacted in 1976 and is managed by the USEPA to identify new and existing chemicals that may pose risk to occupational, environmental, and/or public health. Materials manufactured before 1976 were grandfathered, while chemicals developed since 1976 must be registered with the USEPA before manufacturing or transportation. Today, approximately 84,000 chemicals are included in the TSCA inventory. However, many chemicals are exempted from the TSCA, including chemicals only used for pharmaceuticals, cosmetics, and food products. There also is a low-volume exemption (LVE) in the TSCA excepting chemicals produced in quantities less than 10,000 kg/yr. While toxicology data is not explicitly required, the USEPA may impose limitations on chemicals use/distribution. However, the TSCA does include "categories of concern" that considers grouping of chemicals based on previous history of exposure and/or toxicity information. Under Section 4 of the TSCA, the USEPA may require testing on substances to gain more information as to their potential for harm to human and environmental health. In Section 6 of the TSCA, the USEPA has the authority to regulate or ban chemicals that are found to be health hazards. In March 2012, the USEPA announced a workplan to evaluate 83 chemicals under the TSCA, which includes some CECs commonly detected in water, including: HHCB, octylphenol, TCEP, 1,4-dioxane, NDMA, and others. Recently, a TSCA reform has been suggested through the "Chemical Safety Improvement Act of 2013," which is a bipartisan effort to "Require Safety Evaluations for

all Chemicals," "Protect Public Health from Unsafe Chemicals," "Screen New Chemicals for Safety," "Secure Necessary Health and Safety Information," "Promote Innovation and Safer Chemistry," "Protect Children and Pregnant Women," and "Give States and Municipalities a Say." Thus, the TSCA reform continues and may play a future role in CEC management in the U.S.

Within the U.S., the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) provides the basis for regulation, sale, distribution, and use of pesticides. FIFRA was passed in 1947, nearly 30 years before the establishment of the USEPA. FIFRA mandates that "EPA regulate the use and sale of pesticides to protect human health and preserve the environment." The USEPA is specifically authorized to strengthen the regulatory process by shifting the burden of proof for safety onto the manufacturers and ensure compliance with pesticide restrictions and bans. Essentially, all new pesticides registered in the U.S. must be approved by the Administrator of the USEPA. The registration of a pesticide is highly specific and will limit the number of applications and the rates at which the particular pesticide can be used. Once registered, the USEPA has a "goal" to review all registrations every 15 years. In order to register a pesticide in the U.S., the producer must demonstrate environmental fate, hazards to non-target animals, product chemistry (ingredients), and residue chemistry. Hazard assessment must include human and ecological endpoints and assess acute, subchronic, skin and eye irritation, and potential routes of exposure. Thus, pesticides used in the U.S. must undergo a very detailed and specific regulatory process before they can be released into the environment.

Endocrine disruption was not specifically named in any U.S. legislation until 1995, with amendments to the Safe Drinking Water Act (Bill Number S.1316) and the Food Quality Protection Act (Bill Number P.L. 104-170), which mandated that chemicals and formulations be screened for potential endocrine activity before they are manufactured or used in

certain processes where drinking water and/or food could become contaminated. Under these laws, the USEPA is required to "develop a screening program, using appropriate validated test systems and other scientifically relevant information, to determine whether certain substances may have an effect in humans that is similar to an effect produced by a naturally occurring estrogen, or other such endocrine effect as the Administrator may designate." These laws specified that the USEPA must develop a testing program by 1998, implement the program by 1999, and report to Congress by 2000. Clearly, the program has been highly delayed, which is due in part because of the vast nature of endocrine toxicity, which can cover endpoints from cancer to behavioral issues. Regardless, to meet the requirements of this recent legislation, the USEPA formed the Endocrine Disruptor Screening and Testing Advisory Committee (EDSTAC) to provide recommendations on a conceptual framework, priority setting, screening and testing methodologies, and communication and outreach programs. The EDSTAC group consisted of various stakeholders and experts in reproductive toxicology. The committee began deliberations in October of 1996 and issued a final report in July of 1998, recommending that human and wildlife impacts be considered and that estrogen, androgen, and thyroid (EAT) endpoints be examined (EPA 1998). The conceptual framework devised by the EDSTAC consists of an initial sorting, prioritization, Tier 1 & 2 testing, and a hazard assessment of an estimated 87,000 chemicals. In addition to discrete chemicals, the EDSTAC recommended the evaluation of mixtures of chemicals in breast milk, baby formulas, hazardous waste sites, pesticides and fertilizers, drinking water DBPs, and gasoline. What is important to note in terms of management efforts is that this program seeks to screen compounds before they are released into the environment. Theoretically, under the EDSP, compounds that show adverse endocrine impacts to human and/or environmental health would be restricted in use or even banned. However, as of 2013, only 67 pesticides had been preliminary screened

through the Tier 1 battery. What U.S. Congress envisioned as a swift and inexpensive screening tool has morphed into an extremely expensive and glacially slow process. At the current rate, it is difficult to imagine when data might be available for the >80,000 chemicals that were in the queue as of 1997, let alone the transformation products and mixtures found in water. Thus, this management strategy sounds excellent in theory—chemicals are screened during manufacturing and decisions made before release to the environment. However, practical application of this paradigm so far had meager success at best.

Pharmaceuticals have been yet another major class of CECs that have garnered tremendous public and scientific attention. Yet, in terms of human risk, there is no other group of environmental contaminants that has been as thoroughly studied for human health effects than pharmaceuticals. During the registration process, pharmaceuticals must undergo clinical trials with human patients. Few other environmental contaminants undergo human testing, thus there are more uncertainties due to extrapolation from non-human animal models. Regardless, the impact of mixtures, potential impact to the most sensitive groups of humans, and chronic exposure toxicity all remain elusive and concerning. However, these latter concerns should be common among all CECs, not just pharmaceuticals. Perhaps, most concerning are potential impacts to the environment. Numerous observations in the environment have demonstrated that some pharmaceuticals can be expected to impact aquatic health at the concentrations detected in the environment. Without question, the most prominent is the potential impact to fish of the birth control pharmaceutical ethynylestradiol (EE2) at sub-ng/L concentrations (Caldwell et al. 2008). In fact, a field study where an entire lake was dosed with ethynylestradiol at ng/L concentrations resulted in extinction of certain species of fish (Kidd et al. 2007). Yet, the primary regulatory action involving EE2 was inclusion on the drinking water prioritization list (Candidate Contaminant

List [CCL]) and the requirement for drinking water utilities across the U.S. to monitor (Unregulated Contaminants Monitoring Rule, UCMR). Thus, this is a case where clearly the exposure is related to wastewater outfalls and the primary risk is to aquatic organisms. The removal of EE2 from wastewater would surely reduce, if not eliminate, the human exposure from drinking water as well as alleviate the ecosystem risk simultaneously.

Relatively few organic chemicals are regulated in drinking water or natural waters and the establishment of a new regulation can easily take more than a decade. Regardless, the USEPA prioritizes a select number of CECs in drinking water through the CCL and the UCMR. While extensive monitoring programs are underway, toxicological studies conducted at environmentally relevant concentrations are necessary for meaningful, health-based regulations to be established. However, currently approved toxicological studies are *in vivo* and thus, very expensive, complex, and controversial. Therefore, it is extremely improbable that post-release chemicals and transformation products will be fully screened for toxicological data. In addition, the USEPA has begun to think more about chemical mixtures and has announced efforts to "group" chemicals for future regulatory consideration. This grouping may consider management strategies such as treatment barriers, as well as analytical and health risk groups for co-occurring species. Still, the progress for regulatory decision making and evolution of paradigms is extremely slow. Thus, in the absence of any federal mandates, individual states may regulate CECs. Among the states, California has made the most progress in establishing approaches on how to monitor and control CECs mainly in water reuse applications.

In the late 1980s, the California Department of Public Health (CDPH) developed draft criteria for the use of reclaimed municipal wastewater to recharge groundwater basins that are sources of domestic water supply (CDPH 2013). These

draft criteria, which are designed to ensure a groundwater supply that meets all the drinking water standards and other requirements more specific to water derived from wastewater effluent, have been updated several times and are likely to be finalized in 2013. In formulating the proposed criteria, the CDPH considered both acute health effects from microbial pathogens and potential long-term health effects associated with chemical constituents, particularly CECs. In 2010, an independent scientific advisory panel appointed by the California State Water Resources Control Board (SWRCB) developed recommendations for monitoring strategies for CECs in reclaimed water leading to potable reuse (Drewes et al. 2013), which were adopted by the State earlier this year (SWRCB 2013).

The State of California is not alone in concerns regarding unknown chemical contaminants likely, or certain, to occur in water. Beyond initial pre-screening from manufacturers before release, there are two major, yet complementary, approaches that can be considered for characterization of "unknown" chemicals in water. The first involves non-targeted analyses with analytical instrumentation, predominantly mass spectrometry. Increasingly sensitive and selective instruments are able to "scan" organic constituents in water, including transformation products produced during water treatment (Vanderford et al. 2008, Mawhinney et al. 2012, Rajab et al. 2013). However, non-targeted analytical methods generally yield qualitative occurrence information, which does not provide information as to the health-relevance of the identified substances. Thus, an alternative approach considers biological endpoints to help guide analytical identification (Snyder et al. 2001, Escher et al. 2008, Leusch et al. 2010). The National Institutes of Health (NIH), in partnership with the USEPA and the US Food & Drug Administration (FDA), launched Toxicology in the 21st Century (Tox21) to develop and evaluate high-throughput cellular and biochemical assays for screening chemicals for potential to impact

human and environmental health (<http://www.ncats.nih.gov/research/reengineering/tox21/tox21.html>). More than 10,000 chemicals have been evaluated through Tox21; however, it is important to consider that this program does not largely consider mixtures or transformation products. The methods developed likely can be modified to incorporate mixture screening applicable to water. The USEPA also leads a similar program entitled ToxCast™ with a vision for "screening chemicals to predict toxicity faster and better" (<http://www.epa.gov/ncct/toxcast/>). The ToxCast™ program will help inform other USEPA's programs, such as the EDSP, TSCA, and CCL, through rapid high-throughput in-vitro screening and from computational modeling. As an example of the speed at which ToxCast™ can evaluate chemicals, the USEPA claims that they "already screened roughly 300 chemicals in more than 600 different rapid, automated tests, it took 30 years and \$2 billion to screen the same number of chemicals using traditional animal toxicity tests." Looking ahead, it is imperative that CEC management strategies remain informed of developments in genetic, proteomic, and metabolomic approaches for rapid screening of chemicals and of chemical mixtures. When applied to complex chemical mixtures in water, these tools can better inform stakeholders of biological potency as compared to detection or non-detection of discrete chemicals. Considering that wastewater regulation already includes whole-effluent toxicity (WET) testing, which uses in-vivo bioassays to determine if water is "safe" for environmental discharge, it is logical to deduce that high-throughput bioassay screens developed and/or utilized by the NIH, USEPA, and the State of California could likely lead to future monitoring requirements using biological-based endpoints.

For wastewater dischargers, two chemical lists have significance for water quality regulatory programs under the CWA, the toxic and priority pollutants lists. The list of toxic pollutants is comprised of 65 compounds and compound groups, and changes to this list since its ratification in 1977 have been

limited to the removal of three compounds in 1981. The CWA authorizes USEPA to set water quality criteria for "priority" and "non-priority" pollutants based on their potential to adversely affect aquatic and human health. The list of water quality criteria is currently comprised of 150 compounds and the list is frequently amended. Based on these criteria, water quality standards are defined at the state level, setting the goals for a waterbody by designating its uses, protecting those uses, and establishing provisions, such as antidegradation policies to protect waterbodies from pollutants.

Few CECs, such as nonylphenol and certain pesticides, have been included in this USEPA list and are starting to appear in discharge permits of domestic wastewater treatment facilities issued by states that have started to adopt USEPA's criteria into water quality standards (Bradley and Kolpin 2013). Colorado was among the first states adopting a state-wide standard for nonylphenol. Given the difficulty to remove nonylphenol and metabolite formation during conventional wastewater treatment, utilities in Colorado have generally focused compliance initiatives at identifying options for source control in their service area.

International Approaches to Manage CECs
Several countries have proposed or implemented management strategies for CECs in water. Most noticeable are initiatives in the European Union, Switzerland, and Australia, which are briefly discussed in the following sections.

The European Union. The European paradigm to manage CECs in water is based on the precautionary principle realizing that avoiding problematic compounds is better than removing them by costly treatment strategies. The basis for any water policy and regulatory actions in the E.U. is the Water Framework Directive (WFD) based on Directive 2000/60/EC from 23 October 2000. (http://europa.eu/legislation_summaries/agriculture/environment/l28002b_en.htm). In summary, this

framework is intended to provide protection of inland surface waters, groundwater, transitional waters, and coastal waters. Its ultimate objective is to achieve "good ecological and chemical status" for all Community waters by 2015. In 2008, the WFD was amended by Directive 2008/105/EC in order to specify environmental quality standards (EQS) with the intent to control pollution of surface waters by chemicals representing threats to the aquatic environment (acute and chronic toxicity, bioaccumulation, losses of habitats and biodiversity) and human health. Besides regulating priority pollutants similar to the SDWA in the U.S., this directive also includes annual average discharge standards for inland and other surface waters for some CECs. These include 4-nonylphenol (0.3 µg/L) and octylphenol (0.1 µg/L). The enforcement of these standards occurs within river basin districts by state authorities designated by individual member states. In 2009, management plans were produced for each river basin district. In 2012, a proposal was put forward for a revised (second) list of priority pollutants for amending the directive on EQS from 2008 (European Commission 2012). This secondary list also defines EQS for additional CECs, including PFOS (0.65 ng/L, 17a7), 1717enforceme (0.035 ng/L), 17b-estradiol (0.4 ng/L) and diclofenac (100 ng/L). It is noteworthy that the standards for these CECs, with the exception of diclofenac, are far below method reporting limits of analytical methods offered by commercial laboratories (Vanderford et al. 2012). In addition, non-point discharges (i.e., urban run-off, septic tanks, leaking sewer lines), which are difficult to control or monitor, can contribute loads of select CECs (e.g., PFOS, synthetic and natural hormones) that can result in exceedance of these proposed standards. Thus, it remains unlikely that these standards will be enforceable.

Since June 2007, the Registration, Evaluation, Authorisation and Restriction of Chemical Substances (REACH) program is the European Community regulation on chemicals and their safe use (EC 1907/2006) [<http://ec.europa.eu/>

environment/chemicals/reach/reach_intro.htm]. The aim of REACH is to improve the protection of human health and the environment through the better and earlier identification of the intrinsic properties of chemical substances. Since the REACH program also applies to chemicals that are being exported from the E.U. and imported into the U.S., this regulation also partially affects chemicals in commerce in the U.S. The REACH regulation places greater responsibility on industry to manage the risks from chemicals and to provide safety information on the substances. Manufacturers and importers are required to gather information on the properties of their chemical substances, which will allow their safe handling, and to register the information in a central database run by the European Chemicals Agency (ECHA) in Helsinki. The REACH regulation also calls for the progressive substitution of the most dangerous chemicals when suitable alternatives have been identified. One of the main reasons for developing and adopting the REACH regulation was that a large number of substances have been manufactured and placed on the market in Europe for many years, sometimes in very high amounts, and yet there is insufficient information on the hazards that they pose to human health and the environment.

Australia. According to the Australian Constitution, the management of water is the right and responsibility of the states. As such, the responsibility for regulating the management of CECs in the environment and in drinking water belongs to the State Governments. This is then implemented through various state-based environment, public health, and natural resources agencies. This arrangement has historically led to duplication in some areas of legislation and considerable inconsistencies in others.

During the 1990s, the Australian Federal and State Governments began to work together to develop a National Water Quality Management Strategy (NWQMS). This strategy is part of the national program for ecologically sustainable development

and aims to deliver a nationally consistent approach to water quality management. There are now more than 20 national guideline documents that have been developed under the umbrella of the NWQMS. All of these guidelines provide "guideline values" for chemical concentrations in various types of water. In particular, the Australian Guidelines for Water Recycling (AGWR) provide guideline concentrations for many CECs, including a range of pharmaceuticals, personal care products, and hormones. Nonetheless, since regulation of water remains a state-based responsibility, the guidelines themselves are not directly enforceable. The approach to regulation still varies among the states, but most state governments have adopted various procedures for requiring compliance with national guidelines, particularly the Australia Drinking Water Guidelines (ADWG), by water utilities within their jurisdictions.

NWQMS guidelines developed since 2004 have exhibited a significant philosophical departure from the traditional focus on "end-point monitoring" as a means of water quality compliance. Instead, they have adopted a "risk management" approach, also embodied in the World Health Organization (WHO) Guidelines for Drinking Water Quality and the Water Safety Plans described therein. This approach emphasizes the assessment and management of possible means by which contaminants (including CECs) may be introduced to water, and preventative measures for minimizing such contamination. With reduced emphasis on end-point monitoring, Australia has not followed the U.S. and other countries in mandating water quality standards or extensive monitoring programs. Nonetheless, some jurisdictions have required some projects (particularly planned potable water reuse applications) to undertake comprehensive monitoring for CECs and other contaminants.

Objectives

The overall objective of this project is to support the U.S. water industry in systematically assessing the costs and benefits of various effective strategies for

managing and reducing CEC in water. In support of this objective this study will meet the following goals:

1. Identify national and international regulatory and non-regulatory approaches for managing CECs in water and evaluate these approaches in terms of their origination, implementation, and effectiveness and within their specific political, administrative, social, and economical framework.
2. Develop the tools and methods for evaluating the effectiveness of selected, alternative CEC management strategies if implemented in the U.S.
3. Identify alternative CEC management strategies that hold the greatest potential for the U.S. by defining and comparing the direct and indirect costs and benefits.

review will address CEC control strategies, roles and responsibilities in various sectors, including drinking water supply, wastewater effluent discharge standards, non-potable and potable water reuse as well as chemical manufacturing (Table 3.1). In particular, this review will present the current status, commonalities, experiences and latest trends in the U.S., the European Union, with a special emphasis on certain countries (i.e., Germany, Netherlands), Switzerland, Canada, and Australia to manage CECs in water. Sources that will be considered in preparation of this state-of-the-art report will include peer-reviewed literature, grey literature and conference proceedings, and national and international regulations, guidelines and policies related to managing CECs. For this effort, we will build upon multiple reviews on water quality criteria and occurrence databases that team members

Project Tasks

This study is structured into three phases and subdivided into ten tasks. The study will be launched on October 1, 2013 and is designed to be completed within 24 months. Figure 3.1 provides an overview of the study phases and tasks as well as meeting and communication milestones.

PHASE 1 – Identifying alternative Management Strategies for CECs

Task 1: Current and proposed paradigms to control CECs in the U.S. and Internationally.

Task 1 will be initiated with a review of current and proposed policies, regulatory and non-regulatory programs to control CECs in the U.S. and abroad. This comprehensive

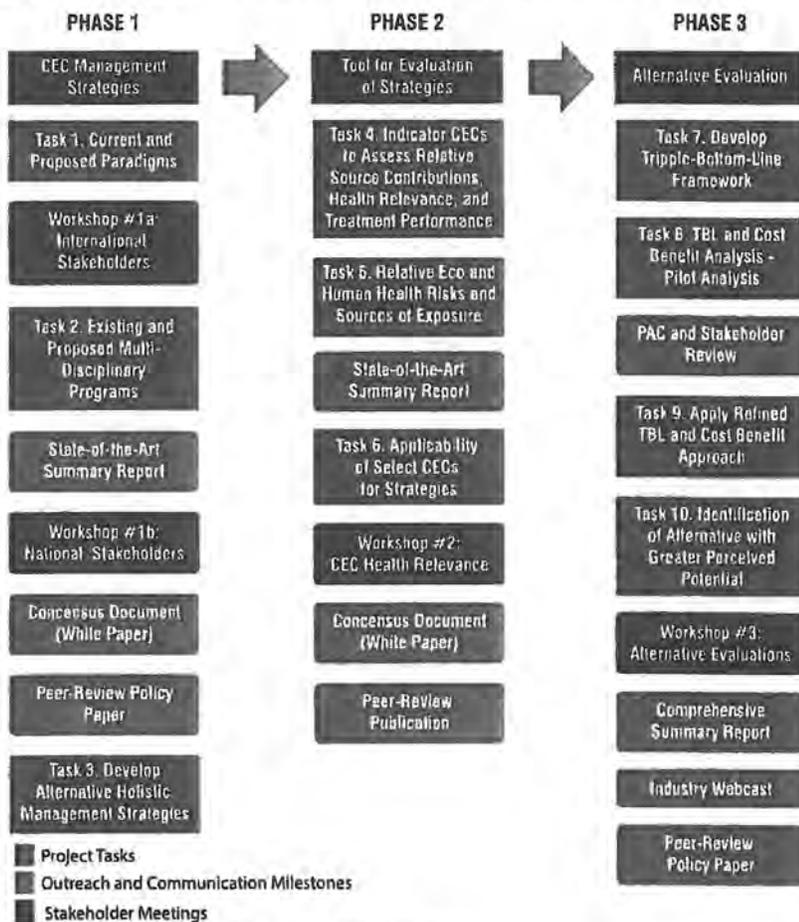


Figure 3.1 - Overview of project approach.

have previously prepared (Snyder et al. 2009, Khan 2009, Drewes and Khan 2010, Drewes et al. 2010, Snyder et al. 2010, Bayer et al. 2013). In consultation with international and national experts, this draft report will be prepared during the initial 4 months of the study primarily by team members at the University of Arizona (U of A) and Technical University Munich (TUM) and reviewed by the Project Advisory Committee (PAC).

Task 2: Existing and proposed multi-disciplinary programs that provide holistic approaches to manage CECs in the environment.

Multi-disciplinary programs and paradigms are used in the U.S. and abroad to control the release of the large number of chemicals in commerce through

various pathways into the environment. Core programs of these more holistic approaches for managing CECs will be summarized during **Task 2** augmenting the state-of-the-art report prepared under **Task 1**. Among others, these include USEPA's TSCA program, USEPA's High Production Volume (HPV) chemical program, USEPA's recent surrogate grouping approach, the REACH program of the E.U., or avoidance strategies for point discharges (*Table 3.1*).

As previously discussed, chemical registration policies are currently fragmented and often focus on unique sectors. Reform of the TSCA has been a major effort in recent years, though actual actions have been limited. Lisa Jackson, while USEPA

Table 3.1 - Regulatory programs for CECs in water in the U.S. and abroad (examples listed).

Sector	Program Specifics	Policy Approach
Wastewater Related	<ul style="list-style-type: none"> NPDES permits 	<ul style="list-style-type: none"> Avoidance; prevention
	<ul style="list-style-type: none"> EU Water Directive (2008) Discharge of priority pollutants EU Water Directive (2012 proposal) – secondary list 	<ul style="list-style-type: none"> Avoidance; prevention
	<ul style="list-style-type: none"> Swiss Upgrade program for wastewater treatment plants using ozone/activated carbon filtration 	<ul style="list-style-type: none"> Avoidance; prevention
Drinking Water Related	<ul style="list-style-type: none"> CCL3/UCMR USEPA EDC Screening 	<ul style="list-style-type: none"> Risk based Risk based
	<ul style="list-style-type: none"> Australian Guidelines for Water Recycling – CEC Guideline Values CA Water Recycling Policy Amendment A – Monitoring requirements for CECs in Recycled Water 	<ul style="list-style-type: none"> Risk based Risk based; technology based; indicator CECs for performance
Holistic Approaches	<ul style="list-style-type: none"> USEPA TSCA Program 	<ul style="list-style-type: none"> Toxic substances control act; prevention
	<ul style="list-style-type: none"> USEPA HPV Program 	<ul style="list-style-type: none"> High production volume chemicals; prevention
	<ul style="list-style-type: none"> USEPA Grouping efforts 	<ul style="list-style-type: none"> Classifying groups of CECs
	<ul style="list-style-type: none"> EU REACH Program 	<ul style="list-style-type: none"> Registration, evaluation, authorization and restriction of chemical substances; prevention
	<ul style="list-style-type: none"> German EPA – Policy for appropriate disposal of unused drugs 	<ul style="list-style-type: none"> Avoidance; prevention

Administrator, testified before the Congressional Committee on Environment and Public Works that TSCA "doesn't place any legal obligation on producers to conduct testing on new chemicals being introduced into commerce." In addition, former Administrator Jackson also said that over the past 30 years, the USEPA has only "been able to require testing on around 200 chemicals" and "has only issued regulations to control five existing chemicals" from the more than 80,000 on the TSCA inventory. While pre-screening of chemical risk to human and environmental health prior to release would be invaluable, the current regulatory paradigm is not, according to the USEPA, providing "assurance that chemicals that are ubiquitous in our economy, our environment and our bodies have been assessed using the best available science" and thus, the drive to reform chemical registration policies continues. However, there are times when agreements are struck between regulatory authorities and chemical producers, for instance the voluntary phase-out of perfluorooctanoic acid (PFOA) where the USEPA invited eight industries to participate in the "*PFOA Stewardship Program*" that would reduce PFOA (and PFOA precursor) emissions into the environment by 2010 and elimination of these emissions by 2015. As another example of partnerships, the USEPA has supported pharmaceutical take-back programs. While pharmaceutical take-back programs likely will not make large gains towards reducing pharmaceutical loadings to WWTPs, these programs are important for public awareness.

Another area gaining tremendous support is "Green Chemistry" for alternatives to commercial chemicals which are persistent in the environment. The USEPA has developed a Green Chemistry Program, which has established partnerships between major chemical producers, academia, NGOs, and others. While green chemistry seems an apparent CEC management strategy, the topic is still quite nebulous and it is critical that potential "replacement" chemicals undergo an equal scrutiny and health assessment as the

original chemicals in question. For instance, an herbicide used in Germany because of its rapid environmental decomposition rate, was found to yield large amounts of NDMA upon ozonation due to an unexpected reaction with an environmental degradation product (Schmidt and Brauch 2008). Source control programs can be very effective, especially for chemicals that are associated with specific practices or industries. For example, after 1,4-dioxane was detected in drinking water wells associated with advanced treated reuse water, the Orange County Water District managed to substantially reduce concentrations by limiting discharge of certain industries to the sewer system.

The uncertainty in regulating chemical by chemical in lieu of thousands of potentially harmful chemical contaminants potentially present in source waters is not much different to the issue of managing risk from pathogenic contaminants in drinking water treatment. For pathogens, setting MCLs is not feasible. Thus, regulators have defined treatment technologies that can achieve certain removal efficiencies, which are coupled with the measurements of certain indicator organism (i.e., *E. coli*) and surrogate parameters (i.e., residual chlorine, effluent turbidity). For unregulated contaminants, a monitoring approach with similar components has been recently proposed for management of CECs in potable reuse schemes (Drewes et al. 2008). This approach combines the monitoring of bulk parameters (i.e., surrogates) and a select number of indicator chemicals to ensure proper performance of unit processes. **In 2010, an independent scientific advisory panel (comprised of our team members) appointed by the California SWRCB endorsed this concept to assure proper performance of water reclamation processes that remove CECs.** The panel suggested a combination of appropriate surrogate parameters and performance-based and health-based indicator chemicals for monitoring reclaimed water quality of indirect potable reuse projects in California (Drewes et al. 2013, SWRCB 2013). Indicators with various properties were

selected to account for compounds currently not identified ("unknowns") and new compounds synthesized and entering the environment in the future (e.g., new pharmaceuticals). Safe drinking water concentrations of many of these CECs may potentially be derived on the basis of the same toxicological considerations used for the establishment of current MCLs as proposed by Schwab et al. (2005) and Snyder et al. (2010).

Recent trends in CEC monitoring consider quantitative structure property relationships (QSPR) and toxicological relevance information as screening criteria to identify the most relevant CECs. Team members at TUM currently develop, in cooperation with German partners, an open source database. This database, called STOFF-IDENT, containing water relevant molecules extracted out of the ECHA REACH database, includes important physicochemical parameters for CECs like pharmaceuticals, pesticides, biocides and fragrances. Fed with relevant molecules, the database will become a contemporary tool for suspected target screening (typically applied for measuring molecules from the 'priority list' and other regulation lists). The value of this database for international use is extremely high, and the E.U. currently considers opening this database to a universal platform, together with other databases to ensure a professional linkage.

Although several new techniques to monitor a diverse set of chemicals in real time have recently been proposed (USEPA 2009, Cahill et al. 2010, Puglisi et al. 2010), significant additional research is required to develop reliable and appropriate approaches for real-time monitoring that are suitable for water reclamation settings. Real-time monitoring techniques that are both sufficiently comprehensive and sensitive are unlikely to be available in this decade. Given these uncertainties, state regulators and progressive water utilities favored to manage CECs in these projects through the establishment of treatment barriers in order to protect public health. While no uniform guidance

exists for how potable reuse systems should be designed and operated, there is agreement that four elements of a multi-barrier approach are typically embedded into the design of potable reuse schemes to assure a water quality suitable for drinking water consumption at all times. These elements are: monitoring, attenuation, retention, and blending (Drewes and Khan 2010).

In **Task 2** above review will be expanded and completed. **Task 2**, led by team members at U of A and TUM, will also be conducted in parallel to **Task 1** and findings will be embedded in the state-of-the-art report.

Task 3: Develop alternative holistic management strategies for managing CECs in water in the U.S.

Our proposed research will aggregate and evaluate CEC management plans, which have been employed or are being considered in the U.S., Europe, Canada, and Australia in a draft state-of-the-art report during **Tasks 1 and 2**. The draft report will be distributed to participants of expert Workshops # 1a and # 1b for review in February/March 2014. In these workshops, we will bring together leading experts who are intimately familiar with these CEC management plans. The intent of the workshops is to discuss the basis and drivers for these management strategies, to discuss experiences, identify trends in policies and regulations both in the U.S. and internationally, discuss areas for harmonization, and identify the strengths and weaknesses of each considering a holistic water approach that considers environmental and public health. The need for an international exchange on this subject matter and to harmonize approaches was evident in the overwhelmingly positive responses we received during the preparation of this proposal from our U.S. and international participants. In order to provide a comprehensive review of international and national approaches, we decided to hold workshops with leading experts in two locations during **Phase 1**. The first workshop (#1a) will be held in Munich,

Germany (in March 2014) with participants from Australia and Europe (Germany, Switzerland, The Netherlands, Austria, France, and Italy) involving a representative group of key stakeholders (drinking water industry; wastewater industry; state, federal and E.U. regulators; academics) (*Table 3.2*). This workshop will be sponsored by TUM and facilitated through TUM's Institute of Advanced Study. The findings from this workshop will be further discussed during the second meeting (#1b) with a representative group of stakeholders in the U.S. (planned for April 2014 in Henderson, NV). A limited number of international participants from Europe will join this meeting to assist in reporting and discussing the key findings from Workshop #1a.

The outcome of these workshops will be a comprehensive view of CEC management options and a ranking of alternative holistic management strategies that combine the best features and principles of those evaluated. The ranking of alternatives will utilize selection criteria such as the effectiveness of various measures regarding minimizing ecological and human health impacts, suitability of a broad range of chemicals and biological endpoints, implementability from a technical and regulatory standpoint, and cost, among others. **These criteria follow a Triple-Bottom-Line (TBL) Approach of considering social, environmental, and financial impacts in decision making.**

Finally, the management options, identified core principles and alternative CEC management strategies developed during each workshop during **Task 3** will be summarized in a consensus document (White Paper), signed by each of the diverse stakeholders. This transformative consensus document will be incorporated in the comprehensive review report as a final deliverable of **Phase 1**. These publications will include PAC and WaterRF review and comments addressed before distribution. Those management strategies that are highly ranked by participants of workshop #1b will be carried into **Phase 3** for further evaluation

in order to investigate whether these could be adopted to manage CECs in water in the USA. The identified core principles and alternative management strategies might serve as a foundation to further harmonize policies and regulations to manage CECs in water both in the U.S. and abroad. In addition, key findings of the report and workshop outcomes will be edited and prepared for submission as a policy paper to a peer-reviewed journal for publication. **The external peer-reviewed publication of these consensus documents is absolutely critical if they are to be used in policy discussions by the USEPA and other regulatory bodies.**

PHASE 2 - Select Representative CECs to Evaluate Management Strategies

In order to support a quantitative assessment of various alternative CEC management strategies during **Phase 3**, the purpose of **Phase 2** in this study is to define sets of representative CECs that can be used as "tools" by utilities and other stakeholders to determine relative source contributions of CECs in a watershed and to evaluate treatment efficacy in mitigating CECs. During **Phase 2**, we will also identify in consultation with leading experts in the field health-based CECs that are most suitable to assess impacts on human and ecological health.

Task 4: Indicator CECs to assess relative source contributions and treatment performance.

During **Task 4**, sets of representative CECs, both representing classes of compounds and individual chemicals will be defined to assess relative source contributions and reduction / treatment performance efficacy for use in evaluating the alternative management strategies developed during **Phase 1**.

Characterizing Relative Source Water Contributions

Building upon studies in the general peer-reviewed literature and data bases available to the project team as well as previously proposed approaches by the project team (Mawhinney et al. 2011, Dickenson

Table 3.2 - Suggested stakeholder participants for Workshops #1a and #1b CEC management strategies.

Proposed Stakeholder Participants	Role / Rationale
Workshop #1a – Munich, March 2014 (Sponsored by TUM)	
Project research team members (Snyder, Drewes, Rauch-Williams, Letzel)	State-of-the-art report presentation on US regulatory approaches and trends, green chemistry, take-back programs; workshop moderation
Bernd Gawlik, European Commission	European Water Framework Directive/Joint Research Centre – Watch List Mechanisms
Peter Stoks, Association of Rhine Water Supply Companies, The Netherlands	International Association of Water Works in the Rhine basin; federal regulations/policies in the Netherlands
Stefanie Jäger, German Env. Protection Agency	Federal regulations/policies in Germany
Georg Windhofer, Austrian Env. Protection Agency	Federal regulations/policies in Austria
Werner Reifenhäuser, Bavarian Agency for Environment	State regulations/policies
Urs von Gunten, Eawag, Switzerland	Federal regulations/policies in Switzerland
Thomas Temes, Federal Institute of Hydrology, Germany	German Association of Water, Wastewater, and Waste (DWA)
Claudia Castell-Exner, DVGW, Germany	German Technical and Scientific Association for Gas and Water (DVGW)/ European Federation of National Associations of Water & Wastewater Svcs.
Stuart Khan, Univ. of New South Wales, Sydney, Australia	Federal regulations/policies in Australia
Carlos Campos, Suez Environment, France	Water and wastewater service provider
Workshop #1b- Henderson, NV, April 2014 (Sponsored by SNWA)	
Project research team members (Snyder, Drewes, Rauch-Williams, Dickenson, Letzel)	State-of-the-art report presentations on international regulatory approaches and trends, green chemistry, take-back programs; workshop moderation
TBD, USEPA and USGS	Federal regulations/policies; Federal monitoring programs and effects studies for CECs
Metropolitan Water District of Southern California, SNWA, Central Arkansas Water, Denver Water, City of Boulder, Minneapolis Dep. of Public Works, Greater Cincinnati Water Works, Philadelphia Water Dep., Orange County Water District, Milwaukee Water Works, Aurora Water	Representatives from Drinking Water Providers
West Basin Municipal Water District, City of Tucson	Water, wastewater, water reuse
American Water, Veolia Water	Water and wastewater service provider
Peter Stoks, Association of Rhine Water Supply Companies, The Netherlands	International Association of Water Works in the Rhine basin; federal regulations/policies in the Netherlands
Urs von Gunten, Eawag, Switzerland	Federal regulations/policies in Switzerland
WaterRF Project Advisory Committee and PM	Process review

et al. 2011, Teerlink et al. 2012), sets of specific indicator CECs will be proposed for characterizing the origin of CEC contamination in source waters. CEC indicators will be categorized as either qualitative, indicating the presence or absence of a type of contamination, or where possible quantitative, indicating the magnitude or degree of contamination. The literature will be reviewed for applicable sets of indicator CECs to differentiate point and nonpoint sources, such as wastewater and industrial discharges, onsite wastewater treatment, leaky sewers, or agricultural and urban runoff. Conditions that need to be fulfilled for a chemical or sets of chemicals to serve as a tracer for characterizing relative source water contaminant contributions include: (1) high occurrence frequency in combination with specific CEC contamination, (2) concentration proportionately related to CEC contamination, (3) high detection ratio (ratio between mean concentration and detection limit) in the specific source, and (4) quantifiable in the specific matrix with commercially available analytical methods. A preliminary list of possible CEC indicators for different contamination sources based on previous work is presented in Table 3.3. This task will also draw upon a recently completed WRRF study (WaterReuse-09-08 "Development of Markers to Identify Nutrient Sources Impacting Surface Water Bodies") and two ongoing WaterRF and WRRF studies (WaterRF 4260 "EDC/PPCP Benchmarking and Monitoring for Drinking Water Utilities;" WaterReuse-11-05 "Demonstrating the

Table 3.3 - Preliminary list of CEC indicators / tracers to identify contaminant sources.

Source	Example
Wastewater Effluent	Sucralose, fecal steroids
Industrial Discharge	Site specific (e.g. 1,4-dioxane)
Septic Tank Impact	Sucralose/gadolinium ratio; chlorinated flame retardant/caffeine ratios
Agricultural Runoff	Pesticides (i.e., metolachlor), animal antibiotics, cholesterol content of steroids, isotopes
Urban Runoff	Perfluoroalkyl substances

Ref.: Mawhinney et al. 2011; Standley et al. 2000; Dickenson et al. 2011; Teerlink et al. 2012; Oppenheimer et al 2012.

Benefits of Engineered Direct versus Unintended Indirect Potable Reuse Systems"). These studies attempt to examine the impact of wastewater discharges on downstream receiving water intakes for water treatment plants.

Characterizing Treatment Efficacy

Management strategies developed during Task 3 may suggest the control of CECs at the point of discharge in the sewer system, at the wastewater treatment plant, in the environmental buffer (i.e., groundwater or receiving surface waters), or at the drinking water treatment plant. **Previous research funded by WaterRF and other organizations that was led by members of our research team has demonstrated that the costs and effectiveness of treatment technologies reduce CEC concentrations**, e.g., for biological nutrient removal processes, oxidation (i.e., chlorination, ozone, advanced oxidation processes), physical separation (i.e., granular activated carbon, nanofiltration, reverse osmosis) and natural treatment processes (e.g., riverbank filtration, soil-aquifer treatment). Since the presence of known and unknown CECs in impaired source waters can be numerous, a conservative, performance-based indicator CEC approach as previously discussed can be used to assess the efficacy of different treatment strategies. Here, multiple CEC indicators representing a broad range of physicochemical and biological properties will allow accounting for other known, unknown or new chemicals synthesized and entering the

environment in the future provided they fall within the range of properties covered. This concept has been adopted by the State of California for monitoring CECs in recycled water application for potable reuse (SWRCB 2013), as recommended by members of our team.

The knowledge regarding CEC indicators will be used in

Phase 3 to evaluate the effectiveness for certain management strategies involving treatment processes and assess if certain classes of CEC are better controlled prior to entering the sewer system, at the wastewater treatment plant, in the environment, at the drinking water treatment plant or simultaneously at multiple locations. The project team has extensive experience from past projects that identified appropriate treatment indicators for effective treatment processes, such as activated sludge treatment and conventional and advanced (i.e., advanced oxidation, activated carbon adsorption, reverse osmosis, nanofiltration) as well as natural treatment systems (i.e., receiving waters and subsurface treatment) (Drewes et al. 2005, Bellona and Drewes 2007, Dickenson et al 2009, Drewes et al. 2010, Dickenson et al. 2011, Laws et al. 2011, Salveson et al. 2012).

Where previous studies on the fate of certain CECs in engineered and natural systems are lacking to assess effective management strategies that include treatment, CEC removal can be estimated via model predictions, such as mass balance models with measured CEC fate input parameters and/or quantitative structure property relationships (QSPRs). Modeling tools will be identified for the prediction of CECs for various advanced treatment processes that can be incorporated in a management strategy decision-making process. The project team will draw upon our extensive experience of completed projects on the identification and development of such models (Dickenson and Drewes 2010, Stevens-Garmon et al 2011). In addition, the research team will consider tools currently developed during relevant completed or ongoing WaterRF projects (WaterRF-4169: "Water Utility Tool For Responding To Emerging Contaminant Issues;" WaterRF-4168: "Quantitative Structure Property Relationships (QSPR) to Predict Removal of EDC/PPCPs in Water Treatment Processes;" WaterRF-4386: "Decision Support Program for Reducing EDCs and PPCPs in Drinking Water."

Task 5: Compile information on relative ecological and human health risks and relative sources of exposure.

Task 5 will develop a conceptual framework of health-based indicator CECs to identify the relative ecological and human health risks in source water and finished drinking water. This approach will build upon similar frameworks that have been developed by the project team for human health exposure to recycled waters (Drewes et al. 2013) and will inform the final selection of suitable health-based CECs during **Task 6**. To assess ecological impacts, a similar framework has been developed for receiving streams impacted by wastewater effluents (WERF CEC5R082 "Diagnostic Tools to Evaluate Impacts of TORCs"). In general, the developed framework will consist of a criterion that compares the environmental concentration and adverse effects level. For human health, the adverse effects level is based on conservative allowable daily intake and ecological effects is based on chronic toxicities (from the ECOSAR or PBT Profiler models) or estrogenic activities (from the FDA Estrogenic Activity Database). The framework will have a provision for addressing unknown compounds of toxicological relevance by using bioanalytical methods for non-targeted screening. Also, the relative source contribution of CEC via drinking water will be compared against other exposure routes, such as food, air, drugs, and consumer products and will be considered in the prioritization of CECs. The framework will be applied to prioritize CEC for selected case study watersheds identified in **Phase 3**.

Task 6: Finalizing a list of suitable CECs to assess alternative management strategies.

The selection of suitable CECs to represent potential adverse ecological and human health impacts is characterized by a high degree of uncertainty. This topic is also highly controversial, especially among members of the environmental community. Any dialogue intended to derive

Table 3.4 - Suggested stakeholder participants for Workshop #2 CEC risks and need for action.

Proposed Stakeholder Participants for Workshop 2	Role / Rationale
Nancy Denslow, University of Florida	Ecotoxicology
Joe Cotruvo, Cotruvo and Associates	Human toxicology
Robert Hultquist, Cal Dept. of Public Health	State regulator
Steven, Schindler, NYC Environmental Protection	State regulator
TBD, USEPA	Federal regulator
Scientists suggested by Environmental Community	Ecotoxicology/ human toxicology
Andrew Eaton, Eurofins Eaton Analytical Inc.	CEC analysis, QA/QC
Yann Moreau, Veolia Water	Water and wastewater environmental research and innovation
Barbara S. Losey, TBD, Inter-Industry Network on Microconstituents	Industry trade association of chemical, pharmaceutical and consumer products
e.g. Metropolitan Water District of Southern California, SNWA, Central Arkansas Water, Denver Water, City of Boulder, Minneapolis Dep. of Public Works, Greater Cincinnati Water Works, Philadelphia Water Dep., Orange County Water District, Milwaukee Water Works, Aurora Water	3-4 selected representatives from water treatment providers (different regions, watersheds, treatment sizes, etc.)
e.g., West Basin Municipal Water District, City of Tucson, Snyderville Water Reclamation District, Metro Wastewater Reclamation District Denver	2-4 selected representatives from water, wastewater, water reuse utilities
PAC WaterRF#4494 and WaterRF PM Alice Fulmer	Process review
Project team	State-of-the-art report presentation (Tasks 4+5); workshop moderation

appropriate monitoring strategies to assess the health relevance of CECs must therefore consider this broad spectrum of opinions, which often influences perception of the general public—the customer base of the U.S. drinking water industry. Similar to **Phase 1**, we propose to facilitate this dialogue during **Task 6** through a workshop (#2) targeted to capture CECs risks and the need for action by engaging a broad group of stakeholders. The participants in this workshop will be renowned experts in human and ecological toxicology, representatives from the pharmaceutical and chemical industry, federal and state regulators, and representatives of water and wastewater utilities (*Table 3.4*). In addition, we will reach out to the environmental community (e.g., WWF, Trout Unlimited, and other NGOs) to solicit names

of scientists they consider credible to assist in identifying suitable ecological- and human health-based CECs and/or monitoring strategies. In close consultation with WaterRF's PAC, we will assemble the final list participants of this multi-sector expert group to develop and evaluate the applicability of select CEC or screening efforts (bioassays) to best assess the ecological and human health relevance of alternative CEC management strategies.

Similar to **Task 3**, findings of Workshop #2 will be summarized in a consensus document (White Paper), signed by each of the diverse stakeholders. This consensus document along with the state-of-the-art report summarizing efforts of **Tasks 4 and 5** will represent the final deliverable of **Phase 2**. In addition, key findings of this report and outcomes

of Workshop #2 will be edited and prepared for submission as a policy paper to a peer-reviewed journal for publication.

PHASE 3 – Triple-Bottom-Line and Cost Benefit Analysis

Phase 3 entails analyzing the selected alternative CEC management strategies identified in **Phase 1** using a TBL framework. Clearly, any large-scale implementation of CEC management approaches in the U.S. would result in projects that will have broad-reaching financial, ecological, and community impacts. Direct and indirect externalities of such programs need to be identified and quantified to become an intrinsic part of the policy decision-making process. Key questions to be answered during **Phase 3** of the study include:

- What is the most cost-effective way of reducing the environmental and human health risks caused by CECs to acceptable levels?
- Do all benefits associated with specific CEC approaches (e.g., upgrading drinking water facilities with CEC removal technologies) outweigh the environmental, social, and life cycle costs?
- What are the trade-offs between financial costs and environmental and social benefits for various CEC management strategies compared to the base case, “do-nothing”?

The ultimate objective of this study is to identify the best-suited CEC management strategies to be considered for implementation in the U.S. to protect human health and the environment. Therefore, the findings of this study will be scrutinized given the breadth of opinions among stakeholders involved. The approaches for identifying ecological and human health risks identified in Phases 1 and 2 address the primary impacts for first two categories of TBL: social and environmental. The other primary impact is the financial cost of the management approaches. In using a TBL framework for this project, it is important to consider other secondary impacts and benefits in these categories such as increased greenhouse gas emissions due to

increased power use, improved public perception and rate-payer impacts. Stakeholder participation in determining the potential impact and benefit criteria to be used is critical for us to ensure early and broad support for the TBL evaluation to assure that the final study conclusions are defensible and endorsed by a diverse group of decision makers.

We believe that the value and credibility of the TBL and cost benefit analysis conducted in this study very much depends on the institutional and scientific insight that a team brings to this task. The straightforward use of existing market research databases in support of cost-benefit analyses that has been successfully used in the past for very specific well-described contaminants, such as arsenic and even nutrients, is not as convincingly applied to CECs, given our inability to date to forecast many indirect, direct, or suspected causal relationships. Assigning monetary values in such cases may result in questionable, skewed analysis results and could ultimately narrow the impact and credibility of the study. Instead, we have comprised a team of CEC experts whose backgrounds reach across the spectrum of water treatment sectors, covering water, wastewater, and reuse, consumer, and environmental protection groups, public agencies, and private industry. Our Co-PIs Prof. Shane Snyder and Prof. Jörg Drewes have successfully worked with regulators in California on the development of CEC regulations in the recent past and know the process. Our team members conducting the cost-benefit analyses in the TBL framework are not only experienced in these types of analysis, but are also intrinsically familiar with applying these methods to complex, water quality related questions. Our team members have had numerous conversations with relevant and diverse stakeholders, which are founded in long, trusted relationships. This stakeholder involvement and endorsement of our team will facilitate consensus and the implementation of our recommendations.

Our proposed approach for **Phase 3** is illustrated in *Figure 3.2* and broken into three tasks that are further explained in the following sections.

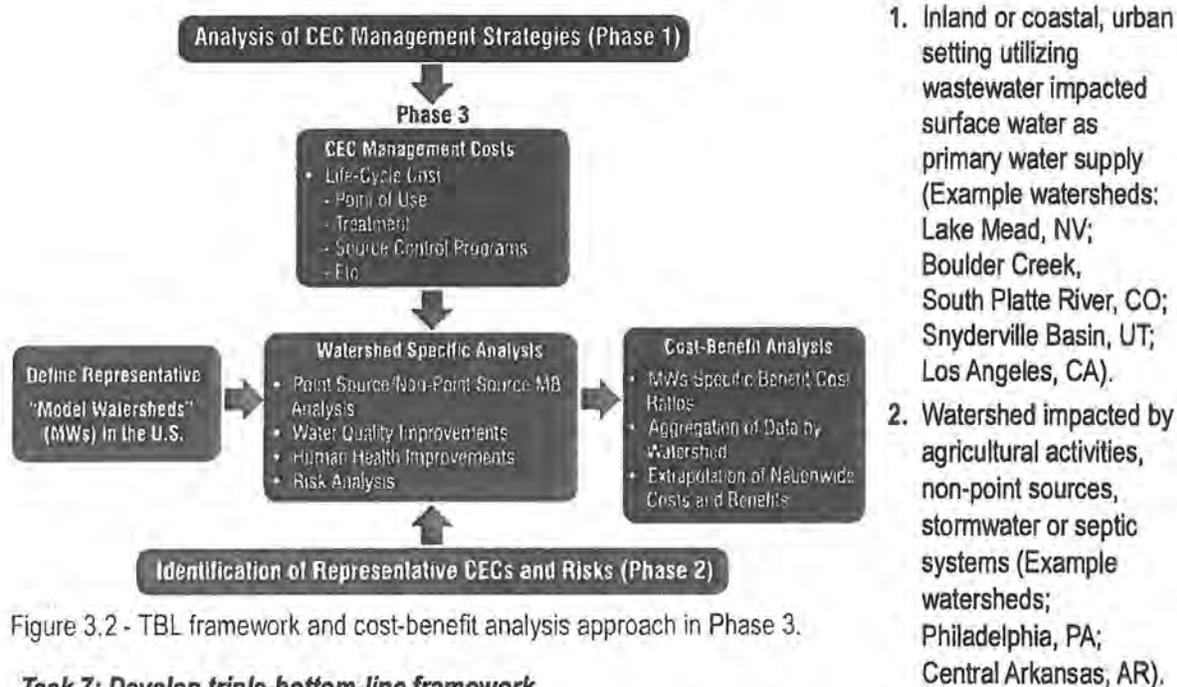


Figure 3.2 - TBL framework and cost-benefit analysis approach in Phase 3.

Task 7: Develop triple-bottom-line framework.

We propose to develop a list of evaluation criteria for each TBL category to compare the identified management strategies. A variety of tools (as discussed in Phases 1 and 2 approaches) will be used to compare the management strategies. We also propose to conduct a Cost-Benefit Analysis for the alternative CEC management strategies identified during **Task 3** using CEC indicators for source contributions, treatment performance and health relevance identified during **Phase 2** for specific representative Model Watersheds in the U.S. These watershed scenarios will be finalized during the study based on results of **Phases 1** and **2** in consultation with WaterRF, the PAC, and participating stakeholders.

Representative Model Watersheds

The qualitative and quantitative costs and benefits of various CEC management strategies utilizing representative CEC indicators will be evaluated in representative watershed scenarios. Given the support provided by our utility partner, a range of watershed databases is available to support this effort:

At this time, and pending further discussions until **Task 7** in this study, we envision to evaluate 2-3 model watersheds, among them Lake Mead and Philadelphia as there is extensive data available for these sites.

TBL Framework

There are many different approaches to applying a TBL framework to decision analysis, ranging from completely qualitative analysis to as quantitative as possible. Monetizing, or translating impacts and benefits into dollars using economic data is one approach to applying the TBL. However it is often difficult to translate qualitative criteria, such as public perception, into dollars. Translating CEC impacts to dollars will be even more complex. Monetization only works where there is a database of economic impacts and benefits associated with a criteria. While the economic price of having a viable salmon fishery for human consumption is fairly understood, the economic benefit of not feminizing specific aquatic species, such as frogs, may be more difficult to quantify.

Quantifying or even just identifying actual direct and indirect benefits and costs for CECs will require more

than text-book-style TBL skills. CECs comprise a large, diverse group of compounds for which environmental and human health impacts are not completely understood; this makes monetizing their impacts and risks difficult. The health/environmental risk work needed to inform cost-benefit assessment has only recently begun. Co-PI's Snyder and Drewes have been integral to this work from its inception. The state-of-the-art scientific insight our team brings to this task will be instrumental in defining what tangible and intangible impacts are most useful and appropriate to consider.

Traditionally, TBL assessments focus on three areas: economic, environmental, and social impacts. We propose to expand this framework to "Technical Impacts," as operation, reliability, and performance are vital to agencies and not well captured under the other categories. Further, it is relevant to consider the "implementability" of different CEC management approaches in the U.S. within this framework. We

will use quantitative tools (many identified in the approaches outlined in Phases 1 and 2) as much as possible to compare strategies, however some qualitative comparisons will be required to be comprehensive. We also propose to do a cost-benefit analysis to compare economic benefits and impacts. *Table 3.5* provides a preliminary list of financial, environmental, and social impacts specific to CECs to be evaluated as part of the TBL and cost-benefit analysis. The PAC, WaterRF and stakeholders will play an important role in truth-testing and approving the TBL framework and criteria to ensure a wide range of benefits and impacts is considered.

We anticipate that a suite of tools will be required to support evaluating and comparing the impacts and benefits. Carollo and other members of our team have used a variety of tools to support TBL and Cost-Benefit Analyses that are available to this project and will be tailored to best fit the final agreed

Table 3.5 - Example criteria matrix to assess financial, environmental, and social costs & benefits in Phase 3.

Criterion	Costs	Benefits / Avoided Costs
Financial	<ul style="list-style-type: none"> Program Life-Cycle Costs R&D costs for alternative chemicals development, production, and marketing 	<ul style="list-style-type: none"> Income from recreational activities Improved commercial fisheries Sales of "green products"
Environmental	<ul style="list-style-type: none"> Chemical use Energy consumption GHG emissions Solids production 	<ul style="list-style-type: none"> Aquatic life improvement Ecological risk reduction from CECs & metabolites Water quality improvements Reduced dispersion and accumulation of CECs in the aquatic environment
Social	<ul style="list-style-type: none"> Higher treatment costs / rate increases Community involvement Increased taxes Higher consumer product prices 	<ul style="list-style-type: none"> Value of "Clean" Water Human health risk reduction from CECs and metabolites Fewer consumer complaints Lower CEC exposure from water versus other routes
Technical	<ul style="list-style-type: none"> Generation of toxic metabolites Moving contaminants from one media to another 	<ul style="list-style-type: none"> Synergies of CEC treatment upgrades & other treatment goals Process reliability
Implementability	<ul style="list-style-type: none"> Administrative Costs Regulatory framework Behavioral changes Institutional barriers 	<ul style="list-style-type: none"> Stakeholder involvement Increased awareness

upon criteria (e.g., life-cycle assessment tools, TEST (EPA); TRACI (EPA); GaBi; SimaPro; WEST and WWEST (UC-Berkeley; Economic TBL; Envision™ rating tool; Ecological Footprinting tool; and GHG emission estimations). Combined, these tools are able to support the quantitative assessment of many endpoints, including human toxicity—carcinogens, fresh water and marine aquatic ecotoxicity, terrestrial ecotoxicity, photochemical oxidation, global warming, ecological footprint and more.

Task 8: TBL framework and cost-benefit analysis – Pilot analysis.

During **Task 8**, we propose to conduct a pilot trial of applying the TBL framework for one model scenario to demonstrate the mechanics of the proposed methodology before applying it to the full suite of CEC management scenarios to be evaluated in **Phase 3**. The base case “No Action” (current status quo) will be developed to be compared to other CEC management approaches selected in **Phase 1**. As part of this analysis, valuable input from stakeholders, PAC, and WaterRF is sought to refine the approach. Engaging and soliciting input from stakeholders in this trial process supports the development of defensible and broadly accepted final results.

We envision that the following scenarios will be analyzed within representative Model Watersheds:

1. Base Case “No Action.”
2. Upgrade Drinking Water Facilities for CEC Treatment.
3. Upgrade Wastewater Facilities for CEC Treatment.

Additional scenarios may be identified in **Phase 1** for further evaluation and may consist of stringent source control measures (e.g., hospital waste or stormwater treatment) or green chemistry approaches for specific compounds or compound groups.

Developing Capital and O&M Costs

From recent R&D and design projects, our team has developed CEC treatment technologies costs

for water, wastewater, and water reuse applications. Moreover, we are uniquely positioned to identify technology risks, limitations, and synergistic benefits for employing such technologies. For example, enhanced CEC removal at wastewater treatment facilities may synergistically also reduce DBP precursor, nitrogen and phosphorus loads in the treated effluent (Dickenson et al. 2009, Rauch-Williams et al. 2012).

During the course of multiple recent R&D, design, and pilot studies, Carollo collected detailed treatment process, operational and financial data for CEC in water reuse, wastewater, and drinking water facilities (WRRF 02-009, WRRF 11-02, WRRF 06-019, Salveson et al. 2012). This database includes cost estimates for hydraulics, site work, yard piping, electrical, I&C, repairs, and land acquisition. The existing cost database will be amended with cost data from collaborating facilities and other relevant published data. The incremental O&M cost increase between the base scenario “No Action” and various CEC management strategies will be estimated for labor and annual training, chemicals, and power costs from Carollo’s databases and will be augmented with information from participating utilities.

Developing Life-Cycle Costs

Life-cycle costs will be quantified for different CEC management strategies selected in **Phase 1** of this study. The project team led by team members at Carollo will conduct a multi-year life-cycle cost forecast that includes capital and O&M costs, as well as labor, power, sludge disposal, and chemical costs.

Individual CEC management strategies identified and included in this analysis may have different time lines for implementation (*Figure 3.3*). This will need to be taken into consideration when comparing scenarios

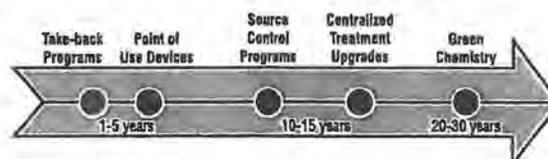


Figure 3.3 - Anticipated timelines for different CEC management approaches.

on the basis of a specific forecast period for net present value.

Capturing Customer and Community Financial Impacts

Life-cycle cost estimates will be used by the research team led by Carollo's Business Solutions Group to calculate monthly bill increases for residential customers, rate increases, and estimated community affordability. This analysis will differentiate the costs for different sizes of service areas and populations served by taking into consideration the economy of scale for upgrading facilities of different size ranges.

Extending the TBL to Include Criteria that are Difficult to Quantify

Many conventional approaches and data bases used for cause-effect relationships may not be applicable for the analysis of CECs, as either the current state of the science does not support defining such relationships or such relationships are highly watershed and community specific and difficult to generalize. In cases where costs and benefits cannot be reliably monetized, we will clearly

identify current scientific knowledge limitations for defining cause-effect relationships as basis for market studies. The scope and budget does not allow us to undertake original market research. Instead, in anticipation that these issues will become relevant in this study, we have comprised a team of environmental and human toxicological experts that will be instrumental in supporting our decisions on whether impact factors and uncertainty measures should be developed for currently unquantifiable costs and benefits, and how such factors should be appropriately defined. Carollo's Business Solutions Group and our project team is experienced in conducting uncertainty analyses, sensitivity analyses, and Monte Carlo simulations in support of selecting specific criteria (or impact factors) for defined "worst case" and "best case" scenarios to assess their impact on the TBL outcome.

Task 9: Apply refined TBL framework and cost-benefit analyses approach to other scenarios.

The approaches for which the ratio of benefits to cost of compliance or implementation are highest will be identified during **Task 9**. In other words,

Table 3.6 - Proposed stakeholder participants in 3rd Workshop TBL and cost-benefit analysis.

Proposed Stakeholder Participants for Workshop 3 - Early Summer 2015 -	Role / Rationale
TBD, USEPA	Federal regulations/policies
Steven, Schindler, NYC Environmental Protection, Robert Hultquist, CADPH	State regulator
Key representatives of Selected Model Watersheds	Case study representatives
Metro Wastewater Reclamation District - City of Denver, CO, Snyderville Basin Water Reclamation District, UT	Small, medium and large wastewater utility representatives
e.g. Metropolitan Water District of Southern California, Southern Nevada Water Authority, Central Arkansas Water, Denver Water, City of Boulder, Minneapolis Dep. of Public Works, Greater Cincinnati Water Works, Philadelphia Water Dep., Orange County Water District, Milwaukee Water Works, Aurora Water	Small, medium, and large water provider representatives
West Basin Municipal Water District, CA City of Tucson, AZ	Water, wastewater, water reuse representatives
American Water, Veolia Environment, Suez Environment CIRSEE	Water and wastewater service representatives
Inter-Industry Network on Microconstituents	Industry representatives
WaterRF PM Alice Fulmer and & PAC	Process review

approaches will be identified that yield the highest level of risk reduction at the lowest possible compliance or implementation cost. Additional risk mitigation options and potential approaches for overcoming financial or implementation barriers will be identified. Findings of this task will be presented to key stakeholders in a final workshop (#3) proposed to be conducted in conjunction with a national water conference in the U.S. as proposed in *Table 3.6*. The final list of stakeholder participants will be expanded to balance various stakeholder perspectives essential to the Cost-Benefit and TBL Analysis, depending on the scenarios analyzed and in consultation with WaterRF and the PAC.

Task 10: Identification of alternative with greatest perceived overall benefits and lowest overall costs and preparation of final report.

Task 10 will compare the costs and benefits for different CEC management strategies on a national level. The findings along with the state-of-the-art reports from **Phases 1 and 2** will be edited in preparation of the final report.

Why Choose Our Team?

Our team members combine more than 100 years of research and practical experiences directly relevant to the tasks requested in the RFP. With the degree of leverage this team provides, we will utilize WaterRF's research funds far beyond the immediate RFP requirements in a way that we believe will benefit the project's intentions and be transformative to the water industry at large.

For more than a decade our team members have established close national and international relationships with regulators, researchers, industries, and practitioners on CEC related issues. Professors Shane Snyder (U of A) and Jörg Drewes (TUM, formerly Colorado School of Mines) have been the trusted advisors in the U.S. for state and federal legislators and administrators on the risk of CECs. Both have provided advice at the national level and contributed cutting edge research on the issue of measuring CECs in various matrices,

treatment options for their removal, predicting CEC occurrence, relevance to human and ecological health, and appropriate monitoring strategies.

This team has collectively published more than 200 peer-reviewed manuscripts over the past decade and has an exemplary track record of publications of quality as demonstrated by citation indices and impact factors. Thus, this team will be capable of not only generating quality reports and peer-reviewed publications, but we ourselves apart from our competitors in **our proven ability to reach and influence a broad and diverse reader basis**. Our team has carefully crafted a series of workshops to accompany this study. Our concept goes beyond the aggregation and evaluation of different perspectives and experiences in this stakeholder process. We believe that this study needs an additional component to generate the necessary momentum to embrace its final conclusions and support their implementation. We will use the stakeholder workshops to seek and document stakeholder consensus and core principles on key contentious issues related to CEC risk assessment and management approaches. Professor Shane Snyder's long-standing relationships with the pharmaceutical and chemical industry will be critical in this process. By having diverse points of view, we believe that our proposed approach will be transformative to the water industry, regulators, and the general public.

Carollo has a long-standing service relationship with the WaterRF demonstrating technical excellence and strong project management skills. Beyond these vital services Carollo Engineers and our Carollo Business Group brings our industry-wide experts in the field of TBL Analysis, GHG emissions, and sustainability assessments to this project. The fact that these services are very closely integrated into our company's and project team's CEC expertise for drinking water, wastewater, and non-point source water treatment, allows a seamless coordination between economic, social, technical, and environmental considerations when performing the Cost-Benefit Analysis in **Phase 3**.

APPLICATIONS POTENTIAL

The proposed research will benefit the drinking water industry by helping to broaden the currently progressing regulatory perspective on controlling CECs in the U.S. for the mitigation of perceived or demonstrated environmental and human health risks. It will help provide a scientific basis for the discussion with regulators on CEC management approaches that provide the highest overall benefit at the lowest overall costs to society.

Leveraging this team's international network for this project will allow us to go far beyond a general description and review of CEC management alternatives in the U.S. and abroad during Phase 1. This knowledge largely resides already within our project team. Instead, we will engage key stakeholders to critically analyze the specific administrative, institutional, and economic context from which specific CEC management approaches have successfully evolved or have been proposed, but where a comprehensive assessment to their effectiveness is still lacking.

Specific project deliverables that will directly benefit the water industry include:

- **Policy white papers.** They will be one outcome of our stakeholder workshops, which will be submitted to a high-profile, industry-relevant journal and that will summarize, as one example, the consensus and basic principles among diverse stakeholders on the risk of CEC for the environment and human health.
- **Systematic analysis and documentation of all benefits, risks, and costs of various CEC management approaches.** These include, but are not limited to the following scenarios: CEC treatment at wastewater treatment plants, CEC treatment at drinking water treatment plants, and the base scenario "No-Action."
- **Summary of state-of-the-art knowledge on risk factors of centralized CEC treatment that are less known to the general public.**

These include metabolite formation and generation of potentially harmful by-products.

- **Utility tools.** These include tools that utilities can employ for assessing the relative source contributions of CECs in their watersheds.
- **Exemplary analyses of "Representative Model Watersheds" in the U.S.** They will demonstrate and quantify economic, environmental, and social costs and benefits, as well as implementation and technical aspects for selected CEC management strategies.
- **Final project report.** It will provide utilities with useful background for conducting public outreach initiatives, decision making support in regulatory negotiations, and strategic planning within their watersheds for implementations of CEC management strategies.

By having a team of highly cited and globally recognized impartial experts leading this important project, the WaterRF is assured that subscribers and other stakeholders are keen to hear and read the products of this project. Communication is one of our team's unique unequaled strengths.

Our team has a long standing history for platform presentations at regional, and nearly all major national and international water conferences. Presentations in 2012 alone include: Co-PI Snyder (28 invited presentations in nine different countries including five keynote presentations, Co-PI Drewes (20 invited presentations and five keynotes), PI Rauch-Williams (7), and Co-PI Dickenson (10).

Our team members also have intrinsic impact through our roles in national, international, and regional expert panels, such as the National Research Council, USEPA Science Advisory Board, Cal SWRCB Science Advisory Panels. This kind of impact is crucial to the success and impact of this project.

QUALITY ASSURANCE

Project Review

The quality of data utilized to form expert judgment can have a large bearing on decision-making. For instance, the inclusion of steroid hormones on the CCL3 is largely the result of monitoring studies with faculty methods. For this reason, the team will rely only upon data that has been through both external peer-review and our own internal QA/QC review. We have also included Dr. Andy Eaton as part of our expert working group. He will contribute specifically on the QA/QC of data previously generated data sets, as well as helping to provide QA/QC specifications for future monitoring programs for surrogates and indicators.

Cost Estimates for Treatment Upgrades

Budget-level present-worth cost estimates will be developed in Phase 3 of the study for upgrading existing water, wastewater, and reclamation treatment facilities for CEC removal. The expected accuracy range for the cost estimates provided will be +50/-30 percent .

The following QA/QC procedures will be used:

- Estimate major equipment costs, as well as construction and installation costs from recent projects and vendor quotes received within last costs 2 years.
- Estimate site work, excavation, shoring, piping, electrical work, instruments, roads, support facilities, appurtenances, freight, taxes, etc. from recent estimates and published cost estimation guidelines.
- Escalate past costs using adequate indices, e.g., provided by Engineering News-Record
- Include appropriate percentages for overhead and profit for contractors, engineering and construction management, legal and administrative costs, and contingencies for budgetary cost estimate level.

Cost-Benefit Analysis

The Cost-Benefit Analysis in the TBL framework will be performed by our team under the leadership of economic experts in Carollo's Business Group. The exclusive focus of this group is the application of economic analyses methods, such as Cost-Benefit Analysis and Rate Impact Studies, to issues related to the water industry.

The specific approach and TBL framework to be applied to CEC management alternatives in this study will be developed with input from key stakeholders and our PAC. These will be tested on a trail scenario, prior to finalization.

MANAGEMENT PLAN

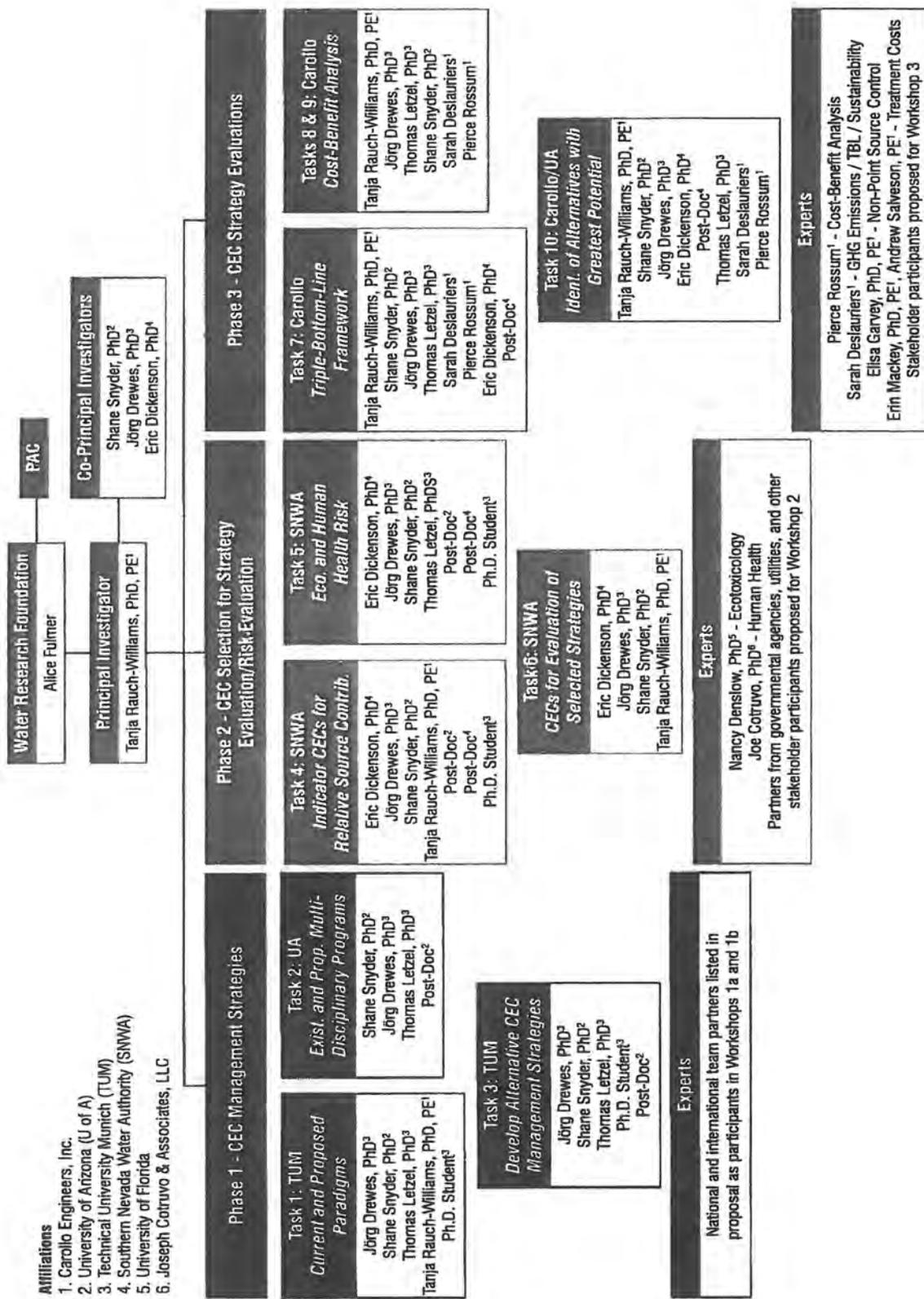
The research team is successfully committed to a team management philosophy based upon the tenets of quality management. A self-directed work group, consisting of all of the principal investigators, and engineers/scientists working on the research, will manage this project. All aspects of the project will be managed by this team using tools such as timed agendas, flow charting, brainstorming, time lines, action plans, process management tracking, and the extensive use of data in decision processes and continuous focus on the customer's (WaterRF) needs and expectations.

Monthly conference calls via video link involving all of the scientists will allow for updates on project progress. Key team members are located in Denver, CO (Rauch-Williams), Tucson, AZ (Snyder and Post-Doc), Munich, Germany (Drewes, Letzel, and Ph.D. student), and Las Vegas, NV (Dickenson and Post-Doc). Local set-ups and Carollo offices in team member locations allow for bi-monthly video-conference meetings, allowing for more in-depth discussions. The team will take full responsibility for carrying out the quality assurance plan, and will include a quality assurance check as part of each team meeting. The roles and responsibilities of each team member are illustrated in the organization chart on the next page (Figure 6.1). For each task, the first listed name for that task is the Task Leader. Each Task Leader will be responsible for the coordination, analysis, and reporting for each Task.

The Principal Investigator and Project Manager, Dr. Tanja Rauch-Williams, will coordinate the research team towards one objective of a quality product (Figure 6.1). Dr. Rauch-Williams will also be responsible to WaterRF for day-to-day communications, project deliverables, schedule, budget, and contracting. She has successfully led several large research efforts in the past that consisted of diverse teams, and that have included all principal investigators of this study. Dr. Rauch-Williams residence in Denver allows for personal

and regular communication with the WaterRF throughout the project. The time commitment of our key team members to this project is 10% for Dr. Rauch-Williams and 4.3% for four other Carollo experts, respectively, who will be supporting the TBL and Cost-Benefit Analysis, 2% for Prof. Snyder and 75% for his supporting Post-Doc, 5% for Prof. Drewes and 60% for his supporting Ph.D. student, 22% for Dr. Letzel, 4% for Dr. Dickenson and 11% for his supporting Post-Doc.

The project team strongly believes that not only the effective communication within the team and with WaterRF, but also the timely sharing of the research findings with the water industry is critical for success. This is especially true as the USEPA is currently embarking on TSCA reform, which must include careful and constructive input from the water community. Likewise, utilities and agencies continue to struggle with communication of CEC related issues. Prof. Snyder and Dr. Rauch-Williams will function as the primary communication liaisons to respond to any topic-related questions from the industry that may arise during the study.



nization and responsibilities.

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LICENSES AND INVENTIONS

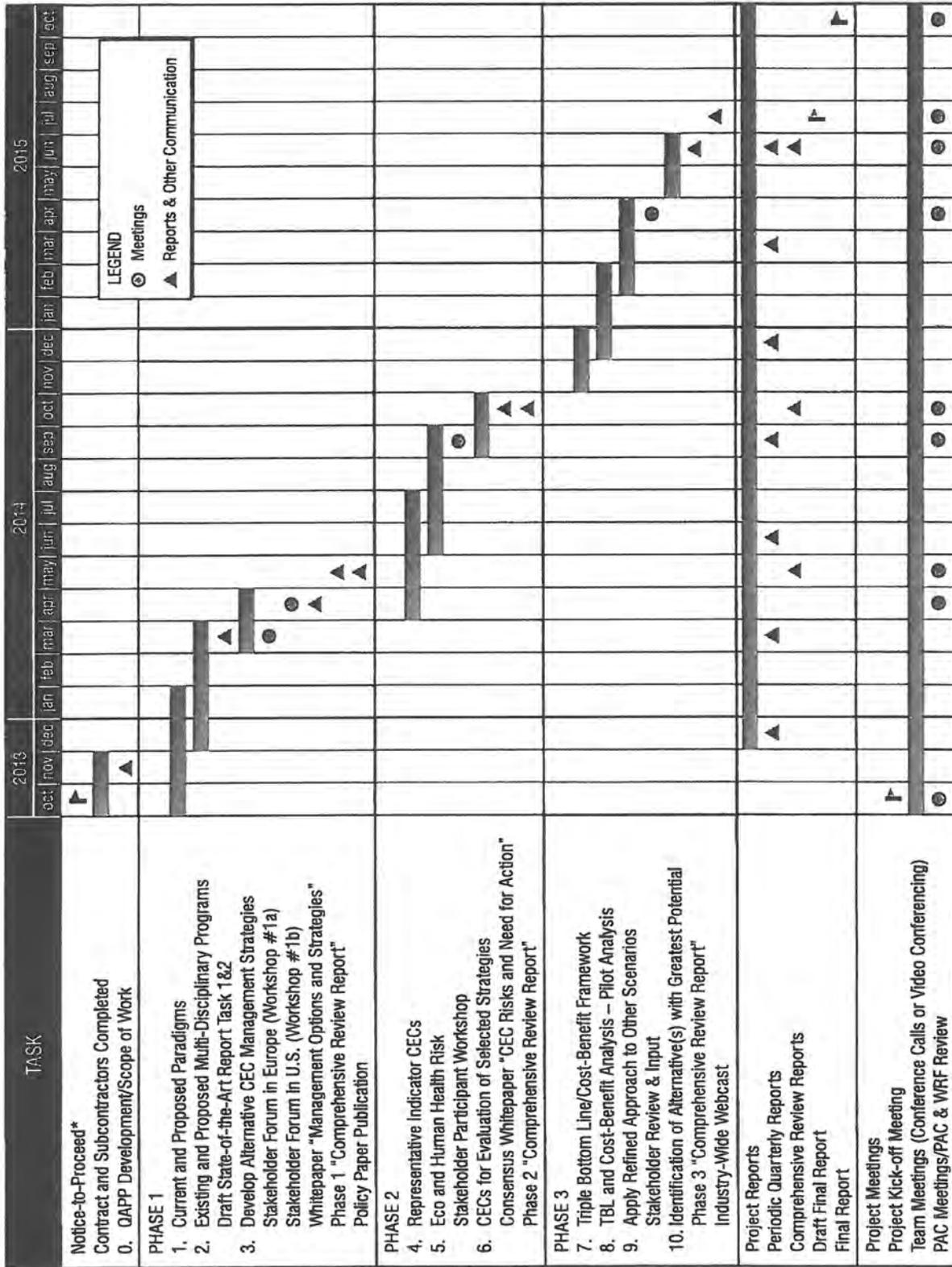
We do not anticipate this study will generate inventions, new products, or processes (or improvements thereof) that would cause the need for patents.

SCHEDULE

Our team proposes to complete this study in a period of 24 months, as depicted in Figure 9.1 on the following page. The anticipated start date is October 2013, 4 months after the proposal submission date, resulting in an end date of June 2015. This schedule provides sufficient time to engage various project participants (participating utilities, manufacturers, stakeholders, regulators, environmental and human toxicologists, environmental groups, and other workshop attendees) throughout the study, as well as sufficient time for the WaterRF and PAC members to review and provide feedback on intermediate and draft deliverables. The project will be accomplished by performing ten tasks with the key milestones presented in Figure 9.1.

The proposed schedule provides several benefits, including the following:

- Ample opportunity for stakeholders to contribute to the project vision and weigh in on key decisions before advancing into the subsequent project phases through workshops and interim report deliverables.
- State-of-the-art summary reports provided by our project team to the WaterRF, our PAC, and project stakeholders to solicit feedback and broad support before moving onto the next project phase.
- Staged cost-benefit analysis by analyzing a pilot model watershed scenario first. This process reduces the likelihood of significant redirection after spending substantial effort on CEC management evaluations in Phase 3.
- Timing of the last workshop in Phase 3 in conjunction with a major conference to facilitate the participation of a larger group of interested stakeholders.



LEGEND

- Meetings
- ▲ Reports & Other Communication

* If Notice-to-Proceed is issued in different month, schedule will be shifted accordingly.

Figure 9.1 - Proposed schedule

Current and Pending Form

This form must be completed for the Principal Investigator and for each Co-Principal Investigator.
Failure to provide this information may result in disqualification of your proposal.

Investigator: Other agencies to which this proposal has been/will be submitted:

Support: Current Pending Submission Planned in Near Future Transfer of Support*

Project/Proposal Title:

Source of Support:

Total Award Amount: Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project:

Support: Current Pending Submission Planned in Near Future Transfer of Support*

Project/Proposal Title:

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*If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.
USE ADDITIONAL SHEETS AS NECESSARY

Current and Pending Form

This form must be completed for the Principal Investigator and for each Co-Principal Investigator.
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Source of Support:

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Location of Project:

Person-Months Per Year Committed to the Project:



Bayerisches Landesamt für Umwelt



LfU Bayerisches Landesamt für Umwelt · 86177 Augsburg

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Datum
24.05.2013

Water Research Foundation RFP No. 4494:

"Evaluation of Current and Alternative Strategies for Managing CECs In Water"

Dear Professor Drewes,

my department in the Bavarian Environment Agency is committed to supporting the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing chemicals of emerging concern (CECs) in water.

The Bavarian Environment Agency (Bayerisches Landesamt für Umwelt) is responsible for all environmental questions in Bavaria regardless of whether they are a matter of air or water quality, waste or wastewater, use of soil, raw materials or groundwater, radiation, plant safety or the behaviour of (emerging) chemicals.

CECs pose a multi-disciplinary, complex challenge for the water industry in the US, the European Union and Australia that has triggered a number of initiatives at various administrative levels both in the US and the EU. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders is urgent. Finding agreement on effective acceptable management strategies for CECs continues to be a



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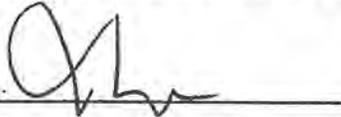
challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team will be taking is promising to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches to mitigate the risks of CEC for humans and the environment.

To support this project, we will provide an in-kind contribution of \$ 10,000 for the following activities:

- Compile and provide CEC occurrence data from our organization (in support of Phase 2 of this study).
- Compile and provide data developed as part of previous proactive master planning efforts on treatment, effectiveness, and capital and O&M costs for CEC removal at our facility (in support of Phase 3 of the study).

Details and extent of the exact services will be further defined by the research team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team on this important project. If you have any questions, please feel free to contact me.



Dr. W. Relfenhäuser

Head of Department Analytical Laboratories,
Evaluation of Chemicals

Privatdienstschreiben



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Prof. Dr. Thomas Ternes
29.05.2013

Our reference

Tel. of POC

E-Mail

POC

Date

Subject: Water Research Foundation RFP No. 4494: "Evaluation of Current and Alternative Strategies for Managing CECs in Water"

Dear Professor Drewes,

on behalf of the ERC project Athene and the BMBF project TransRisk I commit to support the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing chemicals of emerging concern (CECs) in water.

CECs pose a multi-disciplinary, complex challenge for the water industry in the US, the European Union and Australia that has triggered a number of initiatives at various administrative levels both in the US and the EU. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders is urgent. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team will be taking is promising to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches to mitigate the risks of CEC for humans and the environment.

To support this project, we will provide an in-kind contribution for the following activities:

- Participation in a survey on experiences with past and current CEC mitigation approaches that we have been involved or have considered in the past (in support of Phase 1 of this study).
- Time and travel costs associated with participation in a one-day project workshop held at the Technische Universität München, Garching, Germany in support of Phase 1 of the study.

Details and extent of the exact services will be further defined by the research team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team on this important project. If you have any questions, please feel free to contact me at (+49) 261-13065560.

Signature

Title



(Prof. Dr. Thomas Ternes)

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Seite 2 von 2

From: Windhofer Georg [<mailto:georg.windhofer@umweltbundesamt.at>]
Sent: Montag, 3. Juni 2013 21:42
To: T. Letzel
Cc: Uhl Maria; Clara Manfred; Chovanec Andreas
Subject: AW: Reminder: Anfrage zur Teilnahme an einem internationalen Workshop

Sehr geehrter Herr Dr. Letzel!

Vielen Dank für die Information und die Möglichkeit an unten angeführten Workshop betreffend Managementstrategien für die Verringerung/Vermeidung von organischen Spurenstoffen im Wasser und der Umwelt teilnehmen zu können.

Gerne nehmen mein Kollege Manfred Clara und/oder ich an diesem Workshop in München im Februar/März 2014 teil.

Weitere Aktivitäten in diesem Themenfeld sind für uns ebenfalls von großem Interesse, allerdings sind unsere budgetären Möglichkeiten über die Teilnahme an dem Workshop hinausgehend limitiert. Weitere Arbeiten könnten daher nur im Rahmen eines finanzierten Projektes stattfinden.

Wir würden uns über weitere Informationen zum geplanten Workshop sowie auch sonstige Aktivitäten sehr freuen.

Mit freundlichen Grüßen aus Wien
Georg Windhofer

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Firmenbuchnummer (Identification-No): FN 187010s
Firmenbuchgericht: Handelsgericht Wien

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From: T. Letzel
Sent: Mittwoch, 22. Mai 2013 02:10
To: 'maria.uhl@umweltbundesamt.at'
Subject: Anfrage zur Teilnahme an einem internationalen Workshop
Importance: High

Sehr geehrte Frau Dr. Uhl,

wie von Ihnen letzte Woche dankenswerterweise angeboten uebersende ich Ihnen nun eine Skizze (mit Bitte um Weitergabe an entsprechende Kolleg(inn)en) zu einem Projektvorhaben zwischen der TU Muenchen (Prof Joerg Drewes und ich) und amerikanischen sowie australischen Partnern zur Feststellung und Harmonisierung von Wasserrichtlinien und darin enthaltene Regeln fuer Spurenstoffe. Der Projektauftrag kam von der Water Research Foundation in den USA (angehaengt), mit dem Ziel mehr holistische Managementstrategien fuer organische Spurenstoffe in den USA zu entwickeln. Dies sieht auch eine Sondierung von Ansaetzen in Europa, insbesondere Deutschland (evtl. Oesterreich) und der Schweiz, sowie Australien vor. Daher haben wir vor, einen 1-taegigen Workshop im Fruehjahr (Feb/Maerz) an der TUM zu veranstalten. Es ist beabsichtigt konkrete und holistische Strategien fuer die Verringerung/Vermeidung von organischen Spurenstoffen (chemicals of emerging concern - CECs) in Wasserressourcen und der Umwelt innerhalb eines internationalen Workshops zu diskutieren, die Sichtweisen aus Europa, Deutschland, der Schweiz, Australien und den USA zusammenbringt. Das Ziel dieses Workshops ist es die Grundlage zu schaffen, alternative holistische Management Strategien und Paradigma fuer CECs in der aquatischen Umwelt und die Wasserver- und -entsorgung zu entwickeln.

Ich kann Ihnen gerne weitere Details zu unseren Ueberlegungen schicken, falls Sie Interesse haben. Anbei finden Sie auch ein Schreiben als ‚Letter of Interest‘, in dem Sie uns Ihr Interesse bekunden koennen mit der Bereitschaft am Workshop teilzunehmen oder auch mehr.

Bitte fuellen Sie im beiliegenden Schreiben nur aus, was Sie auch unterstuetzen moechten und entfernen Sie den Rest. Des Weiteren ist es Ihnen natuerlich freigestellt, ob Sie Betraege einfuellen, denn diese dienen eigentlich nur dazu unsere Chancen bei der potentiell finanzierenden Institution zu erhoehen.

Falls Sie oder Ihr Haus bereit sind, dieses Vorhaben zu unterstuetzen waere ich Ihnen sehr dankbar. Dies waere fuer uns auch deshalb von besonderem Interesse, da Sie ja die (!) ausgewiesene Stelle fuer diesen Ansatzpunkt in Oesterreich sind.

Der Workshop ist fuer die eingeladenen Teilnehmer kostenfrei und wir wuerden nur erwarten, dass Reisekosten von den Teilnehmern selbst getragen werden.

Besten Dank und ich freue mich von Ihnen oder Ihren Kolleg(inn)en bis spaetestens 30.05.2013 (bitte auch schriftlich ;-)) zu hoeren. Der Einreichtermin des finalen Antrags ist der 1.Juni 2013.

Mit freundlichen Gruessen,

Thomas Letzel

PD Dr. Thomas Letzel

Analytische Forschungsgruppe am
Lehrstuhl fuer Siedlungswasserwirtschaft
TU Muenchen
Am Coulombwall 8
85748 Garching
Tel: +49 (0)89 289 13780
Fax: +49 (0)89 289 14657

Eawag Water resources and drinking water
Überlandstrasse 133 Prof. Dr. Urs von Gunten
P. O. Box 611 Deputy department head
8600 Dübendorf Head of Competence Centre for Drinking
Switzerland Water
Phone +41 (0)58 765 55 11 Phone direct +41 (0)58 765 52 70
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www.eawag.ch vungunten@eawag.ch

Dr. Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
1133 E. James E. Rogers Way; Harshbarger 108
Tucson, AZ 85721-0011 USA

Dübendorf, May 29, 2013

Subject: Water Research Foundation RFP No. 4494: ***"Evaluation of Current and Alternative Strategies for Managing CECs in Water"***

Dear Shane,

As a senior researcher at Eawag, the Swiss Federal Institute of Aquatic Science and Technology and a professor at the Ecole Polytechnique Fédérale de Lausanne I am committed to supporting the University of Arizona/Carollo/Technical University Munich/Southern Nevada Water Authority team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing CECs in water.

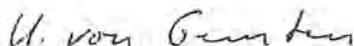
In this context, I welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. I can bring in expertise from the handling of the CEC problem in Switzerland and other European countries. The project approach the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team will be taking is promising to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches in the US to mitigate the risks of CEC for humans and the environment.

To support this project, we will provide an in-kind contribution of \$ 2000 for the following activities:

- Participation in a survey on experiences with past and current CEC management approaches that we have been involved or have considered in the past (in support of Phase 1 of this study).
- Time and travel costs associated with participation in a one-day project workshop at the end of Phase 1 of the study.

Details and extent of the exact services will be further defined by the research team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team on this important project. Please do not hesitate to contact me if you have any questions.

Sincerely,



Prof. Urs von Gunten

The logo for RIWA (River Water Association) is a dark grey rectangle with a wavy bottom edge. The letters "RIWA" are written in white, bold, sans-serif font in the center of the rectangle.

Dr Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
1133 E. James E. Rogers Way; Harshbarger108
Tucson, ZA 85721-0011
USA

Subject: Water Research Foundation RFP No. 4494: *"Evaluation of Current and Alternative Strategies for Managing CECs in Water"*

Nieuwegein, May 28, 2013

Dear Professor Snyder,

The RIWA, the River Water Association in The Netherlands and Belgium is committed to supporting the University of Arizona/Carollo/Technical University Munich/Southern Nevada Water Authority team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing CECs in water.

CECs pose a multi-disciplinary, complex challenge for the water industry in the US that has triggered a number of initiatives at various administrative levels in the US. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders in the US is urgent. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team will be taking is promising to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches in the US to mitigate the risks of CEC for humans and the environment.

RIWA Rhine Water Works The Netherlands

Groenendael 6, 3439 LV Nieuwegein • Tel. +31 30 600 90 30 • Fax +31 30 600 90 39 • E-mail riwa@riwa.org • www.riwa.org

The logo for RIWA (Rhine Water Works) is a dark grey rectangular box with the letters "RIWA" in white, bold, sans-serif font. The bottom edge of the box is slightly wavy.

To support this project, we will provide an in-kind contribution of \$ 6000 for the following activities:

- Participation in a survey on experiences with past and current CEC management approaches that we have been involved or have considered in the past (in support of Phase 1 of this study).
- Time and travel costs associated with participation in a one-day project workshop at the end of Phase 1 of the study.

Details and extent of the exact services will be further defined by the research team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team on this important project. If you have any questions, please feel free to contact me at +31 30 600 9036 or stoks@riwa.org

A handwritten signature in black ink, appearing to read "P. Stoks", is positioned above the typed name.

Dr Peter G Stoks
Director

Analytische Forschungsgruppe am
Lehrstuhl für Siedlungswasserwirtschaft
TU Muenchen
Herrn PD Dr. Thomas Letzel
Am Coulombwall 8
85748 Garching

Datum: Dessau-Roßlau, 24.05.13

Bearbeiter: Dr. Ulrich Irmer

Tel /Fax: (0340) 2103 2328
(0340) 2104 2328

Aktenz.: Abtl. II 2
e-mail: ulrich.irm@uba.de

Anfrage zur Teilnahme an einem internationalen Workshop

Sehr geehrter Herr Dr. Letzel,

wir finden Ihr Projekt sehr interessant. Wir haben im Umweltbundesamt insbesondere mit der Umsetzung der EG-Wasserrahmenrichtlinie und der EG-Meeresstrategie-rahmenrichtlinie zu tun, die vielfältige Anknüpfungspunkte an die Überwachung, die Bewertung und die Minderung der Einträge dieser Stoffe in die Umwelt haben.

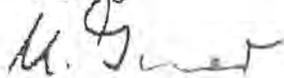
Einladungen zu Workshops können Sie gerne auch an die nachfolgend aufgeführten Kolleginnen und Kollegen übermitteln:

- Herrn Dr. Jörg Rechenberg (joerg.rechenberg@uba.de)
- Herrn Dr. Volker Mohaupt (volker.mohaupt@uba.de)
- Herrn Ulrich Claussen (ulrich.claussen@uba.de)
- Herrn Dr. Joachim Heidemeier (joachim.heidemeier@uba.de).

Weitergehende Beiträge oder eine Co-Finanzierung können wir leider nicht leisten, sind aber an den Ergebnissen Ihres Projektes interessiert.

Mit freundlichen Grüßen

Im Auftrag



Ulrich Irmer
(Abteilungsleiter Wasser & Boden)

UNSW



DR STUART KHAN
SENIOR LECTURER
School of Civil
and Environmental Engineering

31 May, 2013

Dr. Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
1133 E. James E. Rogers Way; Harshbarger 10B
Tucson, AZ 85721-0011 USA

Water Research Foundation RFP No. 4494: "Evaluation of Current and Alternative Strategies for Managing CECs in Water"

Dear Professor Snyder,

The UNSW Water Research Centre is committed to supporting the University of Arizona/Carollo/Technical University Munich/Southern Nevada Water Authority team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing CECs in water.

There are now more than 20 national guideline documents that have been developed for the management of water quality in Australia. These include Guidelines for Fresh and Marine Water Quality, The Australian Drinking Water Guidelines (ADWG) and Australian Guidelines for Water Recycling (AGWR). All of these guidelines provide "guideline values" for chemical concentration in various types of water. In particular, the AGWR provide guideline concentrations for many CECs including a range of pharmaceuticals, personal care products and hormones. Nonetheless, since regulation of water remains a state-based responsibility, the guidelines themselves are not directly enforceable. The approach to regulation still varies among the states, but most state governments have adopted various procedures for requiring compliance with national guidelines (particularly the ADWG) by water utilities within their jurisdictions.

Australian water quality guidelines developed since 2004 have exhibited a significant philosophical departure from the traditional focus on 'end point monitoring' as a means of water quality compliance. Instead, they have adopted a 'risk management' approach, also embodied in the World Health Organisation Guidelines for Drinking Water Quality and the Water Safety Plans described therein. This approach emphasises the assessment and management of possible means by which contaminants (including CECs) may be introduced to water, and preventative measures for minimising such contamination. With reduced emphasis on end-point monitoring, Australia has not followed the USA and other countries in extensively mandating water quality standards or the requirement for extensive monitoring programs. Nonetheless, some jurisdictions have required some schemes (particularly planned potable water recycling projects) to undertake comprehensive monitoring for CECs and other contaminants. This has led to the collection of large volumes of data for these schemes.

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T: +61(2) 9385 5070 | E: s.khan@unsw.edu.au | ABN 57 195 873 179 | CRICOS Provider Code 00098G
SYDNEY | CANBERRA | AUSTRALIA

Currently there are no general environmental standards for CECs in Australia. Environmental pollution is regulated by the state-based environment agencies and these agencies may impose specific water quality requirements or discharge limits on various industry operations including individual wastewater treatment plants.

Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, I welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach your team will be taking is promising to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches to mitigate the risks of CEC for humans and the environment.

To support this project, we will provide an in-kind contribution of \$5,000 for the following activities:

- Participation in a survey on experiences with past and current CEC management approaches that we have been involved or have considered in the past (in support of Phase 1 of this study).
- Time associated with participation in a one-day project workshop at the end of Phase 1 of the study.

Details and extent of the exact services will be further defined by the research team at the time of the study. We look forward to working with the Water Research Foundation and your team on this important project. If you have any questions, please feel free to contact me via the details provided below.

Yours sincerely,



Dr Stuart Khan

Senior Lecturer,
School of Civil & Environmental Engineering.
Phone: (02) 93855070
Email: s.khan@unsw.edu.au

4 June 2013

Dr. Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
1133 E. James E. Rogers Way; Harshbarger 108
Tucson, AZ 85721-0011 USA

Dear Professor Snyder,

Subject: Water Research Foundation RFP No. 4494: *"Evaluation of Current and Alternative Strategies for Managing CECs in Water"*

Melbourne Water (Australia) is committed to supporting the University of Arizona/Carollo/Technical University Munich/Southern Nevada Water Authority team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing Chemicals of Emerging Concern (CECs) in water.

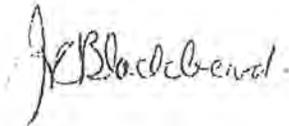
CECs pose a multi-disciplinary, complex challenge for the water industry in the US and internationally that has triggered a number of initiatives at various administrative levels internationally. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders is urgently required. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team will be taking is promising to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches in the US to mitigate the risks of CEC for humans and the environment.

To support this project, we will provide an in-kind contribution of AUD15,000 over the life of the project for the following activities:

- Participation in a survey on experiences with past and current CEC management approaches that we have been involved in or have considered in the past (in support of Phase 1 of this study).
- Provision of information on national regulatory approaches to CECs in water in the Australia.
- Provide information on the three tiered Quantitative Risk Assessment method developed for prioritisation of CECs in the outflows from Melbourne Waters wastewater treatment plants.
- Where available, compile and provide CEC occurrence data from our facility (in support of Phase 2 of this study).

Details and extent of the exact services will be further defined by the research team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team on this important project. If you have any questions, please feel free to contact me at (+61) 3 9679 7230.



JUDY BLACKBEARD
MANAGER WATER RECYCLING RESEARCH
MELBOURNE WATER CORPORATION, AUSTRALIA

INMW

Inter-Industry Network on Microconstituents in Water
1250 Connecticut Ave., N.W. Suite 700, Washington, DC 20036

June 3, 2013

Dr. Shane Snyder
Professor and Co-Director
Chemical and Environmental Engineering
The University of Arizona
Harshbarger 108
1133 E. James E. Rogers Way
Tucson, AZ 85721-0011

Subject: Water Research Foundation RFP No. 4494: "Evaluation of Current and Alternative Strategies for Managing CECs in Water"

Dear Professor Snyder,

Thank you for bringing the Water Research Foundation (WaterRF) Request for Proposal (RFP) "Evaluation of Current and Alternative Strategies for Managing Chemicals of Emerging Concern (CECs) in Water" to our attention and for inviting participation of the Inter-industry Network on Microconstituents in Water (INMW) in the project being proposed by the team representing The University of Arizona, Carollo Engineers, the Technical University Munich and the Southern Nevada Water Authority.

INMW is a network of industry trade associations, representing a wide range of products and industries that formed to discuss common issues related to the detection of chemical microconstituents, or trace contaminants, in surface, ground and drinking water; as such, the participants in our network have an interest in this project. Participants in the network include national trade associations representing manufacturers of chemicals, pharmaceuticals and consumer products, including the Alkylphenols & Ethoxylates Research Council (APERC), the Consumer Healthcare Products Association (CHPA), CropLife America and the Pharmaceutical Research and Manufacturers Association (PhRMA). The network also extends to other trade associations that represent other chemicals and products in commerce should they come up during the project.

Finding agreement on strategies for assessing and managing CECs has been a challenge due to the uncertainties and differences in opinions reflected in public and scientific discussions on this issue. It is INMW's view that the public dialogue on CECs could benefit from a review of existing CEC programs, science and risk based assessment of CECs, and as warranted a prioritization approach based on actual risks to humans and the environment. The proposal by your team to utilize workshops with knowledgeable subject area experts representing multiple stakeholders (i.e., water agencies, regulators,

chemical and product producers and non-governmental organizations) offers an important opportunity for assessment of existing approaches to addressing CEC as well as for much-needed dialog on this issue.

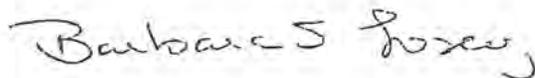
Therefore, the INMW network commits to support your team, if chosen by WaterRF, in implementing this important project, in the following ways:

- Act as a coordinator and liaison between your project team and various pharmaceutical, chemical and allied trade associations and industry experts for the anticipated two-year duration of the project for the purpose of assisting your team to identify, collect and summarize relevant chemical data, and
- Identify subject area experts from industry willing to supply their professional time and travel costs to participate in workshops during the course of the project.

We currently estimate that the in-kind value of this contribution is \$25,000; however this may change based on the number of experts and time needed to provide information on chemical specific questions. Recognizing that the details of the proposal are still under development and that the project is contingent on selection by WaterRF, the extent of INMW support can be further refined as the needs of the project become clearer.

If you have any questions please contact me at blosey@regnet.com or by telephone at (732) 557-5524.

Sincerely,



Barbara S. Losey
Coordinator



Eaton Analytical

May 28, 2013

Dr. Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
1133 E. James E. Rogers Way; Harshbarger 108
Tucson, AZ 85721-0011 USA

Subject: Water Research Foundation RFP No. 4494: ***"Evaluation of Current and Alternative Strategies for Managing CECs in Water"***

Dear Professor Snyder,

Eurofins Eaton Analytical Inc (EEA) is committed to supporting the University of Arizona/Carollo/Technical University Munich/Southern Nevada Water Authority team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing CECs in water.

CECs pose a multi-disciplinary, complex challenge for the water industry in the US that has triggered a number of initiatives at various administrative levels in the US. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders in the US is urgent. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team will be taking is promising to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches in the US to mitigate the risks of CEC for humans and the environment.

Formerly MWH Laboratories

Eurofins Eaton Analytical, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, CA 91016-3629

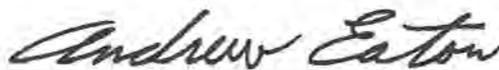
T | 626-386-1100
F | 626-386-1101
www.EatonAnalytical.com

To support this project, we will provide an in-kind contribution of \$3,000 for the following activities:

- Participation in a survey on experiences with past and current CEC management approaches that we have been involved or have considered in the past (in support of Phase 1 of this study).
- Time and travel costs associated with participation in a one-day project workshop at the end of Phase 1 of the study.
- Compile and provide selected CEC occurrence data from studies we have conducted (in support of Phase 2 of this study).

Details and extent of the exact services will be further defined by the research team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team on this important project. If you have any questions, please feel free to contact me at 626-386-1125 or via email at andyeaton@eurofinsus.com.

Eurofins Eaton Analytical Inc (EEA)



Andrew Eaton, PhD, BCES

Vice President/Technical Director



BOB CHARPAAK, M.D., MPH
Director

State of California—Health and Human Services Agency
California Department of Public Health



LEONARD S. BLOOM, M.D.
Governor

May 30, 2013
Dr. Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
1133 E. James E. Rogers Way; Hershberger 106
Tucson, AZ 85721-0011 USA

Subject: Water Research Foundation RFP No. 4494: *"Evaluation of Current and Alternative Strategies for Managing CECs in Water"*

Dear Professor Snyder,

This letter is to confirm my participation with the University of Arizona/Carollo/Technical University Munich/Southern Nevada Water Authority team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing CECs in water.

CECs pose a multi-disciplinary, complex challenge for the water industry in the US that has triggered a number of initiatives at various administrative levels in the US. These efforts vary widely in their approach for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders in the US would be beneficial. Consensus on effective management strategies has been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team will be taking promises to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches to mitigate the risks of CEC for humans and the environment.

Dr. Share Snyder
Page 2 of 2

To support this project, I will provide:

- Participation in a survey on experiences with past and current CEC management approaches that the Department has been involved or have considered in the past (in support of Phase 1 of this study)
- Time associated with participation in a one-day project workshop at the end of Phase 1 of the study.

I look forward to working with the Water Research Foundation and the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team on this important project. If you have any questions, please contact me at (510) 527-2523.



Robert H. Hultquist, P.E.
Retired Annuitant (Principal Engineer)

NYC
Environmental
Protection

Carter Strickland, Jr.
Commissioner

Paul V. Rush, P.E.
Deputy Commissioner
Bureau of Water Supply
prush@dep.nyc.gov

71 Smith Avenue
Kingston, NY 12401
T: (845) 340-7800
F: (845) 334-7175

May 23, 2013

Dr. Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
1133 E. James E. Rogers Way; Harshbarger 108
Tucson, AZ 85721-0011

RE: Water Research Foundation RFP No. 4494:
*"Evaluation of Current and Alternative
Strategies for Managing CECs in Water"*

Dear Professor Snyder:

The City of New Department of Environmental Protection is committed to supporting the University of Arizona/Carollo/Technical University Munich/Southern Nevada Water Authority team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing CECs in water.

CECs pose a multi-disciplinary, complex challenge for the water industry in the US that has triggered a number of initiatives at various administrative levels in the US. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders in the US is urgent. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

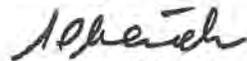
In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team will be taking is promising to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches in the US to mitigate the risks of CEC for humans and the environment.

To support this project, we will provide an in-kind contribution of approximately \$ 5,000:

- Participation in a survey on experiences with past and current CEC management approaches that we have been involved or have considered in the past.
- Time and travel costs associated with participation in a one-day project workshop at the end of Phase 1 of the study.

Details and extent of the exact services will be further defined by the research team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team on this important project. If you have any questions, please feel free to contact me at (845) 340-7701.

Sincerely,



Steven C. Schindler
Director, Water Quality

c: file

P. Rush, P.E., Deputy Commissioner NYC DEP

D. Lipsky, Ph.D., Chief, NYC DEP

C. Glaser, Section Chief, NYC DEP



AMERICAN WATER

American Water P 856-346-8261
1025 Laurel Oak Rd. M 856-287-2538
P.O. Box 1770 F 856-782-3602
Voorhees, NJ 08043
mark.lechevallier@amwater.com

May 24, 2013

Dr. Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
1133 E. James E. Rogers Way; Harshbarger 108
Tucson, AZ 85721-0011 USA

Subject: Water Research Foundation RFP No. 4494: ***“Evaluation of Current and Alternative Strategies for Managing CECs in Water”***

Dear Professor Snyder,

American Water is pleased to support the University of Arizona/Carollo/Technical University Munich/Southern Nevada Water Authority team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing CECs in water.

CECs pose a multi-disciplinary, complex challenge for the water industry in the US that has triggered a number of initiatives at various administrative levels in the US. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders in the US is urgent. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs

in water. The project approach the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team will be taking is promising to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches in the US to mitigate the risks of CEC for humans and the environment.

To support this project, we will provide an in-kind contribution of \$10,000 for the following activities:

- Participation in a survey on experiences with past and current CEC management approaches that we have been involved or have considered in the past (in support of Phase 1 of this study).
- Time and travel costs associated with participation in a one-day project workshop at the end of Phase 1 of the study.
- Compile and provide CEC occurrence data from our facility (in support of Phase 2 of this study).
- Compile and provide data developed as part of previous proactive master planning efforts on treatment, effectiveness, and capital and O&M costs for CEC removal at our facility (in support of Phase 3 of the study).

Details and extent of the exact services will be further defined by the research team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team on this important project. If you have any questions, please feel free to contact me.

Sincerely,



Mark W. LeChevallier, Ph.D.

Director, Innovation & Environmental Stewardship

SUEZ ENVIRONNEMENT
CIRSEE
38 RUE DU PRESIDENT WILSON
78230 LE PECQ, FRANCE
TEL +33 (0)1 34 80 23 45
FAX +33 (0)1 34 80 09 01
WWW.SUEZ-ENVIRONNEMENT.COM



May 23, 2013
Dr. Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
1133 E. James E. Rogers Way: Harshbarger 108
Tucson, AZ 85721-0011 USA

Subject: Water Research Foundation RFP No. 4494: *"Evaluation of Current and Alternative Strategies for Managing CECs in Water"*

Dear Professor Snyder,

Suez Environnement is committed to supporting the University of Arizona / Carollo team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing CECs in water.

CECs pose a multi-disciplinary, complex challenge for the water industry in the US that has triggered a number of initiatives at various administrative levels in the US. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders in the US is urgent. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach the University of Arizona / Carollo team will be taking is promising to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches in the US to mitigate the risks of CEC for humans and the environment.

To support this project, we will provide an in-kind contribution for the following activities:

- Participation in a survey on experiences with past and current CEC management approaches that we have been involved or have considered in the past (in support of Phase I of this study). Comparison between US and European Regulation approach and analysis of the current and future the trends regarding CECs. Feedback on the



- actions plans implemented in France, national surveys and campaigns (ex. on pharmaceuticals).
- Provide information on the recent position papers and guidelines of the French Health Authorities on a wide range of CECs (ex. perchlorate, ETBE, BPA, nitrosamines, resistance to antibiotics, CrVI, VCM, algae toxins, nanoparticles, etc.) and vision documents on identified current needs and research priorities
 - Provide an inventory list of Past and Current Research Projects and activities in relation to the CEC topics in France and in Europe (ex. health risk studies and exposure assessment to cocktails of low concentrations of micro-pollutants, relationship between chemical characterisation and effect characterisation with in-vivo/in-vitro assays)
 - Provide update on new analytical approaches for monitoring of CECs
 - Compile and provide CEC occurrence data from our facilities in France (in support of Phase 2 of this study).
 - Compile and provide data developed as part of previous proactive master planning efforts on treatment, effectiveness, and capital and O&M costs for CEC removal at our facility (in support of Phase 3 of the study). Presentation of the approach for water quality indicators selection for water treatment efficiency assessment
 - Time and travel costs associated with participation in one one-day project workshop at the end of Phase 1 of the study.

Details and extent of the exact services will be further defined by the University of Arizona / Carollo Engineers team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona / Carollo Engineers team on this important project.

If you have any questions, please feel free to contact me at (tel: +33134802345).

Suez Environnement

Signature

A handwritten signature in black ink, appearing to read "Carlos Campos", written over a horizontal line.

Carlos Campos
Director of CIRSEE

UNITED WATER
GREGG OELKER
MANAGER OF WATER QUALITY
1935 S. HUGHES WAY
EL SEGUNDO, CA, 90245
TEL 310-426-6143
FAX 310-414-9776
GREGG.OELKER@UNITEDWATER.COM
WWW.UNITEDWATER.COM



Dr. Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
1133 E. James E. Rogers Way; Harshbarger 108
Tucson, AZ 85721-0011 USA

May 24, 2013

Dear Professor Snyder,

United Water is committed to supporting the University of Arizona / Carollo team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing CECs in water.

CECs pose a multi-disciplinary, complex challenge for the water industry in the US that has triggered a number of initiatives at various administrative levels in the US. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders in the US is urgent. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach the University of Arizona / Carollo team will be taking is promising to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches in the US to mitigate the risks of CEC for humans and the environment.

To support this project, we will provide an in-kind contribution of \$5000 for the following activities:

UNITED WATER
GREGG OELKER
MANAGER OF WATER QUALITY
1935 S. HUGHES WAY
EL SEGUNDO, CA, 90245
TEL 310-426-6143
FAX 310-414-9776
GREGG.OELKER@UNITEDWATER.COM
WWW.UNITEDWATER.COM



- Participation in a survey on experiences with past and current CEC management approaches that we have been involved or have considered in the past (in support of Phase 1 of this study).
- Time and travel costs associated with participation in one one-day project workshop at the end of Phase 1 of the study.
- Compile and provide CEC occurrence data from our facility (in support of Phase 2 of this study).
- Compile and provide data developed as part of previous proactive master planning efforts on treatment, effectiveness, and capital and O&M costs for CEC removal at our facility (in support of Phase 3 of the study).

Details and extent of the exact services will be further defined by the University of Arizona / Carollo Engineers team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona / Carollo Engineers team on this important project. If you have any questions, please feel free to contact me at (310) 426-6143.

United Water

Signature _____

A handwritten signature in black ink, appearing to read 'G. Oelker', is written over a horizontal line.

Title: Manager of Water Quality, ECLWRF



Veolia Environnement Research and Innovation
200 E Randolph, Suite 7900
Chicago, IL 60601, USA
Phone: +1 312 552 2845

May 30, 2013

Dr. Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
1133 E. James E. Rogers Way; Harshbarger 108
Tucson, AZ 85721-0011 USA

Subject: Water Research Foundation RFP No. 4494: *"Evaluation of Current and Alternative Strategies for Managing CECs in Water"*

Dear Professor Snyder,

Veolia Environnement Research and Innovation (VERI) is committed to supporting the University of Arizona/Carollo/Technical University Munich/Southern Nevada Water Authority team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing CECs in water.

CECs pose a multi-disciplinary, complex challenge for the water industry in the US that has triggered a number of initiatives at various administrative levels in the US. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders in the US is urgent. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach the

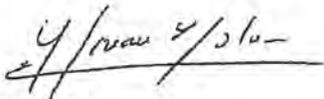
University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team will be taking is promising to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches in the US to mitigate the risks of CEC for humans and the environment.

To support this project, we will provide an in-kind contribution of \$5,000 for the following activities:

- Participation in a survey on experiences with past and current CEC management approaches that we have been involved or have considered in the past (in support of Phase 1 of this study).
- Time and travel costs associated with participation in a one-day project workshop at the end of Phase 1 of the study.
- Compile and provide CEC occurrence data from facilities we are operating when publicly available (in support of Phase 2 of this study).
- Compile and provide data developed as part of previous proactive master planning efforts on treatment, effectiveness, and capital and O&M costs for CEC removal at facilities we are operating when publicly available (in support of Phase 3 of the study).

Details and extent of the exact services will be further defined by the research team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team on this important project. If you have any questions, please feel free to contact me at (312) 552 - 2845.

Veolia Environnement Research and Innovation



Signature

Yann Moreau, Ph.D.

Director North America, Veolia Environnement Research and Innovation



THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Office of the General Manager

May 31, 2013

Shane Snyder, Ph.D.
Professor & Co-Director
University of Arizona
Chemical and Environmental Engineering
Arizona Laboratory for Emerging Contaminants (ALEC)
1500 West University Avenue
Tucson, AZ 85721

Reply to: 700 Moreno Avenue
La Verne, CA 91750 USA

Dear Dr. Snyder:

Water Research Foundation RFP No. 4494 *Evaluation of Current and Alternative Strategies for Managing CECs in Water*

The Metropolitan Water District of Southern California (Metropolitan) is a regional drinking water wholesaler that provides up to 2.6 billion gallons per day of treated water to nearly 20 million people in a service area encompassing 5,200 square miles in six counties in the coastal southern California region. Metropolitan currently owns and operates five water treatment plants, the largest of which delivers up to 750 million gallons of water per day; the Colorado River Aqueduct, a 242-mile conveyance system designated as a national historic engineering landmark by the American Society of Civil Engineers, which conveys 1.7 billion gallons of water per day from Lake Havasu to southern California; 775 miles of pipelines ranging up to nearly 20 feet in diameter; and numerous pumping plants, hydroelectric generating stations, and support facilities. As the manager of Metropolitan's Water Quality Chemistry Unit, I supervise the efforts to monitor and report the water quality of Metropolitan's source and treated water.

Metropolitan will commit to supporting the team consisting of the University of Arizona, Carollo Engineers, the Technische Universität München, and Southern Nevada Water Authority in the Water Research Foundation project #4494 to evaluate current and alternative strategies for managing chemicals of emerging concern (CECs) in water.

Ubiquitous occurrence of CECs poses a multi-disciplinary, complex challenge for the water industry in the US and elsewhere, and has triggered a number of initiatives to control perceived and potential risks associated with these chemicals. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding of what the most cost-effective approaches for

Shane Snyder, Ph.D.

Page 2

May 31, 2013

managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs. Metropolitan supports the team's approach of increasing coordination among different water agencies, dischargers, and public and private stakeholders to development of agreements on effective acceptable management strategies for CECs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of developing approaches to manage CECs in water.

To support this project, we will provide an in-kind contribution of staff support equivalent to \$6,000 for the following activities:

- Participation in a survey on experiences with past and current CEC management approaches that we have been involved in or have considered in the past (in support of Phase 1 of this study).
- Time and travel costs associated with participation in a two-day project workshop in support of Phase 1 of the study.
- Compiling and providing CEC occurrence data from our organization (in support of Phase 2 of this study).
- Compiling and providing data developed as part of previous proactive master planning efforts on treatment, effectiveness, and capital and O&M costs for CEC removal at our facility (in support of Phase 3 of the study).

At the time of the study, the research team will further define details and the extent of the exact services. We look forward to working with the Water Research Foundation on this project and the team comprised of University of Arizona, Carollo Engineers, Technische Universität München, and Southern Nevada Water Authority. If you have any questions, please contact me at (909) 392-5398.



Rich Yates
Emerging Chemical Constituents Team Manager

RSY:smh
H:\Waters\rsy wrf\4494 ccc.docx



**GREATER CINCINNATI
WATER WORKS**

A Service of The City of Cincinnati

May 28, 2013

Dr. Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
1133 E. James E. Rogers Way; Harshbarger 108
Tucson, AZ 85721-0011 USA

Subject: Water Research Foundation RFP No. 4494: *"Evaluation of Current and Alternative Strategies for Managing CECs in Water"*

Dear Professor Snyder,

The Greater Cincinnati Water Works is committed to supporting the University of Arizona / Carollo team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing CECs in water.

CECs pose a multi-disciplinary, complex challenge for the water industry in the US that has triggered a number of initiatives at various administrative levels in the US. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders in the US is urgent. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach the University of Arizona / Carollo team will be taking is promising to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches in the US to mitigate the risks of CEC for humans and the environment.

**Greater Cincinnati
Water Works**
The Standard for Excellence

5651 Kellogg Avenue
Cincinnati, Ohio 45230
513-624-6800 Phone
513-624-6870 Fax

Biju George, P.E.
Interim Director

Deborah H. Metz
*Superintendent
Water Quality & Treatment*

Customer Service
513-581-7700
513-581-7730 TDD

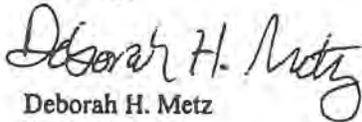
Emergency Service
513-581-7700
513-581-7805 TDD

To support this project, we expect to provide an in-kind contribution of \$8,500 for the following activities:

- Participation in a survey on experiences with past and current CEC management approaches that we have been involved or have considered in the past (in support of Phase 1 of this study).
- Time and travel costs associated with participation in one one-day project workshop at the end of Phase 1 of the study.
- Compile and provide CEC occurrence data from our facility (in support of Phase 2 of this study).
- Compile and provide data developed as part of previous proactive master planning efforts on treatment, effectiveness, and capital and O&M costs for CEC removal at our facility (in support of Phase 3 of the study).

Details and extent of the exact services will be further defined by the University of Arizona / Carollo Engineers team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona / Carollo Engineers team on this important project. If you have any questions, please feel free to contact me at (513) 624-5600.

Sincerely,



Deborah H. Metz
Superintendent
Water Quality & Treatment Division
Greater Cincinnati Water Works



CITY OF
TUCSON
TUCSON WATER
DEPARTMENT

May 20, 2013

Dr. Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
1133 E. James E. Rogers Way; Harshbarger 108
Tucson, AZ 85721-0011

Subject: Water Research Foundation RFP No. 4494: *"Evaluation of Current and Alternative Strategies for Managing CECs in Water"*

Dear Professor Snyder,

The Tucson Water Department is committed to supporting the University of Arizona/Carollo/Technical University Munich/Southern Nevada Water Authority team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing CECs in water.

CECs pose a multi-disciplinary, complex challenge for the water industry in the US that has triggered a number of initiatives at various administrative levels in the US. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders in the US is urgent. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team will be taking is promising to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches in the US to mitigate the risks of CEC for humans and the environment.



To: Dr. Shane Snyder
Subject: Water Research Foundation RFP No. 4494
Page: 2

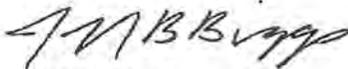
To support this project, we will provide an in-kind contribution of \$30,000 for the following activities:

- Participation in a survey on experiences with past and current CEC management approaches that we have been involved or have considered in the past (in support of Phase 1 of this study).
- Time and travel costs associated with participation in a one-day project workshop at the end of Phase 1 of the study.
- Compile and provide CEC occurrence data from our facility (in support of Phase 2 of this study).
- Compile and provide data developed as part of previous proactive master planning efforts on treatment, effectiveness, and capital and O&M costs for CEC removal at our facility (in support of Phase 3 of the study).

Details and extent of the exact services will be further defined by the research team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team on this important project.

If you have any questions, please feel free to contact me at (520) 791-2666.

Sincerely,



Jeff B. Biggs
Administrator
Tucson Water Department



Minneapolis
City of Lakes

**Department of
Public Works**
Steven A. Kolke, P.E.
City Engineer
Director

350 South 5th Street - Room 203
Minneapolis MN 55415

Office 612 673-4921
Fax 612 673-3565
TTY 612 673-2157

May 29, 2013

Dr. Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
1133 E. James E. Rogers Way; Harshbarger 108
Tucson, AZ 85721-0011 USA

**Subject: Water Research Foundation RFP No. 4494: "Evaluation
of Current and Alternative Strategies for Managing
CECs in Water"**

Dear Professor Snyder,

The City of Minneapolis Public Works Department Water Treatment and Distribution Services is committed to supporting the University of Arizona/Carollo/Technical University Munich/Southern Nevada Water Authority team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing CECs in water.

CECs pose a multi-disciplinary, complex challenge for the water industry in the US that has triggered a number of initiatives at various administrative levels in the US. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders in the US is urgent. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team will be taking is promising to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for



developing effective, implementable, and affordable approaches in the US to mitigate the risks of CEC for humans and the environment.

To support this project, we will provide an in-kind contribution of \$10,000:

Participation in a survey on experiences with past and current CEC management approaches that we have been involved or have considered in the past.

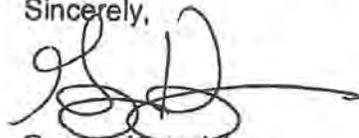
Time and travel costs associated with participation in a one-day project workshop.

Compile and provide CEC occurrence data from our facility.

Compile and provide data developed as part of previous proactive master planning efforts on treatment, effectiveness, and capital and O&M costs for CEC removal at our facility.

Details and extent of the exact services will be further defined by the research team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team on this important project. If you have any questions, please feel free to contact me at (612)661-4923.

Sincerely,



George Kraynick
Laboratory Supervisor
Water Treatment and Distribution Services
Minneapolis Public Works Department

DIRECTORS

PHILIP L. ANTHONY
KATHRYN L. BARR
DENIS R. BILODEAU, P.E.
SHAWN DEWAHE
CATHY GREEN
VINCENT F. SARMIENTO, ESQ.
STEPHEN R. SHELDON
HARRY S. SIOHU, P.E.
BRUCE WHITAKER
ROGER C. YOH, P.E.



SINCE 1924
Celebrating 80 Years

ORANGE COUNTY WATER DISTRICT

ORANGE COUNTY'S GROUNDWATER AUTHORITY

OFFICERS

President
SHAWN DEWAHE

First Vice President
CATHY GREEN

Second Vice President
ROGER C. YOH, P.E.

General Manager
MICHAEL R. MARKUS, P.E., D.WRE

May 29, 2013

Dr. Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
Arizona Laboratory for Emerging Contaminants (ALEC)
1500 W University Avenue
University of Arizona, Tucson, AZ 85721

Subject: Water Research Foundation RFP No. 4494: *"Evaluation of Current and Alternative Strategies for Managing CECs in Water"*

Dear Dr. Snyder,

Orange County Water District (OCWD) is committed to supporting the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing chemicals of emerging concern (CECs) in water.

CECs pose a multi-disciplinary, complex challenge for the water industry in the US, the European Union and Australia that has triggered a number of initiatives at various administrative levels both in the US and the EU. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders is urgent. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of

May 29, 2013

Page 2

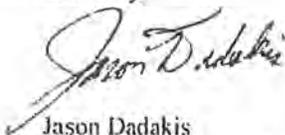
alternative approaches to manage CECs in water. The project approach the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team will be taking is promising to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches to mitigate the risks of CEC for humans and the environment.

To support this project, we will provide an in-kind contribution of \$5,000 for the following activities:

- Participation in a survey on experiences with past and current CEC management approaches that we have been involved or have considered in the past (in support of Phase 1 of this study).
- Time and travel costs associated with participation in a two-day project workshop in support of Phase 1 of the study, contingent on budget approval and staffing availability.
- Support in compile and providing CEC occurrence data from our organization (in support of Phase 2 of this study).
- Compile and provide data developed as part of previous proactive master planning efforts on treatment, effectiveness, and capital and O&M costs for CEC removal at our facility (in support of Phase 3 of the study).

Details and extent of the exact services will be further defined by the research team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team on this important project. If you have any questions, please feel free to contact me at (714) 378-3200 or via email to jdadakis@ocwd.com.

Sincerely,



Jason Dadakis
Director of Health & Regulatory Affairs

Milwaukee Water Works

Safe, Abundant Drinking Water.

May 23, 2013

Dr. Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
Arizona Laboratory for Emerging Contaminants
1500 W University Avenue
University of Arizona, Tucson, AZ 85721

Subject: Water Research Foundation RFP No. 4494: ***“Evaluation of Current and Alternative Strategies for Managing CECs in Water”***

Dear Dr. Snyder,

On behalf of Milwaukee Water Works, I forward this letter in support of the University of Arizona/SNWA team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing chemicals of emerging concern (CECs) in water.

CECs pose a multi-disciplinary, complex challenge for the water industry in the US, the European Union and Australia that has triggered a number of initiatives at various administrative levels both in the US and the EU. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders is urgent.

Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

MWW shares the concern of the Water Research Foundation, via this project, to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach promises to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches to mitigate the risks of CEC for humans and the environment.



In support of this project, MWW is committed to provide in-kind contribution(s) for the following activities:

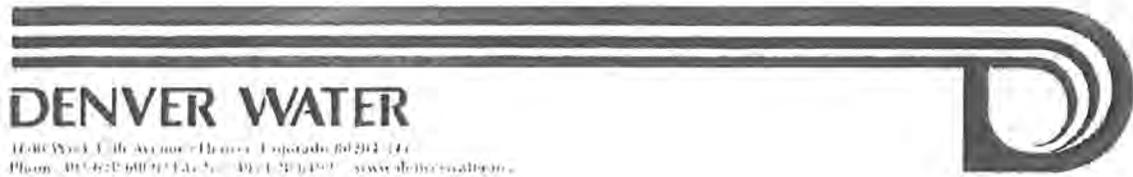
- Participation in a survey on experiences with past and current CEC management and treatment approaches that we have been involved or have considered in the past (in support of Phase 1 of this study).
- Participation in a two-day project workshop in support of Phase 1 or Phase 2 of the study.
- Project data support via compilation of historical CEC occurrence data from our organization (in support of Phase 2 of this study).
- Compile and provide any data developed as part of previous proactive master planning efforts on treatment, effectiveness, and capital and O&M costs for CEC removal at our facility (in support of Phase 3 of the study).
- Review of and feedback on projects drafts and final reports.

MWW anticipates that in-kind services (staff time and overhead) for the project tasks identified above amount to the following in terms of estimated value:

<u>Total hours for completion of outlined tasks:</u>	200 hours
Multiplier for wages and fringe benefits (\$39.64 per hour)	X 39.64
<u>Total value for in-kind services:</u>	\$7928

Details of exact project tasks and support services will be further defined by the research team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona/SNWA team on this important project. If you have any questions, please feel free to contact me at:

Lon A. Couillard
 Water Quality Manager
 Milwaukee Water Works
 3000 N. Lincoln Memorial Drive
 Milwaukee, WI 53211
 Phone: 414-286-2226
 E-mail: Lon.Couillard@Milwaukee.gov



DENVER WATER

1600 West 13th Avenue • Denver, Colorado 80202-3144
Phone: 303.625.6000 • Fax: 303.625.4500 • www.denverwater.com

May 31, 2013

Dr. Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
Arizona Laboratory for Emerging Contaminants (ALEC)
1500 W University Avenue
University of Arizona, Tucson, AZ 85721
USA

Subject: Water Research Foundation RFP No. 4494: *"Evaluation of Current and Alternative Strategies for Managing CECs in Water"*

Dear Dr. Snyder,

Denver Water is committed to supporting the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing chemicals of emerging concern (CECs) in water.

CECs pose a multi-disciplinary, complex challenge for the water industry in the US, the European Union and Australia that has triggered a number of initiatives at various administrative levels both in the US and the EU. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders is urgent. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team will be taking is promising to greatly advance the necessary



CONSERVE

collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches to mitigate the risks of CEC for humans and the environment.

To support this project, we will provide an in-kind contribution of \$7,500 for the following activities:

- Participation in a survey on experiences with past and current CEC management approaches that we have been involved or have considered in the past (in support of Phase 1 of this study).
- Time and travel costs associated with participation in a two-day project workshop in support of Phase 1 of the study.
- Support in compile and providing CEC occurrence data from our organization and South Platte River watershed (in support of Phase 2 and 3 of this study).
- Compile and provide data developed as part of previous proactive master planning efforts on treatment, effectiveness, and capital and O&M costs for CEC removal at our facility (in support of Phase 3 of the study).

Details and extent of the exact services will be further defined by the research team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team on this important project. If you have any questions, please feel free to contact me at (303) 628-6446.

Regards,



Sarah Dominick, P.E.
Water Resource Engineer
Denver Water



Catherine R. Gerali, District Manager

June 4, 2013

Dr. Shane Snyder, Professor and Co-Director
Department of Chemical and Environmental Engineering
Arizona Laboratory for Emerging Contaminants
1500 W. University Avenue, University of Arizona
Tucson, AZ 85721

Subject: Water Research Foundation Request for Proposal No. 4494: *Evaluation of Current and Alternative Strategies for Managing CECs in Water*

Dear Dr. Snyder:

The Metro Wastewater Reclamation District (Metro District or District), located in Denver, Colorado, is committed to supporting the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team (Team) in the subject Water Research Foundation project to evaluate current and alternative strategies for managing contaminants of emerging concern (CECs) in water.

CECs pose a multi-disciplinary, complex challenge for the water resource and wastewater treatment industries in the United States (US) and the European Union (EU). Concerns have triggered several initiatives at various administrative levels in the US and the EU. These efforts vary widely in their approach to researching the effects of known and perceived risks associated with CECs in water. For example, the Metro District participated on the Issue Area Team for the Water Environment Research Foundation (WERF) project CEC4R08, completed in 2012, *Trace Organic Compound Indicator Removal during Conventional Wastewater Treatment*. Several of the principal investigators for that WERF project also will be involved in the proposed effort.

Given the need to direct limited resources most effectively to address CEC-related issues, closer coordination among different educational institutions, regulators, water resource managers, clean water agencies, and other stakeholders is critical. Finding agreement on efficient and cost-effective management strategies for CECs continues to be a challenge, due to continued scientific uncertainty, as well as differences in opinions on the actual and perceived risks posed by CECs to humans and the environment. There is also a need to reach consensus on effective CEC management strategies based on their respective risks, diverse source and occurrence patterns, and associated treatment and source control costs.

In this context, Metro District staff believes the project approach proposed by the Team will help advance collaboration among utilities, regulators, and other private and public stakeholders to develop effective, implementable, and affordable approaches to better understand and manage risks associated with CECs for humans and the environment.

Dr. Shane Snyder, Arizona Laboratory for Emerging Contaminants
Water Research Foundation Request for Proposal No. 4494
June 4, 2013 – Page 2

To support this effort, the Metro District offers to provide to the Team an in-kind contribution of \$7,500 to support the following project-related activities upon contract award:

- Participation in a survey on experiences with past and current CEC management and treatment approaches that have been evaluated at the Robert W. Hite Treatment Facility (RWHTF) and in the South Platte River watershed (in support of Phase 1 of this study).
- Time and travel costs associated with participation in a two-day project workshop in support of Phase 1 or Phase 3 of the study.
- Support in compiling and providing CEC occurrence data from the RWHTF and in the South Platte River watershed (in support of Phase 2 of this study).
- Compilation of data developed as part of planning efforts on treatment, effectiveness, and capital and operational and maintenance costs for CEC removal at the RWHTF (in support of Phase 3 of the study).
- Review of and feedback on project drafts and final reports.

Specific details regarding the Metro District's in-kind contribution will be further defined should this project commence. If you have questions, please contact Amy Woodis of my staff at (303) 286-3240.

Yours truly,



Catherine R. Gerali
District Manager

cc: Barbara Biggs, Metro District
Robert Thomas, Metro District
Amy Woodis, Metro District
Tanja Rauch-Williams, Carollo
Records Management



The ARAMARK Tower
1101 Market Street
Philadelphia, Pennsylvania 19107-2994

Howard M. Neukrug
Commissioner

May 23, 2013
Dr. Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
1133 E. James E. Rogers Way; Harshbarger 108
Tucson, AZ 85721-0011 USA

Subject: Water Research Foundation RFP No. 4494:
"Evaluation of Current and Alternative Strategies for Managing CECs in Water"

Dear Professor Snyder,

Philadelphia Water Department (PWD) is committed to supporting the University of Arizona / Carollo team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing CECs in water.

CECs pose a multi-disciplinary, complex challenge for the water industry in the US that has triggered a number of initiatives at various administrative levels in the US. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders in the US is urgent. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach the University of Arizona / Carollo team will be taking is promising to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches in the US to mitigate the risks of CEC for humans and the environment.

To support this project, we will provide an in-kind contribution of \$15,000.

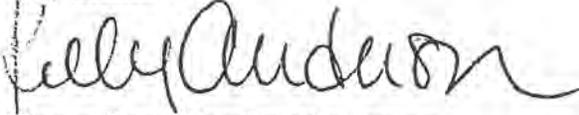
- Participation in a survey on experiences with past and current CEC management approaches that we have been involved or have considered in the past (in support of Phase 1 of this study).
- Time and travel costs associated with participation in one one-day project workshop at the end of Phase 1 of the study.
- Compile and provide CEC occurrence data from our facility (in support of Phase 2 of this study).

Details and extent of the exact services will be further defined by the University of Arizona / Carollo Engineers team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona / Carollo Engineers team on this important project. Alison

Aminto is an environmental engineer who also works on PWD's Source Water Protection Program. Alison will be the point of contact for PWD as the project is initiated. If you have any questions, please feel free to contact me at (215) 685-6245 or Alison Aminto at (215) 685-6324.

Sincerely,

Kelly Anderson

A handwritten signature in black ink that reads "Kelly Anderson". The signature is written in a cursive, flowing style.

Manager, Source Water Protection Program
Division of Planning and Research
Philadelphia Water Department

CC:

Gary Burlingame
Christine Marjoram
Alison Aminto



Memorandum from



To: Dr. Jorg E. Drewes, Professor and Co-Director
Department of Civil and Environmental Engineering
Colorado School of Mines

From: Sarah Sandoval, Senior Engineer
Aurora Water Department

Date: May 30, 2013

Subject: Aurora Water's Participation in "Evaluation of Current and Alternative Strategies for Managing CECs in Water (RFP 4494)"

Dear Professor Dr. Jorg E. Drewes:

Aurora Water is committed to supporting the Colorado School of Mines team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing CECs in water. CECs pose a multi-disciplinary, complex challenge for the water industry in the US that has triggered a number of initiatives at various administrative levels in the US. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders in the US is urgent. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach the Colorado School of Mines team will be taking is promising to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches in the US to mitigate the risks of CEC for humans and the environment.

To support this project, we will provide an in-kind contribution of \$7,500 and for the following activities:

- Participation in a survey on experiences with past and current CEC management approaches that we have been involved or have considered in the past (in support of Phase 1 of this study).

- Potentially time and travel costs associated with participation in a one-day project workshop at the end of Phase 1 of the study.
- Compile and provide CEC occurrence data from our facility (in support of Phase 2 of this study).
- Compile and provide data developed as part of previous proactive master planning efforts on treatment, effectiveness, and capital and O&M costs for CEC removal at our facility (in support of Phase 3 of the study).

Details and extent of the exact services will be further defined by the research team at the time of the study. We look forward to working with the Water Research Foundation and the Colorado School of Mines team on this important project. If you have any questions, please feel free to contact me at (303) 739-7279.

Aurora Water,



Sarah Sandoval, PE
Senior Engineer



**CITY OF
BOULDER**
Public Works/Utilities

Water Quality & Environmental Services
boulderwater.net

May 31, 2013

Dr. Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
1133 E. James E. Rogers Way; Harshbarger 108
Tucson, AZ 85721-0011 USA

Subject: Water Research Foundation Request for Proposal No. 4494:
Evaluation of Current and Alternative Strategies for Managing CECs in Water

Dear Professor Snyder,

The City of Boulder (city) appreciates the opportunity to participate with the University of Arizona, Carollo, Technical University Munich and Southern Nevada Water Authority (Project Team) in the "Evaluation of Current and Alternative Strategies for Managing CECs in Water".

The city welcomes the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water.

To support this project, the city will commit to provide the following in-kind contribution of an estimated \$5,000:

- Participate in a survey of experiences with past and current CEC management approaches that the city has implemented or considered in the past or currently
- Participate in a one-day project workshop (by webcast if travel expenses are not available)
- Compile and provide CEC occurrence data from our facility
- Evaluate new potential management strategies and review draft results in respect to feasibility and applicability to the city's utility.

The city looks forward to working with the Water Research Foundation and the project team on this important project.

Sincerely,

Ken Clark
Regulatory Compliance Specialist

STORMWATER / INDUSTRIAL PRETREATMENT / WATERSHED OUTREACH /
LABORATORY SERVICES
4049 N. 75th Street, Boulder, Colorado 80301
PHONE (303) 413-7350
FAX (303) 413-7373

DRINKING WATER / WATER CONSERVATION
5605 63rd Street Boulder, Colorado 80301
PHONE (303) 413-7400
FAX (303) 630-1137



May 31, 2013

Subject: Water Research Foundation RFP No. 4494: *"Evaluation of Current and Alternative Strategies for Managing CECs in Water"*

Dear Dr. Snyder,

Central Arkansas Water is committed to supporting the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing chemicals of emerging concern (CECs) in water.

CECs pose a multi-disciplinary, complex challenge for the water industry in the US, the European Union and Australia that has triggered a number of initiatives at various administrative levels both in the US and the EU. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders is urgent. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

For this project, Central Arkansas Water will commit to provide \$20,000 as in-kind services. This in-kind contribution includes: staff hours for participation in a survey on experiences with past and current CEC monitoring that we have been involved or have considered in the past in our water sources; time and travel costs associated with participation in a two-day project workshop in support of Phase 1 or 3 of the study; compile and provide data developed as part of previous proactive master planning efforts on treatment, effectiveness, and capital and O&M costs for CEC removal at our facility.

Central Arkansas Water believes that this project will produce valuable information for water and wastewater utilities, regulatory agencies, and industries, and looks forward to our participation.

Sincerely,

Paul R. Easley
Director of Water Quality
Central Arkansas Water
221 East Capitol Ave.
Little Rock, AR 72203



LAKE HAVASU CITY

May 27, 2013

Dr. Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
1133 E. James E. Rogers Way; Harshbarger 108
Tucson, AZ 85721-0011 USA

Subject: Water Research Foundation RFP No. 4494: *"Evaluation of Current and Alternative Strategies for Managing CECs in Water"*

Dear Professor Snyder,

The City of Lake Havasu City is committed to supporting the University of Arizona/Carollo/Technical University Munich/Southern Nevada Water Authority team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing CECs in water.

CECs pose a multi-disciplinary, complex challenge for the water industry in the US that has triggered a number of initiatives at various administrative levels in the US. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders in the US is urgent. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach the

University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team will be taking is promising to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches in the US to mitigate the risks of CEC for humans and the environment.

To support this project, we will provide an in-kind contribution of \$ 3,000.00 and a cash contributions of \$ 0.00 for the following activities:

- Participation in a survey on experiences with past and current CEC management approaches that we have been involved or have considered in the past (in support of Phase 1 of this study).
- Time and travel costs associated with participation in a one-day project workshop at the end of Phase 1 of the study.
- Compile and provide CEC occurrence data from our facility (in support of Phase 2 of this study).
- Compile and provide data developed as part of previous proactive master planning efforts on treatment, effectiveness, and capital and O&M costs for CEC removal at our facility (in support of Phase 3 of the study).

Details and extent of the exact services will be further defined by the research team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team on this important project. If you have any questions, please feel free to contact me at (928) 855-3999.

Sincerely,



Doyle Wilson, Ph. D., RG
Water Resources Coordinator
Lake Havasu City Operations Department



SNYDERVILLE BASIN

WATER RECLAMATION DISTRICT

2800 HOMESTEAD RD, PARK CITY, UT 84098 WWW.SBWRD.ORG T 435-649-7993 F 435-649-8040

May 21, 2013

Dr. Shane Snyder
Professor and Co-Director
Chemical and Environmental Engineering
Arizona Laboratory for Emerging Contaminants (ALEC)
1500 W University Avenue
University of Arizona, Tucson, AZ 85721

Subject: Water Research Foundation RFP No. 4494: "Evaluation of Current and Alternative Strategies for Managing CECs in Water"

Dear Dr. Snyder,

The Snyderville Basin Water Reclamation District is committed to supporting the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing chemicals of emerging concern (CECs) in water.

CECs pose a multi-disciplinary, complex challenge for the water/wastewater industry in the US, the European Union and Australia that has triggered a number of initiatives at various administrative levels both in the US and the EU. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, wastewater sector, water sector, and public as well as private stakeholders is urgent. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team will be taking is promising to greatly

advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective, implementable, and affordable approaches to mitigate the risks of CEC for humans and the environment.

To support this project, we will provide an in-kind contribution of up to \$10,000 for the following activities:

- Participation in a survey on experiences with past and current CEC management and treatment approaches (bench scale studies, pilot studies on advanced treatment, E screen tests, bioassays) that we have been involved or have considered in the past (in support of Phase 1 of this study).
- Time and travel costs associated with participation in a two-day project workshop in support of Phase 1 of the study.
- Support in compile and providing CEC occurrence data from our organization and watershed (in support of Phase 2 of this study).
- Compile and provide data developed as part of previous proactive master planning efforts on treatment, effectiveness, and capital and O&M costs for CEC removal at our facility (in support of Phase 3 of the study).

Details and extent of the exact services will be further defined by the research team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team on this important project.

If you have any questions, please feel free to contact me at (435) 649-7993, x 223.

Sincerely,

A handwritten signature in black ink, appearing to read "Michael Luers". The signature is fluid and cursive, written over a light blue horizontal line.

Michael Luers
General Manager



College of Engineering
Engineering Research Administration
www.engineering.arizona.edu/research
engrproposalserv@email.arizona.edu

Civil Engineering Bldg., #72
P.O. Box 210072
Tucson, AZ 85721-0072
Tel: (520) 621-6595
Fax: (520) 621-9291

May 29, 2013

Dear Dr. Tanja Rauch-Williams:

The University of Arizona is pleased to collaborate on the proposal titled, "Evaluation of Current and Alternative Strategies for Managing CECs in Water" for the period of 10/01/13 through 09/30/15, under my direction.

We anticipate that the total project costs at University of Arizona will be \$134,906, as set forth in our budget.

This letter represents The University of Arizona's commitment to participate in and accept a subcontract from Carollo Engineering, should the prime proposal be funded. The appropriate programmatic and administrative personnel at the UA are prepared to establish the requirement agreements consistent with Carollo Engineering and Water Research Foundation policies, should the prime proposal be funded.

Sincerely,

A handwritten signature in black ink, appearing to read 'Shane Snyder', written over a horizontal line.

Dr. Shane Snyder, Professor
University of Arizona

Dr. Leslie P. Tolbert
Senior Vice President for Research
University of Arizona



Technische Universität München

Technische Universität München - Institut für Wasser und Umwelt - Lehrstuhl für
Siedlungswasserversorgung - Am Coulombwall - 85748 Garching - Germany



Institute of
Water and Environment

Tanja Rauch-Williams, Ph.D., P.E.
390 Interlocken Crescent
Suite 800
Broomfield, Colorado 80021
USA

Chair of Urban Water Systems
Engineering

Prof. Dr.-Ing. Jörg E. Drewes
(starting 1.8.2013)

Am Coulombwall
85748 Garching
Germany

Tel +49.89.289.13701
Fax +49.89.289.13718

sww@tum.de
www.sww.bgu.tum.de

Garching, 28. Mai 2013

Re: Participation in WaterRF study

Dear Tanja,

I look forward to collaborating with you, Professor Shane Snyder at the University of Arizona and Dr. Eric Dickenson at the Southern Nevada Water Authority on a joint proposal to the Water Research Foundation. I believe teaming up with Carollo, UofA and SNWA has created the perfect team to address raising challenges in the global water industry through our joint proposal in response to WaterRF's RFP „Evaluation of Current and Alternative Strategies for Managing CECs in Water (#4494)“.

As we have discussed, the Technische Universität München will resume the role of a Co-PI in the study. Dr. Thomas Letzel, who leads the Analytical Research Group in my department, and I are keen to contribute to this study and leverage the effort through use of our extensive CEC monitoring data bases, new STOFF-IDENT data base, and close ties to international and national research groups and networks in the area of CEC research. In addition, we are happy to provide the following in-kind contribution totaling \$34,168 in support of this research effort:

- The Chair of Urban Water Systems Engineering will sponsor the expert workshop (#1a) with international participants from Europe, Australia and the U.S. in Munich in March 2014. This include an appropriate meeting location, A/V and internet support, catering, and travel assistance for workshop participants estimated at \$6,000.
- The department will cover office supplies up to an amount of \$500.
- Travel support for Dr. Peter Stoks, RIWA to participate in Workshop #1b in Las Vegas estimated at \$1,700.
- Travel support for Prof. Jörg Drewes to participate in Workshops #1b (Las Vegas) and #2 (Boston) estimated to be \$3,380.
- Lastly, in order to show our dedication to the proposed study, I am pleased to provide 250 hours of my academic year salary to fulfill the role of a co-PI in the study, estimated at \$22,588.

We look forward to working with you and your team should you successfully obtain WaterRF funding for this project. If you have any questions, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jörg E. Drewes'. The signature is written in a cursive style with a large initial 'J'.

Prof. Dr.-Ing. Jörg E. Drewes



SOUTHERN NEVADA WATER AUTHORITY

SOUTHERN NEVADA WATER SYSTEM
River Mountains Water Treatment Facility
1299 Burkholder Boulevard • Henderson, NV 89015
MAILING ADDRESS P.O. Box 99954 • Las Vegas, NV 89193-9954
(702) 856-3500 • snwa.com

May 30, 2013

Dr. Shane Snyder
Professor & Co-Director
Chemical and Environmental Engineering
1133 E. James E. Rogers Way; Harshbarger 108
Tucson, AZ 85721-0011 USA

Subject: Water Research Foundation RFP No. 4494: *"Evaluation of Current and Alternative Strategies for Managing CECs in Water"*

Dear Professor Snyder,

As a Co-Principal Investigator the Southern Nevada Water Authority is committed to supporting the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing CECs in water. To support this project, we will provide an in-kind contribution of \$10,000, which includes project team efforts associated with Phases 1, 2, and 3:

- Participation in a survey on experiences with past and current CEC management approaches that we have been involved or have considered in the past.
- Developing lists of indicator CECs
- Hosting a stakeholder workshop at the Southern Nevada Water Authority.
- Compile and provide CEC occurrence data from our facility and watershed.
- Compile and provide data developed as part of previous proactive master planning efforts on treatment, effectiveness, and capital and O&M costs for CEC removal at our facility.

We look forward to working with the Water Research Foundation and the project team on this important project. If you have any questions, please feel free to contact me at (702) 856-3664.

Respectfully,

David J Rexing
SNWA W.Q. R&D Manager
P O Box 99954 M/S 1970
Las Vegas NV 89193-9954
702.856.3664 T
702.856.3647 F
D.Rexing@SNWA.com

cc: David L. Johnson, Southern Nevada Water Authority, Water Quality and Treatment Director

SNWA MEMBER AGENCIES

Big Bend Water District • Boulder City • Clark County Water Reclamation District • City of Henderson • City of Las Vegas • City of North Las Vegas • Las Vegas Valley Water District

May 31, 2013

Prof. Dr. Jörg Drewes
Technische Universität München
Chair of Urban Water Systems Engineering
Am Coulombwall 8
85748 Garching
GERMANY

Subject: Water Research Foundation RFP No. 4494: ***"Evaluation of Current and Alternative Strategies for Managing CECs in Water"***

Dear Professor Drewes,

I, Dr. Nancy Denslow, from the University of Florida, Gainesville, FL, am committed to supporting your research team's effort to evaluate current and alternative strategies to manage contaminants of emerging concern (CECs) in water. I understand your team will be composed of excellent researchers from the University of Arizona, the Technical University in Munich, Carollo, and the Southern Nevada Water Authority and that you have formed a consortium to develop this project for the Water Research Foundation.

CECs pose a very complex challenge for the water industry and this has triggered a number of initiatives at various administrative levels in the US. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water but clearly would benefit from a multi-disciplinary approach, as described in your proposal. The need in this area is great, but the resources are limited and thus they should be used most effectively to address the problem at hand. It is clear that a closer coordination is needed urgently among different agencies, water sectors, and the public as well as private stakeholders in the US. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. It has been difficult to get consensus on effective management strategies because of a general lack of understanding of these issues, especially the actual risks posed by the CECs, their diverse sources and occurrence patterns, and the monetary costs that are associated with treatment or avoidance.

To solve some of these issues, it is critical to develop a better understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. I am very enthusiastic about the approach that your team from the University of Arizona/Carollo/

Technische Universität München/Southern Nevada Water Authority has designed in this proposal. This approach will help to advance needed collaboration among utilities, regulators, and private and public stakeholders and will undoubtedly be central in building effective, implementable and affordable strategies for the US to mitigate the risks of CECs for humans and the environment.

To support this project, I am willing to assist the team in an expert workshop to address the applicability of using representative CECs to assess ecological and human health relevance. The research team will define the details and extent of the exact services at the time of the study. I look forward to working with the Water Research Foundation and the team you have brought together from the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority on this important project. If you have any questions, please feel free to contact me at (352) 294-4642.

I am looking forward to working with you as part of the expert workshop.



Nancy Denslow, Ph.D.
Professor
University of Florida



8015 46th St NW
Washington, DC 20012
Phone/Fax: 202-362-3270
Cell: 1-552-210-7371

Joseph Cotruvo & Associates L.L.C.
Water, Environment and
Public Health Consultants

Joseph A. Cotruvo
President
joseph.cotruvo@verizon.net
(552)210-7373 ext 001

May 31, 2013

Prof. Dr. Jörg Drewes
Technische Universität München
Chair of Urban Water Systems Engineering
Am Coulombwall 9
85748 Garching
GERMANY

Subject: Water Research Foundation RFP No. 4494 "Evaluation of Current and Alternative Strategies for Managing CECs in Water"

Dear Professor Drewes,

Joseph Cotruvo & Associates is committed to supporting the University of Arizona/Carollo/Technical University Munich/Southern Nevada Water Authority team in the aforementioned Water Research Foundation project to evaluate current and alternative strategies for managing CECs in water.

CECs pose a multi-disciplinary, complex challenge for the water industry in the US that has triggered a number of initiatives at various administrative levels in the US. These efforts vary widely in their approach and implementation for mitigating known and perceived risks associated with CECs in water. Given the need to direct limited resources most effectively to addressing the problem at hand, a closer coordination among different agencies, water sectors, and public as well as private stakeholders in the US is urgent. Finding agreement on effective acceptable management strategies for CECs continues to be a challenge due to the continued uncertainty and differences in opinions reflected in public and scientific discussions about the actual risks posed by CECs for humans and the environment. Consensus on effective management strategies has also been delayed by a lack of understanding what the most cost-effective approaches for managing various groups of CECs are in consideration of their respective risks, diverse source and occurrence patterns, and associated treatment or avoidance costs.

In this context, we welcome the very timely involvement of the Water Research Foundation with this project to help advance our understanding of the benefits, costs, and non-monetary implications of alternative approaches to manage CECs in water. The project approach the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team will be taking is promising to greatly advance the necessary collaboration between utilities, regulators, and private and public stakeholders for developing effective,

implementable, and affordable approaches in the US to mitigate the risks of CEC for humans and the environment.

To support this project, I am willing to assist the project team in an expert workshop to assess the applicability of representative CECs to assess ecological and human health relevance

Details and extent of the exact services will be further defined by the research team at the time of the study. We look forward to working with the Water Research Foundation and the University of Arizona/Carollo/Technische Universität München/Southern Nevada Water Authority team on this important project. If you have any questions, please feel free to contact me at (202 362 3076)



Joseph A. Cotruvo, PhD, President

Joseph Cotruvo & Associates LLC .

attachment

Search Results

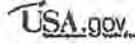
Current Search Terms: TANJA* RAUCH-WILIAMS

No records found for current search.

SAM | System for Award Management 1.0

Note to all Users: This is a Federal Government computer system. Use of this system constitutes consent to monitoring at all times.

IBM v1.970.20138522-1640



Search Results

Current Search Terms: SHANE* snyder*

No records found for current search.

SAM | System for Award Management 1.0

IBM v1.970.20130522-1640

Note to all Users: This is a Federal Government computer system. Use of this system constitutes consent to monitoring at all times.



Search Results

Current Search Terms: JORG* drewes*

No records found for current search.

SAM | System for Award Management 3.0

IBM v1.970.20130522-1640

Note to all Users: This is a Federal Government computer system. Use of this system constitutes consent to monitoring at all times.



Search Results

Current Search Terms: ERIC* dickenson*

No records found for current search.

SAM | System for Award Management 1.0

IBM v1.970.20130522-1640

Note to all Users: This is a Federal Government computer system. Use of this system constitutes consent to monitoring at all times.



Search Results

Current Search Terms: JANE* M anderson*

No records found for current search.

SAM | System for Award Management 1.0

IBM v1.970.20130522-1640

Note to all Users: This is a Federal Government computer system. Use of this system constitutes consent to monitoring at all times.



Search Results

Your search returned the following results...

<input type="text" value="Entity"/>	CAROLLO ENGINEERS, INC.	Status: Active <input type="checkbox"/>
DUNS: 045809316	CAGE Code: 1WWZ9	View Details
Has Active Exclusion?: No	DoDAAC:	

SAM | System for Award Management 1.0

IBM v1.970.20130522-1640

Note to all Users: This is a Federal Government computer system. Use of this system constitutes consent to monitoring at all times.



**Water Research Foundation
Research Project Budget**

* Required fields are highlighted in yellow.

Instructions for budgets are at <http://www.waterrf.org/funding/Pages/proposal-guidelines.aspx>
 * Required fields are highlighted in yellow.

Sub-recipient (organization name): Carollo Engineers, Inc.
 PI Name: Tanja-Rauch Williams (PI)
 Project Title: Evaluation of Current and Alternative Strategies for Managing CECs in Water
 Preparation/Revision Date:
 RFP # (if applicable):

4494

Note: The information above will carry over to subsequent pages/worksheets.

Sources of Award, Cost Share, and Non-Cash In-Kind Contributions (insert rows to list more third parties.)	Award		Cost Share		Third-Party Non-Cash In Kind
	Foundation Funds	Sub-recipient	Third-Party Cash to Foundation	Sub-recipient	
Water Research Foundation	400,000	n/a	n/a	n/a	n/a
Sub-recipient (including subcontract contributions)	n/a	400,000	n/a	60,038	n/a
American Water, NJ	n/a	n/a	n/a	n/a	10,000
Bavarian Environment Agency, Germany	n/a	n/a	n/a	n/a	10,000
BFG (Federal Institute of Hydrology), Germany	n/a	n/a	n/a	n/a	30,000
City of Tucson, AZ	n/a	n/a	n/a	n/a	2,000
EAWAG, Switzerland	n/a	n/a	n/a	n/a	8,500
Greater Cincinnati Water Works, OH	n/a	n/a	n/a	n/a	10,000
Lake Havasu City, AZ	n/a	n/a	n/a	n/a	3,000
Minneapolis Department of Public Works	n/a	n/a	n/a	n/a	5,000
NYC Environmental Protection, NY	n/a	n/a	n/a	n/a	15,000
Philadelphia Water Department, PA	n/a	n/a	n/a	n/a	6,000
RWA Rhine Water Works, The Netherlands	n/a	n/a	n/a	n/a	10,000
Snyderville Water Reclamation District, UT	n/a	n/a	n/a	n/a	5,000
Suez Environment CIRSEE, France	n/a	n/a	n/a	n/a	5,000
United Water, CA	n/a	n/a	n/a	n/a	5,000
Oranges County Water District	n/a	n/a	n/a	n/a	5,000
Eurofins Eaton Analytical, Inc.	n/a	n/a	n/a	n/a	3,000
California Department of Public Health	n/a	n/a	n/a	n/a	
UBA (German EPA)	n/a	n/a	n/a	n/a	
Milwaukee Water Works	n/a	n/a	n/a	n/a	7,928
Danver Water					7,500
Veolia					5,000
Stuart Kahn, LUNSW					5,000
Melbourne Water					15,000
Aurora Water					7,500
City of Boulder, CO					5,000
Metro Wastewater Reclamation District, Denver					7,500

Contribution Sources

**Water Research Foundation
Research Project Budget**

Instructions for budgets are at <http://www.waterrf.org/funding/Pages/proposal-guidelines.aspx>. * Required fields are highlighted in yellow.

Sub-recipient (organization name): **Carollo Engineers, Inc.**
 PI Name: **Tanja-Rauch Williams (PI)**
 Project Title: **Evaluation of Current and Alternative Strategies for Managing CECs in Water**
 Preparation/Revision Date: **4494**
 RFP # (if applicable):

Note: The information above will carry over to subsequent pages/worksheets.

	Award		Cost Share
Central Arkansas Water			20,000
MWD/H2O, Inter-Industry Network on Microconstituents			6,000
Umweltbundesamt Österreich (Austrian EPA)			25,000
European Commission	n/a	n/a	
Total Award, Cost Share, and Third-Party Non-Cash In Kind	400,000	0	60,038
Total Project Value		693,966	233,928

**Water Research Foundation
Research Project Budget**

Instructions for budgets are at <http://www.waterrf.org/funding/Pages/proposal-guidelines.aspx> * Required fields are highlighted in yellow.

Sub-recipient (organization name): **Carollo Engineers, Inc.**
 PI Name: **Tanja-Rauch Williams (PI)**
 Project Title: **Evaluation of Current and Alternative Strategies for Managing CECs in Water**
 Preparation/Revision Date:
 RFP # (if applicable): **4494**

* Required fields are highlighted in yellow.

Note: The information above will carry over to subsequent pages/worksheets.

Sources of Award, Cost Share, and Non-Cash In-Kind Contributions (Insert rows to list more third parties.)	Award		Third-Party Cash to Foundation	Cost Share		Third-Party Non-Cash In Kind
	Foundation Funds	Sub-recipient		Sub-recipient	Third-Party Cash to Sub-recipient	
Water Research Foundation						
Sub-recipient (including subcontract contributions)						
American Water, NJ	n/a	400,000	n/a	n/a	n/a	n/a
Bavarian Environment Agency, Germany	n/a	n/a	n/a	n/a	n/a	10,000
BFG (Federal Institute of Hydrology), Germany	n/a	n/a	n/a	n/a	n/a	10,000
City of Tucson, AZ	n/a	n/a	n/a	n/a	n/a	30,000
EAWAG, Switzerland	n/a	n/a	n/a	n/a	n/a	2,000
Greater Cincinnati Water Works, OH	n/a	n/a	n/a	n/a	n/a	8,500
Lake Havasu City, AZ	n/a	n/a	n/a	n/a	n/a	3,000
Minneapolis Department of Public Works	n/a	n/a	n/a	n/a	n/a	10,000
NYC Environmental Protection, NY	n/a	n/a	n/a	n/a	n/a	5,000
Philadelphia Water Department, PA	n/a	n/a	n/a	n/a	n/a	15,000
RIWA Rhine Water Works, The Netherlands	n/a	n/a	n/a	n/a	n/a	6,000
Snyderville Water Reclamation District, UT	n/a	n/a	n/a	n/a	n/a	10,000
Suez Environment CIRSEE, France	n/a	n/a	n/a	n/a	n/a	
United Water, CA	n/a	n/a	n/a	n/a	n/a	5,000
Orange County Water District	n/a	n/a	n/a	n/a	n/a	5,000
Eurofins Eaton Analytical, Inc.	n/a	n/a	n/a	n/a	n/a	3,000
California Department of Public Health	n/a	n/a	n/a	n/a	n/a	
UBA (German EPA)	n/a	n/a	n/a	n/a	n/a	
Milwaukee Water Works	n/a	n/a	n/a	n/a	n/a	7,928
Denver Water						7,500
Veolia						5,000
Stuart Kahn,						5,000
LNSW						
Melbourne Water						15,000
Aurora Water						7,500
City of Boulder, CO						5,000
Metro Wastewater Reclamation District, Denver						7,500
Third Parties						

**Water Research Foundation
Research Project Budget**

Instructions for budgets are at <http://www.waterrf.org/funding/Pages/proposal-guidelines.aspx>.

* Required fields are highlighted in yellow.

Sub-recipient (organization name):

Carollo Engineers, Inc.

PI Name:

Tanja-Rauch Williams (PI)

Project Title:

Evaluation of Current and Alternative Strategies for Managing CECs in Water

Preparation/Revision Date:

4494

RFP # (if applicable):

Note: The information above will carry over to subsequent pages/worksheets.

	Award		Cost Share	
Central Arkansas Water				20,000
MWDH2O, Inter-Industry Network on Microconstituents				6,000
Umwelbundesamt Osterreich (Austrian EPA)				25,000
European Commission	n/a	n/a	n/a	
	0	400,000	60,038	233,928
Total Award, Cost Share, and Third-Party Non-Cash In Kind	400,000	400,000	60,038	233,928
Total Project Value	893,966			233,928

**Water Research Foundation
Research Project Budget**

Sub-recipient (organization name): Carollo Engineers, Inc.
 PI Name: Tanja-Rauch Williams (PI)
 Project Title: Evaluation of Current and Alternative Strategies for Managing CECs in Water
 Preparation/Revision Date: 1/0/1900
 RFP # (if applicable): 4494

OK
OK

Note: All amounts below will be automatically populated from the following pages/worksheets.

	Total	Award	Cost Share
A Key Personnel	28,350	24,664	3,686
B Other Personnel	29,954	26,060	3,894
	58,304	50,724	7,580
Total Direct Labor and Fringe Benefits			
C Equipment Rental	0	0	0
Special Equipment	0	0	0
D Materials and Supplies	0	0	0
E Travel	9,400	8,800	600
F Subcontracts	318,871	274,700	44,171
G Other Direct Costs	0	0	0
	386,575	334,224	52,351
Total Direct Costs			
H Indirect Costs	73,463	65,776	7,687
I Fee	0	0	0
J Surveys	0	0	0
	460,038	400,000	60,038
Total Direct and Indirect Costs			
Third-Party Non-Cash In Kind	233,928	n/a	n/a
	693,966		
Total Project Value			

**Water Research Foundation
Research Project Budget**

Sub-recipient (organization name): Carollo Engineers, Inc.
 PI Name: Tanja-Rauch Williams (PI)
 Project Title: Evaluation of Current and Alternative Strategies for Managing CECs in Water
 Preparation/Revision Date: Preparation/Revision Date
 RFP # (if applicable): 4494

C. Equipment Rental and Special Equipment Purchase

Equipment Rental (List items and dollar amount for each item exceeding \$1,000)	Total	Award	Cost Share
None			0
			0
			0
			0
			0
			0
Total Equipment Rental	0	0	0

Special Equipment Purchase (List items and dollar amount for each item exceeding \$5,000)	Total	Award	Cost Share
None			0
			0
			0
			0
			0
			0
Total Special Equipment Purchase	0	0	0

**Water Research Foundation
Research Project Budget**

Sub-recipient (organization name): Carollo Engineers, Inc.
 PI Name: Tanja-Rauch Williams (PI)
 Project Title: Evaluation of Current and Alternative Strategies for Managing CECs in Water
 Preparation/Revision Date: Preparation/Revision Date
 RFP # (if applicable): 4494

<i>D. Materials and Supplies</i>	Total	Award	Cost Share
None			0
			0
			0
			0
			0
			0
			0
			0
			0
			0
Total Materials and Supplies	0	0	0

<i>E. Travel</i>	Total	Award	Cost Share
Airfare (Denver-Munich) and lodging for Tanja Rauch-Williams for Workshop #1 a	1,700	1,300	400
Airfare (Denver-Las Vegas) and lodging for Tanja Rauch-Williams for Workshop #1 b	500	300	200
Airfare (Denver-TBD in US) and lodging for Tanja Rauch-Williams for Workshop #2	700	700	0
Airfare (Denver-TBD in US) and lodging for Tanja Rauch-Williams for Workshop #3	500	500	0
Airfare (Florida - TBD in US) and lodging for Nancy Denslow for Workshop # 2	1,000	1,000	0
Airfare (Switzerland - Las Vegas) and lodging for Urs von Gunten; EAWAG, for Workshop 1 b	2,000	2,000	0
Airfare (Germany - Las Vegas) and lodging for Peter Stoks, RIWA, for Workshop #1 b	2,000	2,000	0
Airfare (Washington - TBD in US) and lodging for Joe Cotruvo for Workshop # 2	1,000	1,000	0
Total Travel	9,400	8,800	600

**Water Research Foundation
Research Project Budget**

Sub-recipient (organization name): Carollo Engineers, Inc.
 PI Name: Tanja-Rauch Williams (PI)
 Project Title: Evaluation of Current and Alternative Strategies for Managing CECs in Water
 Preparation/Revision Date: Preparation/Revision Date
 RFP # (if applicable): 4494

F. Subcontracts	Total	Award	Cost Share
University of Arizona	135,000	135,000	0
Technical University of Munic, Germany	134,168	100,000	34,168
Southern Nevada Water Authority	45,003	35,000	10,003
Joe Cotruvo & Associates LLC	3,000	3,000	0
Nancy Denslow, University of Florida	1,000	1,000	0
California Department of Public Health, travel for Robert Hultquist from CA to Las Vegas and Lodging	700	700	0
			0
			0
Total Subcontracts	318,871	274,700	44,171

G. Other Direct Costs	Total	Award	Cost Share
			0
			0
			0
			0
			0
			0
			0
			0
Total Other Direct Costs	0	0	0

**Water Research Foundation
Research Project Budget**

Sub-recipient (organization name): Carollo Engineers, Inc.
 PI Name: Tanja-Rauch Williams (PI)
 Project Title: Evaluation of Current and Alternative Strategies for Managing CECs in Water
 Preparation/Revision Date: Preparation/Revision Date
 RFP # (if applicable): 4494

H. Indirect Costs (Attach copy of federally approved rates or detailed basis for rates)						
Cost Category	Rate %	Base \$	Total	Award	Cost Share	
A. Key Personnel Indirect Labor	126%	28,350	35,721	31,065	4,656	
B. Other Personnel Indirect Labor	126%	29,954	37,742	34,711	3,031	
			0		0	
			0		0	
			0		0	
Total Indirect Costs			73,463	65,776	7,687	

I. Fee				
	%	Base \$	Total	Cost Share
			0	0
Total Fee			0	0

J. Survey				
	Total	Award	Cost Share	
			0	0
			0	0
			0	0
			0	0
			0	0
Total Survey Costs	0	0	0	0

**Water Research Foundation
Research Project Budget**

Sub-recipient (organization name): University of Arizona
 PI Name: Shane Snyder (Co-PI)
 Project Title: Evaluation of Current and Alternative Strategies for Managing CECs in Water
 Preparation/Revision Date: 1/0/1900
 RFP # (if applicable): 4494

OK
OK

Note: All amounts below will be automatically populated from the following pages/worksheets.

	Total	Award	Cost Share
A Key Personnel	13,375	13,375	0
B Other Personnel	87,338	87,338	0
Total Direct Labor and Fringe Benefits			
	100,713	100,713	0
C Equipment Rental	0	0	0
Special Equipment	0	0	0
D Materials and Supplies	1,430	1,430	0
E Travel	5,000	5,000	0
F Subcontracts	0	0	0
G Other Direct Costs	0	0	0
Total Direct Costs			
	107,143	107,143	0
H Indirect Costs	27,857	27,857	0
I Fee	0	0	0
J Surveys	0	0	0
Total Direct and Indirect Costs			
	135,000	135,000	0
Third-Party Non-Cash In Kind	0	n/a	n/a
Total Project Value			
	135,000		

**Water Research Foundation
Research Project Budget**

Sub-recipient (organization name): University of Arizona
 PI Name: Shane Snyder (Co-PI)
 Project Title: Evaluation of Current and Alternative Strategies for Managing CECs in Water
 Preparation/Revision Date: Preparation/Revision Date
 RFP # (if applicable): 4494

C. Equipment Rental and Special Equipment Purchase

Equipment Rental (List items and dollar amount for each item exceeding \$1,000)	Total	Award	Cost Share
			0
			0
			0
			0
			0
Total Equipment Rental	0	0	0

Special Equipment Purchase (List items and dollar amount for each item exceeding \$5,000)	Total	Award	Cost Share
			0
			0
			0
			0
			0
Total Special Equipment Purchase	0	0	0

**Water Research Foundation
Research Project Budget**

Sub-recipient (organization name): Technische Universität München
PI Name: Jörg E. Drewes (Co-PI)
Project Title: Evaluation of Current and Alternative Strategies for Managing CECs in Water
Preparation/Revision Date: 1/0/1900
RFP # (if applicable): 4494

OK
OK

Note: All amounts below will be automatically populated from the following pages/worksheets.

	Total	Award	Cost Share
A Key Personnel	22,588	0	22,588
B Other Personnel	74,702	74,702	0
	97,290	74,702	22,588
Total Direct Labor and Fringe Benefits			
C Equipment Rental	0	0	0
Special Equipment	0	0	0
D Materials and Supplies	6,500	0	6,500
E Travel	10,410	5,330	5,080
F Subcontracts	0	0	0
G Other Direct Costs	0	0	0
	114,200	80,032	34,168
Total Direct Costs			
H Indirect Costs	15,966	15,966	0
I Fee	4,002	4,002	0
J Surveys	0	0	0
	134,168	100,000	34,168
Total Direct and Indirect Costs			
Third-Party Non-Cash In Kind	0	n/a	n/a
	134,168		
Total Project Value			

**Water Research Foundation
Research Project Budget**

Sub-recipient (organization name): Technische Universität München
 PI Name: Jörg E. Drewes (Co-PI)
 Project Title: Evaluation of Current and Alternative Strategies for Managing CECs in Water
 Preparation/Revision Date: Preparation/Revision Date
 RFP # (if applicable): 4494

H. Indirect Costs (Attach copy of federally approved rates or detailed basis for rates)

Cost Category	Rate %	Base \$	Total	Award	Cost Share
Federal tax (19%)	19%	84,034	15,966	15,966	0
			0		0
			0		0
			0		0
			0		0
Total Indirect Costs			15,966	15,966	0

I. Fee

	%	Base \$	Total	Award	Cost Share
	5.00%	80,032	4,002	4,002	0
		Total Fee	4,002	4,002	0

J. Survey

	Total	Award	Cost Share
			0
			0
			0
			0
			0
			0
Total Survey Costs	0	0	0

**Water Research Foundation
Research Project Budget**

Sub-recipient (organization name): Southern Nevada Water Authority
 PI Name: Eric Dickenson (Co-PI)
 Project Title: Evaluation of Current and Alternative Strategies for Managing CECs in Water
 Preparation/Revision Date: 1/0/1900
 RFP # (if applicable): 4494

OK
OK

Note: All amounts below will be automatically populated from the following pages/worksheets.

	Total	Award	Cost Share
A Key Personnel	12,336	9,195	3,141
B Other Personnel	26,670	19,808	6,862
Total Direct Labor and Fringe Benefits			
	39,006	29,003	10,003
C Equipment Rental	0	0	0
Special Equipment	0	0	0
D Materials and Supplies	997	997	0
E Travel	5,000	5,000	0
F Subcontracts	0	0	0
G Other Direct Costs	0	0	0
Total Direct Costs			
	45,003	35,000	10,003
H Indirect Costs	0	0	0
I Fee	0	0	0
J Surveys	0	0	0
Total Direct and Indirect Costs			
	45,003	35,000	10,003
Third-Party Non-Cash In Kind	0	n/a	n/a
Total Project Value			
	45,003		

**Water Research Foundation
Research Project Budget**

Sub-recipient (organization name): Southern Nevada Water Authority
 PI Name: Eric Dickenson (Co-PI)
 Project Title: Evaluation of Current and Alternative Strategies for Managing CECs in Water
 Preparation/Revision Date: Preparation/Revision Date
 RFP # (if applicable): 4494

C. Equipment Rental and Special Equipment Purchase

Equipment Rental (List items and dollar amount for each item exceeding \$1,000)	Total	Award	Cost Share
			0
			0
			0
			0
			0
			0
Total Equipment Rental	0	0	0

Special Equipment Purchase (List items and dollar amount for each item exceeding \$5,000)	Total	Award	Cost Share
			0
			0
			0
			0
			0
			0
Total Special Equipment Purchase	0	0	0

**Water Research Foundation
Research Project Budget**

Sub-recipient (organization name): Southern Nevada Water Authority
 PI Name: Eric Dickenson (Co-PI)
 Project Title: Evaluation of Current and Alternative Strategies for Managing CECs in Water
 Preparation/Revision Date: Preparation/Revision Date
 RFP # (if applicable): 4494

<i>D. Materials and Supplies</i>	Total	Award	Cost Share
Expenses for a workshop at SNWA (location, local transport, catering, materials)	997	997	0
			0
			0
			0
			0
			0
			0
			0
			0
			0
Total Materials and Supplies	997	997	0

<i>E. Travel</i>	Total	Award	Cost Share
Project Meetings/Workshops/Conference	5,000	5,000	0
			0
			0
			0
			0
			0
			0
			0
			0
			0
Total Travel	5,000	5,000	0

BUDGET NARRATIVE

Carollo Engineers, Inc., is proposing to complete this project in 24 months. We estimate that approximately \$240,000 of the Foundation share of the project will be expended in the first year of the project, with the remainder (approximately \$160,000) expended in the second year.

Primary Contractor Budget Justification

Carollo Engineers, Inc.

Salaries and Wages

Salary rates for the non-federal employees (Dr. Tanja Rauch-Williams, Pierce Rossum, Dr. Erin Mackey, and Sarah Deslauriers, with support from Elisa Garvey and Andrew Salvesson) are established in conjunction with their employer(s), Carollo Engineers. Indirect costs of 126% are included in the hourly rates budget for each of these researchers. A 0% wage increase has been incorporated for each staff person for each year of the project. Dr. Tanja Rauch-Williams will devote 10% of her time to the planning, directing, and execution of research activities, as well as monitoring the project budget and preparing project reports for submission to the Foundation and other project publications in both study years, respectively. 15% of all Carollo salaries are being contributed as an in-kind contribution to this project. Sarah Deslauriers will lead the TBL, GHG emission, and sustainability analyses associated with the selected CEC management strategies and will devote 5.5% of her time to this effort in the second year. Pierce Rossum will devote 5% of his time in the second year to lead the Cost-Benefit Analysis of identified CEC management options within the TBL analysis framework. Pierce will also conduct associated rate impact studies and community affordability analysis. Dr. Erin Mackey will devote 3.5% of her time in the second year to support the life-cycle cost analysis for CEC upgrades of water facilities nationwide.

Fringe Benefits

For Carollo personnel, fringe benefits are 50% of direct labor.

Equipment Rental

No equipment rentals are expected as part of this proposal.

Materials and Supplies

No funds are requested to cover materials and supplies.

Travels

Travel costs for Carollo Engineer's employee Dr. Rauch-Williams to attend workshops are estimated at \$3,400, of which 18% will be provided by Carollo Engineers as an in-kind contribution. All other travels for project meetings, conference presentations, and WaterRF annual research updates, etc. will be covered as an in-kind contribution by Carollo Engineers (this in-kind is not included in the budget sheets).

Carollo's budget also includes travel costs for four external experts scheduled to attend specific workshops, including: Dr. Nancy Denslow (University of Florida), Urs von Gunten (EAWAG), Peter Stoks (RIWA), Joe Cotruvo (Joseph Cotruvo & Ass.), and Robert Hultquist from CDPH, California. The total travel budget included for these experts is \$6,700.

Subcontract

Carollo Engineers, Inc. will enter into a subcontract with five entities. The larger subcontracts include: 1) University of Arizona (U of A) at a cost of \$135,000, 2) Technical University of Munich (TUM) at a cost of \$100,000, 3) Southern Nevada Water Authority (SNWA) at a cost of \$35,000. A subcontractor budget is included for Joe Cotruvo (Joseph Cotruvo & Ass.) (\$3,000) and Dr. Nancy Denslow (University of Florida) (\$1,000) in Carollo's budget.

1

See the Subcontractor Budget Justification for a detailed description of these costs for U of A, TUM, and SNWA.

Other Direct Costs

There are no other direct costs expected as part of this proposal.

Indirect Costs

As noted earlier, 126% indirect costs for non-federal researcher salaries have been included in the Salaries and Wages budget estimate, as these costs are more accurately described for this project as direct costs incurred by Carollo Engineers.

Subcontractor Budget Justification

University of Arizona

Salaries and Wages

Dr. Snyder, Co-PI, will spend 0.25 summer months per year to conduct three workshops in support of this project. A 3% cost of living increase has been factored into the second year.

There will be one Post-Doc at 75% effort FY that will assist the Co-PI in the organization of the workshops as well as conduct them. The Post-Doc will split his time at three locations, spending 1/3 of his time at each location for the duration of the project. A 3% cost of living increase has been factored into the second year.

Fringe Benefits

ERE RATES:

Faculty: 31.2%

Postdoc: 4.3%

Equipment Rental

No equipment rentals are expected as part of this proposal.

Materials and Supplies

Workshop supplies to be distributed to participants are estimated to cost \$715 per year.

Travels

- **Domestic:** The Post-Doc will travel once a year to a TBD location within the U.S. to conduct workshops.
- **Annual Domestic Travel Costs:** \$1,500 per year.
- **Total Project Domestic Travel Costs:** \$3,000.
- **International:** The Post-Doc will travel to a TBD international location to conduct a workshop.
- **International Travel Costs:** \$2,000.

Other Direct & Indirect Costs

Facilities & Administrative (F&A) Costs
The University's federally approved facilities and administrative (F&A, or indirect) cost rate is 26% MTDC. This project is entirely literature and workshop-based. There is no laboratory component at all to this effort and the vast majority of invested time will take place off-campus.

Technical University Munich (TUM)

The total budget of the TUM is estimated at \$134,168, with \$100,100 requested from WaterRF for the second year of the study. The TUM research team will offer \$34,168 in-kind contribution, including organizing and facilitating expert Workshop #1a in Munich, travel costs for travel from Germany to the U.S., office supplies, and Professor Jörg Drewes's academic year time to the proposed study.

Salaries and Wages

The salary rates of state employee participating in the project (Dr. Thomas Letzel and graduate research assistant/PhD student) are established by TUM. Indirect costs of 30% are included in the hourly rates budget for each of these researchers. Dr. Letzel will devote 22% of his time to support Tasks 1-3, 5, 6 and 9 of the project and co-supervise the PhD student at TUM. The PhD student will devote 60% of his/her time to conduct technical tasks in support of Tasks 1-6 and 9 of the project and assist in preparing reports. Professor Jörg Drewes is on a 12-month contract with 9-month of teaching obligations. He will devote 5%

of his time to overseeing, planning and directing research.

Fringe Benefits

An estimate of 30% has been incorporated for Dr. Thomas Letzel and the PhD student.

Equipment Rental

No equipment rentals are expected as part of this proposal.

Materials and Supplies

No funds are requested to cover materials and supplies. Instead, TUM will provide in-kind contributions in the amount of \$6,500 to cover office supplies and to organize and facilitate the expert Workshop #1a in Munich.

Travel

We request \$5,330 funds to cover travel expenses for Dr. Stuart Khan, Sydney to participate in the international expert Workshop #1a in Munich and for Dr. Thomas Letzel to participate in expert Workshops #1ab and #2 in the U.S. TUM will provide in-kind contributions to cover airfares for Prof. Drewes to participate in expert Workshops #1b, 2, and 3 in the U.S.

Subcontract

None

Other Direct Costs

TUM charges a fee of 5% on all external grants. This amounts to \$4,002 from WaterRF.

Indirect Costs

The contract mechanism to be used by TUM has 20% indirect costs associated with labor, materials and supplies, travels, and subcontracts. This is less than 50% of a common overhead rate of public universities in the U.S., compensating for the current currency exchange rate between the US\$ and the Euro.

Southern Nevada Water Authority (SNWA)

Salaries and Wages

The salary rates of the professional research staff and associates are established by SNWA and their Board of Directors. The amount of \$8,812 (161 hours) will cover Co-PI Dr. Eric Dickenson, \$16,960 (476 hours) will cover a postdoctoral researcher and \$2,926 (133 hours) will cover a graduate intern. Total: \$19,886.

Fringe Benefits

The rate for fringe benefits is established by SNWA and is currently 40%. Grad interns are not overheaded. The total fringe benefit cost is estimated at \$6,784.

Equipment Rental

No equipment rentals are expected as part of this proposal.

Materials and Supplies

A total of \$997 is allocated for expenses for a workshop located at the River Mountains Water Treatment Facility located in Henderson, NV.

Travel

We estimate that a SNWA team member will travel to project workshops located in the U.S. and at least one scientific meeting to present research results from this project. The total travel cost is estimated at \$5,000.

Subcontract

No subcontract is expected.

Other Direct Costs

No other direct costs are expected.

Indirect Costs

SNWA has no indirect costs.

Cost Share

SNWA will provide as in-kind labor and associated fringe benefits. This in-kind cost share totals \$10,003. SNWA will also provide as in-kind the use of our facility for a project workshop.

Summary Information Sheet
 Carollo Engineers, Inc.
 Balance Sheet
 As of December 31, 2012

Assets

Cash	6,962,839
Receivables	29,836,230
Prepaid	1,828,057
Investments	238,363
Fixed Assets	9,841,903
Other	<u>2,166,509</u>
Total Assets	50,873,901

Liabilities

Current A/P	9,506,433
Accrued Expenses	6,173,740
Notes Payable	1,646,715
Other Liabilities	11,429,128
Owner's Equity	<u>22,117,885</u>
Total Liabilities & OE	50,873,901



G. Warren Adams CFO

Carollo Engineers, Inc. (Carollo), has been in operation since 1933. Carollo's professional engineering services extend throughout the United States with offices in 26 cities, including major design centers in Walnut Creek, California; Orange County, California; and Phoenix, Arizona.

The firm has demonstrated a high level of fiscal responsibility throughout the years. Borrowings are on a short-term basis to meet cash requirements at peak times of the year.

The company has a banking relationship with National Bank of Arizona.

National Bank of Arizona
 6001 N 24th St
 Phoenix, AZ 85016
 Rob Maver, Vice President
 Office (602) 235-6000
 Direct (602) 212-8810

Some information indicating the capacity of the firm to handle large jobs is:

	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
Gross Revenue (000)	157,070	177,516	173,964	165,441	147,765	146,215	148,542
ENR Ranking	77	72	68	73	70	77	73
# of Employees (avg.)	711	790	795	716	662	625	618

CAROLLO ENGINEERS, INC.
Statement of Direct Labor, Fringe Benefits,
and General Overhead
Reduced for PECE Charges
For the Year Ended December 31, 2012

CAROLLO ENGINEERS, INC.

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2201 E. Camelback Road
Suite 360
Phoenix, AZ 85016

**Independent Auditors' Report on the Statement of Direct Labor,
Fringe Benefits, and General Overhead Reduced for PECE Charges**

**Board of Directors
CAROLLO ENGINEERS, INC.
Phoenix, Arizona**

We have audited the Statement of Direct Labor, Fringe Benefits, and General Overhead Reduced for PECE Charges (the statement) of CAROLLO ENGINEERS, INC. (the Company), for the year ended December 31, 2012, and the related notes to the financial statement.

Management's Responsibility for the Financial Statement

Management is responsible for the preparation and fair presentation of this financial statement in accordance with accounting practices prescribed by Part 31 of the Federal Acquisition Regulation and is not intended to be a presentation in conformity with accounting principles generally accepted in the United States of America. Management is responsible for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of the financial statement that is free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on this financial statement based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statement is free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statement. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statement, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statement in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statement.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statement referred to above presents fairly, in all material respects, the direct labor, fringe benefits, and general overhead of the Company for the year ended December 31, 2012, on the basis of accounting described in Note 1.

BDO USA, LLP

April 30, 2013

CAROLLO ENGINEERS, INC.
Statement of Direct Labor, Fringe Benefits, and General Overhead
Reduced for PECE Charges
For the Year Ended December 31, 2012

<u>Description</u>	<u>Unadjusted Costs</u>	<u>Unallowable Costs</u>	<u>Notes</u>	<u>Allowable Costs</u>
Direct Labor	\$ 30,488,751			\$ 30,488,751
Indirect labor and benefits	37,438,470	(507,272)	a,b	36,931,198
Travel	4,632,055	(2,463,089)	c,d,e,f,g,h,i	2,168,966
Professional fees, dues and subscriptions	3,659,224	(1,290,336)	c,d,f,j,k,l,m,n	2,368,888
Automobile	222,097	(141,350)	d,i	80,747
Insurance	1,365,214			1,365,214
Rent	6,650,246			6,650,246
Repairs and maintenance	1,292,253	(171,676)	d	1,120,577
Supplies, postage and reproduction	1,246,254	(327,950)	d,e,n,p	918,304
Depreciation	1,292,779	34,371	r	1,327,150
Telephone and communications	506,330	(63,058)	d	443,272
Other	1,615,734	(1,305,897)	d,e,h,j,q,o	309,837
Fringe Benefits and General Overhead Total	\$ 59,920,656	\$ (6,236,257)		\$ 53,684,399

OVERHEAD RATE 176.08%
FACILITIES CAPITAL COST OF MONEY RATE 0.51%

Footnotes

- a Unallowable compensation for personal services per FAR 31.205-6.
- b Unallowable employer payroll taxes related to unallowable indirect labor.
- c Unallowable personal expenses of officers, owners or employees.
- d Unallowable costs due to lack of supporting documentation per FAR 31.201-2(d).
- e Unallowable direct costs per FAR 31.202.
- f Unallowable public relations and advertising costs per FAR 31.205-1.
- g Unallowable entertainment costs per FAR 31.205-14.
- h Unallowable fines, penalties, and mischarging costs per FAR 31.205-15.
- i Unallowable travel costs per FAR 31.205-46.
- j Unallowable contributions or donations per FAR 31.205-8.
- k Unallowable lobbying and political activity costs per FAR 31.205-22.
- l Unallowable patent costs per FAR 31.205-30.
- m Unallowable professional and consultant service costs per FAR 31.205-33.
- n Unallowable training and education costs per FAR 31.205-44.
- o Unallowable bad debts per FAR 31.205-3.
- p Unallowable employee morale, health, welfare costs and credits per FAR 31.205-13.
- q Unallowable interest and other financial costs per FAR 31.205-20.
- r Adjustment for inclusion of depreciation expense related to fixed assets that should have been capitalized.

See accompanying notes.

CAROLLO ENGINEERS, INC.
Notes to Statement of Direct Labor, Fringe Benefits,
and General Overhead Reduced for PECE Charges
For the Year Ended December 31, 2012

1. Nature of Business and Significant Accounting Policies

Nature of Operations

Carollo Engineers, Inc. (the Company) was established in 1933 and provides a full range of planning, design and construction management services to meet the water and wastewater needs of municipalities, public agencies and industrial clients. Services are provided from 26 offices and several project offices throughout the United States.

Basis of Accounting

The statement was prepared on the basis of accounting practices prescribed in Federal Acquisition Regulation Title 48 CFR, Chapter 1, Subchapter E, Part 31 (Contract Cost Principles and Procedures) and other applicable Federal regulations. Accordingly, the statement is not intended to present the results of operations of the Company in conformity with accounting principles generally accepted in the United States of America.

The Company maintains its accounting records on the accrual basis method of accounting for financial reporting and the cash basis method for income tax purposes. The accompanying statement has been prepared on the accrual basis.

The statement includes the Company's expenses only and does not include any expenses of Carollo's subsidiaries or joint ventures.

Job Cost Accounting System

The Company maintains and utilizes a job cost accounting system that accounts for all direct costs (direct labor and other costs that can be identified specifically with a project or final cost objective), on a consistent basis. The Company also maintains a general ledger in which direct and indirect costs are separated and accumulated which allows for the periodic reconciliation of the job costs to the general ledger.

The applicable overhead expenses have been reduced by a Project Equipment and Communication Expense (PECE) charge of \$9.90 per direct labor hour. The PECE charge to direct costs is offset by an equal credit to overhead expense.

Distribution of Direct Labor Costs

The Company distributes labor costs to direct projects for all employee classifications based on actual time incurred. The premium portion of overtime costs is allocated to the overhead pool.

CAROLLO ENGINEERS, INC.
Notes to Statement of Direct Labor, Fringe Benefits,
and General Overhead Reduced for PECE Charges
For the Year Ended December 31, 2012

1. Nature of Business and Significant Accounting Policies (Continued)

Direct Costs

The Company's method of estimating costs for pricing purposes during the proposal process is consistent with the accumulation and reporting of costs under its job cost system. The statement excludes the following classifications of costs which were related to projects:

- Subconsultants - The source of the direct charge is the vendor invoice received by the Company.
- Travel and subsistence - The source of the direct charge is employee submitted receipts and mileage logs.
- Reproduction - The source of the direct charge is vendor invoices received by the Company.
- Other direct expenses - The source of the direct charge is vendor invoice or employee submitted receipts.

2. Labor Related Costs

Highly Compensated Employees/Officers

The cost principles used in the evaluation of the Company's compensation for FAR overhead rate purposes are the allowability and reasonableness criteria contained in FAR 31.201-3, Determining Reasonableness, and FAR 31.205-6, Compensation for Personal Services. In determining the reasonableness of total compensation, the factors that are important to consider include conformity with compensation practices of other firms:

- i. of the same size;
- ii. in the same industry; and,
- iii. in the same geographic area.

Bonuses and incentive compensation are allowable provided the:

- i. awards are paid or accrued under an agreement entered into in good faith between the contractor and the employees before the services are rendered or pursuant to an established plan or policy followed by the contractor so consistently as to imply, in effect, an agreement to make such payment, and
- ii. basis for the award is supported.

The Company performed an analysis of executive compensation using the National Compensation Matrix. For the year ended December 31, 2012, the Company paid compensation in excess of amounts deemed allowable and reasonable for FAR overhead rate purposes in the amount of \$105,467, which was adjusted to the financial statement. The related unallowable employer payroll taxes in the amount of \$1,529 have also been adjusted to the financial statement.

CAROLLO ENGINEERS, INC.
Notes to Statement of Direct Labor, Fringe Benefits,
and General Overhead Reduced for PECE Charges
For the Year Ended December 31, 2012

No compensation claimed for any Senior Executive exceeded the Benchmark Compensation Amount as determined by the Office of Federal Procurement Policy, Section 808(b) of Public Law 105-85.

2. Labor Related Costs (Continued)

Expressly Unallowable Compensation

For the year ended December 31, 2012, the Company paid compensation related to unallowable activities in the amount of \$347,722, which was adjusted to the financial statement. The related unallowable employer payroll taxes in the amount of \$5,042 have also been adjusted to the financial statement.

Paid Overtime

Non-exempt employees are eligible for overtime at the rate of one and one-half times their hourly rate for hours worked in excess of 40 hours in one workweek or 8 hours in one workday. A non-exempt employee is compensated at the rate of two times their hourly rate for hours worked in excess of 12 hours in one workday. The straight time portion of overtime is recorded as direct or indirect based on what the employee was doing when working overtime. The premium portion of overtime is allocated to the overhead pool.

Uncompensated Overtime

Exempt employees are exempt from overtime. The Company allows salaried employees to accumulate compensatory time (comp time). Hours worked in excess of the regular hours in a pay period will be accrued as compensatory time on an hour-for-hour basis. In the first quarter of each calendar year, the Company pays out comp time hours in excess of 40 hours based upon the December 31 balance of the previous year. The remaining 40 hours, or such lesser number of hours, is carried over in a comp time account to use in the next year according to this policy.

Paid Time Off

The Company has a paid time off (PTO) policy that can be used for vacation, sick leave or personal leave. Each pay period, employees accrue PTO hours which are available the following pay period to use. The amount of PTO is accrued each pay period at various rates depending on the length of service of each employee. Employees may carry over a maximum of 160 hours of unused PTO into the next year. Any remaining unused PTO not eligible for carryover is paid to employees during the first quarter of the following year. If an employee is terminated, paid time off accrued and earned through the last day of work is paid.

3. Retirement Plan

The Company maintains a retirement plan under Internal Revenue Code Section 401(k). Voluntary contributions to the plan by employees are permissible but limited based on compensation. No discretionary contributions to the plan were made in 2012. The Company

CAROLLO ENGINEERS, INC.
Notes to Statement of Direct Labor, Fringe Benefits,
and General Overhead Reduced for PECE Charges
For the Year Ended December 31, 2012

makes matching contributions for employees up to certain limitations. Matching contributions amounted to \$1,752,400 for the year ended December 31, 2012.

4. Depreciation

Property and equipment are carried at cost. Depreciation is computed principally on the straight-line method over the estimated useful life ranging from five to twelve years except for leasehold improvements, which are depreciated over the lesser of the life of the lease or the economic life of the improvements. When assets are retired or otherwise disposed of, the costs and related accumulated depreciation are removed from the accounts, and any resulting gain or loss is recognized in income for the period. The cost of maintenance and repairs is charged to income as incurred. Significant renewals and betterments are capitalized. Deduction is made for retirements resulting from renewals or betterments.

5. Leases

The Company has leased office spaces and one storage space under various non-cancellable agreements with unrelated parties which expire between January 31, 2012, and December 31, 2020, and which require various minimum annual rentals. Lease expense for these agreements is being amortized on a straight-line basis. The leases also require the payment of property taxes, normal maintenance, and insurance on the properties and additional rentals based on the percentage of total rentable area.

6. Facilities Capital Cost of Money

The Facilities Capital Cost of Money rate has been calculated in accordance with FAR 31.205-10, using average net book values of property and equipment multiplied by the average treasury rate for the applicable period. Property and equipment consists of furniture and equipment, engineering equipment, automotive equipment, leasehold improvements, computer equipment, software, and office equipment. The calculation was made as follows:

Average Net Book Value of Property and Equipment	\$ 8,323,932
Treasury Rate	1.8750%
Computed Facilities Capital	\$ 156,074
Direct Labor Base	\$ 30,488,751
Cost-of-Money Rate	0.51%

7. Field Office Rate

The Company does not utilize a field office overhead rate, as all direct and indirect costs relate to home office operations. Therefore, all direct and indirect costs are allocated to the single home office overhead rate calculated in the statement.

CAROLLO ENGINEERS, INC.
Notes to Statement of Direct Labor, Fringe Benefits,
and General Overhead Reduced for PECE Charges
For the Year Ended December 31, 2012

8. Management Evaluation of Subsequent Events

The Company has evaluated subsequent events through April 30, 2013, the date on which the Statement of Direct Labor, Fringe Benefits, and General Overhead was available to be issued.

Financial Grant Management Capabilities Form

NOTE: It is important that this form be completed by financial staff familiar with the Foundation's current proposal guidelines and subaward requirements.

SECTION A: PURPOSE

Since the Water Research Foundation's financial and business responsibilities include the proper discharge of the Public Trust, this form is used to provide a basis for the evaluation of the capability of your organization's systems, policies and procedures to meet the criteria outlined in the Foundation's Project Funding Agreement.

SECTION B: GENERAL INFORMATION

Please fill every blank and answer every question.

Legal Name of Your Organization:

Carollo Engineers, Inc.

(as it appears on your IRS Form W-9 and as it will appear on The Foundation's Project Funding Agreement)

Address: 2700 Ygnacio Valley Road, Suite 300

City, State: Walnut Creek, CA

Zip+4: 94598

Congressional District: California's 10th

Dun & Brad#: 045809316

EIN: 86-0899222

Primary Location of Performance (Where Research Will Be Conducted):

Tanja Rauch-Williams, Ph.D., P.E.

(name associated with the following address)

Address: 390 Interlocken Crescent, Suite 800 390 Interlocken Crescent, Suite 800

City, State: Broomfield, CO

Zip+4: 80021

Congressional District: 2

1. Number of employees in your organization:

Full Time 550 Part Time 100

2. Has your organization received funding directly from The Foundation within the last two years? Yes No

3. Organization type: Non-Profit Government College/University
 For Profit (Commercial) Other (identify)

Financial Grant Management Capabilities Form

SECTION C: BUSINESS MANAGEMENT SYSTEMS

1. Under which U.S. Federal administrative requirements does your organization operate?

We do not specifically operate under OMB Circular A-110.

2. Has your organization ever been audited under OMB Circular A-133, Single or Program Specific Audit? Yes No

If Yes: Latest FYE audit: (e.g. 06/30/2012)
Name, phone and email address of person who can provide a copy of the Single Audit or URL from which the Foundation can download the Single Audit:

N/A

3. Is your organization likely to spend between \$500,000 and \$1,000,000 in U.S. Federal Assistance in its current fiscal year Yes No, or more than \$1,000,000 Yes No ?

4. Does your organization have written Policies and Procedures to cover the following business management areas?

Personnel Policies and Procedures Yes No

Procurement Policies and Procedures Yes No

Property Policies and Procedures Yes No

Travel Policies and Procedures Yes No

5. Are time and activity distribution records (e.g. time sheets or effort reports) maintained for each employee, by project, to account for his or her total hours? Yes No
6. Are third party in-kind or matching funds supported with documentation? Yes No
7. Does your organization have a written budgetary process and controls to preclude incurring obligations in excess of the grant amount of individual cost categories? Yes No
8. Are purchase approval methods documented and communicated to your employees? Yes No
9. Are duties separated to ensure one individual (i.e., project or financial) is not controlling all aspects of a transaction/process? Yes No

SECTION D: ACCOUNTING SYSTEM & FUNDS MANAGEMENT

1. Does your accounting system account for cost by individual projects? Yes No
2. Which of the following best describes your organization's accounting system?
 Manual Automated Combination

Financial Grant Management Capabilities Form

3. Under which U.S. Federal cost principles does your organization operate?

We do not specifically operate under OMB Circular A-110.

4. How frequently do you post to the general ledger?

Daily Weekly Monthly

5. Does your accounting system accurately and completely track receipt and disbursement of funds by each award and/or funding source? Yes No

6. Are F&A or indirect costs accumulated into cost pools for allocation to projects, contracts and awards? Yes No

7. Are the following books of account maintained?

General Ledger Yes No

Cash Receipts Journal Yes No

Payroll Journal Yes No

Income (Sales) Journal Yes No

Purchase Journal Yes No

General Journal Yes No

8. Does your accounting system provide for the recording of actual expenditures for each award/contract by project and budget cost categories that are reflected in an approved budget? Yes No

9. List the type of documentation you can provide to support recovery of indirect costs.

Each year we have the following audits performed by independent auditors:

Consolidated financial statements prepared in conformity with accounting principles generally accepted in the United States of America audited in accordance with auditing standards generally accepted in the United States of America.

Overhead rate calculated in conformity with Federal Acquisition Regulation Title 48 CFR, Chapter 1, Part 31 and other applicable Federal regulations audited in accordance with auditing standards generally accepted in the United States of America.

10. Are your financial staff and PI familiar with the requirements and procedures for determination of allowable costs in connection with U.S. Federal financial assistance?

Yes No

11. In the preceding fiscal year, did your organization receive 80 percent or more of your annual gross revenues from U.S. Federal procurement contracts (and subcontracts) and

Financial Grant Management Capabilities Form

Federal financial assistance (and subawards) subject to the Transparency Act, as defined at 2 CFR 170.320? Yes No

12. Does the public have access to information about the compensation of executives in your business or organization (the organization represented by the DUNS number on page 1) through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o (d)) or section 6104 of the Internal Revenue Code of 1986? Yes No

13. Who in your organization has a working knowledge of the OMB Circulars for Administrative Requirements, Cost Principles and Audit Requirements?

Title:
Name:
Email:
Phone:

14. Who is responsible for confirming that your organization's PI is aware of the U.S. Federal Administrative Requirements and Cost Principles for projects proposed and invoiced to The Foundation?

Title:
Name:
Email:
Phone:

15. Who should the Foundation contact regarding this form?

Title:
Name:
Email:
Phone:

Prepared by (Signature):

(click inside the text box above and insert a picture of your signature)

Date:

Printed name and title:

Email:

Phone:

CERTIFICATIONS AND ASSURANCES

Certification Regarding Lobbying

Certification for Contracts, Grants, Loans, and Cooperative Agreements

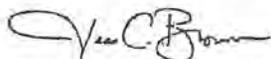
The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Jess Brown, Ph.D., P.E. - Vice President

Type Name and Title of Authorized Representative Above



Signature of Authorized Representative

(click inside the text box above and insert a picture of your signature)

6/1/13

Date

I am unable to certify to the above statements. My explanation is: N/A

Disclosure of Lobbying Activities

Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352

1. Type of Federal Action:

contract

grant

cooperative agreement

loan

loan guarantee

loan insurance

2. Status of Federal Action:

bid/offer/application

initial award

post-award

3. Report Type:

initial filing

material change

For Material Change Only:

year quarter

date of last report

4. Name and Address of Reporting Entity:

Prime

Subawardee

Tier , if known:

Congressional District, if known:

6. Federal Department/Agency:

8. Federal Action Number, if known:

10.a. Name and Address of Lobbying Entity
(if individual, last name, first name, MI):

5. If Reporting Entity in No. 4 is Subawardee,
Enter Name and Address of Prime:

Congressional District, if known:

7. Federal Program Name/Description

CFDA Number, if applicable:

9. Award Amount, if known:

10.b. Individuals Performing Service (including
address if different from 10a [last name,
first name, MI]):

(attach Continuation Sheet(s) if necessary)

11. Amount of Payment (check all that apply):
\$ actual planned

12. Form of Payment (check all that apply):
 cash
 in kind; specify: nature
value

13. Type of Payment (check all that apply):
 retainer
 one-time fee
 commission
 contingent fee
 deferred
 other, specify:

14. Brief Description of Services Performed or to be Performed and Date (s) of Services, including officer (s), employee(s), or Member(s) contacted, for Payment Indicated in Item 11:

(attach Continuation Sheet(s) if necessary)

15. Continuation Sheet(s) attached: yes no

16. Information required through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when this transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. section 1352. This information will be reported to the Congress semiannually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Signature:
(click inside the text box above and insert a picture of your signature)

Print Name:

Title:

Telephone No.: Date:

Federal Use Only:

Authorized for Local Reproduction
Standard Form - LLL

Instructions for Completion of SF-LLL, Disclosure of Lobbying Activities

This disclosure form shall be completed by the reporting entity, whether subawardee or prime Federal recipient, at the initiation or receipt of a covered Federal action, or a material change to a previous filing, pursuant to title 31 U.S.C. section 1352. The filing of a form is required for each payment or agreement to make payment to any lobbying entity for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a covered Federal action. Use the SF-LLL-A Continuation Sheet for additional information if the space on the form is inadequate. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered Federal action for which lobbying activity is and/or has been secured to influence the outcome of a covered Federal action.
2. Identify the status of the covered Federal action.
3. Identify the appropriate classification of this report. If this is a follow-up report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last previously submitted report by this reporting entity for this covered Federal action.
4. Enter the full name, address, city, state and zip code of the reporting entity. Include Congressional District, if known. Check the appropriate classification of the reporting entity that designates if it is, or expects to be, a prime or subaward recipient. Identify the tier of the subawardee, e.g., the first subawardee of the prime is the 1st tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.
5. If the organization filing the report in item 4 checks "Subawardee", then enter the full name, address, city, state and zip code of the prime Federal recipient. Include Congressional District, if known.
6. Enter the name of the Federal agency making the award or loan commitment. Include at least one organizational level below agency name, if known. For example, Department of Transportation, United States Coast Guard.
7. Enter the Federal program name or description for the covered Federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans, and loan commitments.
8. Enter the most appropriate Federal identifying number available for the Federal action identified in item 1 (e.g., Request for Proposal (RFP) number; Invitation for Bid (IFB) number; grant announcement number; the contract, grant, or loan award number; the application/proposal control number assigned by the Federal agency). Include prefixes, e.g., "RFP-DE-90-001".
9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitment for the prime entity identified in item 4 or 5.
10. (a) Enter the full name, address, city, state and zip code of the lobbying entity engaged by the reporting entity identified in item 4 to influence the covered Federal action.

-
- (b) Enter the full names of the individual(s) performing services, and include full address if different from 10 (a). Enter Last Name, First Name, and Middle Initial (MI).
11. Enter the amount of compensation paid or reasonably expected to be paid by the reporting entity (item 4) to the lobbying entity (item 10). Indicate whether the payment has been made (actual) or will be made (planned). Check all boxes that apply. If this is a material change report, enter the cumulative amount of payment made or planned to be made.
 12. Check the appropriate box(es). Check all boxes that apply. If payment is made through an in-kind contribution, specify the nature and value of the in-kind payment.
 13. Check the appropriate box(es). Check all boxes that apply. If other, specify nature.
 14. Provide a specific and detailed description of the services that the lobbyist has performed, or will be expected to perform, and the date(s) of any services rendered. Include all preparatory and related activity, not just time spent in actual contact with Federal officials. Identify the Federal official(s) or employee(s) contacted or the officer(s), employee(s), or Member(s) of Congress that were contacted.
 15. Check whether or not a SF-LLL-A Continuation Sheet(s) is attached.
 16. The certifying official shall sign and date the form, print his/her name, title, and telephone number.

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0046), Washington, D.C. 20503.

Assurances and Certifications Non-Construction Programs

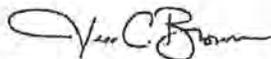
NOTE: Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.
2. Will give the Foundation, the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.
3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.
4. Will initiate and complete the work within the applicable time frame after receipt of approval of The Foundation.
5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).
6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee-3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and (j) the requirements of any other nondiscrimination statute(s) which may apply to the application
7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases
8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.
9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally-assisted construction sub-agreements.
10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is \$10,000 or more.
11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood

hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176c of the Clean Air Act of 1955, as amended (42 U.S.C. §§7401 et seq.) (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).

12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components of potential components of the national wild and scenic rivers system.
13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).
14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.
15. Pursuant to 40 CFR 30.18, will comply, as applicable, with P.L. 101-391, the Hotel-Motel Fire Safety Act. The recipient will agree to ensure that all space for conferences, meetings, conventions, or training seminars funded in whole or in part with federal funds complies with the protection and control guidelines of the Hotel and Motel Fire Safety Act. Recipients may search the Hotel-Motel National Master List at <http://apps.usfa.fema.gov/hotel/> to see if a property is in compliance.
16. Will certify that you as the recipient, your employees, subrecipients under this award, and subrecipients' employees will not engage in severe forms of trafficking in persons during the period of time that the award is in effect; procure a commercial sex act during the period of time that the award is in effect; or use forced labor in the performance of the award or subawards under the award.
17. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. §§2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching or other activities supported by this award of assistance.
18. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.
19. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1966 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."
20. Will make a full disclosure in writing to The Foundation, any corporation, partnership, sole proprietorship, or other business entity of any kind which is a wholly or partially own entity of the applicant or whose relatives supply goods or services to applicant or work for or provide services to applicant.
21. Will certify that no entity, agency, or person associated with the applicant is debarred or suspended or is otherwise excluded from or ineligible for participation in federal assistance programs under Executive Order 12549, "Debarment and Suspension".
22. Will certify that it is registered and licensed to do business in the State it resides. The applicant and its employees and all sub-recipients shall be licensed pursuant to all applicable federal, state, and local laws, ordinances, rules, and regulations and shall upon request provide proof of all licenses.
23. The authorized official signing for the applicant certifies that the statements herein are true, complete, and accurate to the best of his or her knowledge, and that he or she is aware that any false, fictitious, or fraudulent statements or claims may subject him or her to criminal, civil, or administrative penalties. The undersigned agrees the applicant organization will comply with all terms and conditions of the Grant Agreement.
24. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.



Signature of Authorized Certifying Official

Title Vice-President

(click inside the text box above and insert a picture of your signature)

Carollo Engineers, Inc.
Applicant Organization

6/1/13
Date Submitted

Request for Taxpayer Identification Number and Certification

Give Form to the requester. Do not send to the IRS.

Print or type See Specific Instructions on page 2.	Name (as shown on your income tax return) Carollo Engineers, Inc.	
	Business name/disregarded entity name, if different from above	
	Check appropriate box for federal tax classification: <input type="checkbox"/> Individual/sole proprietor <input type="checkbox"/> C Corporation <input checked="" type="checkbox"/> S Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Trust/estate <input type="checkbox"/> Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ▶ _____ <input type="checkbox"/> Exempt payee <input type="checkbox"/> Other (see instructions) ▶ _____	
	Address (number, street, and apt. or suite no.) 2700 Ygnacio Valley Rd, Suite 300	Requester's name and address (optional)
City, state, and ZIP code Walnut Creek, CA 94598		
List account number(s) here (optional)		

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on the "Name" line to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Social security number	
[] [] [] - [] [] - [] [] [] []	
Employer identification number	
8 6 - 0 8 9 9 2 2 2	

Part II Certification

Under penalties of perjury, I certify that:

- The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
- I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
- I am a U.S. citizen or other U.S. person (defined below).

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 4.

Sign Here	Signature of U.S. person ▶	Date ▶ 5-22-13
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General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Purpose of Form

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

- Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
- Certify that you are not subject to backup withholding, or
- Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States,
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax on any foreign partners' share of income from such business. Further, in certain cases where a Form W-9 has not been received, a partnership is required to presume that a partner is a foreign person, and pay the withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid withholding on your share of partnership income.

COMMUNICATION PLAN

Key elements of our communication plan are the three state-of-the-art summary reports with executive summaries that we incorporated into the project plan for each of the three phases. Each of our three workshops will include a review of literature and interviews with key stakeholders (i.e., NGOs, water agencies, chemical industry, and others). The data gathered will be consolidated into summary documents distributed before each workshop and delivered as oral presentations during the workshops. A critical product of each workshop will be a consensus document, signed by each of the diverse stakeholders. This transformative consensus document will be incorporated into each summary report. These reports will include PAC and WaterRF review and comments addressed before distribution. Each summary report also will be edited and prepared for submission to peer-reviewed journals for publication. The external peer-reviewed publication of these consensus documents is absolutely critical if they are to be used in policy discussions by the USEPA and other regulatory bodies.

At a minimum, our team will prepare and deliver a webcast at the conclusion of the project. We are also amenable to periodic webcasts in the interim phases of the project, if deemed beneficial by the PAC and WaterRF. Each member of our team has had previously prepared and delivered webcasts for various sectors of the water industry, in which we have demonstrated our knowledge and experience to prepare professional and highly impactful webcasts.

Our last workshop towards the end of Task 3 will be scheduled to coincide with a major national conference to reach a broad group of industry representatives and WaterRF subscribers in person. Our project schedule and project management plan provides further details on the intermittent and final project deliverables, as well as the project communication among our team members and with the PAC and the WaterRF.

**PAC Questions/Comments on Proposal #04494-2 Submitted by Carollo Engineers
Evaluation of Current and Alternative Strategies for Managing CECs in Water**

1. Project team and stakeholder participants:

1a. The project team is large and includes many co-PIs with lower level commitments to the project. Please provide more information about leadership and management plans for the project.

Team Response:

There are four PIs, which is not uncommon for Water Research Foundation Projects. Our Org chart for this project is detailed and lists under each task the involvement of our four PIs and other support staff. This involvement was carefully considered to assure the following objectives for project management:

- Consistency between the different phases of the project
- Continuity and integration of decisions made in earlier phases into later tasks of the project
- A balanced representation of expertise and perspectives in each task and work phase.

The first PI listed under each task assumes leadership of this specific task. Responsibilities of these task specific leaders involve coordinating the task support team members, assuring that the task stays aligned with the overall project goals, budget and schedule, as well as reporting. While the project PI Dr. T. Rauch-Williams assumes responsibility for coordinating all project related tasks, this management approach does not attribute a lower level of commitment to the project Co-PI's (Dr. S. Snyder, Dr. J. Drewes, and Dr. E. Dickenson) as also reflected by the team's budget allocation. Our core project team of PI's has closely worked together in previous CEC related research projects and feels comfortable that the proposed team structure will also be beneficial and successful in this project. If the PAC continues to be concerned about the management structure of our team, we are happy to discuss this specific feedback during our initial kick-off meeting. Please also do not hesitate to bring up any concerns during the project if you perceive that the objectives of this project would be better met with a different management structure.

It should also be noted that the levels of commitment based on budgets do not accurately represent the actual amounts of time that will be spent on this project. For instance, Profs. Shane Snyder and Jörg Drewes are tenured full-professors at The University of Arizona and Technische Universität München, respectively, and their salaries are guaranteed by the university. Thus, showing a large amount of their time on the project would simply inflate the budget without any appreciable gain to the project. Thus, Profs. Snyder and Drewes are committed to spend far greater time on the project than is budgeted. While both Universities are unable to provide an in-kind value for this time, both are personally willing to write a letter promising their own personal time to the project if the PAC would like to see a greater commitment in writing.

1b. The project team does not include a U.S. regulatory representative or direct regulatory involvement beyond planned workshop invitations, and this involvement is critical to getting buy-in into the project framework and outcome. Is it possible to augment the team with this expertise, or are there other means by which the team plans to involve U.S. regulators? We might also want to consider including representatives from the regulated community (e.g., chemical industry). Some are suggested as participants for Workshop #2. Allowing all

stakeholders an opportunity to comment on various work products might be a way to get more formal stakeholder input/feedback, but it could further complicate project scheduling, etc. Thoughts?

Team Response:

The team includes Thomas Carpenter from the US EPA. Tom is a lead EPA expert on the CCL process and has been intimately involved in rule-making activities for the SDWA. Tom's commitment letter was received by the team the day after the proposal was due, but a copy is included in the Appendix of this document. Regulatory involvement was also guaranteed from the following regulatory state agencies: California Department of Public Health, New York City Environmental Protection, and Arizona Department of Environmental Quality. If the PAC has specific other regulators in mind that would be beneficial to involve in this project, please pass those names on to us and we will make this connection.

Our team also includes a large representation from the chemical industry (see the support letter from the Inter-Industry Network on Microconstituents in Water by Barbara Losey). Again, please pass on any additional contacts from the regulated community that you see should be involved in this effort for our consideration.

The workshops play a significant role in this project to vet specific CEC management approaches through a collaborative exchange and discussion with selected stakeholders. The participants for the four suggested workshops listed in the proposal represent a first proposed selection by our team that was based on a) our goal to cover relevant and diverse perspectives and b) the commitment we received in time for the proposal submission.

Our team encourages specific feedback by the PAC and WRF on the list of proposed invitees and envisions that the lists for each workshop can be changed and finalized after more discussion in our PAC conference calls.

We will provide all interested stakeholders in this project the opportunity to review and provide feedback on key intermediate draft and final deliverables, whether they participated in specific workshops or not. This will involve the State-of-the-Art reports, Whitepapers, and Review reports.

1c. Carollo has convened a strong project team of environmental and human toxicological experts. While these types of experts are important for assessing risk, are they the experts needed for monetizing costs and benefits of management strategies? See correlating questions below. Who on the team is primarily responsible for the TBL analyses, and who on the team will participate in those analyses?

Team Response:

The monetization of risks and benefits will not be conducted by our environmental and human toxicological experts. However, the analysis provided by these experts leading up to Phase 3 of the project will form the critical basis for defining the specific TBL framework that will be used in this project. Our team considers their continued involvement in Phase 3 as very critical to gaining relevant and defensible results from the TBL analysis and monetization efforts.

The TBL framework analysis and monetization of risk and benefits will be conducted by experts within Carollo Engineers under the lead of Pierce Rossum and under close involvement of the following team members:

Lydia Holmes will support the development of the BTL framework for the specific scenarios selected for analysis in Phase 3. Sarah Deslauriers will be responsible for supporting the BTL analysis by applying decision support tools selected to support the TBL framework for each selected scenario (such as GHG emission analysis, life cycle assessments, ecological footprint, and toxicological endpoint assessments). Sarah's resume reflects her extensive experience in providing these services for other projects and research efforts (see proposal).

Pierce will be responsible for conducting the monetization of risks and benefits for the various selected CEC management strategies based on the selected framework. Pierce is a specialist in municipal engineering finance and leads Carollo's Financial and Economic Services. His resume reflect Pierce's extensive experience in conducting cost/benefit analyses, economic /feasibility studies, life cycle cost analysis, and economic impact analyses (see proposal).

Sarah and Pierce will be supported as needed by Elisa Garvey, Erin Mackey, Tanja Rauch-Williams, and Andrew Salvesson from Carollo Engineers in estimating costs associated with upgrading drinking water, wastewater, stormwater or reuse systems for CEC treatment and removal.

1d. The list of stakeholder (Table 3.2) participants does not provide for any stakeholders with a strong emphasis in large scale watershed management (e.g., New York City DEP). Particularly an issue since part of the holistic control strategies have to address non-point source (and for some CECs, such as the triazine pesticides, air deposition) management strategies. Maybe MWDSOC can provide that perspective, but perhaps there should be specific stakeholders that represent watershed managers and not just water utility managers. Is the team open to adding other stakeholder representatives?

Team Response

The Southern Nevada Water Authority's "watershed" Manager (Co-PI in this project) will participate in Workshop #1b as a stakeholder representing a large-scale watershed. Furthermore, we have specifically solicited the support from the New York City DEP (see support letter from Steven Schindler, Director of Water Quality) to represent a watershed in the North East of the US.

Beyond our currently confirmed team, we stay open to discussing the addition of other stakeholders with the PAC. Specific suggestions can be discussed as part of future conference calls between the PAC and our team.

1e. The list of participants for the workshops should align more with the desired outcome of the workshop. For example, Steve Schindler (who is not a state regulator, city regulator, or risk assessor), might be appropriate for assessing management strategies, but not risk. Andrew Eaton is a great chemist with great analytical skills, but is his expertise adequate for assessing holistic strategies, etc.? On a related note, two of the European representatives are proposed for both the Munich and the Henderson workshops (Stoks, and van Gunten). It might be better to add more North American representatives such as Karen Kidd or another Canadian representative than to repeat European representatives.

Team Response:

Good points. We appreciate this detailed feedback and will consider these comments when discussing the value of each proposed participant for the goals of the workshops with our PAC during future conference calls. Due to current budget allocations, it would be difficult to include additional participants for Workshops that are not able to provide their own travel costs for attending the

workshops. It has been our team's experience, however, that for most institutions that we have contacted so far, this request did not pose an issue for this project.

The inclusion of a few selected European participants from Workshop 1a in Workshop 1b to be held in the US was by design. Stoks and von Gunten represent two different CEC management approaches and implementation strategies that are primarily based on ecological risk, and that are going far beyond what is currently being discussed in the USA and Canada. We believe it would be beneficial for the North American audience to hear those perspectives first hand from these two representatives. However, our team members can probably also relate these philosophies without bringing them to the US if the sentiment prevails that this is unnecessary.

At this time, we would like to suggest revisiting the proposed attendees in our first kick off conference call with the PAC. Workshop 1a has been tentatively scheduled for the first Quarter 2014. Early agreement between our team, WRF, and our PAC members on who to involve will be helpful in assuring availability of relevant participants.

2. Project approach: Key discussion questions regarding the scope and certain tasks are below.

2a. Workshops are only valuable exercises if their objectives are clear and they are well facilitated. Who will be facilitating the workshops? Please provide a facilitation plan for the workshops.

Team Response:

Thank you for raising clarification on this important issue. We agree that facilitation is critical to make the workshops we are proposing effective and productive. We believe that the workshops are best facilitated by a person who is

- knowledgeable of the topic being discussed and familiar with regional specifics,
- familiar with the overall goals of this project,
- not a relevant expert actively participating in the workshop discussion
- holds an impartial position towards the diverse perspectives represented by various stakeholders in the meetings.

We therefore propose the following facilitators for the four workshops:

Workshop 1a: European / Australian Perspective – CEC Management Strategies
Facilitator – Dr. J. E. Drewes

Workshop 1b: North American Perspective – CEC Management Strategies
Facilitator: Dr. Shane Snyder

Workshop 2: CEC Risk and Need for Action
Facilitator: Dr. Tanja Rauch-Williams

Workshop 3: TBL and Cost/Benefit Analysis
Facilitator: Dr. Tanja Rauch-Williams

Our team will provide a consistent format for all four workshops. All PIs will be present at all workshops and able to respond to possible issues and questions right away that may arise during the meetings.

In preparation of the workshops, our project team will develop meeting agendas with timelines that will be distributed to all participants in a timely manner. Introductory presentations that are clearly stating the goals and objectives of each specific meeting will be given at each meeting. The workshop facilitators will be responsible for keeping the discussions focused on the goals and in timeline with the agenda. These materials will be prepared with sufficient lead-time to solicit feedback from the WRF and our PAC members.

2b. The proposed scope gets somewhat vague and difficult to understand starting with Task 5, and clarification is requested. A few examples follow. Task 5 seems to be straight forward as a screening level risk assessment comparing detected concentrations against some reasonably conservative thresholds for assessing human or ecological health risk. Therefore, it is unclear what purpose Workshop #2 (Table 3.4) serves, and what the work product will be.

Team Response

The PAC is correct in its understanding of what Task 5 will entail and our team has relevant experience from previous studies to develop and substantiate risk-screening approaches. It has also been the experience of our PIs that the selection of specific CECs and definition of threshold concentrations for assessing human or ecological health risks remains highly controversial among certain stakeholders. In particular, when assessing risks in relation to human health, the consensus among stakeholders frequently is poor. We are therefore proposing to seek a direct exchange in Workshop 2 (Task 6) among stakeholders on the risk of CECs for human health and the environment. We believe that this exchange (and the consensus document/ White Paper resulting from it) will help to develop a broader consensus on the risk from CECs and the need for action among stakeholders that will ultimately also help the acceptance of this study's final recommendations.

As is stated in the first sentence of Task 6, "the selection of suitable CECs is characterized by a high degree of uncertainty." It is unclear whether this phrase refers to the uncertainty of characterizing risk, or the uncertainty of selecting suitable CECs. Will the project team please elaborate?

Team Response:

This sentence was meant to express that it is difficult to select specific CECs that are broadly accepted by various stakeholder groups for representing potential adverse ecological and human health impacts. It is also challenging to reach consensus among critical stakeholders on the level of risk posed by CECs, specifically for human health.

The text goes on that "Any dialogue to derive appropriate monitoring strategies to assess the health relevance must therefore considera broad spectrum of opinions." It is unclear how/why monitoring strategies inform health relevance since it is the toxicological assessment and dose response assessment that are the primary sources of uncertainty, not the monitoring strategies. Certainly there are multiple opinions about assessing risk and uncertainty, but that is not something that can be determined by consensus or with the workshop participants proposed. In any event, the purpose of the Workshop #2 is unclear and should be clarified as to scope and objective and deliverables. Will the project team please elaborate?

Team response:

Our team considers Workshop 2 as one of the most important workshops in this project. Building upon the experience from others and our Co-PIs Dr. S. Snyder and Dr. J. Drewes, while serving on scientific advisory panels to assess the risks posed by CECs, the issue of selecting appropriate reference studies and defining conditions where these apply remains a very controversial issue in the public and scientific community. Different scientific studies can be used in support of different positions with little agreement among stakeholders on which studies are acceptable and appropriate to use. We consider this lack of agreement in the regulatory and scientific community as a major barrier that is important to address to produce a more widely acceptable project end product and successful action program.

We suggest revisiting the motivation for Workshop 2 in our kick off conference call and the participants currently proposed to be invited to such a meeting. The participants for Workshop 2 are not yet finalized as we envisioned to specifically represent controversial positions at this meeting. This may involve environmental organizations, consumer protection groups, and industrial organizations in addition to the toxicological experts listed. We envision that only a small group of utility representatives will be included in this meeting.

As a point for discussion, should this workshop be eliminated or repurposed to evaluate which of the "holistic management strategies are appropriate, and to vet and approve an approach to the TBL assessment (before the findings of the TBL are presented at Workshop #3)? On a related note for task 5, a "similar framework" document is cited (Drewes et al. 2013) but not provided on the reference list. Please provide; perhaps it could help address some of these questions.

Team Response:

Please excuse the oversight to provide this reference. The citation is as follows:

Drewes, J.E., Anderson, P., Denslow, N., Olivieri, A., Schlenk, D., Snyder, S.A., Maruya, K.A. (2013). Designing Monitoring Programs for Chemicals of Emerging Concern in Potable Reuse - What to include and what not to include? *Water Science and Technology* 67(2). 433-439.

Our team proposed that the holistic management strategies that are promising for further vetting during Phase 3 are being identified in Workshop 1 b. We agree with the usefulness of a discussion among our team, WRF, our PAC members and stakeholders at the beginning of Phase 3 to decide on a TBL framework for assessing the target scenarios. We propose to include this discussion as part of the Workshop 2 meeting. Rather than planning for a 5th workshop we propose to solicit feedback on the pilot TBL analysis by written communication and a virtual conference meeting. If the PAC feels strongly that this decision should be revisited, we are open to revising our workshop plan during our kick-off meeting.

2c. Task 7 - What criteria will be used to select the 2-3 model watersheds? Ideally the selected watersheds will help set up a framework that is generally applicable and not too site specific to be meaningful or illustrative for others. Some detailed criteria to assure that will be helpful. On the top of the page 19, the statement is made that "We will use quantitative tools (many identified in Phases 1 and 2) as much as possible to compare strategies." While the different holistic strategies will be developed in Phases 1 and 2, and indicator CECs will be selected, it is unclear what quantitative tools will be selected in these Phases that will be useable for the TBL work. Will the project team please elaborate?

Team Response:

Our team proposes the following criteria to select the model watersheds to be analyzed in this study:

- Availability and quality of data on watershed characteristics and CEC occurrence
- Detailed, site-specific insight on stakeholders in the watershed relevant to CECs and their willingness to collaborate with our team
- Watershed conditions should be relevant and lessons learnt applicable to other settings in similar conditions in the US

Based on these criteria, the following watersheds are potentially target candidates to be analyzed in this study: Lake Mead / Southern Nevada; Schuylkill River / Philadelphia; South Platte River downstream of the Metropolitan Denver area; Central Arkansas. We propose to make the final selection at the end of Phase 2 in this study in consultation with WRF, our PAC, and other stakeholders.

Possible tools used in the TBL framework to support the assessment of costs and benefits of specific CEC management strategies are listed in the paragraph on top of page 20, first column in the proposal. Which subsets of these tools will be applied will be determined in accordance with the specific TBL framework to be defined for the specific scenarios under analysis.

2d. Task 8 – The proposal states that “additional scenarios may be identified in Phase 1 for further evaluation”, but only commits to analyzing a base case, drinking water treatment upgrade, and wastewater treatment upgrade in the pilot analysis. That is a useful exercise, but perhaps not a holistic strategy. While I understand that the team cannot predict the outcome of previous tasks, the project is intended to look at alternative strategies, including holistic strategies, such as the other examples listed but for which no commitment is made. Can the team provide some level of commitment that additional strategies “will” be considered (as opposed to “may”)?

Team Response:

Yes. The three scenarios were explicitly listed as our team considers these a “must” for this study. We fully anticipate that alternative scenarios will be identified in Phases 1 and 2 and we are open to analyzing some of them during Phase 3. However, for budgetary planning we need to limit these scenarios to a specific number and suggest that not more than 2 alternative scenarios will be analyzed during Phase 3 of the study.

And if so, please elaborate on how other options will be evaluated, such as non-point source controls, and whether you anticipate having sufficient information and resources to evaluate more complex sets of options (for example, monetizing “non-use” values for impacts to a fishery as is included in a Natural Resource Damage Assessment, i.e., an approach that might be applicable to CEC management strategies that can be translated to: what is the economic cost of people who might want to go fishing in an area but choose not to because the fish contain PCBs?).

Team Response:

It seems premature to elaborate how specific scenarios, such as non-point source controls will be evaluated. We have experts on our team that are able to do this analysis should this become one of the selected scenarios for analysis in Phase 3. Our team members can use relevant databases in support of monetizing non-use values or willingness to pay. In assessing the value of such parameters within the TBL framework we will need to consider how results of such analyses can be projected to a national scale as such criteria are highly community dependent.

- 3. Budget: While the proposal provides many details, some elements of the project approach are still unclear as described above, including how certain tasks will be executed and how much*

resources are dedicated to them. Please provide a detailed budget breakdown for each research task to give a sense for the resources and focus of each task.

Team Response:

The following Table provides a rough breakdown of the effort distributed by task for our core team members as estimated at this time. Further information on hourly breakdowns has been provided in our budget spreadsheets submitted with the proposals. As stated earlier, it should be noted, that Profs. Snyder and Drewes are committed to spend far greater time on the project than is officially budgeted.

Task	Carollo Engineers	UofA	TU München	SNWA
Task 1 – Paradigms	5%	8%	13%	5%
Task 2 – Multi-Disciplinary Programs	5%	16%	13%	6%
Task 3 – CEC Management Strategies	5%	16%	13%	6%
Task 4 – CEC Indicators	3%	10%	8%	26%
Task 5 – Eco and Human Health Risks	3%	16%	12%	15%
Task 6 – Whitepaper	3%	8%	1%	22%
Task 7 – TBL / Cost Benefit Analysis	18%	6%	8%	5%
Task 8 – Pilot Analysis	18%	3%	8%	5%
Task 9 – Other Scenarios	20%	6%	12%	5%
Task 10 – Alternatives with Greatest Potential	20%	11%	12%	5%
Total Estimated Hours for All Tasks	844	3200	2360	770

4. *RFP request on barriers: The last bullet of the RFP requests “potential approaches for overcoming the barriers to and promoting the advancement of the alternatives with the greatest potential overall benefits and lowest overall costs in a document that can serve as a reference and support for multi-sector stakeholder collaboration.” While it appears that barriers may be identified in Phases 1 & 2 and considered for the TBL analysis, it is not clear where the proposal specifically addresses approaches for overcoming anticipated barriers. Please provide information about how this objective will be achieved.*

Team Response:

We have not dedicated a specific task to address the RFP request to identify “potential approaches for overcoming barriers to and promoting the advancement of the alternatives with the greatest potential overall benefits and lowest overall costs”. Barriers for CEC management implementation and recommendations for overcoming such barriers will be identified and developed at various points throughout this project, namely Tasks 1, 2, and 3, Workshops 1a and 1b, as well as the Consensus Document / Whitepaper and Policy Paper developed in Phase 1; the Consensus White Paper developed in Phase 2, and the TBL analysis of which implementability is one of the five evaluation criteria. The Comprehensive Summary Report prepared at the end of the project will have a dedicated section where barriers and recommendations for overcoming these barriers will be summarized.

PAC Questions/Comments on Team Responses to Initial Set of Proposal Comments

General Team Response

The Project Team appreciates the continued interest from the PAC on this important and timely project. The Project Team strongly recommends a face to face or phone call between the Team, WaterRF, and the PAC. There seems to be continued confusion, especially over the budget. In the teams' collective decades of experience in WaterRF, WRRF, and WERF, we have never quite seen a budget so highly scrutinized. We would like to get to the crux of the issue the PAC members who are concerned so concerns can be fully voiced and the team can address them holistically. Indeed, WaterRF projects are not "for profit". On ALL projects of this type, the team invests far more hours than are allocated. We are concerned that part of the PAC is seemingly interested in how every hour is allocated before the project commences. Indeed, it is not feasible to allocate each and every hour precisely before the project commences, but rather, these are estimates based on our proposed research plan. As the PAC suggests changes in scope and course, obviously we will need to be flexible in order to accommodate within reason. Regardless, we provide more information below, but remain strongly of the opinion that a phone call would be far more effective.

1. Budget.

1a. It is still not clear about who we are getting, for what services and for what cost by task. Shane Snyder is the only listed representative from U of A which has the most hours (3200 hours) overall. There is a post doc listed under Task 2, 3, 4, 5 from U of A, but it would take a lot of post-doc time to fill out the 3200 hours.

Team Response

Our team has submitted the hourly breakdown by each task and personal as part of the budget forms to the Foundation along with our proposal. This information was to the level of detail that follows the budget forms provided by the Foundation. In these forms the hours are clearly broken down for each Co-PI and support staff. It is up to the discretion of the Foundation to share this information with the PAC. To be clear, Professor Snyder is budgeted for one week (40 hours) from the WaterRF funds. Additional time will be donated as in-kind.

The budget allocates funds for a full-time post-doc position at UofA in support of this project. This is equivalent to an estimate of 3200 hours over a period of 2 years. Professor Snyder has recently identified a candidate who brings very valuable prerequisites in support of this project. We are looking forward to introducing her and her background at our first conference call when the contract agreements are in place.

In case the PAC and the Foundation agree that the project would benefit from a larger participation by Professor Snyder that should be reflected in the budget at this time, he would be delighted to increase the number of hours shown for his participation at his normal billing rates. His normal salary equates to approximately \$150/hr. He also notes that the additional 8 hours/week he is providing for consulting is generally billed at \$250/hr. However, if the PAC is insistent on having more hours shown officially, we can transfer hours from the post-doctoral researcher to Professor Snyder. If the PAC agrees, Professor Snyder has offered to leave the budget intact, but to swap some hours from the post-doc to himself yet WITHOUT changing the cost. This will reflect a very large in-kind contribution from Professor Snyder personally. This is a topic where we believe a phone call would be far more effective than written communication.

Ultimately, Professor Snyder remains committed to delivering the work products and services that the proposal outlines being allocated to UofA at a high quality and on time.

Overall, more transparency is needed in the budget about the level of commitment from the principles. And it appears that many of the hours cross over the four parties (Carollo, U of A, TU Munchen and SNWA). It might make sense to pay a post doc or staff person from one or the organizations (or even two if we include the euros), but are nearly 800 hours needed for something like CEC indicators (something that Shane Snyder has already published on)?

Team Response

All of our investigators have a reputation of delivering projects at a high quality and we are fully committed to deliver our proposed scope within the budget set by the Foundation. We have proposed a way to do so cost-effectively. If this comment originates a concern about our ability to direct sufficient resources towards a specific task we are happy to address these specific concerns directly in a conference call.

As to the comment on CEC indicator selection it is precisely the experience and insight that Professor Snyder, Professor Drewes, and Dr. Dickenson bring to this project - all extensively published on this topic – that the proposed research clearly goes above and beyond the indicator approach developed within a very limited and specific scope in the publications we believe the PAC member refers to. This comment shows a difference in problem understanding that can most effectively be clarified by a live discussion. We imagine this can easily be addressed if we knew the inspiration for the comment. Also, please see below section taken directly from the RFP:

Phase Two:

- Develop a list of representative CECs to be used for evaluation of strategies identified in Phase One
 - Focus should be placed on CECs that originate from different sources, enter water supplies through different primary routes, represent different ecological and health effects, and for which sufficient information is available for analysis.
 - Considerations for selection of representative CECs for this project may include classes or types of contaminants, drinking water and wastewater treatment challenges, frequency of occurrence, environmental attenuation, or other factors.
 - Unregulated Contaminant Monitoring Rule lists are suggested for use as a starting point, but the final list of representative CECs will be approved by the Project Advisory Committee (PAC) and WaterRF.

1b. Is \$10K going to be a sufficient travel budget? Some of the U.S. utilities will be providing travel as in-kind services, but this is a workshop-based project with international involvement and \$10K might not be enough.

Team Response

Overall, the Foundation and the PAC should be assured that our team remains committed to completing the project including travel within the funds detailed in our budget forms.

If these funds are not sufficient our team will likely will have to use their own funds, even personal funds at times, to help support the project. Additional travel funds will need to be raised or reallocated if we all agree on the benefit of inviting additional participants not yet included in our budget for the workshops. As previously stated we remain open to this discussion during our first conference call. It should be noted that \$10,000 cited by the PAC member is not the complete travel budget for all team members in this project. This equates roughly to our PI's Dr. Rauch-Williams' travel budget and the external experts Carollo agreed to pay through WRF funds for their workshop participation. Each co-investigator has established an additional travel budget. Details can be found in the detailed budget forms submitted along with the proposal.

Page 1 (2nd to last paragraph) – There is still a disconnect between the commitment of time from the principals and the budget shown. If Shane Snyder is proposing to provide uncompensated time, please specify the level of commitment.

Team Response

Professor Snyder has offered the possibility of reducing post-doc commitment and increasing his own time on the project without impacting the budget, will this satisfy the concerned PAC member?

Page 3 (1st paragraph) – Indicates that Lydia Holmes will support the development of the TBL framework. Who is she? She is not listed in the org chart?

Team Response

The TBL framework is a critical element of this project and we will fully introduce Carollo's team conducting this effort to the PAC members early on in this project in preparation for this task. We have proposed to include Lydia Holmes to facilitate the discussion on how to define the TBL framework for specific CEC management scenarios. Lydia Holmes has specifically provided this service in previous water and wastewater related projects. Per org-chart the TBL analysis will be conducted by the members of our team as shown.

Page 4 (the section on facilitators) – Please provide examples of prior experience of the team members that will provide facilitation, Drs. Snyder and Drewes. While "knowledge of the topic being discussed" is certainly helpful for successful facilitation, it is not necessary for good facilitation. And it could be challenged that Drs. Snyder and Drewes "hold an impartial position towards the diverse perspectives...", considering their prior work in the field.

Team Response

Apparently, workshop facilitation maintains a concern among some PAC members and we would like to suggest that this topic will be revisited in our first conference call.

There seems to be an accusation that the Professors on our team are not impartial. Nothing could be further from the truth. Both Professors Snyder and Drewes have indeed published a wealth of peer-reviewed and widely cited articles related to this topic. This is a benefit, not a bias. In fact, academics are generally held as the most impartial experts. Publication of scientific facts does not imply partiality and the fact that their publications have met peer-review and scientific scrutiny stands on its own. We would; however, be interested in what this PAC member would suggest as an alternative within the budget provided.

2. Objective and project focus.

There remains concern that this project will spend too much time on risk assessment for CECs rather than identifying existing and possible future holistic strategies. The response to question 2b is a case in point. The response indicated, correctly, that the selection of specific CECs and definition of threshold concentrations for assessing human or ecological health risks remains highly controversial. This project will not end that controversy. More to the point, I thought that the purpose here was not to assess risk but to identify potential holistic management strategies and conduct a triple bottom line analysis. If that is the case, then it doesn't matter what the absolute risk is or whether the threshold concentrations are correct or not.

Team Response

It is apparent we need further discussion on this point in a conference call to better understand our different perspectives. We propose to table this discussion until our kick off conference call.

Having threshold doses is critical; otherwise it is not possible to consider the degree of attenuation needed for reduction of health endpoints. To use the US EPA as an example, health and occurrence are the two major categories that trigger regulatory action. One without the other would not lead to regulation. Only after health and occurrence have been assessed can the cost/benefit be calculated. Regardless, this team does not see how the TBL can be calculated without finite goals founded in health relevance. Lastly, please note the RFP section below. Our inclusion of experts, for very limited time and cost commitments, is to help the team compile the risk data (as specified in the RFP) that may not be apparent to the core team members.

- Compile available information on the relative ecological and human health risks of the representative CECs and relative sources of exposure to the representative CECs
 - Relative sources of exposure should include water, food, air, drugs, and consumer products.
 - Information should include quantitative and qualitative information.

What one needs is to pick an example or two (at whatever value is selected), and identify the strategies and conduct the TBL analysis. If necessary, a sensitivity analysis can be performed to see how the TBL conclusions vary with varying threshold concentrations. Is there too much emphasis on risk assessment and not enough emphasis on identifying management strategies?

See response above.

Page 6 (1st paragraph) – Is the focus of the project about reaching a consensus on risk assessment or about identifying and evaluating holistic strategies? The second paragraph implies the project team will try to resolve the controversies that arise around assessing risk, and should be more focused on the ultimate goal of the project to identify alternative management strategies. Can the team provide more context as to the importance or need to resolve issues around risk assessment methodology in order to advance holistic control strategies?

Team Response

The team is more interested in gaining consensus as to the management strategies as stated directly in our proposal (see excerpt below). As stated, a further verbal discussion on how the risk assessment will support this goal seems needed to convey our intentions more clearly.

for CECs in water. *Our team will bring together national and international experts and decision makers to develop consensus documents regarding the best management practices for CECs.* Our collaboration partners include major

Shane A. Snyder
Professor – Chemical & Environmental Engineer
University of Arizona
1133 E. James E. Rogers Way
Tucson, AZ 85721-0011

Subject: Water Research Foundation RFP #4494: "Evaluation of Current and Alternative Strategies for Managing CECs in Water"

Dear Dr. Snyder,

I am pleased to inform you that I am able to participate on your team submitting a response to the Water Research Foundation RFP #4494 "*Evaluation of Current and Alternative Strategies for Managing CECs in Water*". I understand that my role would be to participate as a technical advisor bringing my experience in the US Environmental Protection Agency's national drinking water program, contaminants of emerging concern, public health, and water quality issues.

As a federal employee, I will not require in-kind or other compensation in providing technical assistance to the team. I have enclosed a biosketch and CV for your use in the proposal.

If I can be of further assistance please let me know.

Best Regards,

Thomas Carpenter
Designated Federal Officer / Sr. Biologist
US EPA Science Advisory Board, MC 1400R
1200 Pennsylvania Avenue, NW
Washington DC 20460
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Thomas R. Carpenter
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Abstract

Mr. Carpenter has over 30 years of experience in environmental science, environmental policy, public outreach and communication, and data analysis in a variety of disciplines. He is currently a Designated Federal Officer for the Environmental Protection Agency's Science Advisory Board and coordinates scientific advisory panels that provide advice and review of the science supporting EPA policies. His work experience includes service in the government, in both the executive and legislative branches, and private sector consulting. Previous professional experience includes work in regulatory and policy development, risk assessment, biologic and water quality sampling, data analysis, legislation, and data management. For the EPA, he has provided support under Safe Drinking Water Act, Clean Water Act, Emergency Planning and Community Right-to-Know Act, Comprehensive Emergency Response and Compensation and Liability Act, and Superfund Amendments and Reauthorization Act. Mr. Carpenter holds a B.S. in Biology from George Mason University and a M.S. in Environmental Science and Engineering from Virginia Polytechnic Institute and State University.

EDUCATION:

M.S. Environmental Science and Engineering, Virginia Polytechnic Institute and State University, 2001. Blacksburg, Virginia

B.S. with Distinction, Biology, George Mason University, 1993. Fairfax, Virginia

Chronology of Work Experience

US EPA
Science Advisory Boards Staff Office
Office of the Administrator
1200 Pennsylvania Ave., NW
Washington, DC 22042

Supervisors: Anthony Maciorowski 202 564 2098
Vanessa Vu 202 564 2098

Special Assistant to the Office Director
GS 15-5
November 2009- July 2010

Conducted scientific review of EPA products and analyses used to support EPA positions and policies. Responsible for interviewing potential candidates and forming panels, convening meetings, and developing SAB products with members of standing and ad-hoc committees in accordance with the Federal Advisory Committee Act (FACA.) =Key liaison and point of contact with potential candidates to evaluate professional experience, academic credentials, and potential conflicts of interest in light of products being developed or reviewed by the committee being formed.

**US EPA
Office of Ground Water and Drinking Water
1200 Pennsylvania Ave., NW
Washington, DC 22042
Supervisors: Cynthia Dougherty 202-564 5
Nanci Gelb 202-564**

**Special Assistant to the Office Director
(GS 14, 8)
November 2009- July 2010**

Served on a nine month detail as Special Assistant reporting directly to the Office Director and Deputy Director. Responsibilities included developing speeches, testimony, and briefing materials that communicate the activities of the Office and the importance of safe drinking water issues. Served as the point of contact for congressional inquiries, media responses, and special projects. In addition, was appointed Designated Federal Officer to the National Drinking Water Advisory Council. Assigned duties required working closely with key staff in OGWDW and other EPA offices on high profile, time sensitive issues to prepare technical, policy, and legislative analyses that identify potential impacts on existing EPA, federal agencies, state and local programs, or other activities and programs. One special project was to develop and coordinate a multi office Drinking Water Strategy. This project required frequent liaison with the Office of the Administrator and multiple program offices and statutes with potential to protect drinking water and human health. Stakeholder and communication strategies for the projects included a broad array of listening sessions, webinars, and discussion forums with associations, public interests groups, and major stakeholder organizations. Key elements of the program coordinated among offices implementing the Clean Water Act, Pesticide Programs (FIFRA and FFCA), pollution prevention and remediation (TSCA, RCRA, and CERCLA). The strategy was also a high profile project with frequent briefings at the highest levels of the Agency and was introduced the Administrator in a keynote address to the Association of Metropolitan Water Authorities.

**US EPA
Office of Ground Water and Drinking Water
1200 Pennsylvania Ave., NW
Washington, DC 22042
Supervisors: Eric Brunson 202-564 5250
Ann Codington 202-564-4688**

**Environmental Protection Specialist
(GS-13 10 promoted to 14, 8)
November 2001- 2009**

Served as the Team Leader on a variety of highly-visible and fast-paced projects mandated under the 1996 SDWA Amendments. Management experience includes developing and maintaining effective project plans, developing and monitoring budgets, and directing the efforts of a diverse and multi-disciplinary team, including high level technical experts, contractor staff, intra-agency participants and community stakeholders. Extremely successful at working independently, as a team leader or as a member of a team to design and implement project plans, define measures of success, and communicate goals and achievements. Effective "bridge builder" with other EPA Offices and programs, and outside stakeholder organizations.

Specific activities include: Managed the development of the Contaminant Candidate List 3 (CCL3) and CCL related activities. CCL is a regulatory program mandated to refine the standard setting and rule development process to ensure public health and environmental protection. The 1996 SDWA Amendments require EPA to determine future regulatory needs that, in turn, set the direction and tone for future drinking water regulations and research. Developed a comprehensive approach, based on the policy, technical, and scientific elements of the drinking water regulatory program to ensure effective implementation of the statutory requirements and milestones. Lead large multi-disciplinary teams represent several AAships in day-to-day activities to ensure effective implementation of this approach. Present issues, concerns and progress to senior managers.

- Identified and evaluated over 7,000 contaminants to determine their actual or potential occurrence in drinking water as well as their ability to cause adverse health effects. Using a transparent and reproducible process that used the best available science and different levels information selected 116 chemical for further review. The process incorporated elements of risk-based decision making used in setting drinking water standards as well as indicators that could identify contaminants for further evaluation.
- Lead the National Drinking Water Advisory Council workgroup meetings and conference calls on the CCL Listing process. Convened under the Federal Advisory Committee Act (FACA), experts in all aspects of drinking water policies and programs were consulted included in the review of the National Academy of Sciences recommendations. NDWAC and a 20 member workgroup met for 18 months to develop an implementation strategy of future CCLs. The consensus report recommendations were the basis for the proposed and final CCL 3 process and selected contaminants. The workgroup conducted 10 plenary meeting and over 75 conferences call by subgroups to deliberate the recommendations and propose an implementation strategy that allows successive improvement in the CCL process.
- Prepared technical documents and summaries to document and support in rule makings, (i.e., , Federal Register notices, Standard operating procedures, response to comments submitted by stakeholders, fact sheets, issue papers, summaries of data and analyses and additional materials on all aspects of regulatory decisions.
- Demonstrated strong interpersonal and communication skills through written/oral papers. Routinely prepare and deliver, presentations and briefings to EPA senior officials (including AAs, Office Directors) and to external groups from both technical and non-technical backgrounds (including the National Academy of Sciences/ National Research Council, the Science Advisory Board, and environmental and public health organizations) as well as the Office of Management and Budget.
- Represented the drinking water program on regulatory related issues at intra-agency meetings with multiple program offices including OAR, OPPTS, OPEI, ORD, and OSWER.

Details: Acting Supervisory Environmental Protection Specialist GS-15, 4

US EPA

**Office of Ground Water and Drinking Water
1200 Pennsylvania Ave., NW
Washington, DC 22042**

**February- May 2006
July – December 2007**

**Supervisor: Eric Burneson 202-564 5250 (TAB)
Yu-Ting Guilarain 202 564 1154 (SRRB)**

Served two separate details as Acting Associate Branch Chief of the Targeting and Analysis Branch (TAB) and Standard and Risk Reduction Branches worked with the Branch Chief and Division Director to direct and oversee the programmatic, supervisory and administrative duties of the Branch.

- Responsible for the development and performance of the staff in the Branch, integrating project work across teams and individuals, supporting and guiding teams and /or individuals while the work is being done, reviewing final outputs, and sharing accountability with teams and individuals for products and results.
- Set annual, multi-year, or long-range work plans and schedules for internal or contract work; assures implementation by team leaders, subordinates or others of the Branch's goals and objectives; manages the Branch's program budget and determines the best approach for resolving budget issues; plans for long-range staffing needs and skill requirements.
- Assists in managing the development of policy changes in response to changes in levels of funding or legislated changes; and exercises discretionary authority to approve the allocation and distribution of funds in the program's budget.
- Oversees development and implementation of program plans; communicates program goals, policies and priorities to staff; ensures meeting regulatory requirements and program goals and objectives; makes technical/programmatic decisions regarding the work; and participates in strategic planning and other Agency workgroup efforts.
- Analyzes and reviews scientific, legal, engineering and other technical material to ensure consistency with Agency policies and Division strategies. Works in the development, proposal, and promulgation of technical standards, guidelines, policies, and formal regulation to protect drinking water and the environment, including providing input on policy, programmatic and /or technical issues in the development of standards and regulations.
- Responsible over staff members, making assignments, determining responsibilities and priorities, evaluating employee performance, recommending incentives, initiating corrective actions, assuring safety and security practices, and counseling/coaching employees regarding their performance, benefits, salaries, and requirements as federal employees.
 - Participates with other members of the Division Management Team in long-range planning, strategic planning, and compliance with provisions of the Government Performance and Results Act.

**Science Applications International Corporation
1710 Goodridge Dr.
McLean, VA 22102
Supervisor: Barry Langer 201-498-7346**

**Program Manager
June 1997 - November 2001**

Served as a Senior Project Manager in the SAIC Environmental Consulting Sector. Promoted from scientist to Program Manager responsible for the overall management of numerous Work Assignments and for developing water sector business opportunities at the federal, state, and local levels. Maintained

effective project organization, management and budget tracking . Primary areas of focus were water quality, contaminants occurrence and exposure, water management policy (i.e. Total Maximum Daily Loads), regulatory support, and was in the area of drinking water contaminant identification and occurrence.

Example activities include:

- *Disinfectant / Disinfection Byproduct (D/DBP) Rule Interim Enhanced Surface Water Rule (IESWTR); Long Term 1 Interim Enhanced Surface Water Rule and Filter Backwash Recycle.* Provided technical and regulatory support to the Environmental Protection Agency's, Office of Groundwater and Drinking Water. For the Stage 1 DBPR and IESWTR, oversaw the development of support document to the expedited D/DBP rule and IESWTR. Developed and drafted the comment and response document for both rules and three separate federal Register notices for each rule. Oversaw a multi disciplinary team of engineers, biologists, policy analysts, regulatory specialists, economists, and environmental scientists to produce the scientific reviews, supporting documents for the regulatory impacts analysis (RIA) for both rules. In developing these rules, provide support to EPA for compliance with requirements of applicable statutes and administrative orders, including the Unfunded Mandates Reform Act (UMRA), the Paperwork Reduction Act (PRA), the Regulatory Flexibility Act (RFA), the Small Business Regulatory Enforcement and Fairness Act (SBREFA), and Executive Order 12866. Public input and stakeholder involvement was an integral part of these rulemakings under the Federal Advisory Committee Act. As such the work assignment required detailed focus on the communication among the Agency, stakeholders, contractors and subcontractors. Frequent briefings and presentations for senior EPA management provided biweekly financial information, time lines and Gantt charts for development of the rules and compliance after promulgation, flow charts describing steps to compliance. Additional products produced include Comment and Response documents for the 1994 Proposed Rule, 1997 Notice of Data Availability, and the 1998 NODA for the D/DBP and IESWTR, Cost and Technology for the IESWTR, Occurrence and Exposure documents for the D/DBP rule and the IESWTR, RIA for the D/DBP and RIA for the IESWTR.
- *Occurrence and Exposure of Disinfectants and disinfection Byproducts in Public Drinking Water.* Developed the support document for the Stage 1 D/DBP rule. To support EPA in this rulemaking investigated the occurrence of the D/DBPs included in the 1994 proposed D/DBP rule as well as any additional DBPs included in the May 1996 Information Collection Rule (e.g., haloacetonitriles, halo ketones). In addition, data on the occurrence of bromide, total organic carbon, and UV in ground waters and surface waters were characterized. The D/DBPs and water quality characteristics (bromide, UV, and TOC) investigated were characterized by their physical and chemical properties, transformation properties, and fate and transport characteristics. The occurrence data were characterized with regard to their quality, limitations, and statistical reliability. All levels of data (e.g., national, state, regional, local individual watersheds) were characterized to identify trends and estimate national occurrence. Where possible, national occurrence estimates were developed for each disinfectant, disinfection byproduct, and DBP precursor identified in the rule. Ambient water quality characteristics were developed for the compounds investigated

above. The document also characterized the analytical methods available to detect the D/DBPs and water quality characteristic. A national and regional (i.e., EPA regions) capacity analysis will be performed to determine the availability of these analytical methods to utilities.

- *Evaluation of Valley Fill Impacts on Downstream Aquatic Habitat and Life.* Work Assignment Manager for EPA Region 3. Developed technical approaches to evaluate the impact of valley fills on downstream aquatic life and provide recommendations for possible biocriteria of use in permitting and the future evaluation surface mining activities. Developed consensus among multi-lateral Federal inter-agency groups for technical approaches to identify and evaluate potential impacts of valley fills on downstream aquatic life. After identifying the available data developed a consensus from a multi-agency group with divergent interests of existing data on locations and sizes of valley fills, potential targeted stream reaches to be evaluated, and the availability of data on water quality and aquatic life in targeted stream reaches collected prior to construction of valley fills. Matrixes of the possible sample sites were used to identify sites that provided biological data prior to disturbance, were not affected by previous disturbances. Prepared sampling and analysis plan to identify sampling sites, the number of samples to be taken, replicate sampling, use of reference sites, and appropriate analyses and metrics to be performed on the collected samples. Implemented the sampling plan and maintained compliance with EPA's *Generic Quality Assurance Project Plan Guidance for Programs Using Community Level Biological Assessment in Wadable Streams and Rivers*. The analyses compared the results from the targeted streams to data identified described and collected previously. From these analyses, a list of possible methodologies that may be appropriate to determine impacts of future valley fills will be developed.
- *Peer Review of Office of Wastewater Management Documents.* Provided contractor support to interview, identify, and oversee qualified reviewers and conduct comprehensive technical reviews of OWM documents assessing scientific and statistical validity. The reviewers conducted formal peer reviews using the Office of Water Standard Operating Procedures for Peer Review and additional EPA Peer Review Guidance. Coordinated the review of six documents by expert reviewers ranging from specific National Pollution Discharge Elimination Permit Evaluation to an evaluation of Whole Effluent Toxicity analytical method variation and statistical significance. Developed the charge to each peer reviewer for each document to be reviewed. The charge defined the objectives of the peer review and varied depending on the level of complexity, cost implications that the product may generate, or the controversy of the issue at hand in the document to be reviewed. Responsible for the content and clarity of peer reviews. Compiled peer reviews into a peer review report based on the peer review record as described in the Office of Water Peer Review Standard Operating Procedures and other EPA Peer Review Guidance. Written summaries of each review and any supporting materials developed or identified during the review were provided in the peer review report.

2801 Clarendon Blvd
Arlington, VA,
Supervisor: Robert Pritchard (number not known)

October 1996 June 1997

Mr. Carpenter provided on-site, technical, and data analysis support for US Environmental Protection Agency Office of Emergency Response and Remediation. Reviewed Superfund risk assessments to ensure standard operating procedures were met. Evaluated compliance and risk assessment trends for National Priority sites. Evaluated best available information for contaminants the Agency was considering for delisting.

Designation of Reportable Quantities to Comprehensive Emergency Response Compensation and Liability Act Hazardous Substances. Provided on going support to Office of Emergency Remedial Response in developing and adjusting the reportable quantities for CERCLA hazardous substances. Task Leader for the technical evaluation of compounds using primary and secondary Reportable Quantity criteria. Reviewed petitions to adjust rules and edit for technical correctness. Identified and developed mammalian and aquatic toxicological data, carcinogenic, and physical characteristic profiles for compounds being adjusted or delisted from the CERCLA hazardous substance list. Over saw team of economists, regulatory specialists and environmental scientists supporting rulemaking efforts to deliver products within specified budgets and time schedules.

Superfund Risk Assessment Review

For the Office of Emergency and Remedial Response conducted and performed quality assurance and control of Superfund risk assessment reviews in support of the Risk Assessment Database System (RADS). Reviews of human health and ecological risk assessments consisted of extracting data to evaluate the quality of data and identify national trends. Reviews of human health assessments focused on sources of toxicity data to ensure the risk assessments employ the most current sources available, identify fate and transport information to ensure all relevant pathways were addressed, characterized the range and distribution of exposure parameters, pathway risks, and specific chemicals contributing most to each pathways risk at Superfund sites. Ecological assessment reviews focused on fate and transport mechanisms, indicator and surrogate species used, habitat characterization, and assessments endpoints to ensure sound ecological principles were employed. Data were then entered into RADS to provide a comprehensive database of Superfund risk assessment information. RADS, based on the *Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part A)* and the *Risk Assessment Guidance for Superfund: Volume II - Environmental Evaluation Manual* (EPA, 1989), provides OERR with the ability to evaluate the overall quality of risk assessments conducted for the Superfund program. RADS provides both detailed data for over 300 individual sites that are used to generate annual reports on the trends and quality of risk assessments. Report topics included general trends, chemicals of potential concern, exposure pathways, chemicals contributing most to risk, ecological evaluation information, and many other types of data related to risk assessment.

ICF Kaiser
9300 Lee Highway
Fairfax, VA

Human Health/Ecological Risk Assessor
January 1994 - May 1996

Supervisor: Robert Pritchard (number not known)

Mr. Carpenter provided on-site, technical, and data analysis support for Army Corps of Engineers and Department of Defense baseline risk assessments. Mr. Carpenter participated in initial work start up in the field and followed projects through to delivery of final products. Involvement included sampling and sample preparation using both CLP and standard methods, identification of chemicals of concern, toxicological evaluation of compounds detected, and analysis of ecological exposure. Utilized ambient and modeled food chain concentrations to evaluate potential stress and adverse effects to ecological receptors. Food chain modeling included multi-media exposure and analysis of multiple trophic levels. Provided analytical laboratory support, data review, and quality assurance/quality control support for the U.S. Environmental Protection Agency's Environmental Services Assistance Teams in regions and headquarters.

- Wrote and provided technical support for Ecological Assessment section of the Standard Operating Procedures for Quality Assurance Reviews of Superfund Risk Assessments using the Risk Assessment Database System (RADS SOP). Special focus on defining terms and aspects of ecotoxicology addressed in the RADS SOP. Created reference library of source literature and examples to further define issues addressed in the SOP.
- *Non-CLP Superfund Analytical Services Tracking System.* Provides support to the EPA's Analytical Operations Branch (AOB) by managing the national database that monitors all Superfund analytical services procured outside of the Contract Laboratory Program. Coordinates with EPA Headquarters and contacts in each of the 10 regions, to obtain data on the use of non-CLP analytical services each quarter and compiles these data into the national database. Generates reports from the national database that summarize trends of non-CLP services for the current fiscal quarter. The reports compare information such as total number of samples analyzed, number and type of analytical determinations, quality and useability of data to past quarter. These reports enable EPA to track and oversee the use of non-CLP services on a national, Regional and site-specific basis. Manipulation of the data requires several software programs, dBase, Lotus 123 and Freelance Graphics, and R&R Report Writer. By using direct ASCII transfers, standardized reporting programs, automated routines, and linked graphics generation, quarterly reports are generated in an expeditious manner and are subject to fewer data entry errors.
- *Evaluation of Tentatively Identified Compounds for Addition to the Target Compound List.* Ongoing support to EPA's Toxics Integration Branch (TIB) evaluating tentatively identified compounds (TICs) from the CLP Analytical Results Database (CARD) for possible addition to the Target Compound List. Coordinated with CARD staff to provide an initial listing of all TICs found at Superfund sites. From an initial screening of 36,000 TIC aliases and synonymous generated a list of target TICs to be treated as single compounds for further evaluation. Ranked and evaluated target TICs for frequency of detection across Regions, site, and individual samples. Provided TIB with detailed reports on the frequencies of detection and toxicological data sources for over 6,000 TICs. Prepared reports describing

the methods and approach and possible options to reduce the focus for the continued evaluation of the toxicity and analytical methods associated with 222 TICs.

Enviroflow, Inc.
Balls Ford Road
Manassas VA
Supervisor Frank Gregorio

Technical Support Specialist
June 1993-December 1993

Mr. Carpenter provided technical support for the bioaugmentation and biodegradation of industrial and municipal waste as the Staff Scientist with a manufacturer of remediation products. Mr. Carpenter evaluated the physical and chemical properties of the waste and waste systems to provide clients with biologic and chemical applications to achieve National Pollution Discharge Elimination System (NPDES) and Ambient Water Quality Criteria (AWQC) standards for plant effluents. Provided support to clients in the bioremediation of contaminated soil, providing expertise in the biodegradability of contaminants using both in-situ and ex-situ applications. Further technical support of feasible projects included site visits, evaluation of hydrogeologic parameters and design of pump and deliver systems to ensure compatibility with the biology of the product line.

- As Staff Scientist with an international manufacturer of bacterial bioremediation products Mr. Carpenter evaluated efficacy protocols for the biodegradation of industrial and petroleum based contaminants. Mr. Carpenter assisted in developing protocols to be used to track the success of a fuel oil clean up in the United Kingdom. The protocol not only satisfied the local and provincial requirements for remediation, but was in accordance with the analytical methods employed by the National Oil and Hazardous Substances Contingency Plan (NOHSCP/NCP) in the United States.
- Compared the efficiency and removal rates of created wetlands for nutrients as a storm water best management practice. Data analysis included storm event median concentrations, flow weighted data sampling and biological productivity. The study also examined maintenance practices and the effects of diverging from best management practices.
- Mr. Carpenter researched bacterial and algal nutrient competition for a manufacturer of bacterial remediation products. He constructed microcosms to evaluate changes in unicellular algal production and abundance in competition with bacterial bioaugmentation. Analysis included enumeration of algal cells, biomass determinations, water quality, and nutrient utilization within the microcosms.

**George Mason University
440 University Drive
Fairfax, VA 22030-4444**

**Supervisors: Donald Kelso PhD
Mark Walbridge, PhD**

**Field/Lab Technician
June 1991-June 1993**

- *Field Technician.* Mr. Carpenter conducted research over two growing seasons to detect ecological variation in the water quality of the Potomac River. Mr. Carpenter participated over 50 sampling events for water quality, phytoplankton and finfish populations in tidal embayment of the Potomac River. Sampling techniques employed were trawling, seining, electroshocking, and trap netting. As certified radionuclide laboratory technician performed experiments on bacterial metabolism and community response to toxins.
- *Laboratory Assistant.* Mr. Carpenter conducted research in the adsorptive abilities of wetland soils. Mr. Carpenter's involvement included preparation of over 200 samples for analysis of organic content, acid-digestion techniques, nutrient extraction, and soil texture. Additional duties included general laboratory maintenance and support to graduate level researchers

**U.S. Senator Patrick Leahy
United States Senate
Washington DC**

Supervisor: Clara Kircher 202-224-4242

**Special Assistant/Systems Administrator
March 1982-August 1991**

- Developed and coordinated outreach efforts for U.S. Senate legislative office. Compiled and drafted language on identified issues and legislative accomplishments to produce newsletters, targeted mailings, and schedule events to maximize exposure to constituents using specified budget. Responsibilities included tracking legislation, developing communications programs, documenting accomplishments, and coordinating staff from three personal offices, two committees, and three subcommittees. Developed draft language for mailings, oversaw approval and quality assurance procedures, and arranged printing and mail production services.
- As Systems Administrator, Mr. Carpenter provided technical support to 55 users on a local area network, oversaw a 6 member support staff and coordinated daily communications between interstate office locations. Mr. Carpenter was responsible for designing and managing the installation of a PC based communications system connecting federal agency main frame applications, US Senate minicomputers, and individual PCS on the network. Mr. Carpenter developed and maintained databases to track daily mail, record constituent opinions and voting trends, archive Senate voting records, and document legislative activities. These databases provided the basis for strategic planning and overall productivity reviews.

- As assigned, assisted in special projects to acquire community based development grants, national park land acquisition, and other constituent services.

**U.S. Senator Harrison Williams
United States Senate
Washington DC**

**Special Assistant
May 1979-May 1981**

Supervisor: Roberta Donnell (number not known)

- Provided support to office staff. Mail clerk, assistant to Deputy Press Secretary, coordinated targeted mailing, liaison with administrative offices, Office file archival. Developed and maintained databases to track daily mail, record constituent opinions and voting trends, archive Senate voting records, and document legislative activities. These databases provided the basis for strategic planning and overall productivity reviews

Exhibit B
Project 04494

Title: Evaluation of Current and Alternative Strategies for Managing Contaminants of Emerging Concern in Water

<u>TASK</u>	<u>DUE DATE</u>
Begin Project	December 1, 2013
Scope of Work	January 1, 2014
Participant presents Proof of Insurance(s) or Certificate of Self Insurance & Worker's Compensation Insurance	January 1, 2014
Periodic 1 Report & Invoice	March 1, 2014
Periodic 2 Report (incl. Technical Summary & Web Update) & Invoice	June 1, 2014
Periodic 3 Report & Invoice	September 1, 2014
Periodic 4 Report (incl. Technical Summary & Web Update) & Invoice	December 1, 2014
Periodic 5 Report & Invoice	March 1, 2015
Periodic 6 Report (incl. Technical Summary & Web Update) & Invoice	June 1, 2015
Draft Report & Invoice	September 1, 2015
Final Report	February 1, 2016
Letters of Confirmation from participating utilities	February 1, 2016
Complete & Submit Exhibit E – Assignment of Copyright	February 1, 2016
Final Invoice & Final Compensation	February 1, 2016
Project End & Foundation Publication Date	September 1, 2016

Note: Please submit one electronic copy of each Periodic Report, Draft & Final Report in MSWord format. For each report an invoice must be submitted for payment using Exhibit D – printed on your company letterhead.

Foundation Key Contacts:

Project Management

- Alice E. Fulmer, Senior Research Manager, Water Research Foundation, 6666 W. Quincy Ave., Denver, CO 80235, Phone: (303) 347-6109 and Email: afulmer@WaterRF.org.

Contract Administration

- Peggy Falor, Manager Contracts and Project Administration, Water Research Foundation, 6666 W. Quincy Ave., Denver, CO 80235, Phone: (303) 734-3424 and Email: pfalor@WaterRF.org.
- Monica Morgan, Project Coordinator, Water Research Foundation, 6666 W. Quincy Ave., Denver, CO 80235, Phone: (303) 734-3475 and Email: mmorgan@WaterRF.org.

Sub-recipient Key Contacts:

Principal Investigator, Authorized Representative and Contracting Contact

- Tanja Rauch-Williams, Ph.D., P.E., Senior Technologist, Carollo Engineers, Inc., 390 Interlocken Crescent, Suite 800, Broomfield, CO 80021, Phone: (303) 635-1220 and Email: trauch-williams@carollo.com.

Accounting and Administrative Contact

- Kate Williams, Senior Billing Administrator, Carollo Engineers, Inc., 4600 E. Washington, Suite 500, Phoenix, AZ 85034, Phone: (602) 263-9500 and Email: kwilliams@carollo.com.

Co-Principal Investigator:

- Shane Snyder, Ph.D., Professor of Chemical and Environmental Engineering, University of Arizona, 1133 E. James E. Rogers Way, Harshbarger 108, Tucson, AZ 85721-0011, Phone: (520) 621-2573 and Email: snyders2@email.arizona.edu.
- Jörg Drewes, Ph.D., Professor of Urban Water System Engineering, Technische Universität München, Chair of Urban Water System Engineering, AM Coulombwall 8, D- 85748, Garching, Germany, Phone: +49 89 289 13701 and Email: jdrewes@mines.edu.
- Eric Dickenson, Ph.D., Project Manager, Southern Nevada Water Authority, 100 City Parkway, Suite 700, Las Vegas, NV 89153, Phone: (702) 856-3668 and Email: eric.dickenson@snvwa.com.

Each party shall provide written notice of changes in contact persons, addresses, telephone, fax, and email addresses. The Principal Investigator, Co-Principal Investigator, or any Subcontractor may only be changed with the prior written approval of the Foundation.

BUDGET SUMMARY

**Exhibit C
Project 04494**

Contractor: Carollo Engineers
380 Interlocken Crescent Dr., Suite 780
Broomfield, CO 80021

This PFA shall be effective from **November 1, 2013** and shall end on **August 1, 2016** detailed in Exhibit B. The Foundation shall not have any obligation for payment of invoices for costs incurred by the Sub-recipient after the foregoing end date.

The Foundation agrees to provide aggregate Project Funds to the Sub-recipient in an amount not to exceed Four Hundred Thousand US dollars (\$400,000.00) for the completion of this PFA. The Foundation Contribution and other participant's contributions are as detailed below. The Sub-recipient agrees to contribute Sixty Thousand Thirty Eight US dollars (\$60,038.00) in Cost Share and Two Hundred Thirty Three Thousand Nine Hundred Twenty Eight US dollars (\$233,928.00) in in-kind contributions as detailed below. The total budget for the Project is Six Hundred Ninety Three Thousand Nine Hundred Sixty Six US dollars (\$693,966.00).

Payments to the Sub-recipient will be issued to the Sub-recipient organization and mailed to the address shown in the first paragraph of this funding agreement and shown above unless otherwise noted below:

ORGANIZATION	Award Amount	Cost Share Amount	In-Kind Amount
Participants Contribution			
UK Water Industry Research Limited	\$0.00	\$0.00	\$0.00
American Water	\$0.00	\$0.00	\$10,000.00
Tucson Water	\$0.00	\$0.00	\$30,000.00
Greater Cincinnati Water	\$0.00	\$0.00	\$8,500.00
Minneapolis Division of Water	\$0.00	\$0.00	\$10,000.00
New York City Dept. of Environmental Protection	\$0.00	\$0.00	\$5,000.00
Philadelphia Water Department	\$0.00	\$0.00	\$15,000.00
Suez Environnement – CIRSEE	\$0.00	\$0.00	\$0.00
Orange County Water District	\$0.00	\$0.00	\$5,000.00
Milwaukee Water Works	\$0.00	\$0.00	\$7,928.00
Denver Water	\$0.00	\$0.00	\$7,500.00
Melbourne Water Corporation	\$0.00	\$0.00	\$15,000.00
City of Aurora Utilities	\$0.00	\$0.00	\$7,500.00
City of Boulder	\$0.00	\$0.00	\$5,000.00
Central Arkansas Water	\$0.00	\$0.00	\$20,000.00
Metropolitan Water District of Southern California	\$0.00	\$0.00	\$6,000.00

Exhibit C
Project 04494
Continued

ORGANIZATION	Award Amount	Cost Share Amount	In-Kind Amount
Other Participants			
Bavarian Environment Agency	\$0.00	\$0.00	\$10,000.00
BFG (Federal Institute of Hydrology)	\$0.00	\$0.00	\$0.00
EAWAG	\$0.00	\$0.00	\$2,000.00
Lake Havasu City Water Department	\$0.00	\$0.00	\$3,000.00
RIWA	\$0.00	\$0.00	\$6,000.00
Snyderville Water Reclamation	\$0.00	\$0.00	\$10,000.00
Eurofins Eaton Analytical	\$0.00	\$0.00	\$3,000.00
California Department of Public Health	\$0.00	\$0.00	\$0.00
UBA	\$0.00	\$0.00	\$0.00
UNSW	\$0.00	\$0.00	\$5,000.00
Inter-Industry Network on Microconstituents	\$0.00	\$0.00	\$25,000.00
Veolia Environnement	\$0.00	\$0.00	\$5,000.00
Metro Wastewater Reclamation	\$0.00	\$0.00	\$7,500.00
Umwelt Bundes Amt	\$0.00	\$0.00	\$0.00
Joe Cotruvo & Associates	\$0.00	\$0.00	\$0.00
University of Florida	\$0.00	\$0.00	\$0.00
Austrian EPA	\$0.00	\$0.00	\$0.00
European Commission	\$0.00	\$0.00	\$0.00
United Water	\$0.00	\$0.00	\$5,000.00
Co-PI's			
University of Arizona	\$0.00	\$0.00	\$0.00
Technische Universität München	\$0.00	\$34,168.00	\$0.00
Southern Nevada Water Authority	\$0.00	\$10,003.00	\$0.00
Sub-recipient Contribution			
Carollo Engineers, Inc.	\$0.00	\$15,867.00	\$0.00
Water Research Foundation Contribution	\$400,000.00	\$0.00	\$0.00
Totals	\$400,000.00	\$60,038.00	\$233,928.00
Total Project Budget \$693,966.00			

Project Award Funds: not to exceed \$400,000.00

10% of Project Funds advanced on or following Effective Date: \$40,000.00

Amount due upon the Foundation's acceptance of Draft Report: \$40,000.00

Amount due upon the Foundation's acceptance of the Final Report and final invoice: \$40,000.00

Exhibit D
Project 04494

Title: Evaluation of Current and Alternative Strategies for Managing CECs in Water

Exhibit D – Invoice Form

For access to the Water Research Foundation website please see:

<http://www.waterrf.org>

To download Exhibit D – Invoice Form please see the Foundation's website:

http://www.waterrf.org/funding/ContractMaterials/Invoice_ExhibitD.pdf

**SOUTHERN NEVADA WATER AUTHORITY
BOARD OF DIRECTORS
AGENDA ITEM**

March 20, 2014

Subject: Las Vegas Wash Capital Improvements Plan	Director's Backup
Petitioner: David L. Johnson, Deputy General Manager, Engineering/Operations	
Recommendations: That the Board of Directors adopt the 2014 Las Vegas Wash Capital Improvements Plan.	

Fiscal Impact:

None by approval of the above recommendation. Costs associated with specific projects will be identified and presented to the Board of Directors for consideration at future meetings.

Background:

On June 20, 2002, the Board of Directors approved the Las Vegas Wash Cooperative Agreement, which set forth efforts and initiatives to address ongoing issues in the Las Vegas Wash. On October 18, 2007, the Las Vegas Valley Watershed Advisory Committee (LVVWAC) was established to take a regional approach to watershed management, which included management of the Las Vegas Wash. The LVVWAC's First Amended Agreement, approved by the Board on July 19, 2012, requires the Authority to annually prepare and issue a Las Vegas Wash Capital Improvements Plan (Wash CIP). First issued and approved in 2002, the most recent amended Wash CIP was approved by the Board on February 21, 2013.

The attached 2014 Wash CIP amends the previous plan by identifying specific facilities planned for design and construction through fiscal year 2017-18. The 2014 Wash CIP forecasts a total capital expenditure of \$45,286,601 and represents a decrease of \$14,554,086 over the previous plan forecast. The proposed revisions in the 2014 Wash CIP reflect adjustments in construction unit prices, projected facility construction costs, environmental mitigation requirements, and completion of previously planned projects.

The overall Las Vegas Wash capital improvements effort is now more than 75 percent complete. Since the start of the stabilization effort at the Wash, the Authority has completed 16 of 22 planned gradient control weirs, installed approximately 11 miles of channel bank protection, and revegetated over 350 acres of disturbed lands.

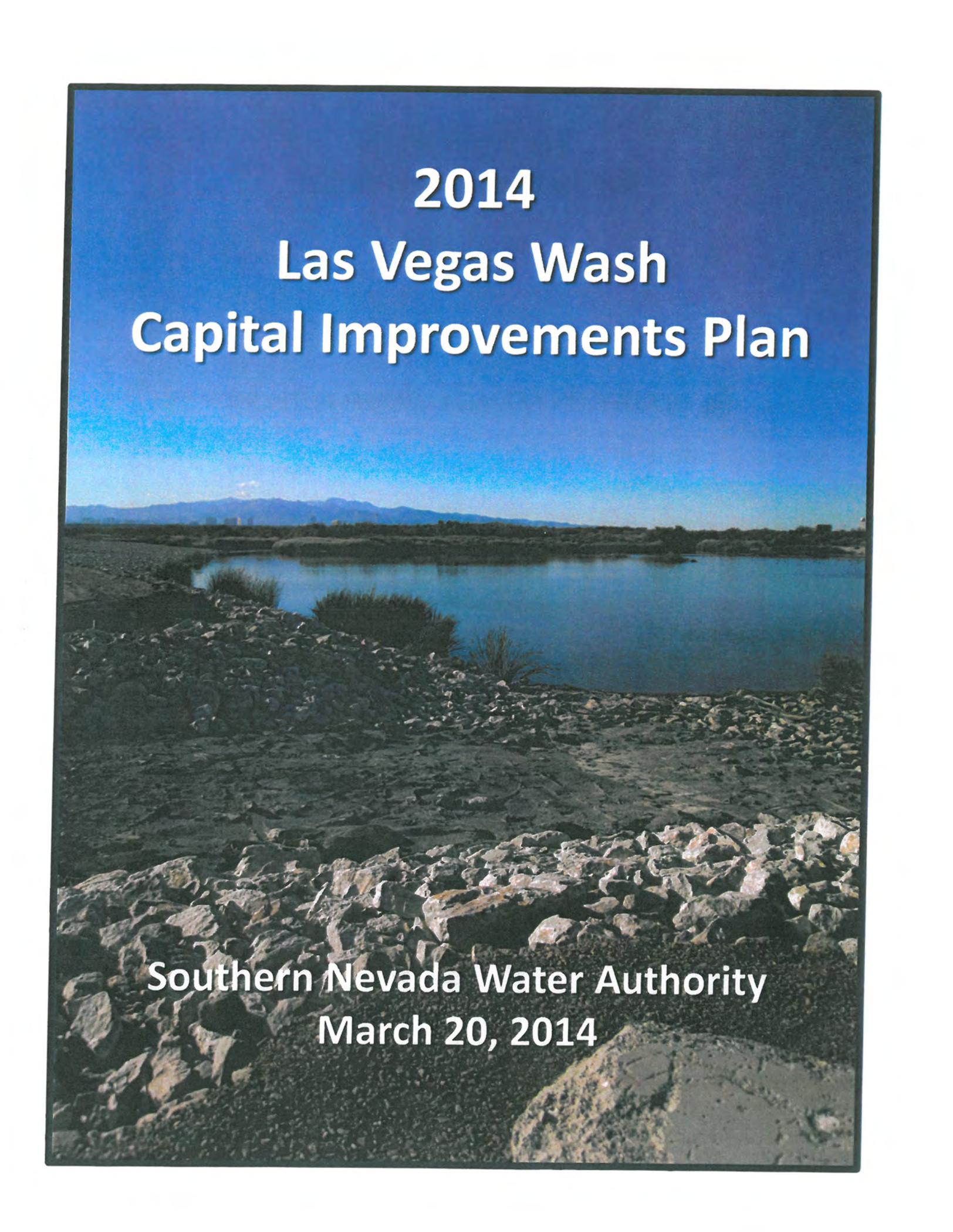
On January 14, 2014, the LVVWAC reviewed and approved the attached 2014 Wash CIP.

This action is authorized pursuant to NRS 277.045, Section 6(j) of the SNWA 1995 Amended Cooperative Agreement, and Section 7.1 of the Las Vegas Valley Watershed Advisory Committee First Amended Agreement. The office of the General Counsel has reviewed and approved this agenda item.

Respectfully submitted:


John J. Entsminger, General Manager
JJE:PDS:DLJ:MRJ:GAH:kjc
Attachment

AGENDA ITEM #	8
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2014
Las Vegas Wash
Capital Improvements Plan

Southern Nevada Water Authority
March 20, 2014

Las Vegas Wash Capital Improvements Plan

March 2014



Board of Directors

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Las Vegas Wash

Capital Improvements Plan

1.0 Introduction

1.1 Purpose

The Lower Las Vegas Wash (Wash), in Clark County, Nevada, is the primary urban runoff, wastewater and floodwater outlet from the Las Vegas Valley into Lake Mead and the Colorado River. The Wash is considered a critical component in the many environmental and water resource issues facing Southern Nevada today. This Southern Nevada Water Authority Las Vegas Wash Capital Improvements Plan (Wash CIP) presents a summary of planned capital expense activities necessary to support long-term enhancement and management of the Wash.

1.2 Background

Since 1975, the Wash has undergone significant erosion and degradation due to increasing flows resulting from expanding upstream urbanization in the Las Vegas Valley. To combat the changes in the Wash, the Las Vegas Wash Coordination Committee (LVWCC), a 29-member interagency group of federal, state, and local agencies, and private interests, was formed and has developed a Comprehensive Adaptive Management Plan (CAMP). The Southern Nevada Water Authority (SNWA) Board of Directors approved the CAMP in April 2000.

Of 44 recommendations, the CAMP identifies erosion control and stream stabilization of the Wash as one of the highest recommended priority efforts. To accomplish this goal, in 2002, a Cooperative Agreement was signed between the local government agencies considered major stakeholders in the Wash. In 2012, the Cooperative Agreement was amended and retitled as the "First Amended Agreement Regarding the Las Vegas Valley Watershed Advisory Committee" (Amended Agreement). As described in the Amended Agreement, the SNWA has been designated by the members of the Las Vegas Valley Watershed Advisory Committee (LVVWAC), as the lead agency to coordinate and manage the enhancement of the Wash. Among many assigned tasks, the SNWA is responsible for maintaining this Wash CIP.

The Amended Agreement establishes the LVVWAC to provide advice and consultation to SNWA on issues regarding this Wash CIP. Local government agency members of the LVVWAC include:

- City of Las Vegas
- City of Henderson
- City of North Las Vegas
- Clark County
- Las Vegas Valley Water District
- Clark County Water Reclamation District
- Clark County Regional Flood Control District
- Southern Nevada Water Authority

2.0 Plan Scope

2.1 General Scope

This Wash CIP covers the geographical area of the Wash from the City of Las Vegas Wastewater Treatment Plant to the western boundary of the Lake Mead National Recreational Area. The Wash CIP is intended to describe all presently identified construction and construction support projects supporting the management and enhancement of the Wash. Project elements included in this Wash CIP include:

- Channel bed and bank stabilization;
- Revegetation; and
- Comprehensive programs.

The purpose of channel bed stabilization is to reduce channel bed erosion by slowing stream flow to less erosive conditions while providing a stable platform for vegetation re-establishment. Gradient control weirs or dams are planned for installation to accomplish the stabilization needs. Channel bank protection installations are planned to be completed as a part of channel bed stabilization projects, and focus on reducing the ability of Wash flows to undercut, erode and collapse channel banks. Capital expenditures for bank protection will include installation of rock or concrete riprap armor and revegetation of stream banks, where appropriate.

Revegetation of the Wash channel bed, banks, disturbed overbank locations and floodplain areas will provide surface erosion protection, aid ecosystem restoration, support water quality goals and meet environmental permitting requirements. Revegetation activities may include wetlands or dry land revegetation, installation of temporary irrigation systems and establishment of vegetation protection measures.

Comprehensive programs include design and support activities serving multiple capital projects or the Wash as a whole. Activities under this element may include acquisition of rock and concrete materials for use as riprap, installation of construction access roads, location of materials storage sites, long term dust control practices, sediment and sediment transport studies, hydraulic studies, topographic mapping, water quality monitoring, stream gauging, and other supporting capital expense activities which are necessary to support construction efforts.

2.2 Facility Information

The following information pertaining to specific facilities is presented in this Wash CIP:

- General description and location of each planned facility;
- Anticipated construction schedules;
- Estimated cost of each proposed facility;
- Proposed funding mechanism(s) for each facility in the Work Plan;
- Total projected Wash CIP cost in current and midpoint dollars;
- Cash flow forecasts by year; and
- A list of SNWA operated and maintained facilities.

3.0 Organization

General information regarding the background, scope, approval process, current revenues, anticipated expenditures, prioritization, and funded Project Work Plan are presented in this Wash CIP report. Specific details defining anticipated projects, project costs, implementation schedules, prioritization analysis, and other information are included as appendices to this Wash CIP.

All identified, individual projects requiring expenditure of capital funds are described in the appendix as Candidate Projects to this Wash CIP. A unique project number and

letter designation and a location name describe each project. Channel bank protection and revegetation projects are named and project numbers are assigned with a letter designation which conforms to the name of the next downstream channel bed stabilization facility to which they are associated.

4.0 Plan Implementation

4.1 Cooperative Agreement

In 2002, SNWA entered into a Cooperative Agreement pertaining to the long-term management and enhancement of the Wash with Clark County, City of Las Vegas, City of Henderson, City of North Las Vegas, Clark County Water Reclamation District, and Clark County Regional Flood Control District. The current Amended Agreement establishes roles and responsibilities for the above agencies in managing the Wash. The development, review, and update of this Wash CIP are identified in the Amended Agreement as a responsibility of the SNWA. The Amended Agreement further defines the contents of the Wash CIP as presented herein.

4.2 Annual Plan Review

The SNWA annually reviews, reaffirms, or revises the Wash CIP, as necessary to meet the goals and requirements of the Amended Agreement. In performing the annual review, the SNWA consults with the local agency stakeholders to the Wash through the Operations Study Team of the LVWCC and through the LVVWAC.

SNWA's consultation with local agency stakeholders and revisions to the Wash CIP focus upon current changes in priority, planning, design, cost, funding, and/or capital needs associated with the elements of the Wash CIP. Revisions to the Wash CIP reflect the elimination of capital items previously completed or revisions proposed by a party to the Amended Agreement and agreed to by the LVVWAC.

Upon revision by SNWA and approval by the LVVWAC, the annual Wash CIP update is submitted to the SNWA Board of Directors for review and action.

4.3 Funding Approval

As appropriate, SNWA prepares and submits Wash CIP funding agreements to the LVVWAC for review. Funding agreements prepared and submitted by SNWA may also define the process whereby entities other than the parties to the Amended Agreement may either fund or contribute to the Wash CIP.

Subsequent to the LVVWAC's review of funding agreements, SNWA submits the funding agreements to each of the local governmental agencies comprising the LVVWAC for consideration and possible approval by their respective Governing Boards as a part of the individual Party's overall budgeting process.

5.0 Funding and Expenditures

5.1 Funding-To-Date

Sales Tax and Grant Funding: The Wash CIP has been partially funded through receipt of local sales tax revenues. The Wash currently receives four percent (4%) of a ¼ cent sales tax allocated for funding water and wastewater projects in Clark County. The Wash has also received capital grant funding commitments from the Southern Nevada Public Lands Management Act (SNPLMA), for current and future projects.

Other Local Agency Funding: In addition to local sales tax revenues and SNPLMA grants, the Wash CIP has received funding or funding commitments from other local agencies through in-kind construction activities or direct funding to SNWA.

Interfund Loans: Periodically, projected, near-term capital expenses for construction of stabilization facilities in the Wash will exceed available cash on hand generated from sales tax and grant funding. In these cases, the Wash CIP will borrow money from SNWA's New Expansion Debt Service fund accounts, as available.

Funding and funding sources to-date are shown in Table 1 below:

Table 1
Funding-to-Date
1999 – 2013

Funding Source	Estimated Funding-to-Date	%
Sales Tax & Interest (Includes Estimated figures through December 2013)	\$ 45,491,020	35.7
US Bureau of Reclamation Grants	\$ 5,828,224	4.6
SNPLMA Funding	\$ 37,315,220	29.3
Miscellaneous State and Federal Grants	\$ 445,500	0.4
Other Local Agency Funding	\$ 14,460,000	11.3
Interfund Borrowings	\$ 23,874,542	18.7
Total:	\$ 127,414,506	100.0

5.2 Expenditures

5.2.1 Expenditures-To-Date

From 1999 through December 2013, Wash CIP total expenditures have been as shown in Table 2 below. These expenditures include contributions by other stakeholder agencies for capital improvements to the Wash.

Other stakeholder agency expenditures have included: Clark County, design and construction of the Pabco Road Weir at approximately \$4,700,000; Lake Las Vegas Resort, design and construction of the Fire Station Weir at approximately \$63,000; SNWA Water CIP, design and construction of the Rainbow Gardens Weir as part of the East Valley Water Lateral crossing of the Wash, at approximately \$7,238,000; and US Bureau of Reclamation construction activities.

Expenditures include repayment with interest, of funds borrowed from the New Expansion Debt Service fund account.

Capital construction expenditures to-date are shown in Table 2 below:

Table 2
Total Expenditures-to-Date
1999 - 2013

Program	Total Expenditures-to-Date	%
Channel Stabilization	\$ 93,700,709	74.0
Revegetation	\$ 1,481,134	1.2
Comprehensive Programs	\$ 6,708,773	5.3
Interfund Borrowing Repayments	\$ 23,874,542	18.9
Interfund Borrowing Interest Repayments	\$ 781,445	0.6
Total:	\$ 126,546,603	100.0

5.2.2 Future Expenditures

Current projections of future capital expenditures for the Wash CIP are detailed in the Construction Program Master Plan shown in Appendix C. Projected expenditures are shown in both current dollars and projected expenses, accelerated to future construction mid-point dollar is cost, based upon an estimated current three percent (3%) annual growth. Funding commitments for individual projects will be based upon availability of funds at the time the commitment is made. Estimated capital expenditures are summarized in Table 3 below:

Table 3
Projected Expenditures
2014-2018

Wash CIP Component	Projected Expenditures	%
Channel Stabilization	\$ 40,947,730	90.4
Revegetation Programs	\$ 2,838,871	6.3
Comprehensive Programs	\$ 1,500,000	3.3
Total Projected Expenditures:	\$ 45,286,601	100.0

6.0 Priority Assessment

The Operations Study Team of the LVWCC has developed a methodology for prioritization of each proposed gradient control and bank protection capital expenditure in the Wash. Rating factors utilized in establishing proposed project priorities are described in Appendix E of this plan.

Unless otherwise noted, bank protection capital investments will occur during implementation of the next downstream gradient control facility. Where severe bank erosion is occurring, stabilization may precede downstream gradient control implementation. Revegetation investments normally follow channel bed and bank stabilization, where practical. Unless otherwise noted, revegetation projects are planned for implementation following channel stabilization projects and are not shown in a separate priority evaluation within this Wash CIP.

Over the long-term life of the Wash CIP, priorities may change as need, funding, and other issues arise. Therefore SNWA, acting through the Operations Study Team and the LVVWAC, will annually review the prioritization schedule, evaluation criteria, proposed candidate project list, and available funding to assess current priorities. A summary of the criteria applied to assess prioritization, as developed by the Operations Study Team, and as approved by the LVVWAC are as follows:

- Upstream Stability
- System Relationship
- Water Quality Enhancement
- Recreational Opportunity
- Public Safety
- Regulatory Permitting Requirements
- Access
- Cost Avoidance
- Availability of Other Funding

Detailed descriptions of these criteria are found in Appendix F of this plan.

Annually, the SNWA staff calculates priority values for each proposed project based upon the prioritization criteria outlined herein. These values and proposed project

rankings are then reviewed, discussed, and/or modified by the Operations Study Team of the LVVWAC. Project activity is then scheduled, as much as practical, to follow priority rankings described in Appendix E. Issues such as land ownership, construction conflict, potential cost savings in grouping several projects together under a single construction contract, and similar issues may cause some projects of lower priority to be scheduled for construction in conjunction with higher priority projects.

After SNWA develops a proposed project implementation schedule, the draft priority and project rankings are submitted to the Operations Study Team of the LVWCC for further review and/or modification. SNWA then publishes those findings in annual updates of the Wash CIP and submits the update to the LVVWAC and SNWA Board of Directors for review and action.

7.0 2014-15 Project Work Plan

The Project Work Plan presented in Appendix A, represents a series of projects scheduled for activity during the next two years for which funding sources have been or are expected to be identified. Approximately 40 percent (40%) of the Project Work Plan will be funded through SMPLA. The remaining funding for individual capital projects will come from revenues generated from sales taxes. Funding commitments for individual projects will be based upon availability of funds at the time the commitment is made. The Project Work Plan is a sub-set of the Construction Program Master Plan detailed in Appendix C.

The Project Work Plan budget is based upon current estimates of present cost and projected actual cost, accelerated to anticipated midpoints of design and construction period activities. Project costs may change depending upon final design configuration, modified design criteria, or construction prices at the time of construction bidding. Where construction cost estimates or bids exceed expected revenues at the scheduled time of construction, a project may be delayed to a future time when revenues become available. Where expenditures are found to be less than available funding, with LVVWAC approval, additional candidate projects may be incorporated into the Project Work Plan for implementation.

8.0 Ownership

The planned erosion control facilities lie within the boundaries of the Clark County Wetlands Park. Consistent with the Amended Agreement, SNWA will transfer ownership to Clark County of stabilization facilities, including channel stabilization facilities, revegetated areas, and other facilities when deemed appropriate by the SNWA and Clark County.

9.0 Operations and Maintenance

In accordance with the Amended Agreement, SNWA operates and maintains Wash facilities, including channel stabilization projects and revegetated areas described in this Wash CIP and Project Work Plan until such time that ownership is transferred to Clark County.

The SNWA conducts these activities in conformance with the Operations and Maintenance Plan for the Wash. Currently, SNWA's operations and maintenance activities are financed through assessments levied to individual LVVWAC member agencies, through the utilization of Bureau of Reclamation construction grant funding or through flood control maintenance funds allocated to SNWA by Clark County.

Appendix A
2014-15 Project Work Plan

2014 - 15 Work Plan Budget Allocation

Project No.	Project Title	Project Start Date	Project Finish Date	Mid-Point Cost					Total Project Cost
				2014	2015	2016	2017	2018	
Design									
810C	Historic Lateral Weir Expansion	1/2/2014	1/2/2015	\$ 113,943					\$ 113,943
810W	Sunrise Mountain Weir	3/1/2014	3/1/2015	\$ 177,188	\$ 35,438				\$ 212,626
810S	Tropical Outfall Weir	3/1/2014	8/28/2015	\$ 190,953	\$ 152,762				\$ 343,715
810T	D-14 Extension	3/1/2014	8/28/2015	\$ 190,953	\$ 152,762				\$ 343,715
Design, Total:				\$ 673,037	\$ 340,963				\$ 1,014,000
Construction									
810K	Three Kids Weir	7/18/2013	6/18/2015	\$ 7,221,333	\$ 3,610,667				\$ 10,832,000
810U	Silver Bowl Weir	2/16/2014	4/17/2015	\$ 4,264,000	\$ 2,132,000				\$ 6,396,000
810Z	Archery Weir	2/16/2014	4/17/2015	\$ 4,264,000	\$ 2,132,000				\$ 6,396,000
810C	Historic Lateral Weir Expansion	5/1/2015	2/25/2016		\$ 2,340,821	\$ 585,205			\$ 2,926,026
Construction, Total:				\$ 15,749,333	\$ 10,215,488	\$ 585,205			\$ 26,550,026
Revegetation									
880M	Homestead, Lower Narrows Weirs Duck Creek Confluence, Upper Narrows, & DU Wetlands No. 1 Weirs	1/1/2014	12/31/2015	\$ 172,319	\$ 57,440				\$ 229,759
880G	Three Kids Weir	1/1/2014	12/31/2015	\$ 465,728	\$ 465,728				\$ 931,456
880K	Silver Bowl Weir	9/1/2015	8/30/2017		\$ 96,595	\$ 289,786	\$ 193,191		\$ 579,573
880U	Archery Weir	9/1/2015	8/30/2017		\$ 48,298	\$ 144,893	\$ 96,595		\$ 289,786
880Z	Historic Lateral Weir Expansion	9/1/2015	8/30/2017		\$ 48,298	\$ 144,893	\$ 96,595		\$ 289,786
Revegetation, Total:				\$ 638,047	\$ 716,359	\$ 579,573	\$ 386,382		\$ 2,320,361
Comprehensive Programs									
860P	Flood Repair Allocation	1/2/2014	1/2/2016	\$ 288,000	\$ 288,000	\$ 24,000			\$ 600,000
860V	BOR Materials & Equipment	2/10/2014	3/11/2016	\$ 300,000	\$ 300,000				\$ 600,000
Comprehensive, Total:				\$ 588,000	\$ 588,000	\$ 24,000			\$ 1,200,000
Program Cost Summary									
Design				\$ 673,037	\$ 340,963	\$ -	\$ -	\$ -	\$ 1,014,000
Construction				\$ 15,749,333	\$ 10,215,488	\$ 585,205	\$ -	\$ -	\$ 26,550,026
Revegetation				\$ 638,047	\$ 716,359	\$ 579,573	\$ 386,382	\$ -	\$ 2,320,361
Comprehensive Programs				\$ 588,000	\$ 588,000	\$ 24,000	\$ -	\$ -	\$ 1,200,000
Total Program:				\$ 17,648,417	\$ 11,860,810	\$ 1,188,778	\$ 386,382	\$ -	\$ 31,084,387

Appendix B
Project Descriptions

Project Descriptions

<u>Project Title:</u> Historic Lateral Weir Expansion		<u>Project Number:</u> 810C
		<u>Project Status:</u> Design
<u>Project Description:</u>		
<p>The existing Historic Lateral Weir was constructed as SNWA Project 910AR in 2000. This facility is located at the site of the first Las Vegas Valley Water Lateral crossing of the Las Vegas Wash. This 518 foot long, 9 foot high, rock riprap structure provides channel bed stabilization upstream to the Pabco Road Erosion Control Structure. This project will increase hydraulic capacity and provide channel bed stabilization to the new, downstream C-1 Channel outfall. This Project will be funded by sales tax revenues.</p>		

<u>Project Title:</u> Three Kids Weir		<u>Project Number:</u> 810K
		<u>Project Status:</u> Construction
<u>Project Description:</u>		
<p>This project involves the construction of a permanent weir facility to replace an existing temporary facility installed following a 1999 flood event. This new facility will provide toe erosion protection for the future Homestead Weir while controlling approximately 18 feet of vertical erosion potential in the Las Vegas Wash. The Three Kids Weir will be approximately 490 feet in length, 528 feet wide, and 18.5 feet high. This Project is being funded by SNPLMA grants and sales tax revenues.</p>		

<u>Project Title:</u> Tropicana Outfall Weir		<u>Project Number:</u> 810S
		<u>Project Status:</u> Planned
<u>Project Description:</u>		
<p>This facility is planned to be located immediately downstream of the confluence of the Tropicana Channel outfall in the Las Vegas Wash, at the Clark County Nature Preserve. The facility is expected to be 9 feet in height and 200 feet long. This Project is currently unfunded.</p>		

<u>Project Title:</u> D-14 Extension Weir		<u>Project Number:</u> 810T
		<u>Project Status:</u> Planned
<u>Project Description:</u>		
<p>Located at the Clark County Nature Preserve this facility is expected to control approximately 5 feet of vertical erosion potential immediately downstream of the Visitor Center Weir. This facility is expected to have a weir crest 500 feet long and tie into the existing D-14 dike structure. This Project is currently unfunded.</p>		

Project Descriptions

Project Title: Silver Bowl Weir		Project Number: 810U
		Project Status: Construction
Project Description:		
<p>This facility is located on the Las Vegas Wash approximately 1/2 mile upstream of the confluence with Duck Creek. The structure will stabilize approximately 10 vertical feet of potential headcut erosion. Currently planned as a rock riprap facility, the structure will be approximately 250 feet long, 263 feet wide, and 7 feet high. This Project is being funded by SNPLMA grants and sales tax revenues.</p>		

Project Title: Sunrise Mountain Weir		Project Number: 810W
		Project Status: Design
Project Description:		
<p>This facility is to be located approximately 0.4 mile upstream of the Pabco Road Erosion Control Structure. This 350 foot long facility will stabilize approximately five feet of potential channel headcut erosion. This Project will be funded by sales tax revenues.</p>		

Project Title: Archery Weir		Project Number: 810Z
		Project Status: Construction
Project Description:		
<p>This gradient control structure will be located on the Las Vegas Wash approximately 1 mile upstream of the confluence with Duck Creek. This facility will stabilize approximately 10 vertical feet of headcutting channel erosion. This facility is planned to be a rock riprap type weir, approximately 400 feet wide and 8 feet tall. This Project will be funded by sales tax revenues.</p>		

Project Title: 2014 Materials Transport		Project Number: 890B
		Project Status: Programmed
Project Description:		
<p>Provide materials for use by SNWA Contractors or the BOR during bank stabilization activities. This Project will be funded by sales tax revenues.</p>		

Project Descriptions

Project Title: Flood Repair Allocation		Project Number: 860P
		Project Status: Construction
Project Description: Large flood events may damage existing stabilization facilities or create damage elsewhere in the Las Vegas Wash. This project will allow for the construction repair of stabilization facilities following major flood events where further damage to SNWA stabilization facilities will limit the ability of the facilities to function as intended. This Project will be funded by sales tax revenues.		

Project Title: BOR Materials & Equipment		Project Number: 860V
		Project Status: Procurement
Project Description: Annually SNWA installs bank protection and performs other construction and maintenance in the Las Vegas Wash in partnership with the U.S. Bureau of Reclamation. Construction activities are cost-shared with SNWA providing funding for construction materials acquisition and construction equipment rental. This project allows for the cost-sharing activities to proceed on an annual basis as federal funding is identified. This Project is funded through BOR grants and sales tax revenues.		

Project Title: Biological Surveys		Project Number: 860X
		Project Status: Implemented
Project Description: This project establishes annual funding for biological monitoring of the Las Vegas Wash where such activities are required as conditions of environmental permits issued for construction of stabilization facilities. This Project will be funded by sales tax revenues.		

Project Title: Historic Lateral Weir Expansion		Project Number: 880C
		Project Status: Design
Project Description: This project is intended to replace wetlands and other vegetation removed during weir construction, stabilize the stream banks, provide erosion control and habitat benefits. This Project will be funded by sales tax revenues.		

Project Descriptions

<u>Project Title:</u> Duck Creek Confluence, Upper Narrows, & DU Wetlands No. 1 Weir Sites Revegetation	<u>Project Number:</u> 880G <u>Project Status:</u> Construction
<u>Project Description:</u> This project is intended to replace wetlands and other vegetation removed during weir construction, stabilize the stream banks, provide erosion control and habitat benefits. This Project is being funded by SNPLMA grants and sales tax revenues.	

<u>Project Title:</u> Three Kids Weir Revegetation	<u>Project Number:</u> 880K <u>Project Status:</u> Programmed
<u>Project Description:</u> This project is intended to replace wetlands and other vegetation removed during weir construction, stabilize the stream banks, provide erosion control and habitat benefits. This Project is being funded by SNPLMA grants and sales tax revenues.	

<u>Project Title:</u> Lower Narrows & Homestead Weirs Revegetation	<u>Project Number:</u> 880M <u>Project Status:</u> Construction
<u>Project Description:</u> This project is intended to replace wetlands and other vegetation removed during weir construction, stabilize the stream banks, provide erosion control and habitat benefits. This Project is being funded by SNPLMA grants and sales tax revenues.	

<u>Project Title:</u> Tropicana Outfall Weir Revegetation	<u>Project Number:</u> 880S <u>Project Status:</u> Programmed
<u>Project Description:</u> This project is intended to replace wetlands and other vegetation removed during weir construction, stabilize the stream banks, provide erosion control and habitat benefits. This Project is currently unfunded.	

Project Descriptions

<u>Project Title:</u> D-14 Extension Weir Revegetation		<u>Project Number:</u> 880T
<u>Project Status:</u> Programmed		
<u>Project Description:</u> This project is intended to replace wetlands and other vegetation removed during weir construction, stabilize the stream banks, provide erosion control and habitat benefits. This Project is currently unfunded.		

<u>Project Title:</u> Silver Bowl Weir Revegetation		<u>Project Number:</u> 880U
<u>Project Status:</u> Programmed		
<u>Project Description:</u> This project is intended to replace wetlands and other vegetation removed during weir construction, stabilize the stream banks, provide erosion control and habitat benefits. This Project is being funded by SNPLMA grants and sales tax revenues.		

<u>Project Title:</u> Sunrise Mountain Weir Revegetation		<u>Project Number:</u> 880W
<u>Project Status:</u> Programmed		
<u>Project Description:</u> This project is intended to replace wetlands and other vegetation removed during weir construction, stabilize the stream banks, provide erosion control and habitat benefits. This Project will be funded by sales tax revenues.		

<u>Project Title:</u> Archery Weir Revegetation		<u>Project Number:</u> 880Z
<u>Project Status:</u> Programmed		
<u>Project Description:</u> This project is intended to replace wetlands and other vegetation removed during weir construction, stabilize the stream banks, provide erosion control and habitat benefits. This Project will be funded by sales tax revenues.		

Appendix C
Construction Program Master Plan

2014 Las Vegas Wash Construction Program Master Plan

Design	Project Name	Start	Finish	Present Value	Future Value	2014	2015	2016	2017	2018	Total
810C	Historic Lateral Weir Expansion	1/2/2014	1/2/2015	\$ 112,000	\$ 113,943	\$ 113,943	\$ -	\$ -	\$ -	\$ -	\$ 113,943
810W	Sunrise Mountain Weir	3/1/2014	3/1/2015	\$ 209,000	\$ 212,626	\$ 177,188	\$ 35,438	\$ -	\$ -	\$ -	\$ 212,626
810S	Tropicana Outfall Weir	3/1/2014	8/28/2015	\$ 335,000	\$ 343,715	\$ 190,953	\$ 152,762	\$ -	\$ -	\$ -	\$ 343,715
810T	D-14 Extension	3/1/2014	8/28/2015	\$ 335,000	\$ 343,715	\$ 190,953	\$ 152,762	\$ -	\$ -	\$ -	\$ 343,715
TOTAL				\$ 991,000	\$ 1,014,000	\$ 673,037	\$ 340,962	\$ -	\$ -	\$ -	\$ 1,014,000

Construction	Project Name	Start	Finish	Present Value	Future Value	2014	2015	2016	2017	2018	Total
810K	Three Kids Weir	7/18/2013	6/18/2015	\$ 10,832,000	\$ 10,832,000	\$ 7,221,333	\$ 3,610,667	\$ -	\$ -	\$ -	\$ 10,832,000
810U	Silver Bowl Weir	2/16/2014	4/17/2015	\$ 6,396,000	\$ 6,396,000	\$ 4,264,000	\$ 2,132,000	\$ -	\$ -	\$ -	\$ 6,396,000
810Z	Archery Weir	2/16/2014	4/17/2015	\$ 6,396,000	\$ 6,396,000	\$ 4,264,000	\$ 2,132,000	\$ -	\$ -	\$ -	\$ 6,396,000
810C	Historic Lateral Weir Expansion	5/1/2015	2/25/2016	\$ 2,884,950	\$ 2,926,026	\$ -	\$ 2,340,821	\$ 585,205	\$ -	\$ -	\$ 2,926,026
810W	Sunrise Mountain Weir	2/15/2016	4/10/2017	\$ 4,936,988	\$ 5,035,677	\$ -	\$ -	\$ 3,692,830	\$ 1,342,847	\$ -	\$ 5,035,677
810S	Tropicana Outfall Weir	2/15/2016	4/10/2017	\$ 4,479,847	\$ 4,569,398	\$ -	\$ -	\$ 3,350,892	\$ 1,218,506	\$ -	\$ 4,569,398
810T	D-14 Extension	2/15/2016	4/10/2017	\$ 3,704,575	\$ 3,778,629	\$ -	\$ -	\$ 2,770,994	\$ 1,007,635	\$ -	\$ 3,778,629
TOTAL				\$ 39,630,360	\$ 39,933,730	\$ 15,749,333	\$ 10,215,488	\$ 10,399,921	\$ 3,568,988	\$ -	\$ 39,933,730

Revegetation	Project Name	Start	Finish	Present Value	Future Value	2014	2015	2016	2017	2018	Total
880M	Lower Narrows/Homestead	1/2/2014	12/31/2015	\$ 222,000	\$ 229,759	\$ 114,880	\$ 114,880	\$ -	\$ -	\$ -	\$ 229,759
880G	Duck Creek Confluence, Upper Narrows, & DU Wetlands No. 1 Weirs	1/2/2014	12/31/2015	\$ 900,000	\$ 931,456	\$ 465,728	\$ 465,728	\$ -	\$ -	\$ -	\$ 931,456
880K	Three Kids Weir	9/1/2015	8/30/2017	\$ 560,000	\$ 579,573	\$ -	\$ 96,595	\$ 289,786	\$ 193,191	\$ -	\$ 579,573
880U	Silver Bowl Weir	9/1/2015	8/30/2017	\$ 280,000	\$ 289,786	\$ -	\$ 48,298	\$ 144,893	\$ 96,595	\$ -	\$ 289,786
880Z	Archery Weir	9/1/2015	8/30/2017	\$ 280,000	\$ 289,786	\$ -	\$ 48,298	\$ 144,893	\$ 96,595	\$ -	\$ 289,786
880C	Historic Lateral Weir Expansion	2/25/2016	2/23/2018	\$ 124,000	\$ 128,334	\$ -	\$ -	\$ 53,472	\$ 64,167	\$ 10,694	\$ 128,334
880W	Sunrise Mountain Weir	4/10/2016	4/9/2018	\$ 128,000	\$ 132,474	\$ -	\$ -	\$ 44,158	\$ 66,237	\$ 22,079	\$ 132,474
880S	Tropicana Outfall Weir	4/10/2016	4/9/2018	\$ 125,000	\$ 129,369	\$ -	\$ -	\$ 43,123	\$ 64,684	\$ 21,561	\$ 129,369
880T	D-14 Extension Weir	4/10/2016	4/9/2018	\$ 124,000	\$ 128,334	\$ -	\$ -	\$ 42,778	\$ 64,167	\$ 21,389	\$ 128,334
TOTAL				\$ 2,743,000	\$ 2,838,871	\$ 580,608	\$ 773,799	\$ 763,104	\$ 645,637	\$ 75,724	\$ 2,838,871

Comprehensive	Project Name	Start	Finish	Present Value	Future Value	2014	2015	2016	2017	2018	Total
860P	Flood Repair Allocation	1/2/2014	1/2/2016	\$ 600,000	\$ 600,000	\$ 288,000	\$ 288,000	\$ 24,000	\$ -	\$ -	\$ 600,000
860V	BOR Materials & Equipment	2/10/2014	3/11/2016	\$ 900,000	\$ 900,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ -	\$ -	\$ 900,000
TOTAL 2014 WASH CIP (D)				\$ 44,864,360	\$ 45,286,601	\$ 17,590,978	\$ 11,918,249	\$ 11,487,025	\$ 4,214,625	\$ 75,724	\$ 45,286,601

Appendix D
Location Map

Appendix E
Ranking Criteria Scoring

2014 - 15 Capital Improvements Plan
 Ranking Criteria Scoring
 Channel Bed Stabilization

Factor	Criteria	Score	Criteria Score																							
			Fire Station	Powerline Crossing	Rainbow Gardens	Three Kids Weir	Homestead	Lower Narrows	Calico Ridge	Bostick	Historic Lateral	Pabco Road	Sunrise Mountain	Upper Narrows	Duck Creek	Archery	Silverbowl	DU Wetlands 1	DU Wetlands 2	Tropicana Outfall	D14 Extension	Visitor Center	Monson	Upper Diversion		
Upstream Stability	Active headcutting risking upstream channel, structures, or banks	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	Moderate headcutting in silty or sandy channel bed, some bank stability threat	3	3																				3	3		
	Slow headcutting in caliche or bedrock, little bank stability threat	1																								
System Relationship	Provides important foundation or stability support for other facilities	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	Provides moderate foundation or stability support to other Wash features	3																								
	Provides minor or no foundation or stability support to other facilities	1																								
Cost Avoidance	Will reduce capital cost of other facilities or is a low maintenance facility	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	Provides minor capital cost savings for other facilities or minor annual maintenance expected	3																								
	Provides no reduction in capital cost for other facilities, high maintenance expected	1																								
Water Quality	Provides large volume for sediment capture or 5 or more acres potential wetlands area	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	Provides minor volume of sediment capture or 3 or more acres potential wetlands area	3	3																							
	Provides little or no volume for sediment capture or less than 1 acre of potential wetlands area	1																								
Ecosystem Enhancement	Provides platform for ecosystem enhancement covering greater than 5 acres	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	Provides platform for ecosystem enhancement covering greater than 3 acres	3	3																							
	Provides platform for ecosystem enhancement covering 1 acre or more	1																								
Recreational Opportunities	Directly reduces threat to recreational features	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	Provides possible threat reduction to recreational features	3	3																							
	Provides little or no threat reduction to recreational features	1	1																							
Public Safety	Is strongly beneficial to public safety associated with activities in the Wash	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	Provides some improvement to public safety associated with activities in the Wash	3	3	3																						
	Provides little improvement to public safety associated with activities in the Wash	1	1																							
Permitting	Relatively minor permitting issues to be resolved	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	Wetlands, WQ, Wildlife, or Archeological issues exist and clearance required	3	3	3																						
	A sensitive site requiring mitigation or high level of protection	1	1																							
ROW & Access	Local Government Ownership, relatively easy acquisition	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	Federal Ownership, requiring federal review and approval	3	3																							
	Private Ownership requiring extended negotiations	1	1																							
Other Funding	other local, state, or federal funding assistance for > 50% of project cost	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	Identified possibility for additional local, state, federal funding assistance for > 25% of project	3	3																							
	No additional funding assistance identified beyond local sales tax revenues or < 25% project	1	1																							

= In Construction or Completed

Appendix F
Project Prioritization

2014 - 15 Project Prioritization Channel Bed Stabilization

Facility Description	Channel Station	Facility ID	Priority Factor and Weight										Priority Value	Ranking	In Construction or Completed	
			Stability	Relationship	Cost Avoidance	WQ Enhancement	Ecosystem Enhancement	Recreational Benefit	Public Safety	Permitting	ROW & Access	Other Funding				
			5	5	5	3.5	3.5	3.5	3.5	2.5	2.5	2.5				
Lower Narrows	9470	810M	5	5	5	5	5	5	5	5	3	5	5	177.5		X
Homestead	6740	810L	5	5	5	5	5	5	5	3	5	5	177.5		X	
Three Kids Weir	5150	810K	5	5	5	5	5	5	5	5	1	5	172.5	1		
Historic Lateral	15400	810C (910AR)	5	5	5	5	5	3	3	3	5	5	163.5		X	
Rainbow Gardens	3120	810N (170A)	5	5	5	5	5	3	3	3	5	5	163.5		X	
Upper Diversion	35650	810F	5	5	5	3	3	5	5	3	5	5	163.5		X	
Pabco Road	20000	810D	5	5	5	3	5	3	5	1	5	5	158.5		X	
Bostick Weir	13300	810E	5	5	5	5	5	3	3	5	5	1	158.5		X	
Powerline Crossing	1950	810P	5	5	5	3	3	5	3	3	5	5	156.5		X	
DU Wetlands 1	29500	810V	5	5	5	3	3	3	3	5	5	5	154.5		X	
Duck Creek Confluence	25330	810G	5	3	5	5	5	5	3	3	5	3	155.5		X	
Upper Narrows	23500	810X	5	5	3	3	3	3	3	5	5	3	139.5		X	
Visitor Center	33850	810J	3	5	3	1	1	5	5	5	5	5	134.5		X	
Monson Weir	34950	810H	3	5	3	1	1	5	5	5	5	5	134.5		X	
DU Wetlands 2	31100	810Y	3	3	5	3	5	5	3	3	3	3	133.5		X	
Calico Ridge	11400	810R	5	5	5	1	1	1	3	5	3	5	128.5		X	
Archery	26500	810Z	5	5	5	3	3	3	1	3	5	1	132.5	2		
Silver Bowl	28190	810U	3	5	5	3	3	3	1	1	5	3	122.5	3		
Fire Station	690	810A	3	5	5	3	3	1	1	5	1	5	120.5		X	
Tropicana Outfall	32300	810S	1	5	5	1	3	3	5	3	5	1	119.5	4		
Sunrise Mountain	22000	810W	3	3	5	3	3	1	3	5	3	1	112.5	5		
D 14 Extension	33280	810T	1	5	5	1	1	3	5	1	5	1	107.5	6		

= In Construction or Completed

Appendix G
Sales Tax Received and Distributed

Southern Nevada Water Authority Sale Tax Received and Distributed

Collection Month	Received Date	Receipts	Distributions			
		Gross Amount	Clark Co. Rural Areas	LV Wash	Wastewater Agencies	SNWA Water
Apr-99	07-Jul-99	3,995,539.18	168,120.30	159,821.57		3,667,597.31
May-99	27-Jul-99	4,083,781.36	171,833.27	163,351.25		3,748,596.84
Jun-99	27-Aug-99	4,466,630.55	187,942.41	178,665.22		4,100,022.92
Jul-99	24-Sep-99	3,876,061.83	163,093.05	155,042.47		3,557,926.31
Aug-99	22-Oct-99	4,056,712.59	170,694.30	162,268.50		3,723,749.79
Sep-99	29-Nov-99	4,389,790.35	184,709.21	175,591.61		4,029,489.53
Oct-99 #	27-Dec-99	4,081,696.66	171,745.55	163,267.87		3,746,683.24
Nov-99	25-Jan-00	4,210,100.80	177,148.41	168,404.03		3,864,548.36
Dec-99	29-Feb-00	5,077,263.36	213,636.01	203,090.53		4,660,536.82
Calendar 1999		38,237,576.68	1,608,922.51	1,529,503.07	0.00	35,099,151.10
Jan-00	24-Mar-00	4,011,032.32	168,772.21	160,441.29		3,681,818.82
Feb-00	25-Apr-00	4,056,424.50	170,682.17	162,256.98		3,723,485.35
Mar-00	26-May-00	4,718,343.86	198,533.75	188,733.75		4,331,076.36
Apr-00	28-Jun-00	4,285,441.90	180,318.54	171,417.68		3,933,705.68
May-00	21-Jul-00	4,403,289.00	185,277.19	176,131.56		4,041,880.25
Jun-00	25-Aug-00	4,816,863.21	202,679.15	192,674.53		4,421,509.53
Jul-00	22-Sep-00	4,316,704.54	181,633.98	172,668.18		3,962,402.38
Aug-00	20-Oct-00	4,470,849.30	188,119.93	178,833.97		4,103,895.40
Sep-00	29-Nov-00	4,819,576.45	202,793.32	192,783.06		4,424,000.07
Oct-00	22-Dec-00	4,363,936.03	183,621.34	174,557.44		4,005,757.25
Nov-00	22-Jan-01	4,423,626.78	186,132.94	176,945.07		4,060,548.77
Dec-00	26-Feb-01	5,353,219.53	225,247.42	214,128.78		4,913,843.33
Calendar 2000		54,039,307.42	2,273,811.94	2,161,572.30	0.00	49,603,923.18
Jan-01	23-Mar-01	4,196,777.45	176,587.80	167,871.10		3,852,318.55
Feb-01	20-Apr-01	4,238,833.88	178,357.41	169,553.36		3,890,923.11
Mar-01	25-May-01	5,122,947.79	215,558.27	204,917.91		4,702,471.61
Apr-01	22-Jun-01	5,192,861.00	191,643.88	182,183.98	1,588,693.23	2,592,078.42
May-01	20-Jul-01	4,811,654.02	202,459.97	192,466.16	1,678,356.60	2,738,371.29
Jun-01	24-Aug-01	4,913,175.32	206,731.68	196,527.01	1,713,768.32	2,796,148.31
Jul-01	21-Sep-01	4,573,130.34	192,423.61	182,925.21	1,595,156.98	2,602,624.54
Aug-01	19-Oct-01	4,769,280.98	200,677.04	190,771.24	1,663,576.43	2,714,256.27
Sep-01	27-Nov-01	4,281,399.03	180,148.43	171,255.96	1,493,397.96	2,436,596.68
Oct-01	26-Dec-01	4,694,971.17	197,550.30	187,798.85	1,637,656.37	2,671,965.65
Nov-01	29-Jan-02	4,472,344.19	188,182.83	178,893.77	1,560,001.69	2,545,265.90
Dec-01	01-Mar-02	5,232,196.78	220,155.14	209,287.87	1,825,046.43	2,977,707.34
Calendar 2001		55,861,310.46	2,350,476.36	2,234,452.42	14,755,654.01	36,520,727.67

**Southern Nevada Water Authority
Sale Tax Received and Distributed (continued)**

Collection Month	Received Date	Receipts	Distributions			
		Gross Amount	Clark Co. Rural Areas	LV Wash	Wastewater Agencies	SNWA Water
Jan-02	25-Mar-02	4,326,824.60	182,059.80	173,072.98	1,509,242.89	2,462,448.93
Feb-02	22-Apr-02	4,349,265.12	183,004.03	173,970.60	1,517,070.38	2,475,220.11
Mar-02	24-May-02	5,103,195.94	214,727.18	204,127.84	1,780,049.55	2,904,291.37
Apr-02	26-Jun-02	4,750,192.16	199,873.84	190,007.69	1,656,918.04	2,703,392.59
May-02	22-Jul-02	4,821,867.75	202,889.73	192,874.71	1,681,919.26	2,744,184.05
Jun-02	26-Aug-02	4,970,041.83	209,124.45	198,801.67	1,733,603.97	2,828,511.74
Jul-02	27-Sep-02	4,749,454.66	199,842.80	189,978.19	1,656,660.79	2,702,972.88
Aug-02	29-Oct-02	5,022,282.62	211,322.59	200,891.30	1,751,826.12	2,858,242.61
Sep-02	27-Nov-02	4,874,255.97	205,094.07	194,970.24	1,700,192.83	2,773,998.83
Oct-02	30-Dec-02	4,823,951.75	202,977.42	192,958.07	1,682,646.18	2,745,370.08
Nov-02	27-Jan-03	4,774,928.64	200,914.67	190,997.15	1,665,546.39	2,717,470.43
Dec-02	28-Feb-03	5,797,103.44	243,924.72	231,884.14	2,022,091.94	3,299,202.64
Calendar 2002		58,363,364.48	2,455,755.30	2,334,534.58	20,357,768.34	33,215,306.26
Jan-03	28-Mar-03	4,691,518.79	197,405.04	187,660.75	1,636,452.14	2,670,000.86
Feb-03	25-Apr-03	4,578,089.84	192,632.29	183,123.59	1,596,886.90	2,605,447.06
Mar-03	30-May-03	5,436,587.00	228,755.27	217,463.48	1,896,339.93	3,094,028.32
Apr-03	27-Jun-03	5,141,703.75	216,347.47	205,668.15	1,793,481.49	2,926,206.64
May-03	28-Jul-03	5,209,543.33	219,201.95	208,381.73	1,817,144.66	2,964,814.99
Jun-03	29-Aug-03	5,479,729.26	230,570.57	219,189.17	1,911,388.42	3,118,581.10
Jul-03	29-Sep-03	5,289,907.96	222,583.46	211,596.32	1,845,176.71	3,010,551.47
Aug-03	24-Oct-03	5,567,908.70	234,280.89	222,716.35	1,942,146.35	3,168,765.11
Sep-03	26-Nov-03	5,593,448.96	235,355.55	223,737.96	1,976,127.81	3,158,227.64
Oct-03	26-Dec-03	5,504,944.68	166,761.51	220,197.79	1,944,834.45	3,173,150.93
Nov-03	30-Jan-04	5,255,726.03	159,211.92	210,229.04	1,856,788.33	3,029,496.74
Dec-03	27-Feb-04	6,274,645.81	190,078.10	250,985.83	2,216,761.11	3,616,820.77
Calendar 2003		64,023,754.11	2,493,184.02	2,560,950.16	22,433,528.30	36,536,091.63
Jan-04	26-Mar-04	5,611,387.95	169,986.00	224,455.52	1,982,439.64	3,234,506.79
Feb-04	30-Apr-04	5,373,732.98	162,786.71	214,949.32	1,898,478.84	3,097,518.11
Mar-04	28-May-04	6,609,509.31	200,222.13	264,380.37	2,335,064.59	3,809,842.22
Apr-04	25-Jun-04	5,958,389.07	180,497.72	238,335.56	2,105,031.20	3,434,524.59
May-04	30-Jul-04	6,248,802.97	189,295.24	249,952.12	2,207,631.13	3,601,924.48
Jun-04	27-Aug-04	6,435,919.54	194,963.57	257,436.78	2,273,737.29	3,709,781.90
Jul-04	24-Sep-04	6,376,347.86	193,158.96	255,053.91	2,252,691.29	3,675,443.70
Aug-04	28-Oct-04	6,277,280.58	190,157.91	251,091.22	2,217,691.95	3,618,339.50
Sep-04	29-Nov-04	6,646,047.72	201,328.99	265,841.91	2,347,973.19	3,830,903.63
Oct-04	23-Dec-04	6,403,723.60	193,988.26	256,148.94	2,262,362.83	3,691,223.57
Nov-04	28-Jan-05	6,306,344.85	191,038.36	252,253.79	2,227,960.03	3,635,092.67
Dec-04	25-Feb-05	7,757,964.11	235,012.32	310,318.56	2,740,800.63	4,471,832.60
Calendar 2004		76,005,450.54	2,302,436.17	3,040,218.02	26,851,862.61	43,810,933.74

**Southern Nevada Water Authority
Sale Tax Received and Distributed (continued)**

Collection Month	Received Date	Receipts	Distributions			
		Gross Amount	Clark Co. Rural Areas	LV Wash	Wastewater Agencies	SNWA Water
Jan-05	28-Mar-05	6,057,704.65	183,506.29	242,308.19	2,140,118.27	3,491,771.90
Feb-05	29-Apr-05	6,093,734.12	184,597.73	243,749.36	2,152,847.07	3,512,539.96
Mar-05	27-May-05	7,596,621.64	230,124.76	303,864.87	2,683,800.16	4,378,831.85
Apr-05	24-Jun-05	6,875,146.03	208,269.07	275,005.84	2,428,911.02	3,962,960.10
May-05	29-Jul-05	7,140,351.88	216,302.97	285,614.08	2,522,605.24	4,115,829.59
Jun-05	26-Aug-05	7,494,218.54	227,022.66	299,768.74	2,647,622.31	4,319,804.83
Jul-05	30-Sep-05	7,024,506.24	212,793.65	280,980.25	2,481,678.29	4,049,054.05
Aug-05	27-Oct-05	7,060,064.09	213,870.80	282,402.56	2,494,240.47	4,069,550.26
Sep-05	29-Nov-05	7,338,500.94	222,305.50	293,540.04	2,592,609.05	4,230,046.35
Oct-05	30-Dec-05	7,016,781.08	212,559.63	280,671.24	2,478,949.08	4,044,601.13
Nov-05	27-Jan-06	6,888,713.57	208,680.08	275,548.54	2,433,704.28	3,970,780.67
Dec-05	01-Mar-06	8,587,151.26	260,130.92	343,486.05	3,033,743.03	4,949,791.26
Calendar 2005		85,173,494.04	2,580,164.06	3,406,939.76	30,090,828.27	49,095,561.95
Jan-06	31-Mar-06	6,743,202.56	204,272.10	269,728.10	2,382,296.89	3,886,905.46
Feb-06	28-Apr-06	6,815,658.80	488,723.20	272,626.35	2,334,259.32	3,720,049.93
Mar-06	01-Jun-06	8,081,356.22	441,313.10	323,254.25	2,780,379.77	4,536,409.10
Apr-06	03-Jul-06	7,394,367.54	233,875.64	295,774.70	2,608,592.54	4,256,124.66
May-06	28-Jul-06	7,484,834.92	236,737.02	299,393.40	2,640,507.71	4,308,196.79
Jun-06	30-Aug-06	7,993,627.56	252,829.57	319,745.10	2,820,000.10	4,601,052.79
Jul-06	02-Oct-06	7,199,839.98	227,722.95	287,993.60	2,539,966.90	4,144,156.53
Aug-06	31-Oct-06	7,323,145.42	231,622.96	292,925.82	2,583,466.72	4,215,129.92
Sep-06	29-Nov-06	7,582,818.24	239,836.12	303,312.73	2,675,074.37	4,364,595.02
Oct-06	29-Dec-06	7,100,582.95	224,583.56	284,023.32	2,504,950.91	4,087,025.16
Nov-06	27-Jan-07	7,046,861.20	222,884.40	281,874.45	2,485,998.89	4,056,103.46
Dec-06	28-Feb-07	8,573,456.58	271,168.92	342,938.26	3,024,552.77	4,934,796.63
Calendar 2006		89,339,751.97	3,275,569.54	3,573,590.08	31,380,046.89	51,110,545.45
Jan-07	30-Mar-07	6,910,452.75	218,569.95	276,418.11	2,437,876.58	3,977,588.11
Feb-07	27-Apr-07	6,986,205.37	220,965.92	279,448.21	2,464,600.67	4,021,190.57
Mar-07	31-May-07	8,161,104.50	258,126.68	326,444.18	2,879,082.78	4,697,450.86
Apr-07	29-Jun-07	7,153,764.65	226,265.63	286,150.59	2,523,712.40	4,117,636.03
May-07	30-Jul-07	7,417,298.89	201,355.32	296,691.96	2,629,315.61	4,289,936.00
Jun-07	31-Aug-07	7,918,593.34	210,795.25	316,743.73	2,808,600.66	4,582,453.70
Jul-07	28-Sep-07	7,035,190.85	187,278.82	281,407.63	2,495,271.67	4,071,232.73
Aug-07	31-Oct-07	7,030,119.84	187,143.84	281,204.79	2,493,473.06	4,068,298.15
Sep-07	30-Nov-07	7,371,727.70	196,237.53	294,869.11	2,614,636.00	4,265,985.06
Oct-07	31-Dec-07	7,203,146.50	191,749.85	288,125.86	2,554,842.90	4,168,427.89
Nov-07	30-Jan-08	7,001,344.07	186,377.81	280,053.76	2,483,266.75	4,051,645.75
Dec-07	29-Feb-08	8,565,787.90	241,383.90	342,631.52	3,033,073.54	4,948,698.94
Calendar 2007		88,754,736.36	2,526,250.50	3,550,189.45	31,417,752.62	51,260,543.79

**Southern Nevada Water Authority
Sale Tax Received and Distributed (continued)**

Collection Month	Received Date	Receipts		Distributions		
		Gross Amount	Clark Co. Rural Areas	LV Wash	Wastewater Agencies	SNWA Water
Jan-08	28-Mar-08	6,498,944.03	205,937.90	259,957.76	2,292,558.38	3,740,489.99
Feb-08	30-Apr-08	6,544,565.49	184,425.86	261,782.62	2,317,375.67	3,780,981.34
Mar-08	30-May-08	7,683,502.55	216,521.10	307,340.10	2,720,663.71	4,438,977.64
Apr-08	27-Jun-08	6,927,959.59	195,229.90	277,118.38	2,453,132.30	4,002,479.00
May-08	31-Jul-08	7,171,986.97	202,106.59	286,879.48	2,539,540.34	4,143,460.55
Jun-08	29-Aug-08	7,242,215.02	204,085.62	289,688.60	2,564,407.51	4,184,033.29
Jul-08	29-Sep-08	6,712,162.02	189,148.73	268,486.48	2,376,720.20	3,877,806.61
Aug-08	30-Oct-08	7,180,617.73	205,186.15	287,224.71	2,541,518.62	4,146,688.25
Sep-08	25-Nov-08	6,622,651.28	189,242.26	264,906.05	2,344,031.14	3,824,471.83
Oct-08	28-Dec-08	6,608,538.41	188,838.99	264,341.54	2,339,036.01	3,816,321.87
Nov-08	30-Jan-09	6,058,232.95	173,114.01	242,329.32	2,144,260.07	3,498,529.55
Dec-08	27-Feb-09	6,913,933.90	197,565.66	276,557.36	2,447,128.15	3,992,682.73
Calendar 2008		82,165,309.94	2,351,402.77	3,286,612.40	29,080,372.10	47,446,922.65
Jan-09	30-Mar-09	5,440,196.44	155,453.61	217,607.87	1,925,511.30	3,141,623.66
Feb-09	30-Apr-09	5,320,985.61	152,047.17	212,839.42	1,883,317.64	3,072,781.38
Mar-09	29-May-09	6,589,177.07	188,285.73	263,567.08	2,332,183.23	3,805,141.03
Apr-09	26-Jun-09	5,838,657.59	166,839.64	233,546.30	2,066,543.24	3,371,728.41
May-09	30-Jul-09	5,790,454.59	165,462.25	231,618.18	2,049,482.19	3,343,891.97
Jun-09	28-Aug-09	5,958,459.00	170,262.97	238,338.36	2,108,945.92	3,440,911.75
Jul-09	29-Sep-09	5,411,300.79	167,577.16	216,452.03	1,910,363.22	3,116,908.38
Aug-09	29-Oct-09	5,435,528.13	168,327.44	217,421.13	1,918,916.24	3,130,863.32
Sep-09	30-Nov-09	5,630,829.06	174,375.51	225,233.16	1,987,863.75	3,243,356.64
Oct-09	30-Dec-09	5,467,931.03	169,330.89	218,717.24	1,930,355.50	3,149,527.40
Nov-09	29-Jan-10	5,421,077.48	167,879.93	216,843.10	1,913,814.69	3,122,539.76
Dec-09	26-Feb-10	6,590,956.06	204,108.73	263,638.24	2,326,819.45	3,796,389.64
Calendar 2009		68,895,552.85	2,049,951.03	2,755,822.11	24,354,116.37	39,735,663.34
Jan-10	31-Mar-10	5,108,795.78	158,209.19	204,351.83	1,803,569.21	2,942,665.55
Feb-10	30-Apr-10	5,108,584.48	158,202.64	204,343.38	1,803,494.61	2,942,543.84
Mar-10	28-May-10	6,069,443.99	187,958.54	242,777.76	2,142,708.92	3,495,998.77
Apr-10	30-Jun-10	5,998,217.64	185,752.80	239,928.71	2,117,563.73	3,454,972.40
May-10	2-Aug-10	5,735,351.33	177,612.36	229,414.05	2,024,763.47	3,303,561.45
Jun-10	31-Aug-10	5,928,143.48	183,582.75	237,125.74	2,092,825.30	3,414,609.69
Jul-10	30-Sep-10	5,654,889.57	188,890.90	226,195.58	1,991,125.17	3,248,677.92
Aug-10	28-Oct-10	5,803,041.71	193,839.66	232,121.67	2,043,290.54	3,333,789.84
Sep-10	30-Nov-10	5,711,559.73	190,783.86	228,462.39	2,011,079.12	3,281,234.36
Oct-10	30-Dec-10	5,601,460.83	187,106.22	224,058.43	1,972,312.55	3,217,983.63
Nov-10	31-Jan-11	5,584,548.13	186,541.28	223,381.93	1,966,357.46	3,208,267.46
Dec-10	28-Feb-11	6,606,718.98	220,684.96	264,268.76	2,326,270.80	3,795,494.46
Calendar 2010		68,910,755.65	2,219,165.16	2,756,430.23	24,295,360.88	39,639,799.37

**Southern Nevada Water Authority
Sale Tax Received and Distributed (continued)**

Collection Month	Received Date	Receipts	Distributions			
		Gross Amount	Clark Co. Rural Areas	LV Wash	Wastewater Agencies	SNWA Water
Jan-11	31-Mar-11	5,405,921.13	180,574.58	216,236.85	1,903,461.68	3,105,648.02
Feb-11	29-Apr-11	5,353,999.20	178,840.22	214,159.97	1,885,179.63	3,075,819.38
Mar-11	31-May-11	6,697,135.98	223,705.17	267,885.44	2,358,107.24	3,847,438.13
Apr-11	30-Jun-11	6,063,185.70	202,529.26	242,527.43	2,134,889.02	3,483,239.99
May-11	1-Aug-11	6,036,785.75	201,647.42	241,471.43	2,125,593.42	3,468,073.48
Jun-11	31-Aug-11	6,397,099.10	213,683.00	255,883.96	2,252,462.21	3,675,069.93
Jul-11	3-Oct-11	5,879,272.39	196,385.98	235,170.90	2,134,327.71	3,313,387.80
Aug-11	31-Oct-11	5,859,385.06	195,721.68	234,375.40	1,998,933.61	3,430,354.37
Sep-11	29-Nov-11	6,305,007.32	210,606.85	252,200.29	2,220,036.07	3,622,164.11
Oct-11	29-Dec-11	6,129,515.21	204,744.87	245,180.61	2,158,244.10	3,521,345.63
Nov-11	31-Jan-12	6,055,230.26	202,263.52	242,209.21	2,132,087.86	3,478,669.67
Dec-11	29-Feb-12	7,144,138.09	238,636.43	285,765.52	2,515,499.74	4,104,236.40
Calendar 2011		73,326,675.19	2,449,338.98	2,933,067.01	25,818,822.29	42,125,446.91
Jan-12	30-Mar-12	5,658,195.97	189,001.34	226,327.84	1,992,289.38	3,250,577.41
Feb-12	30-Apr-12	5,922,925.06	197,844.12	236,917.00	2,085,502.30	3,402,661.64
Mar-12	31-May-12	6,790,047.64	226,808.71	271,601.91	2,390,822.07	3,900,814.95
Apr-12	29-Jun-12	6,212,889.36	207,529.83	248,515.57	2,187,600.70	3,569,243.26
May-12	30-Jul-12	6,522,231.72	217,862.82	260,889.27	2,296,522.26	3,746,957.37
Jun-12	31-Aug-12	6,742,691.04	225,226.85	269,707.64	2,374,147.49	3,873,609.06
Jul-12	28-Sep-12	6,167,978.96	206,029.68	246,719.16	2,171,787.45	3,543,442.67
Aug-12	31-Oct-12	6,347,611.21	212,029.96	253,904.45	2,235,037.19	3,646,639.61
Sep-12	30-Nov-12	6,574,756.29	219,617.31	262,990.25	2,315,016.52	3,777,132.21
Oct-12	31-Dec-12	6,472,578.79	216,204.25	258,903.15	2,279,039.12	3,718,432.27
Nov-12	31-Jan-13	6,355,186.60	212,283.00	254,207.46	2,237,704.53	3,650,991.61
Dec-12	1-Mar-13	7,550,851.36	252,221.92	302,034.05	2,658,706.25	4,337,889.14
Calendar 2012		77,317,944.00	2,582,659.79	3,092,717.75	27,224,175.26	44,418,391.20
Jan-13	29-Mar-13	6,218,961.23	207,732.65	248,758.45	2,189,738.65	3,572,731.48
Feb-13	30-Apr-13	6,019,983.45	201,086.17	240,799.34	2,119,677.22	3,458,420.72
Mar-13	31-May-13	7,289,671.83	243,497.71	291,586.87	2,566,743.15	4,187,844.10
Apr-13	28-Jun-13	6,577,240.44	219,700.29	263,089.62	2,315,891.20	3,778,559.33
May-13	31-Jul-13	6,958,034.21	232,419.98	278,321.37	2,449,971.79	3,997,321.07
Jun-13	30-Aug-13	6,959,568.24	232,471.22	278,382.73	2,450,511.43	3,998,202.86
Calendar 2013 through June		40,023,459.40	1,336,908.02	1,600,938.38	14,092,533.44	22,993,079.56
Total through June 2013		943,120,499.09	32,273,336.36	37,724,819.96	294,928,646.12	578,193,696.61
Estimate of Remainder Calendar 2013						
Jul-12	Est	6,538,057.70	218,391.46	261,522.31	2,302,094.70	3,756,049.23
Aug-12	Est	6,728,467.88	224,751.76	269,138.72	2,369,139.42	3,865,437.98
Sep-12	Est	6,969,241.67	232,794.35	278,769.67	2,453,917.51	4,003,760.14
Oct-12	Est	6,860,933.52	229,176.51	274,437.34	2,415,781.47	3,941,538.20
Nov-12	Est	6,736,497.80	225,019.98	269,459.91	2,371,966.80	3,870,051.11
Dec-12	Est	8,003,902.44	267,355.24	320,156.09	2,818,228.63	4,598,162.48
Estimated Calendar 2013		81,860,560.41	2,734,397.32	3,274,422.42	28,823,661.97	47,028,078.70

Appendix H
Sales Tax Revenue Projection

CLARK COUNTY WATER AND WASTEWATER INFRASTRUCTURE (QUARTER CENT) SALES TAX
Received by the Southern Nevada Water Authority
Actual / Forecast

Calendar Year	Clark Co. Population		Gross Sales Tax Receipts			Clark Co		Wastewater Agencies	SNWA CIP
	Count	% Change	Per Person	Receipts	% Change	Rural Areas	LV Wash		
1999 * -	1,321,319		N/A+	\$ 38,237,577		\$ 1,608,923	\$ 1,529,503	\$ -	\$ 35,099,151
2000 *	1,428,689	8.1%	37.82	54,039,307	+	2,273,812	2,161,572	-	49,603,923
2001 *	1,498,278	4.9%	37.28	55,861,310	3.4%	2,350,476	2,234,452	14,755,654	36,520,728
2002 *	1,578,332	5.3%	36.98	58,363,364	4.5%	2,455,755	2,334,535	20,357,768	33,215,306
2003 *	1,641,529	4.0%	39.00	64,023,754	9.7%	2,493,184	2,560,950	22,433,528	36,536,092
2004 *	1,747,025	6.4%	43.51	76,005,451	18.7%	2,302,436	3,040,218	26,851,863	43,810,934
2005 *	1,815,700	3.9%	46.91	85,173,494	12.1%	2,580,164	3,406,940	30,090,792	49,095,598
2006 *	1,912,654	5.3%	46.71	89,339,752	4.9%	3,275,570	3,573,590	31,380,047	51,110,545
2007 *	1,996,542	4.4%	44.45	88,754,736	-0.7%	2,526,251	3,550,189	31,417,753	51,260,544
2008 *	1,986,145	-0.5%	41.37	82,165,310	-7.4%	2,351,403	3,286,612	29,080,372	47,446,923
2009 *	2,006,347	1.0%	34.34	68,895,553	-16.2%	2,049,951	2,755,822	24,354,116	39,735,663
2010 *	1,951,269	-2.7%	35.32	68,910,756	0.0%	2,219,165	2,756,430	24,295,361	39,639,799
2011 *	1,966,630	0.8%	37.29	73,326,675	6.4%	2,449,339	2,933,067	25,818,822	42,125,447
2012 *	2,008,654	2.1%	38.49	77,317,944	5.4%	2,582,660	3,092,718	27,224,175	44,418,391
2013 -	2,031,000	1.1%	40.31	81,860,560	5.9%	2,734,397	3,274,422	28,823,662	47,028,079
2014	2,061,000	1.5%	41.58	85,689,265	4.7%	2,862,288	3,427,571	30,171,775	49,227,631
2015	2,085,000	1.2%	42.89	89,429,159	4.4%	2,987,212	3,577,167	31,488,617	51,376,163
2016	2,111,000	1.2%	44.25	93,406,076	4.4%	3,120,053	3,736,244	32,888,917	53,660,862
2017	2,138,000	1.3%	45.65	97,589,748	4.5%	3,259,801	3,903,591	34,362,016	56,064,340
2018	2,167,000	1.4%	47.09	102,036,336	4.6%	3,408,331	4,081,455	35,927,690	58,618,860
2019	2,196,000	1.3%	48.57	106,667,006	4.5%	3,563,010	4,266,682	37,558,180	61,279,134
2020	2,224,000	1.3%	50.11	111,440,403	4.5%	3,722,456	4,457,618	39,238,926	64,021,403
2021	2,253,000	1.3%	51.69	116,459,630	4.5%	3,890,114	4,658,387	41,006,230	66,904,899
2022	2,281,000	1.2%	53.32	121,633,683	4.4%	4,062,943	4,865,349	42,828,050	69,877,341
2023	2,309,000	1.2%	55.01	127,019,053	4.4%	4,242,831	5,080,764	44,724,276	72,971,182
2024	2,337,000	1.2%	56.75	132,623,954	4.4%	4,430,052	5,304,960	46,697,800	76,191,142
2025	2,365,000	1.2%	N/A+	53,730,143	+	1,857,267	2,146,619	18,895,978	30,830,278
				<u>\$ 2,300,000,000</u>		<u>\$ 77,659,844</u>	<u>\$ 91,997,429</u>	<u>\$ 772,672,369</u>	<u>\$ 1,357,670,358</u>

Totals may be off slightly due to rounding
 * Actual Sales Tax receipts
 + Partial Year -- Ratios would be skewed if calculated

Appendix I
Interfund Loans

**Southern Nevada Water Authority
INTERFUND LOAN ACTIVITY
Historical Through June 30, 2013
Projected From July 1, 2012 - June 2025^{1/}**

HISTORICAL

Fiscal Year	Beginning		Payback		Total
	Balance	Borrowings	From Sales Tax ^{2/}	From Grants	
2006	\$ -	\$ 1,771,721	\$ 3,246	\$ -	\$ 3,246
2007	1,768,475	3,043,206	243,901		243,901
2008	4,567,781	8,128,593	675,279	9,322,409	9,997,688
2009	2,698,686	2,145,993	2,775,949		2,775,949
2010	2,068,730	4,884,051	1,131,523	1,063,408	2,194,931
2011	4,757,850	994,459	2,805,838	2,317,606	5,123,444
2012	628,865	2,855,066	1,887,910	-	1,887,910
2013	1,596,021	51,453		1,647,474	1,647,474
2014	0				
		\$ 23,874,542	\$ 9,523,645	\$ 14,350,897	\$ 23,874,542

PROJECTED

Fiscal Year	Beginning	Construction	Interest	Sales
	Balance	To be Financed		Tax
	Interfund Loan	With Sales Tax ^{3/4/}	Expense	Receipts
2014	\$ 0	\$ 13,896,360	\$ 179,859	\$ 3,350,997
2015	10,725,223	13,430,908	696,915	3,502,369
2016	21,350,677	6,713,743	1,052,542	3,656,706
2017	25,460,257	5,208,023	1,212,218	3,819,918
2018	28,060,580	2,791,111	1,273,181	3,992,523
2019	28,132,349	150,156	1,201,668	4,174,069
2020	25,310,104	41,456	1,048,434	4,362,150
2021	22,037,844	-	873,992	4,558,003
2022	18,353,834	-	679,598	4,761,868
2023	14,271,564	-	464,925	4,973,057
2024	9,763,433	-	228,529	5,192,862
2025	4,799,099	-	0	4,799,099
2026	0			
		\$ 42,231,757	\$ 8,911,861	\$ 51,143,619

- 1/ All amounts shown have been converted into fiscal years (July 1, 20xx to June 30, 20xx+1)
- 2/ Sales tax has also been used for pay-as-you-go construction costs
- 3/ Estimated construction is based on cash flow projections in the Las Vegas Wash Capital Plan assuming remainder to be paid with additional future grant revenues.
- 4/ The 2011 Nevada State Legislature passed legislation allowing the June 30, 2025, sunset of sales tax collection to be lifted subject to Clark County approval. At this writing, Clark County has not approved the sunset lift. If the sunset is lifted, additional construction might be allowed to be funded with the revenue source.

Appendix J
Completed Projects Summary

Completed Projects Summary

Project No.	Project Title	Year Completed	Cost (\$1,000)
	Temporary Demonstration Weir	1999	\$173
810A	Fire Station Weir	2000	\$63
910-AR (810C)	Historic Lateral Weir	2000	\$1,823
810D	Pabco Weir (Clark County)	2000	\$5,700
810H	Monson Weir	2002	\$152
810J	Visitor Center Weir	2002	\$172
810E	Bostick Weir	2003	\$5,020
170-A (810N)	Rainbow Gardens Weir	2004	\$7,238
810R	Calico Ridge (Landfill Weir)	2005	\$1,868
810P	Powerline Crossing Weir	2007	\$5,883
810F	Upper Diversion Weir and Outfall Channel	2008	\$12,850
810Y	DU Wetlands No. 2 Weir	2009	\$3,470
810M	Lower Narrows Weir	2011	\$3,494
810L	Homestead Weir	2011	\$6,490
810V	DU Wetlands No. 1 Weir	2012	\$4,126
810X	Upper Narrows Weir	2013	\$6,683
810G	Duck Creek Confluence Weir	2013	\$6,683
830C/840C	Bank Protection - Historic Lateral (5,000 lf)	2001	\$428
840J	Bank Protection South - Visitor Center (1,100 lf)	2001	\$88
840B	Bank Protection South - Demonstration (1,200 lf)	2001	\$177
840T	Bank Protection South - D-14 Extension (400 lf)	2001	\$44
830N/840N	Bank Protection - Three Kids Wash (Rainbow Gardens) (2,600 lf)	2002	\$92
830J	Bank Protection North - Visitor Center (400 lf)	2002	\$41
830H/840H	Bank Protection - Monson (400 lf)	2002	\$40
830T	Bank Protection North - D-14 Extension (300 lf)	2002	\$10
840Q	Bank Protection South - Wells (1,100 lf)	2003	\$95
830L	Bank Protection North - Homestead (1,600 lf)	2003	\$146
840V	Bank Protection South - DU Wetlands No. 1 (800 lf)	2003	\$62
830M	Bank Protection North - Lower Narrows (1,500 lf)	2003	\$129
840R	Bank Protection South - Calico Ridge (Landfill) (600 lf)	2003	\$50
840X	Bank Protection South - Upper Narrows (900 lf)	2003	\$78
830N/840N	Bank Protection - Rainbow Gardens (1,585 lf)	2005	\$74
830D	Bank Protection North - Pabco (640 lf)	2005	\$68
830E/840E	Bank Protection - Bostick (2,205 lf)	2005	\$127
830D/840D	Bank Protection - Pabco (1,725 lf)	2006	\$48
830W/840W	Bank Protection - Sunrise Mtn (1,765 lf)	2006	\$74
840S	Bank Protection South - Tropicana (575 lf)	2006	\$21
830C/840C	Bank Protection - Historic Lateral (3,075 lf)	2008	\$321
840D	Bank Protection South - Pabco (520 lf)	2008	\$40
840A	Bank Protection South - Fire Station (630 lf)	2010	\$469
840G	Bank Protection South - Duck Creek Confluence (700 lf)	2010	\$90
840D	Bank Protection South - Pabco (320 lf)	2011	\$122
830C	Bank Protection North - Historic Lateral (400 lf)	2011	\$152
830E	Bank Protection North - Bostick (155 lf)	2011	\$59
830D	Bank Protection North - Pabco (690 lf)	2012	\$65

Completed Projects Summary

Project No.	Project Title	Year Completed	Cost (\$1,000)
880B	Revegetation South - Demonstration (4.23 ac)	2000	\$63
870C/880C	Revegetation - Historic Lateral (4.90 ac)	2001	\$74
880D/870D	Revegetation - Pabco (7.40 ac)	2001	\$111
870H/880H	Revegetation - Monson (2.78 ac)	2002	\$48
870J/880J	Revegetation - Visitor Center (1.84 ac)	2002	\$32
880E	Revegetation South - Bostick (6.55 ac)	2004	\$115
870R/880R	Revegetation - Calico Ridge (Landfill) (6.80 ac)	2005	\$117
870E	Revegetation North - Bostick (7.85 ac)	2005	\$47
870D	Revegetation North - Pabco (3.40 ac)	2005	\$2
880P	Revegetation South - Powerline (14.91 ac)	2007	\$245
880F	Revegetation South - Upper Diversion (17.58 Ac)	2009	\$145
870Y/880Y	Revegetation - DU Wetlands No. 2 (0.89 Ac)	2010	\$2
870M/880M	Revegetation - Lower Narrows & Homestead (22.64 Ac)	2011	\$3
870M/880M	Revegetation - Lower Narrows & Homestead (5.14 Ac)	2012	\$23
870G/880G	Revegetation - Duck Creek Confluence (23.4 Ac)	2013	\$223
860A	2000 Materials Transportation Program	2000	\$304
860B	2001 Materials Transportation Program	2001	\$753
860C	2002 Materials Transportation Program	2002	\$866
860D	2003 Materials Transportation Program	2003	\$489
860E	2004 Materials Transportation Program	2004	\$806
860F	2005 Materials Transportation Program	2005	\$216
860G	2006 Materials Transportation Program	2006	\$590
860H	2007 Materials Transportation Program	2007	\$513
860J	2008 Materials Transportation Program	2008	\$667
860K	2009 Materials Transportation Program	2009	\$209
860Q	2010 Materials Transportation Program	2010	\$329
890A	2011 Materials Transportation Program	2011	\$178
890A	2012 Materials Transportation Program	2012	\$194
860L	2001 Topographic Mapping	2001	\$80
860M	2005 Topographic Mapping	2005	\$80
860N	2008 Topographic Mapping	2008	\$63
860S	Sediment Study I	2003	\$177
860T	Sediment Study II	2008	\$236

SOUTHERN NEVADA WATER AUTHORITY
BOARD OF DIRECTORS
AGENDA ITEM

March 20, 2014

Subject: Agreement	Director's Backup
Petitioner: David H. Wright, Chief Financial Officer	
Recommendations: That the Board of Directors approve a professional services agreement with Hobbs, Ong and Associates for services related to future issues presented to the Authority's Integrated Resource Planning Advisory Committee and for other general financial and debt-management related services associated with the Authority's overall operations.	

Fiscal Impact:

The required \$400,000 is available in the Authority's Operating Budget.

Background:

On June 16, 2011, the Board of Directors approved an agreement with Hobbs, Ong and Associates (Hobbs Ong) to evaluate the Authority's rates and charges given the significant funding challenges experienced by the Authority during depressed economic conditions.

Since that time, the Board authorized formation of a citizens advisory committee to evaluate and make recommendations on Authority initiatives including funding, water resources, conservation and water quality. On September 26, 2013, the Integrated Resource Planning Advisory Committee (IRPAC) presented nine funding-related recommendations to the Board for approval. Hobbs Ong's services were critical during this phase of the committee process, as they were involved in developing rate scenarios and presenting funding impacts of proposed recommendations.

Approval of this item will continue Hobbs Ong's participation through the next phase of the IRPAC process, in which the committee is expected to consider topics such as facilities, water quality, water resources, drought and climate change. Hobbs Ong will provide financial modeling and advisement related to any recommendations made by the committee that may impact Authority funding. Hobbs Ong will attend meetings in conjunction with or on behalf of the Authority with member agencies, stakeholder groups, or other affected parties as required. At the request of the Authority, Hobbs Ong will make presentations to the IRPAC, member agencies, governmental bodies, and other parties. Support services from Hobbs Ong for the next phase of the IRPAC process are expected not to exceed \$250,000.

In addition, Hobbs Ong provides ongoing professional services to support financial and debt-management related activities of the Authority. These activities relate to financial planning, including short and long-term capital improvement program planning, feasibility studies, evaluation of proposals for various financings, and financial policy guidance. Hobbs Ong also provides support with managing and issuing debt securities, which includes debt timing and structure, rating agency presentations, evaluating various financing structures, assisting with underwriters, bond attorneys, bankers, actuarials, and accountants, and preparation of the official statement. These services are anticipated to not exceed \$150,000 through June 30, 2015.

AGENDA ITEM #	9
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Professional Services Agreement

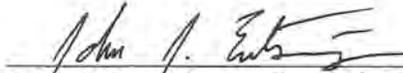
March 20, 2014

Page Two

Professional services agreements are not adapted to competitive bidding and are therefore exempt from the competitive bidding process pursuant to NRS 332.115(1)(b).

This agreement is being entered into pursuant to NRS 332.115(1)(b) and Section 6(i) of the SNWA 1995 Amended Cooperative Agreement. The office of the General Counsel has reviewed and approved the agreement.

Respectfully submitted:



John J. Entsminger, General Manager
JJE:DHW:kah
Attachments

DISCLOSURE OF OWNERSHIP/PRINCIPALS

Business Entity Type						
<input type="checkbox"/> Sole Proprietorship	<input type="checkbox"/> Partnership	<input type="checkbox"/> Limited Liability Company	<input checked="" type="checkbox"/> Corporation	<input type="checkbox"/> Trust	<input type="checkbox"/> Non-Profit Organization	<input type="checkbox"/> Other
Business Designation Group						
<input type="checkbox"/> MBE	<input type="checkbox"/> WBE	<input checked="" type="checkbox"/> SBE	<input type="checkbox"/> PBE	<input type="checkbox"/>	<input type="checkbox"/>	
Minority Business Enterprise	Women-Owned Business Enterprise	Small Business Enterprise	Physically Challenged Business Enterprise			
Corporate/Business Entity Name:		Hobbs, Ong & Associates, Inc.				
(Include d.b.a., if applicable)						
Street Address:		3900 Paradise Road, Suite 152		Website: www.hobbsong.com		
City, State and Zip Code:		Las Vegas, NV 89169		POC Name and Email: Guy Hobbs, guy@hobbsong.com		
Telephone No: 702-733-7223				Fax No: 702-733-7250		
Local Street Address:		3900 Paradise Road, Suite 152		Website: www.hobbsong.com		
City, State and Zip Code:		Las Vegas, NV 89169		Local Fax No: 702-733-7250		
Local Telephone No: 702-733-7223				Local POC Name Email: Guy Hobbs, guy@hobbsong.com		
Number of Clark County, Nevada Residents Employed: 3						

All entities, with the exception of publicly-traded and non-profit organizations, must list the names of individuals, either directly or indirectly, holding more than five percent (5%) ownership or financial interest in the business entity appearing before the SNWA Board of Directors.

Publicly-traded entities and non-profit organizations shall list all Corporate Officers and Directors in lieu of disclosing the names of individuals with ownership or financial interest. The disclosure requirement, as applied to land-use applications, extends to the applicant and the landowner(s).

Entities include all business associations organized under or governed by Title 7 of the Nevada Revised Statutes, including but not limited to private corporations, close corporations, foreign corporations, limited liability companies, partnerships, limited partnerships, and professional corporations.

Full Name	Title	% Owned <small>(Not required for Publicly Traded Corporations/Non-profit organizations)</small>
Guy S. Hobbs	Managing Director	60%
Katherine W. Ong	Director	40%

This section is not required for publicly-traded corporations.

1. Are any individual members, partners, owners or principals, involved in the business entity, an SNWA full-time employee(s), or appointed/elected official(s)?
 - Yes No (If yes, please note that SNWA employee(s), or appointed/elected official(s) may not perform any work on professional service contracts, or other contracts, which are not subject to competitive bid.)

2. Do any individual members, partners, owners or principals have a spouse, registered domestic partner, child, parent, in-law or brother/sister, half-brother/half-sister, grandchild, grandparent, related to an SNWA full-time employee(s), or appointed/elected official(s)?
 - Yes No (If yes, please complete the Disclosure of Relationship form on Page 2. If no, please print N/A on Page 2.)

I certify under penalty of perjury, that all of the information provided herein is current, complete, and accurate. I also understand that the SNWA will not take action on land-use approvals, contract approvals, land sales, leases or exchanges without the completed disclosure form.

Signature

Managing Director

Title

Guy S. Hobbs

Print Name

3-4-2014

Date

DISCLOSURE OF RELATIONSHIP

List any disclosures below:
(Mark N/A, if not applicable.)

NAME OF BUSINESS OWNER/PRINCIPAL	NAME OF SNWA EMPLOYEE OR OFFICIAL AND JOB TITLE	RELATIONSHIP TO SNWA EMPLOYEE OR OFFICIAL	SNWA EMPLOYEE'S/OFFICIAL'S DEPARTMENT
N/A			

"Consanguinity" is a relationship by blood. "Affinity" is a relationship by marriage.

"To the second degree of consanguinity" applies to the candidate's first and second degree of blood relatives as follows:

- Spouse – Registered Domestic Partners – Children – Parents – In-laws (first degree)
- Brothers/Sisters – Half-Brothers/Half-Sisters – Grandchildren – Grandparents – In-laws (second degree)

For SNWA Use Only:

If no Disclosure or Relationship is noted above or if the section is marked N/A, please check this box:

No Disclosure

If any Disclosure of Relationship is noted above, please complete the following:

Yes No Is the SNWA employee(s) noted above involved in the contracting/selection process for this particular agenda item?

Yes No Is the SNWA employee(s) noted above involved in any way with the business in performance of the contract?

Notes/Comments:



 Signature
 David H. Wright

 Print Name
 Authorized Department Representative

DISCLOSURE OF OWNERSHIP/PRINCIPALS

Business Entity Type						
<input type="checkbox"/> Sole Proprietorship	<input type="checkbox"/> Partnership	<input type="checkbox"/> Limited Liability Company	<input checked="" type="checkbox"/> Corporation	<input type="checkbox"/> Trust	<input type="checkbox"/> Non-Profit Organization	<input type="checkbox"/> Other
Business Designation Group						
<input type="checkbox"/> MBE	<input type="checkbox"/> WBE	<input type="checkbox"/> SBE	<input type="checkbox"/> PBE	<input type="checkbox"/>	<input type="checkbox"/>	
Minority Business Enterprise	Women-Owned Business Enterprise	Small Business Enterprise	Physically Challenged Business Enterprise			
Corporate/Business Entity Name:		Public Financial Management, Inc.				
<i>(Include d.b.a., if applicable)</i>						
Street Address:		Two Logan Square, Suite 1600, 18 th and Arch Streets		Website: www.pfm.com		
City, State and Zip Code:		Philadelphia, PA 19103		POC Name and Email: Brian Thomas, thomasb@pfm.com		
Telephone No:		215-567-6100		Fax No: 213-489-4085		
Local Street Address:		601 S. Figueroa St., Suite 4500		Website:		
City, State and Zip Code:		Los Angeles, CA 90017		Local Fax No: 213-489-4085		
Local Telephone No:		213-489-4075		Local POC Name Email: Brian Thomas, thomasb@pfm.com		
Number of Clark County, Nevada Residents Employed: 0						

All entities, with the exception of publicly-traded and non-profit organizations, must list the names of individuals, either directly or indirectly, holding more than five percent (5%) ownership or financial interest in the business entity appearing before the SNWA Board of Directors.

Publicly-traded entities and non-profit organizations shall list all Corporate Officers and Directors in lieu of disclosing the names of individuals with ownership or financial interest. The disclosure requirement, as applied to land-use applications, extends to the applicant and the landowner(s).

Entities include all business associations organized under or governed by Title 7 of the Nevada Revised Statutes, including but not limited to private corporations, close corporations, foreign corporations, limited liability companies, partnerships, limited partnerships, and professional corporations.

Full Name	Title	% Owned <small>(Not required for Publicly Traded Corporations, Non profit organizations)</small>
_____	_____	_____
_____	_____	_____
_____	_____	_____

This section is not required for publicly-traded corporations.

- Are any individual members, partners, owners or principals, involved in the business entity, an SNWA full-time employee(s), or appointed/elected official(s)?
 - Yes No (If yes, please note that SNWA employee(s), or appointed/elected official(s) may not perform any work on professional service contracts, or other contracts, which are not subject to competitive bid.)
- Do any individual members, partners, owners or principals have a spouse, registered domestic partner, child, parent, in-law or brother/sister, half-brother/half-sister, grandchild, grandparent, related to an SNWA full-time employee(s), or appointed/elected official(s)?
 - Yes No (If yes, please complete the Disclosure of Relationship form on Page 2. If no, please print N/A on Page 2.)

I certify under penalty of perjury, that all of the information provided herein is current, complete, and accurate. I also understand that the SNWA will not take action on land-use approvals, contract approvals, land sales, leases or exchanges without the completed disclosure form.

Brian G. Thomas
 Signature
Managing Director
 Title

Brian G. Thomas
 Print Name
3-4-14
 Date

DISCLOSURE OF RELATIONSHIP

List any disclosures below:
(Mark N/A, if not applicable.)

NAME OF BUSINESS OWNER/PRINCIPAL	NAME OF SNWA EMPLOYEE OR OFFICIAL AND JOB TITLE	RELATIONSHIP TO SNWA EMPLOYEE OR OFFICIAL	SNWA EMPLOYEE'S/OFFICIAL'S DEPARTMENT
N/A			

"Consanguinity" is a relationship by blood. "Affinity" is a relationship by marriage.

"To the second degree of consanguinity" applies to the candidate's first and second degree of blood relatives as follows:

- Spouse – Registered Domestic Partners – Children – Parents – In-laws (first degree)
- Brothers/Sisters – Half-Brothers/Half-Sisters – Grandchildren – Grandparents – In-laws (second degree)

For SNWA Use Only:

If no Disclosure or Relationship is noted above or if the section is marked N/A, please check this box:

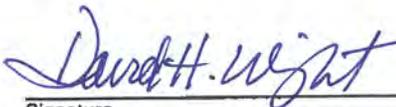
No Disclosure

If any Disclosure of Relationship is noted above, please complete the following:

Yes No Is the SNWA employee(s) noted above involved in the contracting/selection process for this particular agenda item?

Yes No Is the SNWA employee(s) noted above involved in any way with the business in performance of the contract?

Notes/Comments:



Signature

David H. Wright

Print Name

Authorized Department Representative

AGREEMENT TO PROVIDE PROFESSIONAL SERVICES

This Agreement is made and entered into this ____ day of _____, 2014, by and between Hobbs Ong & Associates, Inc. and Public Financial Management, Inc., hereinafter called "CONSULTANT," and the SOUTHERN NEVADA WATER AUTHORITY, a political subdivision of the State of Nevada, hereinafter called the "AUTHORITY." The CONSULTANT and the AUTHORITY are sometimes hereinafter referred to individually as "Party" and collectively as the "Parties." The term "AUTHORITY" also refers to staff of the AUTHORITY acting within their designated authority and duties.

WITNESSETH:

WHEREAS, the AUTHORITY desires to obtain professional services as more specifically described herein, and

WHEREAS, the CONSULTANT is properly qualified and desires to provide the professional services required by the AUTHORITY, and

WHEREAS, the AUTHORITY, in reliance on the CONSULTANT's representations and proposals, agrees to retain the CONSULTANT, and the CONSULTANT agrees to furnish professional services to the AUTHORITY, on the terms and conditions hereinafter set forth.

NOW, THEREFORE, in consideration of the promises and mutual covenants contained herein, the Parties hereto agree as follows:

1. SCOPE OF SERVICES:

(a) The CONSULTANT shall provide any requested services, hereinafter referred to as "Services" or "Work," as described and within the time indicated in **Exhibit A** and **Exhibit B**, which is attached herewith and made a part of this Agreement.

(b) All Services performed shall be subject to the cost ceiling contained in Paragraph 4 hereof and subject to the AUTHORITY's directions respecting priorities. The CONSULTANT will furnish professional Services in the amount necessary to complete promptly and effectively the Work assigned under this Agreement. All of the Services shall be performed by the CONSULTANT or an approved subcontractor or subconsultant.

(c) In performing Services under this Agreement, the CONSULTANT shall observe and abide by the terms and conditions of all applicable laws, regulations, ordinances, or rules of the United States, of the State of Nevada, of any political subdivision thereof, and of any other duly constituted public authority or agency. The CONSULTANT shall be responsible for obtaining any license, permit or other approval as required by law or otherwise, arising out of the Services to be performed hereunder.

(d) The CONSULTANT has, or will secure at its own expense, the qualified personnel required to perform the Services assigned under this Agreement. Such personnel shall not be employed by the United States, the State of Nevada, Clark County, the AUTHORITY, or any other political subdivision of the State of Nevada.

2. PERIOD OF PERFORMANCE:

This Agreement shall become effective as of the date it is fully executed by both Parties and, unless terminated in accordance with the terms of this Agreement, shall remain in effect until all Services authorized to be performed by the AUTHORITY are completed by the CONSULTANT or terminated in accordance with this Agreement.

3. COMPENSATION:

(a) In consideration for completion of all duties and responsibilities under this Agreement, the AUTHORITY agrees to pay the CONSULTANT, in accordance with **Exhibit A** and **Exhibit B**, for Work completed to the AUTHORITY's satisfaction.

(b) The CONSULTANT shall provide itemized monthly invoices for Services performed during the previous month. Invoices are to be submitted to the AUTHORITY in accordance with the Notice provisions of the Agreement and must reference the name and date of the Agreement. A copy of any invoice received from subcontractors or subconsultants used by the CONSULTANT shall be included.

(c) The AUTHORITY shall pay invoiced amounts from the CONSULTANT based on the fees set forth in **Exhibit A** and **Exhibit B** within thirty 30 calendar days after the date the invoice is received and approved by the AUTHORITY.

4. LIMITATION ON COSTS:

The total cost of Services provided under this Agreement shall not exceed four hundred thousand dollars (\$400,000.00).

5. TRUTH-IN-NEGOTIATION CERTIFICATION:

Signing of this Agreement by CONSULTANT shall constitute a truth-in-negotiation certification by CONSULTANT that wage rates and other factual unit costs supporting the compensation of this Agreement are accurate, complete, and current at the time of execution of this Agreement. The original Agreement price and any additions thereto shall be adjusted to exclude any significant sums by which the AUTHORITY determines the Agreement price was increased due to inaccurate, incomplete, or noncurrent wage rates and other factual unit costs.

All such Agreement adjustments shall be made within one (1) year following the end of the term of this Agreement.

6. INDEPENDENT CONTRACTOR:

The relationship of the CONSULTANT to the AUTHORITY hereunder shall be that of an independent contractor and not an agent or employee. The CONSULTANT shall have complete control over its employees and the method of performing its Work under this Agreement. No permitted or required approval by the AUTHORITY of personnel, costs, documents or Services of the CONSULTANT shall be construed as making the AUTHORITY responsible for the manner in which the CONSULTANT performs its Services or for any acts, errors or omissions of the CONSULTANT. Such approvals are intended only to give the AUTHORITY the right to satisfy itself with the quality of Work performed by the CONSULTANT.

7. INTELLECTUAL PROPERTY ACKNOWLEDGMENT

In consideration of the covenants, representations and warranties set forth herein and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, CONSULTANT hereby covenants, represents and warrants the following:

- (a) All content developed on behalf of the AUTHORITY, in whole or in part, solely or jointly by CONSULTANT and all of CONSULTANT's employees, associates or subcontractors assisting in creating developments and/or other work product, whether or not copyrightable or otherwise protected, including, without limitation, advertisements and marketing material ("Work Product") arising from services performed pursuant to, or arising out of the AUTHORITY's engagement of CONSULTANT, or previously conceived in anticipation of work to be performed in regard to the AUTHORITY's

engagement of CONSULTANT, shall be deemed “work made for hire” as defined in the copyright laws of the United States of America (17 U.S.C. §101 et seq.) and the AUTHORITY shall own all right, title, and interest, including, without limitation, all copyrights and other intellectual property right, title, and interest (“Right”) in and to the Work Product.

(b) To the extent that CONSULTANT is deemed to have or retain any Right or otherwise possess any Right in and to any Work Product, CONSULTANT hereby assigns, transfers, and conveys, all such Right to the AUTHORITY.

(c) CONSULTANT shall execute all documents and undertake all actions necessary to effect the clarification of ownership of all Work Product in and to the AUTHORITY and to allow the AUTHORITY to apply for registrations of the Work Product, as well as maintain any registrations gained, including, without limitation, the Intellectual Property Assignment set forth in paragraph 8.

(d) CONSULTANT hereby waives and releases any claim of infringement of any Right of CONSULTANT (whether based in any intellectual property Right, other proprietary interest whatsoever, or fiduciary theory) in, to or respecting any Work Product (including, without limitation, any claim based on any CONSULTANT’s rights in any Work Product which may be construed as “works of visual art” as defined in the Visual Arts Rights Act of 1990, 17 U.S.C. 106A) and shall never challenge nor dispute the AUTHORITY's Right in and to the Work Product.

8. INTELLECTUAL PROPERTY ASSIGNMENT

In consideration of the covenants, representations and warranties set forth herein and other good and valuable consideration, the receipt and sufficiency of which is hereby

acknowledged, CONSULTANT hereby sells, conveys, transfers and assigns to the AUTHORITY all of the CONSULTANT's right, title, license and interest (including, without limitation, all intellectual property right, title, license and interest) in and to any and all ideas and content (including, without limitation, all material, information, creative works, documents, matter, text, data, graphics, computer-generated displays and interfaces, images, photographs and works of whatsoever nature, including, without limitation, all compilations of the foregoing and all results and/or derivations of the expression of the foregoing) designed, developed, or created by the CONSULTANT or otherwise arising out of the CONSULTANT's Services or Work and related content by and for the benefit of the AUTHORITY (including, without limitation, patents applications, issued patents, prototypes for the purpose of same, and other associated derivatives) including, without limitation, all marks, all goodwill associated with such patents, marks, trade secrets, and copyrights in and to, relating to, associated with and/or arising from the Work, the right to applications, issuance, continuations, and divisionals of such patents and the right to applications, registrations, renewals, reissues, and extensions of such marks and copyrights, and the right to sue and recover for any past and/or continuing infringements or contract breaches, said rights, titles, licenses and interests to be held and enjoyed by the AUTHORITY, for the AUTHORITY's own use and benefit and for the use and benefit of the AUTHORITY's successors, assigns or other legal representatives, as fully and entirely as the same would have been held and enjoyed by the CONSULTANT if this sale, conveyance, transfer and assignment had not been made.

9. JOINT VENTURE:

Nothing herein shall be construed to imply a joint venture or principal and agent relationship between the AUTHORITY and the CONSULTANT, and neither Party shall have

any right, power or authority to create any obligation, expressed or implied, on behalf of the other.

10. INTERPRETATION:

The Parties agree that neither Party shall be deemed the drafter of this Agreement and, in the event this Agreement is ever construed by a court of law or equity, such court shall not construe this Agreement or any provision hereof against either Party as drafter of this Agreement.

11. CONFLICT OF INTEREST:

During the course of performance of this Agreement, the CONSULTANT will not contract with any client whose interest is adverse to or would require the CONSULTANT to take a position contrary to that of the Las Vegas Valley Water District and/or the AUTHORITY.

12. PROHIBITION AGAINST COMMISSION FOR OBTAINING AGREEMENT:

The CONSULTANT warrants that no person or company has been employed or retained to solicit or secure this Agreement upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, except bona fide employees; nor has the CONSULTANT paid or agreed to pay any person, company, corporation, individual or firm other than a partner or bona fide employee, any fee, commission, contribution, donation, percentage, gift, or any other consideration, contingent upon or resulting from award of this Agreement. For any breach or violation of this warranty, the AUTHORITY shall have the right to terminate this Agreement without liability, or at its discretion, to deduct from the contract price, or otherwise recover, the full amount of such fee, commission, percentage, gift or consideration and any other damages.

13. PROHIBITION AGAINST INTEREST BY GOVERNMENT EMPLOYEES:

(a) No officer, employee or member of the governing body of the AUTHORITY shall (1) participate in any decision relating to this Agreement which affects his or her personal interest or the interest of any corporation, partnership, or association in which he or she is, directly or indirectly, interested or (2) have any interest, direct or indirect, in this Agreement or the proceeds thereof.

(b) The CONSULTANT represents that it presently has no interest and shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance of Services required to be performed under this Agreement. The CONSULTANT further covenants that in the performance of said Services, no person having any such interest shall be employed.

(c) No member of, delegate to or officer or employee of the legislative, executive or judicial branches of the government of the United States, of the State of Nevada or any of its political subdivisions shall be entitled to any share or part hereof or to any benefit to arise therefrom.

14. COMPLETENESS AND ACCURACY OF CONSULTANT'S WORK:

(a) The CONSULTANT shall be responsible for the completeness and accuracy of its research, supporting data, and any final reports or other deliverables prepared or compiled under its obligation under this Agreement and shall correct, at its expense, all errors or omissions therein which may be disclosed.

(b) The cost necessary to correct those errors attributable to the CONSULTANT and any damage incurred by the AUTHORITY as a result of additional costs caused by such errors shall be chargeable to the CONSULTANT. The fact that the

AUTHORITY has accepted or approved the CONSULTANT's Work shall in no way relieve the CONSULTANT of any of its responsibilities.

15. INDEMNIFICATION:

CONSULTANT shall indemnify, hold harmless, and defend without cost to the AUTHORITY, its Board of Directors and its officers, agents, and employees, against any and all losses, claims, costs, damages, actions, proceedings, and liability arising out of, resulting from, or in any way incidental to CONSULTANT's provision of Services or Work under this Agreement. This indemnification includes, but is not limited to, claims for or by reason of any death or deaths of, or any physical injury or injuries to, any person or persons or damage to real or personal property of any kind whatsoever, whether the person(s) or property of CONSULTANT, its agents, or subconsultants, or of third parties; harassment or discrimination or any theory of joint or dual employment by the CONSULTANT's employees, agents, subcontractors or subconsultants, arising out of the Services or Work under this Agreement; negligence, whether active, passive or contributory, of the AUTHORITY, and its officers, employees or agents; or infringement on any U.S. patent (issued as of the Effective Date) or any copyright or trademark.

16. INSURANCE:

(a) General:

1. The CONSULTANT shall not commence any Work under this Agreement until the CONSULTANT obtains, at its own expense, all insurance as required in this section; however, failure to obtain all insurance shall not relieve the CONSULTANT of the obligation to achieve the schedule milestone dates as defined herein. The types of insurance to be obtained by the CONSULTANT are

Workers' Compensation, Employers' Liability, Automobile Liability, Commercial General Liability, and Professional Liability as outlined in the following portions of this section.

2. The Workers' Compensation, Employers' Liability, and Automobile Liability insurance will be maintained in force for the full period of the Agreement.

3. The Professional Liability insurance will be maintained in force for two years following the completion of the project.

4. These insurance provisions are in addition and cumulative to any other right of indemnification or contribution that the AUTHORITY may have in law, in equity, or otherwise and shall survive the completion of the project.

5. Nothing contained in these insurance requirements is to be construed as limiting the extent of the CONSULTANT's total responsibility for payment of claims arising in whole or in part from the actions of a third party when such actions might be taken as a result of the CONSULTANT's operations under this Agreement.

6. At the time of executing this Agreement and before commencement of the Work, the CONSULTANT shall have delivered to the AUTHORITY certificates of insurance and endorsements that attest to the fact that the CONSULTANT has obtained the insurance as specified in this Agreement.

(b) Other Insurance:

1. All insurance provided by the CONSULTANT shall be considered primary with respect to the AUTHORITY's insurance, and any similar insurance maintained by the AUTHORITY shall be considered excess and non-contributory.

2. The CONSULTANT's Workers' Compensation insurance shall be written with a property and casualty insurance company admitted to do business in the State of Nevada and rated A- or better and Class V or higher of financial size category in the current issue of Best's Key Rating Guide.

3. The CONSULTANT's Automobile Liability, Commercial General Liability and Professional Liability insurance shall be written with property and casualty insurance companies admitted to do business in the State of Nevada and rated A- or better and Class VIII or higher of financial size category in the current issue of Best's Key Rating Guide.

4. In the event any of the CONSULTANT's insurance companies are not admitted to write business in the state of Nevada, then the CONSULTANT will furnish evidence of insurance with insurance companies that are rated A- or better and Class IX or higher of financial size category in the current issue of Best's Key Rating Guide for each coverage written with a non-admitted carrier.

5. The Certificate of Insurance and related endorsements must be satisfactory to the AUTHORITY as to form and content and must comply with all insurance requirements as set forth herein, or the certificate and endorsements may be rejected and thereby, at the option of the AUTHORITY, render this Agreement cancelable.

6. All endorsements are to be dated, reflect the name of the insurance company, the type of insurance, and the policy number; be executed by a duly authorized representative of the insurance company; and be attached to the certificate.

7. The full legal operating names of the CONSULTANT and insurance carrier shall be properly shown where applicable.

8. The cancellation section of the certificate is to be amended to provide 30-day written notice of cancellation and initialed by the Agent.

9. By endorsement (I.S.O. Forms CG 20 10 07 04 and CA 20 48 02 99, or equivalent), the AUTHORITY shall be included as an additional insured under the Commercial General Liability and Automobile Liability insurance policies as to bodily injury, sickness, disease, or death, personal injury, damage to or destruction of the property or persons which may arise out of or in connection with activities under the Agreement. The CONSULTANT's insurance shall be primary with respect to the additional insureds; any insurance coverage maintained by the AUTHORITY shall be in excess of the CONSULTANT's insurance and non-contributing.

10. By endorsement (I.S.O. Form CG 24 04 10 93 or its equivalent), the CONSULTANT's Commercial General Liability, Automobile Liability and Workers' Compensation Insurance carriers shall waive their transfer rights of recovery (Waiver of Subrogation) against the AUTHORITY, its members and affiliated companies, successors or assignees, including their directors, officers, and employees individually and collectively.

11. The additional insured and waiver of subrogation endorsements shall read as follows:

The Southern Nevada Water Authority, its members, and affiliated companies, successors, or assigns, including their directors, officers, and employees individually and collectively, when acting within the scope of their employment.

12. If the CONSULTANT fails to procure and/or maintain insurance set forth herein, in addition to other rights or remedies, the AUTHORITY shall have the right, if the AUTHORITY so chooses, to procure and/or maintain the said insurance for and in the name of the CONSULTANT with the AUTHORITY as an Additional Insured, and the CONSULTANT shall pay the cost thereof and shall furnish all necessary information to make effective and/or maintain such insurance. In the event the CONSULTANT fails to pay the cost, the AUTHORITY hereby has the right to offset any premiums from the compensation set forth in this Agreement and directly pay for such coverage.

13. With respect to any and all insurance required under this Agreement, the deductible shall not exceed \$50,000, unless otherwise agreed to by the AUTHORITY or the AUTHORITY'S Risk Management Division.

(c) Workers' Compensation and Employers' Liability Insurance:

1. The CONSULTANT shall procure and maintain such insurance and see that its subcontractors/subconsultants purchase and maintain such insurance as is required under the Nevada Industrial Insurance Act, Nevada Revised Statutes Chapters 616 and 617, for all of its employees working on the project to protect the AUTHORITY from any industrial insurance claims.

2. In the event any class of employees engaged in any Work on the project relative to this Agreement is not protected under the Nevada Industrial Insurance Act, then the CONSULTANT shall provide to the AUTHORITY adequate insurance coverage in a form and by an insurance carrier satisfactory to the AUTHORITY for the protection of such employees.

3. In the event the CONSULTANT is permissibly self-insured for Workers' Compensation insurance in the State of Nevada, the CONSULTANT shall deliver to the AUTHORITY a copy of the Certificate of Consent to Self-Insure issued by the State of Nevada.

4. The CONSULTANT shall procure and maintain Employers' Liability Insurance with limits as set forth in paragraph 16 (h).

(d) Commercial General Liability Insurance:

The CONSULTANT shall procure and maintain Commercial General Liability insurance coverage. The coverage under this policy shall include, but not be limited to, commercial general liability, protective liability, blanket contractual liability, and broad-form property damage. The Commercial General Liability Insurance policy shall be written for limits as outlined under paragraph 16 (h). The amount of coverage shall apply to bodily injury, sickness, disease or death, personal injury, damage to or destruction of the property of persons that may arise out of or in connection with the activities under this Agreement.

(e) Automobile Liability Insurance:

The CONSULTANT shall procure and maintain, at its own expense, automobile liability insurance limits as outlined in paragraph 16 (h), written on a

combined-single-limit basis for bodily injury and property damage including all owned, leased, hired, or non-owned motorized vehicles and apparatus and shall indicate these coverages on the certificate.

(f) Professional Liability Insurance:

The CONSULTANT shall procure and maintain Professional Liability Insurance as outlined in paragraph 16 (h). If this coverage is written on a claims-made basis, the retroactive date shall be prior to or coincident with the date of this Agreement and the certificate shall so state.

(g) It is the CONSULTANT's sole responsibility to ascertain that the aforementioned insurance requirements are fulfilled. In the event they are not, the CONSULTANT shall not be relieved of their duty to perform, indemnify, defend, and hold harmless the AUTHORITY and all others concerned herein, nor shall the AUTHORITY and all concerned herein be liable to the CONSULTANT or any others in the event the CONSULTANT's insurance, as accepted by the AUTHORITY, fails to meet the full requirements herein.

(h) Insurance Limits

<u>Value of Contract</u>	<u>Coverage</u>	<u>Limits of Liability</u>
\$100,000 to \$999,999	Professional Liability	\$500,000/per claim \$1,000,000 aggregate
	General Liability	\$1,000,000/per occurrence \$2,000,000/aggregate
	Automobile Liability	\$1,000,000/per occurrence
	Workers' Compensation	Statutory
	Employers' Liability	\$100,000
\$1,000,000 to \$4,999,999	Professional Liability	\$1,000,000/per claim \$2,000,000 aggregate
	General Liability	\$1,000,000/per occurrence \$2,000,000/aggregate
	Automobile Liability	\$1,000,000/per occurrence

	Workers' Compensation Employers' Liability	Statutory \$500,000
\$5,000,000 to \$9,999,999	Professional Liability	\$3,000,000/per claim \$5,000,000 aggregate
	General Liability	\$1,000,000/per occurrence \$2,000,000/aggregate
	Automobile Liability	\$1,000,000/per occurrence
	Workers' Compensation Employers' Liability	Statutory \$1,000,000
\$10,000,000 to \$19,999,999	Professional Liability	\$5,000,000/per claim \$10,000,000 aggregate
	General Liability	\$2,000,000/per occurrence \$4,000,000/aggregate
	Automobile Liability	\$2,000,000/per occurrence
	Workers' Compensation Employers' Liability	Statutory \$1,000,000
\$20,000,000 to \$24,999,999	Professional Liability	\$10,000,000/per claim \$20,000,000 aggregate
	General Liability	\$2,000,000/per occurrence \$4,000,000/aggregate
	Automobile Liability	\$2,000,000/per occurrence
	Workers' Compensation Employers' Liability	Statutory \$1,000,000
\$25,000,000 and over	Coverage and limits to be negotiated.	

17. TERMINATION:

The AUTHORITY's General Manager, his/her designee and/or the CONSULTANT may terminate this Agreement on thirty (30) days prior written notice. In the case of termination by the AUTHORITY, the AUTHORITY shall pay the CONSULTANT for all Work performed to the effective date of termination and the reasonable costs of transferring all documentation of all Work to the AUTHORITY.

18. REVIEWS:

(a) The CONSULTANT shall submit draft reports and other materials for review by the AUTHORITY prior to the submission of a final report on materials. Due dates will be negotiated, but in every instance, earlier submittal is encouraged.

(b) The AUTHORITY will review the submittals and any pertinent attachments and mark all required changes. All reviews will be completed within ten (10) working days after receipt of the submission package, and the package will be returned to the CONSULTANT. Corrections and changes to the submission will be made by the CONSULTANT and resubmitted to the AUTHORITY for approval within ten (10) working days after receipt. The final approval will be submitted to the CONSULTANT within five (5) working days after receipt of the corrected document and any attachments. Alternate review schedules may be negotiated by mutual agreement of the Parties.

19. RELEASE OF INFORMATION:

The CONSULTANT shall make public information releases only as provided for and in accordance with this Agreement. Any and all other public releases of information gathered, obtained, or produced during the performance of this Agreement must be specifically approved in writing by the AUTHORITY prior to release. Such information shall include, but is not limited to, all products, intellectual property, Work Product, ideas, data, reports, background materials, and any and all other materials belonging to the AUTHORITY. Such public releases of information shall include, but are not limited to, publication in any book, newspaper, magazine, professional or academic journal, the Internet, radio, television, and presentations to professional, academic, and/or other groups or conferences.

20. USE OF MATERIALS:

(a) The AUTHORITY shall make available to the CONSULTANT such materials from its files as may be required by the CONSULTANT in connection with its performance of Services under this Agreement. Such materials shall remain the property of the AUTHORITY while in the CONSULTANT's possession.

(b) Upon termination of this Agreement, the CONSULTANT shall turn over to the AUTHORITY any property of the AUTHORITY in its possession and any calculations, notes, reports, or other materials prepared by the CONSULTANT in the course of performing this Agreement. Any proprietary software or other tools of the CONSULTANT used to execute the Work shall remain the property of the CONSULTANT.

21. RECORDS:

The CONSULTANT shall retain financial and other records related to this Agreement for six (6) years after the completion or termination of this agreement, and shall make available to the AUTHORITY for inspection, all books, records, documents, and other evidence directly pertinent to performance under this Agreement upon reasonable notice.

22. ASSIGNMENT:

The CONSULTANT shall not assign or transfer its interest in this Agreement without the prior written consent of the AUTHORITY. If CONSULTANT assigns or transfers without prior written approval, the assignment or transfer shall be void, and not merely voidable.

23. MODIFICATION OF AGREEMENT:

This Agreement may not be changed or modified except by written instrument executed by both Parties or their designees.

24. SEVERABILITY:

Any provisions or portions of this Agreement prohibited as unlawful or unenforceable under any application of law of any jurisdiction shall as to such jurisdiction be ineffective without affecting other provisions of this Agreement. If the provisions of such applicable law

may be waived, they are hereby waived to the end that this Agreement may be deemed to be a valid and binding Agreement enforceable in accordance with its terms.

25. NON-DISCRIMINATORY EMPLOYEE PRACTICES:

(a) The CONSULTANT shall not employ discriminatory practices in the provision of Services, employment of personnel, or in any other respect on the basis of race, color, religion, sex, sexual orientation, gender identity or expression, age, disability, or national origin.

(b) No person in the United States shall, on the grounds of race, color, religion, sex, sexual orientation, gender identity or expression, age, disability, or national origin, be excluded from participation in, be denied the benefits of, or be subject to discrimination under any program or activity made possible by or resulting from this Agreement.

(c) The CONSULTANT will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity or expression, age, disability, or national origin. The CONSULTANT shall ensure that applicants are employed, and the employees are treated during employment, without regard to their race, color, religion, sex, sexual orientation, gender identity or expression, age, disability, or national origin. This non-discrimination provision shall include, but not be limited to employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship. The CONSULTANT agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provision of this non-discrimination clause.

(d) The CONSULTANT will, in all solicitations or advertisements for employees placed by or on behalf of the CONSULTANT, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity or expression, age, disability, or national origin.

(e) The CONSULTANT will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice advising the said labor union or workers representatives of the CONSULTANT's commitment under this provision and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

26. EQUAL EMPLOYMENT OPPORTUNITY:

(a) The CONSULTANT and any subcontractor or subconsultant working under the authority of the CONSULTANT, who is responsible for the selection, referral, hiring, or assignment of workers for the Services provided pursuant to this Agreement, is required to comply with all applicable provisions of Title VII of the Civil Rights Act of 1964. This requirement includes compliance with Equal Employment Opportunity Commission regulations that prohibit discrimination based upon race, color, religion, sex, or national origin. Furthermore, the CONSULTANT shall in all relevant manners comply with the Age Discrimination in Employment Act, the Civil Rights Act of 1991, the Equal Pay Act, and Title I of the Americans with Disabilities Act.

(b) The CONSULTANT shall make all necessary documentation as required to comply with the Acts referred to above and shall make such documentation

immediately available to the AUTHORITY upon the AUTHORITY's request. The CONSULTANT is solely liable for failure to comply with this provision.

27. APPLICABLE LAW:

Nevada law shall govern the interpretation of this Agreement, without reference to its choice of law provisions.

28. VENUE:

The Parties agree that venue for any dispute arising from the terms of this Agreement shall be Clark County, Nevada.

29. ATTORNEY'S FEES:

Except as otherwise set forth in this Agreement, the Parties shall bear their own attorneys' fees and costs incurred in resolving the claims, as well as on the preparation of this Agreement. In the event that any Party commences an action to enforce or interpret this Agreement, or for any other remedy based on or arising from this Agreement, the prevailing party therein shall be entitled to recover its reasonable and necessary attorneys' fees and costs incurred. For the purposes of this provision, the "prevailing party" shall be that party which has been successful with regard to the main issue, even if that Party did not prevail on all issues.

30. NO THIRD PARTY RIGHTS:

This Agreement is not intended by the Parties to create any right in or benefit to parties other than the AUTHORITY and the CONSULTANT. This Agreement does not create any third party beneficiary rights or causes of action.

31. WAIVER:

The failure of either Party to enforce at any time, or for any period of time, the provisions hereof shall not be construed as a waiver of such provisions or of the rights of such Party to enforce each and every such provision.

32. CAPTIONS:

The captions contained in this Agreement are for reference only and in no way to be construed as part of this Agreement.

33. COUNTERPARTS:

This Agreement may be executed in any number of counterparts and by the different Parties on separate counterparts, each of which, when so executed, shall be deemed an original, and all counterparts together shall constitute one and the same instrument.

34. INTEGRATION:

This Agreement contains the entire understanding between the Parties relating to the transactions contemplated by this Agreement, notwithstanding any previous negotiations or agreements, oral or written, between the Parties with respect to all or any part of the subject matter hereof. All prior or contemporaneous agreements, understandings, representations and statements, oral or written, regarding the subject matter of this Agreement are merged in this Agreement and shall be of no further force or effect.

35. NOTICES:

Any and all notices, demands or requests required or appropriate under this Agreement (including invoices) shall be given in writing and signed by a person with authorization to bind the CONSULTANT or AUTHORITY, either by personal delivery, via facsimile, via a scanned

document sent via email, or by registered or certified mail, return receipt requested, addressed to the following addresses and fax numbers:

To CONSULTANT: Hobbs Ong & Associates, Inc.
3900 Paradise Road, Suite 152
Las Vegas, NV 89169
Attention: Guy S. Hobbs
guy@hobbson.com
(702) 733-7250

Public Financial Management, Inc.
719 Second Avenue, Suite 801
Seattle, WA 98104
Attention: John H. Bonow
bonowj@pfm.com
(206) 264-9699

To AUTHORITY: Southern Nevada Water Authority
1001 S. Valley View Boulevard, M/S 320
Las Vegas, NV 89153
Attention: David Wright
Dave.wright@lvvwd.com
(702) 258-3106

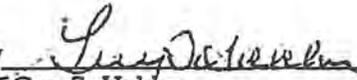
When notice is given by mail, it shall be deemed served three (3) business days following deposit, postage prepaid in the United States mail. When notice is given by facsimile or email transmission, it shall be deemed served upon receipt of confirmation of transmission if transmitted during normal business hours or, if not transmitted during normal business hours, on the next business day following the facsimile or email transmission.

The Parties may designate a new contact person under this provision for notices or invoices or change the address, email address or fax number identified above by notifying the other Party in writing.

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed the day and year first above written.

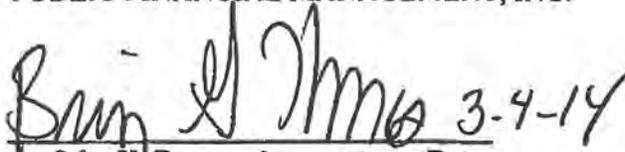
HOBBS ONG & ASSOCIATES, INC.

SOUTHERN NEVADA WATER AUTHORITY

By 
Guy S. Hobbs Date
Managing Director

By _____
John J. Entsminger Date
General Manager

PUBLIC FINANCIAL MANAGEMENT, INC.

 3-4-14
~~John H. Benow~~ ~~BRIAN THOMAS~~ Date
Managing Director

Approved as to form:

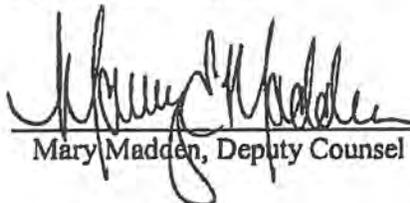

Mary Madden, Deputy Counsel

EXHIBIT A
IRPAC
SCOPE OF SERVICES

The CONSULTANT shall assist the AUTHORITY in financial technical support activities. These activities include, but are not limited to, conducting regular reviews of the AUTHORITY'S existing rate structure, projecting and modeling future funding requirements, advising the AUTHORITY on funding-related matters, and ensuring the policies recommended by the Integrated Resource Planning Advisory Committee, which were adopted by the AUTHORITY'S Board of Directors, are implemented in a manner that aligns with the intent of the Committee's recommendations and the Board's direction.

The CONSULTANT will determine the methods, details and means of performing the above-described services in cooperation with AUTHORITY staff. The following are the identified issue areas for which the CONSULTANT will provide the above-mentioned services.

FINANCIAL ADVISEMENT

Financial Support Services. As required or requested by the AUTHORITY, the CONSULTANT will provide financial support services related to the AUTHORITY'S general financial health, rate setting, budget preparation, revenue forecasting, legislative initiatives and other areas where support may be required from time to time.

Integrated Resource Planning Advisory Committee. The CONSULTANT will participate through the second phase of the Integrated Resource Planning process, in which the committee is expected to consider topics affecting the AUTHORITY, including facilities,

water quality, water resources, drought and climate change. As such, the CONSULTANT will provide financial modeling and advisement related to any recommendations made by the committee that may impact AUTHORITY funding. The CONSULTANT will attend meetings in conjunction with or on behalf of the AUTHORITY with member agencies, stakeholder groups or other affected parties as may be requested by the AUTHORITY. The CONSULTANT, as the request of the AUTHORITY, will make presentations to IRPAC, member agencies, governmental bodies and/or other parties.

Rate Accountability. The CONSULTANT will work with AUTHORITY staff to monitor AUTHORITY finances to ensure existing rate structures are sufficient to provide adequate and stable funding sources into the future.

RATES AND FEES

Invoices shall be submitted to the Southern Nevada Water Authority and shall state information as outlined in the Agreement, Paragraph 3 (Compensation, page 3).

EXHIBIT B

GENERAL AUTHORITY SUPPORT SERVICES

SCOPE OF SERVICES AND RATES & FEES SCHEDULE

SCOPE OF SERVICES

A. Financial Planning

1. Review and make recommendations regarding the short and long-term capital improvement programs in order to match sources of capital funding to infrastructure needs.
2. Provide financial feasibility studies which will include financing alternatives, amortization schedules, revenue estimates, revenue alternatives, rate modeling and analysis, and make recommendations to the AUTHORITY as to the optimal financing strategy.
3. Evaluate proposals and/or studies provided to the AUTHORITY, by outside interested parties, relative to the financing of capital projects, and report findings to the AUTHORITY.
4. Assist the AUTHORITY in debt management policy development, including policies and procedures for measuring and making financial decisions.

B. Managing and Issuing Debt Securities

1. Review existing debt structure to identify strengths and weaknesses of structure, identify funding opportunities.
2. Develop and analyze appropriate debt structure alternatives and bond financing schedules.
3. Assist the AUTHORITY with credit rating management and upgrade strategies.
4. Assist the AUTHORITY in the development of the terms of the financing and make recommendations concerning the terms and conditions (including public or private sale) upon which the securities are to be issued and sold, including final repayment schedules, call and redemption features, reserve funds, revenue options, coverage requirements, and other details.

5. Develop and review financing documents including the Official Statement, which sets forth financial and other information about the AUTHORITY and a description of the security issue, for each contemplated debt issuance planned to be sold at a public sale.
6. Assist the AUTHORITY and the underwriter in preparation of an Official Statement for issues planned to be sold at a private sale. The preparation of the material will be in general conformance with Government Finance Officers Association Disclosure Guidelines for Offerings of Securities by State and Local Governments.
7. Review official Statements not prepared by the CONSULTANT and report findings to the AUTHORITY.
8. Confer with legal counsel, disclosure counsel, bond attorneys, underwriters, bankers, actuarial firms, and accountants selected.
9. Assist the AUTHORITY with presentations made to the Debt Management Commission to secure its approval for issuance of securities.
10. Inform the AUTHORITY of market conditions and advise the AUTHORITY as to advantageous timing that the securities might be sold.
11. Participate with the AUTHORITY in due diligence meetings.
12. Assist in the procurement of other financial services such as trustee, printer and verification agent.
13. Assist the AUTHORITY in establishing a marketing plan via widely circulated financial journals and publications, to obtain publicity for the AUTHORITY's security sale.
14. Assist the AUTHORITY with preparation of materials for rating agency presentations.
15. Review bids to verify calculations are in conformance with the specifications, and make recommendations, for award of bids on competitive sales.
16. Assist with the pricing of bonds.
17. Perform the necessary functions in connection with the Proceedings, which include acting as liaison, assembling documents, and participate in all closings.

C. Other Services

1. Attend all meetings of the AUTHORITY which such meetings include matters directly or indirectly related to the planning and management of AUTHORITY's debt.
2. Monitor and report local, State, and Federal regulations that may affect the AUTHORITY's debt position.
3. Consult with the AUTHORITY concerning investment of security proceeds with particular attention to arbitrage and filing requirements of the U.S. Treasury Department.
4. The AUTHORITY will assist the CONSULTANT with the identification of any potential instances of material events.
5. CONSULTANT shall notify, in accordance with requirements, all affected parties of any material event disclosures and potential impacts.

RATES & FEES SCHEDULE

- A. The CONSULTANT shall be compensated for its services in accordance with the rate schedule below.

The fee and expenses for issuance of securities is contingent and is payable only upon the successful delivery of any securities. The fee shall be paid only from the proceeds of sale of the securities or other legally available sources. The minimum fee for each series of securities shall be \$12,000. The maximum allowable fee for each series of securities shall be \$98,750 (not including expenses), and shall not apply to refunding or restructurings for any issuer. A bond issuance for the same general purpose which is issued on the same day and uses the same official statement should be considered as one series of securities even though the issuance is sub-divided as Series A, B and/or C.

<u>Amount of Issue</u>	<u>Fee</u>
To \$5,000,000	\$0.3969 per \$100
Additional Securities from \$5,000,001 to \$15,000,000	\$0.1764 per \$100
Additional Securities from \$15,000,001 to \$30,000,000	\$0.0662 per \$100
Additional Securities from \$30,000,001 to \$60,000,000	\$0.0353 per \$100
Additional Securities from \$60,000,001 to \$150,000,000	\$0.0176 per \$100
Additional Securities more than \$150,000,000	\$0.0088 per \$100

In addition, the AUTHORITY agrees to reimburse all expenses incurred in the performance of the consulting services rendered, including but not limited to, travel, lodging, meals, long distance telephone calls, printing, reproduction, advertising and other expenses, subject to approved, appropriated funding and within the limits stated in the Agreement, Paragraph 4 (Limitation on Costs).

- B. With thirty (30) days notice, either party may request, in writing to the other party, a review and revision of the rate schedule above. At that time, the rate schedule may be open to negotiation by either party to provide for an increase or decrease of the rates, subject to changes in market conditions.
- C. The following services shall be excluded from the standard bond fee schedule above and shall be negotiated under separate agreement if such services are required:
 - 1. Analysis and procurement of interest rate swaps and hedges and post-sale swap support and compliance services.
 - 2. Analysis and procurement of fuel hedges.
 - 3. Open market escrow analyses and bidding/procurement of open market and or State and Local Government Series (SLGS) securities for escrows, except as escrows may apply to SLGS for current and advanced refunding.
 - 4. Arbitrage rebate compliance strategies, analyses and filings.
 - 5. Bond proceeds' investments.
- D. Upon mutual consent of the parties, the fees for projects not directly related to a financing (such as studies, negotiations, financial plans, reports, preparation of memoranda, and any other matters with which the AUTHORITY may request for assistance) will be billed to the AUTHORITY on a time and materials basis plus expenses incurred in providing such services within the limit stated in the Agreement, Paragraph 4 (Limitation on Costs). The hourly rates will be:

Managing Director	\$325
Director/Senior Consultant	\$275
Consultant	\$225
Associate/Analyst	\$175

E. Invoices

Invoices shall be submitted to the Southern Nevada Water Authority and shall state information as outlined in the Agreement, Paragraph 3 (Compensation), including:

- 1. The agreed upon amount as per Paragraph A of this Section.
- 2. A list of expenses as noted in Paragraph A of this Section.

**SOUTHERN NEVADA WATER AUTHORITY
BOARD OF DIRECTORS
AGENDA ITEM**

March 20, 2014

Subject: Sales Tax Allocation Resolution & Cooperative Agreement	Director's Backup
Petitioner: David H. Wright, Chief Financial Officer	
Recommendations: That the Board of Directors approve a new Sales Tax Allocation Resolution and Cooperative Agreement among the Authority and the wastewater agencies of the City of Henderson, the City of Las Vegas, the City of North Las Vegas, and the Clark County Water Reclamation District.	

Fiscal Impact:

None to the Authority by the approval of the above recommendations. The reallocation and distribution adjustment affects only the wastewater agencies' share (38 percent) of the remaining sales tax balance. The Authority's share (62 percent) is not affected by this adjustment.

Background:

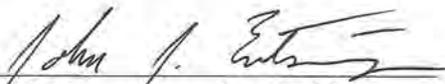
On July 20, 2000, the Board of Directors approved a Sales Tax Allocation Cooperative Agreement (2000 Cooperative Agreement) among the Authority and three wastewater agencies represented by the City of Henderson, the City of Las Vegas, and the Clark County Water Reclamation District (CCWRD), formerly Clark County Sanitation District. As outlined in the 2000 Cooperative Agreement, beginning with the April 2001 sales tax receipts, the Authority shares 38 percent of the "remaining sales tax revenue" (the balance after deducting the allotment for the Las Vegas Wash Fund and the Rural Area Distribution) with the wastewater agencies.

At the time of the 2000 Cooperative Agreement, the City of North Las Vegas did not treat wastewater and consequently was not a party to the 2000 Cooperative Agreement. Recently, the City of North Las Vegas began treating its own wastewater. This new Cooperative Agreement will add the City of North Las Vegas as a wastewater agency and allow it to receive its percentage of the sales tax for infrastructure collected by the Authority.

The city councils of all the wastewater agencies and the board of the CCWRD have approved this agreement. Approval of this new Cooperative Agreement will not affect the 96-month May 2013 agreement in which the CCWRD and the City of Henderson agreed to repay the City of Las Vegas for over collection of their sales tax revenue.

This agreement is being entered into pursuant to NRS 277.045, NRS Chapter 377B and Section 6(p) of the SNWA 1995 Amended Cooperative Agreement. The office of the General Counsel has reviewed and approved the agreement.

Respectfully submitted:


John J. Entsminger, General Manager
JJE:PDS:DHW:CKH:llm
Attachment

AGENDA
ITEM #

10

RESOLUTION NO. _____

BE IT RESOLVED, by the City Council of the City of Henderson, Nevada, the City Council of the City of Las Vegas, Nevada, the City Council of the City of North Las Vegas, Nevada, the Board of Trustees of the Clark County Water Reclamation District, and the Board of Directors of the Southern Nevada Water Authority that the following Cooperative Agreement is hereby adopted and approved:

SALES TAX ALLOCATION COOPERATIVE AGREEMENT
BETWEEN THE SOUTHERN NEVADA WATER AUTHORITY AND THE
WASTEWATER AGENCIES REPRESENTED BY THE CITY OF HENDERSON,
CITY OF LAS VEGAS, THE CITY OF NORTH LAS VEGAS, AND THE CLARK COUNTY
WATER RECLAMATION DISTRICT

This Agreement is entered into by the Southern Nevada Water Authority (Authority) and the four wastewater agencies represented by the City of Henderson, City of Las Vegas, the City of North Las Vegas and the Clark County Water Reclamation District (Wastewater Agencies), which are members of the Authority, this ____ day of _____, 20__.

WHEREAS, the Authority is an entity created by Cooperative Agreement between the Big Bend Water District, City of Boulder City, City of Henderson, City of Las Vegas, City of North Las Vegas, Clark County Sanitation District (now known as the Clark County Water Reclamation District) and Las Vegas Valley Water District; and

WHEREAS, the Authority is charged under the aforementioned Cooperative Agreement and subsequent laws of the State of Nevada with responsibility for administering, operating, and maintaining the regional water treatment and transmission facilities which comprise the Southern Nevada Water System (SNWS) for the benefit of the Water Authority Purveyor member agencies and their customers; and

WHEREAS, the Authority embarked on an integrated resource planning process in 1994 which identified the construction of additional regional water facilities as essential to ensuring the continued safe and reliable delivery of water to the Purveyor member agencies in Southern Nevada and to meeting Southern Nevada's increasing water demands; and

WHEREAS, the Wastewater Agencies, considered collectively, are charged under state and local government regulations with the responsibility for ensuring the proper treatment and discharge of wastewater flows from the City of Henderson, City of Las Vegas, City of North Las Vegas, and unincorporated areas of Clark County; and

WHEREAS, the Authority Board of Directors accepted the Las Vegas Wash Comprehensive Adaptive Management Plan, which outlines an action plan including wetlands restoration in the Las Vegas Wash; and

WHEREAS, a needs assessment by the Wastewater Agencies has indicated that stricter environmental regulations and continued growth in Southern Nevada will necessitate the construction of

additional wastewater treatment facilities, including water reclamation and reuse facilities by the Wastewater Agencies; and

WHEREAS, the aforementioned Authority integrated resource planning process included a citizens advisory committee which, over a one-year period, studied various ways to fund, both dependably and fairly, the significant costs of constructing additional regional water facilities; and

WHEREAS, the Citizens Advisory Committee developed a series of funding recommendations for the SNWS capital expansion, including the implementation of a regional connection charge and water rate, and proposed a sales tax and a reliability surcharge (excise tax); and

WHEREAS, the citizens advisory committee also recognized the impending need by the Wastewater Agencies for additional treatment capacity, and therefore recommended that a portion of the sales tax increase, if implemented, be directed by the Authority to the Wastewater Agencies to assist them in funding their future treatment capacity and capital expansion needs; and

WHEREAS, The Authority Board of Directors accepted the recommendations of the citizens advisory committee to implement the regional water rate and connection charge, and the 69th Session of the Nevada Legislature adopted Chapter 377B, Tax for Infrastructure, and the Clark County Commission passed an ordinance imposing the tax; and

WHEREAS, the Authority and the Original Wastewater Agencies, comprised of The City of Henderson, the City of Las Vegas, and the Clark County Sanitation District (now Clark County Water Reclamation District), by Resolution entered into a Cooperative Agreement regarding the disbursement of the Tax for Infrastructure on the 20th day of July, 2000; and

WHEREAS, Section C, paragraph 2 of the above referenced Cooperative Agreement provided: "The parties to this agreement also acknowledge that the City of North Las Vegas may construct "Wastewater Facilities" in the future and if so the distribution of revenue and parties to this agreement would be reevaluated by the Authority Board."; and

WHEREAS, on or about July 2011, the City of North Las Vegas began to accept and treat wastewater for and on behalf of the citizens of North Las Vegas; and

WHEREAS, the Original Parties and the City of North Las Vegas agree to include the City of North Las Vegas as a member of the Wastewater Agencies effective the final signatory approval date of this Cooperative Agreement; and

WHEREAS, NRS 277.045 provides that two or more political subdivisions may enter into cooperative agreements for the performance of any governmental functions, and this agreement is authorized pursuant to NRS Chapter 377B;

NOW THEREFORE, in consideration of the mutual covenants contained herein, the Authority and Wastewater Agencies agree as follows:

A. DEFINITIONS

For the purposes of this agreement, the following terms shall be defined as follows:

1. "Water Facilities" shall be defined as in NRS 377B.040, and include only those facilities built by the Authority to provide water service in the Las Vegas Valley.
2. "Wastewater Facilities" shall be defined as in NRS 377B.030, and include only those facilities built by the Wastewater Agencies to provide wastewater service in the Las Vegas Valley. Wastewater Facilities shall be further defined to include those facilities built to provide treatment, solids disposal, and disposal of wastewater effluent, including satellite wastewater treatment plants, but shall not include collection system facilities, such as gravity sewers, force mains, or raw sewage pumping stations not located at a wastewater treatment facility, nor pumping stations, pipelines, or other appurtenances built for the delivery of reuse water from the wastewater facilities to the point of use.
3. "Rural Area Distribution" shall mean that portion of the gross sales tax allocated to rural areas of Clark County based on the ratio of assessed value of property in those rural areas to total assessed value in Clark County as defined in NRS 377B.170.
4. "Las Vegas Wash Fund" shall mean that portion of the gross sales tax amounting to four (4) percent of the total gross sales tax to be set aside to establish a fund for improvements in the Las Vegas Wash, for purposes consistent with NRS 377B.010 through NRS 377B.210, inclusive, beginning with the effective date of this agreement, and as may be amended by the Authority Board.
5. "Remaining Sales Tax Revenue" shall mean the amount of sales tax revenue remitted directly to the Authority remaining after deducting the "Las Vegas Wash Fund" and the "Rural Area Distribution".
6. "ERU" shall mean an Equivalent Residential Unit, equivalent to one single family residence producing approximately 90,000 gallons of wastewater per year which is either paid for by connection charges or on service and being billed for sewer service.

B. SHARING OF "REMAINING SALES TAX REVENUE"

The Authority agrees to share with the Wastewater Agencies the "remaining Sales Tax Revenue" as follows:

1. After those taxes collected for March 31, 2001, the Authority will deliver to the Wastewater Agencies their respective shares of the "Remaining Sales Tax Revenue".
2. The Authority shall allocate the "Remaining Sales Tax Revenue" between the Authority and the Wastewater Agencies based on each one's proportional share of the total costs of "Water Facilities" and "Wastewater Facilities".
3. The allocation of "Remaining Sales Tax Revenue" will be allocated with 62% to the Authority and 38% to the Wastewater Agencies.
4. Beginning at its regularly scheduled meeting in July of 2005 and every five (5) years thereafter, the Authority Board may make an adjustment to the allocations between the "Water Facilities" and

“Wastewater Facilities”. Adjustments to the initial allocations will be made considering: (1) Actual expenditures for “Water Facilities” and “Wastewater Facilities” from the period beginning July 1, 1995 to March 31 of the year of the adjustment, (2) the projected expenditures for “Water Facilities” and “Wastewater Facilities” from March 31 of the year of the adjustment to June 30, 2025, and (3) the amount of sales tax revenue already received for “Water Facilities” and “Wastewater Facilities” by the year of the adjustment.

5. Beginning with the tax revenues collected after March 31, 2001, and monthly thereafter, the Authority shall further be obligated to divide the amount allocated to the Wastewater Agencies and distribute to each Wastewater Agency that agency’s respective share of the wastewater portion of the revenues as follows:

(a) The first twenty (20) percent of the wastewater revenue shall be divided annually between the Wastewater Agencies based on the proportion of the total Las Vegas Valley wastewater flow that each agency is receiving. The initial proportional flow shall be based on the average daily flow in million gallons per day, for the calendar year 2000 and then updated annually for succeeding years.

(b) The remaining eighty (80) percent of the wastewater revenues shall be divided annually among the agencies based on the proportion of the total Las Vegas Valley “ERU’s” that each agency is serving beginning with calendar year 1995. Each year the cumulative total “ERU’s” for each agency for the period including calendar year 1995 through the last previous calendar year shall be determined. Each agency’s respective share of the remaining eighty (80) percent of wastewater revenues will be determined by dividing that agency’s cumulative “ERU’s” by the cumulative total of all four agency’s “ERU’s” and multiplying by the remaining eighty (80) percent of the revenues for that year.

C. AMENDMENTS TO THIS AND OTHER AGREEMENTS

1. The parties acknowledge that unforeseen requirements or regulations could be imposed on the Authority or the Wastewater Agencies that could substantially change the cost of “Water Facilities” or “Wastewater Facilities”. Such substantial changes were not considered when determining the division of revenues in this agreement, and should substantial changes occur in the future, any party to this agreement may petition the Authority Board to reevaluate the allocation made in this agreement.

2. The ratios for distribution of the remaining Sales Tax Revenue set forth in Paragraph B, 4. shall not be changed or amended without the affirmative vote of each Authority Director appointed to serve on the Authority Board by the Wastewater Agencies.

D. REPORTING OF INFORMATION

1. The parties to this agreement agree to supply to the Authority and to each other such information as may be required to administer this agreement, or as may be required by State law.

This information includes, but is not limited to:

(a) A report by September 30 of each year which details:

1. The amount of sales tax proceeds received for the prior fiscal year,
 2. A description of the projects funded by the sales tax proceeds,
 3. The status of each project funded by sales tax proceeds.
- (b) A report by March 31 of each year which details:
1. Each Wastewater Agencies previous calendar year annual average influent flow
 2. Each Wastewater Agencies previous calendar year "ERU's."
- (c) A report by March 31 of 2014 and every five years thereafter which details:
1. The total cumulative capital spent on "Wastewater Facilities" and "Water Facilities" for the period beginning July 1, 2013
 2. A projected capital improvement plan for "Wastewater Facilities" and "Water Facilities" for the through to June 30, 2025.

E. OTHER CONDITIONS

1. This Cooperative Agreement supersedes the Cooperative Agreement dated July 1, 2000 in its entirety and represents the entire agreement among the Original Wastewater Agencies, the City of North Las Vegas and the Authority.
2. The obligation to provide a proportionate share of the Tax Allocation to the City of North Las Vegas shall commence on the final signatory approval date of this Cooperative Agreement.
3. This agreement shall be binding upon the successors and assigns of the parties hereto, and shall not be deemed to be for the benefit of any entity or person who is not a party hereto, and neither this Agreement, nor any interest therein, may be assigned without the prior written consent of the non-assigning parties.
4. The laws of the State of Nevada will govern as to the interpretation, validity, and effect of this Agreement.
5. If any term provision, covenant, or condition of this Agreement, or an application thereof, should be held by a court of competent jurisdiction to be invalid, void or unenforceable by the laws applicable thereto, such provision shall be deemed severable from, and shall in no way effect the enforceability and validity of the remaining provisions of this Agreement, and all provisions, covenant, and conditions of this Agreement, and all applications thereof, not held to be invalid, void or unenforceable shall continue in full force and effect.
6. The failure of any party to this Agreement to insist in any one or more instances upon the performance of any of the terms, covenants or conditions of this Agreement, or to exercise any right herein, shall not be construed as a waiver of relinquishment or such term, covenants, condition or right as respects further performance.

IN WITNESS WHEREOF, the Authority and Wastewater Agencies have executed this agreement as of the day and year first above written.

Signed:  _____ Andy A. Hafen, Mayor
City of Henderson

 _____ Josh M. Reid, City Attorney
Approved as to form

 _____ Attest:
Sabrina Mercadante, City Clerk

Signed: _____ Lawrence L. Brown III, Chair
Clark County Water Reclamation District

_____ Carolyn Campbell, Deputy District Attorney
Approved as to form

Signed: _____ Carolyn Goodman, Mayor
City of Las Vegas

_____ Bradford Jerbic, City Attorney
Approved as to form

_____ Attest:
Beverly Bridges

IN WITNESS WHEREOF, the Authority and Wastewater Agencies have executed this agreement as of the day and year first above written.

Signed: _____ Andy Hafen, Mayor
City of Henderson

_____ Josh M. Reid, City Attorney
Approved as to form

_____ Attest:
Sabrina Mercadante, City Clerk

Signed: Lawrence L. Brown III Lawrence L. Brown III, Chair
Clark County Water Reclamation District

Carolyn Campbell Carolyn Campbell, Deputy District Attorney
Approved as to form

Diana Alba Attest:
Diana Alba, County Clerk

Signed: Carolyn Goodman Carolyn Goodman, Mayor
City of Las Vegas

Teresita L. Ponticello Teresita L. Ponticello, Chief Deputy City Attorney
Approved as to form

Beverly K. Bridges Attest:
Beverly K. Bridges, City Clerk

Signed: John Lee John Lee, Mayor
City of North Las Vegas

Sandra Douglass Morgan Sandra Douglass Morgan, Acting City Attorney
Approved as to form

Barbara A. Andolina Attest:
Barbara A. Andolina, Acting City Clerk

Signed: _____ Mary Beth Scow, Chair
Southern Nevada Water Authority

_____ Greg Walch, General Counsel
Approved as to form

SOUTHERN NEVADA WATER AUTHORITY
BOARD OF DIRECTORS
AGENDA ITEM
March 20, 2014

Subject: Citizens Advisory Committee	Director's Backup
Petitioner: Julie A. Wilcox, Deputy General Manager, Administration	
Recommendations: That the Board of Directors make an appointment to fill a vacancy on the Integrated Resource Planning Advisory Committee.	

Fiscal Impact:

None by approval of the above recommendation.

Background:

On April 19, 2012, the Board of Directors approved an integrated resource planning process to evaluate current and long-term Authority initiatives including resource development and management, construction and maintenance of facilities, funding, planning, conservation and water quality. To support this effort, the Board established the Integrated Resource Planning Advisory Committee (IRPAC) to discuss these issues comprehensively and ultimately make recommendations to the Board.

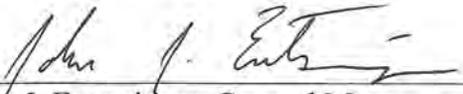
On May 17, 2012, the Board appointed 21 members to the committee, representing a broad spectrum of community interests. On September 26, 2013, the IRPAC, along with a Financial Subcommittee, submitted nine funding-related recommendations for the Board's consideration.

On January 16, 2014, the Board appointed four individuals to replace vacancies on the committee as the process moves into its second phase to evaluate resources, facilities, water quality and conservation. Since then, external commitments have necessitated the replacement of one member.

At this time, the Board is being asked to appoint a new committee member on the IRPAC.

This action is authorized by Section 6(p) of the SNWA 1995 Amended Cooperative Agreement. The office of the General Counsel has reviewed and approved this agenda item.

Respectfully submitted:


John J. Entsminger, General Manager
JJE:PDS:JAW:AMB:JCD:KH

AGENDA
ITEM #

11

**SOUTHERN NEVADA WATER AUTHORITY
BOARD OF DIRECTORS
AGENDA ITEM**

March 20, 2014

Subject: Update on Water Resources	Director's Backup
Petitioner: John J. Entsminger, General Manager	
Recommendations: That the Board of Directors receive an update from staff on water resources including, but not limited to, drought conditions in the Colorado River Basin, the results of the implementation of the Authority's Water Resource and Conservation Plans, activities on the Colorado River, the development of in-state water resources, and the status of the third intake project.	

Fiscal Impact:

None by approval of the above recommendation.

Background:

The Colorado River Basin has been experiencing a severe drought that began in 2000. The severity of these conditions has become increasingly evident in lake levels along the lower Colorado River Basin, where major reservoirs such as Lake Powell and Lake Mead are experiencing some of the lowest water levels in recent memory.

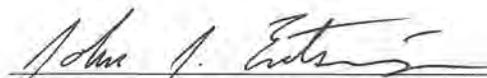
The nature of the drought in the Colorado River Basin has direct effects on water resources and future planning. The drought has prompted communities to launch major conservation initiatives to reduce water use among citizens and businesses, and has resulted in the development and implementation of the Authority's Water Resource and Conservation Plans.

In May 2005, the Board of Directors approved a project for design and construction of a third intake in Lake Mead with the primary objective of protecting southern Nevada's water supply from significant loss of system capacity resulting from a continuing decline in lake elevation. The project design and environmental approvals were completed by 2007. Construction began on the project in March of 2008.

This agenda item provides for an update from staff on the drought, the results of the implementation of the Authority's Water Resource and Conservation Plans, activities on the Colorado River, the development of in-state water resources, and the status of the third intake project.

The office of the General Counsel has reviewed and approved this agenda item.

Respectfully submitted:


John J. Entsminger, General Manager
JJE:PDS:DLJ:td

AGENDA
ITEM #

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