



John Beckman
Project Manager

June 18, 2018

Ms. Jessica Chambers
WV Purchasing Division
2019 Washington Street, East
Charleston, WV 25305

RECEIVED

2018 JUN 18 AM 9:50

WV PURCHASING
DIVISION

EOI#: EHS1800000001
Title: Source Water Protection Plan
Opening Date: June 19, 2018
Opening Time: 1:30 PM

Dear Ms. Chambers:

Tetra Tech, Inc. is pleased to submit our proposal in response to West Virginia Department Health and Human Resources Expression of Interest number EHS1800000001 for Source Water Protection Plan development. Please find enclosed one original proposal and one convenience copy, plus on CD an electronic copy in PDF format.

We hope that our proposal and qualifications demonstrate our considerable experience and continued commitment to providing comprehensive source water protection planning services. Our experience in developing source water protection plans for community water systems in West Virginia is unmatched by any other firm.

In our proposal, we have identified a core group of staff, all of whom have extensive source water protection experience, and many who have directly supported West Virginia under previous contracts. I will serve as the Project Manager located in our Charleston office to facilitate communication and maximize our efficiency in meeting project needs.

We appreciate the opportunity to present our qualifications to West Virginia and we look forward to providing support for this project. If you should have any questions, please feel free to contact me at 304-414-0054 x 103.

Sincerely,

John Beckman

Tetra Tech, Inc.

803 Quorum Street, Suite 400
Charleston, WV 25301

Tel 304.414.0054 Fax 304.730.2234 www.tetrattech.com

ADDENDUM ACKNOWLEDGEMENT FORM

SOLICITATION NO.: 0506 EHS1800000001

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:

(Check the box next to each addendum received)

- | | |
|--|--|
| <input checked="" type="checkbox"/> Addendum No. 1 | <input type="checkbox"/> Addendum No. 6 |
| <input checked="" type="checkbox"/> Addendum No. 2 | <input type="checkbox"/> Addendum No. 7 |
| <input type="checkbox"/> Addendum No. 3 | <input type="checkbox"/> Addendum No. 8 |
| <input type="checkbox"/> Addendum No. 4 | <input type="checkbox"/> Addendum No. 9 |
| <input type="checkbox"/> Addendum No. 5 | <input type="checkbox"/> Addendum No. 10 |

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

TETRA TECH, INC

Company



Authorized Signature

JUNE 13, 2018

Date

NOTE: This addendum acknowledgment should be submitted with the bid to expedite document processing.
Revised 6/8/2012



Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

State of West Virginia
 Centralized Expression of Interest
 02 – Architect/Engr

Proc Folder: 403929

Doc Description: EO: Source Water Protection Plan


Proc Type: Central Purchase Order

Date issued	Solicitation Closes	Solicitation No	Version
2018-05-04	2018-06-06 13:30:00	CEOI 0506 EHS1800000001	1

BID RECEIVING LOCATION
 BID CLERK
 DEPARTMENT OF ADMINISTRATION
 PURCHASING DIVISION
 2019 WASHINGTON ST E
 CHARLESTON WV 25305
 US

VENDOR
 Vendor Name, Address and Telephone Number:
 Tetra Tech, Inc.
 803 Quarrier Street, Suite 400
 Charleston, WV 25301
 304-414-0054

FOR INFORMATION CONTACT THE BUYER
 Jessica S Chambers
 (304) 558-0246
 jessica.s.chambers@wv.gov

Signature  FEIN # 95 - 4148514 DATE *MAY 30, 2018*

All offers subject to all terms and conditions contained in this solicitation

ADDITIONAL INFORMATION:

The Acquisition and Contract Administration Section of the Purchasing Division is soliciting Expression(s) of Interest for Department of Health and Human Resources, Office of Environmental Health Services, Environmental Engineering Division, from qualified firms to provide architectural/engineering services as defined herein in the attached terms and conditions and specifications.

***Please note: Online Responses via Oasis have been prohibited. Proposals must be mailed or faxed prior to bid opening.

INVOICE TO		SHIP TO	
PURCHASING DIRECTOR 304-356-4116		PURCHASING DIRECTOR 304-356-4116	
HEALTH AND HUMAN RESOURCES		HEALTH AND HUMAN RESOURCES	
BUREAU FOR PUBLIC HEALTH ENVIRONMENTAL HEALTH SERVICES		BPH - ENVIRONMENTAL HEALTH SERVICES	
350 CAPITOL ST, RM 313		350 CAPITOL ST, RM 313	
CHARLESTON	WV25301-1757	CHARLESTON	WV 25301-1757
US		US	

Line	Comm Ln Desc	Qty	Unit Issue
1	Source Water Protection Plan		

Comm Code	Manufacturer	Specification	Model #
81100000			

Extended Description :

The Source Water Protection Plan project will be coordinated by the Office of Environmental Health Services, and the project will be completed at various (CPWS) utilities as displayed in Appendix A and B of the attached Expression of Interest document. The service would be for Engineering technical assistance to assist community public water supply (CPWS) utilities in developing local source water protection programs to protect public health and safety.

EHS1800000001	Document Phase Final	Document Description EOI: Source Water Protection Plan	Page 3 of 3
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ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions



Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

State of West Virginia
 Centralized Expression of Interest
 02 – Architect/Engr

Proc Folder: 403929

Doc Description: Addendum 1-EOI: Source Water Protection Plan


Proc Type: Central Purchase Order

Date Issued	Solicitation Closes	Solicitation No	Version
2018-06-04	2018-06-13 13:30:00	CEOI 0506 EHS1800000001	2

RECEIVING LOCATION			
BID CLERK			
DEPARTMENT OF ADMINISTRATION			
PURCHASING DIVISION			
2019 WASHINGTON ST E			
CHARLESTON	WV	25305	
US			

VENDOR	
Vendor Name, Address and Telephone Number:	
Tetra Tech, Inc. 803 Quarrier Street, Suite 400 Charleston, WV 25301 304-414-0054	

FOR INFORMATION CONTACT THE BUYER
 Jessica S Chambers
 (304) 558-0246
 jessica.s.chambers@wv.gov

Signature X  FEIN # 95-4148514 DATE 6/08/2018

All offers subject to all terms and conditions contained in this solicitation

ADDITIONAL INFORMATION:

Addendum

Addendum No.01 issued to publish and distribute the attached information to the vendor community.

The Acquisition and Contract Administration Section of the Purchasing Division is soliciting Expression(s) of Interest for Department of Health and Human Resources, Office of Environmental Health Services, Environmental Engineering Division, from qualified firms to provide architectural/engineering services as defined herein in the attached terms and conditions and specifications.

***Please note: Online Responses via Oasis have been prohibited. Proposals must be mailed or faxed prior to bid opening.

INVOICE TO		SHIP TO	
PURCHASING DIRECTOR 304-356-4116 HEALTH AND HUMAN RESOURCES BUREAU FOR PUBLIC HEALTH ENVIRONMENTAL HEALTH SERVICES 350 CAPITOL ST, RM 313		PURCHASING DIRECTOR 304-356-4116 HEALTH AND HUMAN RESOURCES BPH - ENVIRONMENTAL HEALTH SERVICES 350 CAPITOL ST, RM 313	
CHARLESTON	WV25301-1757	CHARLESTON	WV 25301-1757
US		US	

Line	Comm Ln Desc	Qty	Unit Issue
1	Source Water Protection Plan		

Comm Code	Manufacturer	Specification	Model #
81100000			

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EHS1800000001	Document Phase Final	Document Description Addendum 1-EOI: Source Water Protection Plan	Page 3 of 3
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ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions



Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

State of West Virginia
 Centralized Expression of Interest
 02 - Architect/Engr

Proc Folder: 403929

Doc Description: Addendum 2 EO: Source Water Protection Plan

Proc Type: Central Purchase Order

Date Issued	Solicitation Closes	Solicitation No	Version
2018-06-11	2018-06-19 13:30:00	CEOI 0506 EHS1800000001	3

BID RECEIVING LOCATION

BID CLERK
 DEPARTMENT OF ADMINISTRATION
 PURCHASING DIVISION
 2019 WASHINGTON ST E
 CHARLESTON WV 25305
 US

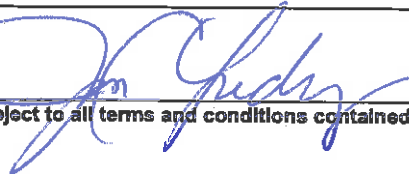
VENDOR

Vendor Name, Address and Telephone Number:

Tetra Tech, Inc.
 803 Quarrier Street, Suite 400
 Charleston, WV 25301
 304-414-0054

FOR INFORMATION CONTACT THE BUYER

Jessica S Chambers
 (304) 558-0246
 jessica.s.chambers@wv.gov

Signature X  FEIN # 95-4148514 DATE 6/13/18

All offers subject to all terms and conditions contained in this solicitation

ADDITIONAL INFORMATION:

Addendum

Addendum No.02 issued to publish and distribute the attached information to the vendor community.

The Acquisition and Contract Administration Section of the Purchasing Division is soliciting Expression(s) of Interest for Department of Health and Human Resources, Office of Environmental Health Services, Environmental Engineering Division, from qualified firms to provide architectural/engineering services as defined herein in the attached terms and conditions and specifications.

***Please note: Online Responses via Oasis have been prohibited. Proposals must be mailed or faxed prior to bid opening.

INVOICE TO		SHIP TO	
PURCHASING DIRECTOR 304-356-4116 HEALTH AND HUMAN RESOURCES BUREAU FOR PUBLIC HEALTH ENVIRONMENTAL HEALTH SERVICES 350 CAPITOL ST, RM 313		PURCHASING DIRECTOR 304-356-4116 HEALTH AND HUMAN RESOURCES BPH - ENVIRONMENTAL HEALTH SERVICES 350 CAPITOL ST, RM 313	
CHARLESTON	WV25301-1757	CHARLESTON	WV 25301-1757
US		US	

Line	Comm Ln Desc	Qty	Unit Issue
1	Source Water Protection Plan		

Comm Code	Manufacturer	Specification	Model #
81100000			

Extended Description :

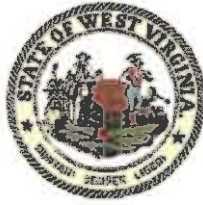
The Source Water Protection Plan project will be coordinated by the Office of Environmental Health Services, and the project will be completed at various (CPWS) utilities as displayed in Appendix A and B of the attached Expression of Interest document. The service would be for Engineering technical assistance to assist community public water supply (CPWS) utilities in developing local source water protection programs to protect public health and safety.

EHS180000001	Document Phase Final	Document Description Addendum 2 EOI: Source Water Protection Plan	Page 3 of 3
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ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

West Virginia Ethics Commission



Disclosure of Interested Parties to Contracts

Pursuant to *W. Va. Code* § 6D-1-2, a state agency may not enter into a contract, or a series of related contracts, that has/have an actual or estimated value of \$100,000 or more until the business entity submits to the contracting state agency a Disclosure of Interested Parties to the applicable contract. In addition, the business entity awarded a contract is obligated to submit a supplemental Disclosure of Interested Parties reflecting any new or differing interested parties to the contract within 30 days following the completion or termination of the applicable contract.

For purposes of complying with these requirements, the following definitions apply:

"Business entity" means any entity recognized by law through which business is conducted, including a sole proprietorship, partnership or corporation.

"Interested party" or *"Interested parties"* means:

- (1) A business entity performing work or service pursuant to, or in furtherance of, the applicable contract, including specifically sub-contractors;
- (2) the person(s) who have an ownership interest equal to or greater than 25% in the business entity performing work or service pursuant to, or in furtherance of, the applicable contract. (This subdivision does not apply to a publicly traded company); and
- (3) the person or business entity, if any, that served as a compensated broker or intermediary to actively facilitate the applicable contract or negotiated the terms of the applicable contract with the state agency. (This subdivision does not apply to persons or business entities performing legal services related to the negotiation or drafting of the applicable contract.)

"State agency" means a board, commission, office, department or other agency in the executive, judicial or legislative branch of state government, including publicly funded institutions of higher education: Provided, that for purposes of *W. Va. Code* § 6D-1-2, the West Virginia Investment Management Board shall not be deemed a state agency nor subject to the requirements of that provision.

The contracting business entity must complete this form and submit it to the contracting state agency prior to contract award and to complete another form within 30 days of contract completion or termination.

This form was created by the State of West Virginia Ethics Commission, 210 Brooks Street, Suite 300, Charleston, WV 25301-1804. Telephone: (304)558-0664; fax: (304)558-2169; e-mail: ethics@wv.gov; website: www.ethics.wv.gov.

West Virginia Ethics Commission
Disclosure of Interested Parties to Contracts

(Required by W. Va. Code § 6D-1-2)

Contracting Business Entity: Tetra Tech, Inc. Address: 10306 Eaton Place, Suite 340
Fairfax VA 22030

Authorized Agent: Jon C. Ludwig Address: 10306 Eaton Place, Suite 340, Fairfax VA 22030

Contract Number: CEOI 0506 EHS 1800000001 Contract Description: Central Purchase Order

Governmental agency awarding contract: Health and Human Resources, Bureau for Public Health

Check here if this is a Supplemental Disclosure

List the Names of Interested Parties to the contract which are known or reasonably anticipated by the contracting business entity for each category below (attach additional pages if necessary):

1. Subcontractors or other entities performing work or service under the Contract

Check here if none, otherwise list entity/individual names below.

2. Any person or entity who owns 25% or more of contracting entity (not applicable to publicly traded entities)

Check here if none, otherwise list entity/individual names below.

3. Any person or entity that facilitated, or negotiated the terms of, the applicable contract (excluding legal services related to the negotiation or drafting of the applicable contract)

Check here if none, otherwise list entity/individual names below.

Signature: 

Date Signed: MAY 30, 2018

Notary Verification

State of Virginia, County of Fairfax:

I, Angela Marciano, the authorized agent of the contracting business entity listed above, being duly sworn, acknowledge that the Disclosure herein is being made under oath and under the penalty of perjury.

Taken, sworn to and subscribed before me this 30th day of May 2018.

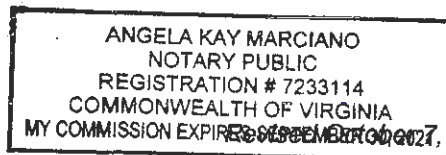

Notary Public's Signature

To be completed by State Agency:

Date Received by State Agency: _____

Date submitted to Ethics Commission: _____

Governmental agency submitting Disclosure: _____



DESIGNATED CONTACT: Vendor appoints the individual identified in this Section as the Contract Administrator and the initial point of contact for matters relating to this Contract.

(Name, Title) John Beckman, Project Manager
(Printed Name and Title) 803 Quarrier Street, Suite 400, Charleston, WV 25301
(Address) 304-414-0054 x 103 / 304-720-2334
(Phone Number) / (Fax Number) john.beckman@tetrattech.com
(email address)

CERTIFICATION AND SIGNATURE: By signing below, or submitting documentation through wvOASIS, I certify that I have reviewed this Solicitation in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise stated herein; that the Vendor accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that I am authorized by the vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

Tetra Tech, Inc.
(Company)


(Authorized Signature) (Representative Name, Title)

Jon C. Ludwig, Director

(Printed Name and Title of Authorized Representative)

MAY 30, 2018
(Date)

703-385-1973 / 703-385-6007

(Phone Number) (Fax Number)

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

CONSTRUCTION CONTRACTS: Under W. Va. Code § 5-22-1(i), the contracting public entity shall not award a construction contract to any bidder that is known to be in default on any monetary obligation owed to the state or a political subdivision of the state, including, but not limited to, obligations related to payroll taxes, property taxes, sales and use taxes, fire service fees, or other fines or fees.

ALL CONTRACTS: Under W. Va. Code §5A-3-10a, no contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

EXCEPTION: The prohibition listed above does not apply where a vendor has contested any tax administered pursuant to chapter eleven of the W. Va. Code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

DEFINITIONS:

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Employer default" means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

"Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceeds five percent of the total contract amount.

AFFIRMATION: By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (W. Va. Code §61-5-3) that: (1) for construction contracts, the vendor is not in default on any monetary obligation owed to the state or a political subdivision of the state, and (2) for all other contracts, that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

WITNESS THE FOLLOWING SIGNATURE:

Vendor's Name: Tetra Tech, Inc.

Authorized Signature: *[Signature]* Date: MAY 30, 2018

State of Virginia

County of Fairfax, to-wit:

Taken, subscribed, and sworn to before me this 30 day of May, 2018

My Commission expires 9/30/2021

ANGELA KAY MARCIANO NOTARY PUBLIC REGISTRATION # 7233114 COMMONWEALTH OF VIRGINIA MY COMMISSION EXPIRES SEPTEMBER 30, 2021
--

AFFIX SEAL HERE

NOTARY PUBLIC

[Signature]



CERTIFICATE OF LIABILITY INSURANCE

DATE(MM/DD/YYYY)
10/12/2017

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Aon Risk Insurance Services West, Inc. Los Angeles CA Office 707 Wilshire Boulevard Suite 2600 Los Angeles CA 90017-0460 USA	CONTACT NAME: PHONE (A/C. No. Ext): (866) 283-7122 FAX (A/C. No.): (800) 363-0105 E-MAIL ADDRESS:														
	<table border="1"> <thead> <tr> <th>INSURER(S) AFFORDING COVERAGE</th> <th>NAIC #</th> </tr> </thead> <tbody> <tr> <td>INSURER A: National Union Fire Ins Co of Pittsburgh</td> <td>19445</td> </tr> <tr> <td>INSURER B: AIG Europe Limited</td> <td>AA1120841</td> </tr> <tr> <td>INSURER C: The Insurance Co of the State of PA</td> <td>19429</td> </tr> <tr> <td>INSURER D: American Home Assurance Co.</td> <td>19380</td> </tr> <tr> <td>INSURER E:</td> <td></td> </tr> <tr> <td>INSURER F:</td> <td></td> </tr> </tbody> </table>		INSURER(S) AFFORDING COVERAGE	NAIC #	INSURER A: National Union Fire Ins Co of Pittsburgh	19445	INSURER B: AIG Europe Limited	AA1120841	INSURER C: The Insurance Co of the State of PA	19429	INSURER D: American Home Assurance Co.	19380	INSURER E:		INSURER F:
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INSURER F:															
INSURED Tetra Tech, Inc. 10306 Eaton Place, Suite 340 Fairfax VA 22030 USA	INSURER A: National Union Fire Ins Co of Pittsburgh														
	INSURER B: AIG Europe Limited														
	INSURER C: The Insurance Co of the State of PA														
	INSURER D: American Home Assurance Co.														
	INSURER E:														
	INSURER F:														

COVERAGES **CERTIFICATE NUMBER:** 570068924627 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS. **Limits shown are as requested**

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR <input checked="" type="checkbox"/> X,C,U Coverage GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PROJECT <input checked="" type="checkbox"/> LOC OTHER:			GL7468716	10/01/2017	10/01/2018	EACH OCCURRENCE \$2,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$1,000,000 MED EXP (Any one person) \$10,000 PERSONAL & ADV INJURY \$2,000,000 GENERAL AGGREGATE \$4,000,000 PRODUCTS - COM/OP AGG \$4,000,000
A	AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> NON-OWNED AUTOS ONLY			CA 428-80-55	10/01/2017	10/01/2018	COMBINED SINGLE LIMIT (Ea accident) \$2,000,000 BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)
B	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED <input checked="" type="checkbox"/> RETENTION \$100,000			CSUSA1702199	10/01/2017	10/01/2018	EACH OCCURRENCE \$1,000,000 AGGREGATE \$1,000,000
C	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY <input checked="" type="checkbox"/> ANY PROPRIETOR / PARTNER / EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) if yes, describe under DESCRIPTION OF OPERATIONS below	Y/N	N/A	WC014629496 WC014629497 WC014629498 WC014629499	10/01/2017 10/01/2017 10/01/2017 10/01/2017	10/01/2018 10/01/2018 10/01/2018 10/01/2018	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTHER E.L. EACH ACCIDENT \$1,000,000 E.L. DISEASE-EA EMPLOYEE \$1,000,000 E.L. DISEASE-POLICY LIMIT \$1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
Re: Evidence of Insurance.
Stop Gap Coverage for the following states: OH, ND, WA, WY.

CERTIFICATE HOLDER

CANCELLATION

Tetra Tech, Inc.
10306 Eaton Place, Suite 340
Fairfax VA 22030 USA

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Aon Risk Insurance Services West Inc

Holder Identifier :

Certificate No : 570068924627



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Appendix A Resumes

I. Introduction

Tetra Tech's Charleston office has worked closely with the West Virginia Department of Health and Human Resources (DHHR) since 2009 when the Source Water Assessment and Protection Program (SWAP) awarded Tetra Tech two contracts under the Source Water Technical Help Program to develop source water protection plans for 104 community public drinking water systems in the Beckley, Philippi, and Kearneysville Districts.

After the January 2014 Charleston Water Crisis, the DHHR enlisted Tetra Tech to develop templates for the alternative source feasibility study and source water protection plan updates required by Senate Bill 373 and Legislative Rule 64 CSR 3. Tetra Tech developed the technical and economic feasibility matrix and a matrix guidance document that is currently used statewide. Tetra Tech also worked with WVDHHR to develop a recommended communication plan template that provided a tiered incident communication process to provide a universal system of alert levels to utilities and water system managers.

In 2015, Tetra Tech served the West Virginia Regions 4 and 7 Planning and Development Councils (RPDCs) under two separate contracts to create 25 contingency plans with alternative source feasibility studies required by Senate Bill 373. The RPDCs retained Tetra Tech, Inc. to provide these services for public water systems in Nicholas, Pocahontas, Greenbrier, Fayette, Webster, Randolph, Tucker, Upshur, and Barbour Counties.

Later in 2015 and 2016, Tetra Tech provided support to the DHHR SWAP program to write source water protection plan updates for 25 public water systems in RPDC Regions 4 and 7, plus an additional 38 plans for water systems elsewhere in the state. This effort made it possible for DHHR meet the July 2016 deadline for completing source water protection plan updates for surface water systems. Tetra Tech contributed technical support toward development of the online source water protection GIS web portal. Tetra Tech also provided on-call editorial assistance to format and redact sensitive information in plans written by other contractors.

Tetra Tech has continued to work with community public water systems to meet source water protection implementation goals. In 2017, Tetra Tech contracted directly Wilderness PSD and Buffalo Creek PSD to develop source water protection plan updates. These updated plans featured the results of new windshield surveys and mapping to improve plan accuracy. Documentation of source water protection implementation activities such as the purchase of backup mobile water pumps were also incorporated into plans. Work to complete a plan update for the Town of Gilbert will start June 2018.

Tetra Tech is a full service, multi-disciplinary science and engineering firm that is focused on developing cost-effective technical solutions to environmental challenges. We can provide complex modeling and data analysis support to water utilities to implement more advanced protection measures. Between our Charleston, West Virginia and Fairfax, Virginia office locations we can provide over 50 staff with expertise in source water protection, hydrologic modeling, watershed modeling, GIS, environmental investigation, grant writing, graphic design, and public outreach.



2. Qualifications and Experience

Tetra Tech personnel are well qualified to carry out the tasks associated with source water protection planning. Tetra Tech developed the feasibility study matrix and communication plan currently part of the source water protection plan template. We are familiar with DHHR datasets and know how to use all source water protection online GIS resources. Since 2009, Tetra Tech has written over 100 source water protection plans, 25 contingency plans with feasibility studies, and over 60 protection plan updates. Our source water protection specialists have facilitated protection team meetings and public meetings, gathering input from local stakeholders and private citizens. Tetra Tech's downtown Charleston office location is convenient for close collaboration with DHHR SWAP staff for data transfer and document review.

Tetra Tech has personnel with extensive experience with all aspects of source water protection plan development, including: field investigations, technical writing, threat assessment, public outreach, and protection strategy implementation. Staff scientists are supplied with industry standard data management, word processing, and GIS technical resources that will be used to develop protection plans.

Tetra Tech' source water specialists are familiar with Surface Water-Influenced Groundwater (SWIG) sources defined by Senate Bill 373 as wells that are heavily influenced by nearby surface waterbodies. Before passage of the Senate Bill, wells with significant surface water influences were known as Ground Water Under the Direct Influence of surface water (GWUDI) sources. Tetra Tech has experience identifying threats and prioritizing management strategies for GWUDI systems. In 2011, Tetra Tech completed source water protection plans for McDowell County PSD – Berwind, Mount Hope Water in Fayette County, and Town of Fairview in Marion County, which were considered GWUDI systems at the time. Outside of West Virginia, under our contract with the Virginia Department of Health we have recently completed plans for the Town of Luray, as well as Bealeton Regional water system in Fauquier County, which are both Virginia GWUDI systems.

Tetra Tech engineers are well versed in drinking water source water alternative analyses. Our project team includes experts that have performed source water alternative analyses in West Virginia, as well in as other states like Florida and Texas where source water is a limited resource. The team understands that the proper selection among alternatives requires a multi-faceted approach that must incorporate technical and economic concepts as well as weigh the impact to the local community. This requires knowledgeable staff with both extensive and diverse experience in water source alternatives analysis on a regional level. As a result, our team is comprised of individuals that are experts in water quality and treatment, utility planning, rates and finance, and hydraulic analyses. This proposal presents our qualifications, technical expertise, management/staffing resources, and descriptions of projects that have been chosen as demonstrate our prior experience most relevant to this Expression of Interest (EOI).

2.1. Personnel

The Tetra Tech team represents the most experienced source water protection experts who have worked in West Virginia and neighboring states. Many of the staff who provided support to DHHR under previous source water protection planning efforts are again available to provide their expertise. A staff organizational chart is provided in Figure 2-1. Complete resumes for key personnel are included in Appendix A.

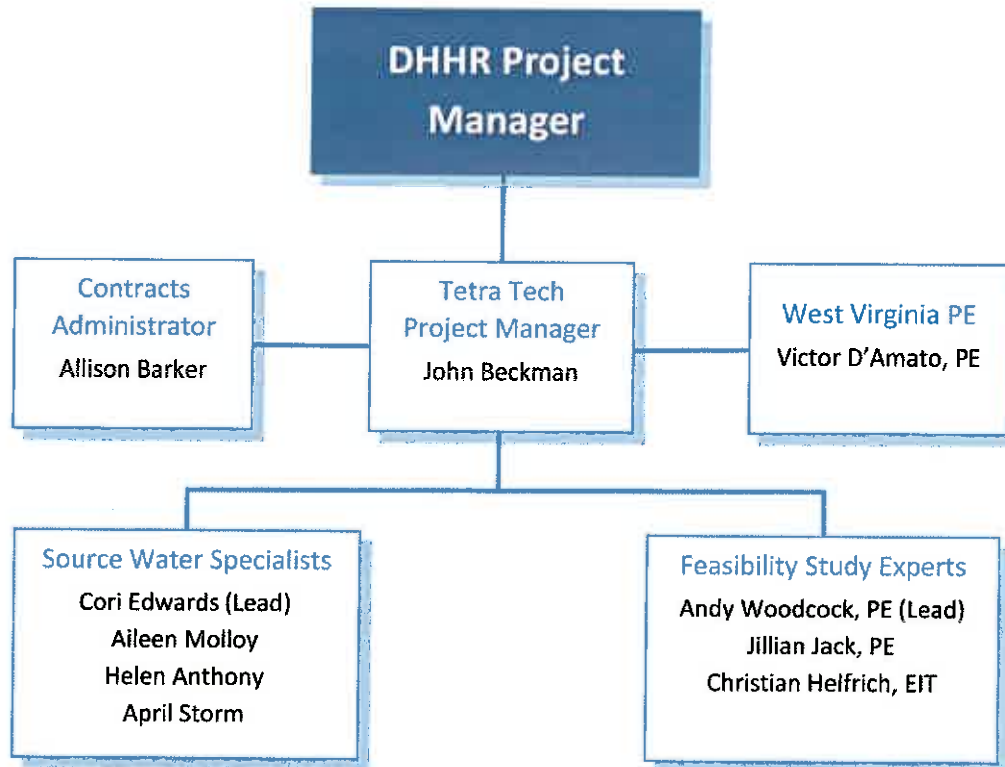


Figure 2-1. Tetra Tech Source Water Protection Staffing Plan

John Beckman – Project Manager

Mr. Beckman is an environmental scientist specializing in source water protection and watershed modeling. He has over 20 years of professional experience performing scientific research, analysis, and large-scale field surveys. Mr. Beckman has performed field investigations for PSSCs (Potential Significant Sources of Contamination) for over 50 West Virginia source water protection plans completed in 2011. He has also updated plans, and conducted source water protection team meetings and public meetings for 20 West Virginia water systems in 2016. Recently, he has managed source water protection update contracts with Buffalo Creek PSD and Wilderness PSD, and is currently project manager for source water plan updates for the Town of Gilbert. Mr. Beckman also leads Tetra Tech’s Total Maximum Daily Load development support for the West Virginia Department of Environmental Protection. Mr. Beckman will serve as project manager and Tetra Tech’s primary point of contact with DHHR for this effort.



Victor D'Amato, PE – West Virginia Professional Engineer

Victor D'Amato is a West Virginia registered professional engineer with 25 years of water quality engineering, wastewater process design, and applied environmental research experience. Mr. D'Amato currently leads a practice in sustainable water resource management and design for Tetra Tech, where his focus is on helping governments, communities, builders, and utilities plan and implement sustainable strategies that decrease capital and recurring costs, increase energy efficiency, and effectively address emerging challenges. In 2015, he reviewed and approved 25 contingency plans with alternative source feasibility studies for water systems in Planning and Development Council Regions 4 and 7. Mr. D'Amato will provide engineering oversight to contingency planning and feasibility studies for the systems in this EOI.

Allison Barker – Contracts Administrator

Ms. Barker is a senior contract administrator in Tetra Tech's Fairfax, Virginia office. She has been extensively involved in negotiating and managing all levels and types of federal, state, local, and private sector contracts and subcontracts. Ms. Barker will be responsible for financial reporting, contract administration, and cost control.

Cori Edwards – Source Water Specialist Lead

Ms. Edwards is an environmental scientist with over 7 years' experience with West Virginia infrastructure project management and grant writing, including source water protection. She has authored numerous source water protection plans in compliance with local, state, and federal authorities. Ms. Edwards is proficient in meeting and stakeholder facilitation and public education and outreach. Her expertise includes experience with ArcGIS and Trimble Global Positioning System (GPS) technology for demographic and environmental analysis, project area mapping, and transit evaluation. Ms. Edwards has managed FEMA Hazard Mitigation Planning for 33 jurisdictions; Federal Transit Administration (FTA) and Federal Highways Administration (FHWA) Title VI and Disadvantaged Business Enterprise (DBE) Programs; and National Environmental Policy Act (NEPA) Environmental Assessments for WV Housing & Urban Development (HUD) programs. Through her positions both at Tetra Tech and at Region 1 RPDC, she has extensive experience working with community water systems and their stakeholders. Ms. Edwards will serve as the lead source water protection specialist, interacting with water plant operators, gathering data, and facilitating required meetings.

Aileen Molloy – Source Water Specialist

Ms. Molloy is an environmental scientist with 15 years of experience in water resources management. She provides technical and programmatic support to federal, state, and local government clients in watershed management, stormwater management, and source water protection. Ms. Molloy is the project manager for Tetra Tech's Virginia source water protection support contract with the Virginia Department of Health. For the past 6 years, Tetra Tech has developed source water protection plans for small water supply systems throughout Virginia. Activities include assessment of potential sources of contamination, windshield surveys, outreach to the waterworks and larger community, and assistance with formation of local advisory committees. As a source water specialist, Ms. Molloy will support Ms. Edwards with plan development, data management, and meeting facilitation.

Helen Anthony – Source Water Specialist

Ms. Anthony has 5 years of professional experience as an environmental scientist. She provides general and technical support on various projects related to stormwater, watershed, and water quality assessment and management, including research, field work, data collection and analysis, GIS data analysis, and technical writing. Since 2015 she has performed windshield surveys and GIS mapping in support of Virginia Department of Health source water protection program. Ms. Anthony will assist Ms. Edwards with PSSC mapping and data management tasks.

April Storm – Source Water Specialist

Mrs. Storm has 11 years of experience in the environmental field performing asset management oversight, Drinking Water Treatment Revolving Fund project support, soil and water assessments, and hazardous materials programs. Ms. Storm has been a critical component of the Asset Management initiative for Bureau of Public Health State Revolving Fund projects. She has also provided GIS and data management support for WVDHHR Source Water Protection Plans. Ms. Storm will assist Ms. Edwards with PSSC mapping and other data management tasks.

Andy Woodcock, PE – Feasibility Study Expert Lead

Mr. Woodcock is an environmental engineer who has been involved with many different facets of utility master planning, due diligence investigations, utility valuations, financial feasibility analyses and business plans. Mr. Woodcock has conducted numerous economic, present value and feasibility analyses that provide useful decision-making criteria for capital planning programs that include water, wastewater and reclaimed water utilities. In 2015, he developed the alternative source feasibility study matrix and guidance document for DHHR SWAP. Mr. Woodcock will lead the alternative source feasibility study efforts and contribute to contingency plan portions of the source water protection plans in the EOI.

Jillian Jack, PE – Feasibility Study Expert

Ms. Jack has over 12 years of experience in the management of complex water and wastewater projects, including sanitary sewer collection system projects, capital improvement project program management, asset management, wastewater reuse feasibility studies, and various water and wastewater master planning efforts. In 2015, she was responsible for conducting feasibility studies for 25 water systems under contract to Regions 4 and 7 Planning and Development Councils. In close coordination with Mr. Woodcock and Mr. Beckman, Ms. Jack will complete the alternative source feasibility study and contingency planning portions of the source water protection plans in the EOI.

Christian Helfrich, EIT – Feasibility Study Expert

Mr. Helfrich has over 4 years of experience as an environmental engineer working in the water resources field. He has generated cost estimating databases for stormwater infrastructure projects for the City of San Diego, California, and Athens-Clarke County, Georgia. In 2015, he supported the alternative source feasibility analysis for 14 source water protection plans for West Virginia drinking water systems. Mr. Helfrich will support Mr. Woodcock and Ms. Jack to complete the feasibility study and contingency planning portions of the plans for systems in the EOI.



2.2. Project Descriptions

Tetra Tech has extensive experience developing source water protection plans in West Virginia and other states. In West Virginia, Tetra Tech was instrumental in developing source water protection plan updates following the Charleston Water Crisis in 2014. The spill and subsequent contamination of drinking water supplies prompted the West Virginia legislature to require the development of contingency plans and analysis of source water alternatives. Tetra Tech assisted DHHR SWAP in developing a new template for the enhanced plans, as well as a technical and economic feasibility decision matrix to assist communities in determining the most appropriate back-up water supply. After developing the template and decision tools, Tetra Tech assisted 25 public water systems in developing updated contingency plans with feasibility analyses, and updated source water protection plans for an additional 38 systems.

In Virginia, Tetra Tech has worked with over 20 ground and surface water supply systems (including 2 GWUDI systems) to develop source water protection plans and provide management strategy implementation assistance. One of our key implementation assistance activities was working with the Maury Service Authority to use a hydrologic model to conduct a time of travel study for the Maury River. This study allowed Tetra Tech to delineate a source water protection area zone of concern for the water supply intake. Many Virginia water systems rely on groundwater. Developing plans for these groundwater systems has provided our staff with valuable knowledge and experience analyzing threats to wells and springs.

The following project descriptions highlight Tetra Tech's source water protection experience relevant to developing plans for the 19 systems in this EOI.

Source Water Alternatives Analysis and Contingency Planning

CLIENT: Regions 4 and Region 7
Planning and Development Councils

REFERENCES:

John Tuggle, PE, PS
Executive Director
Region IV PDC
885 Broad Street, Suite 100
Summersville, WV 26651
(304) 872-4970

Shane Whitehair
Executive Director
Region VII PDC
99 Edmiston Way, Suite 225
Buckhannon, WV 26201
(304) 472-6564

DURATION:
2015-2016

KEY PERSONNEL:

Andy Woodcock, PE
Jillian Jack, PE
Christian Helfrich, EIT
Victor D'Amato, PE

Tetra Tech served the West Virginia Regions 4 and 7 Planning and Development Councils (RPDCs) in two separate contracts. The RPDCs received grants through the DHHR SWAP Program to provide Alternative Source Water Feasibility Analyses and contingency plan services, to prepare and document studies required for source water protection plans.

The RPDCs contracted with Tetra Tech, Inc. to provide these services for 25 public water systems in Nicholas, Pocahontas, Greenbrier, Fayette, Webster, Randolph, Tucker, Upshur, and Barbour Counties, including the communities of: Richwood, Alderson, Lewisburg, Cowen, Marlinton, Cass, Cheat Mountain Water Company, Summersville, Craigsville, Nettie PSD, Wilderness PSD, Armstrong PSD, Kanawha Falls PSD, Mt. Hope, Davis, Thomas, Parsons, Philippi, Hamrick PSD, Elkins, Mill Creek, Beverley, Huttonsville PSD, Buckhannon, and Belington.

The Alternative Source Water Feasibility Analysis for each system considered secondary intakes, interconnections with neighboring systems, raw and/or treated water storage, or other possible alternative. To accomplish the analysis, Tetra Tech met with water systems to gather data such as, treatment facility capacity, average and maximum daily production, storage

capacity, and distribution system details including geographic extent and water main sizes. Tetra Tech gathered information about potential threats to source water, land parcels, possible environmentally sensitive areas, stream flows, and stakeholders to consider when conceptualizing alternatives and their feasibility. Tetra Tech completed required Feasibility Study Matrices for each system, using best professional judgement to score specific evaluation criteria for each alternative. Based on the data gathered and ranking derived through the matrices, Tetra Tech prepared a technical memorandum summarizing the findings and identifying the most feasible alternative(s).



In addition to the Alternative Source Water Feasibility Analyses, Tetra Tech also documented each water system's current ability to respond in case of a contamination incident (e.g., ability to divert contamination, close intake, rely upon stored water, etc.) or power outage (i.e., available generators and fuel supplies). Tetra Tech also investigated stream monitoring equipment to determine the feasibility of an early warning monitoring systems for each system and provide specific recommendations.



West Virginia DHHR Source Water Protection Feasibility Matrix and Communication Plan Templates

CLIENT: WVDHHR SWAP Program

REFERENCE:

Mr. William J. Toomey
Unit Manager
350 Capitol Street, Room 313
Charleston, WV 25301-3713
304-356-4298
William.J.Toomey@wv.gov

DURATION:
2014-2016

KEY PERSONNEL:

Andy Woodcock, P.E.
John Beckman

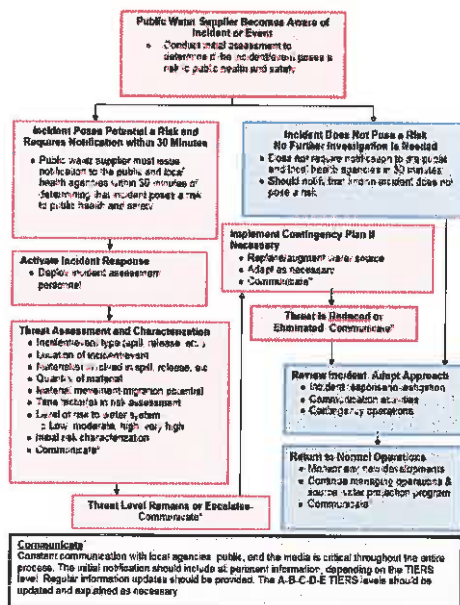
In the aftermath of the January 2014 Charleston Water Crisis in which the drinking water supply for 300,000 people was contaminated by a chemical spill, the DHHR enlisted Tetra Tech to develop templates for required feasibility studies and source water protection plan updates. Andrew Woodcock, PE of Tetra Tech developed the Feasibility Matrix and a Matrix Guidance Document that was used in feasibility studies statewide.

To fulfill the requirements of Senate Bill 373 and Legislative Rule 64 CSR 3, public water systems in West Virginia were required to evaluate their existing contingency planning and conduct a feasibility study of source water alternatives. If a secondary source of water supply was not available, public water systems were required to prepare a study to determine the technical and economic feasibility of alternatives to provide continued water service in the event their water source becomes contaminated. Options included constructing

backup intake, building additional raw water or treated water storage capacity, or creating an interconnection to another water system.

If one or more options was determined to be feasible, the system was required to provide additional detail on the costs, risks and benefits of implementing each feasible alternative. Economic, technical, and environmental criteria were scored for each alternative and evaluated in the matrix.

Table 4. Feasibility Matrix



The Source Water Protection Plan also included a Communication Plan that documents the way the public water utility, working in concert with state and local emergency response agencies, shall notify the local health agencies and the public of an initial spill or contamination event. The Communication Plan is vital to compliance with new regulations dictating that the public will be notified no later than thirty minutes after a public water system becomes aware of a spill, release, or potential contamination of the public water system. Tetra Tech worked with DHHR to develop a recommended communication plan template that provided a tiered incident communication process to provide a universal system of alert levels to utilities and water system managers.

West Virginia DHHR 2016 Source Water Protection Plan Updates

CLIENT: WVDHHR SWAP Program

REFERENCE:

Mr. William J. Toomey
Unit Manager
350 Capitol Street, Room 313
Charleston, WV 25301-3713
304-356-4298
William.J.Toomey@wv.gov

DURATION:

2015-2016

KEY PERSONNEL:

John Beckman
April Storm

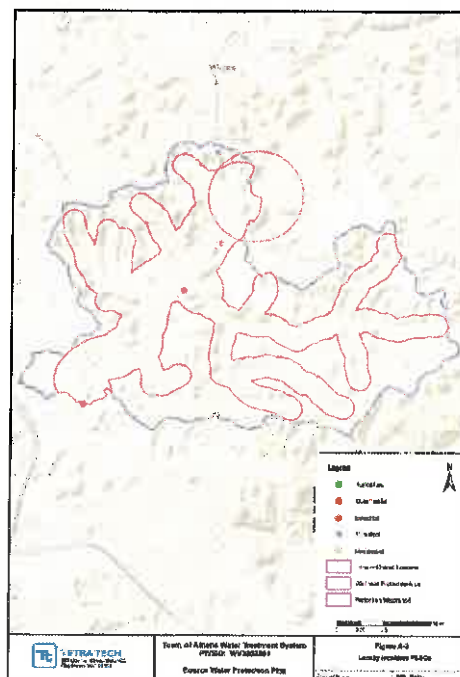
To fulfill the requirements of Senate Bill 373 and Legislative Rule 64 CSR 3, public water systems in West Virginia were required to update their existing source water protection plans. Systems were also encouraged to form a source water protection team and host at least one public meeting. Tetra Tech provided technical assistance to 63 public water systems to develop source water protection plan updates in advance of the July 2016 deadline. Many of the systems in the Philippi and Beckley DHHR Districts were utilities that Tetra Tech had worked with before in 2009-2011 to develop original source water protection plans under the Source Water Technical Help Program.

Source Water Protection Plan updates included: revised Zone of Critical Concern (ZCC), Zone of Peripheral Concern (ZPC), and Wellhead Protection area delineations, updated PSSC inventory, a prioritized list of categorized PSSCs (describing their threat),

management strategies to address each prioritized threat, recommended education and outreach activities to raise public awareness of source water issue, contingency plans for short and long-term water outages, and a communication plan in case of contamination or other incidents.

To develop protection plans, Tetra Tech coordinated with the SWAP Program staff to gather existing data including: susceptibility reports, previously delineated source water protection areas, and existing PSSCs. Tetra Tech also queried available databases of state-regulated PSSCs such as NPDES permits and above ground storage tanks. Meetings were held with water system administrators and operators to gain first-hand knowledge of the protection area and known PSSCs. These data are presented in the protection plan in tables and depicted in report figures, created in ArcGIS.

Tetra Tech prioritized all PSSCs and devised strategies to address each high priority PSSCs. Finally, all survey data and management strategies were compiled into to a complete Source Water Protection Plan. The protection plan also documented the water systems' contingency plans for short term and long-term water shortages, as well as procedures for toxic spills and other emergency incidents. Results of the alternative source feasibility study with alternatives matrix were included as an appendix. Tetra Tech submitted the protection plan to the SWAP Program for review and official approval on behalf of the water system. The final approved plan was then presented to the water system in meetings frequently incorporated into the agenda of regularly scheduled town council or public service district board meetings open to the public. Tetra Tech source water specialists also attended required source water protection public hearings in support of SWAP program staff.





Virginia Source Water Protection and Implementation

CLIENT: Virginia Department of Health Office of Drinking Water

REFERENCE:

Mr. Aaron Moses
Office of Drinking Water
109 Governor Street
Richmond, VA 23219
804 864-7492
aaron.moses@vdh.virginia.gov

DURATION:

2012-2018 (ongoing)

KEY PERSONNEL:

Aileen Molloy
John Beckman
Helen Anthony
Cori Edwards

As part of a recently completed project with the Virginia Department of Health, Tetra Tech worked with over 20 community water works in the northern region of Virginia to develop source water protection plans and assist in implementation. Tetra Tech has worked with the communities of Middleburg, Orange, Purcellville, Berryville, Elkton, Buena Vista, Maury Service Authority, Long Hollow, Natural Bridge, Three Springs, Glasgow, Rivanna Water and Sewer Authority, and the Fauquier County Water and Sewer Authority to prepare plans. To begin, Tetra Tech interviews the water works operators and administrators to gather information about the water works and local concerns. Tetra Tech encourages water works personnel to form a local advisory committee that will oversee the development and implementation of the source water plan. Tetra Tech assimilates data from federal and state databases and Geographic Information Systems (GIS) and reviews the water works source water assessments. With an understanding of existing data, Tetra Tech performs field investigations to verify data and identify unreported potential

contaminant sources. Tetra Tech presents these data to the water works local advisory committee and prioritizes threats.

Tetra Tech recommends management strategies to address each prioritized threat to the local advisory committee and collaborates to finalize the plan. The figure below provides an example of mapping prepared to support the Town of Middleburg as they draft source water protection ordinances and update their comprehensive plan. The local advisory committee is proposing a wellhead protection overlay district. Model ordinance language provides examples of land uses and facilities that will be restricted within the district, representing a 1,000-foot buffer around each wellhead.

Similarly, on behalf of the Maury Service Authority, Rockbridge County prepared a local source water protection ordinance. Tetra Tech has also employed hydrologic modeling of the Maury River to conduct a time of travel study. Using the results of this study, Tetra Tech delineated a source water protection area that will be specified in the ordinance.

In addition to specific management strategies each source water protection plan provides recommended education and outreach activities to raise public awareness of source water issue, contingency plans for short and long-term water outages, and emergency response procedures for spills or other incidents.

Tetra Tech also performs an annual survey of all water works in the region with written strategies or source water protection plans to determine if they are implementing source water protection measures. This provides an opportunity for Tetra Tech to learn more about approaches taken by local governments and to provide recommendations.



3. Technical Approach

3.1. Scope

Tetra Tech will implement source water protection planning activities according to the guidance available from the West Virginia SWAP program. Plans will be developed for the 19 systems in the Central and Northern Ohio River areas of West Virginia. Table 3-1 lists the subject water systems of this EOI. Tetra Tech will obtain system-specific GIS data from the DHHR web portal. Data will include five-year conjunctive capture zones, and field verified and regulated PSSCs. PSSC inventory, threat assessment, and strategy development will focus on the potential threats to wells and intakes within the conjunctive capture zones.

Table 3-1 EOI Water Systems

PWSID	System Name	# Wells	District	County
WV3302714	Mason County PSD - Crab Creek	3	St. Albans	Mason
WV3302712	Mason County PSD - Lakin	3	St. Albans	Mason
WV3302713	Mason County PSD - Letart	4	St. Albans	Mason
WV3303701	City of Belmont	2	Wheeling	Pleasant
WV3305204	Paden City	4	Wheeling	Wetzel
WV3304801	Friendly PSD (Tyler County PSD)	4	Wheeling	Tyler
WV3305206	Grandview - Doolin PSD	2	Wheeling	Wetzel
WV3305404	Lubeck PSD	7	Wheeling	Wood
WV3305203	New Martinsville	5	Wheeling	Wetzel
WV3305410	Union Williams PSD	4	Wheeling	Wood
WV3305411	Vienna	6	Wheeling	Wood
WV3300502	Beech Bottom Water Department	1	Wheeling	Brooke
WV3302618	Benwood Water Department	2	Wheeling	Marshall
WV3300517	City of Wellsburg	4	Wheeling	Brooke
WV3300506	Follansbee Municipal	3	Wheeling	Brooke
WV3302605	Glen Dale Water Works	2	Wheeling	Marshall
WV3302610	McMechen Municipal Water	4	Wheeling	Marshall
WV3302611	Moundsville	9	Wheeling	Marshall
WV3301516	Newell Company	3	Wheeling	Hancock



3.2. Project Management

If awarded the contract, Tetra Tech will appoint John Beckman to be the Source Water Protection Project Manager (SWP PM). Mr. Beckman has 9 years of source water protection experience and is currently serving as the Tetra Tech project manager for source water protection plan updates for the Town of Gilbert. The Tetra Tech SWP PM will supervise all elements of technical work performed to develop the source water protection plans. Mr. Beckman will serve as the primary point-of-contact with the DHHR SWAP program for communication concerning technical aspects of plan development. Tetra Tech will be prepared to provide timely project status updates and discuss any potential problems gathering data or working with systems. Mr. Beckman, with the help of Tetra Tech contracts staff, will submit progress reports and invoices in a timely manner.

As a contractor to the DHHR SWAP Program both before and after the Charleston Water Crisis, Tetra Tech provided project updates, projected invoice amounts, and drafted deliverables for review. The Tetra Tech SWP PM and technical leads will use Tetra Tech's internal financial reporting system to track tasks, expenditures, and invoices. Tetra Tech has developed in-house systems that offer near real-time tracking of project budgets. Our Oracle-based, enterprise-wide management information system is a Web-based cost reporting and tracking tool that provides up-to-date, comprehensive financial information at the contract, task, and subtask level on every contract. Using this system, contracts staff in our Fairfax office generate weekly Project Status Reports available to all project managers. This report uses the approved project budget and accounting data to provide detailed cost and level-of-effort summaries. Reviewing costs weekly allows our project managers to evaluate whether expenditures are commensurate with the level of effort and other costs that are expected for the given task and identify any issues immediately.

The SWP PM will coordinate the activities of source water specialists performing technical tasks necessary to complete the project. Proposed source water specialists have extensive experience working directly with water plant operators and water utility managers to gather data, plan meetings, and develop source water protection plans. The SWP PM will also supervise the efforts of proposed engineering staff performing the contingency plan and feasibility study portions of the project. Source water specialists and engineering staff are introduced in Section 2.1 above. The SWP PM will ensure clear internal communication between all members of the Tetra Tech team, as well as external communication with the DHHR. Tetra Tech staff named in this EOI will perform the work necessary to complete the project. Any necessary staffing changes will be subject to advance approval by the DHHR SWAP program.

Upon receipt of the contract, the Tetra Tech SWP PM will assign tasks to the project team, develop an approach to complete tasks, and create a schedule for project milestones and deliverable deadlines. The SWP PM will coordinate with the Agency to ensure work is being performed according to expectations, schedule and budget. The Tetra Tech SWP PM will work with the project team and clearly communicate expectations to ensure that all members are aware of their roles, responsibilities, and commitments. This will ensure that tasks proceed on time and with a clear purpose to eliminate the potential for delays, duplication of effort, or incomplete tasks. Sound project management will make it possible for multiple water systems to be assisted simultaneously, and protection plans can be completed on schedule.

3.3. Meetings

Tetra Tech will attend and coordinate all meetings required by the EOI to support source water protection project implementation.

Project Initiation Meeting

Tetra Tech source water specialists will contact each water system and organize a project initiation meeting with the plant operator and/or utility manager to begin the effort, introduce SWAP program goals, and gather basic information about the system and the community it serves. During the project initiation meeting, Tetra Tech Source Water Specialists and water system staff will work together to designate points-of-contact, establish a project timeline, and introduce the contingency plan, single-source feasibility study, and communication plan. Tetra Tech will review regulated and existing PSSCs with water system staff and invited stakeholders. The DHHR SWAP program will be given at least 48 hours' prior notice of meeting dates to allow agency officials to attend.

Protection Team Meetings

Tetra Tech will facilitate two protection team meetings during the project. To fulfill the requirements of SB 373, water utilities are required to engage local stakeholders, including representatives of local government, local emergency planning committees, local health departments, customers or public. DHHR SWAP requires that every effort be made to include these representatives on the protection team. Tetra Tech will assist with assembling a team and educating members on the requirements of source water protection plan and their roles. Protection team members will also be reminded of the system's responsibility to inform customers within 30 minutes of a source water contamination event that threatens health and safety.

Water system staff have the responsibility to select source water protection team members. However, Tetra Tech source water specialists will be available to assist water system staff to identify appropriate protection team members and provide support, if needed, in contacting those individuals. The source water specialist will also document protection team members who, although they wish to participate, are unable to attend meetings. Tetra Tech will present draft PSSC maps for protection team members to review. Source water specialists will also introduce and receive input from the protection team concerning management strategies, education and outreach strategies, contingency plan, single-source feasibility study, communication plan, and emergency response procedures. Once protection team comments have been incorporated into the draft source water protection plan, the protection team will have an opportunity to review the plan during the second source water protection team meeting before the plan is finalized.

Public Meeting

Tetra Tech will conduct a public meeting to present the final draft of the source water protection plan to local stakeholders, water customers, and other interested members of the public. Tetra Tech will recommend that meetings be publicized in advance. DHHR SWAP staff will be given at least 48 hours' notice so that they may attend. Tetra Tech will attempt to schedule the public meeting concurrently with regularly scheduled town council or public service district governing board meeting to guarantee a minimum attendance. During required source water protection



public meetings in 2016, Tetra Tech source water specialists paired a 20-minute Power Point presentation followed by a flexible question-and-answer period commensurate with the breadth and depth of interest among attendees. Tetra Tech will maintain this basic format for public meetings for each system in the EOI. Topics to be covered will include explaining benefits of having a source water protection plan and a communication plan, an overview of high-priority PSSCs, management strategies to address potential threats, and the results of the alternative source feasibility study.

3.4. Feasibility Study

The source water alternatives analysis will focus on determining the economic or technological feasibility of alternative water sources, such as constructing a secondary intake, increasing raw and/or treated water storage to allow for 2 days of stored capacity, interconnecting with other water systems, and identifying any other alternative. According to SB 373, if alternatives are deemed feasible, they will be subjected to a more in-depth study to analyze the costs, benefits, and risks of the alternatives.

The source water alternative analysis will begin with a review of each system to determine the unique characteristics, condition and operational environment of each water system. This not only allows the team the ability to be thorough in its evaluation of the required alternatives but also allows for the development of other potential alternatives that merit evaluation.

Tetra Tech's approach to evaluating source water alternatives will involve a two-phase process. The first phase is a high-level feasibility analysis of the required alternatives (and additional alternatives if developed) to eliminate any obviously infeasible or impractical alternatives. This allows for a more focused evaluation of viable alternatives in the second-phase. The highest-ranking alternatives of from the first phase will be scrutinized at a higher level of detail in the second phase so that the optimal alternative for each system is identified.

To identify if an alternative is feasible, Tetra Tech will consider economic, technical and environmental criteria. Economic criteria will evaluate the capitol costs and operational and maintenance costs relative to existing system expenses. Technical criteria will evaluate, permitting requirements, the flexibility and resilience of an alternative, and constraints of institutional requirements (ex. Land easements, compliance with Safe Drinking Water Act regulations). Finally, the environmental criteria will consider ecosystem impacts, aesthetic restrictions, and stakeholder concerns. By examining these criteria, Tetra Tech will work with water systems to provide an objective judgment of feasibility to support additional alternative analysis. Tetra Tech will prepare a summary of the pros and cons of the alternatives and a recommendation of the optimal source water alternative for the system.

3.5. Plan Development

Tetra Tech will provide plan development technical support to the 19 water systems in the EOI. Tetra Tech will take every step necessary to successfully complete source water protection plans that meet all requirements for DHHR SWAP program approval. Plans will follow the template available online at http://www.wvdhhr.org/oehs/eed/swap/Draft_Template.asp. Tetra Tech will also electronically submit source water protection data to the agency through the source water

protection WV.gov Accounts website at <https://apps.wv.gov/Accounts/Login.aspx?ReturnUrl=%faccounts%2f>. Contingency plans for short and long-term water shortages will be included in source water protection plans, as well as emergency contact information. A comprehensive communication plan will designate media contacts and methods to contact customers in case of a contamination event that threatens health and safety.

Once Tetra Tech has compiled a draft source water protection plan, it will be submitted to the DHHR SWAP staff for review. A 14-day review period will allow for a thorough agency review. Tetra Tech will work with reviewers to address any comments and make needed corrections. Upon approval, Tetra Tech will submit one paper copy and one electronic copy of the final source water protection plan for each of the water systems in the EOI.

Tetra Tech has successfully developed source water protection plans and plan updates for West Virginia community water systems. Our experience related to source water protection planning tasks includes assembling protection teams, inventorying PSSCs, prioritizing local concerns, developing protective strategies, identifying education and outreach opportunities, assessing early warning monitoring systems, and examining water systems' treatment capacities, storage capacities, water loss, and ability to respond to water shortages due to power outages, spills, or future demand. If selected, Tetra Tech staff will put their extensive experience to work creating complete, accurate, and implementable source water protection plans for systems in this EOI.



Appendix A

Resumes



EXPERIENCE SUMMARY

Mr. Beckman has 21 years of professional experience performing scientific research, analysis, and large-scale field surveys. He has been involved with source water protection projects in West Virginia since 2009, conducting field surveys, GIS mapping, public meetings and plan preparation. Mr. Beckman also leads Tetra Tech’s statewide TMDL development efforts for the West Virginia Department of Environmental Protection (WVDEP). His duties include water quality modeling, data management, GIS analysis, technical writing, field investigations, and public outreach support. Mr. Beckman has also performed stream ecology, forestry, wildlife, and botanical studies in the eastern United States.

EMPLOYMENT HISTORY

- Tetra Tech, Inc., Environmental Scientist, 2000–present
- West Virginia Division of Natural Resources/The Nature Conservancy, Wildlife Biologist, 1998–2000
- Colorado State University, Contractor, 1997
- The Nature Conservancy, Intern, 1996

RELEVANT EXPERIENCE

Source Water Protection Plan Updates, WV. 2018. For Buffalo Creek PSD, Wilderness PSD, and Town of Gilbert, served as project manager for plan update projects funded by WVDHHR source water protection grants.

TMDLs for Hughes River and Monongahela River Watersheds, WV. 2016-2018. For WVDEP, led fecal coliform TMDL development for watershed group D3. Created subwatershed delineation and modeled reach for MDAS model setup. Developed EFDC model inputs to represent point and nonpoint sources of pollution.

Planning Level Surveys for Flora, Fauna, and Noxious Weed Species, U.S. Army, Joint Systems Manufacturing Center – Lima, OH. 2016-2017. Compiled existing data and researched vegetative communities known from the ecoregion. Identified herb, shrub, and tree species in research plots across approximately 95 acres.

TMDLs for Meadow River, Warm Spring Run, and Rocky Marsh Run Watersheds, WV. 2015-2017. For WVDEP, led fecal coliform TMDL development for watershed group C3. Developed and calibrated MDAS water quality models for fecal coliform. Developed model inputs for failing septic systems, MS4 areas, and agricultural sources. Supported pH model landuse setup. Calculated TMDL fecal coliform load allocations and wasteload allocations.

Source Water Protection Plan Updates, WV. 2015-2016. For WVDHHR, Source Water Assessment and Protection Program, served as source water protection specialist for drinking water systems in southern WV to update existing source water protection plans to meet requirements set forth in West Virginia Senate Bill 373. Conducted protection team meetings, mapped potential sources of contamination using GIS, and drafted protection plans.

EDUCATION

- M.E.M., Environmental Management, Duke University, 1998
- B.A., Biology, University of California – Santa Cruz, 1994

AREAS OF EXPERTISE

- TMDL development
- Watershed modeling
- Water quality field studies
- Land use analysis and GIS
- Watershed data management
- Technical writing/editing
- Stream ecology and hydrogeomorphology surveys
- Botanical surveys

LICENSES/REGISTRATIONS

None

TRAINING/CERTIFICATIONS

Rosgen Level I - Applied Fluvial Geomorphology, 2006

PROFESSIONAL AFFILIATIONS

Southern Appalachian Botanical Society

OFFICE LOCATION

Charleston, WV

YEARS OF EXPERIENCE

21

YEARS WITH FIRM

18

Planning Level Surveys for Vegetation Classification, Bats, and Small Mammals, U.S. Army, Holston Ammunition Plant, TN. 2014-2015. Project Manager for summer field survey effort. Supervised subcontractor for bat and small mammal surveys. Identified herb, shrub, and tree species in 80 research plots across approximately 6,000 acres. Matched observed vegetation types to plant communities described in the United States National Vegetation Classification Database. Performed GIS mapping and data management and wrote and edited reports.

TMDLs for Tygart Valley River Watershed, WV. 2014-2015. For WVDEP, led fecal coliform TMDL development for watershed group B3. Gathered hydrologic data and built MDAS model. Calibrated MDAS water quality models for fecal coliform. Supported MDAS model setup for iron, aluminum, and beryllium. Developed model inputs for failing septic systems, MS4 areas, and agricultural sources. Developed estimates of streambank erosion in modeled streams. Calculated TMDL load allocations for fecal coliform, aluminum and pH TMDLs. Provided technical support to WVDEP at public meetings.

Source Water Protection Field Surveys, VA. 2013-2015. For Virginia Department of Health, led field surveys to verify potential contaminant sources for drinking water systems in Albermarle and Rockbridge Counties. Wrote and edited source water protection plans. Performed time of travel analysis for Maury Service Authority source water intake.

Community Water System Source Water Protection Plan Updates, Clarksburg and Fairmont, WV. Clarksburg Water Board and City of Fairmont. 2014-present. Conducted data gathering meetings with drinking water plant operators, developed survey area maps using GIS, and performed field investigations to confirm known potential contaminant sources and identify new threats to drinking water in the West Fork and Tygart Valley River watersheds.

Nutrient TMDLs for Wissahickon Creek, PA. 2014. Developed phosphorus TMDL allocation inputs specific to 16 MS4 entities in the Wissahickon Creek watershed in eastern Pennsylvania. Ran load reduction scenarios in LSPC watershed model to generate inputs for EFDC receiving water modeling system.

TMDLs for South Branch Potomac, Upper Kanawha, and Upper Ohio North Watersheds, WV. 2013-2015. For WVDEP, led fecal coliform TMDL development for watershed group A3. Gathered hydrologic data and built MDAS model. Calibrated MDAS watershed models for hydrology and water quality. Developed model inputs for failing septic systems, MS4 areas, and agricultural sources. Modeled point-source permitted fecal coliform discharges. Developed TMDLs for selenium by allocating loads to active mining operations and historic acid mine drainage seeps.

TMDLs for West Fork River Watershed, WV. 2012-2014. For WVDEP, led fecal coliform TMDL development for watershed group E2. Built MDAS watershed model through analysis of hydrology, land cover, and elevation datasets. Conducted MDAS watershed model calibration for hydrology and water quality parameters. Performed iron-sediment correlation and streambank erosion calibration. Represented fecal coliform and iron point-source discharges in the MDAS model. Developed TMDL load allocations and pollutant reductions for fecal coliform sources.

TMDLs for Monongahela River Watershed, WV. 2011-2013. For WVDEP, led fecal coliform TMDL development for watershed group D2. Constructed a hydrologic model using GIS analysis and database techniques. Calibrated MDAS watershed models for hydrology and water quality. Developed model inputs for CSOs, failing septic systems, MS4 areas, and agricultural sources. Incorporated point-source permitted fecal coliform discharges into the watershed model. Developed TMDL load allocations and pollutant reductions for both point and nonpoint sources.

Source Water Protection Field Surveys, WV. 2009-2011. For the West Virginia Department of Health and Human Resources, Source Water Assessment and Protection Program, led field surveys to verify potential contaminant sources for 100 drinking water systems. Served as primary point of contact for subcontractors and off-site field staff. Organized field data using GIS and MS Access databases.

Perennial Streams Survey, WV. 2010. Field botanist for USACE Huntington District project to assess hydrogeomorphology of headwater streams and vegetative characteristics of headwater riparian areas in southern West Virginia. Used field methods to determine canopy, shrub, and herbaceous percent cover.



EXPERIENCE SUMMARY

Mr. D'Amato is a registered professional engineer with 25 years of water quality engineering, wastewater process design, and applied environmental research experience. Mr. D'Amato currently leads a practice in sustainable water resource management and design for Tetra Tech, where his focus is on helping governments, communities, builders, and utilities plan and implement sustainable strategies that decrease capital and recurring costs, increase energy efficiency, and effectively address emerging challenges.

Mr. D'Amato has internationally recognized expertise in innovative wastewater infrastructure planning and implementation approaches that maximize efficient and effective water service delivery and asset management, including the use of distributed and decentralized systems (e.g., satellite reuse and sewer mining, sustainable onsite systems, utility-managed cluster wastewater systems), integrated water reclamation and waste-related resource (energy, carbon, nutrients) recovery and reuse at multiple scales, and aggressive energy management programs. He also has extensive experience reducing nutrient pollution at multiple scales ranging from individual treatment systems to large watersheds, including the Chesapeake Bay watershed.

EMPLOYMENT HISTORY

Tetra Tech, Inc., Senior Engineer/Project Manager, 2008–present. (refer to bio)

ARCADIS, Project Engineer, 2000–2008.

I Kruger, Inc., Process Engineer, 1997–2000.

RELEVANT EXPERIENCE

Chatham County, NC Water and Wastewater Master Plan. 05/18-present. Project Manager to develop a countywide water and wastewater master plan. Identifying and leveraging opportunities to integrate water and wastewater infrastructure for innovative and mutually reinforcing resource recovery and reuse for agriculture and other countywide efforts that enhance rural/urban economic development

Hertford County, NC Water and Wastewater Needs Assessment, Southeast Rural Communities Assistance Project. 08/17-present. Project Manager for County-wide assessment of existing water and wastewater assets and needs as they relate to economic development plans for a socioeconomically disadvantaged area in northeastern North Carolina. Tasks include high-level system inventory and condition assessment, spatial analyses, conceptual design and costing of expanded service alternatives, and capital improvement plan recommendations.

Montana Nutrient Reduction Analysis, EPA Region 8. 08/16–present. Technical lead for project to estimate costs for retrofitting or replacing existing major (> 1 MGD) and minor (< 1 MGD) mechanical wastewater treatment plants (WWTPs) and lagoon systems to different limits of technology for effluent total nitrogen and total phosphorus concentrations.

EDUCATION

MSEE, Water Resources Engineering, University of North Carolina. 1994

BS, Civil Engineering, Penn State University, 1991

AREAS OF EXPERTISE

Applied environmental research and technology development

Climate change adaptation

Distributed water reclamation, resource recovery/reuse

Outreach and training

Sustainability planning and design

Wastewater treatment process and hydraulic engineering

Water and wastewater treatment system energy management

Water conservation

Watershed-scale nutrient management

REGISTRATIONS/AFFILIATIONS

Professional Engineer, North Carolina, 1997; South Carolina, 2015; West Virginia, 2013

Water Environment Federation (Small Communities Committee; Technical Practices Committee)

National Onsite Wastewater Recycling Association

North Carolina Water Resources Association (President)

Chatham County (NC) Environmental Review Advisory Committee (Past Chair)

OFFICE

Research Triangle Park, NC

YEARS OF EXPERIENCE

25

YEARS WITHIN FIRM

10

Technical Assistance to Support Chesapeake Bay Program Goals and Outcomes, Chesapeake Bay Trust. 07/16–present. Technical expert on onsite and decentralized wastewater systems. Evaluating and rating on-site wastewater sector BMP performance across a range of 29 management strategies.

West Virginia Source Water Protection Planning, Region 4 and Region 7 Planning and Development Councils. 04/15–01/16. Project manager and certifying engineer for developing source water contingency plans and alternative source water feasibility studies for 14 public water systems under the Region 4 Planning and Development Council and 11 systems under the Region 7 Planning and Development Council. Plans address responses to water shortage or contamination, power reliability, future water supply needs, water loss mitigation, early warning systems, and alternative water sources.

Chatham County Schools Wastewater System Operational Consulting, Chatham County, NC, Schools. 04/16–present. Providing on-call engineering services to support client's operational contract, including operator training, system performance troubleshooting and optimization, data review, minor design tasks and related engineering support of operation, and maintenance and compliance reporting for four discharging and nondischarging onsite wastewater systems.

Chesapeake Bay Boat Pump-Out Expert Panel, EPA Region 3, Chesapeake Bay Program Office (CBPO). 02/16–present. Coordinating expert panel charged with developing baseline estimates of historical nutrient loads associated with boat discharges in the Chesapeake Bay and methodology to credit nutrient load reductions for jurisdictions with boat pump-out programs. Activities include suggesting panel members, assembling panel, guiding panel activities, technical support such as literature and regulatory reviews and development of methodologies and estimates for historical nutrient loads, and coordinating development of recommendations and a final report.

Olde Beau RV Park, NC. 12/15–present. Engineer of record for new decentralized wastewater treatment system to serve an RV park and new golf course community in the mountains of North Carolina. Tasks to date include coordinating preliminary soils evaluation and hydraulic analysis, conceptual design, and preparing an improvement permit application for the first phase of the project.

Sewer Feasibility Study, Town of Lake Santeetlah, NC. 07/15–present. Engineer of record and manager for project to develop a plan to provide townwide wastewater management considering a range of centralized and decentralized wastewater treatment alternatives. Includes detailed evaluation of existing parcels for wastewater dispersal, conceptual design and cost estimation, ownership and managerial evaluation, financial viability analysis, funding source evaluation and acquisition of funding, and negotiation assistance and policy development.

Support of Chesapeake Bay Watershed Onsite Wastewater Treatment Systems (OWTS) Best Management Practices (BMPs) Expert Panel, EPA Region 3, CBPO. 12/11–03/14; 06/15–present. Coordinated activities of the OWTS expert panel, which developed definitions and effectiveness values for prioritized Chesapeake Bay Program OWTS BMPs to reduce sectoral nitrogen loadings. Activities included organizing and facilitating monthly conference calls, drafting and revising the final report with panel input, literature searches, data management and assessment, assisting experts on BMP subcommittees, and surveying/interviewing stakeholders and experts. Panel was reconvened in 2015 to consider additional BMPs for credits.

Stormwater System Improvements, Emerson Waldorf School. 03/15–present. Managing on-call engineering tasks, including stormwater BMP design and installation and onsite wastewater treatment efforts.

Integrated Wastewater and Stormwater Planning Technical Assistance, City of Santa Maria, CA, EPA Office of Wastewater Management (OWM). 11/14–present. Managing EPA grant-funded project to develop a toolkit and methodology for making integrated wastewater/stormwater management decisions, considering a wide range of technical and nontechnical factors. Guidance and multicriteria decision support tools developed for Santa Maria will be transferrable to other communities making similar management decisions.

North Carolina Nutrient Technical Support, EPA OWOW. 10/14–present. Managing project to help the North Carolina Division of Water Resources finalize guidance on programs for local governments to reduce nutrient loading attributed to malfunctioning septic systems and discharging onsite systems and to develop a methodology to account for nutrient attenuation due to landscape characteristics for making nutrient reduction practice credits more location specific in the North Carolina Piedmont (Falls and Jordan Lake watersheds).



EXPERIENCE SUMMARY

Ms. Edwards is an Environmental Scientist with over seven years' experience with source water protection for various states and West Virginia infrastructure project management and grant writing. She has authored numerous source water protection plans in compliance with local, state, and federal authorities. Ms. Edwards is proficient in meeting and stakeholder facilitation and public education and outreach. Her expertise includes experience with ArcGIS and Trimble Global Positioning System (GPS) technology for demographic and environmental analysis, project area mapping, and transit evaluation. Ms. Edwards has managed FEMA Hazard Mitigation Planning for 33 jurisdictions; Federal Transit Administration (FTA) and Federal Highways Administration (FHWA) Title VI and Disadvantaged Business Enterprise (DBE) Programs; and National Environmental Policy Act (NEPA) Environmental Assessments for WV Housing & Urban Development (HUD) programs.

EMPLOYMENT HISTORY

Tetra Tech, Inc., Environmental Scientist, 2017–present

Region I Planning & Development Council, Project Manager/GIS Specialist 2014-2017

Region I Planning & Development Council, GIS/Planner 2006-2010

RELEVANT EXPERIENCE

Iowa Source Water Protection Plan Updates, IA. 2017-present. For Spirit Lake Waterworks in Dickinson County and Winterset Waterworks in Madison County, updated existing source water protection plans. Performed technical writing and mapping of potential sources of contamination using GIS. Coordinated with Robin McNeely, GIS Program Manager at the ISU GIS Facility, and duplicated Best Management Practice (BMP) mapping for areas of Minnesota used in the Agricultural Conservation Planning Framework tool.

Eastern Lancaster County Nutrient Pollution Assessment Tool, PA. 2017-present. For Eastern Lancaster County Source Water Collaborative, USEPA, and Pennsylvania DEP, developed a GIS desktop methodology and ModelBuilder component to provide a relative risk assessment of nutrient pollution to both surface and ground water based on Chesapeake Bay CAST nitrogen and phosphorus loading rates.

Source Water Protection Annual Survey, VA. 2017- present. For Virginia Department of Health, assisted with the annual survey response from 112 systems. Investigated Coastal Plain Construction and system susceptibility to contamination.

Muskegon Water Filtration Plant Source Water Intake Protection Plan, MI. 2017. Drafted the first Source Water Intake Protection Plan (SWIPP) for the Muskegon Water Filtration Plant in Muskegon County approved by the Michigan Department of Environmental Quality (MDEQ). Conducted

EDUCATION

MGIS, Penn State Earth & Mineral Sciences, expected 2018

B.A., Geography/Cartography & GIS, Concord University, 2006

AREAS OF EXPERTISE

- Source Water Protection
- HUD & RUS NEPA Environmental Review
- SHPO Coordination
- ArcGIS Desktop & Online
- TRIMBLE GPS
- Technical Writing
- Grant Writing

TRAINING/CERTIFICATIONS

- HUD ERR Training
- ICS-100 Introduction to the National Incident Management System
- WVAGP ESRI ArcGIS Online Governance
- Deriving Rasters for Terrain Analysis Using ArcGIS
- 3D Analysis of Surfaces and Features Using ArcGIS

PROFESSIONAL AFFILIATIONS

- WV Association of Geospatial Professionals

OFFICE LOCATION

Charleston, WV

YEARS OF EXPERIENCE

7.5

YEARS WITH FIRM

1.5

protection team meetings, investigated potential contamination sources, and executed technical writing to complete the 2017 SWIPP.

Wilderness Source Water Protection Plan Update, WV. 2017. For Wilderness PSD in Nicholas County, updated existing source water protection plan. Conducted protection team meetings, mapping potential sources of contamination using field investigations and GIS, and drafting standard protocol for water sampling.

Buffalo Creek Source Water Protection Plan Update, WV. 2017. For Buffalo Creek PSD in Logan County, updated existing source water protection plan. Conducted protection team meetings, mapping potential sources of contamination using field investigations and GIS, and drafting standard protocol for water sampling.

Fauquier County Source Water Protection Plan Update, VA. 2017-present. For Virginia Department of Health and Fauquier County Water and Sanitation Authority, initiated the update concerning a source water protection plan for 14 water systems in Fauquier County, Pennsylvania. Conducted protection team meetings and field investigations concerning potential sources of contamination.

TMDLs for Upper Guyandotte River Watershed, WV. 2017-present. For WVDEP, GIS support, technical writing, pollutant source report, and map figure creation for Total Maximum Daily Load (TMDL) development for watershed group D3. Created elevation mosaics and performed QA/QC for subwatershed delineation.

TMDLs for Hughes River Watershed, WV. 2017-present. For WVDEP, GIS support and technical writing for Total Maximum Daily Load (TMDL) development for watershed group D3. Calculated disturbed areas represented by oil and gas industry activity and unpaved roads not represented by existing TIGER datasets. Performed QA/QC for land use representation and metals modeling.

Source Water Assessment and Protection Project Management, WV. 2015-2016. Coordinated the development of WVDHHR and WVBPH Source Water Protection Plans (SWPPs) in compliance with Senate Bill 373 for the following water utilities and systems: McDowell County PSD for the Berwind and Bartley Systems, Green Valley Glenwood PSD, Red Sulphur PSD, Oceana Municipal Water System, Athens Municipal Water System, Pineville Municipal Water System, Bluewell PSD, Big Bend PSD, Pocahontas VA Municipal Water System. Managed project team members, engineers, consultants, and PSWUs.

Region I Hazard Mitigation Plan Update, WV. 2015. For FEMA, formed the foundation for a community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage in accordance with Title 44 Code of Federal Regulations (CFR) §201.6 and section 322 of the Stafford Act, 42 U.S.C 5165. Evaluated natural hazard risk to individual communities. Conducted extensive public outreach and stakeholder collaboration meetings. Served as technical lead updating the hazard mitigation plans for McDowell, Mercer, Monroe, Raleigh, Summers, and Wyoming Counties in West Virginia including the following municipalities therein: Town of Anawalt, Town of Athens, Town of Bradshaw, City of Bluefield, Town of Davy, Town of Bramwell, City of Gary, Town of Matoaka, Town of laeger, Town of Oakvale, City of Keystone, City of Princeton, Town of Kimball, Town of Northfork, Town of Peterstown, City of War, Town of Union, City of Welch, City of Hinton, City of Mullens, City of Beckley, Town of Oceana, Town of Lester, Town of Pineville, Town of Mabscott, Town of Rhodell, and Town of Sophia.

Environmental Review Record (ERR) Compilation, WV. 2008 - 2015. Prepared Environmental Review Records governed by NEPA for West Virginia Housing and Urban Development Funds, Appalachian Regional Commission Funds, Land and Water Conservation Funds, and USDA Rural Development Funds concerning the following projects: Town of Union and UTC Aerospace Systems water infrastructure project, McDowell County Coalwood Connector water infrastructure project, 2009 Raleigh County Housing Authority 5 Year Action Plan, 2009 Beckley Housing Authority 5 Year Action Plan, 2008 McDowell County Welch Woodmont 7C water infrastructure project, Town of Sophia Interpretive Park, and Town of Oceana Gilliland Park. Executed project mapping, site suitability evaluations based on the National Environmental Policy Act, and coordination with engineers, the West Virginia Development Office, and regulatory organizations including the State Historical Preservation Office (SHPO), Tribal Historical Preservation Agencies, Department of Natural Resources (DNR), U.S. Fish and Wildlife Service (USFWS), Natural Resource Conservation Center (NRCS), Environmental Protection Agency (EPA), and the Corps of Engineers. Managed ERR revisions corresponding to engineering amendments.



EXPERIENCE SUMMARY

Ms. Molloy is an environmental scientist with 15 years of experience in water resources management. She provides technical and programmatic support to federal, state, and local government clients in watershed management, stormwater management, and TMDL development. She also provides general and technical support for various projects related to watershed management and planning, watershed characterization, literature reviews, data compilation and analysis, and technical writing. Recent projects include managing and providing technical assistance to multiple states in developing statewide nutrient reduction framework strategies and managing a stormwater BMP siting and design project for the Maryland State Highway Administration. Ms. Molloy has also served as the Chesapeake Bay nutrient and sediment TMDL technical support liaison for Pennsylvania and the District of Columbia, working with each jurisdiction to develop strategies to meet TMDL allocations. She has experience developing BMP implementation strategies and load reduction calculations.

EMPLOYMENT HISTORY

- Tetra Tech, Inc., Environmental Scientist, 2009–present
- Oak Ridge Institute for Science and Education Fellow at the U.S. Environmental Protection Agency, Office of Wetlands, Oceans and Watersheds, 2006–2009
- ATC Associates, Inc., Environmental Scientist, 2000–2003

RELEVANT EXPERIENCE

Green Infrastructure Stormwater Retention Credit Assessment in Washington, DC., District Stormwater. 04/18-present. Project manager for collaboration with District Stormwater to assess properties within the District with large impervious area for stormwater retention credit generation viability. Project also includes master planning for sites deemed viable and BMP design work for sites that move forward with secured private capital funding. Site viability is assessed based on opportunity areas, costs, risks and landowner acceptance. Projects will result in voluntary stormwater BMP credits that provide landowner relief from stormwater fees.

Source Water Protection Plan Development and Program Support, Virginia Department of Health. 07/16-present. Project manager supporting the development and update of source water protection plans (SWPPs) for smaller (<50,000 population) water supply systems throughout Virginia. Activities include assessment of potential sources of contamination, windshield surveys, outreach to the waterworks and larger community, and assistance with formation of, and participation with, local advisory committees. Support is also provided to VDH directly by conducting the annual Substantial Implementation Survey of all systems within the state that are on record as having a SWPP. The survey attempts to identify whether the systems are implementing the recommended protection actions in their SWPPs. Implementation support is also provided to interested systems, including brochure development, grant assistance, data analysis and other projects identified by the systems.

Mt. Olivet Cemetery Stormwater Retention Credit Green Infrastructure Buildout Phase II, District Stormwater. 01/18-present. Project manager for Phase II identification, design, and implementation of voluntary stormwater BMPs to create Stormwater Retention Credits (SRC) to sell on Washington, DC's open marketplace. Project included a master planning analysis to identify all opportunities for BMP placement and type at the Phase II project area within Mt. Olivet Cemetery in Northeast DC. BMP configurations were assessed for cost, risk and acceptability to the Cemetery leadership.

EDUCATION

- MEM, Ecosystem Science and Management, Duke University, 2005
- BS, Biology and Marine Science, University of Miami, 2000

AREAS OF EXPERTISE

- Clean Water Act program support
- Stormwater management
- Technical writing
- TMDL development
- Water quality assessment
- Watershed characterization
- Watershed management

OFFICE LOCATION

Fairfax, VA

YEARS OF EXPERIENCE

15

YEARS WITH FIRM

9

Citywide Stormwater Implementation Plan, City of Harrisonburg, VA. 01/17-01/18. Provided technical support for development of citywide stormwater implementation plan. Conducted pollutant load analysis to calculate potential load reductions from stream restoration activities using Virginia DEQ Chesapeake Bay guidance. Calculated existing and projected load reductions from a variety of non-structural practices to help meet the City's Chesapeake Bay TMDL and MS4 permit load reduction requirements.

STEPL Model Support, EPA Office of Wetlands Oceans and Watersheds. 10/17 to 3/18. Project manager for support to EPA in the development and maintenance for the STEPL model. STEPL employs simple algorithms to calculate nutrient and sediment loads from different land uses and load reductions that would result from implementing various BMPs. Responsible for technical oversight of STEPL enhancements and user support, coordination with IT developers, and conducted a nationwide STEPL training webinar with over 200 attendees, providing a comprehensive overview to the successful use of STEPL, including outlining the latest features in version 4.4.

Urban Nutrient Management–Fertilizer Usage Analysis, District of Columbia, EPA Chesapeake Bay Program. 07/16–03/18. Evaluated fertilizer use practices in the District of Columbia to establish more accurate loading rates for turf in the District and crediting for urban nutrient management BMPs. The project included GIS analysis of turf and parcels to identify high-risk areas and quantify the acres of turf by ownership type. To determine fertilizer application characteristics or lack of fertilization, discussions were conducted with points of sale, federal and local land managers, and commercial lawn care operations.

Nutrient Framework Strategy Development Support, EPA OW/OWOW. 05/13–02/18. For USEPA, managing and providing technical assistance to states in developing nutrient reduction framework strategies. State assistance has included development of a recovery potential screening tool for Utah to prioritize watersheds, a literature review of published BMP efficiencies to establish scientifically based and state-specific BMP efficiencies for Missouri to incorporate into their strategy, and watershed and in-lake analysis of Lake Winnebago to help identify strategies to reduce loading to return the lake to a macrophyte dominated system. Assisted multiple states in developing customized Recovery Potential Screening Tools focused on nutrient reduction and watershed prioritization. The prioritization process will assist the states in identifying priority watersheds for nutrient reductions within the states' Nutrient Reduction Strategies.

Chesapeake Bay BMP Review Panel Support, EPA Region 3 and Chesapeake Bay Program. 03/12–03/2018. Provided technical assistance and support to the Wetlands BMP Expert review panel, including developing a document tracking system and literature review on wetland loading rates and nutrient and sediment removal efficiencies. Also provided technical assistance and support to the Riparian Buffer BMP review panel, including interviewing all panel members to obtain representative expert analysis and producing a summary report. Provided assistance with data collection and managed panel materials.

Stormwater BMP Site Search and Concept Designs, Montgomery County, MD, Maryland State Highway Administration (SHA). 12/14–09/2016. Managed multiphased project to support Maryland SHA in identifying potential stormwater BMP opportunities along state-owned roadways to comply with requirements of the Chesapeake Bay TMDL and their MS4 permit. Support includes desktop geospatial analysis of areas of roadways identified by SHA as lacking stormwater BMPs to identify the most promising locations for BMP installation.

Silver Creek, Richardson Flat Tailings Superfund Site, Park City, UT, EPA Region 8. 03/14–04/2017. Project manager for the Silver Creek site characterization, remedial investigation support, field data collection, laboratory QA, and characterization and evaluation of work conducted by others in the Silver Creek floodplain areas (OU2, OU3) and Prospector Gulch (OU4) and adjacent areas under Utah's Voluntary Cleanup Program in the Park City, UT, area. Support included coordination with technical experts, primary responsible parties, and stakeholder agencies. Managed technical support related to evaluating the source, transport, and fate of metals.

Stormwater BMP Site Search and Concept Designs, Carroll County, MD, Maryland SHA. 05/15–09/16. Managed multiphased project to support Maryland SHA in identifying potential stormwater BMP opportunities along state-owned roadways to comply with requirements of their MS4 permit and the Chesapeake Bay TMDL. Support included conducting field investigations and verification at more than 100 sites and developing concept designs in Microstation for 26 sites determined to have a high likelihood of implementation. The project required rapid and accurate execution of SHA protocols.



EXPERIENCE SUMMARY

Ms. Anthony provides general and technical support on various projects related to stormwater, watershed, and water quality assessment and management, including research, field work, data collection and analysis, GIS data analysis, and technical writing. Ms. Anthony has five years of professional experience as an environmental scientist. She has academic experience in many areas of environmental sciences including spatial technology, environmental law and planning, and environmental monitoring of water, plants, soils, and air. She is conversant with ArcMap, Flowlink and Microsoft Office (Word, Excel, Access, and PowerPoint).

EMPLOYMENT HISTORY

Tetra Tech, November 2014–present
SEPI Engineering and Construction, May 2012–October 2014

RELEVANT EXPERIENCE

Virginia Source Water Protection, Virginia Department of Health, Office of Drinking Water. 1/2015–Present. Provides fieldwork, community meeting support, GIS editing, and report development for creating source water protection plans for municipalities across Virginia. Field work includes windshield surveys to identify potential sources of contamination to source water such as gas stations, working farms, and propane tanks. Community meetings include reaching out to the operator, explaining the importance of having a source water protection plan, reviewing the plan with community leaders, and following up with any community outreach.

Citywide Stormwater Implementation Plan, City of Harrisonburg, VA. Subcontractor to A. Morton Thomas & Associates, Inc. (AMT). 01/2017–present. Assisted with the development of a stormwater implementation plan (SWIP), including completing BMP siting, BMP prioritizations, and GIS documentation for reporting.

Rural Residential Impervious Area Disconnection Analysis, Prince George’s County, MD. 4/2016–7/2016. Analyzed impervious area on parcels in the rural area of Prince George’s County to identify impervious surfaces that could be classified as disconnected consistent with MDE criteria. Assisted with GIS analysis, QA/QC of qualifying impervious areas, and finalization of methodology.

Rural Roads Impervious Area BMP Siting, Prince George’s County, MD. 11/2015–12/2015. (Subcontractor) Identified suitable BMP locations in rural sections of Prince George’s County road sections. Assisted with GIS analysis and QA/QC of impervious areas for the criteria set for different BMPs.

Stampede Creek TMDL, Alaska, EPA Region 10. 11/2017–present. Supported development of a nutrient TMDL. Created GIS projects and researched and summarized background conditions for the creek and surrounding region.

Oregon MidCoast TMDL Support, Oregon, EPA Region 10. 8/2015–6/2016. Performed a detailed literature review to support conceptual model

EDUCATION

B.S., Environmental Technology and Management, North Carolina State University, 2013

AREAS OF EXPERTISE

GIS analysis
Water quality monitoring
Data management/analysis

TRAINING/CERTIFICATIONS

40-Hour HAZWOPER (OSHA), December 2011
30-Hour OSHA General Industry Safety and Health, May 2012

OFFICE LOCATION

Fairfax, VA

YEARS OF EXPERIENCE

5

YEARS WITH FIRM

3

development and TMDL linkages.

Waialeale Watershed TMDL, Hawaii, EPA Region 9. 11/2015–9/2017. Provided GIS analysis support for development of sediment and nutrient TMDLs. Searched for and updated background information for the associated region through data and relevant maps.

Chesapeake Bay Regulatory and Accountability Grants (CBRAP) Local Watershed Implementation Plans, Prince George's County, MD. 7/2015–10/2015. Supported Prince George's County in locating and evaluating potential BMP locations on municipal-owned properties in Phase II MS4 municipalities. Conducted desktop geospatial analysis of areas owned by municipalities to identify the most promising locations for BMP installation through a ranking methodology. Created summary maps and tables to demonstrate potential BMPs and their associated drainage areas. Conducted field evaluations at the highest ranked sites for each municipality including site visits, photo log, field checklists, and navigation. Following field evaluations, updated municipality summaries, project, and geodatabase BMP with revised drainage areas and onsite utilities and created maps for submission to the county.

Montgomery County and Carroll County Stormwater Management BMP Site Search and Concept Designs, Maryland State Highway Administration (SHA). 12/2014–Present. Supported Maryland SHA in identifying potential stormwater BMP opportunities along state-owned roadways to comply with requirements of their MS4 permit and the Chesapeake Bay TMDL. Support includes creating and maintaining field maps for field verification visits based on desktop geospatial analysis of areas of roadways identified by SHA as lacking stormwater BMPs to identify the most promising locations for BMP installation. Conducted field verifications, including completing field check lists, photo log, and navigation. Following field verification, updated geodatabase BMP layers, drew drainage areas, noted on-site utilities, created maps, and packaged information for submission to SHA. The project requires rapid and accurate execution of SHA protocols.

Operational Support for Implementation of CB45, Prince George's County, MD. 11/2014–Present. Provides project management and GIS support for implementation of Prince George's County Bill (CB) 45. CB45 is the Clean Water Act Fee that establishes a stormwater management fee based on tiered residential zoning and direct measurements of impervious area on commercial, industrial and multifamily properties. Money collected under this fee is used for MS4 and TMDL stormwater compliance programs. Communicates with County agencies, including DoE and Treasury, and manages subcontractors under this task. Duties include developing and maintaining written guidance documents, updating monthly progress reports, appeals processing, account updates, property owner BMP discounts, tracking non-profit alternative compliance accounts, extensive QA/QC and GIS parcel editing.

NPDES Long-Term Monitoring Program, Prince George's County, MD. 11/2014–Present. Supports the development of the County's annual NPDES report by performing water quality sampling, data collection and analysis, and maintenance of ISCO flow meters and samplers in the Bear Branch watershed in Laurel, MD. Supports sampling of stormwater runoff. Duties include programming automatic samplers, collecting water quality and stormwater samples, maintaining sampling equipment, conducting site visits, coordinating site visits, managing flow and rain data using FlowLink, and supporting production of the annual MS4 monitoring report for Maryland Department of the Environment. Manages subcontractors under this task.

NCDOT Bridge Replacement Projects, NC. 2013–2014. While employed by SEPI Engineering, provided NCDOT with various items needed to begin the bridge replacement process. Field surveys, Threatened and Endangered species searches, and State Historic Preservation Office searches were sometimes required. GIS maps were always required. Duties included field surveys, GIS mapping, georeferencing USGS quadrangles and county soil surveys, online T&E database searches, and online SHPO database searches. A GIS template was made for these often-created maps.

NCDENR Environmental Ecosystem Program, NC. 2013–2014. Provided assessments of 5 streams undergoing remediation through the Environmental Ecosystem Program with SEPI Engineering. Field surveys of thalweg, cross sections, stream structures, vegetation plots, and overall condition were done at each stream. Duties included field surveys, GIS mapping, report editing, and Microsoft Access data assessment.

NCDOT Western Loop Expansion, Greensboro, NC. 2013–2014. Provided wetland and stream assessment services for a proposed highway expansion with SEPI Engineering. Also included in the scope of the project was a T&E search. Duties included field surveys, Wetland and Upland Data Forms, GIS mapping, report editing, on-site agents meeting, online T&E database search, and a field T&E search.



EXPERIENCE SUMMARY

Mrs. Storm has 11 years of experience in the environmental field performing asset management oversight, Drinking Water Treatment Revolving Fund (DWTRF) project support, non-profit management, engineering consulting, business management, soil and water assessments, and hazardous materials programs. She is currently providing administrative oversight for West Virginia Department of Health and Human Resources (WVDHHR) DWTRF projects.

She has worked to develop the Piney Creek Watershed Based Plan which considered streams that WVDEP previously determined through their Total Maximum Daily Load (TMDL) program modeling efforts to be significantly impaired for metals and/or fecal coliform bacteria. This watershed based implementation plan outlined projects and their potential reductions that if pursued may achieve the necessary reductions in pollutant loads to the receiving stream to comply with the State's water quality standard(s). Mrs. Storm has also provided GIS and data management support for WVDHHR Source Water Protection Plans.

Before joining Tetra Tech, Mrs. Storm's fieldwork experience included public outreach and training, client interaction, maintaining water, soil and biological monitoring sites, environmental education instruction, and environmental outreach. She has administrative experience with environmental nonprofit and small business oversight. Her project sites have included chemical manufacturing plants, general businesses, municipal landfills, abandoned mine land, fire mitigation areas, water systems and entire watershed areas.

EMPLOYMENT HISTORY

Tetra Tech, Inc., Environmental Scientist, 2009–present

Kiski-Conemaugh Stream Team, Watershed Coordinator, Ligonier, PA, 5/2001–9/2002

Dark Shade Brownfields Project (DSBP)/Shade Creek Watershed Association (SCWA), Watershed Coordinator/Executive Director, PA, 9/2000–5/2001

ADVENT Environmental, Inc., Environmental Scientist, Charleston, SC, 7/1997–7/1999

RELEVANT EXPERIENCE

Drinking Water State Revolving Fund (DWSRF) Project Support, WV. 2009-2017. Provided Asset Management oversight for all BPH SRF projects. Helped redesign the Asset Management program at the WVDHHR by expanding on the original program to include all aspects asset management. Also trained project engineers, state staff and water system personnel to use the Check Up Program for Small Systems (CUPSS). Assisted water systems with meeting their asset management requirements without using CUPSS. Coordinated with all of the systems to receive updates during the process to allow systems to enter all information into the

EDUCATION

B.S., Environmental Resource Management, Pennsylvania State University, 1997

AREAS OF EXPERTISE

- Davis Bacon and bond document requirements
- DBE requirements
- ARRA requirements and reporting
- Project priority lists
- Asset management program development
- Asset management plan development
- CUPPS training
- Public outreach
- TMDL implementation
- GIS and data management
- Abandoned mine lands
- Environmental education

TRAINING/CERTIFICATIONS

Pennsylvania stream surveying and sampling Training, PADEP, 2000–2002

Project WET, PADEP, 2002

Requirements for Hazardous Waste Operations & Emergency Response Personnel (OSHA 1910.120), including yearly re-certification; Hazardous Materials Site Worker Annual Recertification, 1997–2000

Project Management Training, ADVENT Environmental, Inc., 1998

Risk Management Training, ADVENT Environmental, Inc., 1998

PROFESSIONAL AFFILIATIONS

West Virginia Association of Geospatial Professionals

plan for state approval. Has presented at various conferences, trainings, and national webinars about West Virginia's Bureau for Public Health's Asset Management guidance and requirements.

Also provided support to WVDHHR Infrastructure and Capacity Development Department to oversee 13 ARRA and 26 SRF water infrastructure projects by tracking ARRA, Davis Bacon, and bond condition documentation submitted by the project's personnel. Provides developmental support for multiple project checklists that are sent to potential projects. During the information gathering, contacts project personnel such as engineers, mayors, administrators, and contractors to put together such documents as the Substantial Transformation Evaluation (STE) Checklist, bond documents, Davis Bacon Monthly Certification Form, DBE Quarterly Reporting Form, De Minimus Waiver Tracking Spreadsheet and Itemized Tracking Tool and Asset Management Checklist. Also communicates with multiple systems per week and contacts each system every month at a minimum through multiple emails, phone calls and/or site visits.

Project oversight duties also included conducting project site inspections, traveling to project site and checking over all Davis Bacon prevailing wage rate asset management progress and Buy American documentation to make sure the projects are in full compliance with regulations. During site visits, reviewed all documents with contractors so that they fully understood compliance requirements.

Asset Management Plan Development, WV. 2014-2017. For Wilderness PSD, worked closely with the client to initiate an asset management program and develop an Asset Management Plan in accordance with the WVDHHR guidelines. Met with the client onsite as needed to advise them on the asset management methods and software available and assisted with bond requirements. Managed data for the client, entered information into software and advised required or suggested changes.

Source Water Protection Field Surveys, WV. 2009-2011. For West Virginia DHHR, Source Water Assessment and Protection Program, used GIS to prepare project maps of potential contaminant sources. Maps were used in outreach presentations and were incorporated into source water protection plans for over 50 drinking water systems. Also performed data entry tasks in support of potential contaminant source field surveys.

Kiski-Conemaugh Stream Team, Ligonier, PA. 2001-2002. Worked as the Water Monitoring/Site Coordinator of the KC Stream Team, including managing the abandoned mine drainage monitoring sites throughout the Kiski-Conemaugh River Basin. Evaluated, marked, wrote directions, recalculated GPS units, and took quarterly samples for the monitoring sites. The data from the monitoring sites she choose was also used by the Pennsylvania Department of Environmental Protection. Responsibilities also included recruiting, managing and training the volunteer core. Has gained experience with creating and maintaining an Excel database, incorporating and organizing old databases from various groups, helping to get the data put into GIS, and teaching others how to use the database. Also coordinated with other entities about issues in the watershed and worked on an Abandoned Mine Drainage curriculum that is now being used in many Pennsylvania schools.

Dark Shade Brownfields Project (DSBP)/Shade Creek Watershed Association (SCWA), PA. 2000-2001. As the Watershed Coordinator for the DSBP and the Executive Director of SCWA, had many responsibilities. For one, was involved with the first ever full watershed to earn a Brownfield designation. While there, worked on a Brownfield job training certificate program that the DSPB was doing in conjunction with Carnegie Mellon University. The program took underprivileged from the Pittsburgh area and the Appalachian Mountain area and taught them skills for becoming Environmental Technicians. Was responsible for writing the entrance and exit exam, and designing the curriculum and teaching a few of the classes. Was in charge of the risk, soil and water assessment classes; this included teaching the students about toxicology, chemistry, risk reporting, soil and water VOC, and petroleum testing, soil vapor analysis, water bacteria and AMD sampling, macroinvertebrate studies and water flow measurements. Was also in charge of the DSBP/SCWA monitoring programs. She held public meetings recruiting volunteers, trained people in coordination with the PADEP, managed the volunteer core, and transported the samples to the PADEP. Also managed the Excel database and shared results with many other environmental entities such as the state DEP, consultants, and other non-profits.

Worked as the Executive Director of the SCWA with tasks such as conducting monthly meetings, recruiting volunteers for helping with projects, and writing grant applications. Also taught about environmental and historical aspects of the Kiski-Conemaugh River Basin inside and outside the classroom environment.



EXPERIENCE SUMMARY

Mr. Woodcock has been involved with many different facets of environmental engineering for 28 years. He has special expertise in utility master planning, due diligence investigations, utility valuations, financial feasibility analyses and business plans. Mr. Woodcock’s skills include assisting utilities prepare operating and capital programs and supporting those programs with a series of rates and charges to provide for their successful implementation. He is also experienced in conducting economic and feasibility analyses and serves as an expert witness on utility rate regulatory matters.

RELEVANT EXPERIENCE

20-Year Collection System Master Plan, City of Clearwater, FL. 2018 – Present. Project Manager. The City of Clearwater’s collection system consists of 72 pump stations 370 mile of gravity sewer, 38 miles of force main and over 8,300 manholes spread over three wastewater service areas. The field work for the master plan consisted of a condition analysis and drawdown test of all lift stations and air release valves as well as a review of gravity sewer CCTV data and identification of areas with high incidences of SSOs. All assets were assigned a condition and criticality based on the field review and a business risk evaluation was performed to assist in identifying areas of concern and prioritizing capital projects. The results of the condition assessment and business risk evaluation were linked with the City’s existing GIS and asset management platform. A hydraulic model of the collection system was developed, calibrated and verified to predict current system performance, identify levels of services and develop capital improvements to meet projected needs.

Source Water Protection Plans - Alternative Source Water Feasibility Analysis, West Virginia Planning and Development Council Regions 4 and 7. 2015. Designed and implemented feasibility study matrix to assess drinking water source alternatives for 25 community water systems in West Virginia. Technical and financial factors were evaluated. Also managed technical effort to develop contingency plans for these same systems.

TA-13 Water Supply and Interim Facilities Planning (20 Year), Miami-Dade Water and Sewer Department, FL. 2017 – Ongoing. Lead Engineer for a system wide master plan of MDWASD’s water treatment plants. Planning efforts involve a detailed analysis of the feasibility of combining the Hialeah and Preston water treatment plants (WTPs) collocated in the northern part of the service area. The analysis includes a condition analysis, performance review, and capacity analysis of both facilities to determine the ability of the Preston WTP to assume the treatment capacity utilized by the older Hialeah WTP. As part of the analysis, a capital program will be developed for both the decommissioned scenario as well as for continued independent operation. A detailed review of the operations and maintenance costs will be performed to evaluate the economic efficiency of each WTP. The feasibility of the decommissioning was determined through a 20-year life cycle cost analysis.

Conceptual Evaluation of Water Reclamation and Reuse Alternatives, Tulsa Metropolitan Utility Authority, Tulsa, OK. 2016 – Ongoing. Financial Analyst. TMUA’s conceptual evaluation of implementing reclaimed water considers both non-potable and potable uses. The project evaluated the feasibility of numerous alternatives for each use. Mr. Woodcock’s role on the project evaluated the cost of service of providing non-potable reclaimed water to industry and other uses in the TMUA service area. The cost of service that was developed was compared against TMUA’s cost of providing potable water. The feasibility of potable reuse was determined through a present value analysis that considered reuse against projected potable supplies.

EDUCATION

MBA, Rollins College, 2001
MS, Environmental Engineering, University of Central Florida, 1989
BS, Environmental Engineering, University of Central Florida, 1988

REGISTRATIONS

Professional Engineer:
Florida, No. [REDACTED] 1993
Georgia, [REDACTED] 2018

AREAS OF EXPERTISE

Utility Master Planning
Feasibility Analysis
Capital Improvement Plans
Water Supply
Water Reclamation and Reuse

OFFICE LOCATION

Orlando, FL

YEARS OF EXPERIENCE

28

YEARS WITH FIRM

26

Town of Medley Water and Wastewater Rate Assistance, Town of Medley, FL. 2017 – Ongoing. Senior Engineer. The Town of Medley, a municipality in Miami-Dade County, FL, relies upon water service and wastewater treatment by the Miami-Dade County Water and Sewer Department and is subject to routine rate increases and true-ups with Miami-Dade's cost to serve. In addition, the Town is faced with numerous water and wastewater projects that will require funding. Mr. Woodcock is providing professional services to the Town in reviewing its existing water and wastewater rates for cost recovery and developing a rate structure that better suits the needs of the community. To do this, Mr. Woodcock is performing a rate sufficiency study that serve as a baseline for projecting potential adjustments in the level of revenues that will drive the proposed rates. He is developing rate structure alternatives for the Town, 5-year cash flow projections with the proposed rates, and providing recommendations for the implementation of these adjustments.

20-Year Reuse Water Master Plan, Daytona Beach, FL. 2013. Project Manager. The master plan evaluated the existing city reuse system and provided a listing of projects to expand the City's use of reclaimed water over the projection period. A hydraulic model of the system was created in Innovzye software using the City's existing CAD drawings and as-builts of recent projects. A unique feature of the modeling effort was to effectively simulate a low pressure reclaimed water transmission line that also acts as an outfall to the Halifax River. When the WWTP produces water that does not meet public reuse standards, the pipeline is the sole form of effluent disposal. The model was used to develop an operational protocol for the pipeline given these two conflicting uses. Once the CIP was determined, a full reclaimed water rate study was performed to demonstrate how varying levels of investment in the CIP would affect reclaimed rates.

Water, Wastewater, and Reclaimed Water Rate Study, Naples, FL. 2007. Project Manager. Performed a study for the evaluation and adjustment of the City's rate structures for water, wastewater and reclaimed water as necessary to recover costs from capital improvement projects and to promote water conservation. The rate study recommended the development of a tiered structure to promote water conservation and provided for lower reclaimed water rates to promote the connection to the City's non-mandatory reclaimed water system. The project included multiple public workshops for citizen input and presentations to the City Council, with ultimate adoption of the rate structure.

Water and Wastewater Utility Master Plan, Marion County, FL. 2004. Project Manager. In the four years prior to initiation of the Water and Wastewater Master Plan, Marion County had quadrupled its utility customer base through a series of utility acquisitions in key growth areas. The primary focus of the Water and Wastewater Master Plan was to provide a roadmap to efficiently consolidate utility systems and establish four County sub regions that would serve as the future basis for utility planning and operations. The Master Plan presented a program for systematically decommissioning small package plants and expanding sub regional facilities to accommodate the existing customer base and projected growth.

Water System Master Planning, Mapping, and Modeling, City of Bartow, FL. 2007. Project Manager. Tetra Tech was contracted by the City in 1996 to perform a water master plan. In 2008, Tetra Tech updated the master plan with new projections, an expanded hydraulic model, and a revised CIP. The hydraulic model was revised to include completed system improvements and projected extensions to serve growth areas. The resulting CIP was classified by three project types: pressure improvements, fire flow improvements, and growth improvements. The master plan also included an upper level financial analysis that evaluated the impact of CIP funding on the cash flows of the system.

Integrated Water Resources Plan, City of Naples, FL. 2008. Financial Evaluation. Tetra Tech developed an integrated water resources plan for the City of Naples that evaluated all water supply options for a twenty-year planning period. All available water supply sources were considered including brackish ground water, stormwater, and surface water from the Golden Gate Canal and Naples Bay. Mr. Woodcock performed a financial evaluation of the most technically feasible alternatives to determine the short-term impact of capital and operations costs on the utility's cash flows.

Water and Wastewater Master Plan, City of Deltona, FL. 2008. Project Engineer. The water and wastewater master plans for the City of Deltona were the first master plans prepared on the systems since the City's acquisition in 2003. In addition, the projections and capacity analysis of facilities a hydraulic model was prepared for both the water and wastewater systems to document system behavior and act as a planning tool to develop the proposed CIP. Hydraulic deficiencies in the water and wastewater systems were already well documented by City staff.



EXPERIENCE SUMMARY

Ms. Jack has over 16 years of experience in the management of complex water and wastewater projects, including sanitary sewer collection system projects, CIP program management, wastewater reuse feasibility studies, construction management, and various water and wastewater master planning efforts. Ms. Jack has managed complex wastewater projects from preliminary design to construction management.

RELEVANT EXPERIENCE

Rockbridge Road Water Main Replacement Construction Management Services, DeKalb County, GA. 2017-2019. Project Manager. Responsible for the construction management of 40,000 LF of 6-inch to 8-inch-diameter water main along Rockbridge Road, between Memorial Drive and North Deshon Road. Services include daily construction oversight, processing of RFIs, Shop Drawings and Change Management.

Emergency Modifications to High Service Pumping Stations at the Scott Candler Water Treatment Plant, DeKalb County, GA. 2012 – 2013. Construction Manager for the construction of two diesel engine high service pumps and a 54” transmission main at the Scott Candler Water Treatment Plant. Responsibilities include communicating with the selected contractor, responding to RFIs, updating of the submittal log, issuance of change orders, review of the construction schedule, review and approval of pay applications, and supervision of the project’s Resident Inspector. The estimated construction cost for the project exceeds \$2.2 million.

Snapfinger Creek Advanced Wastewater Treatment Plant Expansion Phase II, DeKalb County, GA. 2014 - Present. Deputy Project Manager for Construction Management of a new 54 MGD Membrane Bioreactor (MBR) facility. Responsibilities include oversight of bidding phase assistance and construction management services including on-site inspections, MIS, change management and helping to ensure the construction of the facility meets the satisfaction of the client.

Honey Creek Pump Station and Force Main Design/Build, DeKalb County, GA. 2017. Project Manager for design/build delivery of a new 7.5 MGD wastewater pump station and 16,000LF of 18” force main. Project included four submersible pumps, climber screen, diesel generator, odor control system and other site improvements including a new electrical building, temporary flow equalization system and flow metering.

Source Water Protection Plans - Alternative Source Water Feasibility Analysis, EPA Region 4, WV. 2015. Task Manager for feasibility study that provided for the systematic evaluation of water supply alternatives for 14 community water systems in West Virginia based on economic and technical criteria to determine the most feasible option for implementation.

Program Management, Sanitary Sewer Evaluation Survey (SSES) and Sanitary Sewer Rehabilitation Specification Development, Columbia, SC. Task Manager responsible for the coordination and development of SSES Specifications and Scope of Work and sanitary sewer rehabilitation specifications for the City of Columbia’s CleanWater 2020 Program. Responsibilities included coordinating the writing of the specifications and ensuring that all specifications provided seamless and clear directives to contractors and engineers who will provide services to the City.

EDUCATION

MS, Environmental Engineering, Johns Hopkins University, 2002
BS, Environmental Engineering, University of Florida, 2001

REGISTRATIONS

Professional Engineer, Georgia
No. [REDACTED]
Professional Engineer, Florida
No. [REDACTED]

AREAS OF EXPERTISE

- Drinking Water Planning
- Wastewater Treatment
- Capital Improvement Programs
- Wastewater Reuse
- Construction Management
- Stormwater Design

OFFICE LOCATION

Atlanta, GA

YEARS OF EXPERIENCE

16

YEARS WITH FIRM

5

Asset Management Project, Standard Operating Procedures (SOPs) Development, Jefferson County, AL. Task Manager responsible for coordinating and finalizing Standard Operating Procedures for Pre and Post Flow Monitoring; Sewer Overflow Response Plans; Adding New Fixed Assets (GIS Updating) and CCTV SOPs to be used by the County's Environmental Division staff.

Wastewater Disinfection Project, Phase 1, City of Memphis, TN. Project Manager for a disinfection pilot study project for the City of Memphis, Tennessee. The project included bench scale testing and pilot scale testing to determine viable disinfection technologies for two wastewater treatment plants.

Coordinating Editor, Environmental Protection Agency 2012 Guidelines for Water Reuse. Coordinating Editor responsible for the coordination of submissions and the editing of technical content for the *2012 Guidelines for Water Reuse*. Presented the technical content of the guidelines and the process of updating the document at the Georgia Association of Water Professionals Annual Conference in Savannah Georgia in July 2012.

City of East Point Capital Improvement Program, East Point, GA. Interim Program Manager for the City of East Point's Capital Improvement Program for 6 months. The City has a \$30 million CIP program for sewer, water and storm water improvement projects. CIP projects completed under her supervision included culvert repair projects, water line extension projects, sanitary sewer evaluation surveys and sanitary sewer rehabilitation projects. During her time as interim program manager, Ms. Jack was responsible for the overseeing of all CIP sub-contractors, the public involvement team, construction management team, and internal program staff. She was also directly responsible for reporting all CIP Program information to the Director of Government Operations, City Council, City Attorney and City Manager. Reports and documents created by Ms. Jack were submitted to the GaEPD and the EPA.

City of East Point Capital Improvement Program, East Point, GA. Office Engineer for the City of East Point's Capital Improvement Program for 1+ years. The City of East Point has a \$30 million CIP program for sewer, water and storm water improvement projects. CIP projects completed under her supervision included culvert repair projects, water line extension projects, sanitary sewer evaluation surveys and sanitary sewer rehabilitation projects.

Sanitary Sewer Flow Monitoring and Capacity Model, East Point, GA. Project Manager for the sanitary sewer flow monitoring and hydraulic modeling project for the City of East Point, a \$1.7 million Consent Order driven project. Responsible for managing the project team, coordinating hydraulic modeling efforts, meeting with the City to discuss flow monitoring data and flow monitoring needs, and delivery/review of the Final Report. Work from this project was used as the basis for the City's SSES Program, which was later supervised by Ms. Jack in her role as Interim Program Manager.

Spout Springs Water Reclamation Facility Expansion, Hall County, GA. Served as the initial Project Manager and Project Engineer for Hall County's NPDES Permitting project, which required the writing and submittal of an Environmental Information Document, Anti Degradation Report, and Design Development Report for Georgia Environmental Protection Division approval of Hall County's NPDES Permit for the Spout Springs Water Reclamation Facility's expansion. Responsibilities included completion of the Design Development Report and oversight of the EID and ADR reports, and the delivery of the project on schedule and within budget.

Wastewater Reuse Feasibility Study, City of Fort Lauderdale, FL. Lead Project Engineer for the City of Fort Lauderdale's 5- year update to the Wastewater Reuse Feasibility Study. Responsibilities included research of potential wastewater reuse opportunities within the City of Fort Lauderdale including landscape irrigation, aquifer recharge, wetlands recharge and industrial reuse. Responsible for the completion of the Final Report and all communications with the South Florida Water Management District.

Wastewater Reuse Study Update, Town of Mt. Pleasant, SC. Project Engineer for the wastewater reuse study update. Responsibilities included calculations of estimated reclaimed water demand from residential users, recommendations for implementation of a residential reclaimed water system and writing of the final report.

Priority Stormwater Improvement Project, City of East Point, GA. Project Manager for the \$350,000 detailed design project for storm water improvement projects throughout the City of East Point, Georgia. Projects included the design of culverts, natural channels and a 60" CMP pipe to reduce localized flooding within the City. Ms. Jack was directly responsible for overseeing the completion of the design and completing the projects on schedule and within budget.



EXPERIENCE SUMMARY

Mr. Helfrich has 5 years of experience as an environmental engineer working in the water resources field. He has gained professional experience by working on environmental assessments in DeKalb County, Georgia and Washington State; a major watershed management project in San Diego, California; and stormwater management projects for the City of Cape Coral, Florida and Athens-Clarke County, Georgia. His extensive field work experience spans a variety of projects including wetland delineations in West Virginia, stream assessments in Athens-Clarke County, Georgia, and flood damage assessments for Richland County, South Carolina, Fayette County, Georgia, and the City of Houston, Texas. Mr. Helfrich has developed his technical expertise by delivering hydrodynamic and water quality models for the Georgia State Water Plan and the development of total maximum daily loads (TMDL) on Florida's eastern coast. He has also generated cost estimating databases for stormwater infrastructure projects for the City of San Diego, California, Richland County, South Carolina, Fayette County, Georgia, and Athens-Clarke County, Georgia. Mr. Helfrich has also assisted senior engineers on planning level designs of stormwater best management practices (BMP) and low-irrpact development (LID).

EMPLOYMENT HISTORY

Tetra Tech, Water Resources Engineer, 2012-Present

RELEVANT EXPERIENCE

Stream Assessments for the Athens-Clarke County Watershed Improvement Program. Athens-Clarke County. September 2008–Present. Field Scientist/Junior Engineer. Tetra Tech was contracted to develop watershed management plans to improve water quality throughout Athens-Clarke County. In support of that effort, conducted over 80 miles of stream assessments in seven different watersheds to generate watershed characterizations that aided in identifying candidate areas of restoration and developing best management practices.

Community Development Block Grant Disaster Recovery Data Collection and Analysis. City of Houston, Texas. August-September 2016. Junior Engineer/Field Team Lead. Conducted on-site assessments of over 30 sites to gather and analyze data for use in identifying infrastructure and economic development related projects. Identified root causes of flooding and strategies to mitigate future flooding. Developed planning level cost estimates for projects to be included in the City of Houston's Action Plan to the Department of Housing and Urban Development (HUD).

Fayette County SPLOST Emergency Culvert Replacements. Fayette County, Georgia. 2017. This project involved the assessment of impaired culverts throughout Fayette County for consideration of replacement/repair using SPLOST funding. As Junior Engineer, conducted on-site damage assessments of 16 impaired culverts. Additionally, completed hydraulic analyses of the 25-year storm event for over 60 culvert sites using HY-8 Culvert Hydraulic Analysis Program. Generated concept design sheets and construction cost estimates for each culvert site.

EDUCATION

B.S., Environmental Engineering, Georgia Institute of Technology, 2011

B.S., General Studies (Pre-Engineering Dual Degree Program), Georgia College and State University, 2009

AREAS OF EXPERTISE

- Cost estimating
- Stormwater Infrastructure Assessments
- Environmental Assessments
- GIS Analysis
- Best management practice (BMP) design
- Low-impact development (LID)
- Database management
- Computer aided design

REGISTRATIONS/ AFFILIATIONS

Engineer in Training (EIT)

OFFICE

Atlanta, GA

YEARS OF EXPERIENCE

5

YEARS WITHIN FIRM

5

Alternative Source Water Feasibility Analysis. Region 4 Planning and Development Council, West Virginia. May-September 2015. Junior Engineer. As part of the Source Water Protection Plan required by Senate Bill 373, Tetra Tech provided the systematic evaluation of a minimum of source water alternatives for each distribution system on economic and technical criteria to determine the most feasible option for implementation. Tasks included data acquisition, system analysis, and source water alternative development for 14 different communities.

Athens-Clarke County Stormwater Management Plan. Athens-Clarke County, Georgia. December 2015-January 2016. Junior Engineer. Generated construction cost estimates for proposed structural stormwater control measures located throughout Athens-Clarke County.

Athens-Clarke County Impaired Waters Long Term Monitoring and Implementation Plan. Athens-Clarke County, Georgia. October 2015-Present (until October 2017). Deputy Project Manager. This project is part of an effort to delist impaired streams in Clarke County from the 303(d) list by monitoring fecal coliform counts and developing BMP implementation strategies. Coordinated the collection of in-situ grab samples at 26 different stream sites. Tasks included the creation of sampling routes and schedule, maintenance of data log sheets, lab results and other documentation, and communication with laboratory personnel.

Richland County Flood Damage Assessment. Richland County, South Carolina. October-November 2015. Junior Engineer. Richland County contracted with Tetra Tech to gather data relating to extreme flooding events and develop flood mitigation strategies. Participated in on-site initial flood damage assessments of road infrastructure throughout Richland County. Created and maintained a cost estimating database for the approximately 260 identified sites needing repairs.

Cape Coral Stormwater Management Prioritization. City of Cape Coral. March 2015-June 2015. Junior Engineer. Evaluated load reductions of structural and non-structural projects to improve water quality within City watersheds. Developed a project priority list based on performance criteria, provided GIS analysis, and aided in drafting conceptual designs of selected stormwater BMPs and a conceptual street sweeping plan.

City of San Diego Water Quality Improvement Plan (WQIP)/Watershed Asset Management Plan (WAMP). City of San Diego (CSD), California. August 2014 – Present. Junior Engineer. Developed and maintained the master cost estimating database for structural and non-structural strategies to support development of WQIPs for several City watersheds and the City's WAMP.

Georgia Comprehensive State-wide Water Management Plan. Georgia Environmental Protection Division (GAEPD). January - August 2014. Water Resources Engineer. Prepared and executed hydrodynamic and water quality models for the St. Marys River and Lower Savannah River watersheds in support of state wide project to determine the available assimilative capacity in Georgia's rivers, streams, lakes, and estuaries to support regional water planning.

Southeastern Water Treatment Plant, Huntsville Utilities. Huntsville Utilities, Alabama. May – July 2014. Junior Engineer. Supported design, permitting and construction services of a new 24 MGD surface water treatment plant, which will be constructed for the ultimate capacity of 96 MGD. Reviewed permitting requirements and assisted in design of an onsite sewage treatment and disposal system at the water treatment plant's location.

Snapfinger Advanced Wastewater Treatment Facilities (AWTF) Expansion, Georgia. DeKalb County. August 2013-January 2014. Junior Engineer. Supported Tetra Tech team serving as Construction Manager in the AWTF system additions, a project that will span five years and totals over \$280,000,000. Completed supporting tasks including structural and mechanical quantity take-offs, cost estimate/budget development, and schedule assembly. Also built and maintained databases for Original Equipment Manufacturer (OEM) contact management and constructability review comment tracking.

Fort Allen Training Annex Sanitary Sewer Improvements, Puerto Rico. Puerto Rico National Guard. August-September 2013. Junior Engineer. Supported the implementation of improvements to Fort Allen's existing gravity sewer system. Working with the lead Project Engineer, estimated flows based on population as well as fixture unit demand, and assisted in the design of new PVC piping and manhole installation based on the flow analysis.

2012 Florida Total Maximum Daily Load (TMDL) Development. U.S. Environmental Protection Agency (USEPA), Region 4. June 2012-August 2013. Water Resources Engineer. Supported development of more than 150 TMDLs in WBIDs located throughout Florida as part of a consent decree. Provided pre-processing of model data and created hydrodynamic/water quality models and reports for subwatersheds on Florida's eastern coast.