Submitted to:

KENTUCKY
AMERICAN WATER

New Filter Building Design
Richmond Road Station Water Treatment Plant
Lexington, Kentucky

Submitted by:

Gannett Fleming

*Excellence Delivered **As Promised***


Blendville WTP

Hopewell WTP


Kentucky River Station II WTP

December 19, 2013

ISO 9001:2008 CERTIFIED

December 19, 2013

Zachery B. Dukes, P.E.
Project Manager Engineer
Kentucky American Water
2300 Richmond Road
Lexington, KY 40502

RE: Request for Proposal: New Filter Building Design, Richmond Road Station Water Treatment Plant

Dear Mr. Dukes:

In response to Kentucky American Water's (KAW) Request for Proposal, dated November 19, 2013, as well as discussions from the pre-proposal meeting held December 4, 2013, Gannett Fleming has assembled this document to demonstrate our desire and commitment to continue our partnership with KAW in order to ensure the successful completion of the design and construction services related to the proposed new filter building at Richmond Road Station Water Treatment Plant.

Our proposed Project Team for this project includes Timothy J. Glessner, P.E. Tim has served as Project Manager on past KAW projects and will oversee all aspects of this project. Tim will be supported by Jeffery L. Raffensperger, Vice President – Water Practice as Project Principal. Quality assurance will be overseen by Gene C. Koontz, Senior Vice President. Process design will be performed by Lori L. Kappen, a Senior Project Engineer and Project Manager responsible for water quality, regulatory, process, and economic assessments and design for potable drinking WTPs. All staff proposed for this project routinely work together on water treatment facility projects. All proposed staff has the availability to begin providing services to KAW as soon as Notice to Proceed is authorized.

We have reviewed the Design Concept included in the Request for Proposal. Our Proposal offers several design critiques that could lower construction costs and improve operation of the new filter building. These are described in more detail in Section 5 of the Proposal.

With Gannett Fleming as its partner, KAW will receive the following benefits:

- **Responsiveness** – Gannett Fleming has a vested interest in KAW's future and has already begun evaluating options for the filter building. In addition, we will pre-plan some of our initial activities to assure a fast start of the project schedule once Notice to Proceed is authorized.
- **Water Treatment Plant Design Experience** – We offer multi-discipline engineering design, bid, and construction management services in addition to assessment and evaluation of facilities.
- **Alternate Project Delivery Experience** – Gannett Fleming has prior experience with Design/Build and Construction Manager at Risk project delivery methods, as shown by our project references.

- **Past Experience with KAW Facilities and Staff and Knowledge of KAW Practices and Procedures** – All members of our Project Team have provided services on past projects for KAW and are familiar with your facilities and procedures. We will develop the best option to meet the needs of all staff involved, from the KAW engineering staff to the plan production staff.
- **ISO 9001:2008 Certification** – This certification enhances our efficiency and effectiveness to provide quality service and deliverables to meet your requirements. All subconsultants are subject to the same quality standards.

The prospect of working for KAW again is very exciting. We trust the information provided in this document adequately presents our experience, capabilities, and genuine interest in providing services for KAW. Should you have any questions regarding this information, please contact Tim Glessner at 717-763-7212, extension 2673.

Very truly yours,

GANNETT FLEMING, INC.
Environmental Resources Division

William W. Allis Jr.

WILLIAM W. ALLIS, P.E.
Vice President
National Water Practice Leader

Timothy J. Glessner

TIMOTHY J. GLESSNER, P.E.
Principal Project Engineer
Water Practice

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1. Construction Budget Adequacy

1. Construction Budget Adequacy

Gannett Fleming has reviewed the opinion of construction cost for a new filter building included in Appendix F of the HDR Engineering, Inc. Report, reviewed the scope of work involved in constructing the new building (including interfacing with existing facilities), and prepared an independent planning-level opinion of construction cost.

Gannett Fleming believes actual construction cost for the proposed facilities, as defined in the Request For Proposal, may actually be between $12,500,000 and $13,000,000. Our Proposal offers several design critiques that could potentially reduce construction cost by over $1,500,000, if accepted.

2. Conceptual Design Critique

Gannett Fleming has reviewed the Design Concept included in the Request for Proposal and would like to offer several design critiques that could potentially reduce construction cost and/or improve operation of the new filter facility. These include:

- Use the Alternate 1 building location identified in the HDR Engineering, Inc. study
- Design and construct a new backwash supply system, and retire the existing backwash storage tank
- Reduce filter size and design for maximum filter loading of 5.0 gpm/sq. ft.
- Provide six (6) dual bay filters in lieu of twelve (12) single bay filters
- Install new larger motor on existing filter air wash blower.

These alternatives are discussed in more detail, including impacts on design, construction, and operational costs, in Section 5, Project Understanding of this Proposal.

3. Fees

3. Fees

COST PROPOSAL

Provide separate Lump Sum costs for each of the following items:

Design Phase $[redacted]

CM at Risk Bidding Services $[redacted]

Construction Administration $[redacted]

Additional Construction Meeting Attendance $[redacted] per meeting

Resident Project Representative

1. Hourly Rate $[redacted] er hour (labor only)

2. Overtime Rate $[redacted] per hour (labor only)

3. Per Diem Rate (based on 40hr week) $[redacted] per day (including expenses)

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Support of PSC Submission $[redacted]
Structural Special Inspections $[redacted] er site visit

III. ATTACHMENTS

The following attachments are included:

A. Design Concept
B. Existing Facility Drawings (Drawings on enclosed CD)

[1] See attached for additional explanation.

3.1. Supplemental Prices

Gannett Fleming is offering two (2) supplemental prices:

3.1.1. Support of Kentucky Public Services Commission (PSC) Submission

At the Pre-Proposal meeting, Kentucky American Water (KAW) indicated the successful consultant will need to support KAW's efforts related to their submission to PSC. This support could include providing supporting documentation and testimony to the PSC. Since the Scope of Services cannot be accurately defined at this point, Gannett Fleming proposes to do this work on a Cost-Plus basis, in accordance with the supplemental hourly rates provided in Section 4 of this Proposal. We are proposing a cost of [redacted] for this effort for budgetary purposes. This cost is not included in the lump sum fees.

3.1.2. Structural Special Inspections

Special Structural Inspections will be required for this project, although this was not specifically identified in the Scope of Services in the Request for Proposal. Gannett Fleming provided management of the Special Inspections for the Kentucky River Station II Water Treatment Plant construction. We can also provide this service for the proposed filter building construction if desired, for the fee per site visit listed on the Cost Proposal form. This service would include site visits by the Structural Project Manager and completion of the documentation associated with the special inspections. We would anticipate two (2) site visits by the Structural Project Manager for this project.

3.2. Design Critiques

Adjustments to Gannett Fleming's fees associated with proposed Design Critiques are presented in Section 5, Project Understanding.

4. Hourly Rates

The attached Billing Rate Schedule, under the Master Agreement for Engineering Services between American Water and Gannett Fleming, Inc., was agreed to on December 31, 2011 and is valid for two years. Gannett Fleming understands that these rates will be held through 2014 and 2015.

Schedule B-2: RATES

WORKSHEET INSTRUCTIONS

Please provide proposed straight-time billing rates for each classification of engineering listed below, where applicable, and for each state listed. The rate provided should apply to all work done within the United States for the particular American Water state listed. If offered, also provided rates by classification for off-shore resources that may be used to deliver work. These rates would apply for projects in any state where off-shore resources are utilized. American Water requires notification when off-shore resources are used.

Engineering classifications are per NSPE Professional Grade Descriptions. Resident Project Representative Tech descriptions are per the NICET Certification Levels III and IV for Water/Wastewater Plants. If Supplier uses a different title for equivalent level of personnel, provide the matching title in the space provided. Additional rows are provided for personnel classifications which are not listed, but which Supplier intends to utilize.

Rates proposed shall remain valid for two (2) years from the execution date of any agreement awarded as part of this RFP.

Key

Pricing or other input
[redacted]
No Input

B-2 ENGINEERING STRAIGHT-TIME BILLING RATES

NSPE Classifications	Consultant Matching Title (if different)	NJ	NY	PA	MD	VA*	WV	KY	TN	IL	IN	MO	IA	CA	HI	Off-shore	Comments
Principal/ Executive / Engineer IX		$ 222.00	$ 222.00	$ 190.00	$ 190.00	$ 190.00	$ 190.00	$ 190.00	$ 190.00	$ 190.00	$ 190.00	$ 190.00	$ 190.00	$ 222.00	$ 222.00	$ 222.00	
Project Manager		$ 157.00	$ 157.00	$ 134.00	$ 134.00	$ 134.00	$ 134.00	$ 134.00	$ 134.00	$ 134.00	$ 134.00	$ 134.00	$ 134.00	$ 157.00	$ 157.00	$ 157.00	
Engineer VIII		$ 205.00	$ 205.00	$ 175.00	$ 175.00	$ 175.00	$ 175.00	$ 175.00	$ 175.00	$ 175.00	$ 175.00	$ 175.00	$ 175.00	$ 205.00	$ 205.00	$ 205.00	
Engineer VII	Also includes our Construction Manager Classification	$ 190.00	$ 190.00	$ 162.00	$ 162.00	$ 162.00	$ 162.00	$ 162.00	$ 162.00	$ 162.00	$ 162.00	$ 162.00	$ 162.00	$ 190.00	$ 190.00	$ 190.00	
Engineer VI		$ 167.00	$ 167.00	$ 143.00	$ 143.00	$ 143.00	$ 143.00	$ 143.00	$ 143.00	$ 143.00	$ 143.00	$ 143.00	$ 143.00	$ 167.00	$ 167.00	$ 167.00	
Engineer V		$ 142.00	$ 142.00	$ 121.00	$ 121.00	$ 121.00	$ 121.00	$ 121.00	$ 121.00	$ 121.00	$ 121.00	$ 121.00	$ 121.00	$ 142.00	$ 142.00	$ 142.00	
Engineer IV		$ 125.00	$ 125.00	$ 107.00	$ 107.00	$ 107.00	$ 107.00	$ 107.00	$ 107.00	$ 107.00	$ 107.00	$ 107.00	$ 107.00	$ 125.00	$ 125.00	$ 125.00	
Engineer III		$ 111.00	$ 111.00	$ 95.00	$ 95.00	$ 95.00	$ 95.00	$ 95.00	$ 95.00	$ 95.00	$ 95.00	$ 95.00	$ 95.00	$ 111.00	$ 111.00	$ 111.00	
Engineer I/II		$ 97.00	$ 97.00	$ 83.00	$ 83.00	$ 83.00	$ 83.00	$ 83.00	$ 83.00	$ 83.00	$ 83.00	$ 83.00	$ 83.00	$ 97.00	$ 97.00	$ 97.00	
Senior Technician		$ 112.00	$ 112.00	$ 96.00	$ 96.00	$ 96.00	$ 96.00	$ 96.00	$ 96.00	$ 96.00	$ 96.00	$ 96.00	$ 96.00	$ 112.00	$ 112.00	$ 112.00	
Technician		$ 76.00	$ 76.00	$ 65.00	$ 65.00	$ 65.00	$ 65.00	$ 65.00	$ 65.00	$ 65.00	$ 65.00	$ 65.00	$ 65.00	$ 76.00	$ 76.00	$ 76.00	Overtime Rate is $11 higher than base rate
Land Surveyor		$ 128.70	$ 128.70	$ 110.00	$ 110.00	$ 110.00	$ 110.00	$ 110.00	$ 110.00	$ 110.00	$ 110.00	$ 110.00	$ 110.00	$ 128.70	$ 128.70	$ 128.70	
Resident Project Representative Engineer III		$ 112.00	$ 112.00	$ 96.00	$ 96.00	$ 96.00	$ 96.00	$ 96.00	$ 96.00	$ 96.00	$ 96.00	$ 96.00	$ 96.00	$ 112.00	$ 112.00	$ 112.00	
Resident Project Representative Engineer IV		$ 124.00	$ 124.00	$ 106.00	$ 106.00	$ 106.00	$ 106.00	$ 106.00	$ 106.00	$ 106.00	$ 106.00	$ 106.00	$ 106.00	$ 124.00	$ 124.00	$ 124.00	
Resident Project Representative Tech III		$ 88.00	$ 88.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 88.00	$ 88.00	$ 88.00	Overtime Rate is $12 higher than base rate
Resident Project Representative Sr. Tech IV		$ 97.00	$ 97.00	$ 83.00	$ 83.00	$ 83.00	$ 83.00	$ 83.00	$ 83.00	$ 83.00	$ 83.00	$ 83.00	$ 83.00	$ 97.00	$ 97.00	$ 97.00	Overtime Rate is $14 higher than base rate
Pipe Inspector		$ 78.00	$ 78.00	$ 67.00	$ 67.00	$ 67.00	$ 67.00	$ 67.00	$ 67.00	$ 67.00	$ 67.00	$ 67.00	$ 67.00	$ 78.00	$ 78.00	$ 78.00	Overtime Rate is $11 higher than base rate
Clerical		$ 57.00	$ 57.00	$ 49.00	$ 49.00	$ 49.00	$ 49.00	$ 49.00	$ 49.00	$ 49.00	$ 49.00	$ 49.00	$ 49.00	$ 57.00	$ 57.00	$ 57.00	Overtime Rate is $7 higher than base rate
Other 1 (provide title in "Matching Title" and description in "Comments")	Senior Project Manager	$ 181.00	$ 181.00	$ 155.00	$ 155.00	$ 155.00	$ 155.00	$ 155.00	$ 155.00	$ 155.00	$ 155.00	$ 155.00	$ 155.00	$ 181.00	$ 181.00	$ 181.00	
Other 2 (provide title in "Matching Title" and description in "Comments")	Junior Technician	$ 62.00	$ 62.00	$ 53.00	$ 53.00	$ 53.00	$ 53.00	$ 53.00	$ 53.00	$ 53.00	$ 53.00	$ 53.00	$ 53.00	$ 62.00	$ 62.00	$ 62.00	Overtime Rate is $8 higher than base rate
Other 3 (provide title in "Matching Title" and description in "Comments")	Specification Writer	$ 116.00	$ 116.00	$ 99.00	$ 99.00	$ 99.00	$ 99.00	$ 99.00	$ 99.00	$ 99.00	$ 99.00	$ 99.00	$ 99.00	$ 116.00	$ 116.00	$ 116.00	
Other 4 (provide title in "Matching Title" and description in "Comments")	Administration Assistant	$ 82.00	$ 82.00	$ 70.00	$ 70.00	$ 70.00	$ 70.00	$ 70.00	$ 70.00	$ 70.00	$ 70.00	$ 70.00	$ 70.00	$ 82.00	$ 82.00	$ 82.00	
Other 5 (provide title in "Matching Title" and description in "Comments")																	

Billing Rates apply for the state of Virginia, except for the metropolitan D.C. area where New Jersey rates apply.

END OF WORKSHEET

KAW_R_PSCDR1_NUM012_091714

Confidential to American Water

5. Project Understanding

5.1. Background

Kentucky American Water (KAW) owns and operates Richmond Road Station Water Treatment Plant (RRS). RRS is one of three water treatment plants (WTPs) that provides finished water to customers KAW's Lexington service area. RRS was originally constructed in 1885 and has subsequently been expanded to a capacity of 25 million gallons per day (mgd).

The existing filter building has 16 filters with surface area of 340 square feet each. The plant can treat its rated capacity of 25 mgd at a filter loading rate of 3.4 gallons per minute per square foot (gpm/ft^2), which is less than the 5.0 gpm/ft^2 allowed by Kentucky Department of Water (DOW). Filter backwash is supplied by a washwater tank on the treatment plant site. The washwater tank is refilled by a 1,000 gallon per minute (gpm) pump located in the filter pipe gallery. This pump can also supplement the backwash flow rate during backwash.

The existing filter building shows signs of structural issues, the existing pipe gallery is tight and difficult to access, and the existing filter piping is corroded from the high levels of moisture and condensation in the pipe gallery. A study was completed by HDR Engineering, Inc. (HDR) in September 2013, which examined options for repair or replacement of the existing filter building. This study recommended construction of a new filter building at the RRS site. The study also recommended maintaining the existing clearwell underneath the existing filters.

5.2. Project Understanding

5.2.1. General

The Request for Proposal (RFP) indicates that the new filter building is to be designed with twelve (12) filters with a surface area of 475 square feet each. This configuration will provide a capacity of 25 mgd at a filter loading rate of 3.3 gpm/ft^2 with one (1) filter out of service. A flow rate of 30 mgd could be achieved under peak demand conditions at a filter loading rate of 4.0 gpm/ft^2 with one (1) filter out of service, which is still less than the 5.0 gpm/ft^2 allowed by DOW.

The desired media profile utilizes 12 inches of sand media beneath 24 inches of granular activated carbon (GAC). This media profile will provide 4.9 minutes of empty bed contact time (EBCT) at 25 mgd with all filters in service.

The desired backwash sequence will utilize air scour with concurrent air/water backwash. Gannett Fleming anticipates using a Roberts Filter Aries system, which uses an air flow rate of 2.5 standard cubic feet per square foot (scfm/ft^2). This installation would use a modified Aries system with a fixed grid fed through the filter box wall to avoid the drop pipe through the filter media used with the standard Aries configuration. This configuration was used at the Kentucky River Station II WTP (KRS-2).

The filters will be provided with filter to waste capability. The piping will be sized to permit filter to waste at the full rated filter capacity. An air gap will be provided to insure against cross contamination. The filter rinse piping could be hard piped to an outside air gap manhole to prevent venting chlorine vapors in the filter gallery. A preliminary layout of the proposed filter building can be seen on Drawing EX-1, located at the end of this Section. A preliminary section of the proposed pipe gallery can be seen on Drawing EX-2, located at the end of this Section.

Chemical feed points will be provided for adding chlorine to the combined filter influent and combined filter effluent. Feed points will also be provided for adding filter aid polymer to individual filter influents.

It is Gannett Fleming's understanding that KAW would like to maintain the ability to add future ozone facilities between the existing sedimentation basins and the new filters and/or future ultraviolet facilities between the new filters and existing clearwell. Based on hydraulic profile information included with the RFP, there appears to be excess head available between the existing

sedimentation basins and the existing clearwells. Gannett Fleming will evaluate hydraulics and will set the proposed filter elevation to maximize the use of the head available to allow addition of these facilities at a future date.

5.2.2. Filter Backwashing

The larger filters proposed for the new building will require higher flow rates and larger volumes of water for backwash. The existing washwater tank and existing 16-inch backwash supply main will not be capable of providing adequate backwash water supply, either maximum rate or volume. The capacity of the existing system could be supplemented by installing a backwash pump in the new filter building.

This backwash pump would take suction from the combined filter effluent pipe. The pump would be sized to meet the low filter wash rate (2,375 gpm at 5.0 gpm/ft^2). Water would be drawn from the existing backwash tank to supplement the pump to achieve the high backwash rate. In order to achieve the desired bed expansion with warm water, Gannett Fleming anticipates the high backwash rate will be approximately 20 gpm/ft^2. The pump would be equipped with a variable frequency drive (VFD) so that it could be operated at reduced speed and used to refill the backwash tank between filter backwashes.

This method of operation will impact water level and detention time in the existing clearwell underneath the existing filter building. During a filter backwash, filter effluent from the other filters will be diverted from the clearwell, while water is still being drawn from the clearwell to supply the high service pumps. Gannett Fleming will assess the impacts on levels and storage in the existing clearwell to confirm adequate volumes and detention times can be maintained.

With this approach, the existing backwash connection to the existing high service system would be maintained to allow backwashing when the existing backwash tank is taken out of service for maintenance.

5.2.2.1. Process Wastewater Handling

Regardless of which option for backwash supply is used, the proposed larger filters will also impact operation of the process wastewater handling facilities. The larger filter area will generate higher flow rates and volumes during backwash. A brief preliminary check indicates the existing backwash holding tanks will have sufficient volume. Gannett Fleming will evaluate the volumes within the existing backwash wastewater holding tanks to confirm they can operate satisfactorily with the volumes and flows generated by the proposed larger filters.

5.2.3. Existing Clearwell

The study prepared by HDR indicated that the existing clearwell beneath the existing filter building is in relatively good condition and should be maintained in service. Gannett Fleming's design will provide for discharge of filter effluent from the new filter building to the existing clearwell. Gannett Fleming anticipates the new combined filter effluent will be connected to the southern end of the existing clearwell. Since the feed to Clearwell No. 1 and the high service station is connected to the northern end of the existing clearwell, this will help maximize detention time through the existing clearwell and minimize the impacts of drawdown during backwash.

Gannett Fleming's design will provide for decommissioning of the existing filters. We anticipate decommissioning will involve removal of existing valves, piping, process equipment, and filter media. The existing superstructure could potentially be retained for storage or other future use, but we will review the HDR Report to verify that the superstructure can and should be saved.

5.3. Design Critiques

Gannett Fleming would like to offer several design critiques, which could provide simplified and more reliable operations and/or could reduce project cost. These are further described in the Sections below.

5.3.1. Use Alternate Building Location 1

The study prepared by HDR evaluated three (3) potential locations for the proposed new filter building. The location recommended by HDR in their study, identified as "Alternative 3," is north of the existing sedimentation basins and west of the existing chemical building. Gannett Fleming believes that "Alternative 1," as identified in the HDR study, south of the existing sedimentation basins and west of the existing filter building, is also a viable location.

Associated issues, advantages, and disadvantages are discussed in the following Sections:

5.3.1.1. Alternative Location 3 (Recommended by HDR)

This location is on a side hill. With the anticipated filter operating floor elevation, the existing hillside will need to be cut back on the west side of the building so that the operating floor can exit at grade. On the east side, the filter substructure will be partially out of ground. It is anticipated that access on the east side will be between the operating floor and pipe gallery levels via a stair tower.

Construction at this location will require relocation of two existing alum feed lines from the existing chemical building to the existing sedimentation basins, as well as relocation of an existing overhead electrical line.

It is anticipated that the new filter building will be provided with its own separate electric service and meter, similar to the other buildings at the facility. The close proximity of Alternative Location 3 may simplify providing electric service to the building.

Chemical feed lines for chlorine and polymer would need to be extended to the new building. The distance between the chlorine feed system and either building location is approximately the same. The polymer feed system is closer to this location.

Advantages of Alternative Location 3 include:

- Closer proximity to the existing 16-inch backwash main and to the existing back-up connection to the high service. This will maximize the volume of water available from the existing washwater tank and minimize the amount of new backwash water supply piping required.
  - (This advantage would not be present if an entirely new backwash supply system using redundant backwash pumps is used – see Design Critique 5.3.2.)
- Ready vehicle access close to existing access road.
- Closer proximity to the polymer feed system. The extension of polymer feed lines would be relatively short.

Disadvantages of Alternative Location 3 include:

- Farther from the existing clearwell. This will require installation of more new combined filter effluent piping to reach the existing clearwell. The new combined filter effluent pipe will need to cross an area that is congested with existing buried utilities.
- Farther from the existing process wastewater facilities. This will require installation of more new backwash wastewater piping to reach the existing backwash holding tanks. The new backwash wastewater pipe will need to cross an area that is congested with existing buried utilities.
- The length of pipe required to connect the existing sedimentation basin effluent to the new filter influent will be approximately the same as for Alternative Location 1; however, the pipe route will go through an area that is more congested with existing buried utilities.

A site plan showing Alternative Location 3 and the associated piping and chemical conduit duct banks can be seen on Drawing EX-3, located at the end of this Section.

5.3.1.2. Alternative Location 1

This location is also on a side hill. As with Alternative Location 3, the anticipated filter operating floor elevation is such that the existing hillside will need to be cut back on the west side of the building so that the operating floor can exit at grade. Also, as with Alternative Location 3, the east side of the filter substructure will be partially out of ground. It is anticipated that access on the east side will be between the operating floor and pipe gallery levels via a stair tower with this alternative as well.

Construction at this location will potentially require relocation of an existing fiber optic cable.

Again, it is anticipated that the new filter building will be provided with its own separate electric service and meter, similar to the other buildings at the facility. This location is farther from the main electric utility feed to the site, which may increase the effort required to provide utility power. If acceptable to KAW, Gannett Fleming would investigate providing power to the new filter building from one of the existing facilities. While not entirely consistent with the method of supplying utility power to the remainder of the site, this approach may be more cost-effective.

As with Alternative Location 3, chemical feed lines for chlorine and polymer would need to be extended to the new building. As noted previously, the distance between the chlorine feed system and either building location is approximately the same. The polymer feed system is farther from this location.

Advantages of Alternative Location 1 include:

- Closer proximity to the existing clearwell. This will minimize the amount of combined filter effluent pipe required to connect to the existing clearwell. This location is also close to the southern end of the existing clearwell, which is the preferred point of connection.
- Closer proximity to the existing process wastewater facilities. This will minimize the amount of backwash wastewater piping that will need to be installed to reach the existing backwash holding tanks. In addition, there are fewer existing buried utilities along the anticipated pipeline route.
- The route of the new sedimentation basin effluent/filter influent connection would go through a less congested area.

Disadvantages of Alternative Location 1 include:

- Farther from the existing backwash supply system. This location would require an extension of the existing backwash main and would increase the distance from the existing backwash tank.
  - (This disadvantage would not be present if an entirely new backwash supply system using redundant backwash pumps is used – see Design Critique 5.3.2.)
- More difficult vehicle access. Alternative Location 1 is close to the existing access road that goes around the west side of the existing sedimentation basin; however, this does not provide a direct route. To provide direct access from the existing main access road through the site, approximately 250 feet of new access road to the new filter building would be required.
- Polymer feed lines must be extended farther.

A site plan showing Alternative Location 1 and the associated piping and chemical conduit duct banks can be seen on Drawing EX-4, located at the end of this Section.

5.3.1.3. Anticipated Cost and Schedule Impacts

Estimated Design Cost Savings	$3,000
Estimated Construction Cost Savings	$285,000
Estimated Impact on Design Schedule	None
Estimated Operational Cost Impact	None

5.3.2. Design and Construction of a Completely New Backwash Supply

Due to the size, age, and condition of the existing backwash tank and supply main, it may be advantageous to provide an entirely new backwash

supply system as part of the new filter building project. One option would be to eliminate the existing backwash supply tank and furnish backwash water from the combined filter effluent using two (2) new backwash pumps (one active, one standby). With redundant backwash pumps, the existing interconnection to the high service system could be eliminated.

This alternative could be approached in one of two ways. One method would be to construct a pump sump with sufficient equalization volume to provide the high filter backwash rate during times when combined filter effluent flow is less than the high wash rate (estimated to be approximately 13.7 mgd) as part of the new filter building. Based on the minimum plant flow of 4 mgd stated in the RFP, sump volume would need to be approximately 40,000 gallons. New vertical turbine washwater pumps, discharge piping, and valves would be installed in a room above the sump.

Another approach would be to construct the combined filter effluent main to the existing clearwell at an elevation low enough to allow the pump suction to draw water from the existing clearwell, so that the existing clearwell could provide the necessary equalization storage. In this case, vertical "can" pumps could be used.

Either of these alternative approaches will have a similar impact water level and detention time in the existing clearwell underneath the existing filter building as the base design approach. Gannett Fleming will assess the impacts on levels and storage in the existing clearwell to confirm adequate volumes and detention times can be maintained.

Estimated Additional Design Cost	$8,000
Estimated Additional Construction Cost	$500,000
Estimated Impact on Schedule	None
Estimated Operational Cost Impact	None[1]

[1] Although the proposed backwash pumps will be larger, they will only run during the backwash. They will not be running between washes to refill the tank. As a whole, this alternative will involve adding the same amount of head to the same amount of water, just over a different time frame.

The evaluation of additional construction cost does not include maintenance or replacement of the existing washwater tank. The life cycle cost of this alternative would be equal to the increase in construction cost, less any costs associated with repair or replacement of the existing tank.

In addition, this alternative would eliminate the need to backwash filters off of the high service pump discharge when the existing washwater tank is out of service.

5.3.3. Reduce Filter Size

The proposed filter size presented in the RFP will allow the filters to operate at less than the maximum rate allowed by DOW. Filter size could be reduced by designing the filters to operate at the maximum rate allowed of 5.0 gpm/ft². The desired peak flow rate of 30 mgd could be achieved using twelve (12) filters, each sized at 380 square feet, operating at 5.0 gpm/ft² with one filter out of service. This would also reduce backwash flow rate and volume requirements and would lessen the impact on the existing backwash supply system.

The depth of the GAC media would need to be increased from 24-inches to 30-inches in order to maintain the same EBCT provided by the base concept.

A preliminary layout of the reduced size filters can be seen on Drawing EX-5, located at the end of this Section.

Estimated Impact on Design Cost	None
Estimated Construction Cost Savings	$1,300,000
Estimated Impact on Design Schedule	None
Estimated Impact on Operational Cost	(See Notes Below)

The primary impact on operational cost would be any increase (or decrease) in the volume of backwash water generated and the cost associated with producing and pumping that water. There are various scenarios that could result in operational cost savings, no change in operating cost, or an operating cost increase. These scenarios cannot be

readily evaluated with the information available in the RFP. Possible outcomes are discussed in more detail below.

If the existing filters are generally backwashed on filter run time and not high head loss or turbidity breakthrough, it's possible that backwash frequency would be the same, or only increased slightly, by using smaller filters at a higher loading rate. With a smaller surface area, filter backwash flow rates would be lower and overall backwash wastewater generation would be reduced. If filter backwash frequency does not change, backwash volumes could be reduced by 10 percent or more.

If the existing filters periodically require backwashing on high head loss or turbidity breakthrough, it could be expected that the backwash frequency would increase with the higher filter loading rate. If current filter run times are say 48 hours, backwash wastewater generation would be the same, or less, as long as filter run times are 43 hours or longer with the smaller size filters.

It is Gannett Fleming's understanding that under certain conditions the plant experiences high settled water turbidities. Floc carryover may tend to blind the surface of the filter bed relatively quickly. Under those conditions, backwash frequency may increase to the point that more backwash water is generated with the smaller filters.

As noted above, any change in operating cost would be related to an increase or decrease in the amount of backwash water that must be produced and pumped. The volume of solids generated will not significantly change with this alternative.

5.3.4. Provide Dual Box Filters

This alternative would provide six (6) dual box filters in lieu of twelve (12) single box filters. With dual box filters, both bays would be taken out of service for backwashing, but each bay would be backwashed separately. Assuming six (6) filters with an area of 950 square feet (475 square feet each bay), filter loading rate would be 4.4 gpm/ft^2 at 30 mgd with one (1) filter out of service. Using dual box filters would reduce the amount of filter piping and the number of automated valves and instruments required, as shown below in Figure 5-1.

Figure 5-1: Dual Box Filters versus Single Box Filters

Device	Single Box Filters		Dual Box Filters	
	Per Filter	Total	Per Filter	Total
Filter Influent Valve	1	12	1	6
Filter Effluent Valve	1	12	1	6
Filter Rinse Valve	1	12	1	6
Backwash Valve	1	12	3	18[1]
Drain Valve	1	12	1	6
Air Wash Valve	1	12	2	12[2]
Total Automated Valves	**6**	**72**	**9**	**54**
Filter Effluent Flow Meter	1	12	1	6
Loss of Head Transmitter	1	12	2	12[2]
Filter Level Transmitter	1	12	2	12[2]
Filter Level Point Probes	1	12	2	12[2]
Filter Effluent Turbidimeter	1	12	1	6
Total Instruments	**5**	**60**	**8**	**48**

[1] Dual bay filters require one backwash valve for each bay, plus one backwash valve on the main backwash header.

[2] Assumes one per bay.

It should be noted that this alternative is only viable if used in conjunction with Design Critique 5.3.2. – Construct New Backwash Supply System. Since each bay of the dual box filter is backwashed separately, the maximum backwash flow rate would be the same as twelve (12) single box filters. However, the two (2) bays would be

backwashed sequentially. The existing backwash supply tank does not have sufficient volume to backwash two (2) filter bays sequentially without time for refill in between. This delay would not be acceptable in a normal backwash sequence. If new backwash supply facilities are constructed, they would be designed to allow sequential backwash of two (2) bays.

Estimated Design Cost Savings	$4,000
Estimated Construction Cost Savings	$200,000
Estimated Impact on Design Schedule	None
Estimated Impact on Operational Cost	None

This dual bay filter is used at KAW's KRS-2. For your reference, we have included a copy of a filter plan from KRS-2, located at the end of this Section.

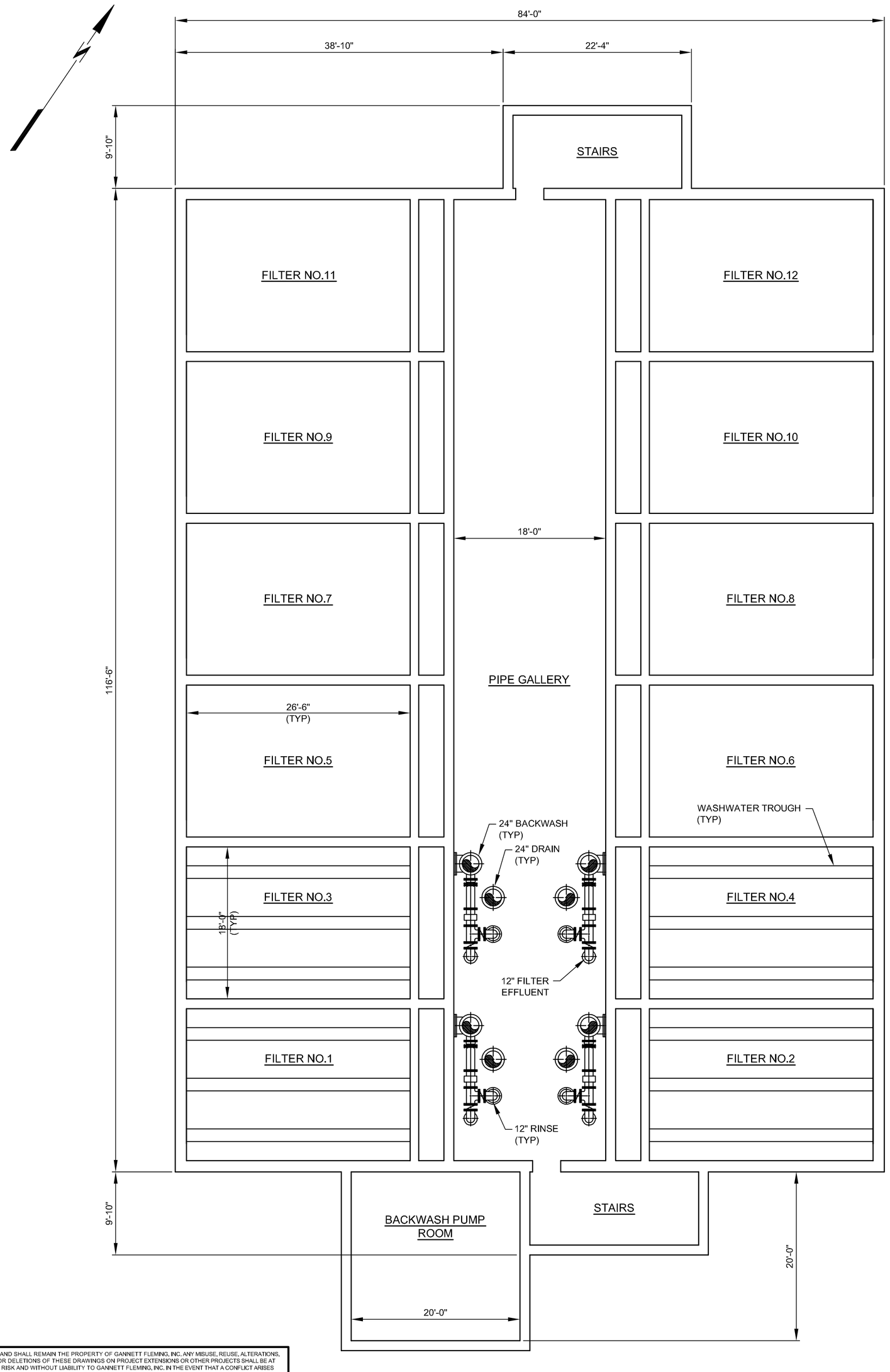
5.3.5. Modify and Re-Use Existing Air Wash Blower

The existing air wash blower at RRS is relatively new, installed in 2013. Preliminary contacts with the supplier of the existing air wash blower indicate the existing blower could be modified to meet the required air flow rate and pressure by changing the existing motor from 30 horsepower (hp) to 50 hp.

Estimated Impact on Design Cost	None
Estimated Construction Cost Savings	$22,000[1]
Estimated Impact on Design Schedule	None
Estimated Impact on Operational Cost	None

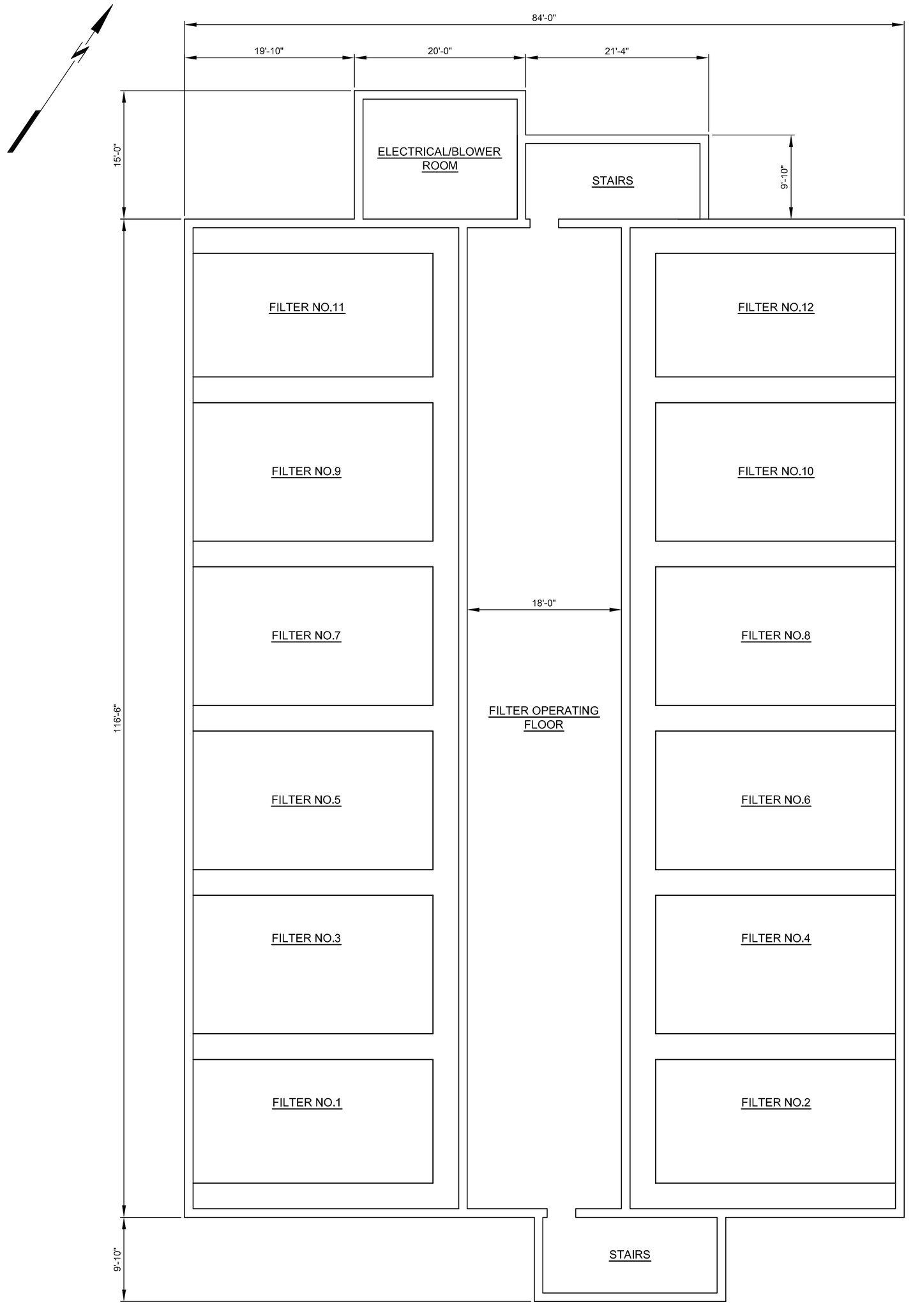
[1] Based on equipment pricing received from Delaney Associates

Due to the logistics of modifying, moving, and reinstalling the existing air wash blower, it will not be possible to maintain the blower in service continuously. A temporary air wash blower could be installed. Another option would be to construct and start-up the new filters prior to modifying the air wash blower, remove and modify the air wash blower, and reinstall at the new filters. This would mean operating the new filters for two (2) weeks to one (1) month without air wash.



LOWER FLOOR PLAN

SCALE: 1/8" = 1'-0"



UPPER FLOOR PLAN

SCALE: 1/8" = 1'-0"

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Gannett Fleming

HARRISBURG, PENNSYLVANIA

KENTUCKY AMERICAN WATER

RICHMOND ROAD STATION
FILTER BUILDING

FILTER BUILDING
PROCESS
UPPER AND LOWER FLOOR PLANS

JOB No. -

DATE NOVEMBER 2013

SHEET No. EX-1

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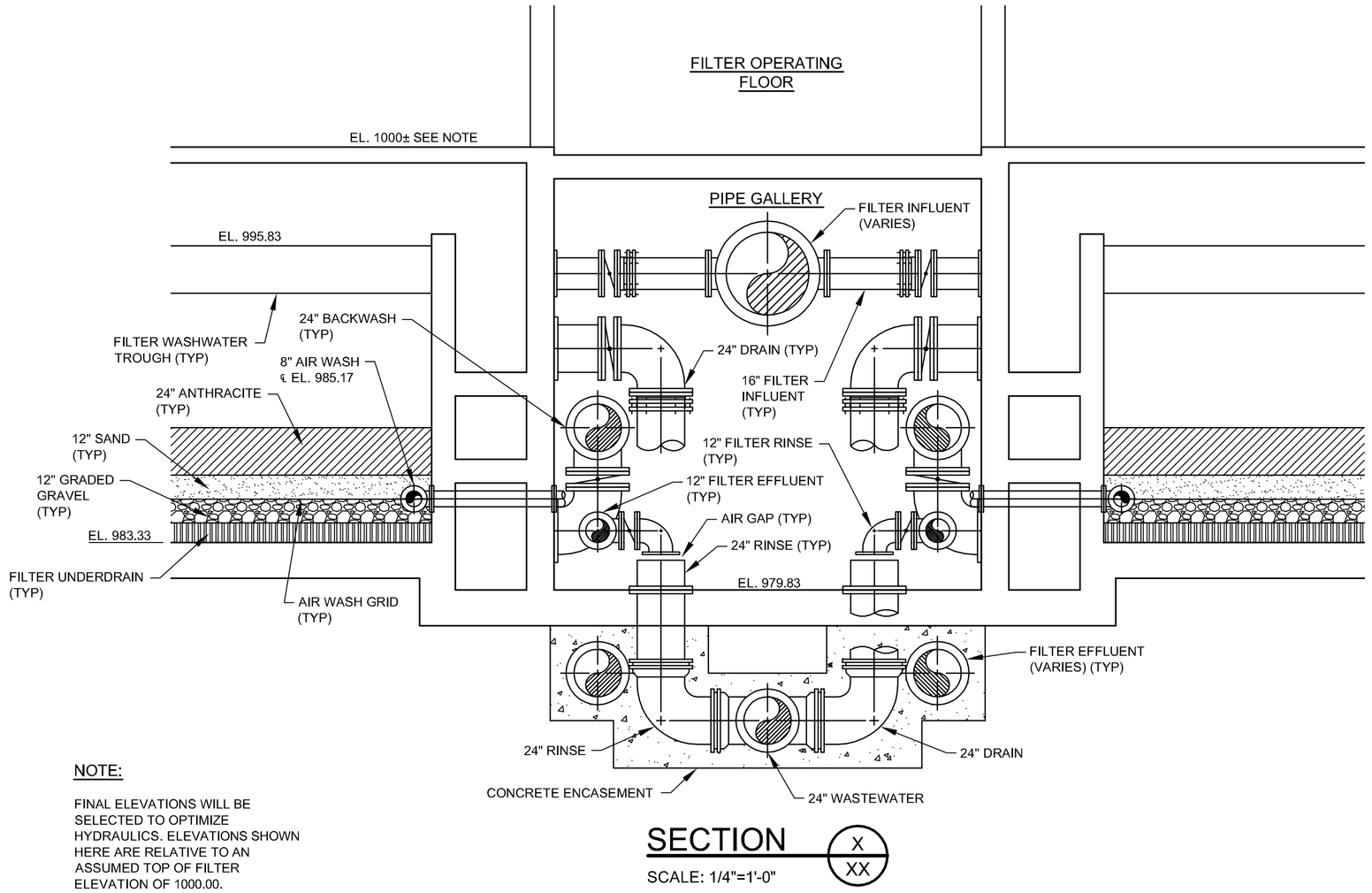
Page 24 of 283



SECTION X/XX

SCALE: 1/4"=1'-0"

NOTE:

FINAL ELEVATIONS WILL BE SELECTED TO OPTIMIZE HYDRAULICS. ELEVATIONS SHOWN HERE ARE RELATIVE TO AN ASSUMED TOP OF FILTER ELEVATION OF 1000.00.

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KENTUCKY AMERICAN WATER

RICHMOND ROAD STATION
FILTER BUILDING

FILTER BUILDING
PROCESS
SECTION

JOB No. -

DATE: NOVEMBER 2013

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Page 25 of 283

SITE PLAN

SCALE: 1" = 50'

50 25 0 50 100

LEGEND

- PROPOSED CHEMICAL CONDUITS
- PROPOSED PIPING
- EXISTING PIPE AND CHEMICAL CONDUIT

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Gannett Fleming

HARRISBURG, PENNSYLVANIA

KENTUCKY AMERICAN WATER

RICHMOND ROAD STATION
FILTER BUILDING

SITE PLAN
BASE DESIGN
ALTERNATE LOCATION 3

JOB No. -

DATE NOVEMBER 2013

SHEET No. EX-3

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Page 26 of 283

LEGEND

- PROPOSED CHEMICAL CONDUITS
- PROPOSED PIPING
- EXISTING PIPE AND CHEMICAL CONDUIT

SITE PLAN

SCALE: 1" = 50'

50 25 0 50 100

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HARRISBURG, PENNSYLVANIA

KENTUCKY AMERICAN WATER

RICHMOND ROAD STATION
FILTER BUILDING

SITE PLAN
ALTERNATE DESIGN
ALTERNATE LOCATION 1

JOB No. -

DATE NOVEMBER 2013

SHEET No. EX-4

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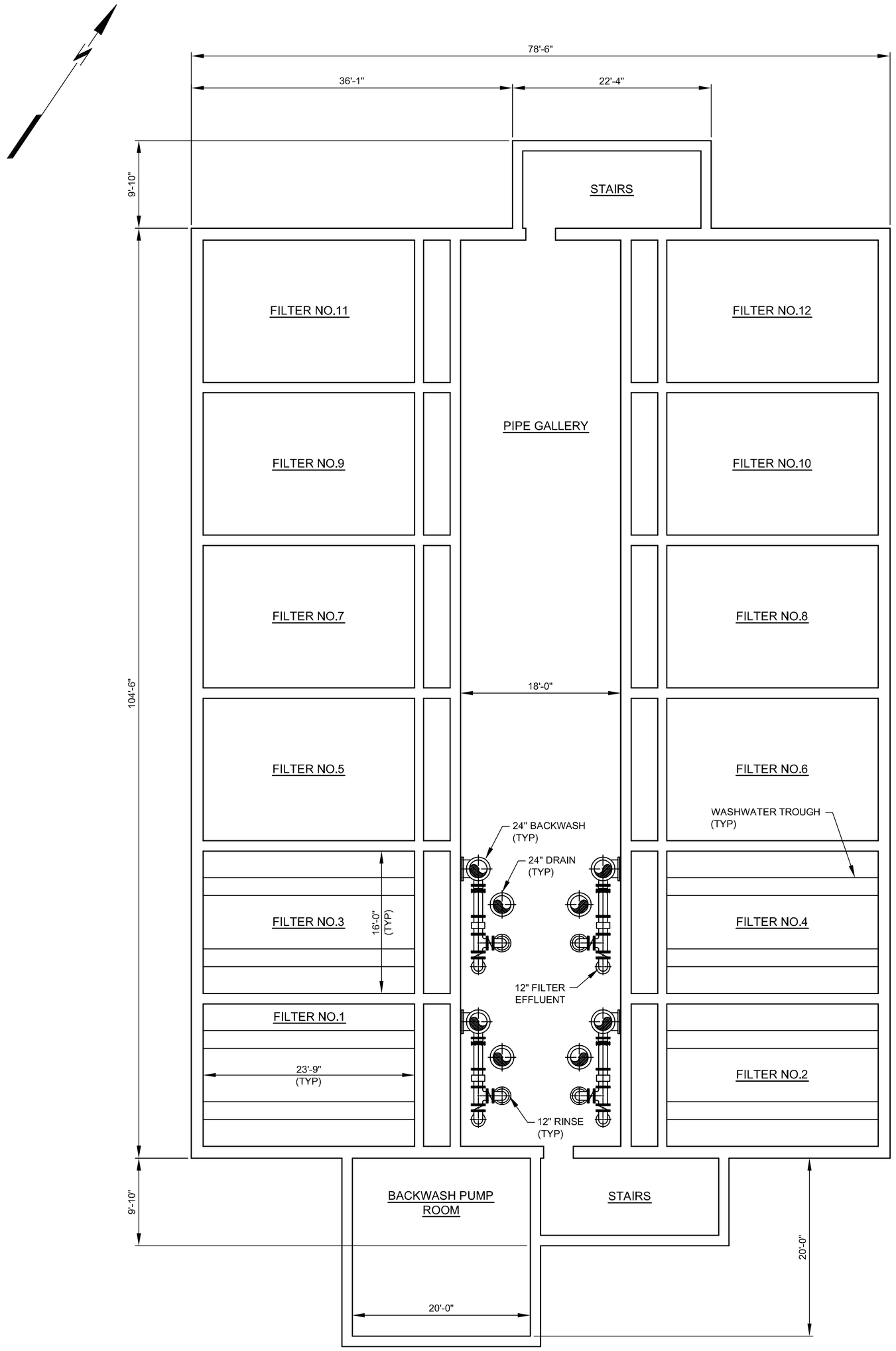
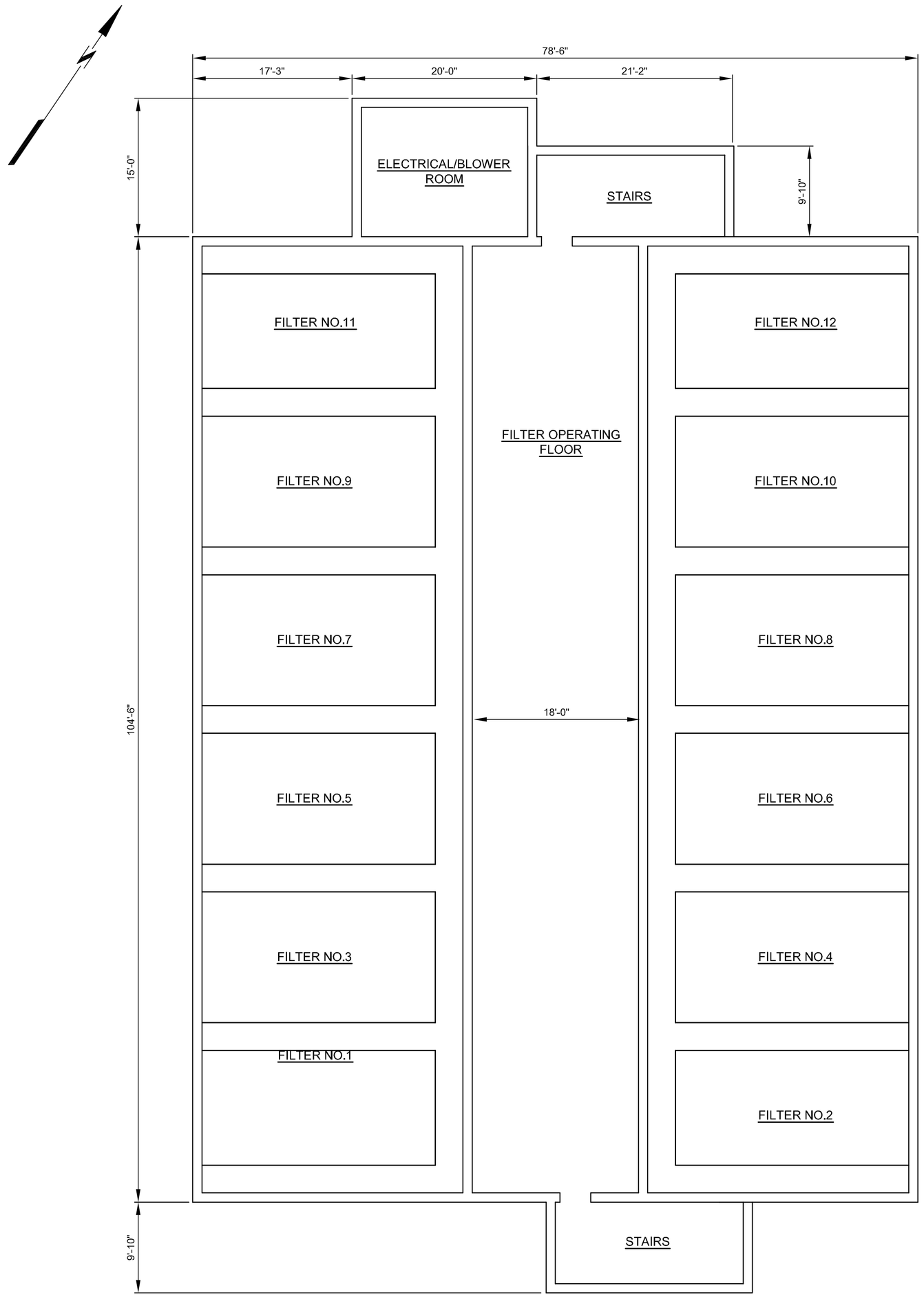


LOWER FLOOR PLAN

SCALE: 1/8" = 1'-0"



UPPER FLOOR PLAN

SCALE: 1/8" = 1'-0"

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Gannett Fleming

HARRISBURG, PENNSYLVANIA

KENTUCKY AMERICAN WATER

RICHMOND ROAD STATION
FILTER BUILDING

FILTER BUILDING
PROCESS
ALTERNATE UPPER AND LOWER FLOOR PLANS

JOB No. -

DATE NOVEMBER 2013

SHEET No. EX-5

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Page 23 of 283

PIPE GALLERY PLAN

SCALE: 3/16"=1'-0"

NOTES:

1. INSTALL 30" FILTER EFFLUENT VALVES w/ SHAFT ORIENTED HORIZONTALLY.
2. INSTALL 30" WASTEWATER VALVES w/ SHAFT ORIENTED HORIZONTALLY.
3. INSTALL 16" EFFLUENT FLOW CONTROL VALVES w/ SHAFT ORIENTED VERTICALLY.
4. BLIND FLANGES INSTALLED ONLY IF PHASE 2 IS NOT CONSTRUCTED.

RECORD DRAWING FEBRUARY 2011
AS CONSTRUCTED BY
REYNOLDS / ROGERS
AND BASED ON INFORMATION PROVIDED BY
REYNOLDS / ROGERS

FILE: K:\411\W&WW ERD\47225\KAW\WTP\ASBUILT\PROCESS\PHASE 1\12020001P12.DWG
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	REVISIONS		

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CHECKED	APPROVED	APPROVED
J.L.R.	M.J.C.	G.C.K.

Gannett Fleming
HARRISBURG, PENNSYLVANIA

KENTUCKY-AMERICAN WATER COMPANY
LEXINGTON, KENTUCKY

KENTUCKY RIVER POOL 3
WATER TREATMENT PLANT

FILTER BUILDING
PROCESS
PIPE GALLERY PLAN

JOB No.	SHEET No.
47225	P12
DATE	DRAWING NO.
DECEMBER 2008	AWWSC 1202-0001-P12

6. Soil Borings

6.1. Geotechnical Approach

The geotechnical approach is based on using one of two potential sites (Alternate 1 or Alternate 3) identified in the Richmond Road Station Water Treatment Plant Filter Building Evaluation prepared by HDR Engineering, Inc., September 2013. The proposed filter building is anticipated to be approximately 84 feet by 116 feet in the plan. To meet project hydraulic requirements, it is anticipated that the finished floor elevation of the new filter building will be approximately at elevation 1,001. The bottom of the substructure will be will be approximately at elevation 980. There will be buried piping beneath the bottom of the pipe gallery substructure. The major geotechnical tasks associated with the investigation, evaluations, and geotechnical design of the pump station are described herein.

In order to develop this Proposal, some general assumptions were made. These assumptions are:

- Site investigation and drilling access to the pump station will be provided as needed by Kentucky American Water (KAW).
- KAW will be responsible for locating their own subsurface utility locations on-site prior to commencing drilling activities.
- No elevated contaminated soils, groundwater, or other environmental hazards are anticipated to be encountered during the subsurface investigation program requiring special personal protective equipment (PPE) or waste disposal based upon the environmental investigation for the site completed by Gannett Fleming.
- No abandoned subsurface mines, karst, or other unusual geological conditions are currently known to exist beneath the site that would require an increase to the number or depth of the proposed testing borings.
- Boring locations and survey information will be provided by others. These services are not included with this Proposal.

The following tasks are defined based on our understanding and estimation of the geotechnical services required to support the design and construction of the proposed clearwell and associated structures.

6.2. Office Investigation

This task will include the review of the following information in preparation for field investigations and design:

- Environmental documents
- Historic, current, and proposed design drawings
- Published geologic and hydrogeologic information.

The results of the office investigation will be presented and discussed in the Geotechnical Engineering Report.

6.3. Subsurface Investigation

6.3.1. Test Boring Program

The test boring plan and schedule has been developed based on the conceptual plans for Option 1, dated April 2011, our understanding of the project needs, and preliminary knowledge of site geological conditions. A total of six (6) test borings at the selected location are proposed to define the subsurface conditions and aid in the development of geotechnical design and construction recommendations. A summary of the borings is provided below:

- **Structure Foundations** – Six (6) test borings, totaling 90 lineal feet, are proposed to define and evaluate the subsurface conditions beneath the proposed filter building. It is our understanding that all other modifications to the facility will be within the existing structures; therefore, no geotechnical work activities will be required. It is anticipated that the soil cover is approximately 10 to 15 feet thick. Bedrock was encountered at the approximate elevation 970 feet in the adjacent clarifier constructed about five years ago. These test borings have

been located to help define the type and depth of soil and bedrock beneath the proposed foundations.

6.4. Prepare and Administrate Laboratory Testing Program

Index testing of representative soil samples will be performed to aid in the development of design parameters and classification of on-site soils. Unconfined compressive strength testing is proposed on representative soil samples to aid in the development of foundation design recommendations. A total of three soil classification tests and four unconfined compression tests are proposed.

We propose to perform pH, sulfate, and chloride ion content testing on representative samples of the predominant soil types to assess the corrosion potential. We anticipate two soil types at this site. The purpose of these tests is to evaluate the potential for corrosion to impact the design life of concrete and/or steel structures and to develop recommendations accordingly.

6.5. Design Analyses

The design effort will focus on the following areas:

- **Filter Building** – Evaluations will focus on the allowable bearing pressure, foundation treatments, earth pressures, and ancillary geotechnical design considerations needed to support the proposed structural design. The results of corrosion testing will be considered.
- **Pavement Recommendations** – Recommendations for pavement and pavement subgrade design will be completed based upon available boring information and design drawings. Formal pavement design and subgrade testing are not anticipated. Recommendations will be based on presumptive values and engineering judgment.

6.6. Preparation of the Geotechnical Engineering Report

The Geotechnical Engineering Report will present the recommendations for design and include all of the supporting information produced as part of these evaluations in Tasks 1 through 5. Five (5) copies of the final Report will be furnished for implementation into the facilities expansion design.

6.7. Plans, Specifications, and Estimates Review

The design drawings and specifications will be reviewed for incorporation and compliance of the geotechnical recommendations. Red line mark-ups will be provided for the purpose of revision, as applicable.

7. Listing of Drawings and Specifications

Drawings and Specifications to be prepared as part of the Richmond Road Station Water Treatment Plant new filter building project are listed in the two (2) tables below. The specifications list is provided for Technical Divisions 1 through 16 and does not include the standard Division 1 specifications normally provided by Kentucky American Water.

7.1. Anticipated Drawings

Drawing No.	Description
Cover Sheet	
Index to Drawings	
General and Civil	
C1	Civil Site Symbols, Legends and Abbreviations
C2	Facilities Location Plan
C4	Filter Building Grading Plan
C5	Piping Plan A and Piping Coordinate Schedule
C6	Piping Plan B
C7	Enlarged Piping Plans and Details
C8	Trench Piping and Chemical Manhole Details
C9	Roadway, Sidewalks and Curb Details
C10	Erosion and Sediment Details and Narrative
C11	Erosion and Sediment Details
C12	Stormwater Plan and Details
C13	Stormwater Details and Narrative
Demolition – Existing Filter Building	
D1	Demolition Plans
D2	Demolition Sections, Notes, and Details
Architectural – New Filter Building	
A0	Notes, Symbols and Abbreviations
A1	Code Analysis
A2	Upper and Lower Floor Plans and Details
A3	Roof Plan and Details
A4	Building Elevations and Details
A5	Wall Sections
A6	Stair Plans, Sections and Details
A7	Room and Door Finish Schedules and Details
A8	Miscellaneous Architectural Details
Structural – New Filter Building and Repair to Existing Clearwell	
S1	General Structural Notes and Details
S2	Misc. Detail
S3	New Filter Building – Upper and Lower Plans
S4	Sections
S5	Sections
S6	Sections
S7	Existing Clearwell Repair Details and Misc. Details

S8	Pipe Support and Railings
S9	Special Inspections
Process	
P1	Symbols, Legends and Abbreviations
P2	New Filter Building – Underslab Piping Plan
P3	New Filter Building – Lower Pipe Gallery Piping and Filter Box Plan
P4	New Filter Building – Upper Pipe Gallery Piping and Filter Box Plan
P5	New Filter Building – Operating Floor Plan
P6	Filter Sections
P7	Filter Sections
P8	Blower and Washwater Pump Room Plans and Sections
P9	Filter Aid Polymer Schematic
P10	Chemical Feed and Misc. Details
P11	Filter Underdrain and Air Scour System Plans and Details
P12	Mechanical Coupling Restraint Details
Instrumentation & Control	
I1	Symbols, Legends and Abbreviations
I2	System Architecture
I3	Process & Instrument Diagrams – Filters
I4	Process & Instrument Diagrams – Blower and Washwater Pump(s)
I5	Process & Instrument Diagrams – Chemical Systems
I6	Instrument Installation Details
I7	Panel Wiring Diagrams
I8	Miscellaneous Details
Mechanical	
M1	Symbols and Abbreviations
M2	HVAC Upper and Lower Plans
M3	HVAC Schedules and Details
M4	Plumbing Upper and Lower Floor Plans
M5	Plumbing Schedules and Details
Electrical	
E1	Electrical Symbols, Abbreviations, General Notes
E2	Site Plan
E3	Electrical Site Details
E4	New Filter Building Upper and Lower Floor Plans – Lighting
E5	New Filter Building Upper and Lower Floor Plans – Power
E6	New Filter Building Upper and Lower Floor Plans – Instrument Power
E7	New Filter Building Upper and Lower Floor Plans – Special Systems
E8	Roof Plan – Lightning Layout and Details
E9	One Line Diagram and Schedules
E10	Miscellaneous Equipment Schedules and Details
E11	Control Wiring Diagrams – Blower and Washwater Pump(s)
E12	Control Wiring Diagrams – Misc. Equipment

7.2. Anticipated Technical Specifications – Divisions 1 through 16

DIVISION 1 – GENERAL REQUIREMENTS		
01657	Disinfecting Process Piping	01657-1
01658	Disinfection of Structures and Equipment	01658-1
01666	Testing of Water Mains	01666-1
01669	Testing Process Systems	01669-1
01740	Cleaning	01740-1
DIVISION 2 – SITE CONSTRUCTION		
02082	Manholes	02082-1
02083	Chambers Vaults and Tanks	02083-1
02200	Site Preparation	02200-1
02210	Subsurface Investigation	02210-1
02211	Borings	02211-1
02222	Demolition	02222-1
02224	Demolition and Asbestos Abatement	02224-1
02225	Removal and Abandonment of Existing Facilities	02225-1
02230	Site Clearing	02230-1
02260	Excavation Support and Protection	02260-1
02311	Rough Grading	02311-1
02312	Finish Grading	02312-1
02315	Excavation and Fill	02315-1
02324	Trenching	02324-1
02336	Roadway Excavation Backfill and Compaction	02336-1
02370	Erosion and Sediment Control	02370-1
02535	Gravity Wastewater Sewer	02535-1
02536	Wastewater Force Mains	02536-1
02582	Underground Ducts and Manholes	02582-1
02630	Storm Drainage	02630-1
02700	Bases, Ballasts, Pavements and Appurtenances	02700-1
DIVISION 3 – CONCRETE		
03100	Concrete Formwork	03100-1
03200	Concrete Reinforcement	03200-1
03300	Cast-in-Place Concrete	03300-1
03415	Precast Hollow Core Plank	03415-1
03410	Structural Precast Concrete	03410-1
03600	Grout	03600-1
DIVISION 4 – MASONRY		
04065	Mortar and Masonry Grout	04065-1
04810	Unit Masonry Assemblies	04810-1
DIVISION 5 – METALS		
05100	Structural Steel Framing	05100-1
05500	Metal Fabrications	05500-1
05510	Metal Stairs	05510-1
05520	Handrails and Railings	05520-1
05600	Aluminum Fabrications	05600-1

DIVISION 6 – WOOD AND PLASTIC		
06100	Rough Carpentry	06100-1
06200	Finish Carpentry	06200-1
DIVISION 7 – THERMAL AND MOISTURE PROTECTION		
07110	Dampproofing	07110-1
07115	Adhered Membrane Dampproofing	07115-1
07212	Board and Batt Insulation	07212-1
07260	Vapor Retarders	07260-1
07531	Membrane Roofing	07531-1
07620	Sheet Metal Flashing and Trim	07620-1
07840	Firestopping	07840-1
07900	Joint Sealers	07900-1
DIVISION 8 – DOORS AND WINDOWS		
08110	Steel Doors and Frames	08110-1
08520	Aluminum Windows	08520-1
08710	Door Hardware	08710-1
08800	Glazing	08800-1
DIVISION 9 – FINISHES		
09300	Tile	09300-1
09650	Resilient Flooring	09650-1
09900	Paints and Coatings	09900-1
DIVISION 10 – SPECIALTIES		
010210	Wall Louvers and Vents	10210-1
010441	Plastic Signs	10441-1
010523	Fire Extinguishers and Accessories	10523-1
DIVISION 11 – EQUIPMENT		
011005	Basic Equipment Materials and Methods	11005-1
011214	Vertical Turbine Pumps	11214-1
011235	Rotary Blowers	11235-1
011250	Chemical Feed Equipment Accessories	11250-1
DIVISION 12 – FURNISHINGS – NOT USED		
DIVISION 13 – SPECIAL CONSTRUCTION		
013100	Lightning Protection	13100-1
013222	Filter Media Gravel Sand GAC	13222-1
013224	Filter Underdrain System	13224-1
013225	Fiberglass Filter Washwater Troughs	13225-1
013226	Filter Air Scour System	13226-1
013414	Optical Fiber Cable	13414-1
013420	Instruments	13420-1
013422	Control Valves	13422-1
013423	Flowmeters	13423-1
013424	Level Instruments	13424-1
013427	Pressure Instruments	13427-1
013451	PLC (Programmable Logic Controllers)	13451-1
013453	SCADA (Supervisory Control and Data Acquisition)	13453-1
013490	Measurement and Control Commissioning	13490-1

DIVISION 14 – CONVEYING SYSTEMS – NOT USED		
DIVISION 15 – MECHANICAL		
015060	Hangers and Supports	15060-1
015075	Mechanical Identification	15075-1
015080	Mechanical Insulation	15080-1
015140	Domestic Water Piping	15140-1
015150	Sanitary Waste and Vent Piping	15150-1
015200	Process Piping	15200-1
015410	Plumbing Fixtures	15410-1
015440	Plumbing Pumps	15440-1
015670	Refrigerant Condensing Units	15670-1
015720	Air Handling Units	15720-1
015810	Ducts	15810-1
015820	Duct Accessories	15820-1
015830	Fans	15830-1
015850	Air Outlets and Inlets	15850-1
015910	Direct Digital Controls	15910-1
015940	Sequence of Operation	15940-1
015950	Testing, Adjusting, and Balancing	15950-1
015992	HVAC Commissioning	15992-1
DIVISION 16 – ELECTRICAL		
016050	Basic Electrical Materials and Methods	16050-1
016060	Grounding and Bonding	16060-1
016070	Hangers and Supports	16070-1
016071	Vibration Isolation and Seismic Restraint	16071-1
016075	Electrical Identification	16075-1
016080	Electrical Testing	16080-1
016095	Minor Electrical Demolition	16095-1
016122	Low-Voltage Wire, Cable, and Accessories	16122-1
016131	Conduit and Tubing	16131-1
016132	Surface Raceway	16132-1
016138	Boxes	16138-1
016140	Wiring Devices	16140-1
016150	Wiring Connections	16150-1
016210	Electrical Utility Services	16210-1
016285	Transient-Voltage Surge Suppressors (TVSS)	16285-1
016411	Low-Voltage Enclosed Circuit Breakers	16411-1
016412	Low-Voltage Enclosed Switches	16412-1
016423	Low-Voltage Motor Starter Switches and Controllers	16423-1
016424	Low-Voltage Motor Control Centers	16424-1
016425	Low-Voltage Variable Frequency Controllers	16425-1
016443	Panelboards	16443-1
016460	Low-Voltage Transformers	16460-1
016500	Lighting	16500-1

8. Permit Listing

8. Permit Listing

We will support Kentucky American Water (KAW) to secure local and state permits for this project. We do not expect that there will be any Federal permits involved in this project. Permitting will be limited to two (2) agencies: Commonwealth of Kentucky, Department of Environmental Protection, Division of Water (DOW) and Lexington-Fayette Urban County Government (LFUCG). This project will disturb more than one (1) acre of area, therefore, permitting related to Stormwater National Pollutant Discharge Elimination System (NPDES) will be required. The listing of permits and discussions with those agencies follows:

8.1. Commonwealth of Kentucky, Department of Environmental Protection, Division of Water

- **Approval to Construct Public Water Supply Facilities** – Application form, Engineer's Report, and construction documents will be submitted to the DOW for approval. It is expected for this project that the approval to construct will be provided within 60 days of the initial submission.
- **General Permit for Stormwater NPDES** – Application for Stormwater NPDES during construction and post-construction stormwater management will be submitted to DOW for approval. It is expected that approval will be provided within 30 days of initial submission for hard copy submission. Review time is less if application is submitted electronically.

8.2. Lexington-Fayette Urban County Government

We spoke with officials at LFUCG and understand that the following submission will **not** be required:

- **Land Planning** – Based on Kentucky Revised Statues 100.234 – Public Utility Facilities and discussions with the Planning Department, KAW is exempt from locating service facilities and their associated planning.
- **Zoning** – No zoning submission is anticipated since the property is currently zoned agricultural-urban, and the current use is public utility.

Permits are required for:

- **Land Disturbance** – Land disturbance permitting is required for any area disturbed over 5,000 square feet. A plan and Best Management Practices will be submitted to the County for approval. Expected review time is 30 days. It should be noted that the General Permit for Stormwater NPDES must be approved before the Land Disturbance permit is submitted.
- **Building Permit** – Building permit application and drawings are to be submitted for Code review and approval. Building construction inspections will be done for structural; heating, ventilation, and air-conditioning (HVAC); plumbing; and electrical. Expected review time is 30 days.

9. Preliminary Schedule

It is Gannett Fleming's understanding that the critical milestone for this project is submission to the Kentucky Public Services Commission (PSC) by May, 2014. We also understand that the Kentucky Department of Water (DOW) Construction Permit, General Permit for Stormwater National Pollutant Discharge Elimination System (NPDES), and Lexington-Fayette Urban County Government (LFUCG) Land Disturbance Permit for the project must be approved or at least reviewed and awaiting formal issuance of the permit prior to submission of the project to PSC.

We believe this schedule can be met if the project is awarded by January 3, 2014 and is executed aggressively and efficiently. A Gantt Chart showing a preliminary schedule with a project start date of January 3, 2013 is attached to this section. In order to meet this schedule, overall design must reach 60 percent complete (process and civil design 80 percent complete) and be submitted to Kentucky American Water (KAW) for review by March 17, 2014. The design will be advanced far enough at that point to prepare and submit the required permit applications, following the 60 percent review by KAW.

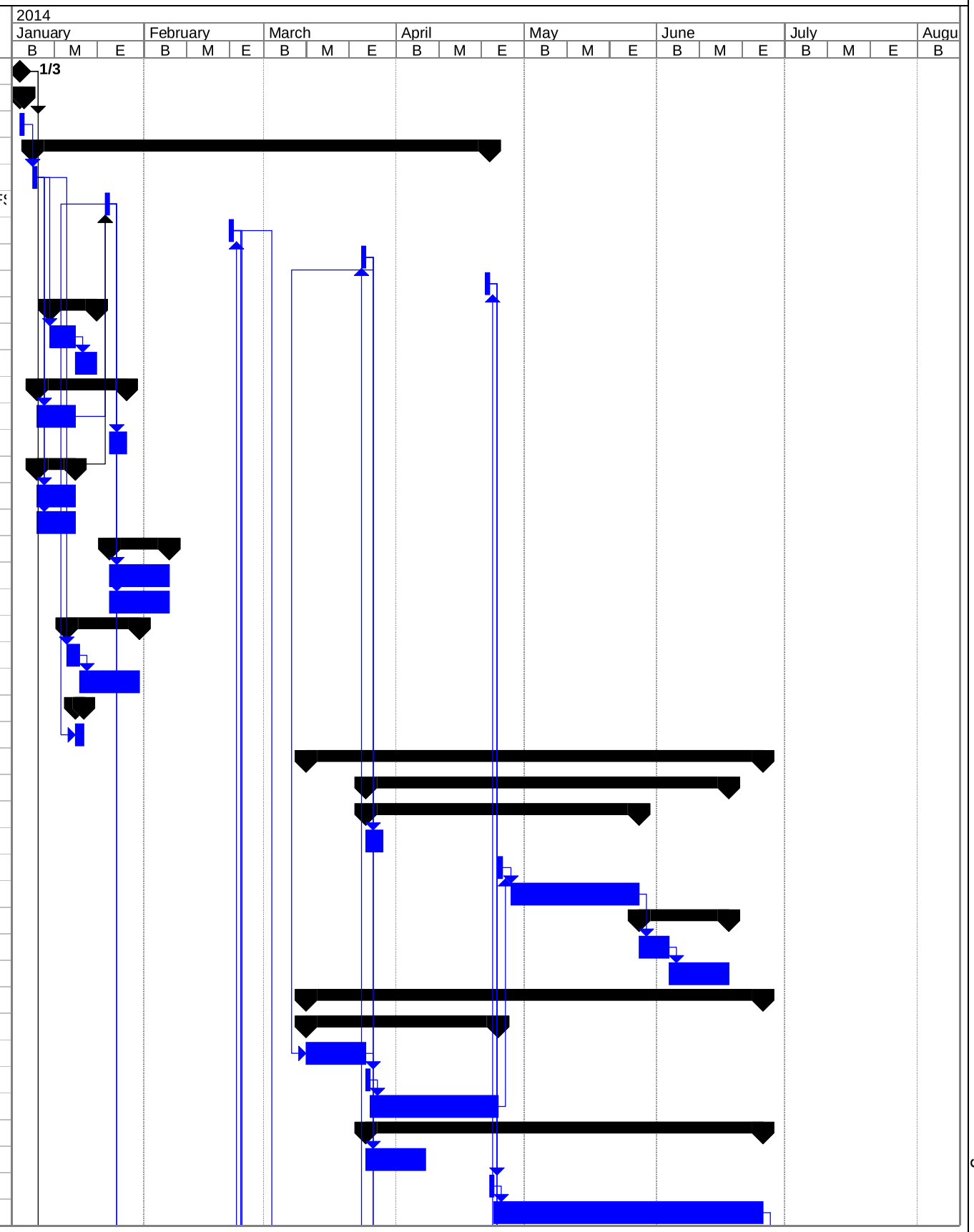
This schedule allows five (5) days for review of documents by KAW between design milestone submittals and the review meeting.

It should be noted that the General Permit for Stormwater NPDES must be approved prior to submitting the Land Disturbance Permit application to LFUCG. DOW provides an option to submit the General Permit application electronically. If submitted electronically, review time is approximately 7 days. If a paper application is submitted, review time is approximately 30 days. The attached schedule has allowed 30 days for review and approval of the General Permit. Using electronic submission will allow some "float" in the schedule to adjust for other unanticipated issues or delays.

It is Gannett Fleming's understanding that KAW originally intended to issue a Request for Proposal for Construction Management at Risk (CMR) services when the project reached 30 percent design, and have the CMR provide a target cost when the project reached 60 percent design. Gannett Fleming believes the process for selecting the CMR should begin earlier in the schedule. This is reflected in the attached schedule, Figure 9-1.

First, as noted above, the project needs to reach 60 percent design by mid-March, 2014, in order to meet PSC submission by the end of May 2014. If it is still the intent to have a CMR engaged and a target cost by 60 percent design, then the CMR procurement process must begin prior to reaching 30 percent design. Second, bringing the CMR on board earlier in the design process potentially increases the benefit that can be obtained from the CMR's value engineering and constructability input. Receiving this input earlier in design allows more flexibility to incorporate that input without re-work.

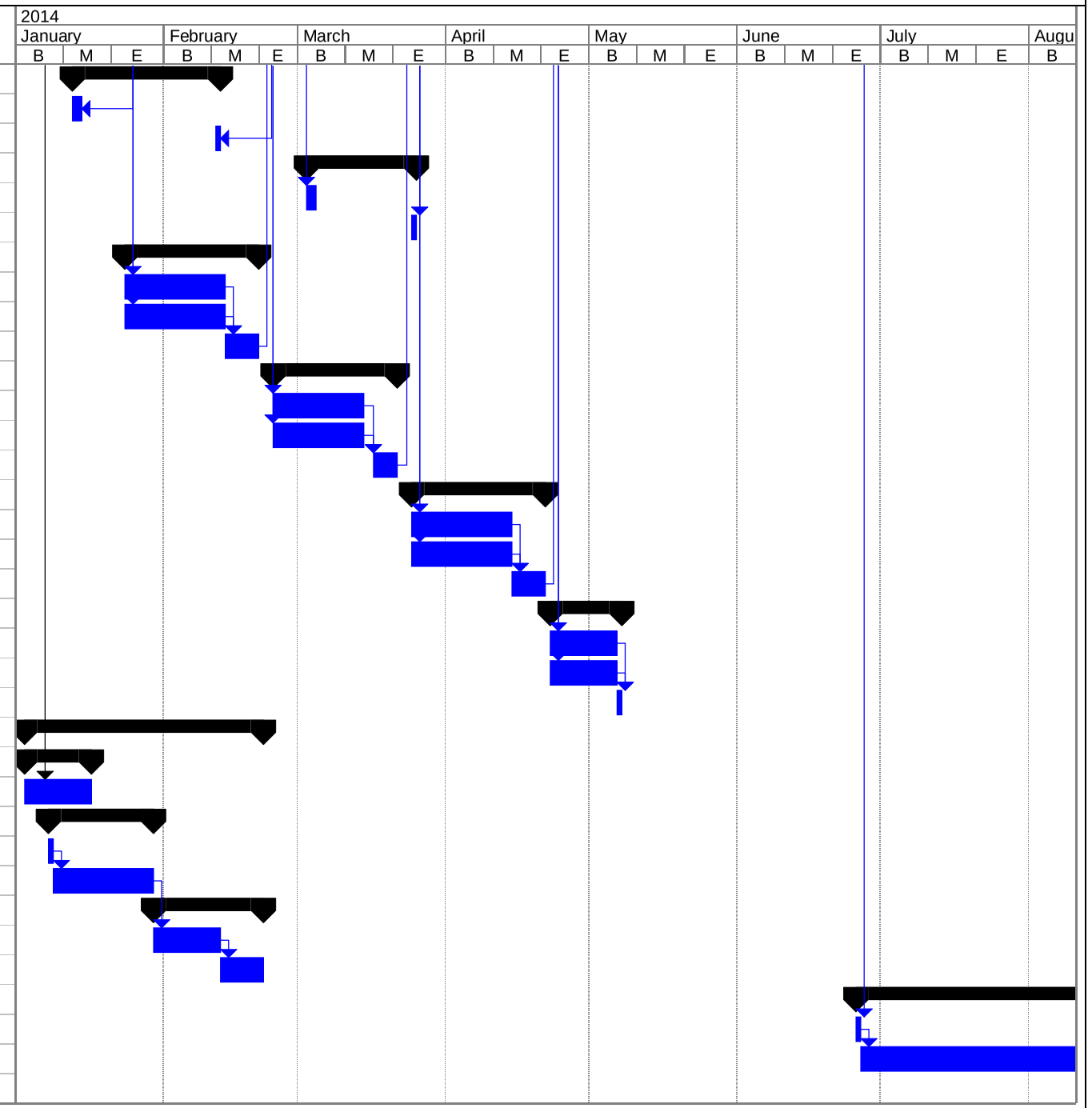
ID	Task Name	Duration	Start	Finish	Predecessors
1	**Design Notice to Proceed by KAW**	**0 days**	**Fri 1/3/14**	**Fri 1/3/14**	
2	**Design Critique**	**1 day**	**Fri 1/3/14**	**Fri 1/3/14**	
3	Review Design Critique Items from the GF Proposal	1 day	Fri 1/3/14	Fri 1/3/14	1
4	**Meetings and Conference Calls**	**77 days**	**Mon 1/6/14**	**Tue 4/22/14**	
5	Kickoff Conference Call - Review Layouts, Site Plan and Filter Blg Details	1 day	Mon 1/6/14	Mon 1/6/14	3
6	Pre Design Meeting to Review Design Memorandum and Preliminary Layouts	1 day	Thu 1/23/14	Thu 1/23/14	14FS+5 days,16FS
7	30% Design Review Meeting - Includes SCADA Concepts	1 day	Fri 2/21/14	Fri 2/21/14	54
8	60% Design Review Meeting	1 day	Mon 3/24/14	Mon 3/24/14	58
9	90% Design Review Meeting	1 day	Tue 4/22/14	Tue 4/22/14	62
10	**Topographical Survey**	**7 days**	**Fri 1/10/14**	**Mon 1/20/14**	
11	Field Work	4 days	Fri 1/10/14	Wed 1/15/14	5FS+3 days
12	Assembly of Existing Conditions Drawing	3 days	Thu 1/16/14	Mon 1/20/14	11
13	**Design Memorandum**	**15 days**	**Tue 1/7/14**	**Mon 1/27/14**	
14	Prepare Draft Memorandum	7 days	Tue 1/7/14	Wed 1/15/14	5
15	Prepare Final Memorandum	2 days	Fri 1/24/14	Mon 1/27/14	6
16	**Preliminary Layouts**	**7 days**	**Tue 1/7/14**	**Wed 1/15/14**	
17	Filter Building	7 days	Tue 1/7/14	Wed 1/15/14	5
18	Site - Locate Building and Propose Routing Site Piping	7 days	Tue 1/7/14	Wed 1/15/14	5
19	**Environmental Activities**	**10 days**	**Fri 1/24/14**	**Thu 2/6/14**	
20	Wetlands Delineation and Results Report	10 days	Fri 1/24/14	Thu 2/6/14	6
21	Phase 1 Archaeological Investigation	10 days	Fri 1/24/14	Thu 2/6/14	6
22	**Geotechnical Investigations**	**13 days**	**Tue 1/14/14**	**Thu 1/30/14**	
23	Subsurface Investigation Program	3 days	Tue 1/14/14	Thu 1/16/14	5FS+5 days
24	Final Geotechnical Report	10 days	Fri 1/17/14	Thu 1/30/14	23
25	**Preliminary Construction Budget Estimate**	**2 days**	**Thu 1/16/14**	**Fri 1/17/14**	
26	Develop Preliminary Construction Budget Estimate with Preliminary Layouts	2 days	Thu 1/16/14	Fri 1/17/14	6SS-5 days
27	**Permitting**	**77 days**	**Tue 3/11/14**	**Wed 6/25/14**	
28	**Lexington-Fayette Urban County Government**	**61 days**	**Tue 3/25/14**	**Tue 6/17/14**	
29	**Earth Disturbance Permit**	**46 days**	**Tue 3/25/14**	**Tue 5/27/14**	
30	Prepare Submission with E&S and Stormwater Controls	4 days	Tue 3/25/14	Fri 3/28/14	8
31	Submit After DOW Approval	1 day	Fri 4/25/14	Fri 4/25/14	40
32	Review and Approval	22 days	Mon 4/28/14	Tue 5/27/14	31
33	**Building Permit**	**15 days**	**Wed 5/28/14**	**Tue 6/17/14**	
34	Prepare Building Permit and Submit	5 days	Wed 5/28/14	Tue 6/3/14	32
35	Approval	10 days	Wed 6/4/14	Tue 6/17/14	34
36	**Kentucky Division of Water**	**77 days**	**Tue 3/11/14**	**Wed 6/25/14**	
37	**General Stormwater Permit**	**33 days**	**Tue 3/11/14**	**Thu 4/24/14**	
38	Prepare Stormwater Controls Submission	10 days	Tue 3/11/14	Mon 3/24/14	8FS-10 days
39	Submit to DOW	1 day	Tue 3/25/14	Tue 3/25/14	38
40	DOW Review and Approval	22 days	Wed 3/26/14	Thu 4/24/14	39
41	**Construct Public Water Supply Facilities**	**67 days**	**Tue 3/25/14**	**Wed 6/25/14**	
42	Prepare Application Form and Engineer's Report	10 days	Tue 3/25/14	Mon 4/7/14	8
43	Submit to DOW	1 day	Wed 4/23/14	Wed 4/23/14	9
44	DOW Review and Approval	45 days	Thu 4/24/14	Wed 6/25/14	43



Project: Preliminary Schedule Rev TJC
Date: Tue 12/17/13

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

ID	Task Name	Duration	Start	Finish	Predecessors
45	**Construction Sequence Plan**	**23 days**	**Mon 1/13/14**	**Wed 2/12/14**	
46	Prepare Draft Construction Sequence Plan	2 days	Mon 1/13/14	Tue 1/14/14	6FF-7 days
47	Update Draft Plan	1 day	Wed 2/12/14	Wed 2/12/14	7FF-7 days
48	**Project Narrative**	**17 days**	**Mon 3/3/14**	**Tue 3/25/14**	
49	Draft Facility Narrative	2 days	Mon 3/3/14	Tue 3/4/14	7FS+5 days
50	Prepare Final Narrative	1 day	Tue 3/25/14	Tue 3/25/14	8
51	**Design Documents - 30% Complete**	**20 days**	**Fri 1/24/14**	**Thu 2/20/14**	
52	Prepare Plans	15 days	Fri 1/24/14	Thu 2/13/14	6
53	Prepare Specifications	15 days	Fri 1/24/14	Thu 2/13/14	6
54	Submit to KAW	5 days	Fri 2/14/14	Thu 2/20/14	52,53
55	**Design Documents - 60% Complete**	**20 days**	**Mon 2/24/14**	**Fri 3/21/14**	
56	Prepare Plans	15 days	Mon 2/24/14	Fri 3/14/14	7
57	Prepare Specifications	15 days	Mon 2/24/14	Fri 3/14/14	7
58	Submit to KAW	5 days	Mon 3/17/14	Fri 3/21/14	56,57
59	**Design Documents - 90% Complete**	**20 days**	**Tue 3/25/14**	**Mon 4/21/14**	
60	Prepare Plans	15 days	Tue 3/25/14	Mon 4/14/14	8
61	Prepare Specifications	15 days	Tue 3/25/14	Mon 4/14/14	8
62	Submit to KAW	5 days	Tue 4/15/14	Mon 4/21/14	60,61
63	**Design Documents - 100% Complete**	**11 days**	**Wed 4/23/14**	**Wed 5/7/14**	
64	Prepare Plans	10 days	Wed 4/23/14	Tue 5/6/14	9
65	Prepare Specifications	10 days	Wed 4/23/14	Tue 5/6/14	9
66	Submit to KAW	1 day	Wed 5/7/14	Wed 5/7/14	64,65
67	**Selection of CM @ Risk Contractor**	**36 days**	**Fri 1/3/14**	**Fri 2/21/14**	
68	**Prepare CM @ Risk RFP**	**10 days**	**Fri 1/3/14**	**Thu 1/16/14**	
69	GF Review of KAW RFP Documents	10 days	Fri 1/3/14	Thu 1/16/14	1
70	**Advertisement and Bid of Services**	**16 days**	**Wed 1/8/14**	**Wed 1/29/14**	
71	Distribution of RFP Documents	1 day	Wed 1/8/14	Wed 1/8/14	
72	Proposal Submissions	15 days	Thu 1/9/14	Wed 1/29/14	71
73	**Selection of CM @ Risk Contractor**	**17 days**	**Thu 1/30/14**	**Fri 2/21/14**	
74	Review of Proposals	10 days	Thu 1/30/14	Wed 2/12/14	72
75	Select Contractor	7 days	Thu 2/13/14	Fri 2/21/14	74
76	**Construct New Filter Building**	**350 days**	**Thu 6/26/14**	**Wed 10/28/15**	
77	Initiate Construction	1 day	Thu 6/26/14	Thu 6/26/14	44
78	Substantial Completion	261 days	Fri 6/27/14	Fri 6/26/15	77
79	Final Completion	88 days	Mon 6/29/15	Wed 10/28/15	78

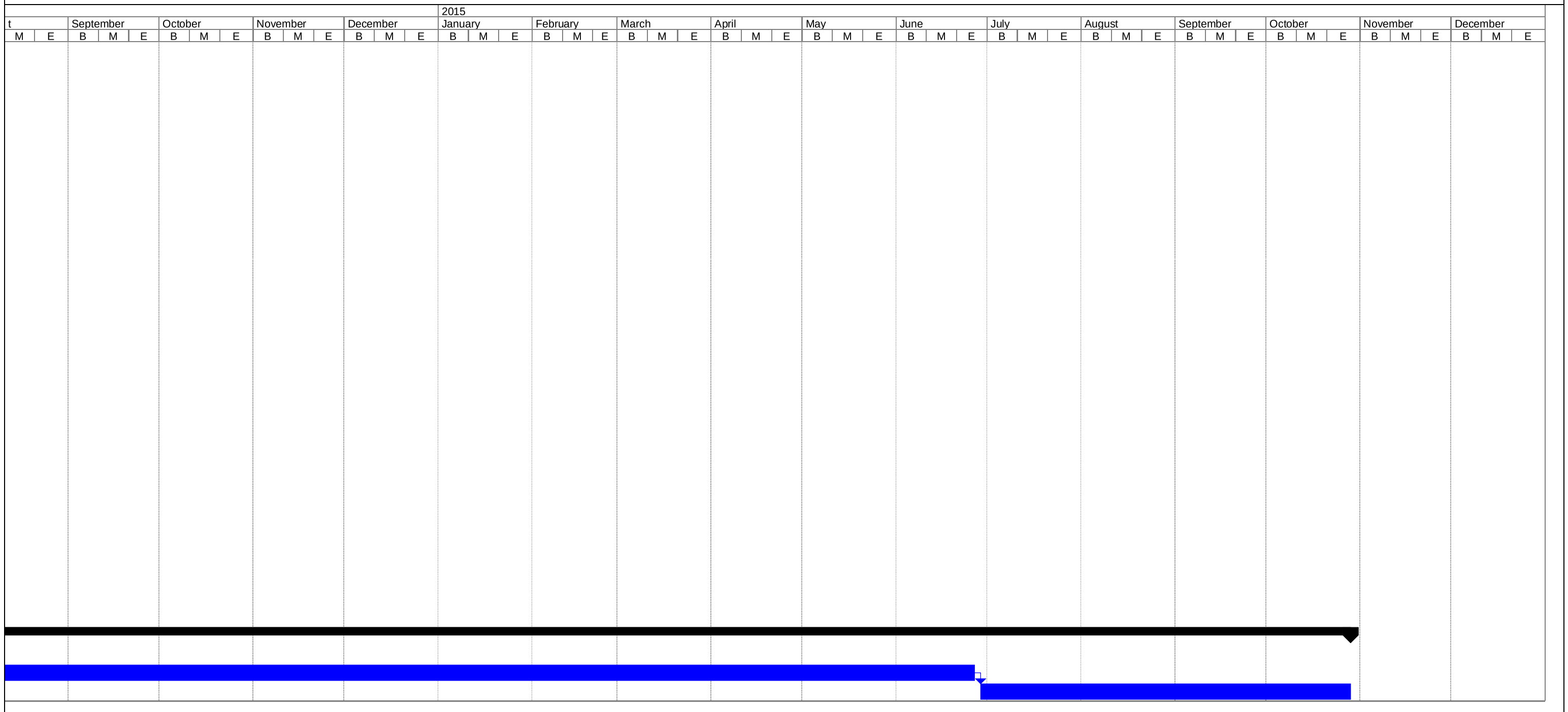


Project: Preliminary Schedule Rev TJC
Date: Tue 12/17/13

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

2015

t		September			October			November			December			January			February			March			April			May			June			July			August			September			October			November			December		
M	E	B	M	E	B	M	E	B	M	E	B	M	E	B	M	E	B	M	E	B	M	E	B	M	E	B	M	E	B	M	E	B	M	E	B	M	E	B	M	E	B	M	E	B	M	E



Project: Preliminary Schedule Rev TJC
Date: Tue 12/17/13

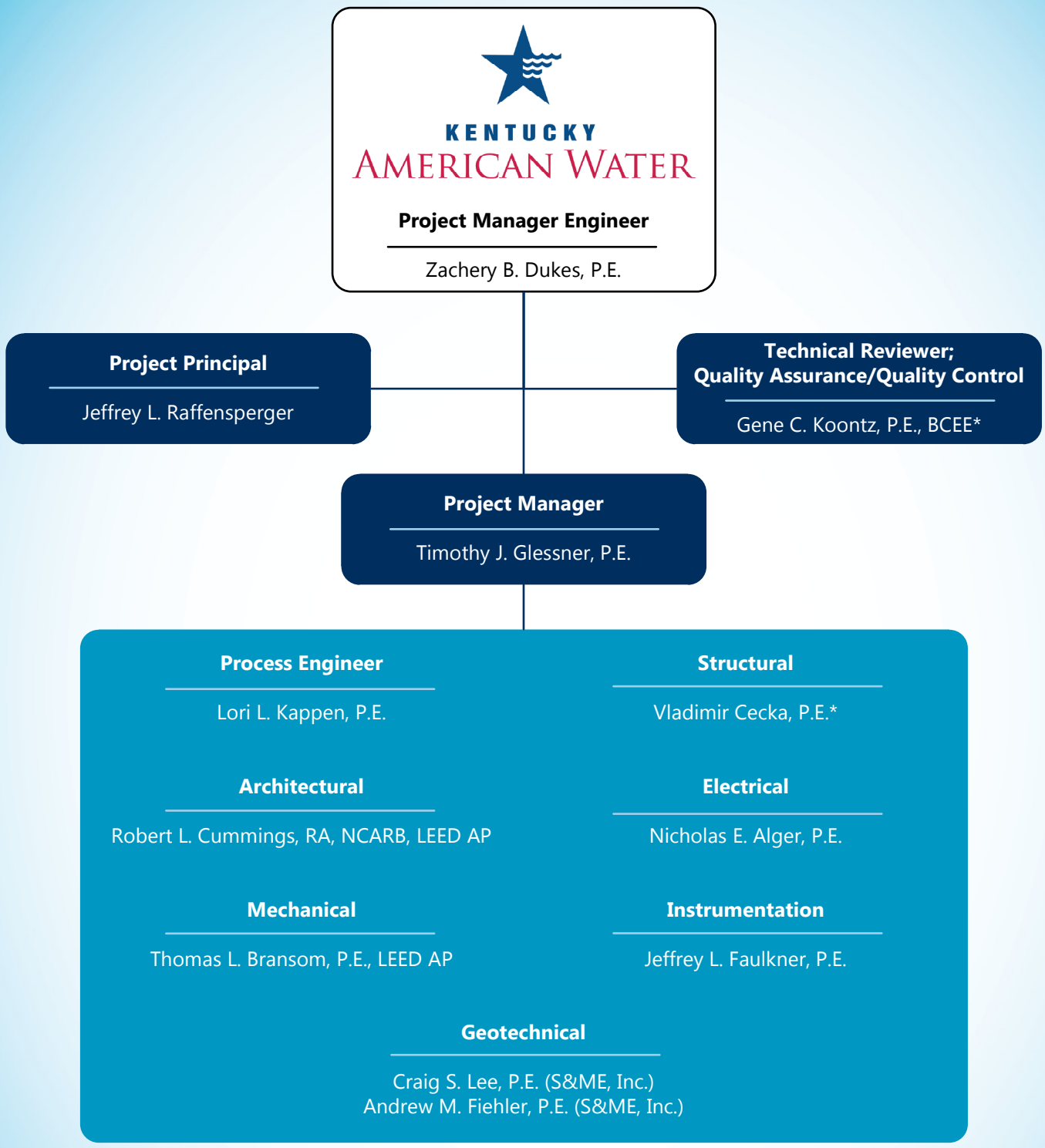
Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

10. Project Organizational Chart

10. Project Organizational Chart

Gannett Fleming's commitment to partner with the Kentucky American Water (KAW) and ensure the successful completion of the proposed project is demonstrated below in the Project Organizational Chart. We have selected the key management members of our proposed Project Team based on their positive relationships and history of working on KAW's projects. Other members of the proposed Project Team routinely work together on other successful water projects. The experience and knowledge gained on past projects will enable them to provide the best solution for the KAW in a cost-effective and timely manner. Figure 10-1 illustrates the organizational structure of our Team and the roles each member will serve. Resumes are presented in Section 11 of this Proposal.

Figure 10-1: Project Organizational Chart



* = Licensed Kentucky Professional Engineer

11. Resumes

The Resumes, which are presented in this Section of our Proposal, highlight the history of working on Kentucky American Water's projects by the key management members of the proposed Project Team, as well as the extensive experience and knowledge of the other key members having routinely worked successfully together on other relevant water projects involving filter design and construction, fast track schedules, and alternate project delivery methods. Figure 11-1 presents these highlights at-a-glance.

Figure 11-1: Proposed Project Team History of Working Together on Relevant Projects

Personnel	Jacobson Reservoir Pump Station	Kentucky River Station II WTP	Hopewell WTP	Blendville WTP	Highland Avenue WTP
Jeffrey L. Raffensperger	●	●	●	●	●
Timothy J. Glessner	●			●	●
Gene C. Koontz	●	●		●	●
Lori L. Kappen		●	●		●
Vladimir Cecka	●	●	●	●	●
Robert L. Cummings		●			
Nicholas E. Alger	●				
Thomas L. Bransom		●			●
Jeffrey L. Faulkner	●	●			

Kentucky American Water

New Filter Building Design
Richmond Road Station Water Treatment Plant, Lexington, Kentucky

Project Assignment: Project Principal
Years Experience with Current Firm: 39
Years Experience with Other Firms: 0
Education:
B.S., Engineering Science, University of Virginia, 1976
Professional Affiliations:
American Water Works Association

Current Responsibilities:

Vice President/Central Pennsylvania Practice Leader for the Water and Wastewater Practice responsible for directing 55 technical support staff personnel, including office managers, project managers, project engineers, CAD technicians, and administrative support staff. Serves as the client contact for American Water master engineering services. Areas of design management include the design and preparation of contract documents for water supply projects and water supply permit applications. Detailed work groups provide the design of water and wastewater treatment plants (WTP and WWTP), well pumping stations, booster pumping stations, water transmission and distribution mains, raw water intakes, storage reservoirs, covering and lining for existing open reservoirs, expansion and upgrading of WTPs and WWTPs, and supervisory control and data acquisition (SCADA) systems from the plant design to distribution system control.

Summary of Experience:

Kentucky River Station II WTP, Lexington, KY, *Kentucky American Water (KAW).* Project Manager for client management and project oversight for the design of a new 20 mgd WTP expandable in 5 mgd modules to 30 mgd. The first 5 mgd expansion module was designed for bidding. Features included raw water facilities with in-river Vee-Wire intake screens, raw water sump of a circular caisson construction, raw water pump station, potassium permanganate feed at the raw water station from a batched system from the WTP, and redundant, 5 kV electric service feeds. A raw water transmission line was installed along a bluff with up to a 40 percent slope founded on concrete piers. The WTP includes unit processes of rapid mixing, horizontal reel three-stage flocculation, plate settler clarification with sludge collectors driven with cable reels, mixed-media sand-anthracite dual-cell filters, and a two-cell clearwell; chemical feed systems, including bulk storage, day tank and feed systems for two coagulant systems, fluoride, sodium thiosulfate, caustic soda, aqua ammonia, and corrosion inhibitor; a carbon bulk sack unloading system with volumetric feeder for powdered activated carbon; a potassium permanganate solution mixing system unloading from 330 drums; a chlorine system delivered in ton liquid cylinders with an emergency gas scrubber system; and a high-service and wash-water pumping station using 5 kV motors and 5 kV variable-frequency drive (VFD) equipment. The WTP also houses an administrative area; chemical and bacteriological laboratories; a fully automated plant SCADA system allowing unmanned plant operation; and 5 kV electric service switchgear with low-voltage 480/277/208/120-V sub fed systems. An extensive process-wastewater-handling system was provided using two backwash-wastewater clarifiers, two sludge thickeners, five wastewater-pumping systems, and a sludge dewatering building designed by a subconsultant.

Jacobson Reservoir Pump Station (JRPS) Design-Build Improvements, Lexington, KY, *KAW.* Project Principal overseeing the design of pump station improvements, including replacement of two existing 100 hp electric-motor-driven and one 400 hp electric/diesel-driven pump with three new 250 hp VFD pumps; replacement of existing electrical gear; installation of a prefabricated building to house electrical gear; installation of a new standby generator; installation of a bulk-liquid-sodium permanganate feed system; and installation of a new SCADA programmable logic controller unit. The JRPS is used to transfer raw water from Jacobson Reservoir to the Richmond Road Station for treatment. The pumping equipment, electrical systems, and permanganate feed system are worn and in need of replacement with new pumps and motors, electrical service rated at 480 volts, and a bulk-liquid-sodium permanganate system for

application into the discharge lines of the pumping equipment.

Hopewell WTP Design-Build Improvements, Hopewell, VA, *Virginia American Water.* Principal-in-Charge for improvements to the 36.75 mgd WTP that included an 18 mgd potable water process and an 18.75 mgd industrial water process. Work included construction of additional domestic filters and carbon contactors, installation of tube settler units, chemical system improvements, complete replacement of industrial process filters, pumping improvements, site piping improvements, and construction of an aboveground clearwell.

Blendville WTP Improvements and Expansion, Design-Build Delivery, Joplin, MO, *Missouri American Water.* Project Manager for client management and project oversight for improvements to a 16 mgd WTP expanded to 21 mgd with an ultimate design capacity of 26 mgd. Features include a new chemical building to replace all plant chemical systems with an on-site sodium hypochlorite generation system, powdered activated carbon in bulk sacks, bulk liquid lime, coagulant, fluoride and aqua ammonia, and polymer systems for filter aid and wastewater. Project also included a new administrative building and rehabilitation of the existing filter control building to replace all filter valves and associated instruments; high-service pump replacement; high-service ventilation and lighting upgrades; new electric utility service, service switchgear, motor control centers, and standby power generation; and a new SCADA instrumentation monitoring and control system. Expansion features include a new 5.5 mgd process building with rapid mixing to split raw water flow between the existing and new processes, vertical turbine-dual stage flocculation, clarification with plate settlers, and dual-media gravity filters; a new 27 mgd filtered-water low-lift pump station with ultraviolet (UV) light disinfection; and a new 1.0 Mgal off-site process-wastewater lagoon. Special features include the on-site hypochlorite generation facilities for primary disinfection that replace a gas chlorine system and the UV disinfection system to meet the U.S. Environmental Protection Agency's Long-Term 2 Enhanced Surface Water Treatment Rule (LT2) disinfection standards.

Highland Avenue WTP Expansion and Improvements, Construction Management At-Risk Delivery, Augusta, GA, *Augusta Utilities Department.* Quality Assurance/Quality Control Advisor for project oversight of the process design of a 60 mgd WTP. The project provided for improvements and expansion on a WTP site with original construction dating to the 1800s. Expansion and improvements included the design of a new administration, chemical, and filter building; a new building consisting of a low-lift filtered-water pumping station, UV light treatment facility, 6 mgd high-service and wash-water pumping station, and electrical distribution; rehabilitation of the raw water storage reservoirs to provide new intake facilities and outlet works; new powdered activated carbon storage and feed building; and new raw water chemical treatment and mixed-water flow-splitting facilities. Additional improvements included replacing the existing flocculation equipment; equipping the existing sedimentation basins with plate settlers; improving the existing filter building to upgrade 10 filters with new underdrains, air-wash systems, filter media, wash-water troughs, and replacement valves; updating the filter rinse system to add flow-monitoring provisions; adding a plant SCADA system; and designing a WTP security system. The existing filter building was updated to provide educational displays and historical artifacts to demonstrate water supply and treatment development for the Augusta Utilities Department. Chemical systems included new facilities for bulk liquid aluminum sulfate, bulk liquid caustic soda, bulk liquid fluoride, on-site generation of 3,000 pounds per day of sodium hypochlorite, bulk liquid corrosion inhibitor, a recycle-bin system for potassium permanganate, bulk liquid polymer for coagulant aid, and a post-liquid lime slurry feed system. New administration facilities included supervisory staff offices, a full environmental laboratory, conference room, operator's facilities, and a WTP control room.

Kentucky American Water

New Filter Building Design
Richmond Road Station Water Treatment Plant, Lexington, Kentucky

Project Assignment: Project Manager
Years Experience with Current Firm: 25
Years Experience with Other Firms: 5
Education:
B.S., Civil Engineering, The Pennsylvania State University, 1982
Professional Registrations:
P.E.: Pennsylvania - No. PE036621E (1987)
Missouri - No. 2006033967 (2006)
Maryland - No. 41749 (2012)
Professional Affiliations:
American Water Works Association

Current Responsibilities:

Principal Project Engineer in the Water Practice responsible for managing the Camp Hill office Water Design Group, as well as leading individual projects. Project responsibilities include developing detailed engineering plans and specifications for water supply projects, including water/wastewater treatment plants (WTP/WWTP), pump stations, and transmission mains. Performs hydraulic calculations, sizes chemical feed and other process equipment, and makes pump selections. Performs design coordination with other design disciplines. Responsibilities also include conceptual and preliminary design, governmental permitting, engineering cost estimates, shop drawing review, preparation of operations and maintenance (O&M) manuals, and operator training.

Summary of Experience:

Reliability Improvements at Kentucky River and Richmond Road Stations, Lexington, KY, *Kentucky American Water (KAW).* Project Manager for pumping upgrades to improve reliability at KAW's Kentucky River and Richmond Road WTPs. The project included replacement of six 12.5 mgd, 1,250 hp vertical turbine raw water pumps with larger 14.5 mgd units; a hydraulic model study of the existing intake to determine necessary modifications to eliminate cavitation and make certain that the higher-capacity pumps performed properly; replacement of two 15 mgd, 900 hp horizontal raw water transfer pumps with larger 18 mgd, 1,000 hp units; addition of a second electrical service for reliability (Kentucky River Station); and addition of a portable generator connection and transfer switch (Richmond Road Station). Responsibilities included hydraulic calculations; pump selection; coordination of design with structural and electrical disciplines; observation of hydraulic model testing for intake; preparation of bidding documents, including pre-purchased equipment contract for pumps; shop drawing review; and assistance with start-up and testing.

Jacobson Reservoir Pump Station Design-Build Improvements, Lexington, KY, *KAW.* Project Manager responsible for replacement of three existing pumps with new more-efficient units, addition of a new electrical building, and replacement of an existing dry permanganate system with a liquid system at an existing pump station facility. Project includes replacement of two 100 hp constant-speed electric pumps and one 400 hp electric/diesel-driven pump with three new 250 hp pumps. One pump will be constant speed and two pumps will be powered by variable-frequency drives (VFDs). The new electrical building, which will house the new electrical switchgear and VFDs, is designed to provide adequate cooling to the VFDs with ventilation only, eliminating the need for air conditioning. The project also includes installation of a liquid chemical feed system designed to feed 40 percent sodium permanganate solution. The system includes an outdoor heated bulk-storage tank and a day tank and feed pumps inside the existing pump station building. Project requirements included development of a construction-sequencing plan that would allow the existing pump station to remain in service during construction. The project is being constructed using a design-build delivery. Responsible for oversight of civil and process design, hydraulic calculations and pump selection, basis-of-design development, coordination with other design disciplines, client communications, communications with the design-build contractor, responses to requests for information, permit

applications, and attendance at regular design and construction meetings.

Blendville WTP Improvements and Expansion, Design-Build Delivery, Joplin, MO, *Missouri American Water.* Assistant Project Manager for the design of improvements to a 16 mgd WTP that is being expanded to 21 mgd with an ultimate design capacity of 26 mgd. Features include a new chemical building to replace plant chemical systems with an on-site sodium hypochlorite generation system, powdered activated carbon in bulk sacks, bulk liquid lime, coagulant, fluoride and aqua ammonia, and polymer systems for filter aid and wastewater. The project also includes a new administrative building; rehabilitation of the existing filter control building that involves replacing filter valves and associated instruments; high-service pump replacement; high-service ventilation and lighting upgrades; new electric utility service, service switchgear, motor control centers, and standby power generation; and a new supervisory control and data acquisition (SCADA) instrumentation monitoring and control system. Features of the expansion include a new 5.5 mgd process building with rapid mixing to split raw water flow between the existing and new processes, vertical turbine dual-stage flocculation, clarification with plate settlers, and dual-media gravity filters; a new 27 mgd filtered water low-lift pump station with ultraviolet (UV) light disinfection; a new 1.0 Mgal aboveground clearwell; a process wastewater equalization basin and pump station; and a new off-site process wastewater lagoon. Special features include on-site hypochlorite generation facilities for primary disinfection (replacing a gas chlorine system) and a UV disinfection system to meet the U.S. Environmental Protection Agency's Long-Term 2 Enhanced Surface Water Treatment Rule (LT2) disinfection standards.

Highland Avenue WTP Expansion and Improvements, Construction Management At-Risk Delivery, Augusta, GA, *Augusta Utilities Department.* Project Engineer for preliminary and final design of a new chemical/filter building, including seven deep-bed gravity filters; coagulant, corrosion inhibitor, polymer, potassium permanganate, and fluoride feed systems; and filter air-wash blowers. Also responsible for the design of modifications to existing sedimentation basins, including the replacement of flocculation equipment and the addition of plate settlers. Developed the hydraulic profile throughout the entire WTP. Performed hydraulic calculations and design of a new high-service/filter-backwash pump station utilizing vertical turbine can pumps. The station includes two filter-backwash pumps and four high-service pumps. Three of the high-service pumps use VFDs.

Forest Park WTP Expansion, Chalfont, PA, *North Penn Water Authority/North Wales Water Authority*. Assistant Project Manager for final design of the expansion of an existing WTP from 20 mgd to 40 mgd. The project included hydraulic improvements to mixed-water piping and flocculators; conversion of six existing rapid sand filters to membrane filters; six additional granular activated carbon (GAC) contactors; raw water, GAC transfer, and high-service pump replacements; chemical feed system improvements; ozone system improvements; design of a chemical building addition to house membrane clean-in-place chemical storage and feed equipment and an on-site sodium hypochlorite generation system; and improvements to process wastewater and sludge dewatering facilities.

Swimming River WTP Improvements, Tinton Falls, NJ, *New Jersey American Water.* Project Engineer for the design of improvements to a 36 mgd WTP that also involved a raw water pumping station upgrade; modification and expansion of pretreatment chemicals, including new ozonation facilities, hydrogen peroxide, and a sodium bisulfite feed system; flash-mixing of coagulant; and rehabilitation of pretreatment and filtration equipment, including the addition of tube settlers, filters with air scour, and media replacement of anthracite with GAC. Improvements involved the modification of filter-effluent routing to increase contact time to comply with new regulations. Work also included a major expansion of SCADA system installation with a dry chlorine scrubber and spill containment facilities.

Kentucky American Water

New Filter Building Design
Richmond Road Station Water Treatment Plant, Lexington, Kentucky

Project Assignment: Technical Reviewer; Quality Assurance/Quality Control

Years Experience with Current Firm: 38

Years Experience with Other Firms: 0

Education:

B.S., Civil Engineering, Lehigh University, 1975

Professional Registrations:

P.E.: Pennsylvania - No. PE029125E (1980)

Virginia - No. 0402023108 (1992)

Maryland - No. 20856 (1994)

Kentucky - No. 20483 (1998)

Florida - No. 52489 (1998)

Missouri - No. 1999137834 (1999)

Ohio - No. PE.64373 (2000)

Connecticut - No. PEN.0021824 (2000)

Iowa - No. 15152 (2000)

Delaware - No. 12076 (2000)

New Jersey - No. 24GE04245500 (2000)

Georgia - No. PE027927 (2002)

Massachusetts - No. 47466-PE (2008)

North Dakota - No. PE-6630 (2010)

Puerto Rico - No. 24630 (2011)

Board Certified Environmental Engineer (BCEE): American Academy of Environmental Engineers (2012)

Professional Affiliations:

American Academy of Environmental Engineers and Scientists

American Water Works Association (AWWA)

AWWA Research Foundation Project Advisory Committees:

Water Works Operators of Pennsylvania

American Council of Engineering Companies (ACEC) – Environmental & Energy Council

Harrisburg Regional Chamber of Commerce

Current Responsibilities:

Senior Vice President/Director of Environmental Resources Division responsible for management of practices providing planning and technical studies, preliminary and final designs, and operational support to municipal and commercial clients. Provides management oversight for 250 engineers and scientists in the Water, Environmental Management, Earth Science and Hydraulics, and Construction Management practices. As Corporate Director for the Water and Natural Resources Markets, provides coordination and guidance for national growth and project execution initiatives for water, dams, oil, gas, mining, and environmental science projects companywide. As Project Principal, provides technical review and guidance for water quality evaluations, water and wastewater designs, process optimization, operations, and water resources studies.

Summary of Experience:

Kentucky River Station II Water Treatment Plant (WTP), Lexington, KY, *Kentucky American Water (KAW).* Technical Reviewer for the design of a new 20 mgd WTP on the Kentucky River to serve the Lexington area.

Jacobson Reservoir Pump Station Design-Build Improvements, Lexington, KY, *KAW.* Project Principal responsible for providing design oversight and quality review for design of improvements to the reservoir pump station.

Blendville WTP Improvements and Expansion, Design-Build Delivery, Joplin, MO, *Missouri American Water.* Technical Reviewer for the design of a 10 mgd expansion of an existing WTP to serve the Joplin area.

Highland Avenue WTP, Augusta, GA, *Augusta Utilities Department.* Technical Reviewer for preliminary and final design for rehabilitation of a 45 mgd WTP and expansion to 60 mgd.

GAC Treatment Facilities for IPMP Taste and Odor Control, Erial, NJ, *Consumers-New Jersey Water Company.* Project Manager responsible for pilot testing of granular activated carbon (GAC) and ultrafiltration processes and preliminary design for a 700 gpm GAC treatment facility for removal of 2-isopropyl-3-methoxypyrazine (IPMP).

WTP, Bethlehem, PA, *City of Bethlehem.* Project Manager responsible for evaluating water quality; pilot testing involving ozone, GAC, direct filtration, and contact clarification; preliminary design; treatment process development; and development of

an operations manual for a 42 mgd (expandable to 65 mgd) WTP. This project included preliminary design of 42-inch raw and treated water transmission mains, in addition to a process wastewater treatment and disposal study.

Forest Park WTP, Bucks County, PA, *North Penn/North Wales Water Authority.* Project Manager in charge of preliminary design and treatment process development. Oversaw the development of an operating manual for a 20 mgd WTP and related facilities for the public water supply portion of the Point Pleasant Project and an intake facility on North Branch Neshaminy Creek. Proposed treatment processes included high-rate settling and filtration, ozone, GAC facilities, and centrifuges for dewatering.

Raritan Millstone WTP, Bound Brook, NJ, *New Jersey American Water.* Technical Reviewer for studies and designs for remedial improvements to filters, piping, and chemical feed systems at a 120 mgd WTP.

Evitts Creek WTP, Cumberland, MD, *City of Cumberland.* Project Manager responsible for process and filter pilot testing, conceptual design, and preliminary design for WTP improvements; a reservoir management plan; a residuals handling plan; and assistance with WTP operations and processes. WTP improvements included retrofit of existing clarifiers with dissolved air flotation, installation of a new rapid mixer, six new chemical feed systems, filter rehabilitation, a filter backwash settling basin, residuals drying beds, and a 0.75 Mgal contact tank.

R.C. Willson WTP, Hagerstown, MD, *City of Hagerstown.* Project Manager for evaluation and preliminary design to improve and expand the existing WTP to 20 mgd. Oversaw regulatory compliance assessments; filter performance evaluations; improvements to mixing, flocculation, and sedimentation (plate settlers); clearwell baffling; testing of filter backwash recycling impacts; mechanical feed improvements; and process wastewater handling.

Shenango Valley WTP Study, Sharon, PA, *Consumers-Pennsylvania Water Company, Shenango Valley Division.* Project Manager responsible for studies to determine whether the existing 16 mgd WTP should be upgraded and expanded or replaced with a new WTP. Evaluated structural and equipment condition, process and filter performance, reliability, operations, ability to meet quality goals, capacity, and costs.

WTP Improvements, Columbia, PA, *Columbia Water Company.* Project Manager in charge of studies and conceptual/preliminary design of improvements to a 3 mgd WTP. This project included a new raw water intake in the Susquehanna River, additions to the flocculation process, modifications to the sludge lagoon, a new lamella plate settler, addition of a wash-water pump, and modifications to filter piping.

Scranton WTP, Scranton, PA, *Pennsylvania American Water.* Project Manager in charge of conceptual design, site investigations, hydraulic studies, preliminary design, treatment process development, pilot testing, and start-up services for providing water treatment facilities for Elmhurst and Lake Scranton supplies. This project included a 33 mgd WTP, contact clarifiers, filter rooms, and a 5 Mgal clearwell.

Water Supply/Treatment Study, Huber Heights, OH, *Ohio Suburban Water Company.* Project Manager in charge of studies, conceptual and preliminary design, and treatment process development for a booster pumping station, air-stripping facilities, and 6 mgd packed tower aerator and filter modifications.

Fullerton WTP, Baltimore, MD, *City of Baltimore.* Technical Reviewer for evaluation of plant process and plant site layouts for a new 120 mgd WTP.

New WTP Study, Bloomsburg, PA, *United Water.* Project Principal responsible for providing design oversight and quality review for study of a replacement of the existing flood-prone WTP.

Kentucky American Water

New Filter Building Design
Richmond Road Station Water Treatment Plant, Lexington, Kentucky

Project Assignment: Process Engineer
Years Experience with Current Firm: 11
Years Experience with Other Firms: 0
Education:
B.S., Environmental Science, Albright College, 1997
M.S., Environmental Engineering, University of Cincinnati, 2003
Professional Registrations:
P.E.: Maryland – No. 30397 (2007)
Standard First Aid: American Red Cross (2012)
CPR/AED - Adult: American Red Cross (2012)
Professional Affiliations:
American Water Works Association (AWWA)

Current Responsibilities:

Senior Project Engineer and Project Manager responsible for water quality, regulatory, process, and economic assessments for potable drinking water treatment plants (WTPs). Specific responsibilities include conducting bench- and pilot-scale testing, evaluating process treatment options, and developing process and facility design criteria for drinking WTPs.

Summary of Experience:

Kentucky River Station II WTP, Lexington, KY, *Kentucky American Water*. Process Specialist responsible for evaluating treatment process options and designing selected treatment processes for a new 20 mgd WTP with an ultimate capacity of 30 mgd. Work included design of raw water intake screens, flocculation, plate setter clarification basins, and residuals-handling facilities, which involved design of two wastewater clarifiers, two sludge thickeners, and a wastewater pumping station.

Taste and Odor Control Study, Hopewell, VA, *Virginia American Water*. Project Engineer responsible for a study of alternative approaches to reduce finished water 2-methylisoborneol (2-MIB) concentrations and objectionable tastes and odors in water delivered to domestic system customers. Hopewell's WTP includes a domestic system with a reliable capacity of 15 mgd and an industrial system with a capacity of 18.75 mgd. The treatment study evaluated technical performance, capital costs, and operating costs of alternatives for geosmin and 2-MIB taste and odor control, including powdered activated carbon, granular activated carbon (GAC), conventional oxidants, and advanced oxidation processes. Responsibilities included assistance with pilot testing of an ultraviolet (UV) -peroxide advanced oxidation process.

Highland Avenue WTP Expansion and Improvements, Construction Management At-Risk Delivery, Augusta, GA, *Augusta Utilities Department*. Process Specialist responsible for on-site facility inspections, evaluation of facility upgrade options, and development of the basis of design document for expansion of the existing 40 mgd WTP to a capacity of 60 mgd. The project included new raw water intakes and flow control, rapid mix facilities, rehabilitation of flocculation basins, addition of inclined plate settlers to the sedimentation basins, new filters and rehabilitation of existing filters, and the addition of buildings to house the new filters, administrative and laboratory facilities, chemical feed equipment, low-lift pumping equipment, and UV light disinfection facilities.

Northampton WTP, Northampton, PA, *Northampton Borough Municipal Authority*. Process Specialist responsible for evaluating treatment process options, developing a basis-of-design document for an 8 mgd WTP, and preparing specifications for UV disinfection equipment. Treatment options evaluated included plate settler clarifiers, ballasted flocculation – clarification, filter adsorbers, carbon contact basins, GAC adsorbers, membrane filters, UV disinfection, and alternate chemicals for pH control and disinfection. Work included conducting bench tests of powdered activated carbon for removal of 2-MIB and geosmin and providing start-up services for the UV disinfection equipment.

Hanover WTP Evaluation and Improvement Study, Hanover, PA, *Borough of Hanover*. Project Engineer responsible for an evaluation of the 11.6 mgd Hanover WTP, which includes two conventional clarification-filtration process trains with

seven mono-media sand filters and four dual-media sand and anthracite filters. Performed a detailed inspection, process evaluation, and selection of recommended improvements to the plant to establish a comprehensive improvement plan. Developed a filter rehabilitation plan for both filter process trains, which included rebuilding each filter using Wheeler inserts with porous plate to improve flow distribution and gain additional filter box depth by eliminating the need for support gravel; installing air scour equipment; providing new sand and anthracite media; raising backwash water troughs; and installing new filter control valves and a new filter control system, among other improvements.

Annual Engineering Services, Lancaster County, PA, *Ephrata Area Joint Authority*. Project Engineer responsible for performing an evaluation of alternatives to achieve compliance with increased *Cryptosporidium* removal requirements under the U.S. Environmental Protection Agency's Long-Term 2 Enhanced Surface Water Treatment Rule (LT2). Evaluation included consideration of reduced individual and combined filter effluent turbidity, pre-sedimentation, UV disinfection, bag/cartridge filtration, and development of a watershed control program. Also responsible for developing technical specifications for chemical cleaning of an existing air-stripping tower that had become fouled with primarily calcium carbonate deposits.

Rock Run WTP Expansion, Coatesville, PA, *Pennsylvania American Water*. Process Discipline Manager responsible for basis of design to expand treatment capacity at an existing WTP from 5 mgd to 7 mgd (with provisions for expansion to 10 mgd) and coordinating with the design team on final process design. The project includes improvements to chemical treatment, construction of a new chemical building with new chemical storage and feed equipment, installation of a filter air-scour system, baffling of an existing clearwell, construction of a new sludge thickener, and improvements to existing treatment processes.

Easton WTP, Easton, PA, *Easton Suburban Water Authority*. Process Specialist responsible for evaluating process improvements to increase treatment capacity. The project included improvements to filter the influent piping to reduce influent velocity; rehabilitation of filters and chemical feed facilities; new raw water and high-service pumps; and improvements to on-site waste-handling facilities, including conversion of retired flocculation basins into filter wastewater clarifiers and a new sludge thickener.

Broad Run WTP, St. Thomas, PA, *Bear Valley Franklin County Pennsylvania Joint Authority*. Project Specialist responsible for evaluating process treatment options, including plate settler clarification, upflow contact clarification, membrane filtration, and granular media filtration, and developing preliminary design criteria for expansion of water treatment capacity from 0.5 to 1.5 mgd. The project included replacement of existing solids blanket clarifiers with an upflow contact clarification process, new granular media filters, and rehabilitation of chemical feed and wastewater-handling facilities. Our firm replaced the existing treatment process with direct membrane filtration and rehabilitated the chemical feed facilities.

Forest Park WTP, Chalfont, PA, *Forest Park Water.* Process Specialist responsible for evaluating existing WTP expansion from 20 mgd to 40 mgd with membrane filtration and developing the basis of design for the facility, following process selection. The project included installation of a vacuum-type membrane filtration process in existing filter cells to double capacity, new on-site sodium hypochlorite-generation facilities, and rehabilitated process wastewater and residuals-handling facilities. Residuals treatment process improvements included the addition of floating inclined plate settler units and sludge collection equipment into existing basins for wastewater clarification, the addition of a new centrifuge, treatment of centrate to remove oxidized metals, and routing of multiple waste streams into the wastewater clarifiers.

Kentucky American Water

New Filter Building Design
Richmond Road Station Water Treatment Plant, Lexington, Kentucky

Project Assignment: Structural

Years Experience with Current Firm: 24

Years Experience with Other Firms: 0

Education:

B.S., Civil Engineering, Structural Design, South Dakota School of Mines and Technology, 1987

Professional Registrations:

P.E.: Pennsylvania - No. PE045454E (1996)

Georgia - No. PE028290 (2002)

Missouri - No. 2006029697 (2006)

Kentucky - No. 25195 (2007)

Virginia - No. 0402046873 (2009)

Florida - No. 72544 (2011)

First Aid: American Red Cross (2011)

CPR/AED - Adult: American Red Cross (2011)

Professional Affiliations:

American Concrete Institute

National Council of Examiners for Engineering and Surveying

Current Responsibilities:

Structural Project Manager experienced in the inspection, design, and rehabilitation of commercial and industrial buildings, water and wastewater treatment facilities, and maintenance facilities for bus and rail systems. Responsibilities include project management, design development, contract document production, discipline coordination, and in-house construction-phase supervision for structural projects.

Summary of Experience:

Kentucky River Station II Water Treatment Plant (WTP), Lexington, KY, *Kentucky American Water (KAW).* Structural Project Manager responsible for designing a 25 mgd WTP, intake foundation, and raw water pump station.

Jacobson Reservoir Pump Station (JRPS) Design-Build Improvements, Lexington, KY, *KAW.* Structural Project Manager responsible for the design of pump station improvements, including replacement of two existing 100 hp electric-motor-driven and one 400 hp electric/diesel-driven pump with three new 250 hp VFD pumps; replacement of existing electrical gear; installation of a prefabricated building to house electrical gear; installation of a new standby generator; installation of a bulk-liquid-sodium permanganate feed system; and installation of a new SCADA programmable logic controller unit. The JRPS is used to transfer raw water from Jacobson Reservoir to the Richmond Road Station for treatment. The pumping equipment, electrical systems, and permanganate feed system are worn and in need of replacement with new pumps and motors, electrical service rated at 480 volts, and a bulk-liquid-sodium permanganate system for application into the discharge lines of the pumping equipment.

Hopewell WTP Design-Build Improvements, Hopewell, VA, *Virginia American Water*. Structural Engineer responsible for design of a new chemical building, filter building addition, new industrial filter building, office building addition, and modifications to existing buildings. Subsequently designed bearing and lateral masonry shear walls to resist wind and seismic loads. Also designed foundations to support large liquid storage tanks and aluminum and fiber-reinforced plastic platforms. Inspected existing sludge holding tanks and developed concrete repair details to extend service life of these tanks. Coordinated the development of the construction drawings and specifications and responded to applicable requests for information during construction.

Blendville WTP Improvements and Expansion, Design-Build Delivery, Joplin, MO, *Missouri American Water/Reynolds, Inc.* Structural Discipline Manager responsible for the design, development of contract drawings, and construction-phase services of a 16 mgd WTP rehabilitation and two 5 mgd WTP expansions. The plant's capacity was expanded to 21.5 mgd. The two-phase assignment included rehabilitating the existing plant by replacing all chemical systems; rehabilitating filter valves; relocating operations facilities to a new administration building; installing a new filtered-water transfer pumping station; and adding

ultraviolet disinfection, clearwell capacity, and high-service pump replacement.

Highland Avenue WTP Expansion and Improvements, Construction Management At-Risk Delivery, Augusta, GA, *Augusta Utilities Department*. Structural Engineer responsible for preliminary and final structural design of improvements to and expansion of the 100-year-old Highland Avenue Water Treatment Plant. The facility was expanded from a capacity of 45 mgd to 60 mgd.

Olean WTP, Olean, NY, *City of Olean.* Project Manager responsible for the design of a 6 mgd WTP, which included a raw water intake structure, clearwell, a high-service pumping station, and a filter/process building.

Norristown WTP, Norristown, PA, *Pennsylvania American Water (PAW).* Project Engineer for a 16 mgd WTP. Work involved modifications to the existing facilities and design of a new post-chemical filter building, clearwell, pumping station, sludge thickener, and wastewater clarifiers. The design included mat foundations, pile foundations, concrete walls, structural slabs, steel framing, and masonry design. Also coordinated with other disciplines and checked final drawings.

Appomattox WTP, Petersburg, VA, *Appomattox River Water Authority.* Structural Project Manager responsible for the design to expand an existing WTP from 46 mgd to 96 mgd. Work included addition of 16 filters, 6 sedimentation/flocculation basins, a rapid-mixer building, a raw water pumping station, a distributive pumping station, and modifications to the existing basins, including structural concrete repairs. Coordinated work with other disciplines.

Water Treatment Facility Improvements, Manassas, VA, *City of Manassas.* Structural Engineer for WTP upgrades that include a new 10 mgd raw water pump, a new powdered activated carbon system, settling-basin improvements, filter-media replacements, new chemical storage and feed systems and modifications to existing systems, and other miscellaneous improvements.

Swimming River WTP, Monmouth, NJ, *New Jersey American Water.* Structural Discipline Manager responsible for designing ozone facilities and filter improvements for a 45 mgd WTP.

Brownsville WTP, Fayette County, PA, *Borough of Brownsville.* Structural Project Engineer responsible for structural modifications to an existing WTP. Design and detailing responsibilities included modifications to filters and the pipe gallery and the addition of several small structures.

Shenango WTP, Sharon, PA, *Consumers-Pennsylvania Water.* Structural Project Engineer responsible for the design and layout of a 16 mgd WTP. The design included the main treatment plant with an underground clearwell, sludge thickener building, belt filter press building, and raw water intake and pumping station. Responsible for design, specifications, coordination with other disciplines, and construction services.

R.C. Willson WTP, Hagerstown, MD, *City of Hagerstown.* Structural Discipline Manager responsible for designing structural improvements to a 14 mgd WTP. Design elements included filter improvements, sedimentation basin concrete repairs, and basin modifications.

Beaver Run WTP, Greensburg, Westmoreland County, PA, *Municipal Authority of Westmoreland County.* Project Engineer for a 24 mgd WTP that included design of a 4 Mgal clearwell, a 350,000-gallon sump pump, 2 Mgal equalization basins, a high-service pump room, filters, and a process building. Designed mat foundations, square footings, concrete walls, retaining walls, columns, structural slabs, stairs, steel framing, bearing and nonbearing masonry walls, lintel beams, monorail beams, and fiberglass platforms and checked structural drawings.

Kentucky American Water

New Filter Building Design
Richmond Road Station Water Treatment Plant, Lexington, Kentucky

Project Assignment: Architectural

Years Experience with Current Firm: 23

Years Experience with Other Firms: 22

Education:

B. Architecture (Design Option), Texas Tech University, 1969

Professional Registrations:

RA: Pennsylvania - No. RA012220B (1989)

Maryland - No. 8304 (1989)

National Council of Architectural Registration Boards (NCARB) Certification - No. 38608 (1989)

USGBC - LEED 2.0 Accredited Professional (2004)

WMATA Contractor Safety and Security Training (2013)

Current Responsibilities:

Senior Project Architect/Manager responsible for supervising construction drawings; directing technical staff; writing and coordinating project specifications; preparing cost estimates; conducting quality assurance/quality control reviews, value engineering analysis, and constructability reviews; reviewing shop drawings; and leading teams in achieving Leadership in Energy and Environmental Design (LEED) requirements and certification. Experienced in AutoCAD, MicroStation, and Revit.

Summary of Experience:

Kentucky River Station II Water Treatment Plant (WTP), Lexington, KY, *Kentucky American Water.* Architect responsible for the exterior design and documentation of a new 62,000-square-foot, 20 mgd plant with expansion capability to 25 mgd.

Moores Bridges WTP, Norfolk, VA, *City of Norfolk.* Architect responsible for construction drawings for a 29,500-square-foot, two-story filter/laboratory building as part of an $80 million expansion to a regional treatment plant.

Still Creek WTP, Tamaqua, PA, *Tamaqua Borough Authority.* Project Architect for the construction of a $7.5 million, 26,000-square-foot, two-story regional treatment plant.

WTP Improvements, Easton, PA, *Easton Suburban Water Authority.* Architect responsible for surveying a treatment facility for deteriorating lintels and parapets and roof conditions, and for supervising the documentation of the corrective measures. The original building, built in 1932, is considered historically significant to its neighborhood, and the team worked with the Pennsylvania Historical and Museum Commission to develop an approach acceptable to all parties.

Bethlehem WTP, Bethlehem, PA, *City of Bethlehem.* Project Architect for 70,300-square-foot, three-story, regional plant and accessory buildings. Construction cost was $30 million.

Becks Run Raw Water Pumping Station, Pittsburgh, PA, *Pennsylvania American Water.* Architect responsible for supervising the documentation of a new pumping station to replace an existing facility and renovations to existing structures. The new building includes architectural features to match the historical architectural features of this type of structure.

Loudoun Route 50 Water Booster Pump Station Improvements, Loudoun County, VA, *Loudoun Water.* Architect responsible for supervising the documentation of the conversion of a mezzanine to an enclosed electrical room in an existing raw water supply building and adding a second exit from the mezzanine, including an exterior stair.

Roth Lane Wastewater Treatment Facility Upgrades, Hampden Township, PA, *Hampden Township Sewer Authority.* Architect responsible for designing and supervising the documentation of the addition of four new structures at an existing wastewater treatment facility.

Wastewater Treatment Plant (WWTP) Additions and Alterations, Mt. Pocono, PA, *CECO Associates, Inc.* Architect responsible for the survey and planning of alterations to existing control and blower buildings at the Mt. Airy Resort and Casino.

Exeter WWTP Additions and Alterations, Berks County, PA, *Exeter Township, Berks County Authority.* Project Architect for three new and three renovated structures. Estimated construction cost was $19 million.

Gowanus Pump Station Upgrade, Brooklyn, NY, *New York City Department of Environmental Protection.* Architect responsible for supervising the documentation of a new service building and pumping station attached to a facility that also includes a restored pump house and gate house built in 1910. The new facilities include architectural features to match a historically significant brick wall that could not be reused. Exterior materials of the new buildings include stainless steel panels, wire-mesh screens, and a curved parapet profile/roof perimeter to simulate the curvature of a wave.

Mon Valley Seneca Street Combined Sewer Overflow Treatment Facility, Phase II, Monessen, PA, *Mon Valley Sewage Authority*. Architect responsible for designing and supervising the documentation of a new combined sewage overflow facility. The new facility includes two major buildings that incorporate architectural features to match the historical architectural features of this type of structure and of regional architecture.

Kentucky American Water

New Filter Building Design
Richmond Road Station Water Treatment Plant, Lexington, Kentucky

Project Assignment: Electrical

Years Experience with Current Firm: 4

Years Experience with Other Firms: 8

Education:

B.S., Engineering (Electrical Concentration), Messiah College, 2001

Professional Registrations:

P.E.: Pennsylvania - No. PE073707 (2006)

e-RAILSAFE Badge: e-VERIFILE.COM, Inc. - No. 219031401477 (2012)

Standard First Aid: American Red Cross (2012)

Adult CPR/AED: American Red Cross (2012)

Amtrak Contractor - No. PA-0113-00237 (2012)

Norfolk Southern Roadway Worker Protection/Contractor Safety (2013)

Professional Affiliations:

Institute of Electrical and Electronics Engineers

Current Responsibilities:

Electrical Engineer responsible for designing electrical systems for various types of projects, including commercial and industrial facilities. Work involves preparing designs and developing plans, specifications, and cost estimate (PS&E) packages for medium- and low-voltage switchgear and distribution, lighting, general power, fire alarm, intrusion-detection, closed-circuit television (CCTV), and communication systems, as well as for instrumentation and control system interfaces. Additional work involves construction services such as checking shop drawings and responding to requests for information.

Summary of Experience:

Jacobson Reservoir Pump Station (JRPS) Design-Build Improvements, Lexington, KY, *Kentucky American Water*. Electrical Design Engineer for the design of pump station improvements, including replacement of two existing 100 hp electric-motor-driven and one 400 hp electric/diesel-driven pump with three new 250 hp VFD pumps; replacement of existing electrical gear; installation of a prefabricated building to house electrical gear; installation of a new standby generator; installation of a bulk-liquid-sodium permanganate feed system; and installation of a new SCADA programmable logic controller unit. The JRPS is used to transfer raw water from Jacobson Reservoir to the Richmond Road Station for treatment. The pumping equipment, electrical systems, and permanganate feed system are worn and in need of replacement with new pumps and motors, electrical service rated at 480 volts, and a bulk-liquid-sodium permanganate system for application into the discharge lines of the pumping equipment.

Additions and Alterations to Rock Run Water Treatment Plant (WTP), Coatesville, PA, *Pennsylvania American Water*. Electrical Engineer assisting in providing construction support services, including shop drawing review and responses to requests for information regarding the electrical portion of the WTP upgrade. Upgrades and modifications to the plant included a new chemical building; additions and renovations to the main WTP building; replacement of the existing plant's main substation with a new 33 kV service, 480-volt substation, and main 480-volt switchgear; and addition of a new standby diesel generator with a soft-load transfer switch integrated into the main switchgear.

Williamsport West Wastewater Treatment Plant (WWTP) Upgrade W1, Williamsport, PA, *Williamsport Sanitary Authority*. Electrical Engineer for the preparation of plans and specifications, and for construction-phase support services, for electrical system upgrades associated with WWTP process upgrades. Plant upgrades include modifications to the existing chemical building, a new site stream treatment tank, a new blower/alkalinity building, new aeration tank mixers, and new internal mixed-liquor recirculation pumps. Electrical upgrades consist of modifications to the existing WWTP's main switchboard; addition of two new motor control centers; new branch circuit panelboards and transformers for the new blower/alkalinity and existing chemical buildings; new site and building distribution feeders as required; process and general power branch circuits;

lighting; and instrumentation and control system interfaces.

Additions and Alterations to WWTP, Bloomsburg, PA, *Municipal Authority of the Town of Bloomsburg.* Electrical Engineer responsible for providing construction support services, including shop drawing review and responses to requests for information, for the electrical portion of the WWTP upgrades. New plant electrical systems include double-circuit 12.47 kV utility service; double-ended (main-tie-main type) secondary unit substation and secondary distribution switchgear; site and building low-voltage distribution feeders; low-voltage motor control centers, panelboards, and transformers; process and general power branch circuits; lighting; and required instrumentation and control system interfaces.

WWTP Upgrade, Hazleton, PA, *Greater Hazleton Joint Sewer Authority.* Electrical Engineer assisting in the preparation of plans and specifications for the electrical portion of upgrades to a WWTP.

Chilled-Water Plant Renovations, Pottstown, PA, *The Hill School.* Electrical Engineer responsible for design of electrical systems to support renovation of the existing central cooling plant. The new central cooling plant completely replaces the old plant and includes both electric- and natural gas engine-driven chillers, as well as ice storage, in order to avoid additional peak electrical demand on the existing service. Unique features of the electrical design include re-use of two existing services to the existing plant (one 208Y/120VAC and one 480Y/277VAC) and the use of low-harmonics variable-frequency drives to avoid injection of power system harmonics onto the low-voltage campus distribution system.

Kentucky American Water

New Filter Building Design
Richmond Road Station Water Treatment Plant, Lexington, Kentucky

Project Assignment: Mechanical

Years Experience with Current Firm: 15

Years Experience with Other Firms: 1

Education:

B.S., Mechanical Engineering Technology, The Pennsylvania State University, 1997

Professional Registrations:

P.E.: Pennsylvania - No. PE060969 (2002)

USGBC - LEED 2.0 Accredited Professional (2002)

Current Responsibilities:

Mechanical Engineer responsible for design development for a variety of mechanical systems, including heating, ventilating, and air-conditioning (HVAC), plumbing, fire protection, and site utilities such as steam and chilled-water distribution systems for industrial, public works, military, and commercial clients. Also responsible for the preparation of drawings and specifications, construction-phase services, field surveys, and construction cost estimating.

Summary of Experience:

Kentucky River Station II Water Treatment Plant (WTP), Owen County, KY, *Kentucky American Water (KAW).* Mechanical Engineer responsible for designing the HVAC, fire suppression, and plumbing systems in support of a new 48,000-square-foot treatment plant building and new raw water pump station. Designed ventilation systems for process, pump station, and chemical areas and air handling systems for the administration and laboratory areas of the plant building.

Highland Avenue WTP Expansion and Improvements, Construction Management At-Risk Delivery, Augusta, GA, *Augusta Utilities Department.* Mechanical Engineer responsible for designing HVAC, plumbing, and fire suppression systems in support of modifications and expansion of a WTP. Designed ventilation systems for process and chemical storage areas, and a gas-fired hot water boiler system and a variable-air-volume air-conditioning system for the administrative and laboratory areas of the new process building.

Louisville Pump Station, Louisville, KY, *KAW.* Mechanical Engineer responsible for designing the ventilation cooling and heating systems for a booster pump station.

Northampton Borough WTP, Northampton, PA, *Northampton Borough Municipal Authority.* Mechanical Engineer responsible for designing HVAC, plumbing, and fire suppression systems in support of modifications and expansion of a WTP. The design incorporated Leaders in Energy and Environmental Design (LEED) criteria in order for the building to achieve LEED certification. Designed ventilation systems for process and chemical storage areas, and a gas-fired hot water boiler system and a variable-air-volume air-conditioning system for the administrative and laboratory areas of the new process building.

Olean WTP, Olean, NY, *City of Olean.* Mechanical Engineer responsible for designing the HVAC systems for a WTP, which included a laboratory and administrative area. Ventilation and heating systems for the chemical storage rooms, process rooms, and pump station were also included in the design.

Pump Station, Lebanon, PA, *AES Ironwood.* Mechanical Engineer responsible for designing a ventilation cooling system for a pump station that included a water filtration room. The plumbing system, consisting of an emergency eye and face wash, as well as a simple bathroom group, was also included as part of the design.

Port Authority Trans-Hudson (PATH) Waldo Yard Train Washer Blower/Dryer, Jersey City, NJ, *The Port Authority of New York and New Jersey.* Mechanical Engineer responsible for designing compressed air and water filtration system modifications in support of changes required for the blower dryer system. The bus wash water reclaim filter system was upgraded and the piping system was revised to improve system operations.

Water Connection, Hershey, PA, *The Pennsylvania State University.* Mechanical Engineer responsible for the design and coordination of a secondary water service connection to feed a water distribution network on the Milton S. Hershey Medical Center campus. Completed the water demand documentation and facilitated the application for service.

Project Assignment: Instrumentation

Years Experience with Current Firm: 9

Years Experience with Other Firms: 28

Education:

B.S., Electrical Engineering Technology, University of Pittsburgh-Johnstown, 1987

Professional Registrations:

P.E.: Pennsylvania - No. PE052033E (1998)

Professional Affiliations:

National Society of Professional Engineers

Pennsylvania Society of Professional Engineers

Current Responsibilities:

Senior Control Systems Engineer responsible for the concept development, installation design, implementation, and validation of process monitoring and control systems for water and wastewater treatment plants (WTP/WWTP) and transportation, dam, and industrial facilities; the integration of complete systems using various instruments, analyzers, programmable logic controllers (PLCs), supervisory control and data acquisition (SCADA)/human machine interface (HMI) hardware and software, and computers; and the development of piping and instrumentation diagrams (P&IDs), equipment wiring loop drawings, panel layouts, system network riser diagrams, and specifications.

Summary of Experience:

Kentucky River Station (KRS) II WTP, Lexington, KY, *Kentucky American Water (KAW).* Process Control Systems Engineer responsible for providing instrumentation and control (I&C) design services for a process monitoring and control system for a new 20 mgd (expandable to 30 mgd) WTP on KRS II of the Kentucky River.

Jacobson Reservoir Pump Station (JRPS) Design-Build Improvements, Lexington, KY, *KAW.* Process Control Systems Engineer responsible for the design of pump station improvements, including replacement of two existing 100 hp electric-motor-driven and one 400 hp electric/diesel-driven pump with three new 250 hp VFD pumps; replacement of existing electrical gear; installation of a prefabricated building to house electrical gear; installation of a new standby generator; installation of a bulk-liquid-sodium permanganate feed system; and installation of a new SCADA programmable logic controller unit. The JRPS is used to transfer raw water from Jacobson Reservoir to the Richmond Road Station for treatment. The pumping equipment, electrical systems, and permanganate feed system are worn and in need of replacement with new pumps and motors, electrical service rated at 480 volts, and a bulk-liquid-sodium permanganate system for application into the discharge lines of the pumping equipment.

Raritan Millstone WTP Improvements, Bridgewater, NJ, *New Jersey American Water.* Process Control Systems Engineer responsible for providing I&C design services for a various systems being upgraded at the WTP. The project includes low-lift pump station improvements, standby power generation, flocculation and sedimentation basin improvements, chemical system improvements, filter improvements, and high-lift station improvements.

Northampton WTP, Northampton, PA, *Northampton Borough Municipal Authority.* Process Control Systems Engineer/Lead SCADA Programmer on a project involving the construction of a new WTP. Responsibilities included reviewing instrumentation process submittals, programming the WTP process monitoring and control system, coordinating programming efforts with three vendors, overseeing and participating in the acceptance testing of control panels, and starting up and performing the validation testing of the completed process monitoring and control system.

Still Creek WTP - SCADA System Replacement, Tamaqua, PA, *Tamaqua Area Water Authority*. Process Control Systems Engineer responsible for providing the budgeting, construction management services, instrumentation, control design, and programming services for the I&C system upgrade for the Still Creek WTP.

Red Lion Municipal WTP, Red Lion, PA, *Red Lion Municipal Authority.* Process Control Systems Engineer responsible for providing I&C design services for a process monitoring and control system for a new 4 mgd WTP.

Rock Run WTP, Coatesville, PA, *Pennsylvania American Water.* Process Control Systems Engineer responsible for providing I&C design services for a process monitoring and control system for an existing 8 mgd WTP.

Annual Water Services, Still Creek WTP I&C Evaluation, Tamaqua, PA, *Tamaqua Area Water Authority.* Process Control Systems Engineer responsible for providing I&C design services for preliminary I&C system upgrades being considered by the Authority for its WTP. The study made recommendations and provided an opinion of probable costs for the associated equipment.

Hanover WTP Evaluation Study, Hanover, PA, *Borough of Hanover.* Process Control Systems Engineer responsible for providing the I&C evaluation of the Borough's WTP. The study made recommendations and provided an opinion of probable costs for the associated equipment.

SCADA System, WTP Upgrade, Chambersburg, PA, *Borough of Chambersburg.* Assistant Project Manager/Process Control Systems Engineer responsible for providing I&C design and programming services for an upgrade of the process monitoring and control system at the Julio D. Lecuona WTP, a raw water intake station, Dull Hill Reservoir, and the No. 3 pressure-reducing valve station.

Elizabethtown-Heritage Water Distribution SCADA System Improvement Project, Elizabethtown, NJ, *New Jersey American Water.* Process Control Systems Engineer responsible for providing I&C design services for the development of process monitoring and control system specifications for the Phase 2 implementation of this improved water distribution SCADA system.

Chambersburg SCADA System, Preliminary Engineering Design Study, Chambersburg, PA, *Borough of Chambersburg.* Process Control Systems Engineer responsible for providing I&C design services for a preliminary I&C system and process equipment upgrades being considered by the Borough for its WTP. The study made recommendations and provided an opinion of probable costs for the associated equipment.

Water Distribution System SCADA Upgrade, Wheeling, WV, *City of Wheeling.* Process Control Systems Engineer responsible for providing I&C design services for the installation of a SCADA system for a water distribution system and SCADA system upgrades at an existing WTP. The City wanted to install a new computerized SCADA system to monitor its water distribution booster pump stations and tanks and replace its old telemetry equipment. At the same time, the City elected to replace its old Fisher and Porter process monitoring and control system.

Kentucky American Water

New Filter Building Design
Richmond Road Station Water Treatment Plant, Lexington, Kentucky

Project Assignment: Geotechnical
Years of Experience: 25
Education:
B.S., Mining Engineering, University of Kentucky, 1984
Professional Registrations:
P.E.: Kentucky - No. 17150
Tennessee - No. 00104010
West Virginia - No. 13382
Illinois - No. 051560

Current Responsibilities:

Senior Geotechnical Engineer with over 25 years of hands-on experience in geotechnical, construction materials testing, general civil engineering, and forensic geotechnical engineering. He has previous experience on projects throughout Kentucky, western Virginia and West Virginia, Ohio, Tennessee and Indiana; in regions ranging from the Mississippian limestone plateau in western Kentucky, the ridge and valley of Tennessee, and the alluvial and glacial deposits of the Ohio River valley to the Eastern Kentucky Coalfields. His experience encompasses most geotechnical and construction aspects of manufacturing, educational, institutional and municipal building sites, as well as water tanks, treatment plants, towers, dams, bridges, and highways. His specific responsibilities have included design, coordination and performance of subsurface explorations and instrumentation, construction monitoring and observation, laboratory testing programs, data compilation and analysis, geotechnical engineering analysis and design, preparation of engineering reports and proposals, and project management of geotechnical engineering and construction monitoring projects.

Summary of Experience:

Paintsville Water Treatment Plant (WTP).

Ashland WTP – Phase 2 Expansion.

Berea WTP.

Harlan WTP.

Bardstown WTP.

Augusta WTP.

West Fleming WTP.

Otter Creek Wastewater Treatment Plant (WWTP).

Strodes Creek WWTP.

North Madison WWTP.

Madison Water WWTP.

Whitesburg WWTP.

Ohio County Regional WWTP.

Kentucky American Water

New Filter Building Design
Richmond Road Station Water Treatment Plant, Lexington, Kentucky

Project Assignment: Geotechnical

Years of Experience: 11

Education:

B.S., Geological Engineering, University of Missouri – Rolla, 2000

Professional Registrations:

P.E.: Kentucky - No. 23977

Current Responsibilities:

Staff Geotechnical Engineer that joined S&ME, Inc. in June 2000 and has acquired his license to practice Professional Engineering in the Commonwealth of Kentucky, progressing from Staff Engineer to Project Engineer/Project Manager. He has successfully completed formal training in Project Management and Loss Prevention as well as ASFE's Fundamentals of Professional Practice course.

He brings 11 years of hands-on experience in geotechnical, construction materials testing, and forensic geotechnical engineering. He has experience on projects throughout Kentucky, Indiana, Ohio, Virginia, North Carolina, and Tennessee. His experience encompasses most geotechnical and construction aspects of manufacturing, educational, institutional and municipal building sites, as well as water tanks and towers, treatment plants, cellular towers, slope stability evaluations, dams, bridges, and highways. His specific responsibilities have included design, coordination and performance of subsurface explorations, construction monitoring and observation, laboratory testing programs, data compilation and analysis, geotechnical engineering analysis and design, preparation of engineering reports and proposals, and project management of geotechnical engineering and construction monitoring projects. He has also participated in several forensic geotechnical and materials testing projects.

Summary of Experience:

Paintsville Water Treatment Plant (WTP).

Ashland WTP – Phase 2 Expansion.

West Fleming WTP.

Clay County WTP.

Whitesburg Wastewater Treatment Plant (WWTP).

Ohio County Regional WWTP.

Strodes Creek WWTP.

North Madison WWTP.

12. Sub-Consultants

Gannett Fleming will utilize S&ME, Inc., as a sub-consultant to support the geotechnical services provided for this project. They have provided geotechnical services, as well as a variety of other services, to many water/wastewater treatment plants (WTPs/WWTPs) located throughout Kentucky. A company overview, including project experience and references, is detailed below.

12.1. S&ME, Inc.

S&ME is an award winning engineering and environmental services firm employing 1,000 professional and support staff working from 25 offices in Alabama, Florida, Georgia, Kentucky, North Carolina, South Carolina, Tennessee, Virginia, and Ohio. The firm is ranked 99th in *Engineering News-Record* (ENR) magazine's Top 500 Design Firms and Top 200 Environmental Firms. They have won more than 70 Engineering Excellence Awards from state chapters of the American Council of Engineering Companies.

They are focused on safely providing technically excellent services, governed by unquestioned integrity, and strive to accomplish their clients' objectives in a cost-effective manner.

S&ME, formerly Soils & Materials Engineering, was founded in 1973 in Raleigh, North Carolina and remains headquartered there. In March 2010, they expanded significantly by acquiring QORE Property Sciences, including their assets and most of their employees, followed by the acquisition of BBC&M in 2011. Their expertise includes:

- Geotechnical engineering
- Construction materials engineering, testing and quality control
- Environmental engineering
- Natural and cultural resources
- Occupational health and safety
- Water resources and solid waste engineering.

12.1.1. Work History

Paintsville WTP
Client: City of Paintsville Utilities
Location: Paintsville, KY

Ashland WTP – Phase 2 Expansion
Client: HDR/Quest Engineers
Location: Ashland, KY

Berea WTP
Client: City of Berea
Location: Berea, KY

Harlan WTP
Client: Leo Miller and Associates/Quest Engineering
Location: Harlan, KY

Bardstown WTP
Client: City of Bardstown
Location: Bardstown, KY

West Fleming WTP
Client: HDR/Quest Engineers
Location: Ewing, KY

Otter Creek WWTP
Client: CDP Engineers, Inc.
Location: Richmond, KY
Owner: Richmond Utilities

Strodes Creek WWTP
Client: CDP Engineers, Inc.
Location: Winchester, KY
Owner: Winchester Municipal Utilities

Barbourville WWTP
Client: Pace Contracting, LLC
Completion Date: 2011

Pikeville WWTP Environmental Evaluation
Client: Vaughn & Melton
Location: Pikeville, KY

West Hickman WWTP Hydrology
Client: Freeland Harris Consulting Engineers
Location: Nicholasville, KY

Prestonsburg WWTP
Client: Kenvirons, Inc.
Location: Prestonsburg, KY

Beattyville WWTP
Client: Smith Contractors
Location: Beattyville, KY

Madison Water WWTP
Client: Dunlap & Company
Location: Richmond, KY

Whitesburg WWTP
Client: Summit Engineering
Location: Whitesburg, KY

Ohio County Regional WWTP
Client: HDR/Quest Engineers
Location: Beaver Dam, KY

12.1.2. References

Mr. Mike Hill, P.E.
Summit Engineers, Inc.
120 Prosperous Place
Lexington, KY 40509
859-264-9860

Mr. Leo Miller, P.E., L.S.
Leo Miller and Associates
114 North Second Street
Harlan, KY 40831
859-573-4300

Mr. Dan Kubican, P.E.
Brown & Kubican, PSC
2224 Young Drive
Lexington, Kentucky 40509
859-543-0933

13. Concurrence with Terms

13. Concurrence with Terms

Gannett Fleming will complete services described in this Proposal in accordance with the terms and conditions of the Master Services Agreement. Gannett Fleming has read the Request for Proposal and is prepared to sign the Task Order as written, should this Proposal be accepted by Kentucky American Water.

14. Exceptions

14. Exceptions

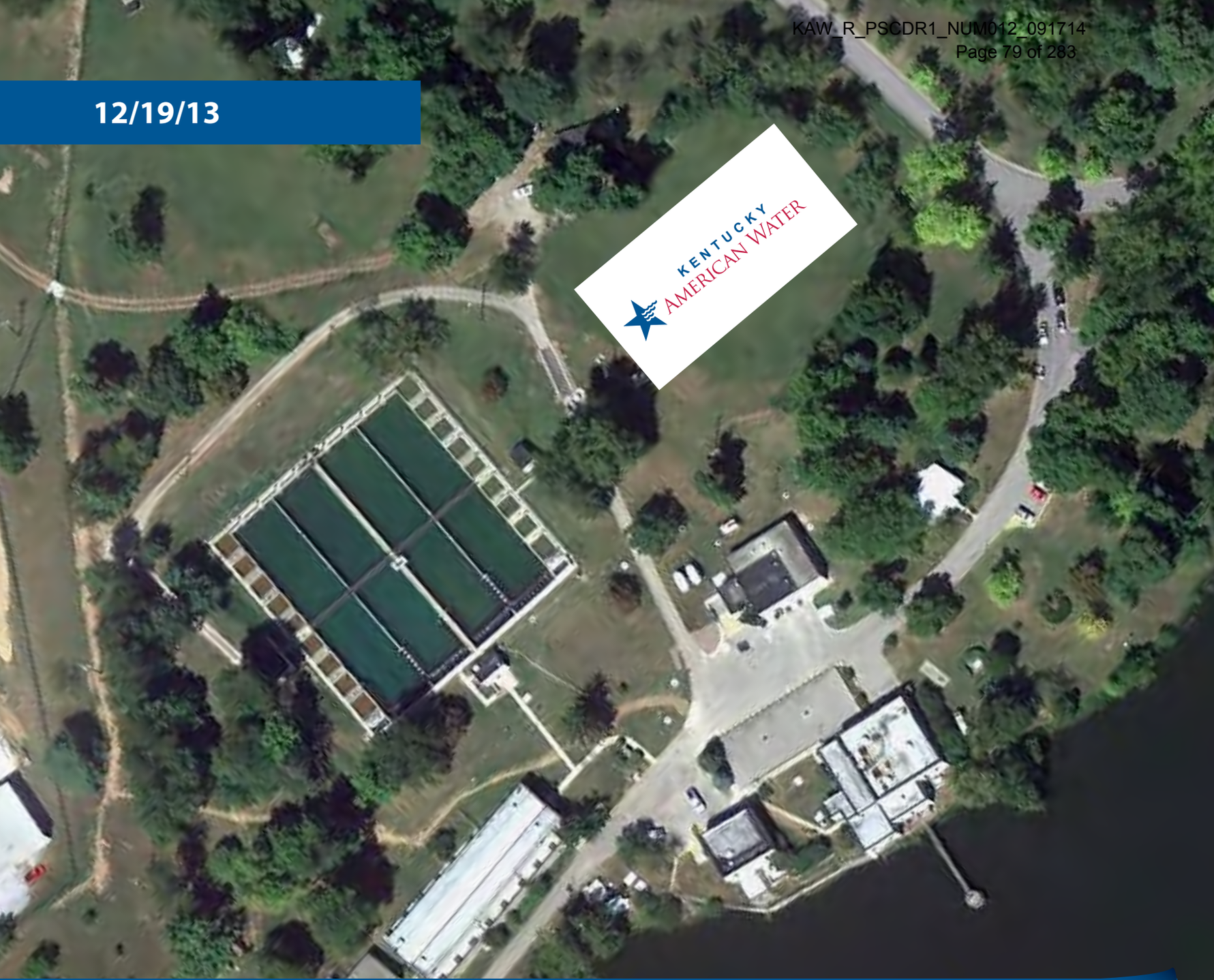
Gannett Fleming takes no exceptions to the items requested in the Request for Proposal.

Excellence Delivered ***As Promised***

Contact Information:

Jeffrey L. Raffensperger
207 Senate Avenue
Camp Hill, PA 17011
t: 717.763.7212 x2277
jraffensperger@gfnet.com

12/19/13



Proposal for Professional Services for the

New Filter Building Design
Richmond Road Station Water Treatment Plant

Kentucky American Water Company

MR1005-338

HAZEN AND SAWYER
Environmental Engineers & Scientists

HAZEN AND SAWYER
Environmental Engineers & Scientists

444 Lewis Hargett Circle
Suite 260
Lexington, Kentucky 40503

(859) 219-1126
hazenandsawyer.com

December 19, 2013

Mr. Zachery Dukes, P.E.
Project Manager Engineer
Kentucky American Water Company
2300 Richmond Road
Lexington, KY 40502

RE: Proposal – Professional Engineering Services for the Richmond Road Station Water Treatment Plant New Filter Building Design

Dear Mr. Dukes:

Hazen and Sawyer is pleased to submit our proposal for Professional Engineering Services for the Richmond Road Station WTP New Filter Building Design.

As you review our proposal you will discover that we have assembled a highly qualified team for your project. We understand Kentucky American's desire to quickly and efficiently replace the plant's existing filter building. The core members of our project team led by me as project manager and assisted by Bob Green, David Laliberte, Nichole Sajdak, and Michael Wang, have many years of experience focused on the study, design and construction of drinking water treatment facilities similar to the Richmond Road Station WTP. We have recently completed design of similar filter buildings for Illinois American Water in Champaign and Streator, and we are currently working on filter improvement projects for Indiana American Water in Seymour and Jeffersonville. While no two facilities are identical, there is no learning curve for our project team.

We have reviewed the design concept and understand the complexities of upgrades and improvements to older facilities such as the Richmond Road Station WTP. We feel that the design concept outlined in the RFP is a good approach to the project; however, as part of our proposal effort we have developed an alternative design concept for consideration. The alternative has some advantages with regard to reducing the risk associated with demolition of the existing filters, providing better control of disinfection and minimization of disinfection byproducts, and providing better control of filter backwash. We will work with Kentucky American Water to finalize the best project approach, considering design, construction, and maintenance of plant operation during construction issues. In addition we will bring in a national construction firm early in the design process to review our design concepts and ensure budget control for the project.

Hazen and Sawyer has in-house experts for the permitting efforts required for this project as well as for all of the support disciplines that will be required to design a new filter building for the Richmond Road Station

HAZEN AND SAWYER
Environmental Engineers & Scientists

WTP. Our discipline leads are supported by our Lexington staff in addition to our sub-consulatants, Gonzalez Companies, LLC, and Integrated Engineering. Our project team members routinely work together on projects throughout the Midwest Region and you are assured of a well-coordinated and efficient project team. In addition, we have the benefit of other support discipline resources within Hazen and Sawyer, many of whom have a long history of successfully completing projects for American Water Company.

We appreciate the opportunity to submit this proposal and look forward to working on this critical project with you. Should you have any questions, please feel free to contact me at (614) 596-4155.

Very truly yours,

HAZEN AND SAWYER, P.S.C.

Bret M. Casey, P.E., BCEE
Senior Associate, Project Manager

TABLE OF CONTENTS

1 Construction Budget Adequacy

SECTION 1: CONSTRUCTION BUDGET ADEQUECY

This section includes our critique of the adequacy of Kentucky American Water's construction budget for the Richmond Road Station Water Treatment Plant (RRS WTP) New Filter Building based on the information presented in the Request for Proposal.

Our Team, with input from a nationally-recognized Contractor, has reviewed the cost estimate prepared by HDR for Option No. 1 – New Filter Building with GAC Dual Media, as identified in the "Richmond Road Station Water Treatment Plant Filter Building Evaluation" dated September 2013. The estimate for the new Filter Building and decommissioning of the existing filter building has some areas where the cost may have been under estimated. Our Team has identified the following items which we believe should be reviewed prior to moving forward with the new filters for the RRS WTP:

- Site Excavation (rock, on-site moving)
- Clearwell Repairs
- Decommission of Existing Filter Building

The site excavation (rock, on-site moving) has a moderate potential of increasing the cost of the filter construction. The cost identified for this item appears to be for the removal of soft weather rock or shale. If hard rock is encountered, the cost for excavation could double.

The costs associated with concrete repair of the clearwell and decommissioning of the existing filters could be responsible for the largest increase in the HDR cost estimate. Our Team has evaluated the as-built drawings provided to us by KAW and has determined that the repair and decommissioning work requested in the proposal could increase the estimate by $500,000. The increased costs for decommissioning the existing filters are primarily associated with the technique used to separate and maintain the security of the clearwell while demolishing the filter building. An additional factor would be the volume of materials that would be hauled off-site for proper disposal.

We believe our alternative design, described in Section 2 - Conceptual Design Critique and Section 5 - Project Understanding, will provide KAW with facilities that meet the filtration needs of the plant while incurring less risk and improving overall water quality in a project within the range of $11.0 to 11.5 million.

2 Conceptual Design Critique

SECTION 2: CONCEPTUAL DESIGN CRITIQUE

This section includes our critique of the Conceptual Design presented in the Request for Proposal for the Richmond Road Station WTP New Filter Building. We have identified the following items which we believe will result in a lower cost and simplified construction for the new filters as well as improved operation of the plant:

- Reduction of number of filters.
- Increased hydraulic loading rate of the filters.
- Replacement of the existing filter backwash facilities.
- Replacement of the existing clearwell under the filter building (Clearwell No. 2) with a new chlorine contact basin.

These items will be described in more detail below.

DESCRIPTION AND COMPARISON OF DESIGN CRITIQUE ITEMS

Number of Filters and Hydraulic Loading Rate

The Conceptual Design included 12 filters to achieve the desired plant capacity of 25 mgd. We believe a more economical layout would be based on a layout with eight filter cells. The significant cost savings associated with reducing the number of filters from 12 to eight include the following items:

- Elimination of four common walls between filter cells.
- Elimination of valves, meters and controls of four filter cells.

This change will increase the size of the filter, which has the potential to impact the requirements for filter backwash water. However, coupled with the increase in hydraulic loading rate of the filters as described in the next item, the total impact in the filter size will be small between the conceptual design layout and layout proposed by Hazen and Sawyer. The filter size in the conceptual design is 475 square fet while the filter size proposed by Hazen and Sawyer as shown in the layouts presented in Section 5 is 496 square feet.

Increase in Filter Hydraulic Loading Rate

Increasing the filter hydraulic loading rate has the most significant ability to reduce the cost of the filter building proposed in the Conceptual Design. It should be noted that Section 2 of the HDR Filter Building Evaluation Report indicated that the filters were sized based on a hydraulic loading rate of 5 gpm/ft2 with one filter out of service. This hydraulic loading rate is consistent with the requirements of the Kentucky Division of Water (KDOW) General Design Criteria for Surface and Groundwater Supplies. These standards allow for a hydraulic loading rate of 5 gpm/ft2 for multi-media gravity filters. However, Option No. 1 presented in Section 3 includes 12 filters, each 475 square feet, which were based on a hydraulic loading rate of 3.1 gpm/ft2. According to the report, this loading rate was used because it is the current permitted loading rate for the existing filters. The loading rate of the existing filters is likely limited due to the shallow media (6” of sand and 24” of anthracite). It appears that the layout and detailed cost provided in Section 3 of the report were

based on the 3.1 gpm/ft2 loading rate and not the allowable loading rate of 5 gpm/ft2.

Hazen and Sawyer recommends basing the sizing of the new filter building on a hydraulic loading rate of 5 gpm/ft2. Our recommended layout includes eight filters, each 496 square feet. This results in a filter area of 3968 square feet as opposed to the 5700 square feet proposed in the conceptual design. This results in a reduction of approximately 30% of the filter area. The resulting filter building in our proposed layout presented in Section 5 is 14,275 square feet which is approximately 45% smaller than the 26,000 square feet filter building proposed in the conceptual design.

Replacement of the Existing Filter Backwash Facilities

The existing filter backwash facilities include a 50,000-gallon elevated filter backwash tank (gravity flow) and a parallel 1000-gpm filter backwash pump located in the existing filter building. In addition, there is an emergency connection to the high service pump discharge to allow backwashing the filters using the high service pumps when the filter backwash tank is out of service. The conceptual design included installing a new filter backwash pump in the filter gallery but keeping the existing elevated tank. The RFP indicated that the water company would prefer an alternative method of backwashing the filters. We agree that providing dedicated backwash pumps instead of an elevated washwater supply tank improves the ability to properly fluidize the media during a backwash. In addition, this eliminates the need to maintain the elevated washwater supply tank.

The existing filter backwash facilities were likely sized based on backwashing the existing filters, which are 340 square feet. The filters proposed in the conceptual design are 475 square feet, while the filters proposed by Hazen and Sawyer are 496 square feet. Both of these filter sizes will likely exceed the ability of the existing filter backwash pumps and elevated tank to properly fluidize the media. Therefore, we propose replacing these facilities with a new filter backwash pump station.

The proposed station includes two vertical turbine can pumps which would be connected to the piping between the new chlorine contact basin and Clearwell No. 1. The location of the pump station is shown in **Figure 2-1** and on the site plan drawing included in Section 5. KDOW requires that the filter backwash facilities be sized to provide a minimum of 15 gpm/ft2 with

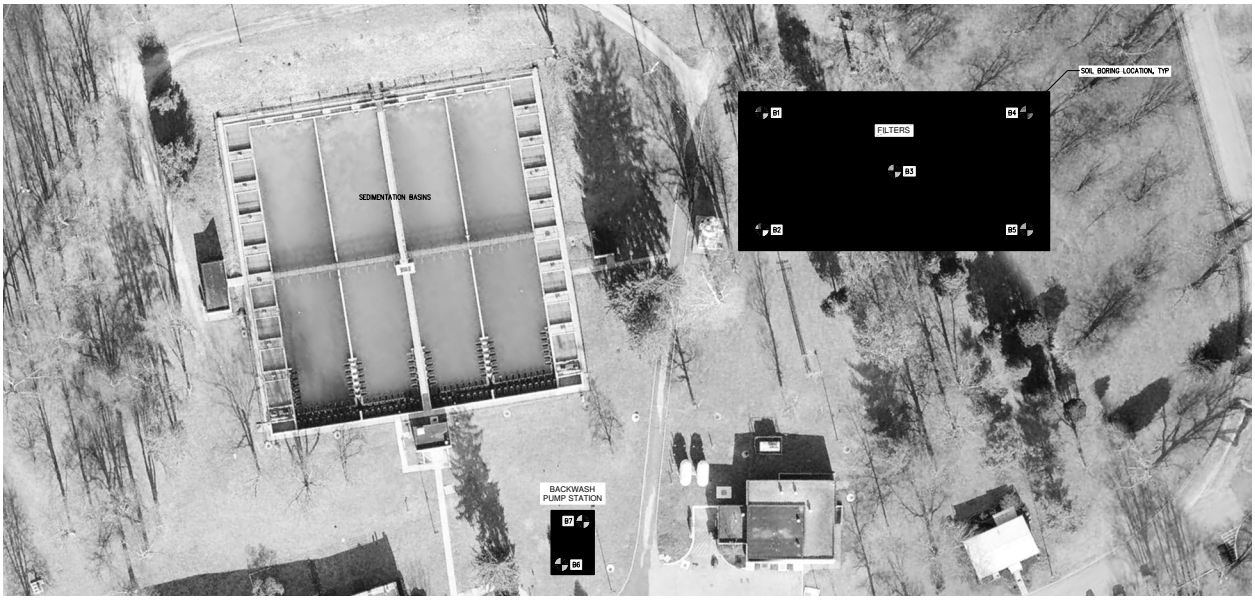


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Figure 2-1

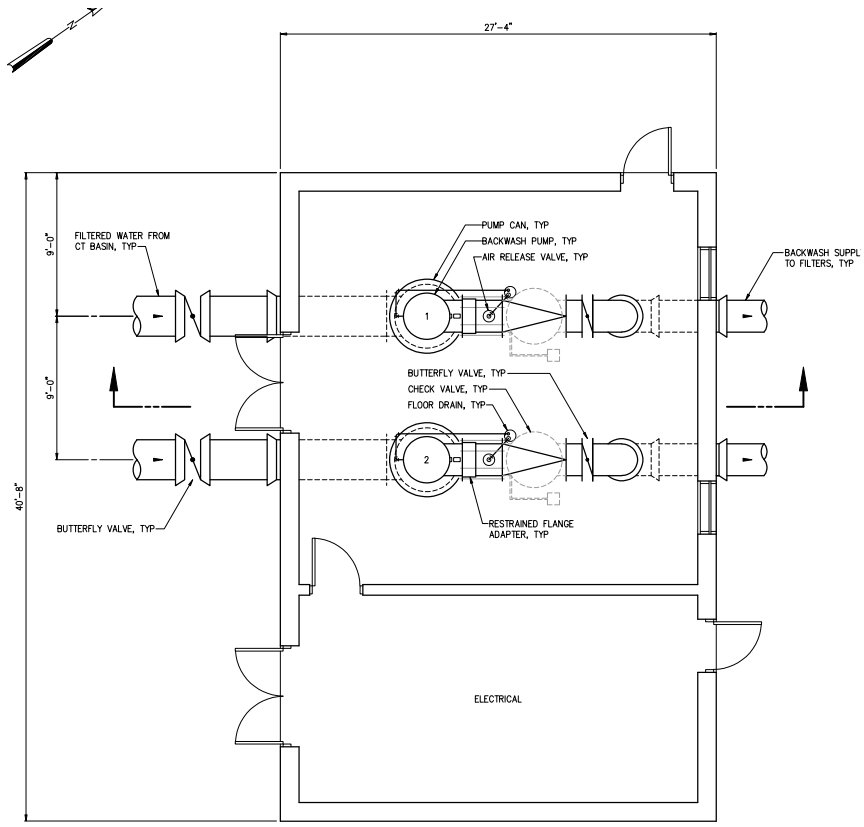

Figure 2-2

a recommended capacity of 20 gpm/ft2. This is not media specific. Preliminary calculations indicate that at the warm water temperatures (worst case scenario), 15 gpm/ft2 is more than adequate to fluidize the media. This is in part to the fact that GAC is less dense than anthracite and easier to fluidize. Our layout provided in **Figure 2-2** and in Section 5 includes two vertical turbine can pumps (one duty, one standby) each sized to provide 15 gpm/ft2 of backwash water. The pumps will be provided with variable frequency drives (VFDs) to allow the necessary turndown to wash the filters at the low wash rate (sub-fluidization rate). The estimated volume of water needed to perform a filter backwash is approximately 100,000 gallons. More detailed discussion of the supply for the backwash pumps is provided in Section 5.

Replacement of Clearwell No. 2

Hazen and Sawyer has several concerns with maintaining the operation of the existing clearwell under the filter building. Some of these concerns were included in the Filter Building Evaluation Report performed by HDR. These concerns were mainly centered on the impact that removing the exiting filter building could have on the existing clearwell structure, both the potential damage that could occur to the clearwell during the demolition of the filter building, as well as long term impact that removing the filter building could have on the top slab of the clearwell. The recommendations in the structural assessment also noted that the clearwell should remain full at all times of operation since the structure would not likely be able to resist the unbalanced hydrostatic load due to the groundwater. This significantly limits the ability of the plant to "float" the elevation of the two clearwells since they are hydraulically connected and also prevents the ability to clean and inspect the clearwell.

In addition, we have the following concerns related to the clearwell:

- Only a visual inspection was performed on the clearwell (done by divers). A more thorough inspection is likely not possible due to the inability to drain the clearwell.
- The structural assessment in the HDR report indicated that the clearwell has a useful life of 20 years with some repair work and modifications. Identifying and performing the necessary repairs with the clearwell remaining full will be difficult and likely exceed the $25,000 included in the detailed cost estimate in Section 3 of the report.
- The clearwell is not baffled, which makes it inefficient for achieving the necessary disinfection contact time. Because of this,

it is likely that the plant needs to maintain a free chlorine residual longer than would be required if a baffled clearwell were provided. This has the potential to increase the disinfection byproducts from the RRS WTP, which appears to be the case from the data provided in the HDR report.

Based on these concerns, we believe that replacement of the existing Clearwell No. 2 should be strongly considered. While this represents a cost increase as compared to the conceptual design, we believe that the cost savings which can be achieved through the increased filter loading rate and the subsequent reduced filter area will offset the majority of the additional cost required for a new clearwell. The new structure would serve as a dedicated chlorine contact basin and would be sized to achieve the necessary contact time to achieve the 0.5 log Giardia inactivation as required in the Safe Drinking Water Act. This sizing is dependent on flow, temperature, pH and chlorine residual. We do not have the necessary data to accurately calculate the required size of the basin, but based on our understanding of the plant operations, we have used the following data to estimate the required basin size:

- Flow: Current average 10 mgd, estimated future average 18 mgd, maximum 25 mgd
- Minimum winter temp 0.5 °C, maximum summer temp 25 °C
- Finished water pH 7.3
- Chlorine residual 2.0 mg/l

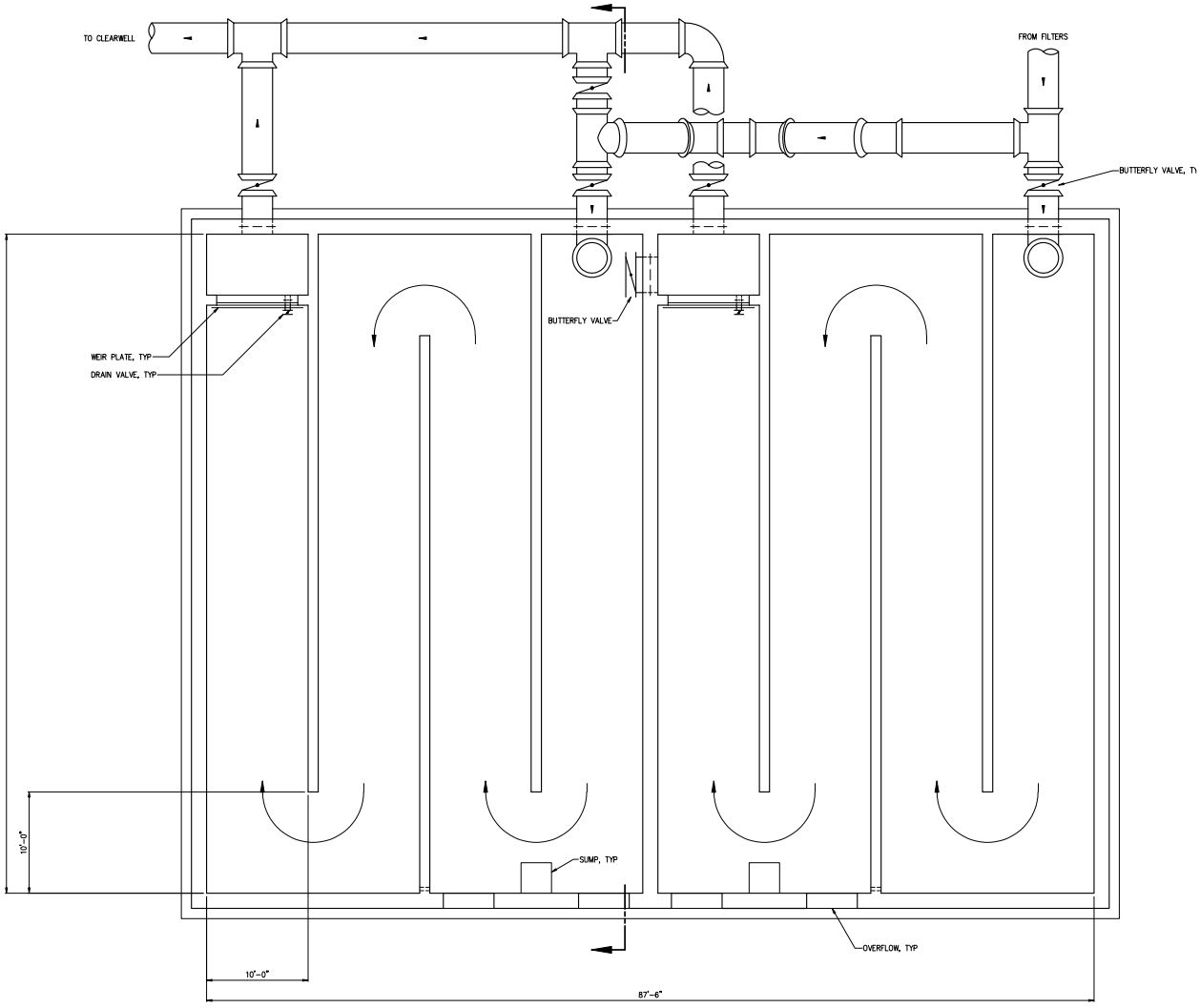

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Figure 2-3

- Baffled chlorine contact tank with baffling factor of 0.7

These criteria result in a wide range of disinfection requirements for the RRS WTP. Maximum disinfection requirements occur during months with cold water. Most often, these months coincide with lower plant flow rates during the winter. The largest chlorine contact tank volume would occur with the maximum treatment rate at the minimum water temperature. Historical plant data would need to be thoroughly evaluated to determine the conditions that should be used to size the chlorine contact basin. For our layout presented in Section 5, we have conservatively assumed a flow rate of 18 mgd at a minimum water temperature of 0.5 °C. This results in a chlorine contact tank of approximately 390,000 gallons. Therefore, we have assumed a chlorine contact tank volume of 400,000 gallons.

The chlorine contact tank would be located directly downstream of the filter building and upstream of Clearwell No. 1 and the high service pumps. Layouts of the chlorine contact tank are presented in **Figure 2-3** and in Section 5. The tank will be split into two baffled cells, each approximately 200,000 gallons. The tanks will be piped to operate in series or parallel. Each tank will include a weir at the end of the structure to maintain a constant volume in the chlorine contact tank and also provide a constant downstream filtering head. The advantage of providing the weir on the downstream side of the chlorine contact tank is that it maintains a set disinfection volume and allows the Clearwell No. 2 downstream of the chlorine contact tank to float up and down based on system demands. Without the weir, during maximum disinfection requirements the chlorine contact tank would need to be 100% full, which would limit the ability to fluctuate the level in Clearwell No. 2.

Cost Savings of Proposed Design Critique Items

In Section 1 we presented our opinion of the construction budget for the Conceptual Design. We have developed a preliminary cost estimate for our alternate design based on a layout of eight filters at the higher loading rate of 5 gpm/ft2. Included in this alternate design is a new chlorine contact basin and backwash pump station. A construction cost estimate for this alternate design is presented in **Table 2-1**. The filter building portion of this estimate is approximately $9,000,000. The filter building construction cost in the HDR report is approximately $10,700,000 when the cost of the filter building demolition and existing clearwell repair is deleted from the overall cost. **Therefore, our alternate filter building design results in a cost savings of approximately $1,700,000.**

The additional cost associated with the new chlorine contact basin and filter backwash pump station is approximately $2,500,000. Therefore, the total construction cost of our alternate design is estimated to be $11,500,000. This represents a cost increase of $500,000 as compared to the cost of the conceptual design. However, as indicated in Section 1, we believe the cost of the filter building demolition and the clearwell rehabilitation as required by the layout in the conceptual design will cost an additional $500,000 so **we estimate that the total cost of our alternate design will be very similar to the cost of the conceptual design layout.**

We do not believe that the proposed changes to the filter building, chlorine contact basin and filter backwash facilities will have an appreciable impact on operating costs for the RRS WTP.

KAW Richmond Road Station WTP - Alternative Design				
CSI Division	Description of Work	Filter Building	Clearwell/BW Pump Station	TOTAL
Division 1	General Requirements	$75,000	$50,000	$125,000
Division 2	Excavation	$325,000	$225,000	$550,000
	Landscaping	$25,000	$15,000	$10,000
	Fence	$25,000	$0	$25,000
	Asphalt Paving	$40,000	$0	$40,000
	Site Concrete	$20,000	$10,000	$30,000
Division 3	Cast-In-Place Concrete	$1,280,000	$568,000	$1,848,000
	Precast Hollow Core	$0	$76,000	$76,000
Division 4	Masonry	$420,000	$30,000	$450,000
Division 5	Steel	$450,000	$20,000	$470,000
Division 6	Carpentry	$12,000	$3,000	$15,000
Division 7	Waterproofing	$40,000	$20,000	$60,000
	Roofing	$200,000	$70,000	$270,000
	Skylights	$17,000	$4,000	$21,000
Division 8	Hollow Metal/Finish Hardware	$45,000	$0	$45,000
	Glazing	$50,000	$0	$50,000
Division 9	Painting	$80,000	$15,000	$95,000
Division 10	Signage	$2,000	$0	$2,000
	Fire Extinguishers	$1,000	$0	$1,000
	Louvers	$4,000	$0	$4,000
	Clearwell Security Vents	$0	$25,000	$25,000
	Clearwell FRP Security Shrouds	$0	$40,000	$40,000
	CLearwell Davit Hoists	$0	$2,000	$2,000
Division 11	Backwash Pumps	$0	$180,000	$180,000
	Pump Cans	$0	$20,000	$20,000
	Filter Underdrains	$745,000	$0	$745,000
	Filter Media	$115,000	$0	$115,000
	Filter Blowers	$120,000	$0	$120,000
	Chemical Feed Lines	$0	$10,000	$10,000
	VFD's	$0	$60,000	$60,000
	Compressed Air System	$0	$25,000	$25,000
Division 15	Mechanical	$2,200,000	$500,000	$2,700,000
	HVAC	$250,000	$0	$250,000
Division 16	Electrical	$950,000	$150,000	$1,100,000
Division 17	Instrumentation	$225,000	$50,000	$275,000
	Field Instruments	$75,000	$25,000	$100,000
	Subtotal	**$7,791,000**	**$2,193,000**	**$9,984,000**
	Contingency 15%	**$1,168,650**	**$328,950**	**$1,497,600**
	Estimated Total	**$8,959,650**	**$2,521,950**	**$11,481,600**

Table 2-1

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3 Lump Sum Fee

SECTION 3: LUMP SUM FEE

This section presents our lump sum fees associated with the design, bidding, construction services and record drawings. We have also provided additional lump sum services for the items outlined in the RFP. The base lump sum fee includes the base filter design as shown in the Conceptual Design. The additional design fee for the chlorine contact basin and backwash pump station presented in Section 2 is included in the additional itemized lump sum fee adjustments below.

Base Lump Sum Fee

Design Phase	[redacted]
CM at Risk Bidding Services	
Construction Administration	
Record Drawings	

Additional Itemized Lump Sum Fee Adjustments

Additional Design Fee for CT Basin and Backwash Pump Station	[redacted]
Additional Construction Meeting Attendance	[redacted] meeting

Resident Project Representative

1. Hourly Rate	[redacted] hr
2. Overtime Rate	[redacted] /hr
3. Per Diem Rate (Based on 40 hr Week):	[redacted] day

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4 Supplemental Hourly Rates

SECTION 4: SUPPLEMENTAL HOURLY RATES

Table 4.1 provides our supplemental hourly billing rates for staff members for use in determining appropriate compensation for any changes in the scope of work. All hourly rates are based on rates in effect during December 2013. Rates are typically adjusted in July.

Supplemental Hourly Billing Rates	
Officers	
Vice President	$217
Associates/Principals	
Senior Associate	$181
Associate	$164
Senior Principal Engineer	$142
Principal Engineer	$131
Engineers	
Engineer/Assistant Engineer	$118
Designers/Drafters	
Senior Principal Designer	$158
Principal Designer	$139
Designer	$110
Technical	
Resident Construction Observer	$98

Table 4-1

5 Project Understanding

SECTION 5: PROJECT UNDERSTANDING

The Design Concept as presented in the Request for Proposal (RFP) is based on design and construction of a new filter building to replace the existing filter building. As described in the RFP, the evaluation of the existing filter building as performed by HDR Engineering determined that the existing filter building could not be rehabilitated and recommended construction of a new filter building. Several options were included in the evaluation for construction of a new filter building. The recommendation in the report was based on construction of a new filter building with conventional dual media (sand/GAC) gravity filters. As described above in Section 2, Hazen and Sawyer has recommended a modified version of the filter building with the main differences being a reduced number of filters (eight instead of 12) and a higher filter loading rate (5 gpm/ft^2 instead of 3.1 gpm/ft^2). The description of these changes with respect to cost savings is presented in Section 2.

In addition to the inspection of the existing filter building. HDR performed an inspection of the existing clearwell underneath the filter building to determine if it could remain in service. The evaluation included an underwater inspection of the clearwell and determined that in general the clearwell was in reasonably good condition with an expected life of 20 years. Based on this evaluation, the HDR report recommended rehabilitating the clearwell and keeping it in service. Again, as described in Section 2 above, Hazen and Sawyer has several concerns with this approach and therefore has proposed an alternate approach to replace the existing clearwell with a new dedicated chlorine contact basin.

The main purpose of this new basin would be to serve as the chlorine contact tank to allow the plant to meet the disinfection requirements of the Safe Drinking Water Act while minimizing the formation of disinfection byproducts. A dedicated chlorine contact basin with multiple ammonia feed points will allow the plant to meet the disinfection requirements while minimizing the free chlorine contact time and the resulting disinfection byproducts. This is especially true during warm water months when disinfection requirements are less due to higher water temperatures but the disinfection byproduct formation potential is highest. A new chlorine contact basin will allow the plant to “fine-tune” the free chlorine contact time. In addition, Hazen and Sawyer will evaluate the operating data of the plant to determine if improvements can be made to the operation of the sedimentation basins to improve TOC removal in the basins. As part of this, we would evaluate the plant’s chlorine feed to determine if changes to the application point (i.e. moving the first chlorine application point to the settled water) would further minimize disinfection byproduct formation.

Construction of a new chlorine contact basin coupled with optimizing the existing sedimentation basins and chlorine feed system will help minimize the formation of disinfection byproducts at the Richmond Road Station Water Treatment Plant. The HDR report discussed other options including ozone/biofiltration and post-filter GAC contactors with a longer empty bed contact time than can be provided with the proposed GAC caps. Both of these options add significant capital and operating costs to the RRS WTP. We believe that the other option that should be given consideration is UV disinfection. This is especially true if the plant is

determined to be in Bin 2 in the next round of Cryptosporidium sampling for the Long Term 2 Enhanced Surface Water Treatment. UV disinfection would allow the plant to meet the additional log inactivation for Cryptosporidium. In addition, the plant could significantly reduce the free chlorine disinfection time to only account for virus inactivation. This would further minimize the formation of disinfection byproducts at the RRS WTP.

Again, as described in Section 2 above, we outlined some concerns regarding the adequacy of the existing backwash facilities. We believe that the existing backwash supply tank and supplemental backwash pump are somewhat limited in their ability to adequately backwash the proposed filters. The filter size proposed by HDR of 475 ft^2 is significantly larger than the existing filter size of 340 square feet. In addition, our proposed filter size in the layouts presented below is slightly larger at 496 ft^2. The increased filter size and the desire of the water company to look at an alternate means of backwash water supply support the need for replacing the existing elevated backwash water supply tank with new backwash water pumps.

While construction of a new chlorine contact basin and backwash supply pump station was not in the scope of the RFP, we believe that modifications we have proposed to the filter building will result in significant cost savings which will allow the new contact basin and backwash pump station to be constructed within the water company's construction budget. As discussed in Sections 1 and 2, the construction cost for the alternate layout we have proposed is estimated to be $11,500,000. We believe that the construction cost of the Conceptual Design will also be in the neighborhood of $11,500,000 due to the additional cost associated with the filter building demolition and necessary repairs to the existing clearwell.

Proposed Hydraulic Profile Discussion

Hazen and Sawyer has developed preliminary hydraulic calculations for the proposed filter building and chlorine contact basin. These hydraulic calculations were used for preliminary sizing and layouts of the proposed facilities presented at the end of Section 5. More detailed hydraulics will be performed during final design to establish final elevations of the facilities. During final design, Hazen and Sawyer will work with the water company to determine if additional head should be included in the hydraulic profile to account for future UV reactors on the downstream side of the filter building.

We believe that consideration should be given to sizing the filter effluent piping to allow for an increased filter loading rate of 6 gpm/ft^2 in the event that the water company would consider approaching KDOW regarding high rating of the filters. This has the advantage of increasing the filtration capacity of the RRS WTP by 20% (to 30 mgd) with very little additional capital expense.

In the event that it is necessary to construct post filter GAC contactors in the future, it will be necessary to construct an intermediate lift station to pump the filtered water to the GAC contactors. We do not believe there is sufficient available head between the filters and the existing clearwell to avoid an intermediate pump station. Therefore, we have not accounted for post filter GAC contactors in the hydraulic profile.

Site and Facility Plan Sketches

At the end of Section 5 we have included a site layout as well as a plan and section of the base filter design as presented in the Conceptual Design. In addition, we have provided a site layout which includes our alternate filter building layout and our proposed chlorine contact basin and filter backwash pump station. We have included layout drawings for these facilities

as well. A summary of our proposed alternate facilities is provided below.

Filter Building

As described in Section 2 we have proposed 8 filters each with a surface area of 496 ft^2. The overall size of the proposed filter building is approximately 97 feet wide by 148 feet long. There are four filter cells on each side of the gallery and each filter is equipped with air scour and filter-to-waste.

Chlorine Contact Basin

Sketches of the proposed chlorine contact basin are included at the end of Section 5. The structure is approximately 65 feet wide long by 88 feet wide and divided into two cells. Each cell is baffled to provide four passes per cell and a length to width ratio of approximately 25:1. We will work with KDOW in the final layout of the contact basin to establish the length to width ratio necessary to maximize the baffling factor of the contact basin. The chlorine contact basin sizing provided in Section 2 and the layout included in the drawings below is based on a baffling factor of 0.7.

As described in Section 2, one of the main benefits of a new chlorine contact basin is to provide for better control of the chlorine and ammonia feed. This has the potential to reduce the formation of disinfection byproducts. For maximum flexibility, reliability and redundancy, multiple application points should be provided within the contact basin for chlorine and ammonia feed. A chlorine application point will be provided at the contact basin influent. Ammonia and chlorine application points will be provided at the effluent end of the contact basin upstream of the overflow weir as well as at an intermediate point. Disinfection byproduct formation testing could be performed during design to determine the limits of free chlorine contact time for various design conditions, and this information could be used to locate intermediate ammonia application points within the chlorine contact basin. The ammonia application point could then be changed at various times in the year based on operating conditions.

Hazen and Sawyer is proposing that chemical mixing within the contact basin be provided by an air mixing system manufactured by Pulsair®, or equal. Disinfection chemicals could be applied within the contact basin using flexible piping installed inside casing pipes as shown in **Figure 5-1** below. Accumulator plates would be installed just downstream of chemical injection points at the inlet to the contact basin and the intermediate chlorine and ammonia application points, and just upstream of the overflow weir to provide complete mixing of disinfection chemicals within the contact basin. **Figure 5-2** below demonstrates how Pulsair®'s air mixing system operates. Two air compressors, one duty and one backup, would be provided to

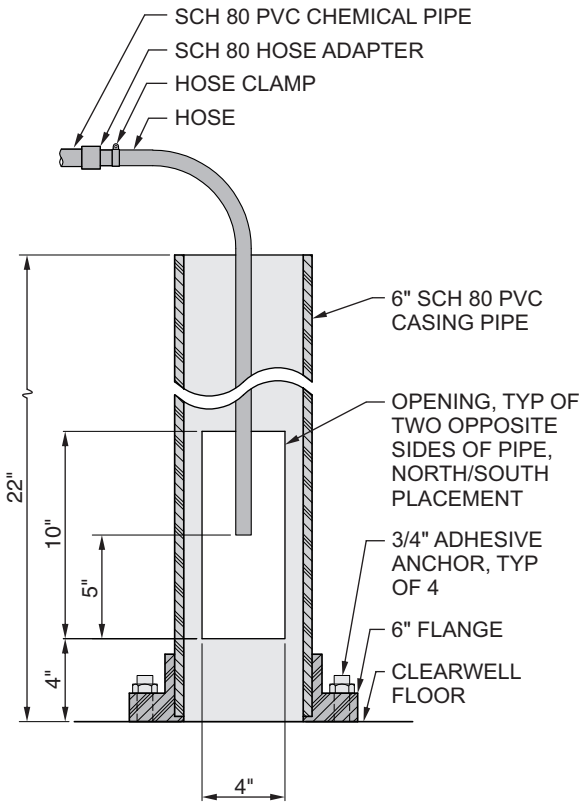

Figure 5-1
Chemical Application Point

supply air to accumulator plates installed at the multiple application points in the contact basin. We have just completed design and installation of a similar chemical application and air mixing system that is in operation in the new clearwell at Illinois American Water's Granite City Water Treatment Plant. Our Team recommends contacting Mike Jackson at Illinois American Water for his assessment of this system. We are also evaluating a similar system for the new clearwell at Indiana American's Muncie Water Treatment Facility. We have designed and installed air mixing systems at several other plants for similar applications and have heard from plant operators that the system is effective for mixing and requires minimal maintenance.

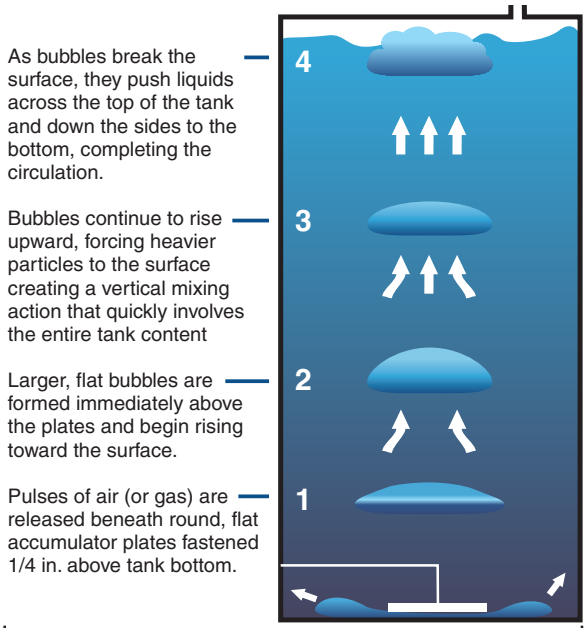

Figure 5-2
Informational Diagram for Pulsair® Mixing System
(Courtesy Pulsair®)

Filter Backwash Pump Station

As described in Section 2 above, we estimate that approximately 100,000 gallons will be required to adequately backwash a filter and recommend a new backwash pump station be provided. The pump station will include vertical turbine can pumps which will pull suction from the line connecting the chlorine contact basin to Clearwell No. 2. Each pump will be capable of meeting the backwash flow requirement of 15 gpm/ft^2. This equates to a flow of approximately 7500 gpm and a motor size of approximately 150-200 hp. Water for the backwash pumps will be supplied from Clearwell No. 2. Construction of the chlorine contact basin will allow Clearwell No. 2 to float based on system demands and provide the necessary volume to supply the backwash pumps. A detailed analysis of the plant's flow data will be performed during final design to confirm that the existing Clearwell No. 2 can provide adequate supply for the backwash pumps.

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KENTUCKY
AMERICAN WATER

RICHMOND ROAD STATION WTP
FILTER BUILDING REPLACEMENT

DECEMBER 2013

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Environmental Engineers & Scientists

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KENTUCKY AMERICAN WATER

RICHMOND ROAD STATION WTP
FILTER BUILDING REPLACEMENT

BASE DESIGN
SITE PLAN

1

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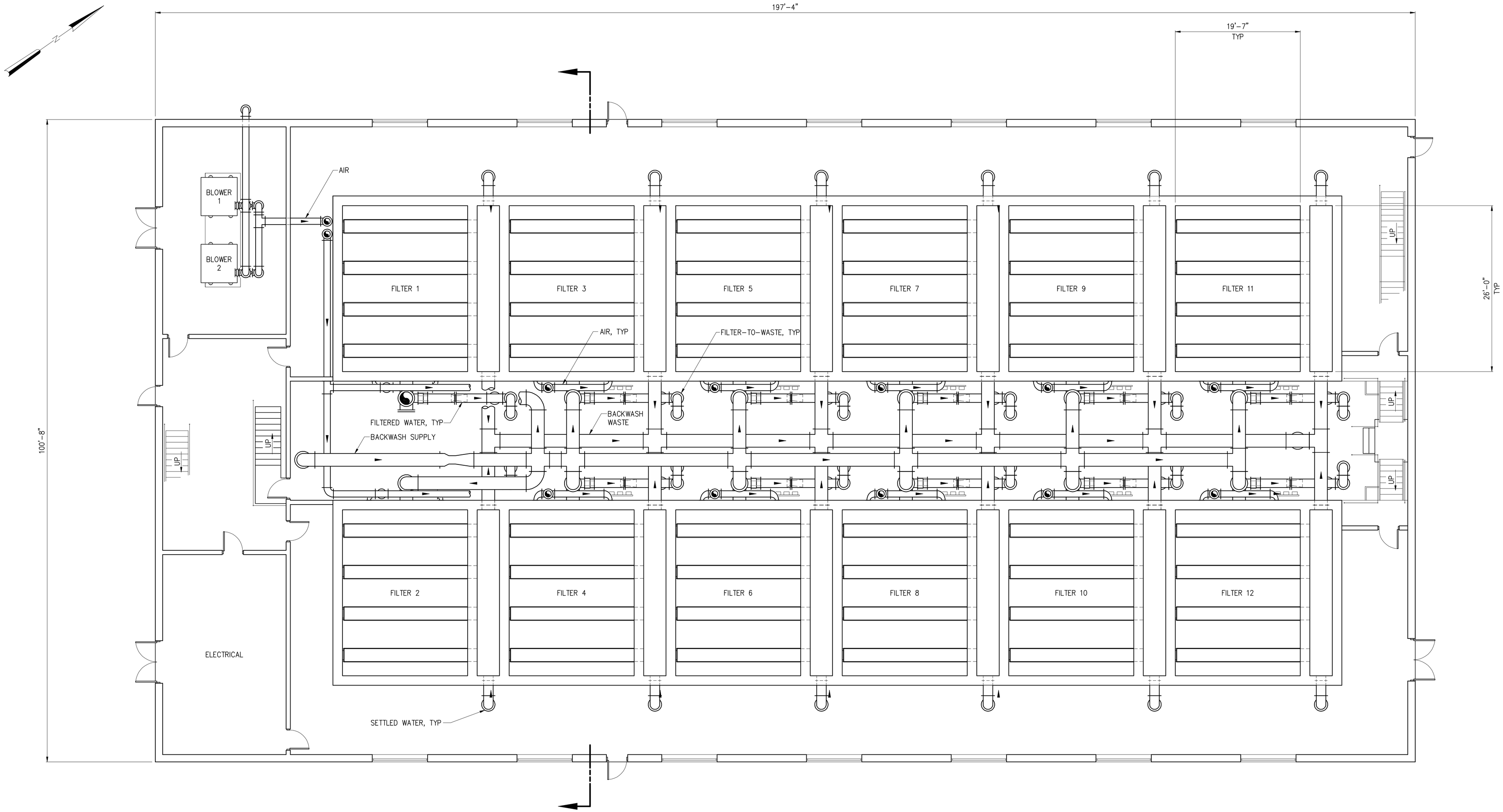

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KENTUCKY AMERICAN WATER

RICHMOND ROAD STATION WTP
FILTER BUILDING REPLACEMENT

BASE DESIGN
FILTER BUILDING
BOTTOM PLAN

2

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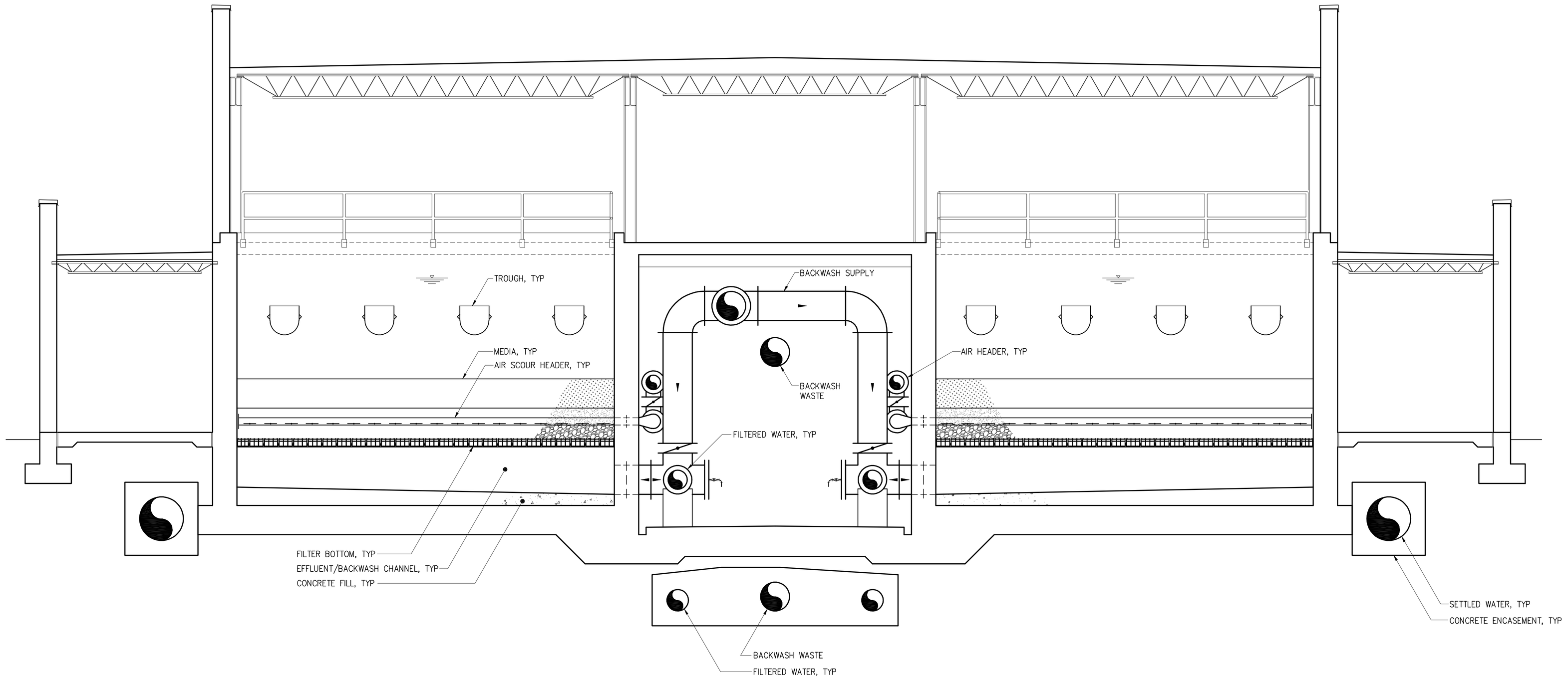

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KENTUCKY AMERICAN WATER

RICHMOND ROAD STATION WTP
FILTER BUILDING REPLACEMENT

BASE DESIGN
FILTER BUILDING
SECTION

3

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RICHMOND ROAD STATION WTP
FILTER BUILDING REPLACEMENT

ALTERNATE DESIGN
SITE PLAN

4

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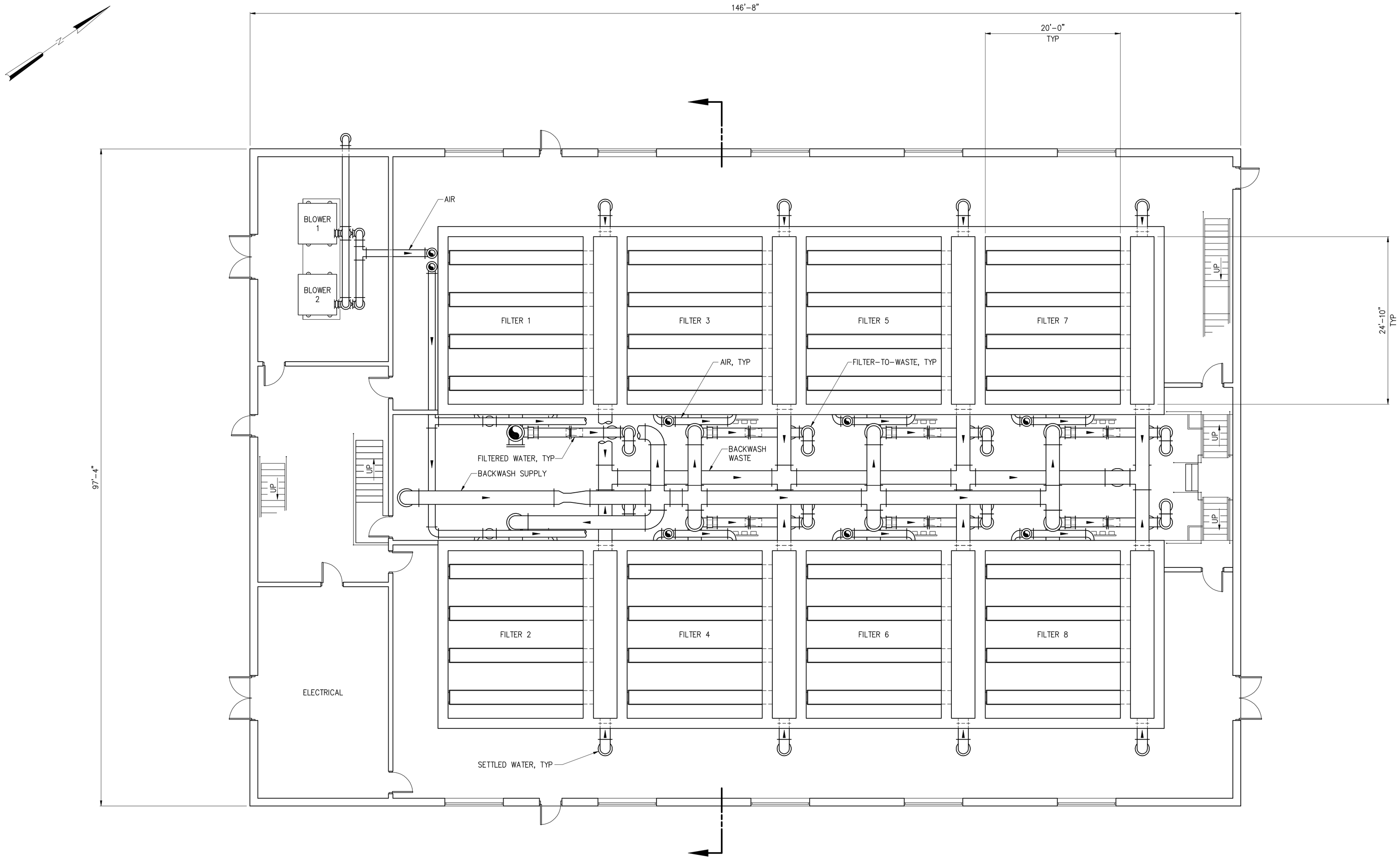

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RICHMOND ROAD STATION WTP
FILTER BUILDING REPLACEMENT

ALTERNATE DESIGN
FILTER BUILDING
BOTTOM PLAN

5

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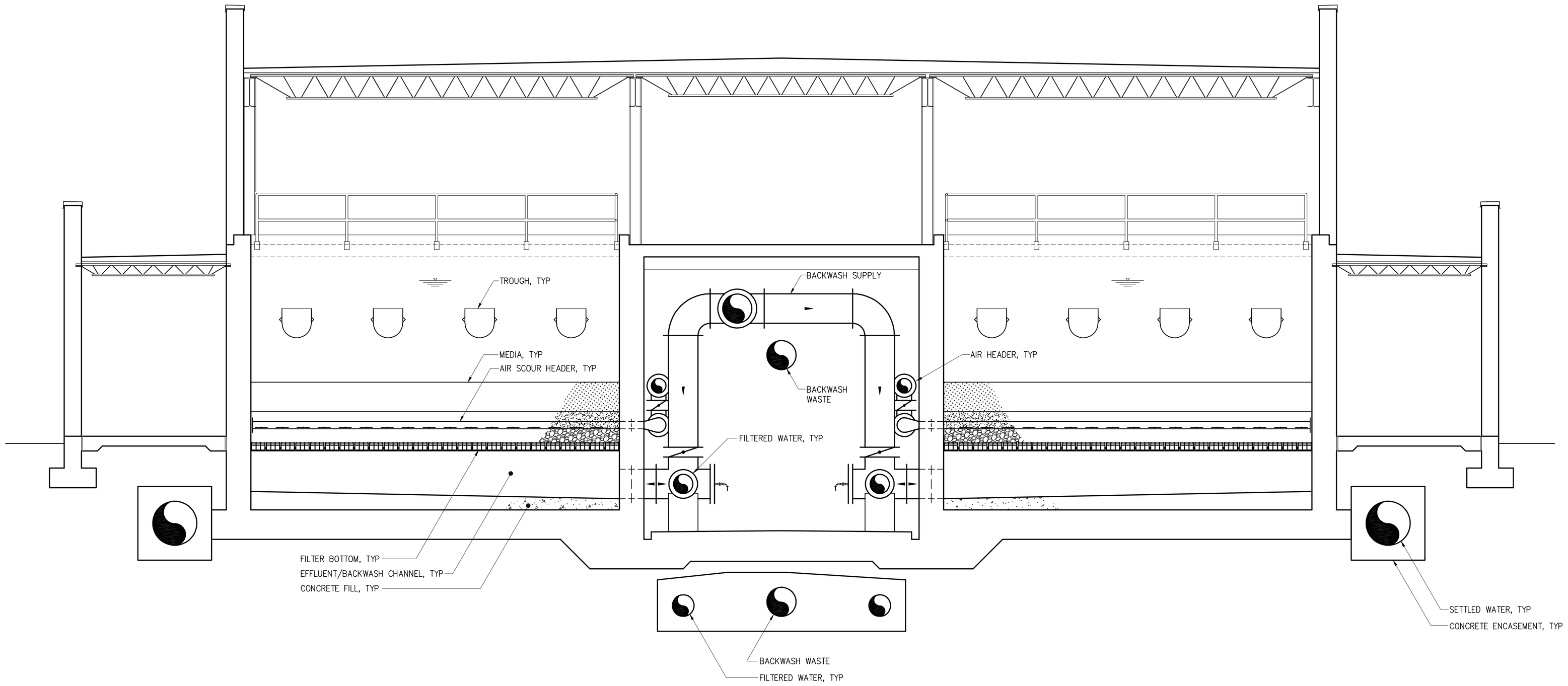

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KENTUCKY AMERICAN WATER

RICHMOND ROAD STATION WTP
FILTER BUILDING REPLACEMENT

ALTERNATE DESIGN
FILTER BUILDING
SECTION

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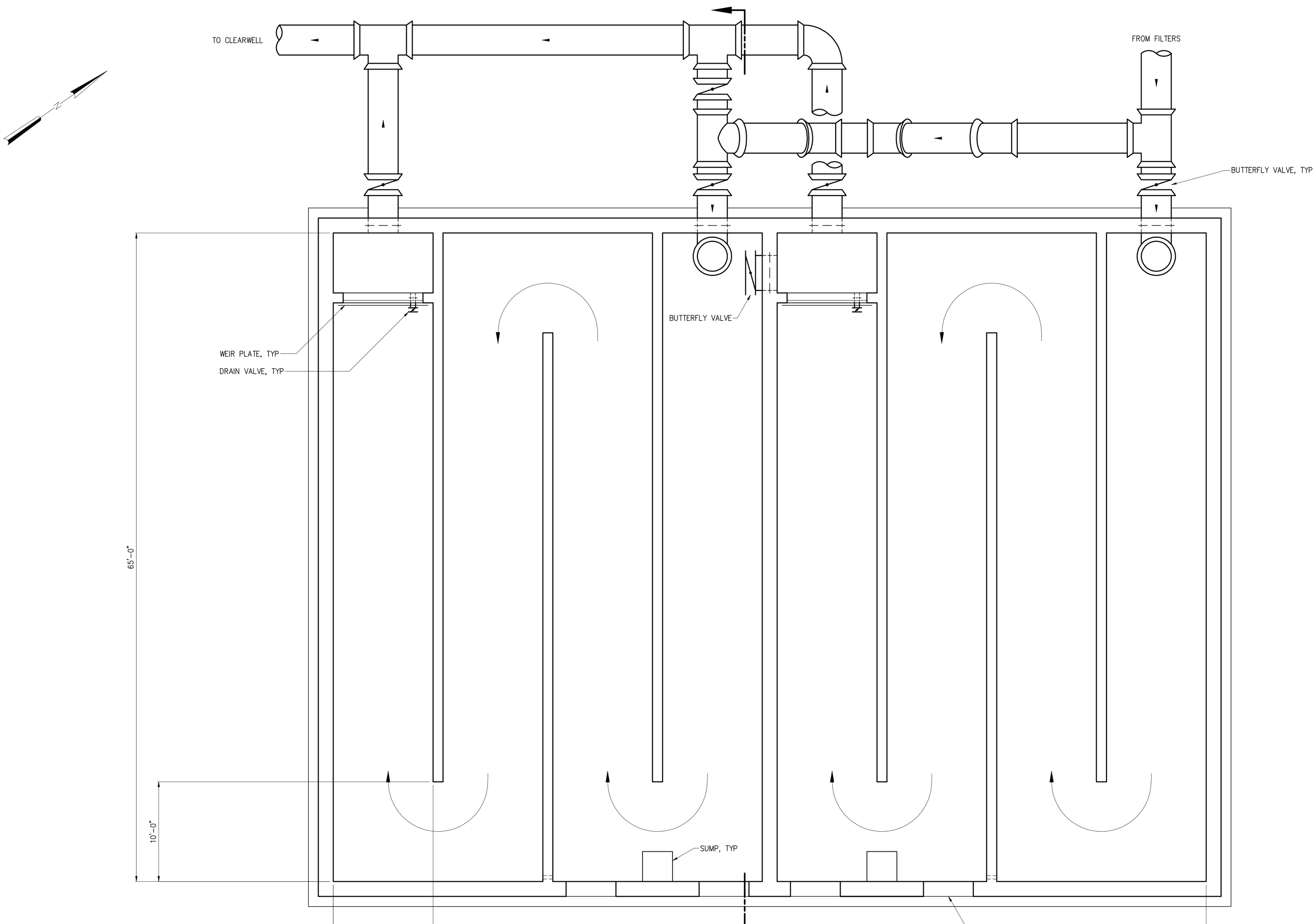

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RICHMOND ROAD STATION WTP FILTER BUILDING REPLACEMENT

ALTERNATE DESIGN
CT BASIN
BOTTOM PLAN

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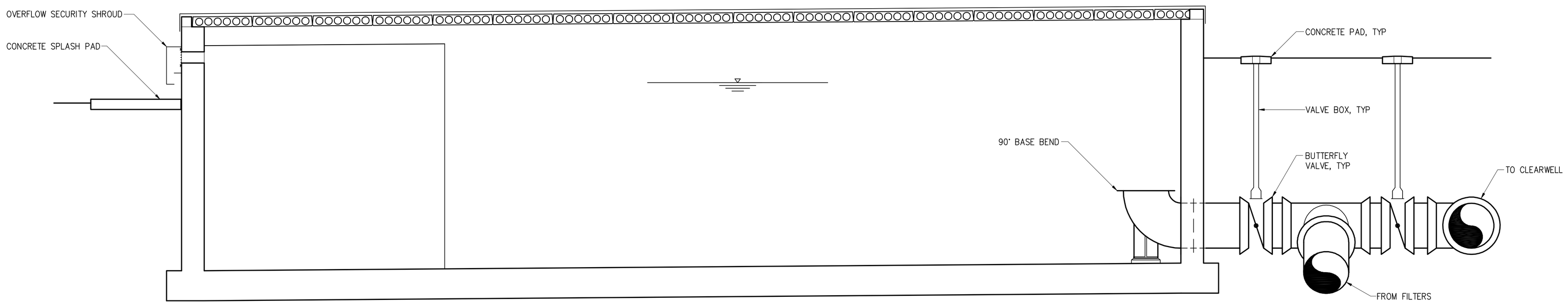

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KENTUCKY AMERICAN WATER

RICHMOND ROAD STATION WTP
FILTER BUILDING REPLACEMENT

ALTERNATE DESIGN
CT BASIN
SECTION

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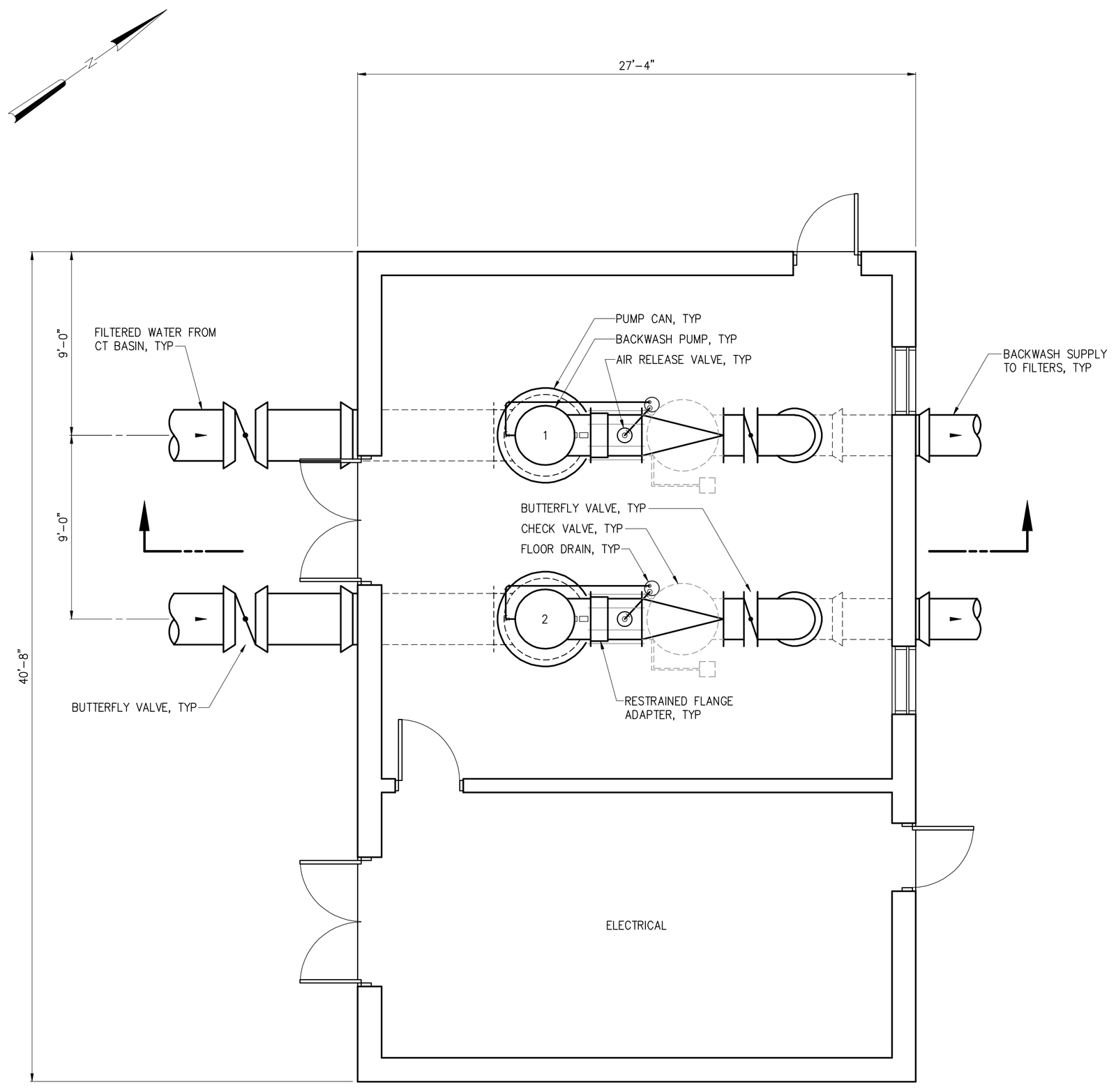

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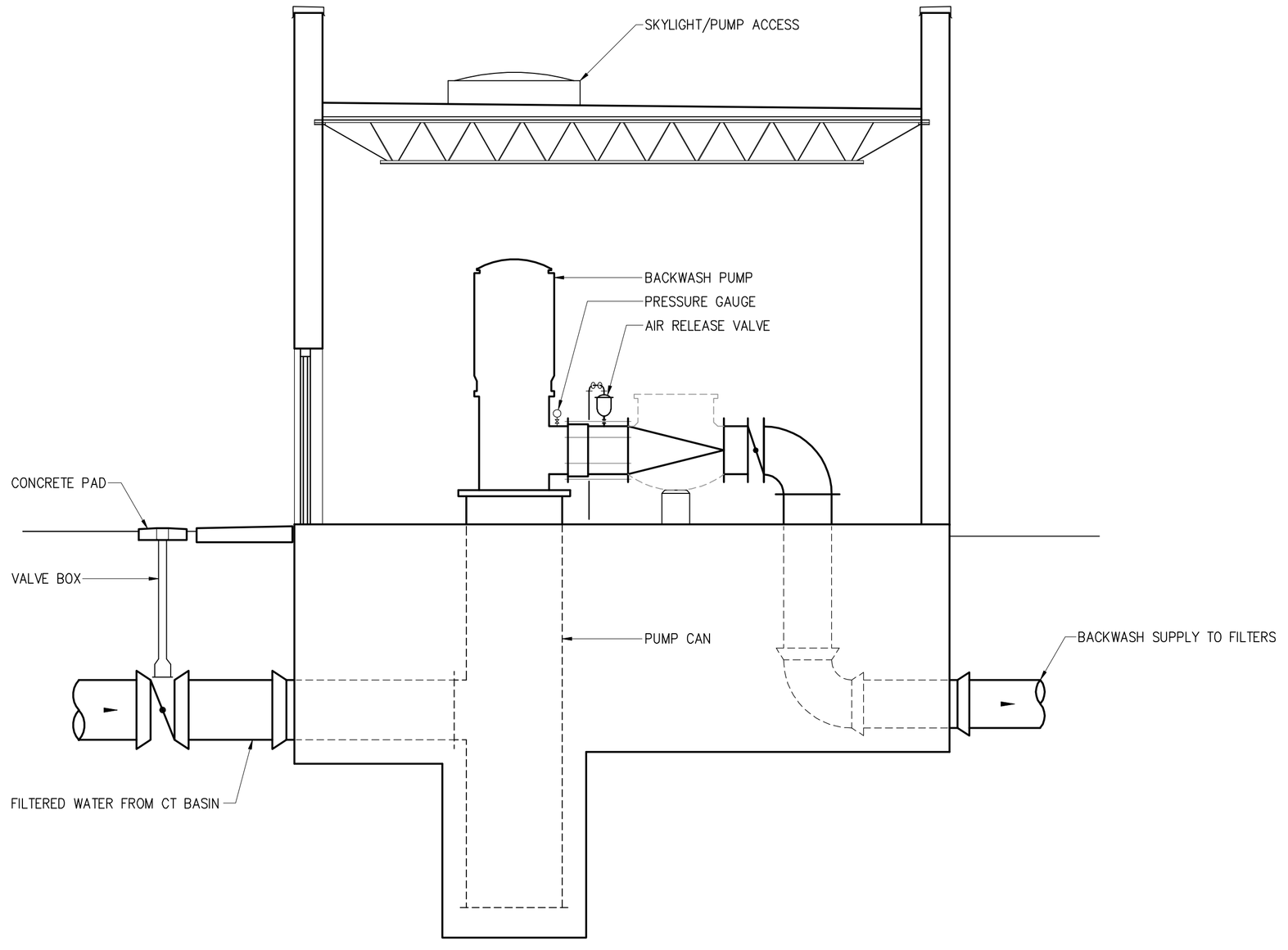

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HAZEN AND SAWYER Environmental Engineers & Scientists	KENTUCKY AMERICAN WATER	RICHMOND ROAD STATION WTP FILTER BUILDING REPLACEMENT	BASE AND ALTERNATE DESIGN BACKWASH PUMP STATION PLAN AND SECTION	9

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6 Geotechnical Exploration

SECTION 6: GEOTECHNICAL EXPLORATION

Structural design of the Richmond Road Station Water Treatment Plant Modifications and Upgrades shall be performed in accordance with the requirements of the 2013 Kentucky Building Code consisting of the 2012 International Building Code with applicable state amendments. Since the structural components of the design include process concrete structures used for treatment of water, the design of these structures shall be performed in accordance with the requirements of ACI 350 - Code Requirements for Environmental Engineering Concrete Structures. This design approach will ensure structures are watertight and impermeable with stresses remaining in the elastic stress range to limit the potential for cracking. Loading conditions shall be based on the worst operating scenario to design for static conditions. Design water surface elevations shall be based on the maximum water level possible, not just the hydraulic profile.

A comprehensive geotechnical investigation will be required prior to proceeding with the design of the proposed facilities. The geotechnical investigation will assist in determining the geometry of the proposed structures, as well as the bearing elevations of the structures. The geotechnical investigation will provide the recommendations for foundation support requirements of the proposed facilities and necessary design parameters such as lateral earth pressures, impact of groundwater on design, allowable bearing capacities of foundation materials, subgrade modulus of bearing materials, and seismic site classification. The investigation will also provide input in regards to issues likely to be encountered during the construction process. These issues include elevation of static groundwater and impacts dewatering will have on construction process, consideration of possible means of excavation including excavation support systems, suitability of onsite materials for use as structural and site backfill, and other construction related parameters.

Previous site assessments indicate hard rock may be encountered at high elevations on the site. If auger refusal is encountered during the process of drilling the soil borings, selected boring locations will be extended further via rock coring to allow the geotechnical consultant to define quality of rock encountered and extent of difficulty in removing rock. The geotechnical report will include not only the suggested means of rock removal, but also the impact of difficult excavation on adjacent structures and utilities, and recommended means of monitoring and protecting these structures and utilities during construction.

The investigation will also include recommendations for resistance to uplift forces due to buoyant loads from elevated groundwater. In addition to the dead weight of the structures, deep foundation members or anchor systems may be needed. The geotechnical report will provide recommendations for the appropriate systems along with the design parameters needed to define the anchorage system.

Filter Building Replacement

The proposed filter building replacement will consist of 12 filter bays, six filters on the west side of the structure and six filters on the east side of the structure. Between the filter cells on each side will be a pipe gallery servicing all 12 filter bays. This structure will consist of reinforced concrete walls supported on a reinforced

concrete mat foundation. Elevated reinforced concrete slabs will be included over the pipe gallery and other areas where access is needed. The geotechnical investigation will verify the type of foundation and assist in determining the bearing elevation of the structure. The filter complex will be covered by a superstructure consisting of a braced structural steel frame supporting a roof consisting of steel bar joists as secondary framing supporting a metal deck. The walls of the superstructure will be reinforced concrete masonry units to transfer loads to the structural steel frame and a brick veneer. Preliminary drawings are included of the proposed structure.

If rock is encountered at a high elevation, some extensive rock excavation will likely be required to allow the structure to be founded where needed for hydraulic and process reasons. Based on the geometry, five borings are suggested for conducting the geotechnical investigation. If rock is encountered above the proposed foundation bearing elevation, at least one of the borings will be extended via rock coring to at least the proposed bearing elevation. If the structure is bearing on rock, as expected, deep foundation members will not be required for compressive support of the structure. However, groundwater concerns may require consideration of means to resist uplift forces on the tank structures. If necessary, rock anchors may be considered to assist with this uplift resistance. The geotechnical investigation will determine the parameters needed to design the rock anchor system.

Backwash Pump Station

Backwash water will be routed from the filters to a Backwash Pump Station included in the alternate design approach. This structure will be located as shown on the attached drawings southeast of the proposed Filter Building Replacement. The structure will consist of a reinforced tank structure supported on a reinforced concrete mat foundation. The geotechnical investigation will verify the proposed foundation type. The top of the structure will be a reinforced concrete slab and beam system designed to support the backwash pumps, as well as a minimum live load of 300 psf. Two borings are suggested for obtaining the information needed to design this structure. Based on the proposed elevation of the Backwash Pump Station, the geotechnical issues including the buoyancy concerns mentioned for the Filter Building may also apply to this structure.

400,000 Gallon Chlorine Contact Basin

As part of an alternate design approach, a new 400,000 gallon Chlorine Contact Basin will be constructed east of the proposed Filter Building Replacement. If the Chlorine Contact Basin is included, the Filter Building Replacement will be reduced in size from 12 filters to eight filters. The Chlorine Contact Basin will be divided into two cells of equal capacity. The Chlorine Contact Basin will consist of a reinforced concrete tank structure supported by a reinforced concrete mat foundation. The walls of the structure will consist of reinforced concrete using both vertical expansion joints and vertical contraction joints spaced as necessary to assist in control of shrinkage crack formation. The Chlorine Contact Basin will be covered by prestressed precast concrete hollow core slabs. The precast members will be supported by the exterior walls of the tanks, the interior divider wall between the two separate chambers of the Chlorine Contact Basin, and the baffle walls within each chamber of the Chlorine Contact Basin. Beams will be added extending from the ends of the baffle walls to the exterior walls to provide continuous support for the precast members. A concrete topping and roofing membrane will be added over the precast members to provide slope for drainage and ensure the watertightness of the cover system.

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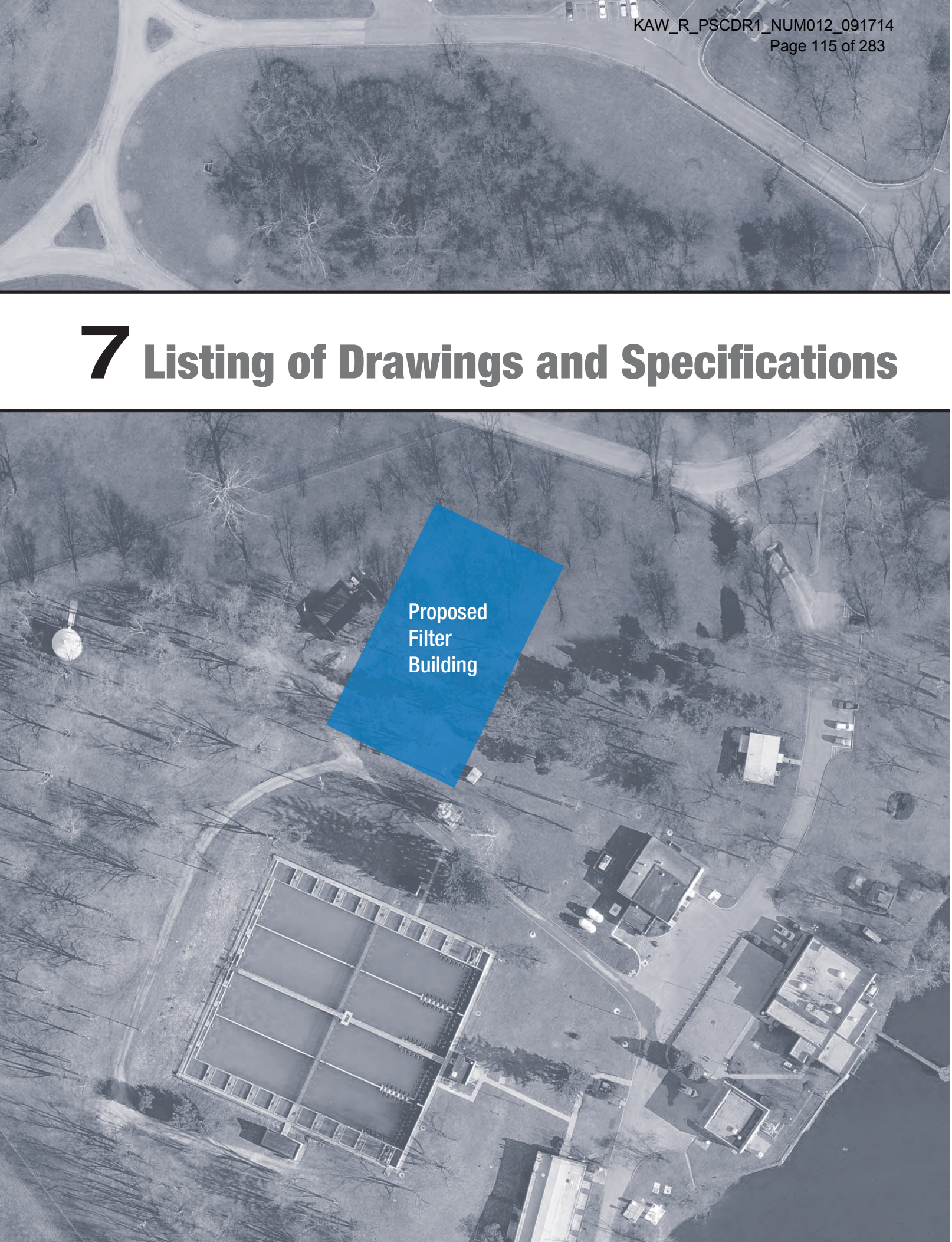
The geotechnical issues mentioned for the Filter Building Replacement will also be issues for the Chlorine Contact Basin. If the Chlorine Contact Basin has to be buried significantly for hydraulic reasons, the rock excavation issues will exist, as will the buoyancy resistance when the tank is totally empty. An evaluation will be required to determine the most economical means of resisting buoyancy. Structural wall and bottom mat sections may be increased to provide adequate ballast loads. Also, extension of foundation lips to engage more resistance from backfill will be considered. If these options result in unrealistic thickness requirements, the buoyant forces will have to be resisted by rock anchors. The geotechnical investigation will evaluate these issues and provide design parameters for the design of the rock anchor system.

7 Listing of Drawings and Specifications



SECTION 7: LISTING OF DRAWINGS AND SPECIFICATIONS

This section contains a list of the drawings and specifications anticipated to be included in the Contract Documents for the Richmond Road Station Water Treatment Plant New Filter Building Design. **Table 7-1** provides a list of drawings, and **Table 7-2** provides a table of contents for specifications. These tables apply to the filter building in the base design. Additional drawings and specifications will be required for the alternate design.

LIST OF DRAWINGS		
Sheet No	Dwg	Drawing Title
	GENERAL	
1	COVER	Cover Sheet
2	G1	Index of Drawings
3	G2	Legend and Abbreviations
4	G3	Hydraulic Profile
5	G4	Process Flow Schematic
	CIVIL	
6	C1	Existing Site Plan
7	C2	Staking and Paving
8	C3	Grading, Drainage and Erosion Control Plan
9	C4	Erosion Control Standard Details
10	C5	Demolition
11	C6	Demolition
	LANDSCAPING	
12	L1	Overall Treatment Plant Site Plan
	MECHANICAL	
13	M1	Yard Piping Plan
14	M2	Demolition
15	M3	Demolition
16	M200	Overall Plan
17	M201	Bottom Plan
18	M202	Bottom Plan
19	M203	Intermediate Plan
20	M204	Intermediate Plan
21	M205	Top Plan
22	M206	Top Plan
23	M207	Sections and Details
24	M208	Sections and Details
	STRUCTURAL	
25	S1	General Structural Notes
26	S200	Foundation Plan
27	S201	Foundation Plan
28	S202	Bottom Plan
29	S203	Bottom Plan
30	S204	Top Plan

LIST OF DRAWINGS		
31	S205	Top Plan
32	S206	Sections and Details
33	S207	Sections and Details
	ARCHITECTURAL	
34	A1	Schedules
35	A200	Building Code Summary
36	A201	Plans (Top, Bottom)
37	A202	Roof Plan
38	A203	Sections and Details
	HVAC	
39	H1	Legend and Symbols
40	H2	Schedules
41	H200	Bottom Plan
42	H201	Top Plan
43	H202	Sections and Details
	ELECTRICAL	
44	E1	Legend And Symbols
45	E2	Overall Site Plan
46	E200	Power and Control Plan
47	E201	Lighting Plan
48	E202	Single Line Diagram
49	E203	Riser and Block Diagrams
50	E204	Panelboard Schedules
	INSTRUMENTATION	
51	I1	Legend, Symbols and General Notes
52	I2	SCADA System Networking Diagram
53	I3	Details
54	I200	Filtration Process and Instrumentation Diagram
	DETAILS	
55	D1	Miscellaneous Standard Details
56	D2	Miscellaneous Standard Details
57	D3	Miscellaneous Standard Details
58	D4	Miscellaneous Standard Details
59	D5	Miscellaneous Standard Details
60	D6	Miscellaneous Standard Details
61	D7	Miscellaneous Standard Details
62	D8	Miscellaneous Standard Details

Table 7-1

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LIST OF SPECIFICATIONS	
Section	Title
DIVISION 1 – GENERAL REQUIREMENTS	
1000	Summary of Work
1046	Continuity of Operations and Work Sequence
1075	Basis of Payment
1300	Submittals
1500	Temporary Facilities
1600	Material and Equipment
1650	Testing
1656	Disinfection of Facilities
1658	Disinfection of Structures and Equipment
1700	Project Closeout
1820	Demonstration and Training
DIVISION 2 – SITEWORK	
2050	Demolition
2100	Clearing, Grubbing, and Site Preparation
2140	Dewatering
2200	Earthwork
2207	Aggregate Materials
2274	Geotextiles
2276	Erosion and Sedimentation Control
2500	Surface Restoration
2510	Paving and Surfacing
2604	Utility Structures
2710	Storm Drains and Roof Drains
2910	Final Grading and Landscaping
DIVISION 3 – CONCRETE	
3100	Concrete Formwork
3200	Reinforcing Steel
3230	Stressing Tendons
3250	Concrete Accessories
3290	Joints in Concrete
3300	Cast-in-Place Concrete
3350	Concrete Finishes
3370	Concrete Curing
3400	Precast Concrete
3415	Precast Prestressed Concrete Hollow Core Planks
3480	Precast Concrete Specialties
3600	Grout
3732	Concrete Repairs
DIVISION 4 – MASONRY	
4100	Mortar and Masonry Grout
4150	Masonry Accessories
4200	Unit Masonry
DIVISION 5 – METALS	
5010	Metal Materials
5035	Galvanizing
5050	Metal Fastening
5061	Stainless Steel
5120	Structural Steel
5140	Structural Aluminum
5210	Steel Joists
5300	Metal Decking
5500	Metal Fabrications
5510	Metal Stairs
5515	Ladders
5520	Handrails and Railings
5531	Gratings, Access Hatches, and Access Doors
5540	Castings
5550	Stair Treads and Nosings
5830	Bearing Devices
DIVISION 6 – WOOD AND PLASTICS	
6100	Rough Carpentry
6610	Glass Fiber and Resin Fabrications

LIST OF SPECIFICATIONS	
DIVISION 7 – THERMAL AND MOISTURE PROTECTION	
7100	Waterproofing
7150	Dampproofing
7180	Liquid Applied Water Repellants
7190	Vapor Barrier
7210	Building Insulation
7540	Single Ply Membrane Roofing (PVC)
7600	Flashing and Sheet Metal
7700	Roof Specialities and Accessories
7900	Joint Fillers, Sealants and Caulking
DIVISION 8 – DOORS AND WINDOWS	
8110	Steel Doors and Frames
8520	Aluminum Windows and Frames
8710	Finish Hardware
8800	Glass and Glazing
DIVISION 9 – FINISHES	
9900	Painting
DIVISION 10 – SPECIALTIES	
10400	Identifying Devices
10522	Fire Extinguishers
10524	Emergency Shower/Eyewash Stations
DIVISION 11 – EQUIPMENT GENERAL PROVISION	
11000	Equipment General Provisions
11100	Pumps - General
11133	Submersible Sump Pumps
11153	Vertical Turbine Pumps
11180	Positive Displacement Blower Package
11360	Sample Pumps
11501	Chemical Injection and Diffuser Assemblies and Sampling Probes
DIVISION 12 – FURNISHINGS	
	(NOT USED)
DIVISION 13 – SPECIAL CONSTRUCTION	
13400	Filter Underdrain System
13410	Filter Media
13450	Disinfection of Water Treatment Facilities
DIVISION 14 – CONVEYING SYSTEMS	
	(NOT USED)
DIVISION 15 – MECHANICAL	
15000	Basic Mechanical Requirements
15006	Ductile Iron Pipe
15008	PVC/CPVC Pipe and Thermoplastic Hose
15010	Copper Pipe
15012	Steel Pipe
15020	Pipe Supports
15030	Piping and Equipment Identification Systems
15095	Valves, General
15100	Valve Operators and Electric Valve Actuators
15101	Butterfly Valves
15104	Ball Valves
15105	Check Valves
15107	Fire, Wall and Yard Hydrants
15108	Gate Valves
15109	Plug Valves
15114	Miscellaneous Valves
15115	PVC/CPVC Valves
15170	Electric Motors
15200	Gate Operators
15209	Sluice Gates
15290	Insulation
15390	Schedules
15500	Basic HVAC Requirements
15510	HVAC Identification
15566	Electric Room Air Conditioner

Table 7-2

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LIST OF SPECIFICATIONS	
15590	Power Ventilators
15597	Aluminum Ductwork
15599	HVAC Insulation
15600	Ductwork Accessories
15604	Electric Space Heating Units
15605	Louvers and Dampers
15606	Air Inlets and Outlets
15608	Electric Control Systems
15616	Testing, Adjusting, and Balancing
DIVISION 16 – ELECTRICAL	
16000	Basic Electrical Requirements
16111	Conduit
16118	Underground Ducts and Manholes
16121	Medium Voltage Cable
16123	Building Wire and Cable
16130	Boxes
16141	Wiring Devices
16170	Grounding and Bonding
16190	Supporting Devices
16195	Electrical-Identification
16280	Surge Protection Devices
16426	Low Voltage Switchboards
16440	Disconnect Switches
16461	Dry Type Distribution Transformers
16470	Panelboards
16481	Individual Motor Controllers
16482	Motor Control Centers
16495	Variable Frequency Drive Systems
16496	Automatic Transfer Switch
16500	Lighting
16670	Lightning Protection Systems
16902	Electric Controls and Relays
DIVISION 17 – CONTROL AND INFORMATION SYSTEMS	
17000	Control and Information System Scope and General Requirements
17015	Preliminary Design Review
17030	Control and Information System Submittals
17040	Control and Information System Training Requirements

LIST OF SPECIFICATIONS	
17050	Tools, Supplies and Spare Parts - General
17060	Signal Coordination Requirements
17070	Control and Information System Testing - General
17071	Acceptance Test
17072	Field Testing
17073	Final Acceptance Test
17080	Quality Assurance
17100	Control and Information System Hardware, General
17120	Programmable Logic Controllers
17125	PLC Operator Interface Units
17180	Local Area Network
17190	Uninterruptible Power Systems
17500	Enclosures, General
17510	Cabinets and Panels
17520	Field Panels
17550	Panel Instruments and Accessories
17560	Surge Protection Devices
17600	Unpowered Instruments, General
17610	Insert Venturi Flow Tubes
17620	Venturi Flow Tubes
17650	Pressure Gauges
17661	Flow Switches
17670	Level Switches (Suspended Float Type)
17675	Pressure Switches
17698	Instrumentation and Control System Accessories
17700	Powered Instruments, General
17740	Ultrasonic Liquid Level Measurement Systems
17749	Submersible Level (Pressure) Sensors
17760	Pressure Indicating Transmitters
17800	Analytical Instruments, General
17801	pH Analyzers
17821	Turbidity Monitoring Systems (Low Range)
17831	Chlorine Analyzers
17900	Schedules and Control Descriptions, General
17910	Instrument Schedule
17920	Control System Input/Output List
17950	Functional Control Descriptions

Table 7-2

8 Permit Listing

SECTION 8: PERMIT LISTING

Public Water System Construction Permit

Under Title 401, Chapter 8 of the Kentucky Administrative Code, the Kentucky Department for Environmental Protection, Division of Water will issue a "construction" permit for the construction of the new facilities. The permit application, Form DW-2, has multiple sections for the following:

- I – Project Information
- II – Utility Information
- III – Design Considerations
- IV – Fees

This application, along with plans, specifications and other supporting documents and design calculations, will be submitted. The permit application and review fee for a partial water treatment plant project, as con-tained in 401 KAR 8:050, will be $525.

Under 401 KAR 8:101, the Department shall have up to 45 days from receipt of a complete submittal package to issue a preliminary or final approval. Submission of a preliminary engineering report may be required depending upon the level of discussion that has taken place between Kentucky American Water and KDOW about this project.

The Hazen and Sawyer Team has interacted with numerous state regulatory agencies on expediting plan submission and review processes prior to 100-percent completion of design documents. Our proposed project team members, aided by their regulatory background and previous interaction with KDOW, will quickly hone in on the information required in preparation of a submittal package. Based on our review of the Kentucky Administrative Regulations, the permit application must include plans and specifications of the sanitary features of the design and other features of public health significance and does not require structural, mechanical or electrical plans and specifications. We anticipate that a submittal package can be issued for permitting at approximately 60% design, containing all the information needed to secure a construction permit from KDOW.

Floodplain Management Permit

It is not anticipated that new construction will take place in the 100 year flood zone area. Therefore, a permit for work in the floodplain will not be required from the Kentucky Department for Environmental Protection, Division of Water.

Division of Water Construction Permit for Sanitary Sewer

This permit may be required if an extension of sanitary sewer service is included in the project. Timeframe should be 60 days or less.

Local Site Plan and Code Official Review and Permitting

The site development of the property within Kentucky American Water's Richmond Road Station property will involve the following processes:

Site Plan Approval Permit – This process will be required by LFUCG's Division of Planning and Development prior to construction as part of the building permit process. This process is initiated by scheduling an appointment

with LFUCG Planning for their Technical Committee Meeting, which meets once per month. LFUCG's Technical Committee consists of representatives from LFUCG's Division of Planning, Engineering, Traffic, and Solid Waste as well other representatives from the Lexington Fire Department and local utility companies. Applicant should allow approximately 60 days for approval.

Building Permit – This will be required by the LFUCG Division of Building Inspections. Architectural, structural, electrical, and HVAC plans will reviewed by the Technical Committee described above. LFUCG currently applies the following codes for these reviews:

- International Mechanical Code 2006
- Kentucky Plumbing Code 2007
- International Building Code 2006, including 2007 Kentucky Amendments
- NEC 2011 Code (AKA NFPA 70)
- National Fuel Gas Code 2006 (AKA NFPA 54)
- International Energy Conservation Code 2009

Plan review fee will be calculated as $0.06 per square foot of construction. The review fee will be accompanied by two sets of plans. In addition, two sets of plans shall also be submitted to the Office of the Fire Marshall for fire alarm and sprinkler systems, as applicable to the project.

Building Permit will be issued as part of the development plan approval, in the same 60-day timeframe.

Final Development Plan Approval Process – A Final Development Plan is required when more than one principal structure is proposed on a lot or a parcel of land. It is our opinion that an approved Final Development Plan will be required for approval for this project. This process can be completed within the same timeline as the site plan approval process.

Land Disturbance Permit – This will be required by LFUCG's Division of Engineering prior to the start of grading. The requirements for this permit include a Grading & Drainage Plan, Erosion Control Plan, and Storm Water Pollution Prevention Plan (SWPPP). A copy of the executed Notice of Intent (NOI) from the Kentucky Division of Water will be required as part of the submittal to LFUCG. This permit will be acquired by the contractor prior to construction, using the NOI and plans prepared by the Hazen and Sawyer Team.

Demolition/Wrecking Permit – Before any building is demolished either in part or in whole, the applicant is required by law to obtain a wrecking permit from the Division of Building Inspection. A wrecking permit is non-transferable and can only be issued to a wrecking contractor or the property owner upon proof of proper liability insurance. Should the property be deemed to have historic significance, the Division of Historic Preservation may impose a delay of up to 30 days so the documentation of the property can be completed before wrecking is commenced. In addition to the demolition permit, an accompanying grading permit of the demolished area must also be obtained.

The permit fee for the demolition permit is calculated as the assessed value of the structure to be demolished times 0.002.

Project Team and the Permitting Process

As stated above, Hazen and Sawyer team members are well versed in identifying permitting concerns and the key components for an early submittal package to KDOW for permitting. Additionally, Hazen and Sawyer staff in Lexington along with our local subconsultant, Integrated Engineering, have invaluable local

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experience with navigating the site plan and building permitting review and approval processes. This project team has demonstrated success keeping a schedule under strenuous permitting situations on American Water projects in other locations, and will perform with the same level of success on this project.

9 Preliminary Schedule

SECTION 9: PRELIMINARY SCHEDULE

A preliminary schedule including design, Construction Manager at Risk (CMR) selection, permitting, Public Service Commission approval, and construction of the New Filter Building for the Richmond Road Station WTP is included in this section of the proposal.

Preliminary design for the project will begin immediately following the Notice of Award. The design team will prepare a design critique for review by Kentucky American Water (KAW), and a pre-design meeting will take place in February of 2014.

The design team will then prepare a draft design memorandum and 30% design documents for review by KAW. During this design phase, Hazen and Sawyer will engage a national contractor to evaluate our design and provide input on areas of potential cost savings. This input from the contractor will be incorporated into our 30% design documents.

After KAW has had the opportunity to review the 30% design documents, the 30% design review meeting will take place in March of 2014. A meeting to review the instrumentation and control requirements will also take place at this time.

The team will then incorporate KAW's design review comments into a final design memorandum and prepare 60% drawings and specifications. The final design memorandum and drawings and specifications will be sent to KAW in late April of 2014 for review, and a 60% design review meeting will be held in early May.

At the time of 60% document submittal, KAW will issue the Construction Manager at Risk Request for Proposal. The CMR pre-bid meeting will be held in early May of 2014, followed by receipt of proposals and award by the end of May.

Permit applications will be prepared and submitted to Kentucky Department of Environmental Protection - Division of Water and to local authorities at the 60% design phase. Our schedule shows a submittal review time of 30 days for state and local permits, which would provide permit approval in June of 2014.

After permit approval is received, KAW will submit 60% design documents and the target cost to the Public Service Commission (PSC) in late June of 2014. It is anticipated that PSC review will require approximately six months.

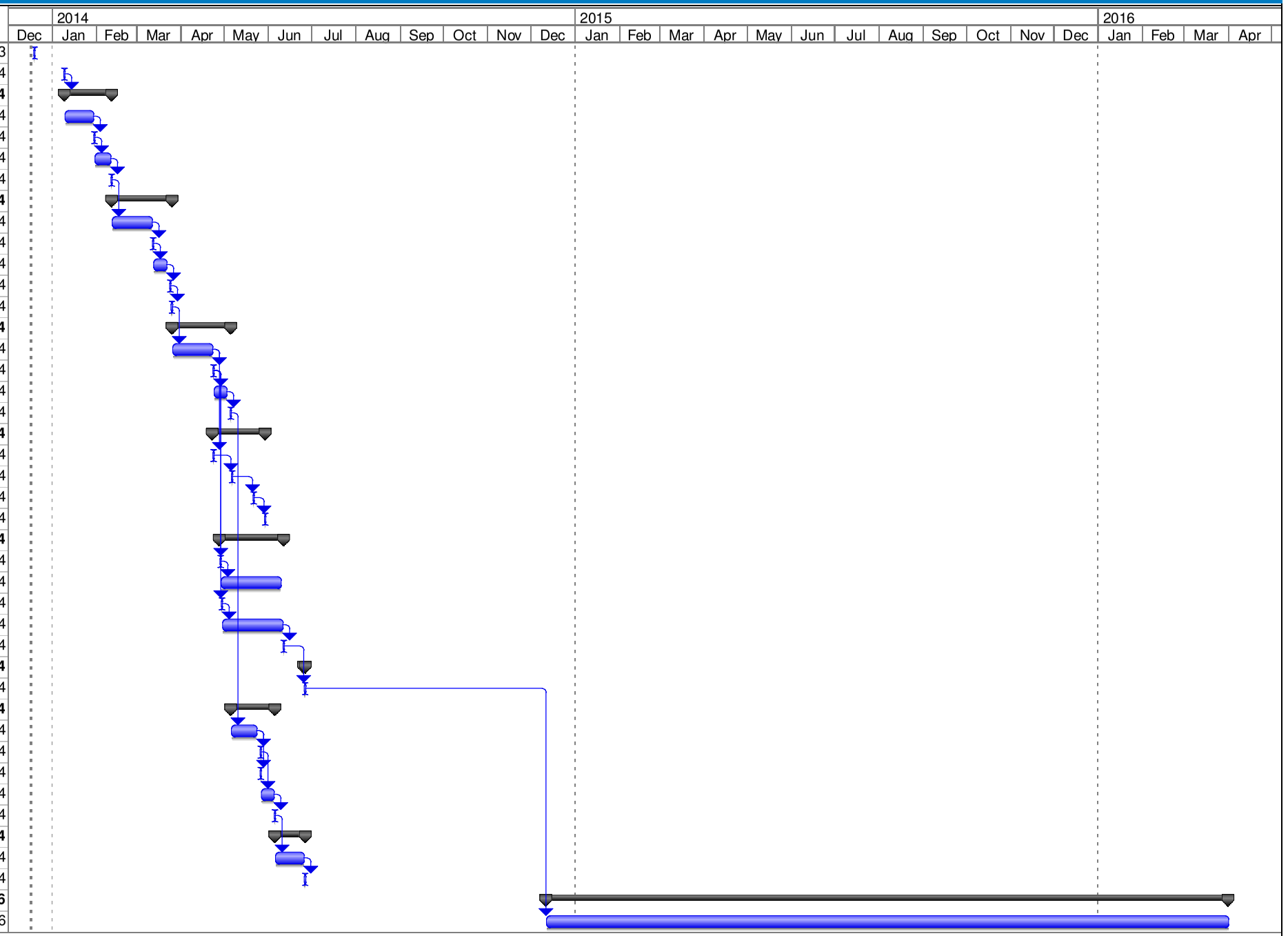
After the 60% design review meeting, 90% design documents will be prepared and provided to KAW for review. A 90% design review meeting will be held in early June of 2014. Based on discussions at this review meeting, 100% drawings and specifications will be prepared and submitted to KAW by the end of June of 2014. This meets the final design completion date given in the RFP; however, we anticipate that approval from PSC will not be received until the end of the year, so design completion could extend beyond June if needed.

The construction phase of the project is expected to commence after approval is received from the PSC, which we anticipate to be before the end of 2014. The new filters should be online in April 2016.

Figure 9-1 on the following page shows the proposed project schedule from the date of award through final construction and start up. The schedule will be updated with each design phase submittal.

Figure 9-1
Preliminary Schedule - Richmond Road Station WTP New Filter Design

ID	Task Name	Duration	Start	Finish
1	Proposals Due	1 day	Thu 12/19/13	Thu 12/19/13
2	Notice of Award	1 day	Thu 1/9/14	Thu 1/9/14
3	**Pre-Design**	**23 days**	**Fri 1/10/14**	**Tue 2/11/14**
4	Prepare Design Critique /Preliminary Design Memorandum	14 days	Fri 1/10/14	Wed 1/29/14
5	Submit Design Memo to KAW	1 day	Thu 1/30/14	Thu 1/30/14
6	KAW Review	7 days	Fri 1/31/14	Mon 2/10/14
7	Pre-Design Meeting	1 day	Tue 2/11/14	Tue 2/11/14
8	**30% Design**	**30 days**	**Wed 2/12/14**	**Tue 3/25/14**
9	Prepare Design Memo and 30% design document	20 days	Wed 2/12/14	Tue 3/11/14
10	Submit Design Memo and 30% Design Documents to KAW	1 day	Wed 3/12/14	Wed 3/12/14
11	KAW Review	7 days	Thu 3/13/14	Fri 3/21/14
12	30% Design Review Meeting	1 day	Mon 3/24/14	Mon 3/24/14
13	Instrumentation and Control Meeting	1 day	Tue 3/25/14	Tue 3/25/14
14	**60% Design**	**29 days**	**Wed 3/26/14**	**Mon 5/5/14**
15	Prepare Design Memo and 60% Design Documents	20 days	Wed 3/26/14	Tue 4/22/14
16	Submit Design Memo and 60% Design Documents to KAW	1 day	Wed 4/23/14	Wed 4/23/14
17	KAW Review	7 days	Thu 4/24/14	Fri 5/2/14
18	60% Design Review Meeting	1 day	Mon 5/5/14	Mon 5/5/14
19	**Construction Manager at Risk (CMR) Bid**	**27 days**	**Wed 4/23/14**	**Thu 5/29/14**
20	Issue CMR RFP	1 day	Wed 4/23/14	Wed 4/23/14
21	CMR Pre-Bid Meeting	1 day	Tue 5/6/14	Tue 5/6/14
22	CMR Proposals Due	1 day	Wed 5/21/14	Wed 5/21/14
23	Notice of Award to CMR	1 day	Thu 5/29/14	Thu 5/29/14
24	**Permitting**	**33 days**	**Mon 4/28/14**	**Wed 6/11/14**
25	Submit KDOW Permit Application	1 day	Mon 4/28/14	Mon 4/28/14
26	KDOW Permit Review	30 days	Tue 4/29/14	Mon 6/9/14
27	Submit Local Permit Applications	1 day	Tue 4/29/14	Tue 4/29/14
28	Local Permit Review	30 days	Wed 4/30/14	Tue 6/10/14
29	Receive Permit Approvals	1 day	Wed 6/11/14	Wed 6/11/14
30	**Public Service Commission (PSC) Presentation**	**1 day**	**Thu 6/26/14**	**Thu 6/26/14**
31	Submit 60% Design and Target Cost to PSC	1 day	Thu 6/26/14	Thu 6/26/14
32	**90% Design**	**23 days**	**Tue 5/6/14**	**Thu 6/5/14**
33	Prepare 90% Design Documents	14 days	Tue 5/6/14	Fri 5/23/14
34	Submit 90% Documents to KAW	1 day	Mon 5/26/14	Mon 5/26/14
35	Submit Final Cost Estimate	1 day	Mon 5/26/14	Mon 5/26/14
36	KAW Review	7 days	Tue 5/27/14	Wed 6/4/14
37	90% Design Review Meeting	1 day	Thu 6/5/14	Thu 6/5/14
38	**100% Design**	**15 days**	**Fri 6/6/14**	**Thu 6/26/14**
39	Prepare 100% Design Documents	14 days	Fri 6/6/14	Wed 6/25/14
40	Submit 100% Design Documents to KAW	1 day	Thu 6/26/14	Thu 6/26/14
41	**Construction Phase**	**340 days**	**Fri 12/12/14**	**Thu 3/31/16**
42	Construction	340 days	Fri 12/12/14	Thu 3/31/16



KENTUCKY AMERICAN WATER

HAZEN AND SAWYER
Environmental Engineers & Scientists

Project: preliminary schedule.mpp
Date: Tue 12/17/13

Task — Progress — Summary — External Tasks — Deadline
Split — Milestone — Project Summary — External Milestone

10 Project Team Organizational Chart

SECTION 10: PROJECT TEAM ORGANIZATIONAL CHART

Hazen and Sawyer is pleased to submit this proposal for engineering services to KAW for the New Filter Building Design for the Richmond Road Station Water Treatment Plant. This section of our proposal provides information about our firm and proposed project team.

The Firm

Hazen and Sawyer is a professional corporation owned entirely by its employees. A Board of Directors, consisting of registered Professional Engineers, provides executive-level management. The firm's principals are also actively involved in the supervision of projects, from the initial planning phase through completion.

With corporate headquarters in New York City, the firm also has regional offices located in Cincinnati, Ohio; Raleigh, North Carolina; and Hollywood, Florida. **Figure 10-1** shows Hazen and Sawyer's regional and branch office locations throughout the United States.

Hazen and Sawyer is a nationally-recognized environmental engineering and consulting firm that provides services in the specialized fields of water supply, treatment, and distribution; wastewater collection, treatment, and disposal; and solid waste management. Since its founding in 1951, the firm has completed thousands of major assignments in the United States and

Hazen and Sawyer Office Locations

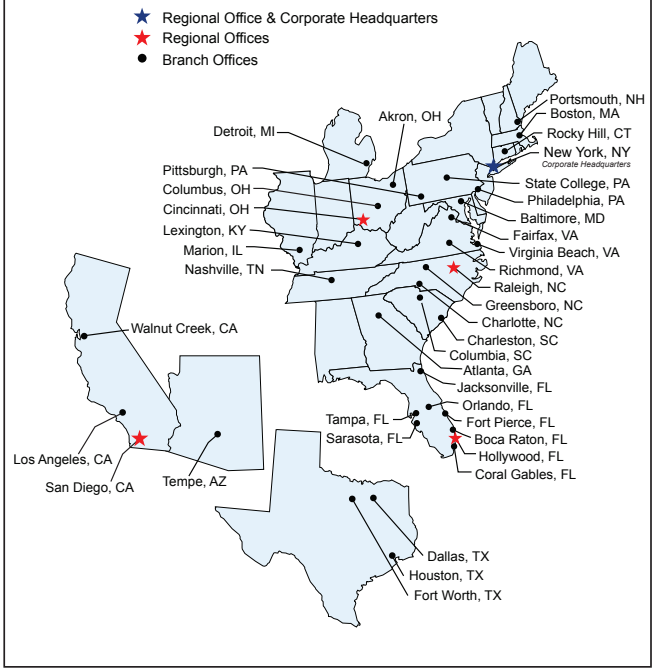


Figure 10-1

Types of Services

WASTEWATER
Design of Treatment Facilities
Effluent Reuse - Recycle
Sludge Processing and Disposal
NPDES Permitting
Toxicity Reduction Evaluation
Operations Assistance and Troubleshooting
Characterization and Treatability Testing
Biosolids Management
Odor Control
Pump Stations

STORMWATER
Watershed Management
Water Quality Modeling
Best Management Practices
Treatment

WATER SUPPLY
Source Development
Water Conservation
Bench and Pilot-Scale Testing
Water Treatment, Transmission and Storage
Supply and Distribution
Groundwater Services
Wellhead Protection

SOLID WASTE MANAGEMENT
Waste Characterization
Landfill Design
Composting
Incineration and Waste-to-Energy Systems

BURIED INFRASTRUCTURE
Collection System Condition Assessment
Sewer Rehabilitation
Trenchless Technologies
Sewer Overflow Mitigation
Equalization Facilities
Collection and Distribution System Modeling
Odor Control

INFORMATION TECHNOLOGY
GIS and Data Management
Mapping and Asset Inventory
SSO and CSO Incident Reporting
Flow Monitoring Programs

SUPPORT SERVICES
Construction Administration
Construction Management
Startup Services
O&M Troubleshooting
Electronic O&M Manuals
Program Management
Computer Systems and CAD

ENVIRONMENTAL SERVICES
Permitting Assistance
Impact Statements
Site Assessments
Water Quality Monitoring
Health Risk Assessments
Wetlands Delineation/Mitigation
Compliance Process Reviews

UTILITY MANAGEMENT
Rate Studies
Asset Management
Public Relations

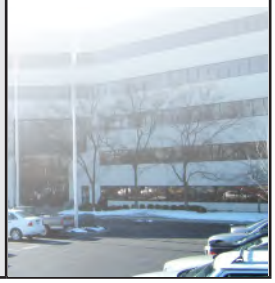


Figure 10-2

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abroad for government agencies, utilities, and industrial organizations. These have ranged in scope from simple analyses for small communities to multi-municipal, multi-million-dollar projects. Hazen and Sawyer provided services are briefly illustrated in **Figure 10-2**.

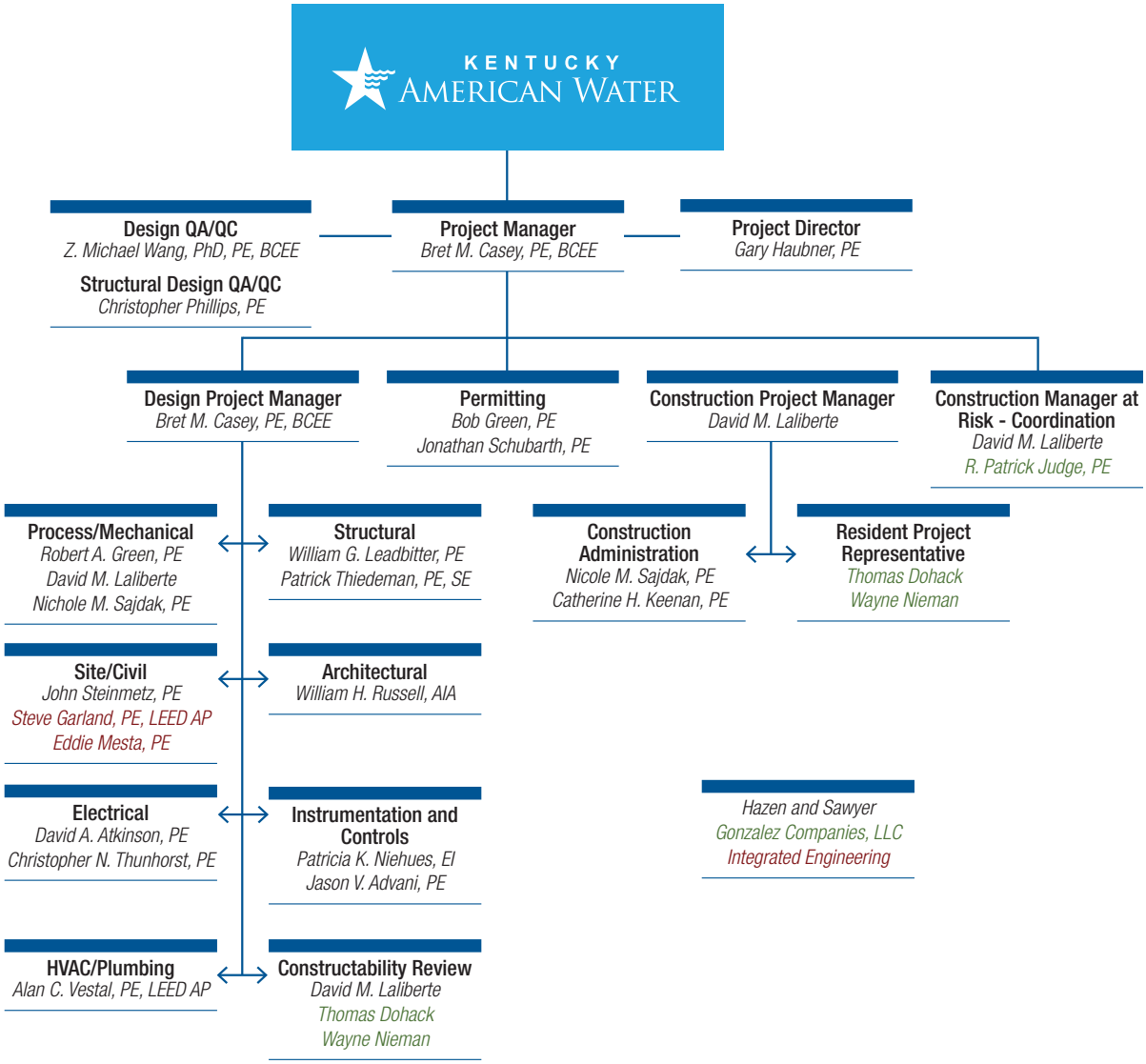
According to the most recent *Engineering News-Record,* Hazen and Sawyer remains the top firm in the nation focused entirely on water and wastewater. We are committed to maintaining this position.

Information about our subconsultants Gonzalez Companies and Integrated Engineering is included in **Section 12**.

Our Project Team

The individuals selected to manage and lead the New Filter Building Design project for the RRS WTP are a cohesive team with a proven track record for delivering projects for American Water in several states.

Filter design has been a major component of several of the projects that the Hazen and Sawyer team has completed for American Water. Many of our team members have been



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involved in these recent American Water projects and are very familiar with American Water's design standards. This unique qualification gives our team a strong advantage for this project.

We understand the goals set by Kentucky American Water for this project, and believe that our team is the best suited to assist KAW in achieving those goals. The team members proposed to carry out the RRS WTP New Filter Building Design project are experienced, highly competent and capable of providing the necessary services in a cost-effective and technically proficient manner.

Figure 10-3 presents an organizational chart of the key management and task leaders for your project. A brief summary of the qualifications of key project team members is presented in the following paragraphs. Full resumes of project team members are included in **Section 11**.

Z. Michael Wang, Ph.D., PE, BCEE, will be responsible for directing **Design QA/QC** for the project. Dr. Wang has 31 years of experience on a wide range of water projects, including water treatment facility design, startup and trouble shooting, and water quality and hydraulic modeling, surge analysis, GIS and master planning for water distribution systems. He has developed extensive expertise in design and analysis of water treatment facilities including plant hydraulics, treatment processes, residuals handling, chemical facilities, and instrumentation and controls.

Dr. Wang has been working on numerous American Water projects since the early 1990s, and recently served as the Project Manager for the 15-mgd Granite City WTF Clearwell Addition project in Granite City, IL, for Illinois American Water. He also served as the Design Project Manager for the 54-mgd Borman Park Backwash Recycling and Residual Management Facility project in Gary, IN, and the new 6-mgd Hidden Lake WTF project in Warsaw, IN, both for Indiana American Water. He was heavily involved in the recent completion of the 15-mgd Bradley Avenue WTP project in Champaign County, in which dual-media gravity filters were provided with air and water backwash; he also served as the Project Manager for the 6-mgd Streator WTP improvements project, in which a new dual-media gravity filter was provided with water and air backwash, and the 22-mgd Mattis Avenue WTF clearwell addition project in Champaign County, all for Illinois American Water. He served as project manager for the East River Station WTP project for Iowa American Water, which involved the improvements to two parallel flocculation trains and improvements to an existing clearwell. Dr. Wang worked as project engineer and project manager on the 5-mgd Bluestone WTP and the 2-mgd Weston WTP for West Virginia American Water.

Christopher T. Phillips, PE, will provide **QA/QC for Structural Design** for the project. Mr. Phillips has 29 years of experience in structural engineering and serves as the Structural Department Manager for Hazen and Sawyer's Mid-Atlantic Region. He has extensive structural design experience on water facilities, including the Alton WTP, Bradley Avenue WTP, Streator WTP and Mattis Avenue WTF, all for Illinois American Water; and the Hidden Lake WTF and Borman Park Backwash Recycling and Residual Management Facility for Indiana American Water. Mr. Phillips recently led structural design on the Granite City WTF Clearwell Addition Project for Illinois American Water. He also led water plant structural design efforts for the Bluestone and Weston WTPs for West Virginia-American Water; the 20-mgd Jones Ferry Road WTP in Carrboro, NC; and the Increased Alum Storage and Delivery System

Modification to the 240-mgd Richard Miller WTP, Greater Cincinnati Water Works.

Bret M. Casey, PE, BCEE, will serve as the overall **Project Manager** as well as the **Design Project Manager** for the project. Mr. Casey has 24 years of experience in municipal drinking water projects. He has served as project manager and design leader on the design, construction administration, and startup of several large water treatment plant projects. His experience covers all aspects of municipal water systems from raw water supply to treatment and distribution. Mr. Casey is currently serving as technical advisor on various projects for Indiana American Water: improvements to the carbon feed system at the Ogden Dunes WTP, a THM removal system evaluation for the facility in Muncie, an economic evaluation of a chlorine scrubber installation vs. an on-site hypochlorite generation system installation for plants in Noblesville and Greenwood, and filter improvement projects for plants in Seymour and Jeffersonville. Mr. Casey recently served in a key technical and project management role for two new water treatment plants in Ohio: a 19.2-mgd plant for the Del-Co Water Company, and a 3.75-mgd plant for the City of Delphos. Both plants utilize two-stage lime softening to treat surface water. His responsibilities on these projects included conceptual-level planning, detailed design, construction administration, and ultimate startup of facilities. The project for the Del-Co Water Company was fast-tracked with design being completed in nine months to meet the growing demands of southern Delaware County just north of Columbus, Ohio.

Gary J. Haubner, PE, will serve as **Project Director** and will be responsible for commitment of the firm's resources and input on major technical issues. Mr. Haubner is a Vice President of the firm serving as the Midwest Regional Manager. Mr. Haubner has over 21 years of water and wastewater experience, focused on facility planning and design. His recent water supply and treatment experience includes Clermont County, OH, Bob McEwen WTP, for which he was Principal for design and construction of plant expansion from 10 mgd to 18 mgd, including a new GAC facility and other plant improvements; Greater Cincinnati Water Works, Richard Miller WTP, for which he provided project support for several projects including design and construction of the Increased Alum Storage and Delivery System and Filter Rehabilitation; Greater Cincinnati Water Works, Pine Hill Elevated Water Storage Tank, for which he was principal for design and construction; Mason OH WTP, for which he was project manager for design of several projects at the groundwater plant, including pressure filter expansion, well field improvements and aquifer study.

Robert A. Green, PE, will coordinate **Permitting** for the project from the various state and local agencies and also lead **Process/Mechanical Design** for the project. Mr. Green has 28 years of experience in the water supply industry. Mr. Green is currently serving as project manager and process lead on various projects for Indiana American Water: improvements to the carbon feed system at the Ogden Dunes WTP, a THM removal system evaluation for the facility in Muncie, and an economic evaluation of a chlorine scrubber installation vs. an on-site hypochlorite generation vs. bulk hypo system installation for plants in Noblesville and Greenwood, water treatment and filter rehabilitation evaluation at Seymour and filter rehabilitation design for SIOTC in Jeffersonville. Mr. Green recently led coordination for project permitting and performed QC for the Borman Park Backwash Recycling and Residual Management Facility project and new Hidden

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Lake WTF for Indiana American Water. He coordinated project permitting and performed document QA/QC with Illinois American Water's new Bradley Avenue WTP, which was delivered by the design-build method, and also performed QC on improvements at Streator, IL for ILAW. Both the Bradley Avenue and Streator projects included design of new dual-media gravity filters with air and water backwash. He also managed the design and construction of an intermediate lift pump station and granular activated carbon facilities for the expanded 20-mgd Bob McEwen WTP for Clermont County, OH.

Jonathan Schubarth, PE, will assist Mr. Green with **Permitting** efforts for the project. Mr. Schubarth has 21 years of experience in both private sector consulting and public sector utility engineering and management. As a consultant Mr. Schubarth's experience includes design and construction services for projects including water and wastewater systems, capital planning, permitting, pump stations, and treatment plants. As a utility manager, Mr. Schubarth managed, designed, and operated public water and wastewater systems including staff planning, capital planning, rate making, budgeting, and policy making; as well as projects including water and wastewater systems, pump stations, and treatment plants. Mr. Schubarth directed, managed, or coordinated multiple pipeline and booster pump station projects for Warren, Butler, and Simpson County Water Districts in Kentucky.

David M. Laliberte will serve as the **Construction Project Manager** and **Construction Manager at Risk Coordinator**, will assist with **Process/Mechanical Design**, and will provide **Constructability Review** for this project. Mr. Laliberte brings 26 years of broad-based experience in the design and construction administration of advanced water treatment facilities. He recently provided construction administration and led process/mechanical design efforts for Illinois American Water's Granite City WTF Clearwell Addition Project as well as Indiana American Water's Borman Park Backwash Recycling and Residual Management Facility design-build project in Gary, IN. Mr. Laliberte's other recent experience includes the new Hidden Lake WTF in Warsaw, Indiana for Indiana American Water, which included pressure filters; and the Mattis Avenue WTF clearwell addition project, Streator WTP Improvements, and new Bradley Avenue WTP, all design-build projects for Illinois American Water. He also served as Project Manager for the design/bid/build 16-mgd Alton WTP for Illinois American Water. The Streator, Bradley Avenue and Alton WTP projects all included design of dual-media gravity filters with air and water backwash. Mr. Laliberte has performed numerous project management and construction administration roles, including the Bluestone WTP and Weston WTP for West Virginia American Water. He served as Project Engineer on the San Koty WTP project for American Water.

R. Patrick Judge, PE, will also serve as **Construction Manager at Risk Coordinator.** Mr. Judge has over 20 years of experience providing design and construction management services to utility companies throughout the Midwest. Mr. Judge has experience with water treatment facilities, large diameter water mains, force mains, and conveyance tunnels. His experience is inclusive of underground design approaches that consist of working around other utilities facilities, below-grade obstructions, and integrating existing facilities with new design. Recently Mr. Judge was project manager for the Water System Improvements in O'Fallon, Illinois, which included design service monitoring, constructability review, specification development, permitting, and inspection services for a facilities plan for construction of a 12-mgd pump

station and elevated water storage tanks. Mr. Judge was also project manager for the Public Works Pump Station Improvements in O'Fallon, Illinois, which included a new booster pump station with 100 HP pumps with variable frequency drives and SCADA controls, as well as new offices, chlorine feed building, and storage areas.

Nichole M. Sajdak, PE, will provide assistance on **Process/Mechanical Design** efforts and **Construction Administration**. Ms. Sajdak is a Principal Engineer in the firm's Cincinnati office and has 12 years of experience in the planning, design, and construction of water treatment facilities and pumping stations. She has been involved in several pumping applications including design of well pumps for Indiana American's Hidden Lake Water Treatment Facility in Warsaw, IN, and the design and construction administration for the intermediate pump station to feed the GAC contactors at the Bob McEwen WTP in Clermont County, OH. She is currently assisting with several projects for Indiana American Water including the THM removal system evaluation for the Muncie Water Treatment Facility and an economic evaluation of a chlorine scrubber installation vs. an on-site hypochlorite generation system installation for plants in Noblesville and Greenwood.

William G. Leadbitter, PE, will lead **Structural Design** for the project. Mr. Leadbitter has over 16 years total experience and serves the lead structural engineer for the company's Midwest Region. He is responsible for coordinating and supervising all structural work in the region and also manages a growing staff of structural engineers. He has significant experience in the design and construction of water treatment facilities, including work as the structural engineer of record for the New Design Road WTP Upgrade in Frederick County, MD; Rockville WTP Upgrades in Rockville, MD; Potomac WFP Disinfection Improvements in Laurel, MD; and City of Baltimore Deer Creek Pumping Station Upgrades. He has also performed design and inspection services for projects at the E. M. Johnson Raw Water Pumping Station in Raleigh, NC and the P.O. Hoffer WTF Clearwell in Fayetteville, NC. Additionally, Mr. Leadbitter has acted as the lead structural engineer for several recent projects that include finished water or equalization storage including the 0.4 MG Double Springs Water Storage Tank in Kingsport, TN; the 4.0 MG Ocala Water Storage Tank in Nashville, TN and the 1.25 MG Clague Park and 0.5 MG Dover Equalization Basins in North Olmsted, OH.

Patrick Thiedeman, PE, will also provide **Structural Design** for the project. Mr. Thiedeman has 16 years of experience in structural engineering. His design experience includes concrete, steel and aluminum structures. He has been responsible for the design of several water and wastewater treatment plant projects involving structures such as process tanks, basins, treatment areas, and pump stations. He also has building design experience. In addition, he has participated in structural condition assessment for environmental structures. Along with his design and assessment responsibilities, Mr. Thiedeman participates during the construction phase of projects. His involvement includes contract document interpretation and submittal review and approval. Mr. Thiedeman was responsible for structural design for the East River Station Water Treatment Plant flocculation modification project for Iowa American Water. He recently led the structural design for Borman Park Backwash Recycling and Residual Management facility for Indiana American Water, as well as the structural design on the Granite

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City Water Treatment Facility Clearwell Addition Project for Illinois American Water.

John Steinmetz, PE, will provide **Site/Civil Design** for the project. Mr. Steinmetz has 30 years of experience in the design and management of projects including water transmission and distribution, pump stations, hydraulic analyses, storm water management, flood studies, and environmental permitting. Mr. Steinmetz served as project manager for the 2009 Winchester Municipal Utilities Water Planning Study, as well as numerous other water and sanitary sewer projects for WMU in the last 20 years. Transmission main projects were completed for Kentucky American Water and communities such as Lawrenceburg, Nicholasville, and Reading, Ohio. Mr. Steinmetz also served as local project manager for the Bluegrass Water Supply Consortium, coordinating with WMU and other utilities in the Bluegrass region.

Steve Garland, PE, LEED AP, will assist with **Site/Civil Design** for the project. Mr. Garland has 16 years of experience in management and project coordination for municipal infrastructure projects along with private development. Major responsibilities include design for transportation, traffic, wastewater collection (gravity and force mains), stormwater drainage, and major site development projects. Additionally Mr. Garland is responsible for scoping, contract negotiations, public awareness and presentation programs, along with qualification control/qualification assurance. Mr. Garland's recent experience includes the Bluegrass Aspendale Phases 1-5 (LFUCG – Lexington Housing Authority), Lexington, KY, a 90-acre infill and redevelopment project for which he was Project Engineer with responsibilities including design calculations for storm water quantity and quality, sanitary sewer collection design calculations and plan design, utility coordination, grading plans, roadway alignments, and coordination with local and state government bodies during design and construction; and the Ward Hall Pump Station and Force Main Improvements, Georgetown Water and Municipal Sewer Service, for which he was Project Engineer for the design phase for the Class B Pump Station, with responsibilities including design calculations, proper wet well and vault sizing as well as buoyancy calculations and cost estimates, appropriate force main sizing, stream crossing design, construction plan preparation and review, specification writing, project coordination with design team members, staff, property owners, and utility companies.

Eddie Mesta, PE, will also assist with **Site/Civil Design** for the project. Mr. Mesta has 18 years of experience in coordination and design involving surveying, transportation, wastewater collection, storm water drainage, site development, and water supply projects for private and public entities. Experience includes preparation of plans and contract documents, utility coordination, bidding, construction administration, easement acquisition, and presentations, as well as preparation of reports for regional facilities planning, marketing endeavors, and providing solutions to engineering and management problems. Mr. Mesta's recent related experience includes North Limestone, North Upper Street, 6th Street Waterline Survey (KAWC), Lexington, KY, for which he was Project Manager for the topographic survey associated with waterline design on Limestone Street for Kentucky American Water Company, with responsibilities including utility coordination and oversight of the field surveying and deed/plat research for approximately 12,000 of water main within the project corridor; and Bob O Link Trunk Sewer Replacement Project (LFUCG), Lexington, KY,

for which he was Project Manager overseeing the planning, coordination, and design of approximately 6,500 lineal feet of trunk sewer in the Wolf Run Sewershed, with responsibilities including Kentucky Infrastructure Authority (KIA) administration and oversight of the topographic survey, easement plat preparation, and easement acquisition services.

William H. Russell, A.I.A., LEED AP, will be **Lead Architect** throughout the design and construction phases of the project. Mr. Russell has 29 years of experience in the architectural design of water treatment plants, wastewater treatment plants, maintenance buildings, laboratories, and other industrial facilities, and is a LEED accredited professional. He recently provided architectural design of the Granite City WTF Clearwell Addition Project for Illinois American Water. Mr. Russell also provided architectural design of the Borman Park Backwash Recycling and Residual Management Facility and new Hidden Lake WTF for Indiana American Water, and new Bradley Avenue WTP in Champaign, Streator WTP Improvements in Streator, and new Alton WTP for Illinois American Water. Mr. Russell also provided architectural design for the upgrade and expansion of 86-mgd E.M. Johnson WTP, City of Raleigh, NC, which included modifying and expanding the existing filter areas, chemical areas and pumping areas; and the addition to the San Koty WTP, San Koty, IL.

David A. Atkinson, PE, LEED AP, will lead **Electrical Design** for the project. Mr. Atkinson has 10 years of experience and serves as a technical specialist in the design of electrical power distribution systems for water treatment plants and pumping stations. He recently performed electrical design for the Granite City Water Treatment Facility Clearwell Addition Project for Illinois American Water. Mr. Atkinson also recently completed electrical design for the Borman Park Backwash Recycling and Residual Management Facility and 6-mgd Hidden Lake Water Treatment Facility, both for Indiana American Water. Recently, Mr. Atkinson completed the electrical design for the 6-mgd Streator Water Treatment Plant Improvements and 22-mgd Mattis Avenue Water Treatment Plant Improvements for Illinois American Water. He was responsible for the design-build project of the electrical distribution system for the Bradley Avenue Water Treatment Plant in Champaign, IL, also for Illinois American Water Company. The facility is entirely new and rated for up to 20 mgd. The electrical system included a 2000kW standby engine-generator set, 3000A automatic transfer switch, 3000A switchboard, and 300hp variable frequency drives. Seven off-site well pump stations and their associated electrical equipment and SCADA systems were also included as part of the design-build project. This facility recently attainted LEED Certification. Recently, Mr. Atkinson served as the lead electrical engineer responsible for the design of the electrical distribution system upgrades for Abingdon Water Treatment Plant expansion project, Harford County, MD. He was responsible for the electrical facility evaluation and report for the City of Rockville Water Treatment Plant, MD.

Christopher N. Thunhorst, PE, will provide **Electrical Design** for the project. Mr. Thunhorst serves as Hazen and Sawyer's Electrical and Instrumentation Group Leader for the Midwest Region. He has over 13 years of experience in electrical engineering for building systems, water and wastewater treatment facilities, and pumping stations associated with water distribution and wastewater collection systems. His electrical system design experience includes medium and low voltage power distribution, lighting, motor control, stand-by

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power, and preparation of equipment specifications. He has completed electrical design and construction administration services for many water plant improvement projects including Nicholasville WTP in Nicholasville, KY, Bob McEwen WTP in Clermont County, OH, and Glendale WTP in Glendale, OH. Mr. Thunhorst has experience designing many different types of standby power and distribution systems. The size and complexity of these systems range from individual generators installed at small pump stations to complex power systems installed at large treatment facilities. Mr. Thunhorst has designed multiple projects which include medium voltage paralleling switchgear and medium voltage distribution equipment. Many of these projects have been for existing facilities and he understands the importance of developing a design that can be constructed while maintaining plant operations. Many of these projects have also involved upgrades to the electric utility service. Many of his projects require coordinating with electric utility companies and he understands that good communication and coordination will help to prevent delays associated with electric utility upgrades.

Patricia K. Niehues, will lead **Instrumentation and Controls Design** for the project. She has considerable experience in the design and construction administration of control and remote telemetry systems. Ms. Niehues recently led instrumentation and controls design for the Clearwell and Distributive Pump Station Upgrade at the Granite City Water Treatment Facility in Granite City, IL, for Illinois American Water Company. She also recently provided instrumentation/control and SCADA system design for the new 6-mgd Hidden Lake Water Treatment Facility for Indiana American Water. She recently provided instrumentation and control design services for the new 15/20-mgd Bradley Avenue Water Treatment Plant in Champaign, IL; the 6-mgd Streator Water Treatment Plant Improvements in Streator, IL; and the 22-mgd Mattis Avenue Water Treatment Facility Improvements in Champaign, IL; all for Illinois American Water Company; and the Borman Park Backwash recycling and residual management upgrade in Gary, IN, for Indiana American Water. Other design projects include the 50-mgd Finished Water Pump and Backwash Addition at the E.M. Johnson Water Treatment Plant, Raleigh, NC; and the Walnut Creek Lift Station, Raleigh, NC. Currently, she is providing design services for the Western Wake Partners Effluent Conveyance Facilities, and the Beaver Creek and West Cary Pumping Stations.

Jason V. Advani, PE, will provide **Instrumentation and Controls Design** for the project. Mr. Advani is a principal engineer in the Hazen and Sawyer's Columbus, Ohio office and has over seven years of water and wastewater control system design and support experience. His responsibilities include the design of controls systems, telemetry systems and network security, and preparation of construction specifications for water and wastewater treatment facilities. He has experience providing construction administration services as it pertains to instrumentation and control. These activities include shop-drawing review and approval, PLC programming, field checkout, start-up, commissioning, and troubleshooting, as well as supervising construction staff. Mr. Advani also has in-depth information technology experience with databases, computer networks, hardware and software design and implementation and integration of systems. Mr. Advani recently served as lead instrumentation and control engineer for design of the rehabilitation of the existing Broadway Pump Stations for the City of Dayton, OH. Design tasks include replacement of most instrumentation and new primary and backup controls for screening and pumping equipment along with the addition of a chemical-feed odor control system.

Alan Vestal, PE, LEED, AP, will provide **HVAC/Plumbing Design** for the project. Mr. Vestal has over 25 years of mechanical design experience as a consulting engineer. His responsibilities include project management, HVAC, plumbing, and fire protection design. He has experience with new building construction, additions, and renovations. Mr. Vestal's experience includes an extensive range of projects working with municipal, commercial, educational, and industrial buildings. He obtained his LEED Accredited Professional status in 2006 from the USGBC. Recent work includes design of HVAC, plumbing, and fire protection systems for the City of Nashua CSO Screening and Disinfection Facility for the City of Nashua, NH; and Clarksville WWTP Chemical Building and Overall Plant Improvements for the City of Clarksville, TN

Thomas Dohack will provide **Constructability Review** and serve as a **Resident Project Representative** for the project. Mr. Dohack has over 30 years of experience managing construction projects at multiple stages including conceptual, design, Resident Engineering, and project closeout. Mr. Dohack has experience with mechanical, electrical, structural, and system controls for water and wastewater improvement projects. As a Resident Engineer, Mr. Dohack has provided onsite inspections, conducted preconstruction meetings, progress meetings, and project closeout meetings. In addition, he has developed and maintained shop drawing/submittal schedules, maintained record documents, managed the RFI process, reviewed and overseen test procedures and system start-ups, and assembled project operational and maintenance manuals. Mr. Dohack recently served as Resident Engineer for the Granite City, IL WTF Clearwell Addition project; the 3-mgd Sand Filter Addition project in Paragould, Arkansas; and the Water Wells and Water Treatment Facility in Wood River, IL.

Wayne Nieman will provide **Constructability Review** and serve as a **Resident Project Representative** for the project. Mr. Nieman has 25 years of experience in Construction Management and Resident Engineering. His projects have ranged in value up to $270,000,000. Mr. Nieman has overseen the jobsite construction and quality of work on each project he has served on along with supervising other RE's and inspectors. Mr. Nieman has experience reviewing general contractor's monthly pay applications, coordinating monthly construction meetings, resolving contractor and subcontractor questions and problems with design engineers, and performing other tasks including being a liaison with owner and cost control of projects. Mr. Nieman recently served as Resident Inspector for the Lower and Middle River Des Peres Tunnel Facilities in St. Louis, MO; as Project Manager for the Lemay WWTP Wet Weather Expansion for the Metropolitan St. Louis Sewer District in St. Louis, MO; and as Resident Engineer for the Meramec WWTP Project for the Metropolitan St. Louis Sewer District in St. Louis, MO.

Catherine H. Keenan, PE, will provide assistance on **Construction Administration** efforts. Ms. Keenan has 16 years of experience in design of water and wastewater treatment facilities and pumping stations, computer modeling of hydraulic systems, water process evaluations and studies, and design of chemical feed systems. She has assisted in the design and construction of water and wastewater facilities, focusing on the design of pumping facilities and chemical feed systems, and performed hydraulic analysis for plant expansions. Ms. Keenan recently worked on design of finished water and backwash pumping facilities, residuals handling facilities and filter modifications for Illinois American Water's Granite City WTF Clearwell Addition Project. She also recently participated in design of backwash recycling

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facilities for Indiana American Water's Borman Park WTF in Gary, IN; design of aeration/detention facilities, pressure filters, and raw water, finished water, and backwash pumping facilities for the new 6-mgd Hidden Lake WTF for Indiana American Water; design of two parallel flocculation trains and sedimentation basin improvements at the East River Station WTF for Iowa American Water; design of new filter and backwash facilities for Illinois American Water's Streator WTP; design of improvements to Illinois American Water's Mattis Avenue WTF; and design of the Bradley Avenue WTP in Champaign for Illinois American Water. Previously, Ms. Keenan designed modifications to the chemical feed system for the City of Raleigh, NC's E. M. Johnson WTP as part of the 50-mgd Finished Water Pump and Backwash Pump Addition project.

11 Resumes

SECTION 11: **RESUMES**

This section includes a resume and work experience history for each individual identified in the Project Team Organizational Chart.

HAZEN AND SAWYER
Environmental Engineers & Scientists

Z. Michael Wang, PhD, PE, BCEE

Design QA/QC

Professional Record

Dr. Wang has over 30 years of experience in civil and environmental engineering including studies, planning, and design of water and wastewater facilities. He has also developed extensive expertise in computer modeling and hydraulic design and analysis of water and wastewater treatment facilities including chemical feed, instrumentation and control systems, and water distribution and wastewater collection systems.

Specialized in hydraulics, chemical storage and feed systems, and aeration systems, Dr. Wang has conducted start-up and trouble shooting of chemical facilities for numerous water treatment plants, wastewater aeration systems treatment plants, and water distribution systems. He currently serves as the Project Manager for the 2-mg clearwell addition at the Granite City WTF for Illinois American Water. He recently served as Design Project Manager for the Borman Park WTP Backwash Recycle and Residual Management Facility in Gary, IN for Indiana American Water. He recently served as the Design Project Manager for the new 6-mgd Hidden Lake WTF design-build project in Warsaw, Indiana for Indiana American Water, as well as the East River Station Flocculation Improvements in Davenport, Iowa for Iowa American Water. Dr. Wang was heavily involved in the San Koty WTP design-build project, and in the recent completion of the 15/20-mgd Bradley Avenue WTP design-build project in Champaign County; he also serves as the project manager for the 6-mgd Streator WTP design-build project and 22-mgd Mattis Avenue WTF design-build project in Champaign County, all for Illinois American Water.

Dr. Wang was Project Manager on the design of the 40-mgd Myrtle Beach Surface Water Treatment Facility Expansion, Myrtle Beach, SC; and Project Manager on Improvements to the 18-mgd Glenville Lake WTP and 32-mgd P.O. Hoffer Water Treatment Facility in Fayetteville, NC. He has played numerous project management and construction administration roles including the 5/15-mgd Bluestone WTP and the 2/4-mgd Weston WTP for the West Virginia American Water Company; the 6 to 12-mgd Expansion/Upgrade of the Sanford Water Treatment Plant in Sanford, NC; the 12 to 18-mgd Expansion/Upgrade of the Gaffney WTP in Gaffney, SC; and was in charge of evaluations on filters and chemical feed facilities for the 44-mgd industrial water treatment plant for Weyerhaeuser Paper Mill in Plymouth, NC. Dr. Wang also served as Project Engineer in design and start-up of the 15 to 20-mgd Jones Ferry Road WTP Expansion/Upgrade for the Orange Water and Sewer Authority, Carrboro, NC. Currently, he is in charge of construction administration for Raleigh, Fayetteville, Rocky Mount, NC and Myrtle Beach, SC WTP expansion construction. He is the project manager for several water treatment plants to convert Cl2 gas to sodium hypochlorite and free chlorine to chloramine, including Orange Water and Sewer Authority, Durham, Fayetteville, Greensboro, and Rocky Mount.

Dr. Wang has performed GIS and computerized hydraulic modeling on water distribution and wastewater collection system projects for Wake County, NC, South Cary, NC, Mount Airy, NC; Bessemer City, NC; and High Point, NC, as part of their Master Plans. In performing system analysis projects, Dr. Wang has applied water distribution system hydraulic models, such as KYPipe, WaterCAD, WaterWorks, and InfoWorks. Recently, as Project Engineer, he played a major role in completion of Water Distribution and Master Plan for the City of Sanford, NC, including evaluation of system pressure deficiencies, multiple pressure zones, pump station and elevated storage tanks. He has presented numerous papers on GIS and water distribution system analysis at various National AWWA and WEF Conferences, and in North Carolina, South Carolina and Virginia.

Areas of Specialization

- Design and analysis of water and wastewater treatment processes
- and facilities
- Computerized hydraulic modeling and mapping of water distribution
- and wastewater collection systems
- Hydraulic design and analysis of water and wastewater
- treatment facilities
- Specializes in chemical storage and feed facilities and aeration systems

Academic Credentials

PhD	North Carolina State University, 2007
MSE	University of North Carolina, 1985
BS	Rutgers University, 1982

Professional Certifications

Professional Engineer:
North Carolina, Illinois, South Carolina, New York, Virginia, Georgia, Ohio, Indiana, Iowa

Employment Record

1986 - Present	Hazen and Sawyer, P.C.
1985 - 1986	UNC, Chapel Hill, Dept. of Environmental Sciences and Engineering
1983 - 1985	UNC, Charlotte, Dept.of Civil and Environmental Engineering
1982 - 1983	Rutgers University, Microbiology Pollution Laboratory

Professional Affiliations

- American Academy of Environmental Engineers
- Diplomat, Board Certified
- Environmental Engineer
- American Water Works Association
- Water Environment Federation

HAZEN AND SAWYER
Environmental Engineers & Scientists

Christopher T. Phillips, P.E.

Concrete Repair Expert and Structural QA/QC

Professional Record

Mr. Phillips has spent his entire professional career since graduation with Hazen and Sawyer. Currently he serves as the Structural Department Manager for Hazen and Sawyer's Mid-Atlantic Region. In this role, he coordinates and manages all structural work in the region and assists in managing a staff of structural engineers and structural design technicians.

Mr. Phillips has designed and supervised design for numerous wastewater treatment and water treatment plant projects involving structures such as intake structures, dams, process tanks, basins, treatment areas, and pump stations. He has extensive building design experience as well as experience in bridge design and dam rehabilitation. He has participated in many structural condition assessments and evaluations for various environmental and building structures mainly at treatment plants, water and wastewater, but also dams, pump stations, and spillways.

Mr. Phillips has served as the lead structural design engineer and manager on numerous wastewater treatment plant projects such as the Flow Equalization and Phase 4A Upgrades to the 40 MGD Arlington County, VA WPCP; the upgrade of the 2.86 MGD Celanese WWTP in Allegany County, MD; the 30 and 40 MGD expansions and upgrades of the T.Z. Osborne WWTP in Greensboro, NC; the 20 MGD expansion and upgrade of the South Durham Water Reclamation Facility in Durham, NC; the 30 MGD expansion and upgrade of the Nansemond WWTP in Suffolk, VA; the 60 MGD and 75 MGD upgrades and expansions of the Neuse River WWTP in Raleigh, NC; the Influent Screen Addition to the Blue Plains WPCP in Washington, D.C., and the Main Building-North Modifications to the Newtown Creek WPCP in New York, NY.

Mr Phillips has extensive experience in structural condition assessments for environmental structures, dams, spillways, pump stations, and buildings including the 1 million gallon clearwell at the Sanford WTP in Sanford, NC, the Final Clarifiers and Secondary Clarifiers at the Irwin Creek WWTP and Sugar Creek WWTP in Charlotte, NC, the Aerobic Digesters at the North Durham WPCP in Durham, NC, the Nitrification Reactors at the Blue Plains WPCP in Washington, DC, the Water Intake Pump Station and all structures at the Water Treatment Facility in Kingsport, Tennessee, the Wiggins Mill Dam in Wilson, North Carolina, the Lake Orange Dam and Spillway Rehabilitation in Hillsborough, North Carolina, the Ni River Water Treatment Plant in Spotsylvania County, Virginia, the flood damaged structures at the Clarksville Wastewater Treatment Plant in Clarksville, Tennessee, the Walnut Creek Booster Pump Station in Raleigh, North Carolina, and the clearwells at the P.O. Hoffer Water Treatment Facility in Fayetteville, North Carolina.

Along with his design and regional managerial responsibilities, Mr. Phillips participates extensively during the construction phase of most projects constructed in the Mid-Atlantic Region as well as projects in the Northeast and Midwest Regions. His involvement includes contract document interpretation including responding to contractor's RFI's, submittal review and approval, and construction inspection. He has extensive field experience mainly in concrete construction. Mr. Phillips also has a broad knowledge of the composition and behavior of hydraulic cement concrete. He is primarily responsible for maintaining Hazen and Sawyer's Concrete Specifications.

Areas of Specialization

- Structural design, analysis and construction of commercial, industrial, and sanitary
- Structural condition assessments of environmental structures including dams, pump stations, and intake structures
- Behavior and composition of hydraulic cement concrete

Academic Credentials

MCE	North Carolina State University, 1988
BSCE	North Carolina State University, 1985

Professional Certifications

Professional Engineer: North Carolina, Virginia, New York, New Jersey, South Carolina, Ohio

Employment Record

1988 – Present	Hazen and Sawyer, P.C.
1986 – 1988	Teaching and Research Assistant, NCSU
1984 – 1986	NC Department of Transportation

Professional Affiliations

- American Society of Civil Engineers
- American Concrete Institute
- National Society of Professional Engineers
- Chi Epsilon
- Concrete Reinforcing Steel Institute

HAZEN AND SAWYER
Environmental Engineers & Scientists

Bret M. Casey, PE, BCEE

Project Manager

Professional Record

Mr. Casey is a Senior Associate and manages the Columbus, Ohio office. He has 24 years of experience in municipal water and wastewater projects. He has served as project manager and design leader on the design, construction administration, and startup of several large water treatment plant projects. His experience covers all aspects of municipal water systems from raw water supply to treatment and distribution. Project work has involved all phases of design and construction from the conceptual level through planning, detailed design, construction administration, resident engineering, and ultimate startup of facilities. Mr. Casey has had a key role on major water treatment plant improvement and expansion projects for Del-Co Water Company; Delphos, Ohio; and Birmingham, Alabama.

City of Delphos: Upground Water Project / Delphos OH

Project Manager for the design and construction administration of a new 3.75-mgd water plant and 450-MG upground reservoir. A new intake and pump station were designed to pump water from the Little Auglaize River to the new upground reservoir. The project includes all of the environmental permitting associated with the river intake and reservoir. A new pump station was included to pump water from the reservoir to the new water plant, and telemetry was provided to communicate between the reservoir and the water plant. Both conventional treatment and membrane treatment were evaluated for treating the new surface water supply. Conventional treatment consisting of two-stage lime softening was selected based on cost considerations and the desire to conserve the surface water supply. The new plant also includes post-filter GAC carbon contactors and UV disinfection. Provided startup assistance and training to assist the City in the startup of the facility. The plant was successfully started up in the fall of 2007.

City of Westerville: Water Plant Improvements and Expansion – Phase I and II / Westerville OH

The project included a water quality and treatment audit to evaluate the options for meeting current and future regulatory requirements. This resulted in recommending GAC post filter contactors and a preliminary design of these facilities. The project also included a capacity evaluation (both supply and treatment) to determine the treatment capacity of the water treatment facilities. In addition, the project included a facilities audit of the treatment plant to develop a CIP for incorporating necessary upgrades to the water plant.

Del-Co Water Company: Olentangy Water Treatment Plant / Delaware OH

Deputy Project Manager for the design of water treatment plant improvements, including replacement of the existing 7.2-mgd, single-stage lime softening plant with a new 19.2-mgd, two-stage lime softening plant. Various clearwell arrangements were evaluated, with a final design approach utilizing a series of prestressed concrete tanks. Several UV disinfection options were evaluated for the new water plant. Hydraulics and piping layout were evaluated to accommodate medium-pressure UV reactors from multiple manufacturers. In the future, the utility intends to install three 10-mgd, medium-pressure reactors at the plant. The project also included modifications to the existing intake on the Olentangy River, and a new 40-mgd raw water pump station/force main to pump water to a new 1-billion-gallon upland reservoir being constructed under a separate contract. Acted as Deputy Project Manager during design of the project and assisted during the construction administration phase.

Puerto Rico Aqueduct and Sewer Authority: Sana Muerto and Hatillo-Camuy Water Treatment Plant Design

Deputy Project Manager for design of the improvements to the Sana Muerto WTP (0.5-mgd surface water treatment plant)

Areas of Specialization

- Drinking water treatment – planning, design, construction administration, startup.
- Project management

Academic Credentials

BSCE - University of Iowa, 1989

Professional Certifications

Professional Engineer:
Kentucky, Ohio, Iowa, Illinois, Missouri, Indiana

Employment Record

2011 - Present	Hazen and Sawyer, P.C.
2002 - 2011	Malcolm Pirnie/ARCADIS
2000 - 2002	Howard R. Green Company
1991 - 2000	Malcolm Pirnie, Inc.
1989 - 1991	Black & Veatch

Professional Affiliations

- American Water Works Association
- American Academy of Environmental Engineers
- Selected Presentations

Selected Publications

Hill, C.P., Casey, B.M., *"The Importance of Managing Distribution System Water Quality,"* presented to the County Commissioners' Association of Ohio and the County Sanitary Engineers' Association of Ohio, Columbus OH, November 29, 2004.

Casey, B. M., *"Meeting the Future Water Needs for The City of Findlay,"* presented at the 61st Annual Conference of the American Water Works Association, Ohio Section, Toledo OH, September 23, 1999.

Casey, B. M., Knight, K. S, *"A Common Sense Approach to Hydraulic Modeling,"* presented at the Summer Meeting of the Ohio Section, Southwest District, American Water Works Association, Miamisburg OH, July 8, 1999.Casey, B. M.,

and Project Manager for construction administration of the Sana Muerto WTP and Hatillo-Camuy WTP (3.45-mgd surface water treatment plant). A preliminary study was performed to establish treatment plant improvements required for each plant to achieve regulatory compliance. The improvements included design of new membrane filtration facilities as an additional treatment barrier and raw water pumping capacity improvement, new package treatment units, chlorine contact basin additions, and upgrades to chemical feed system.

City of Delaware: Delaware Water MP / Delaware OH

Design Leader for the study and preliminary design of improvements to the City of Delaware's water system. The project includes sizing and locating a new upground reservoir to provide raw water supply capacity to meet future demand requirements. Treatment options will be evaluated to provide future capacity while meeting the Stage 2 Disinfectants and Disinfection Byproduct Rule. Both conventional treatment technology and membrane treatment technology will be evaluated for the new water plant, as well as for modifications and upgrades to the existing water plant.

City of Delaware: Water Plant Rehabilitation Study and Membrane Pilot Testing / Delaware OH

Project Manager for the evalutation of the rehabilitation of the existing surface water treatment plant and pliot testing of high-rate iron removal and membrane softening of groundwater. The result was a comprehensive plan to upgrade the existing plant, including replacement of the filters with low-pressure membranes and construction of a new parallel groundwater treatment plant using the piloted technology. This solution allowed the City of Delaware to meet the requirements of the Stage 2 Disinfectant/ Disinfection Byproducts Rule and increase the plant capacity for significantly less cost as compared to construction of a new water plant.

Birmingham Water Works & Sewer Board: Carson Filter Plant Expansion / Birmingham AL

Process/Mechanical Discipline Leader for the design of an expansion to the Carson Filter Plant. A 10-mgd treatment train consisting of dissolved air flotation (DAF), filtration, and CT basin will be added to an existing plant, providing a total treatment capacity of 35.9 mgd. A new chemical feed building, high service pumping station, and sludge dewatering building will be added to serve the entire plant capacity. The new chemical building includes a liquid lime feed system for pre-filter alkalinity control as well as post-filter pH adjustment. In addition to liquid lime, several alkalinity/pH control options were evaluated based on cost and water quality implications. These included hydrated lime and caustic soda. The use of DAF (for drinking water treatment) and on-site generation of sodium hypochlorite are both firsts for the State of Alabama.

City of Wheeling: Water Treatment Plant Improvements / Wheeling WV

Design leader for improvements to the 20-mgd water plant, which treats Ohio River water. The project includes a 12-mgd membrane filtration facility (expandable to 20 mgd) and associated chemical feed systems, along with new high-service pumping facilities.

City of Newport News: Water Storage and High-Service Pumping Filtration Facilities / Newport News VA

Assisted in preparing the preliminary design report for a 52-mgd water treatment facility for the city. Tasks included a layout of filtration facilities, finished water storage, and high-service pumping.

City of Columbus: Hap Cremean Water Plant Value Engineering Study/ Columbus OH

Served as lead process mechanical engineer for a five day value engineering workshop for the ozone/ biofiltration project for the Hap Cremean Water Plant.

HAZEN AND SAWYER
Environmental Engineers & Scientists

Gary J. Haubner, P.E.
Project Director

Professional Record

Mr. Haubner is the Manager of the firm's Midwest Region, located in our Cincinnati Office. He possesses over twenty years of water environment experience, along with extensive project and office management experience, having responsibility for meeting budgets, schedule deadlines, allocating staff resources, and communications with clients.

He has significant experience in the planning, design, and construction administration of wastewater facilities and collection systems. His main area of expertise is the design of wastewater treatment plants and pump stations.

Montgomery County Environmental Services Department – Regional Sewer Utility Options Evaluation
Project Principal for a study to evaluate improvements at Western Regional Water Reclamation Facility as related to receiving flow from another utility.

Allegheny County, Pennsylvania - ALCOSAN Upper Monongahela Basin Planning
Project Principal for collection system planning, modeling, and alternatives evaluation for wet weather overflow mitigation. Project included significant inter-basin coordination with other teams, regulatory compliance strategies, economic assessments, and public participation.

Sanitation District No. 1 of N. Kentucky – Project Principal/Manager for As-needed General Services and Program Management
Numerous projects have included CSO and SSO evaluations and solids/floatables design, Chemical Feed assessments, odor/corrosion control planning and services procurement, structural inspections, regulatory coordination, financial analysis and CIP planning support, storm water evaluations, several pump station evaluations and designs, and presentations to the Board and public workshops.

Sanitation District No. 1 of Northern Kentucky, Dry Creek WWTP
Design projects for New Headworks with Screening and Grit Removal, Dewatering Facility Modifications, Sodium Hypochlorite Modifications, Solids Handling Improvements, and Final Clarifier Improvements, as well as several studies at the 46-MGD plant.

Sanitation District No. 1 of N. Kentucky – Pump Station, Force Main and Air Release Valve Assessment Program
Project Principal for evaluation of critical pump stations, force mains, and ARVs across the SD1 collection system. Project included various testing including new pressure pipe assessment technologies.

Sanitation District No. 1 of N. Kentucky - Lakeview Pump Station
Project Manager for evaluation and design oversight for various improvements to control system, pumps and force main for 22–MGD station ; including transient surge modeling, analysis, and surge mitigation system design and construction.

Cincinnati MSD – WWTP Process and Hydraulic Modeling
Project Principal for Modeling of six plants: Little Miami, Sycamore, Polk Run, Muddy Creek, Taylor Creek, and Indian Creek. Process modeling utilized Hydromantis GPS-X program and included development of an Ops tool.

Cincinnati MSD – Studies at several WWTPs
Project Manager for evaluation of disinfection alternatives to the chlorine railcar system, including 1-ton containers, sodium hypochlorite, and UV for peak secondary flows of 240mgd. Sycamore WWTP – Solids Handling Study and design of sludge tank cover and piping improvements. Little Miami WWTP Four Mile PS - Evaluation of wet weather pumps, bypass treatment alternatives, and outfall sewer.

Butler County Ohio Water & Sewer - Le-Sourdsville WRF Improvements
Project Principal for design and construction of Phase 1 and 2 improvements to expand peak flow capacity to 70 mgd. Improvements included a new electrical

Areas of Specialization
- Wastewater Facility Planning and Design
- Collection System Planning and Design

Academic Credentials
- MSEnvE, University of Cincinnati, 1993
- BSCE, University of Cincinnati, 1991

Professional Certifications
Professional Engineer: Ohio, Kentucky, Indiana, New York, Missouri
CSI Construction Document Technologist

Employment Record

2004 - Present	Hazen and Sawyer, P.C.
1993 - 2004	Malcolm Pirnie, Inc.
1991 -1993	Accelerated Life Testing and Environmental Research Facility, University of Cincinnati
1989 - 1990	Paul C. Rizzo Assoc., Inc.
1988 - 1989	R.W. Consultants, Inc

Professional Affiliations
- Water Environment Federation
- Southwest Ohio WEA Executive Committee (Past President)
- KY-TN Water Professionals Conference Chair 2011
- American Water Works Association

Selected Presentations
"Saving District Dollars and 'Scents' – Simple and Cost-Effective Odor Control in Northern Kentucky", KY/TN WEA Conference, Owensboro, KY, 2003.

"High-Rate Treatment Systems Overview", SWOWEA Plant Operations Seminar, 2001.

building, generators, a new influent pump station, new preliminary treatment facility, conversion of an existing oxidation ditch to an equalization basin, new aeration basins and blower building, new clarifier, existing clarifier improvements, existing RAS/WAS pump station expansion, new effluent outfall, new centrifuge, and septage receiving station.

Dayton, Ohio WWTP
Project Principal for Broadway and Westwood Pump Stations preliminary engineering and design of mechanical screening improvements.

Miamisburg, Ohio WRF
Managed the wastewater facilities master plan for the city in 1999 and again in 2007, covering the collection system and WRF, including prioritized CIP and phasing for future improvements. Currently Project Principal for developing a hydraulic model of the collection system, SECAP/NFA, and Preliminary Engineering for all wastewater improvements.

Clarksville Gas & Water, Tennessee – WWTP Improvements
Project Principal for $70 M in major plant upgrades completed in several phases for the 25-mgd AADF facility. Upgrades include a new electrical distribution center, new headworks, aeration system modifications, new clarifiers, new sodium hypochlorite disinfection system, new dewatering facility, odor control improvements, and new administration building. Also provided technical support for two CSO high-rate treatment facilities.

North Olmsted, Ohio – WWTP and Collection System Improvements
Project Principal for planning, modeling, and design of collection system improvements that included two equalization storage basins, pump station improvements, new trunk sewers, and rehabilitation of existing sewers. WWTP project will include a new headworks, conversion of aeration tanks to VLR, new final clarifiers, and UV disinfection.

Fairborn, Ohio WRC
Project Manager for design and construction of new Influent Pump Station and Stand-by Power Improvements. Also oversight for study of biosolids disposal options.

Tri-Cities North Regional (Ohio) WWTP
Project Principal for various improvements at the plant, including RMF recirculation study and design. Project Manager for Nitrification Process Improvements Design and Construction.

Mason, Ohio - WRF Electronic O&M Manual
Project Manager for development of an eO&M manual for the Mason WRF, including process SOPs. Project also included acquisition of a maintenance management program.

Lancaster, Ohio WPCF
Phase I and II Plant Expansion and Improvements Design and Construction Admin, Lead Engineer. Detailed design work included Septage Receiving Station and Screen Building, including bar screens and screening conveyor/compactor. Primary skimmings mixing/pumping system and skimmings concentrator. New secondary clarifier and control building with all new RAS and WAS pumping systems, gravity belt thickener, and NPW system. Also coordinated funding assistance.

Greater Cincinnati Water Works, Richard Miller WTP
Project support for several projects including design and construction of Increased Alum Storage / Delivery System and Filter Rehabilitation.

Greater Cincinnati Water Works
Project Principal for Water Main Replacement Program prioritization. Project Manager for design and construction of the 2MG Pine Hill Elevated Water Storage Tank.

HAZEN AND SAWYER
Environmental Engineers & Scientists

Robert A. Green, PE

Process/Mechanical & Conventional Filter Options/Permitting

Professional Record

Mr. Green has 28 years of experience in municipal water projects both as a consulting engineer and a former State regulator. He specializes in water treatment processes and filtration and has served as project manager and design leader on all aspects of municipal water systems from raw water supply to treatment to pumping, storage and distribution. Project work has involved all phases of pilot testing and process optimization, study, design and construction from the conceptual level through planning, detailed design, construction administration, and ultimate startup of facilities. Mr. Green has had a key role on major water treatment plant improvement and expansion projects for Detroit Water and Sewerage Department, City of Ann Arbor MI, Greater Cincinnati Water Works, Clermont County OH and Indiana and Illinois American Water.

Illinois American Water, Bradley Avenue Lime Softening Plant - Champaign, IL

Coordinated basis of design report and document submittal to Illinois EPA for the first ever Design/Build approval by this regulatory agency for the new 15 mgd Bradley Avenue lime softening plant in Champaign, IL. Performed QA/QC review during detailed design.

Illinois American Water

Performed QA/QC review during detailed design for this project, which included adding a third filter, raw water flow meter and piping, design and instal¬lation of backwash supply pumps, replacing existing flocculators with twelve new vertical flocculators with variable frequency drives, providing a continuous sludge removal system, and providing a powdered activated carbon feed system.

Indiana American Water, Iron Removal Plant - Warsaw, IN

Engineer of record and QA/QC for design of this 6 mgd ground water iron removal plant in Warsaw, IN, which included new wellfield, raw water transmission, aeration/detention/filtration, chemical feed systems, finished water storage and high service pumping. Coordinated all permitting, which included USACE Section 404, IDEM Section 401, IDNR Flood Control Act, IDEM Construction, IDEM NPDES, IDOT right of way and US Fish and Wildlife endangered species.

Indiana American Water, Borman Park Water Treatment Plant - Gary, IN

QA/QC review and permit coordinator for the design-build of a new backwash water recycle facility at this 50 mgd water treatment plant. The project includes a 1.2 mg, two cell equalization tank, recycle pumps and associated yard piping modifications. The project also included modifications to the plant's stormwater system for compliance with the City of Gary's stormwater ordinance.

Northern Area Water Authority - Tipp City, OH

Project Manager for the investigation, recommendations and technical memorandum involving various issues with the engineering and operation of their 7 MGD groundwater nanofiltration membrane softening plant. The issues investigated revolved primarily around plant hydraulics associated with various treatment processes and residuals discharge. Currently managing the design of various plant improvements associated with the issues identified above.

Bob McEwan Water Treatment Plant - Clermont County, OH

Project manager for the treatment process piloting, rapid small scale column testing (RSSCT), design and construction for a new, retrofit intermediate pump station and granular activated carbon facility for the 20 mgd Bob McEwan WTP. The project also included pilot and full scale demonstration of existing filters to obtain regulatory approval for up-rating the filters from 10 mgd to 20 mgd and avoiding construction of additional filters. This project included extensive modeling to determine how best to up-rate both pretreatment and filtration processes, and incorporate the new GAC process into the hydraulic gradeline.

Areas of Specialization

- Water treatment process evaluation/optimization
- Water process design
- Water quality evaluation
- Pilot, bench, full scale treatment studies
- Environmental regulations

Academic Credentials

BSCE - Michigan Technological University, 1984
AAS - Michigan Technological University, 1981,

Professional Certifications

Professional Engineer:
Michigan, Ohio, Indiana

Employment Record

2000 - Present	Hazen and Sawyer, P.C.
1988 – 2000	Michigan Department of Environmental Quality
1985 – 1988	Orchard, Hiltz & McCliment
1984 – 1985	Thompson McCully

Professional Affiliations

- American Water Works Association

Detroit Water and Sewerage Department (DWSD)
Project Manager for the needs assessments of the 540 mgd Springwells and 220-mgd Southwest WTPs. Evaluations looked at mechanical (process), structural/architectural, electrical/I&C, and HVAC, as related to low and high-lift pumping, pretreatment, filtration, and chemical addition. The project had a focus on modifying existing and retrofitting new processes into the existing plant site and hydraulic grade line.

Detroit Water and Sewerage Department (DWSD):
Project Manager for an eight month pilot study for the 540 mgd Springwells, 300 mgd Northeast and 220 mgd Southwest WTPs. that evaluated flocculation times and mixing energy, plate settler loading rates, raw and intermediate ozonation, filtration, coagulants, coagulant aid polymers and filter aid polymers. This project had a focus on optimization of filter media configurations and loading rates that could be incorporated into the existing facilities.

HAZEN AND SAWYER
Environmental Engineers & Scientists

Jonathan E. Schubarth, P.E.

Permitting

Professional Record

Mr. Schubarth has over 19 years of experience in both private sector consulting and public sector utility engineering and management. As a consultant Mr. Schubarth's experience includes design and construction services for projects including water and wastewater systems, capital planning, permitting, pump stations, and treatment plants. As a utility manager, he managed, designed, and operated public water and wastewater systems including staff planning, capital planning, rate making, budgeting, and policy making; as well as the design of projects including water and wastewater systems, storage tanks, pump stations, and treatment plants.

Mr. Schubarth directed, managed, or coordinated the following representative projects:

Water System Operation – Warren County Water District, Butler County Water System, Inc., and Simpson County Water District

Operated and managed water distribution systems including the supervision of field crews responsible for maintenance to all water lines and booster pump stations, as well as all engineering, planning, sampling, permitting, reporting, policy development, rate making, budgeting, and operational oversight.

Water Capital Improvement Plan – Warren County Water District, Butler County Water System, Inc., and Simpson County Water District

Development and subsequent implementation of the comprehensive long term capital improvement plans for the three water utilities.

Warren County Water District:

- North Warren Water System Improvements – Project manager for the addition of 12.5 miles of 12" and 20" water lines and 2 booster pump stations sized at 750 and 2,600 gpm.
- Project 19 – Project manager for the addition of 1 mile of 10" and 20" water line, a 1,200 gpm booster pump station, and a 2.0 MG composite water tank.
- Cemetery Road Water System Improvements – - Project manager for the addition of 5.5 miles of 16" water line and a 1,500 gpm booster pump station.
- Russellville Road Water System Improvements – Project manager for the addition of 2 miles of 8" and 12" water line and relocation of a 350 gpm booster pump station.

Butler County Water System, Inc:

- Project 15 – Project manager for the addition of 11.5 miles of 4", 6", and 8" water line; 3 booster pump stations; 2 control valve stations; and a 500,000 gallon ground storage tank.
- Project 16 – Project manager for the addition of 8.5 miles of 4" and 6" water line and 2 control valve stations.
- Project 17 – Project manager for the addition of 2 miles of 4", 6", and 8" water line.

Simpson County Water District:

- Project 11 – Project manager for the addition of 12.5 miles of 6" and 8" water line.
- Project 12 – Project manager for the addition of 4 miles of 6" and 8" water line and the upgrade of 2 booster pump stations.
- Project 13 – Project manager for the addition of 12.5 miles of 4", 6", and 8" water line.

Areas of Specialization

- Utility Management and Operation
- Collection and Distribution Systems Planning and Design
- Treatment Plant Planning and Design
- Booster Pump Station Design
- Bidding and Construction Administration Services

Academic Credentials

MSEnvE - Georgia Institute of Technology, 1993
BCE - Georgia Institute of Technology, 1992

Professional Certifications

Professional Engineer: Kentucky

Employment Record

2011 - Present		Hazen and Sawyer, P.C.
2004-2011	-	Warren, Butler, and Simpson County Water Districts
1999-2004	-	HDR/Quest
1995-1999	-	Winchester Municipal Utilities
1993-1995	-	HDR/Quest
1985-1989	-	United States Army

Professional Affiliations

- National Society of Professional Engineers
- Water Environment Federation
- American Water Works Association
- Kentucky Rural Water Association

Selected Presentations

"When and How to do Phosphorus Removal", KY/TN Water Environment Association Annual Conference, May, 1995.

"A System Approach to Infrastructure Renewal", KY/TN Water Environment Association Annual Conference, May, 1997

HAZEN AND SAWYER
Environmental Engineers & Scientists

David M. Laliberte

CM at Risk Coordination & Constructability Review

Professional Record

Mr. Laliberte has 25 years of experience in the field of environmental engineering. He is a technical specialist in the areas of advanced water treatment facilities and has experience with well supply systems. Mr. Laliberte currently serves as Project Manager for Illinois American Water's Granite City WTF Clearwell Addition Project. Mr. Laliberte's experience includes project management of the design/bid/build 16-mgd Alton WTP, and design/build delivery for the new 6-mgd Hidden Lake WTF and Borman Park Backwash Recycling and Residual Management Facility for Indian American Water, and the new 15/20-mgd Bradley Avenue WTP, 6-mgd Streator WTP Improvements and 22-mgd Mattis Avenue WTP Improvements, all for Illinois American Water. He has performed numerous project management and construction administration roles including the 5/15-mgd Bluestone WTP and 2/4-mgd Weston WTP for West Virginia American Water.

He served as Project Manager for the 6-mgd City of Durham Williams Water Treatment Plant Caustic Feed Improvements. He also served as Project Manager for the City of Durham Brown and Williams WTP Chemical Improvements. He also served as a Project Engineer on the 9-mgd San Koty WTP, also for American Water.

He has been involved with studies and pilot plant projects using innovative methods related to drinking water, organic contaminants, disinfection, disinfection byproducts, and corrosion control for lead and copper. Projects have included pilot scale treatability studies and full-scale implementation for compliance with SDWA Amendments. He has designed and operated on-site pilot scale testing facilities including alternative pretreatment chemicals prior to forced-draft aeration, flocculation prior to reverse osmosis treatment, ion exchange treatment, electrodialysis reversal (EDR) treatment and membrane softening, and reverse osmosis treatment for Orlando, FL; Sarasota, FL; Collier County, FL; Vero Beach, FL; Pompano Beach, FL; Hallandale Beach, FL; and City of Fort Lauderdale, FL; and Lee County, FL.

He conducted construction administration and operator training of advanced water treatment facilities including the 12-mgd Membrane Softening North Collier County Water Treatment Facility, Collier County, FL; 6-mgd Reverse Osmosis Water Plant, Vero Beach, FL; and 10-mgd Membrane Softening Water Treatment Plant, City of Pompano Beach, FL.

Mr. Laliberte's experience in the design and construction administration of advanced water treatment facilities includes: design of the 20-mgd Forced Draft Aeration Eastern Regional Water Supply Facility, Orange County, FL; design of the 12-mgd expandable to 20-mgd Membrane Softening North Collier Water Treatment Facility; design of the 6-mgd Reverse Osmosis Water Treatment Plant, Vero Beach, FL; and design of the 12-mgd expandable to 20-mgd Eddie D. Edwards Membrane Softening Water Treatment Plant, Fort Myers, FL.

He was recently responsible for technical management and construction administration of several advanced water treatment plants in Florida. These facilities include the 9-mgd City of Hallandale Beach Membrane Softening Water Treatment Plant in the City of Hallandale Beach, FL, and 12-mgd Reverse Osmosis Facility in Collier County. Mr. Laliberte also performed the construction management of the City of Lynchburg for their College Hill WTP Chemical Feed Facility and related improvements.

Mr. Laliberte has published and presented several papers for American Water Works Association (AWWA) and Southeast Desalting Association (SEDA) on advanced water treatment for drinking water.

Areas of Specialization

- Design and construction administration of water treatment
- and distribution facilities
- Operation of advanced water treatment processes (i.e., ion exchange
- and reverse osmosis processes)
- Operation of conventional processes (i.e., lime softening, sedimentation/filtration and iron/manganese processes)

Academic Credentials

BSCE	University of Central Florida, 1987

Employment Record

1995 – Present	Hazen and Sawyer, P.C.
1987 – 1995	Boyle Engineering Corporation

Professional Affiliations

- American Water Works Association
- Southeast Desalting Association

R. Patrick Judge, P.E.

Principal-In-Charge

Education

BS, Civil Engineering
Southern Illinois University
Edwardsville, Illinois

Registrations

Professional Engineer:
Illinois, Missouri, Nebraska, Arkansas
Wisconsin, Indiana

License #

062-058159 (IL)
2001004613 (MO)
E-12454 (NE)
14759 (AR)
40033-006 (WI)
PE11100078 (IN)

Professional Qualifications

Mr. Judge became a partner with Gonzalez Companies in 2005 and has over 20 years of experience providing design and construction management services to utility companies throughout the Midwest. Mr. Judge has experience with water treatment facilities, large diameter water mains, force mains, and conveyance tunnels. His experience is inclusive of underground design approaches that consist of working around other utilities facilities, below-grade obstructions, and integrating existing facilities with new design. Mr. Judge has managed projects in excess of $240M in construction costs. His experience is inclusive of constructability reviews, review of impacts to operational facilities, review and approval of design and construction change orders; review and approval of contractor pay applications; review and recommending action for construction claims submitted by contractors; coordination with various municipalities and intergovernmental entities; preparing project correspondence and reports; and conducted presentations and held public information meetings for various communities.

Relevant Project Experience

Water Master Plan, O'Fallon, Illinois
Project Manager
Alternative analysis and cost estimating for the development of a 20-year master plan for a water system serving over 60,000 customers.

- GIS Mapping
- Water System Modeling
- Fire Flow Analysis
- Field Calibration of Water Model

Water System Improvements, O'Fallon, Illinois
Project Manager
Facilities Plan for the construction of a 12MGD pump station and two 1MG elevated water storage tanks.

- Design Service Monitoring
- Constructability Review
- Specification Development
- Permitting
- Inspection Services

Public Works Pump Station Improvements, O'Fallon, Illinois
Project Manager
New booster pumps station with two 100hp pumps with variable frequency and SCADA controls.

- New offices
- Chlorine feed building
- Storage areas

New Water Wells, Wood River, Illinois
Project Manager

- 1,500 gpm well
- 2,000 gpm well
- 2,500 feet of 16 inch force main
- SCADA controls
- Emergency generator

R. Patrick Judge, P.E.

Lemay Pump Station No. 1 96" Redundant Force Main, St. Louis, Missouri
Project Manager
- Constructed 3,500' of 96" prestressed concrete pipe and 40' diameter drop shaft
- New connections into the existing pump station facility and waste water treatment plant

I-55/70 Duel 30" Water Main Relocation, East St. Louis, Illinois
Project Manager
- Provided oversight of the demolition of two parallel 30" water mains over interstate 55/70 in St. Clair County
- Prior to demolition of the existing water mains, two 36" ductile iron water mains were constructed under I-55/I-70 via jack and bore methods

Mississippi River Bridge Approach and Illinois Route 3 48" Water Main Relocation, East St. Louis, Illinois
Project Manager
- The Illinois Department of Transportation (IDOT) was in the process of constructing a bridge approach structure for the New Mississippi River Bridge, the existing 48" water main was in conflict with the proposed piers
- The 48" water main was relocated, hot Taps were constructed in order to allow for the existing water main to remain in service.

Scott Air Force 16" Water Main Relocation, St. Clair County, Illinois
Project Manager
- Provided oversight of the relocation for primary main water feed into Scott Air Force Base
- The existing water main had to be relocated to avoid a conflict with a new structure over the CSX railroad

10th and Hawthorn Pump Station and 48" Diameter Force Main, Wood River, Illinois
Project Manager
- 9,600' of 48" force main
- 20,000' of RCP sewers
- 1 duplex 215 hp submersible axial flow stormwater pump station
- 2-1,950 gpm stormwater pump stations.

French Village Pump Station, O'Fallon, Illinois
Project Manager
12MGD water pump station
- Three 100hp pump with variable frequency drives

16" Waterline Replacement, Wood River, Illinois
Project Manager
Replacement of approximately 2,000 feet of 16" waterline from the water treatment plant to the existing tower
- Modeling
- Preliminary and Final Design
- Permitting

HAZEN AND SAWYER
Environmental Engineers & Scientists

Nichole M. Sajdak, PE
Construction Administration

Professional Record

Ms. Sajdak is a Principal Engineer in the firm's Cincinnati office. She has 12 years of experience in the planning, design, and construction of water treatment facilities and wastewater collection facilities.

Seymour WTF - Seymour, IN
INAW identified a need to increase plant capacity at their Seymour, IN facility in order to satisfy near term maximum day demands. Ms. Sajdak performed a hydraulic analysis of the filter influent, media and support, underdrains, effluent piping/appurtenances and control weir box to determine the dynamic headlosses in the current configuration and make recommendations, as warranted, for modifications to increase the filter loading rate to the production volume and flow rate required as determined by INAW. The resulting design was produced on a short time schedule and modified media configuration, underdrains and upsized combined filter effluent piping in the filter gallery and raised the operating level of the filters which allows operation at a filtration rate of 4.5 gpm/sf.

Southern Indiana Operations and Treatment Center (SIOTC) - Jeffersonville, IN
The SIOTC groundwater treatment facility was experiencing operational challenges with the filters since construction including underdrain failures, shortened filter run times, air binding and excessive backwash volumes. Hazen and Sawyer provided a study where several underdrain manufacturers and configurations were considered based on their method of anchorage and resistance to plugging. Ms. Sajdak performed QA/QC and guidance during the design, bid and construction phases of underdrain and media replacement of two filter boxes.

Borman Park - Gary, IN
In addition to general engineering support function during the design of the Borman Park water treatment facility, Ms. Sajdak was recently responsible for engineering services for a quick media and underdrain replacement of the filters.

Bob McEwen WTP - Clermont County, OH
Construction of gravity GAC contactors at this water treatment plant addressed concerns for meeting Stage 2 D/DBP requirements. In addition to uprating the plant from 10-mgd to 20-mgd, the $20 M project constructed a GAC facility to remove taste and odor compounds, improve TOC removal and removal of other organics. Ms. Sajdak focused on the design and construction phase services for the GAC contactor facility and associated pumping station. The intermediate pump station consists of a wetwell and three vertical turbine pumps to lift the existing hydraulic profile for the GAC facility. Project included a performance based specification and post bid RSSCT of GAC media to determine the true cost of activated carbon performance. Budget conscious project with condensed design time frame.

Pierce Union Batavia WTP - Clermont County, OH
Project engineer responsible for design and construction administration phase services for the 15 mgd groundwater treatment facility improvement project. Project included a focus on CT modeling and evaluation to validate achievement of 4-log virus inactivation as required by the USEPA Groundwater Rule and required direct contact with state and local permitting agencies regarding both well and plant upgrades. Other upgrades included filter media and surface sweep rehabilitation, instrumentation upgrades and wellfield improvements.

Springwells WTP - Detroit, MI
Design team member during several phases of renovation at this 540 mgd water treatment plant. Design engineer during plant HVAC and dehumidification, and chemical feed upgrades. In order to upgrade the permanent chlorine gas chemical storage and feed system, temporary (NaOCl) storage and feed facilities were constructed and operated to maintain disinfection at the plant. Later projects at the plant included the replace-

Areas of Specialization
- Water Treatment Processes and Systems
- Water Facility Planning and Design

Academic Credentials
MSEE	University of North Carolina, 2001
BSCE	Wayne State University, 1997

Professional Certifications
Professional Engineer: Ohio, Michigan

Employment Record
2009 - Present	Hazen and Sawyer, PC
2006 - 2008	ARCADIS
2000 - 2005	Black and Veatch
1999 - 2000	University of North Carolina
1997 - 1999	Hazen and Sawyer, PC
1996	Hubbell, Roth & Clark, Inc.

Selected Publications
Philip C. Singer; Christie Arlotta; Nichole Snider-Sajdak; Richard Miltner, "Effectiveness of Pre- and Intermediate Ozonation on the Enhanced Coagulation of Disinfection By-product Precursors in Drinking Water," Ozone: Science & Engineering The Journal of the International Ozone Association, Volume 25 Issue 6, 2003, Pages 453–471

Awni Qaqish; Michelle J. Kelly; David Nickols; Alexander J. Varas; Nichole M. Snider, "Design/Build/Maintain Project Delivery Minimizes Risks While Ensuring Quality for Detroit's New 240-MGD Water Treatment Plant," American Water Works Association, Jan. 1, 1999, 15 pages

"Membrane Pre-Selection Process for Tecumseh Water Treatment Plant," Presented at 2003 Joint Annual Conference for Ontario Water Works Association and the Ontario Municipal Water Assocation

"GAC Absorber Backwash Triggers at Existing Facilities and Application to Design," Presented at 2010 Ohio AWWA

"THM Stripping by Aeration," Presented at 2013 Ohio AWWA

ment of horizontal paddle mechanical flocculators and structural improvements to the concrete flocculation basins. Her most recent project at this plant was rehabilitating existing filter beds, underdrain systems, and backwash systems. Due to the large size of the plant and number of filters to rehabilitate, this project occurred in several phases, with filters out of service only during the low demand seasons.

Donald K. Shine WTP - Wyoming, Michigan

Engineer on team-based project provided a requirement study and preliminary design for an expansion of the existing water treatment plant from 90 to 120 mgd. Preliminary design and layout consisted of primary liquid processes, pumping facilities, and support facilities. Responsibilities included preliminary flocculation, sedimentation and filter box layout and design.

Lake Huron Water Treatment Plant - Detroit, Michigan

Pilot plant operation investigating water quality resulting from direct filtration of raw water from Lake Huron. Determine the effects of direct filtration coagulation on filter media, coagulant dose, filter run times and water quality. Study was conducted for Lake Huron WTP, a 260-mgd traditional flocculation/sedimentation plant considering uprating to 400-mgd. Varying alum doses and addition of cationic coagulant aid and an anionic filter aids were considered. Responsibilities included data review, on site sampling and monitoring of water quality parameters.

Water Works Park II WTP - Detroit, Michigan

- Two-train pilot plant operation to investigate flocculation, clarification (Plate Settlers and DAF), ozonation and filtration of raw Detroit River water for the new 240-mgd Water Works Park WTP. The pilot investigated four filter media configurations and their response to changes in raw water quality, pre-treatment and flow rate. The pilot maximized filtration rates without sacrificing filtered water quality by investigating anionic and ionic filter aids,
- Member of the Owner's oversight team responsible for preparing bidding and specifications for the design-build delivery of a new 240-MGD surface water treatment plant,
- Engineer on Design/Build team working for project completion. Tasks included oversight of pilot plant construction to mimic actual treatment plant performance for process optimization.

Ballou Park Reservoir - Danville, VA

Danville was concerned with high THM samples from its Stage 2 D/DBP compliance sites. Ms. Sajdak examined the potential of installing a post-treatment aeration system to strip THMs from the water either in the 8-MG Ballou Park reservoir. Two manufacturers submitted proposals for evaluation prior to design. A single vendor was selected based on selection criteria and worked with during the design stage.

Indiana American Water - Muncie WTP

INAW was concerned with high THM samples from its Stage 2 D/DBP compliance sites near its Muncie WTP. In addition to performing a water quality evaluation to ensure efficient treatment at the plant, Ms. Sajdak examined the potential of installing a post-treatment aeration system to strip THMs from the water either in the clearwell or the distribution system.

Indiana American Water, Wayne Street WTP, Orme Station and Marlin WTP

Ms. Sajdak performed a conceptual layout and economic evaluation of the life cycle costs for installing chlorine scrubber systems at facilities using gaseous chlorine and compared the results against the life cycle costs of eliminating the gaseous system and converting to on-site generation (OSG) of sodium hypochlorite or bulk sodium hypochlorite. The evaluation considered equipment and operational costs as well as potential layouts for each option.

HAZEN AND SAWYER
Environmental Engineers & Scientists

William Leadbitter, PE
Structural

Professional Record

Mr. Leadbitter is an Associate at Hazen and Sawyer, P.C. and is currently the lead structural engineer for the company's Midwest Region. He is responsible for coordinating and supervising all structural work in the region and also manages a growing staff of structural engineers. His recent work has been directed toward the structural design, drafting and construction administration of water/wastewater treatment facilities and collection system infrastructure. He has acted as the lead structural engineer on multiple plant upgrade and infrastructure improvement projects. Additionally, within that scope of work, he has significant experience in structural inspection, condition assessment, retrofit of existing structures and concrete repair. He has a bachelor's degree in civil engineering with an emphasis in structural design and analysis with 16 years of total experience and is a licensed engineer in eleven states.

Infrastructure Inspection and Assessment, Concrete Repair Experience

Mr. Leadbitter has performed inspection, structural assessment and repair design for multiple structures in recent years. The scope of those inspections includes evaluation of existing reinforced concrete structures, precast concrete elements, masonry buildings, structural steel framing, pre-engineered metal buildings and miscellaneous metals including platforms, stairs and pipe supports. That work includes:

- **Moores Creek WWTP, Charlottesville, VA** – Multiple inspections as part of a full plant assessment including Clarifiers, Equalization Basins, Settling Basins, and Solids Handling Building. Provided multiple reports to the owner and incorporated critical repairs into the $40M plant upgrade.
- **City of Fayetteville Public Works Commission, P.O. Hoffer WTF, NC** – Performed multiple inspections to assess the condition of the 12 MG Clearwater Reservoirs. The work included review of contract drawings for original construction of the facilities built in 1967 and 1974, structural assessment and inspection of previous repairs.
- **Goose Creek WTP, Fairfax, VA** – Performed visual inspection of Sedimentation Basins and Flocculation Channels including all exposed concrete surfaces and mechanical appurtenances. The corrosive effects of ferric sulfate used in the treatment process were evaluated as part of the inspection. Provided full memorandum to the owner.

City of Winchester, KY – Lower Howards Creek Influent Pump Station and WWTP

Mr. Leadbitter has recently served as the Lead Structural Engineer for design and construction of the facility. The project involves more than a dozen structures as part of a new 10 mgd plant and is currently being built. Structures include an Administration Building, Electrical Building, Selector Tanks, Oxidation Ditches, three Clarifiers, RAS-WAS Pump Station, Effluent Facility, Sludge Storage Building, Sludge Dewatering Building and an Odor Control Facility.

Frederick County, MD – New Design Road WTP Expansion

Mr. Leadbitter has previously served as the Lead Structural Engineer for a major upgrade to the plant that resulted in a capacity increase from 8.8 mgd to 25 mgd. The project occurred over a two year construction period and was completed in mid 2010. The upgrade included design and construction of a two-story Chemical/Residuals Building, three Pump Stations, an Equalization Basin, a 70 foot diameter Gravity Thickener and a Chemical Feed Vault. Ten new chemical feed systems were added as part of the project, ranging from power activated carbon to aqueous ammonia. The most significant portion of the structural design is the Chemical/Residuals Building, consisting of a two-story concrete moment frame with a total square footage of 30,000 allowing for storage of over ten different chemicals and operation of two belt filter presses.

Areas of Specialization

- Structural design related to water and wastewater treatment facilities, collection systems, bridges and architectural structures
- Structural condition assessment of existing infrastructure
- Construction administration and field inspection
- Concrete repair and rehabilitation

Academic Credentials

BSCE North Carolina State University, 1997

Professional Certifications

Professional Engineer: Ohio, Kentucky, Tennessee, Indiana, North Carolina, Maryland, Virginia, New Hampshire, Massachusetts, Pennsylvania, Minnesota

Employment Record

1997 - Present	Hazen and Sawyer, P.C.
1996 - Summer	NC Department of Transportation
1994 – 1995	Blythe Construction, Inc.

Professional Affiliations

- American Concrete Institute (ACI)
- Structural Engineers Association of Ohio (SEAoO)

HAZEN AND SAWYER
Environmental Engineers & Scientists

Patrick D. Thiedeman, PE, SE

Structural

Professional Record

Mr. Thiedeman has a diverse background in Structural Engineering. Currently, he serves as Senior Principal Engineer at Hazen and Sawyer. His design experience includes prestressed and reinforced concrete, masonry, structural steel and aluminum structures. In addition to experience in the design of water and wastewater treatment plants, he also has extensive bridge design experience. His previous experience includes work as a Structural Engineer on numerous NCDOT projects including precast girder and steel plate girder spans. He has provided structural engineering services on the following projects:

Phase 1 – Reliability Improvements, P.O. Hoffer Water Treatment Facility, Public Works Commission of the City of Fayetteville, NC
Design of a new raw water meter vault, rapid mix facility, and design of flocculation improvements including support platforms for new variable speed vertical mixers. Condition assessment and development of concrete repair and coating specifications for existing flocculation basins, sedimentation basins and filter rehabilitation including concrete spall repairs, thimble replacement, liner installation, etc.

Granite City Water Treatment Facility, Granite City, IL
Serving as the lead structural engineer for the 2-mg Clearwell Addition project at the 15-mgd Granite City Water Treatment Facility in Granite City, IL for Illinois American Water.

Borman Park Water Treatment Plant, Gary, IN
Served as the lead structural engineer for the recently-completed Backwash Recycling and Residual Management Facility design/build project at the 54-mgd Borman Park Water Treatment Plant in Gary, IN, for Indiana American Water.

East River Station Water Treatment Plant, Davenport, IA
Served as a structural engineer for the flocculation improvements project at the 30-mgd East River Station Water Treatment Plant in Davenport, IA for Iowa American Water.

Examples of other water projects include: **Catskill/Delaware Water Treatment Ultraviolet Light Disinfection Facility** and the **Rye Lake Water Treatment Plant in the State of NY**. Both projects were designed to provide underground reinforced concrete processing chambers vaulted by a structural steel superstructure. Mr. Thiedeman also served as lead structural designer on the Westchester Joint Waterworks for Westchester County, NY, and the Water Project Plan DWRF Project No. 7130 for Adrain, MI.

Areas of Specialization

- Structural design, analysis and construction of industrial, sanitary,
- and waterfront facilities
- Structural condition assessments of environmental
- and waterfront structures
- Behavior of deep foundations and soil-structure interaction
- Prestressed concrete and plate girder bridge design

Academic Credentials

MS	North Carolina State University, 1998
BA	Davidson College, 1994

Professional Certifications

Professional Engineer:
North Carolina, Illinois

Employment Record

2004 – Present	Hazen and Sawyer, P.C.
1998 – 2004	Moffatt & Nichol Engineers
1997 – 1998	NCSU
1996 – 1997	Wang Engineering

Professional Affiliations

- American Society of Civil Engineers

Professional Record

Mr. Steinmetz has 30 years of experience in the design and management of a wide range of projects, including storm and sanitary sewer systems, hydraulic analyses, storm water management, pump stations, flood studies, and environmental permitting.

Scott County Water Main Extensions – Kentucky American Water
Route studies and designs related to the construction of approximately 20 miles of water transmission mains for Kentucky American Water, including stream crossings and the preparation of numerous permanent easements.

US 68 Water Main Relocations – Kentucky American Water
Preparation of design plans and specifications for the relocation of Kentucky American Water's facilities along Harrodsburg Road (US 68) impacted by pending roadway improvements.

Toyota Tsusho America, Georgetown, KY
Metal Recovery Facility, Steel Warehouse, Logistic Building, ARK Building, parking lot expansion, grading and drainage systems, erosion control plan, and railroad spur extensions. The total site development encompassed approximately 600,000 square feet of building area.

Alumni Office Park, Lexington, KY
Preparation of development plan, site, grading, and storm water management for a 7-parcel, 12-acre office park.

Monessen Hearth Systems, Paris, KY
Preparation of site, grading, and drainage plans for the 13-acre parcel in the Paris-Bourbon County Industrial Park.

Barbourville Utilities Office Building, Barbourville, Kentucky
Project management, site plans, grading plans, bidding and construction administrating services for a new 5,500 square foot office building.

Columbia Hospital Office Building, Lexington, Kentucky
Preparation of site plans, grading and erosion control plans, storm water management, site utilities, and related details for a new 50,000 sf, 3-story building on 3.1 acres.

Water Supply Study, Winchester, KY
Scoping study to identify and evaluate alternatives related to increasing the supply of potable water for Winchester, to meet increased demands due to growth, and address problems associated with droughts. The alternatives included connection to the nearby Kentucky American Water system, connection to a potential Bluegrass Water Supply Commission system, and construction of a new water treatment plant, with associated raw water and transmission mains.

Athens-Boonesboro Road Water Main Relocations – Kentucky American Water
Relocation of an existing water transmission main to accommodate the widening of Athens-Boonesboro Road in Lexington, KY from Jacobsen Park to Interstate 75. The project included water main plan and profile, interconnections, and the development of permanent and temporary easements.

Lebanon Industrial Park Sanitary Sewer Extension, Lebanon, KY
Preparation of construction plans to extend sewer service to two separate industrial park sites in Lebanon.

Derby Estates Subdivision, Scott County, Kentucky
Preparation of subdivision plat, roadway designs, storm and sanitary sewer designs, water main extensions, and grading plans for a large subdivision in Scott County.

Cardinal Hill Hospital Expansion, Lexington, Kentucky
Services related to construction conflict resolution for a new Pediatric Center.

Areas of Specialization

- Stormwater Management
- Hydraulic Modeling
- NPDES Permitting
- Drainage Systems Planning and Design
- Collection System Planning and Design
- Infiltration and Inflow Studies
- Sewer System Rehabilitation
- Pump Stations
- Bidding and Construction Administration Services

Academic Credentials

- BSCE University of Kentucky, 1982

Professional Certifications

Professional Engineer:
Kentucky, Ohio, Tennessee

NASSCO Pipeline Assessment Certification Program
PACP Certification No. 04-7430

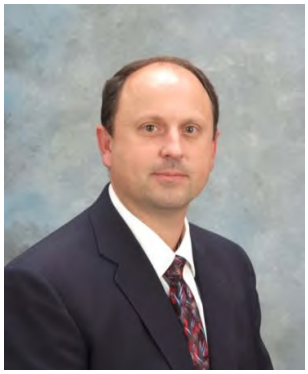
Specialized training in hydraulic modeling, NPDES Permitting. XP-SWMM, PIPE 2000, HEC-RAS, Natural Stream Design

Professional Affiliations

- American Society of Civil Engineers
- National Society of Professional Engineers
- Water Environment Federation
- American Water Works Association

INTEGRATED ENGINEERING

Steve Garland, PE, LSIT, LEED AP



EDUCATION
- University of Kentucky, B.S. Civil Engineering (1998)

EXPERIENCE – 16 YEARS

PROFESSIONAL REGISTRATIONS
- PE – KY 23980
- Tennessee PE 110877
- Indiana PE 10606247
- NCEES Model Law Engineer
- LEED Accredited Professional

PROFESSIONAL AFFILIATIONS
- Kentucky Society of Professional Engineers (KSPE) & Leadership P.E.
- American Society of Civil Engineers (ASCE)
- Lexington Fayette Urban County Government Environmental Commission
- Water Professionals Conference

TECHNICAL TRAINING
- Detention Ponds and Urban Hydrology (Featuring XPSWMM and StormNet Design Software)
- Hydraulic Modeling Training (Featuring HEC-RAS Design Software)
- StormNET Hydraulic / Hydrologic Training
- KYTC Traffic Impact Study Training
- Pump Station Design (Gorman – Rupp Hydraulic Training)

Responsible for management and project coordination for municipal infrastructure projects along with private development. Major responsibilities include design for transportation, traffic, wastewater collection (gravity and force mains), stormwater drainage, and major site development projects. Additionally Mr. Garland is responsible for scoping, contract negotiations, public awareness and presentation programs, along with qualification control/qualification assurance.

RELATED EXPERIENCE

Lexington Mall Sanitary Sewer Relocation Project (LFUCG), *Lexington, KY.* Project Engineer for the design of the relocation of an existing 15" sanitary sewer which was located under the Lexington Mall. Relocation included upsizing the line to a 24" line, traffic control, bypass pumping specification, and bid administration. The engineer's estimate was $600,000 with the successful low bid of $555,431.65 being awarded out of 13 submitted bids.

Bluegrass Aspendale Phases 1-5 (LFUCG – Lexington Housing Authority), *Lexington, KY* ***(2009 Environmental Commission Award Recipient),*** - Project Engineer for the Award Winning re-development of the 90 acres infill and redevelopment project in Lexington, Kentucky. Responsibilities involved design calculations for storm water quantity and quality, sanitary sewer collection design calculations and plan design, utility coordination, grading plans; roadway alignments, and coordination with local and state government bodies during design and construction. ***Green Initiatives included the largest installation of permeable pavers in the state of Kentucky***.

Ward Hall Pump Station and Force Main Improvements, *Georgetown Water and Municipal Sewer Service (GWMSS).* Project Engineer for the design phase for the Class B Pump Station. Responsibilities involved design calculations, proper wet well and vault sizing as well as buoyancy calculations and cost estimates, appropriate force main sizing (14,500 linear feet of 14" force main), stream crossing design to cross North Elkhorn Creek, construction plan preparation and review, specification writing, project coordination with design team members, staff, property owners, and utility companies.

Walgreens, *Fayette County, Kentucky.* Project Engineer for two Walgreens sites in Lexington, KY. The projects included site plans, grading plans, sanitary sewer plans, a bypass pumping plan for sewer relocation, FEMA CLOMR-F, construction administration, and all relative permitting.

Central Bank, *Fayette County, Kentucky.* Project Engineer for the site grading based on the Bank's proto-typical site design. Storm water management and relative permitting to be granted building permits

UK Parking Garage #6, Virginia Ave, Lexington, KY (University of Kentucky)
Project Engineer for the University of Kentucky Parking Garage #6, located at Virginia Ave and Press Ave. The parking garage is 4 stories, and accommodates 721 parking spaces. The project was a Design Build Project with Messer Construction. Project duties included all surface parking design and grading, coordination between the team, field engineering, inspections, and storm sewer design.

INTEGRATED ENGINEERING

Eddie Mesta, P.E.

As a Managing Partner of Integrated Engineering, Mr. Mesta provides a wide array of experience for both public and private sector clients. He is responsible for the coordination and design involving surveying, transportation, wastewater collection, storm water drainage, site development, and water supply projects for private and public entities. Past experience includes preparation of plans and contract documents, utility coordination, bidding, construction administration, easement acquisition, and presentations. Experience also includes preparation of reports for regional facilities planning, marketing endeavors, and providing solutions to engineering and management problems. Mr. Mesta is also responsible for the operations of Integrated Engineering's Northern Kentucky office. Additionally, he is the Survey Coordinator for the company, which includes management for the company's overall survey schedule, budget, personnel, and equipment.

EDUCATION
- University of Kentucky, B.S. Civil Engineering (1995)

EXPERIENCE – 18 YEARS

PROFESSIONAL REGISTRATIONS
- PE – KY 22048
- PE – IN 10200289
- PE – TN 00107842

PROFESSIONAL AFFILIATIONS
- Kentucky Society of Professional Engineers (KSPE) & Leadership P.E. *(Current Past State KSPE President)*
- American Society of Civil Engineers (ASCE)
- American Public Works Association (APWA)
- Kentucky Stormwater Association (KSA)

SPECIALIZED TRAINING
- KYTC Partnering Conference 2013
- KSPE Annual Conference 2013
- Water Professionals Conference 2013
- PSMJ Project Management Bootcamp - 2001

RELATED EXPERIENCE

North Limestone, North Upper Street, 6th Street Waterline Survey (KAWC), *Lexington, KY* – Project Manager for the topographic survey associated with waterline design on Limestone Street for Kentucky American Water Company. Responsibilities include utility coordination and oversight of the field surveying and deed / plat research for approximately 12,000 of water main within the project corridor.

Bob O Link Trunk Sewer Replacement Project (LFUCG), *Lexington, KY* - Project Manager currently overseeing the planning, coordination, and design of approximately 6,500 lineal feet of trunk sewer in the Wolf Run Sewershed. Responsibilities also include Kentucky Infrastructure Authority (KIA) administration and oversight of the topographic survey, easement plat preparation, and easement acquisition services.

Old Boonesboro Road Water Main Relocation, *Winchester, KY* - Project Manager of the design of a water main relocation for Winchester Municipal Utilities associated with the construction of a new bridge on Old Boonesboro Road. Water main relocation plans and specifications were produced for WMU. The length of the water main replacement was approximately 500 lf. Particular attention and construction phasing was made to this water main relocation being that it is the primary water line feed from WMU's Water Plant into the City of Winchester.

Georgetown - Frankfort Gas Transmission Project (Columbia Gas of Kentucky); *Georgetown, KY – Frankfort, KY* - Project Manager for the survey, design, and construction document preparation for 13.5 miles of 12-inch gas transmission line along US 460 between Georgetown and Frankfort, Kentucky. Responsibilities included the coordination of the topographic survey and easement plat preparation for the 50 ft right-of-way associated with the gas transmission line.

Woodsbend Boys Camp, *West Liberty, Ky* - Managed the overall design and coordination of a new waterline distribution system at the Woodsbend Boys Camp. The work was performed for the Kentucky Finance Cabinet. The approximate length of the waterline distribution system was approximately 2,500 linear feet.

Lowe's Home Centers, Inc.; *Louisville, Campbellsville, Danville, Georgetown, Paintsville, and Morehead, KY* - Project Manager Project Manager of overall design

HAZEN AND SAWYER
Environmental Engineers & Scientists

William H. Russell, AIA, LEED AP

Architectural

Professional Record

Mr. Russell has experience in the architectural design of water treatment plants, wastewater treatment plants, maintenance buildings, laboratories, and other industrial facilities. As Architect, his responsibilities include preliminary and final design, technical specifications, cost estimation and project administration during construction. Mr. Russell utilizes computer applications during all phases of architectural design.

Roanoke Regional Water Pollution Control Plant

Provided architectural design of administration, maintenance, primary treatment, and biosolid treatment structures. The structures are designed to blend with the current structures which are heavily influenced by colonial motifs. The buildings have a structural frame with masonry infill and cast stone accents.

Henrico Water Reclamation Facility

Expansion and upgrade of the 75 mgd Henrico WRF. Provided architectural design services for the dewatering building and several other process related facilities. The dewatering facilities were designed to fit within a composting facility that was out of service. Modifications were made to allow the installation of centrifuges and conveyors systems to transport the biosolids to drying beds. Acoustical treatments were added to limit the sound levels within the building.

Blue Plains Influent Screening Facilities Upgrade Project, District of Columbia Water and Sewer Authority (DC Water), Washington, DC

Mr. Russell provided architectural assistance for design of upgrades to the 1 billion gallon per day (bgd) influent screen facilities at DC WASA's Blue Plains Advanced WWTP. Project includes 13 fine (1/4") screens, and completely mechanized and redundant screenings collection and conveyance systems. Architectural work included modifications to the existing facilities including reroofing, providing skylights for access, and providing additional walls for separation of hazardous and non-hazardous spaces in accordance with NFPA 820. Mr. Russell additionally provided office construction administration during construction.

Greensboro Water Reclamation Facility

Provided architectural design several modifications over the years to process and administration buildings at the TZ Osborne plant. Modifications have included several modifications to the dewatering facilities including removing existing belt filter process equipment and replacing with centrifuges and other building and chemical modifications. Designed modifications to the incinerator portion of the dewatering building.

City of Raleigh Neuse River Wastewater Treatment Plant Upgrade

Provided architectural design for the upgrade and expansion of the Neuse River WWTP. Projects have included work on several process buildings including the dewatering structure. Centrifuges and a conveyors were added to the dewatering facility. The facility was designed to harmonize with the existing structures in the vicinity.

Greensboro Water Reclamation Facility

Provided architectural design several modifications over the years to process and administration buildings at the TZ Osborne plant. Modifications have included several modifications to the dewatering facilities including removing existing belt filter process equipment and replacing with centrifuges and other building and chemical modifications. Designed modifications to the incinerator portion of the dewatering building.

City of Raleigh Neuse River Wastewater Treatment Plant Upgrade

Provided architectural design for the upgrade and expansion of the Neuse River WWTP. Projects have included work on several process buildings including the dewatering structure. Centrifuges and a

Areas of Specialization

- Programming and design of Water, Wastewater Facilities,
- Laboratories and industrial facilities
- Sustainable Design of Water and Wastewater Facilities
- Utilization of computer applications in the design of water, wastewater and industrial facilities

Academic Credentials

BArch Clemson University, 1984

Professional Certifications

Registered Architect: North Carolina, Virginia, Illinois, Maryland, Connecticut, New York, Texas, New Hampshire

Employment Record

2000 - Present	Hazen and Sawyer, PC
1997 - 2000	O'Neal Inc.
1992 - 1997	Hazen and Sawyer, PC
1985 - 1992	Piedmont Olsen Inc.
1985	Freeman, Wells & Major
1984 - 1985	Jno. Lambert Architects & Planners

Professional Affiliations

- American Institute of Architects
- Steel Structures Painting Council
- International Code Congress
- National Fire Protection Association

HAZEN AND SAWYER
Environmental Engineers & Scientists

David A. Atkinson, PE, LEED AP

Electrical

Professional Record

Mr. Atkinson serves as a project electrical engineer specializing in the design of electrical power distribution systems for pump stations and water treatment plants.

Granite City Water Treatment Facility, Granite City, IL

Serving as the electrical engineer in responsible charge for the 2-mg Clearwell Addition project at the 15-mgd Granite City Water Treatment Facility in Granite City, IL for Illinois American Water. The electrical design included the relocation of liquid-filled transformers, addition of a switchboard, addition of variable frequency drives, modifications to existing switchgear, and many other electrical modifications and updates around the plant. The project is currently under construction, and Mr. Atkinson is overseeing shop drawing review and addressing any construction issues as they come up.

Borman Park Water Treatment Plant, Gary, IN

Served as the lead electrical engineer for the recently-completed Backwash Recycling and Residual Management Facility design/build project at the 54-mgd Borman Park Water Treatment Plant in Gary, IN, for Indiana American Water. The electrical upgrades included the addition of variable frequency drives, panelboards, lighting fixtures, and controls.

Bradley Avenue Water Treatment Facility, Champaign, IL

Responsible for the design/build of the electrical distribution system for the facility. The facility is entirely new and rated for up to 20 mgd. The electrical system includes a 2000kW standby engine-generator set, 3000A automatic transfer switch, 3000A switchboard, and 300hp variable-frequency drives. Seven off-site well pump stations and their associated electrical equipment and SCADA systems are also included as part of the design/build. This facility recently attainted LEED Certification.

Hidden Lake Water Treatment Facility, Warsaw, IN

Served as the lead electrical engineer for a new 6-mgd water treatment plant design/build project. The electrical system includes variable frequency drives, standby engine generator sets, switchgear, and controls. Remotely located groundwater wells will communicate with the water treatment plant SCADA system wirelessly. This facility will be applying for LEED certification and Mr. Atkinson is responsible for achieving a number of electrical-related credits towards this certification.

Goose Creek Water Treatment Plant, Fairfax, VA

Responsible for the design of the electrical distribution system expansion for the disinfection improvements project. The Goose Creek Water Treatment Plant is rated at 12 mgd, and the disinfection improvements included the addition of aqua ammonia, ferric sulfate, and caustic storage and feed systems. Electrical improvements included the addition of panelboards, DC SCR drives for chemical metering pumps, motor controls, fire alarm system, lighting, and additions to the existing plant control system.

Water Treatment Plant Upgrade and Elevated Storage Tank Addition, Town of Westernport, MD

Responsible for the electrical improvements for the plant upgrade which consisted of the replacement of a chlorine gas system with a bulk hypochlorite feed system, addition of pumping facilities, and a new filter backwash system. The electrical improvements included the addition of a new electric utility service, motor control centers, an automatic transfer switch, a diesel standby engine-generator set, and a control system that allows the plant to run most of the day without the need to be staffed.

Abingdon Water Treatment Plant Expansion Project, Harford County, MD

Lead Electrical Engineer responsible for the design of the electrical distri-

Areas of Specialization

- Low and medium voltage power distribution, lighting, motor controls, fire alarm systems, access control systems, closed circuit television systems, and variable frequency drives
- Computer analysis and design of electrical power systems using SKM Power Tools and ETAP software, computer-aided design using AutoCAD, networking and database applications

Academic Credentials

BSEE Rose-Hulman Institute of Technology, 2003

Professional Certifications

Professional Engineer:
North Carolina, Kentucky, Virginia, Maryland, Indiana, Iowa, New Hampshire, Massachusetts

Employment Record

2003 - Present Hazen and Sawyer, P.C.

bution system upgrades. This expansion will bring the plant from a capacity of 10 mgd to 20 mgd, with the electrical system being designed for a near-future upgrade to 40 mgd. The system consists of plant-owned, low-voltage switchgear served by two independent utility supplies. A second low-voltage switchgear assembly and a 2000kW standby engine-generator set configured for parallel operation with a second future generator are to be installed. Mr. Atkinson is currently responsible for the electrical construction administration duties on the project. Approximate total construction cost is $62 million.

Water Treatment Plant, City of Rockville, MD

Responsible for the electrical facility evaluation and report for the WTP. The plant currently operates at a maximum capacity of 8 mgd and major electrical upgrades will be made to bring it up to 14 mgd and improve overall system reliability. Mr. Atkinson was also responsible for the design of an ongoing upgrade at the plant. The electrical upgrades currently in progress include the addition of a 1250kW standby diesel engine/generator set and 5kV class switchgear with automatic transfer controls. Mr. Atkinson is currently responsible for a power systems study for the plant including protective devices coordination and arc flash evaluation studies.

Wilder's Grove Service Center for the City of Raleigh, NC

Responsible for the electrical distribution system design. This facility has applied for a LEED Gold status, and has begun construction. The facility includes daylight harvesting lighting control systems, low power consumption light emitting diode (LED) technology for the very expansive parking areas, and a ground source heat pump system. Mr. Atkinson is intimately involved in the construction administration and commissioning of the facility.

HAZEN AND SAWYER
Environmental Engineers & Scientists

Christopher Thunhorst, PE
Electrical

Professional Record

Mr. Thunhorst is a Senior Principal Engineer in the firm's Cincinnati office. He has over 13 years of electrical engineering experience in the areas of building systems, water and wastewater treatment facilities, water distribution systems and wastewater collection systems

Glendale WTP – Village of Glendale, OH
Electrical Engineer for the Phase 2 water treatment plant improvements project. Improvements included installation of VFDs on lime softening mixers, replacement of lime feed silo, installation of new chemical feed system, modifications to well pumps, SCADA system improvements, and a new Laboratory.

North Olmsted WWTP Plant Improvements – North Olmsted, OH
Lead Electrical Engineer for the Phase 2 Plant Improvements Project design which included a new standby power and medium voltage distribution system, new Preliminary Treatment Facility, modifications to the Equalization Basin, conversion of the existing Aeration Basins to Vertical Loop Reactors, modifications to the existing Blower Building, new Final Clarifiers, RAS/WAS Pump Station, Effluent Building including tertiary disc filters and UV disinfection, and modifications to the existing Solids Handling Facility including replacement of the back drive and controls for the existing centrifuge and the installation of a new centrifuge and associated sludge conveyance equipment.

LeSourdsville WRF Phase 2 Improvements - Butler County Water and Sewer Department - Butler County, OH
Lead Electrical Engineer for the LeSourdsville WRF Phase 2 Improvements Project design which included a new medium voltage electrical distribution system and a new main electrical building, paralleled generators with medium voltage paralleling switchgear, a new influent pump station, new preliminary treatment facility, conversion of an existing oxidation ditch to an equalization basin, new aeration basins and blower building, new final clarifier, existing final clarifier improvements, and existing RAS/WAS pump station expansion.

Standby Power Improvements – Sanitation District No. 1 of Northern Kentucky
Electrical Engineer for the Initial Action Generator Project including generator installations and electrical upgrades at twenty four (24) wastewater pumping stations.

Walnut Meadow Creek Pump Station – Berea Municipal Utilities – Berea, KY
Electrical Engineer for replacement of the Walnut Meadow Creek Pump Station. The new pump station included three 45 HP submersible pumps and a new pump station control building to house the new service entrance electrical equipment and pump controls. Provisions were also included to connect a portable generator.

Bob McEwen WTP – Clermont County, OH
Electrical Engineer for the plant improvements project including a new 18 mgd, 10 minute EBCT GAC facility with intermediate lift pumps, modifications to several chemical systems including gas chlorine, coagulant, polymer and sodium hydroxide. The project also included a new instrumenta¬tion and control system for the new GAC facility, as well as replacement of the existing Distributed Control System (DCS) for the en¬tire plant with a non-proprietary PC/PLC based system.

Dry Creek WWTP – Sanitation District No. 1 of Northern Kentucky
Lead Electrical Engineer for multiple projects at the Dry Creek WWTP, a 46 MGD wastewater treatment facility which serves the Northern Kentucky area. Projects at the Dry Creek WWTP include:

- Headworks, Hydraulics, and Odor Control Improvements – Installation of a new Headworks facility including three perforated plate screens and grit removal equipment rated for 105 MGD and three odor control biofilters.
- Solids Handling Improvements – Replacement of the existing sludge feed

Areas of Specialization
- Power Distribution
- Control Systems
- Process Instrumentation
- SCADA Systems

Academic Credentials

BSEE	North Carolina State University, 2005
AAS	Asheville-Buncombe Technical Community College, 2001

Professional Certifications
Professional Engineer: Ohio, Kentucky, Tennessee

Employment Record

2007 - Present	Hazen and Sawyer, P.C.
2005 - 2007	GRW Engineers, Inc.
2000 – 2005	United Engineering Group, Inc.

Professional Affiliations
- Instrumentation, Systems, and Automation Society
- International Association of Electrical Inspectors

pumps, three (3) centrifuges, and installation of a new solids loadout facility with a dewatered cake conveyor system. The electrical and controls improvements associated with this project included installation of four new low voltage motor control centers, installation of a new PLC remote I/O panel, and automation of the dewatering process.

- Final Clarifiers Modifications – Replacement of the clarifier mechanisms for six (6) final clarifiers, replacement of three (3) skimmings mixers, six (6) RAS pumps, installation of a new electrical room, new motor control centers, new variable frequency drives to control the new RAS pumps and a new SCADA PLC panel.
- Administration Building Modifications – Remodel of the existing plant control room including removal of outdated SCADA consoles and control panels, addition of new offices, a new conference room layout with new audio visual equipment, relocation of a break room, and new lighting and HVAC systems.
- Laboratory Modifications – Remodel of the existing plant laboratory to provide additional lab space required to support two (2) new regional wastewater treatment plants.
- SCADA Improvements – Installation of a new plant network consisting of a fiber optic ring, modification of existing SCADA PLCs to improve plant monitoring and control, installation of a new PLC, installation of a new HMI video wall and installation of a new CCTV system.

Patricia K. Niehues
Instrumentation and Controls

Professional Record

Ms. Niehues specializes in the design and construction administration of instrumentation and control systems for water and wastewater treatment facilities. Ms. Niehues has been responsible for reviewing control system shop drawings as well as factory and field-acceptance testing of control system equipment for various projects. Ms. Niehues has served or is serving as Project Engineer for the following Design-Build projects:

- Indiana American Water, Borman Park Backwash Recycling and Residual Management Facility – Gary, IN
- Indiana American Water, 6-mgd Hidden Lake Water Treatment Facility – Warsaw, IN
- Illinois American Water, Bradley Avenue Water Treatment Plant – Champaign County, IL
- Illinois American Water, Streator WTP, Renovation Project – Streator, IL
- City of Wilson, Hominy Creek Wastewater Treatment Facility, Solids Handling Facilities – Wilson, NC
- City of Raleigh, E.M. Johnson Water Treatment Plant – Raleigh, NC
- City of Baltimore, Ashburton Filtration Plant, Upgrade and Renovation – Baltimore, MD
- Lee County Department of Solid Waste Management, Ultra Filtration and Reverse Osmosis Facility – Lee County, FL
- Collier County Water District, 12-mgd Reverse Osmosis Membrane Pilot Unit – Collier County, FL

Ms. Niehus also served or is serving as Project Engineer for the following Design projects:

- Illinois American Water, Granite City Water Treatment Facility Clearwell Addition – Granite City, IL
- City of Raleigh, E.M. Johnson Water Treatment Plant – Raleigh, NC
- City of Raleigh, Walnut Creek Lift Station – Raleigh, NC
- Rivanna Water and Sewer Authority, Moores Creek Wastewater Treatment Plant – Charlottesville, VA
- Town of High Point, High Point WWTP Expansions – High Point, NC
- City of Raleigh, Crabtree Creek Odor Control – Raleigh, NC
- City of Baltimore, Deer Creek Pumping Station – Baltimore, MD
- Union County, Union County Wastewater Treatment Plant Expansion – Monroe, NC

Areas of Specialization

- Industrial Process Control and Instrumentation
- Distributed Control System Application

Academic Credentials

BSChE	North Carolina State University, 2001
BS	Michigan Technical University, 1987

Employment Record

2004 - Present	Hazen and Sawyer, PC
1996 - 1999	BE&K Engineering
1990 - 1996	Degussa
1987 - 1990	Dow Corning Corporation

Professional Activities

- American Water Works Association

HAZEN AND SAWYER
Environmental Engineers & Scientists

Jason V. Advani, PE
Instrumentation and Controls

Professional Record

Jason V. Advani, PE is a Principal Engineer in the firm's Columbus, Ohio office and has over seven years of water and wastewater control system design and support experience. His responsibilities include the design of controls systems, telemetry systems and network security, and preparation of construction specifications for water and wastewater treatment facilities. He has experience providing construction administration (CA) services as it pertains to instrumentation and control. These activities include shop-drawing review and approval, PLC programming, field checkout, start-up, commissioning, and troubleshooting, as well as supervising construction staff. Mr. Advani also has in-depth information technology (IT) experience with databases, computer networks, hardware and software design and implementation and integration of systems.

Northern Kentucky Water District, KY – Taylor Mill Treatment Plant Advanced Treatment Improvements

Lead engineer for addition of new Granular Activated Carbon Facility and Preliminary Treatment process. Supported the efforts of four different design consultants.

Columbus, OH – Division of Sewerage and Drainage Documentation

Made significant contributions to the City of Columbus Instrumentation and Control System Design Guidelines versions 5.00 and 5.10—a publication for I&C coordination and design recommendation for engineering firms that do work for the City of Columbus Division of Sewerage and Drainage. Additional work involved updating the City of Columbus instrumentation and control systems master specifications for primary sensors and field instruments, control panel instruments and devices, uninterruptible power supplies, network devices and workstation hardware and software.

Columbus, OH - T. Marzetti, Allen Division – pH Flow Equalization Pretreatment

Provided PLC and OIT programming, start-up, and training services for a pH and flow-rate equalization basin retrofitted at an existing food manufacturing facility. The control system monitored effluent pH, dosed chemical when necessary and metered facility effluent to the sanitary sewer while logging data for future retrieval.

Indianapolis, IN – Belmont Ozone Enhanced Ultraviolet Disinfection Facility

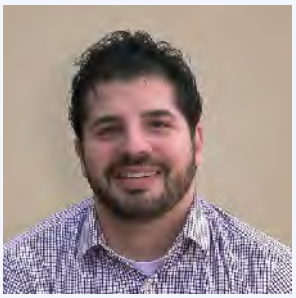
Lead instrumentation and controls engineer for the addition of a large ultraviolet disinfection system for partial-plant-flow disinfection. The design consists of seven new two-bank UV disinfection channels, integration of their existing ozone disinfection system to aid with pre-ozonation and replacement of the instrumentation controls for the existing Sodium Hypochlorite and Sodium Bisulfite wet-weather disinfection system.

Valparaiso, IN – Valparaiso CSO Disinfection Facility Design

Lead instrumentation and control engineer for new a CSO disinfection facility utilizing three existing equalization basins. Integrated existing equipment and instrumentation with the new facility's sampling and chemical systems. Provided assistance with CA services during construction.

Newark, OH – High Rate Treatment System and Facilities Design

Lead instrumentation and controls engineer for the design of a new Krüger new high rate treatment system, along its chemical feed systems, and integration of the facility in to the existing plant SCADA system. Tasks also included replacement of the main plant's influent pump variable speed drives, coordination with numerous vendor control systems and design of a plant-wide video surveillance system.



Areas of Specialization

- Instrumentation and Control Evaluation
- Planning, Design and Startup for WWTP/WTP
- Telemetry System Design
- Networking Design & Security
- PLC Programming (Allen Bradley)
- HMI Programming (Wonderware & iFix)
- Low-voltage Electrical Design

Academic Credentials

BSECE The Ohio State University, 2004

Professional Certifications

Professional Engineer: Ohio

Certified Construction Documents Technologist (CDT)

Employment Record

2012 - Present Hazen and Sawyer, PC
2006-2012 ARCADIS US

Selected Publications

Advani, J.V., "PLCs & HMIs: A Guide to Wastewater Control," presented at the SW Section Meeting of the Ohio Water Environment Association (SWOWEA), Greene County OH, March 18, 2010.

Professional Record

Mr. Vestal has 29 years of mechanical design experience as a consulting engineer. His responsibilities include project management, HVAC, plumbing, and fire protection design. He has experience with new building construction, additions, and renovations. Mr. Vestal's experience includes an extensive range of projects working with municipal, commercial, educational, and industrial buildings. He has obtained his LEED Accredited Professional status in 2006 from the USGBC.

City of Nashua, CSO Screening and Disinfection Facility/Nashua, NH

HVAC/Plumbing and Fire Protection lead designer. HVAC and plumbing design for a disinfection facility which uses sodium hypochlorite (NaOCl) bulk containers and 8% NaOCl solution. Dechlorination with sodium bisulfite (NaHSO3). HVAC ductwork and fans were all aluminum or coated steel construction, interlocked with motor actuated louvers. The electrical room was served via a wall mounted packaged AC unit and the general space heated by stainless steel unitary heaters. Plumbing consisted of emergency shower and eyewash stations coupled with a tempered water system in addition to a small restroom. HVAC and Plumbing.

R.C. Wilson Water Treatment Plant, Phase IV Improvements, Hagerstown, MD

These improvements included HVAC, plumbing and Fire Protection design for a chemical feed building and pump building. HVAC exhaust ductwork and fans were all fiberglass construction, interlocked with custom air handling units. Fire protection included both wet pipe sprinklers and clean agent. HVAC, plumbing and FP Construction.

Newark Water Treatment Plant, Water Treatment Plant Improvements Phases I & 2– Newark, OH

Phase I included a new Finished Water Pump Station heated by hot water unit heaters and a high efficiency tandem of pulse boilers with rooftop exhaust fans for heat removal of the pump heat generation. Phase 2 design included replacement of the central heating system with new high efficiency low thermal shock boilers, and replacement of the cooling systems with a centralized packaged chiller. Building improvements involved entirely new HVAC systems in the control building, filter building and chemical facilities. Centralized dehumidification was added to the plant for the first time.

City of Columbus, Hap Cremean WTP, PAC Facility/Columbus OH

Lead Project Engineer for the HVAC design for the PAC building. Design and construction administration of a powdered activated carbon facility for the 125-mgd plant. The purpose of the facility is to remove atrazine and other agricultural chemicals from the drinking water.

City of Columbus, Hap Cremean WTP, Bulk Chemical Building/Columbus OH

The original design for the Bulk Chemical Building was completed in 1989 and did not include any ventilation per Ten States Standards and consisted of gas-fired unit heaters. Several years later it became apparent that the environment was creating advancing rapid corrosion issues and the HVAC systems required an evaluation leading to improvements. Mr. Vestal did the initial evaluation, recommendation and subsequent design leading to the addition of the current ventilation and exhaust systems and removal of the gas-fired unit heaters. Gas appliances installed within chemical facilities created acids when combusted and condensable by-products drain back into the heat exchangers. Budgetary decisions led to the decision to use PVC coated ductwork throughout. This was an improvement to the previous galvanized steel duct, but not as corrosion resistant as FRP which would be recommended for any new ductwork.

Hidden Lake WTP Indiana-American

Plumbing design for Distribution & Treatment Facilities.

Areas of Specialization

- Water/Wastewater Ventilation
- HVAC & Plumbing
- Odor Control

Academic Credentials

BSAgE The Ohio State University, 1984

Professional Certifications

Professional Engineer: Ohio, Kentucky, Virginia, North Carolina, Tennessee

Certified Construction Documents Technologist (CDT)

Employment Record

2011 - Present	Hazen and Sawyer, PC
2010 - 2011	Vestal Consulting
2008 - 2010	Karpinski Engineering
1999 - 2008	Burgess & Niple, Inc.
1997 - 1999	ASC Services
1987 - 1997	Malcolm Pirnie, Inc.
1985 - 1987	Larsen Engineering
1983 - 1985	Ross Laboratories

Professional Activities

- American Society of Heating, Refrigerating, and Air-Conditioning Engineers
- United States Green Building Council

Thomas Dohack

Project Manager/ Resident Project Representative

Certifications

OSHA 30-hour Certification
Confined Space Entry Certified
APWA Certified Administration/ Inspection
US Army Corp of Engineers
Construction Quality Management for Contractors
CPR/First Aid

Professional Qualifications

Mr. Dohack has over 30 years of experience managing construction projects at multiple stages including conceptual, design, Resident Engineering, and project closeout. Mr. Dohack has experience with mechanical, electrical, structural, and system controls for water and wastewater improvement projects.

Mr. Dohack leads Gonzalez Companies' Design-Build efforts. He has experience with constructing plant upgrades without interrupting plant operations. Prior to joining Gonzalez Companies, Mr. Dohack owned a 75 person mechanical construction company. His ability to understand our client's needs and provide them with a high level of customer service has led to numerous repeat contracts for our firm.

As a Resident Engineer, Mr. Dohack has provided onsite inspections, conducted preconstruction meetings, progress meetings, and project closeout meetings. In addition, he has developed and maintained shop drawing/submittal schedules, maintained record documents, managed the RFI process, reviewed and oversaw test procedures and system start-ups, and assembled project operational and maintenance manuals.

Relevant Project Experience

Water Treatment Facility Clearwell Addition , Granite City, Illinois
Resident Engineer
Construction of a 2.5 million gallon clearwell
- **$10,000,000 project**
- **High service distribution pumps**
- **SCADA system with control valves**
- **Chemical distribution pumps**
- **Bubbler sedimentation system**

3MGD Sand Filter Addition, Paragould, Arkansas
Resident Engineer
- **$2,750,000 project**
- **High-rate sand filters**
- **Filter building**
- **Piping gallery**
- **Filter backwash piping**
- **Process and instrumentation**
- **Civil site improvements**

Water Wells and Water Treatment Facility , Wood River, Illinois
Resident Engineer
- **New water well**
- **Piping to treatment plant**
- **Plant modifications and upgrades**
- **SCADA installation**

Water System SCADA Improvements , O'Fallon, Illinois
Resident Engineer
Implementation of a new control system
- **5 water towers**
- **2 ground storage tanks**
- **1 new booster pump station**
- **1 existing booster pump station**

Elevated Water Storage Tanks, O'Fallon, Illinois
Resident Engineer
Construction of two 1-million gallon elevated water storage tanks
- **Daily inspections**
- **Rebar inspections**
- **Concrete inspection**
- **Site improvements**
- **Site piping**
- **Bowl construction**
- **Paint inspections**
- **Controls installation**

GONZALEZ COMPANIES, LLC

Thomas Dohack

Project Manager/ Resident Project Representative

Sommers Road Water Main Replacement , St. Charles, Missouri
Resident Engineer
- **5,000 feet of 20-inch ductile iron water main**
- **2,000 feet of 8-inch and 10-inch water main**

Weldon Springs and Technology Drive Water Main Extensions, St. Charles, Missouri
Resident Engineer
- **16-inch and 12-inch water mains**

Feise Road Water Main Extension
Resident Engineer
- **2,200 feet of 16-inch water main**
- **Jack and bore under highway**

Joint Sewer Agency WWTP, Paducah, Kentucky
Resident Engineer
Reconstruction of existing components of 2 anaerobic digesters and methane storage tank.
- **Plant operations maintained throughout shutdowns**
- **Piping system replacement**
- **Methane collection system addition**

WWTP, South Sioux City, Nebraska
Project Manager
Value engineering, constructability review, cost estimating, and client management for this future 4.3 MGD regional wastewater treatment plant
- **Influent and effluent lift stations**
- **Cast-in-place concrete splitter box with traveling belt screen**
- **4 lined anaerobic lagoons**
- **Cast-in-place concrete selector tank**
- **2 cast-in-place concrete biological nutrient removal tanks and mixers**
- **2 precast wire-wound concrete final clarifier tanks**
- **UV disinfection system**
- **Return and waste activated sludge lift station**
- **2 precast wire-wound concrete digester tanks**
- **Centrifuge dewatering system**
- **9,000 square foot administrative/maintenance building**

WWTP , Fort Leonard Wood Army Base, Missouri
On-Site Project Manager
- **Construction staging plans**
- **Fixed lid primary digester structural repair**
- **Secondary digester floating lid repair**
- **Mixing system replacement**
- **Control system replacement**
- **Valve and piping replacement**

Thomas Dohack

Project Manager/ Resident Project Representative

Tinker Air Force Base , Oklahoma
On-site Construction Manager
MEP improvements for an existing 40,000 square foot building

- **Site visits**
- **System analysis**
- **Data acquisition**
- **Work plan development and implementation**
- **System functionality remained operational**
- **Interior renovations**
  - ***~ Heating water pump***
  - ***~Gas fired boiler***
  - ***~Chilled water pump***
  - ***~100 ton air-cooled chiller***
  - ***~Return air fan***
  - ***~Ancillary piping***
  - ***~Electrical wiring***
  - ***~Fan coil units***
  - ***~Ductwork***
  - ***~Existing air devices***
  - ***~Conduit***
  - ***~Conductors***
  - ***~Control equipment***

Wastewater Treatment Plant Expansion, O'Fallon, Illinois
Project Manager

- **SCADA system**
- **New headworks with 2, 3.5 foot redundant mechanical fine screens with 1MGD capacity each**
- **New UV structure**

New Public Works Facility , O'Fallon, Illinois
Resident Engineer
Construction of 5,100 square foot building and project closeout including testing and start-up of HVAC, electrical, and plumbing systems.

- **Vehicle Bays**
- **Offices**
- **Storage**
- **Dining facilities**
- **Locker room**

Terminal Lift Station Modifications, O'Fallon, Illinois
Project Manager

- **VFD's**
- **Electrical panel**
- **Controls**
- **Pump replacement**

Wayne Nieman

Project Manager/ Resident Project Representative

Education

BS, Civil Engineering

Certifications

OSHA 10-hour Certification

Professional Qualifications

Mr. Nieman has 25 years of experience in Construction Management and Resident Engineering. His projects have ranged in value up to $270,000,000. Mr. Nieman has overseen the jobsite construction and quality of work on each project he has served on along with supervising other RE's and inspectors. Mr. Nieman has experience reviewing general contractor's monthly pay applications, coordinating monthly construction meetings, resolving contractor and subcontractor questions and problems with design engineers, and performing other tasks including being a liaison with owner and cost control of projects.

Relevant Project Experience

Lower and Middle River Des Peres Tunnel Facilities, St. Louis, Missouri, $28M
Resident Inspector
- **Construction of a $28 million 96 inch force main, including two drop shafts, DECP tunnel, and diversion/intake structures**
- **Tunnels expected to be through hard rock and may encounter karstic conditions**
- **Pump station improvements**

Lemay Wastewater Treatment Plant Wet Weather Expansion, Metropolitan St. Louis Sewer District, St. Louis, Missouri
Project Manager
- **$90 million Wet Weather Expansion Project**
- **Construction of 4-130 foot diameter clarifiers, grit system, primary sludge pump station, odor control, and a 132 inch diameter outfall pipeline**

Meramec Wastewater Treatment Plant Project, Metropolitan St. Louis Sewer District, St. Louis, Missouri
Resident Engineer
- **Construction of a $100 million wastewater treatment plant**
- **Included a headworks building, two primary and secondary clarifiers, two trickling filters, outfall structures and approximately 1-1/2 mile of 78 inch outfall pipeline**

Lemay Overflow Regulation System, Metropolitan St. Louis Sewer District, St. Louis Missouri
Resident Engineer
- **Construction of the Lemay Pump Station electrical modifications, Middle River Des Peres gate modifications, and Lemay North gate modifications**

24 inch Water Main Relocation/ 48 inch Raw Water Project, Belleville, Illinois
Resident Engineer
- **Construction of approximately 280 linear feet of 24 inch ductile iron water main**
- **Provided construction of auger cast piles, concrete structural beams and precast panels for the protection of approximately 200LF of existing 48 inch water main.**

CSX to Winstanley Avenue, Belleville, Illinois
Resident Engineer
- **Construction of approximately 3,800 linear feet of 36 inch diameter ductile iron water main**
- **Jacking and Boring two 54 inch diameter casing pipe, each 380 linear feet long, under I-55/70**

Wayne Nieman

Project Manager/ Resident Project Representative

Bissell Point Secondary Expansion, Metropolitan St. Louis Sewer District, St. Louis, Missouri
Resident Engineer
- **$270,000,000 project**
- **Construction of the aeration tanks, major process equipment, trickling filter covers, maintenance shop, roadway improvements, and Riverview Quarry Landfill project elements.**

Trickling Filter, Bissell Point Wastewater Treatment, Metropolitan St. Louis Sewer District, St. Louis, Missouri
Resident Engineer / Office Engineer
- **Oversaw jobsite construction and supervising inspection work**
- **Implemented and participated in resident engineer training program**
- **Provided technical assistance to project manager and resident engineers: estimating, reviewing technical problems, substituting as a field inspector**

Winstanley to Bowman Avenue, Belleville, Illinois
Resident Engineer
- **Construction of approximately 2,800 linear feet of 36 inch diameter ductile iron water mains**

Exchange Avenue Water Main Extension, Belleville, Illinois
Resident Engineer
- **Construction of 2,800 linear feet of 12 inch ductile iron water main**

St. Clair Avenue to Bowman Avenue, Belleville, IL
Resident Engineer
- **Construction of approximately 3,600 linear feet of 48 inch diameter water main**
- **Included up to 66 inch casing pipe jack and bores**

Sullivan Wastewater Treatment Plant, City of Sullivan, Sullivan, Missouri
Resident Engineer
- **Construction of a $4,000,000 sequencing batch reactor wastewater treatment plant**
- **Abandonment of the old lagoons**

Phoenix Parkway Water Main, Public Water Supply District #2, O'Fallon, Missouri
Resident Engineer
- **Construction of a 16 inch diameter water main replacement**
- **Included boring 255 linear feet of pipeline under Highway 40/61 and installing approximately 7,800 linear feet of 12 inch-diameter water main extension**

HAZEN AND SAWYER
Environmental Engineers & Scientists

Catherine Hughes Keenan, PE

Construction Administration

Professional Record

Ms. Keenan's experience in environmental engineering includes work predominantly in the water process and treatment area for compliance with Safe Drinking Water Regulations. She has assisted in the design and construction of water and wastewater facilities, focusing in the design of chemical feed systems, written and compiled data for 201 Facilities Plans, and performed hydraulic analysis for plant expansions.

Ms. Keenan is currently working on hydraulic calculations, design of finished water pumping stations and backwash pump stations, permitting and design of solid removal equipment for Illinois American Water's Granite City Water Treatment Facility. She recently designed recycle pump station pumps, performed hydraulic and volume calculations and assisted with permitting on Indiana American Water's Borman Park Water Treatment Plant in Gary, IN.

Ms. Keenan recently completed design of Indiana American Water's new 9-mgd Hidden Lake Water Treatment Facility. She recently designed modifications to Illinois American Water's 6-mgd Streator WTP, which includes a new filter and backwash facilities, and 22-mgd Mattis Avenue WTF, which includes new clearwells, and she recently participated in design of Illinois-American Water's 15/20-mgd Bradley Avenue WTP in Champaign, IL.

Ms. Keenan served as a project manager for the Cary/Apex Water Treatment Facility (WTF) Capacity and Re-Rating Study. The project involved evaluating the expansion of the 40-mgd WTF to 80 mgd. This project included hydraulic design, residuals management, alternative disinfection strategies such as UV disinfection, integration and phasing of future expansions, and cost analysis. This project assessed the integration of alternative technologies with future regulatory requirements.

Ms. Keenan served as project engineer for the Montebello Water Treatment Plant (WTP) 32-mgd Recycle Pump Station for the City of Baltimore. The project included hydraulic analysis of existing plant conditions and integrating the recycled water into the plant treatment process.

Ms. Keenan served as a project engineer for the addition of chemical storage and feed facilities at the 14-mgd College Hill WTP in Lynchburg, Virginia. The project included design of storage and feed facilities for sodium hypochlorite, sodium hydroxide, and alum. Ms. Keenan also played an active role in the construction administration of this project by attending monthly progress meetings, resolving field issues with the contractor, and shop drawing review.

Ms. Keenan also served as a project engineer for the Durham Water Treatment Plant Improvements. This project included improvements to both the Brown and Williams Water Treatment Plants in Durham, North Carolina. The project scope included expansion of a finished water pumping station at the Brown WTP, replacement and hydraulic analysis of finished water pumps at the Williams WTP, and review and recommendations for improvements to the washwater flows at both plants.

Ms. Keenan has been involved in the design of several water treatment plants including the installation of chloramination disinfection at two water treatment plants in Rocky Mount, North Carolina having flow rates of 12 and 14 mgd. This project also included the installation of baffle curtains in the Tar River water treatment facility's 1-mgd clearwell. Ms. Keenan conducted the CT testing necessary after the installation of the curtains. Other chloramination projects include the design of chloramination facilities in Wilson, North Carolina, which involved designing chemical storage and feed facilities for ammonia.

Areas of Specialization

- Design of Water and Wastewater Treatment Facilities and Pumping Stations
- Computer Modeling of Hydraulic Systems
- Water Process Evaluations and Studies
- Design of Chemical Feed Systems

Academic Credentials

BSEnvE	University of North Carolina, 1999
BSCE	University at Buffalo, 1997

Employment Record

1999 - Present	Hazen and Sawyer, PC

Professional Activities

- American Water Works Association
  Chairperson, Public Education Committee
  2002-2004
  Seminars and Workshops Committee
  2006-Present

Additionally, Ms. Keenan was involved in the preliminary engineering reports for the expansion of the Brown and Williams water treatment facilities in Durham, NC. During this project, Ms. Keenan focused on the installation of additional centrifuges, chemical feed system upgrades and expansions, and finished water pumping hydraulics.

Ms. Keenan has participated in several treatment studies evaluating treatment methods used and possible ways to optimize and improve plant performance. This includes completing the "Partnership for Safe Drinking Water Study" for the 18-mgd Glenville Lake Water Treatment Plant, the 32-mgd P.O. Hoffer Water Treatment Facility for the Public Works Commission of Fayetteville, NC, and the 40-mgd Cary/Apex Water Treatment Facility in Cary, NC.

As a research assistant with the University of North Carolina at Chapel Hill, Ms. Keenan studied the formation of disinfection by-products for drinking water supply for the Public Works Commission of Fayetteville, NC. This work was required under the SWDA EPA Information Collection Rule. The project also involved using the mathematical logistic function model to describe disinfection by-product formation.

12 Sub-Consultants

SECTION 12: SUB-CONSULTANTS

Hazen and Sawyer does anticipate utilizing sub-consultants for this project. The work experience history of these firms, including references, are included below, and resumes are included in Section 11.

Gonzalez Companies

Gonzalez Companies is a professional civil engineering and construction management firm specializing in water and wastewater infrastructure. They have provided engineering services to municipalities and sewer districts in Paducah, Kentucky; Southern Illinois; the St. Louis metropolitan area; Wisconsin; Nebraska; and Arkansas. Gonzalez Companies has also worked on water supply projects for Military bases in Afghanistan and Dover Air Force base in Delaware. Gonzalez Companies was established in 1999, has five offices, and 40 employees.

Gonzalez Companies staff is comprised of water and wastewater engineers/operators with an average of over 20 years of experience. This unique in-house experience allows their team to meet client's water engineering needs with sensitivity to budgetary constraints with minimal disruption to operations.

Gonzalez Companies has the ability to provide water engineering design and construction services including, but not limited to:

- Hydraulic Analysis and Modeling
- Master Planning Studies
- Capacity Analysis Reports
- Operations & Maintenance Performance Reports
- Water Treatment Facilities
- Ground Storage and Elevated Tank Facilities
- Pump Stations
- Transmission & Distribution Systems
- Inventory and Condition Assessment
- Raw Water Well Development and Abandonment
- Fire Flow Analysis
- Permitting Assistance
- Regulatory Agency Compliance Reports

Gonzalez Companies' recent work experience history includes Construction Phase Services for Illinois American Water's Granite City WTF Clearwell Addition Project, and Design and Construction Observation for Paragould Light, Water & Cable's 3-MG Sand Filter Addition in Paragould, Arkansas. Detailed descriptions of these projects are attached at the end of this section.

References with specific contacts and phone numbers follow:

City of O'Fallon
Dan Scherer
(636) 379-7600

City of Warrenton
Guy Gevers
(636) 456-3535

American Water Company
Jeff Kaiser, P.E.
(618) 239-3231

Alliance Water Resources
Tim Geraghty
(636) 561-3737 x101

Integrated Engineering, PLLC

Integrated Engineering, PLLC is an emerging professional civil engineering, landscape architecture, and surveying company with experience in diverse disciplines. They were founded by Harsha Wijesiri in August of 2006, and currently have a total staff size of 18 employees. Office locations include Lexington, KY, Louisville, KY and Florence, KY.

Having worked on various public works projects, Integrated Engineering has successfully completed numerous municipal projects in the region. They have worked with governmental agencies in various cities across Kentucky. Some of their valuable clients include the Kentucky Transportation Cabinet, Lexington-Fayette Urban County Government, the Northern Kentucky Sanitation District 1, City of Richmond, and the City of Frankfort. Their staff has earned a reputation for completing projects in a responsive manner while meeting and exceeding the client's needs and expectations. This is accomplished by providing functional, economically feasible, and aesthetically pleasing designs in a timely manner. Their project services include the following:

- Boundary & Topographic Surveys
- Construction Stakeout
- Roadway Design
- Traffic Studies
- Planning & Feasibility Studies
- Public Involvement & Coordination
- Local and State Permit Preparation
- Hydraulic Modeling
- Cost Estimates
- Bid & Contract Document Preparation
- Conducting Prebid & Preconstruction Conferences
- Construction Observation & Reporting
- Preparation of Final Plans and Details
- Preparation of As-Built Information

Integrated Engineering's recent work experience history includes Center Court 1 & 2 Redevelopment of Downtown Lexington and Infrastructure for the South Hill Group; Blue Grass Airport West Side T-Hangar Expansion Project, Lexington; Oak Grove Village New Mixed Use Development in Oak Grove, Kentucky; and Bluegrass Aspendale Housing Project Re-Development for the Lexington Housing Authority. Detailed descriptions of these projects, along with references with specific contacts and phone numbers, are included at the end of this section.

Water Treatment Facility Clearwell Addition

Granite City, Illinois

Illinois American Water Company began constructing the Granite City Water Treatment Facility Clearwell Addition in July 2012 with a completion in the fall of 2013. The new facility is a 2.5 million gallon clearwell with new high service distribution pumps, a new SCADA system including control valves, a new chemical distribution system and bubbler sedimentation system. Gonzalez Companies provided the on-site representative during construction. Responsibilities included construction inspection, documentation, and quality assurance. Gonzalez Companies also maintained oversight in critical scheduling and planning to assure the existing facility remained in production during the construction of this new facility. Additionally, Gonzalez Companies coordinated material testing requirements for compliance with the specifications.

Owner
Illinois American Water Company

Gonzalez Services
Construction Phase Services

Contractor
River City Construction

Subcontractor
SCI Engineering, Inc.

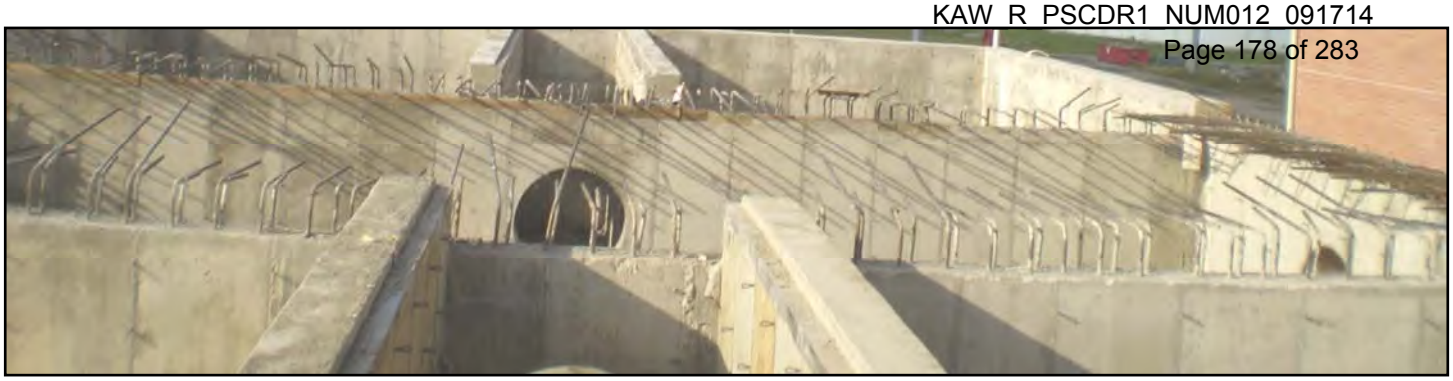
Service Dates
May 2012-August 2013

Construction Costs
$10,000,000

Gonzalez Staff
Tom Dohack

Reference
Brent O'Neill
2300 Richmond Rd.
Lexington, KY 40502
(859) 268-6316

GONZALEZ COMPANIES, LLC



3MG Sand Filter Addition

Paragould, Arkansas

Paragould Light Water & Cable (PLWC) operates the municipal water supply system for the City of Paragould, Arkansas.

The water supply is obtained from seven wells which feed water to a central water treatment plant . This plant utilizes aeration, chemical addition/rapid mix, clarification, sand/anthracite filtration and disinfection to produce potable water. Finished potable water is stored in one below-ground clear well, three ground-level tanks, and six elevated storage tanks located around the community.

A Water System Long-Range Master Plan was developed to forecast demands on the PLWC water system, and to assess the current infrastructure. As part of this Master Plan, PLWC procured the services of Gonzalez Companies to provide design and construction services for the expansion of the WTP high-rate sand filters.

The WTP was originally designed to be a 6.0 million gallons per day (MGD) facility. However, with one filter train down for backwashing or maintenance, no more than 3.0 MGD of water can be treated. To increase the WTP's firm capacity to 6.0 MGD, additional sand filters had to be added to the system. To expand the filter system, the existing facilities were duplicated as closely as possible. Components of the expansion included:

- Two filter trains consisting of two filter cells each.
- Proprietary underdrain blocks to match existing
- Filter media
- Filter tanks
- Gullet channel
- Backwash troughs
- Air scour system utilizing existing blowers
- Related valving and piping
- Building to house the new filters
- Expansion of Instrumentation, Programmable logic controllers, and SCADA integration
- Civil site improvements

Owner
Paragould Light,
Water & Cable

Gonzalez Services
Design and Construction
Observation

Contractor
N/A

Subcontractor
N/A

Service Dates
November 2011-present

Construction Costs
$2,875,000

Gonzalez Staff
Pat Judge, P.E.
Jon Kremer, P.E.
Jon Murray, P.E.
Tom Dohack

Reference
Mr. Darrell Phillips
1901 Jones Road
Paragould, AR 72451
(870) 239-7722

GONZALEZ COMPANIES, LLC

11-211-23

INTEGRATED ENGINEERING

PROJECT RELATED EXPERIENCE

CENTER COURT I & 2

Lexington, Kentucky

TYPE OF IMPROVEMENT:
Redevelopment of Downtown Lexington and Infrastructure

CLIENT/REFERENCE CONTACT:
South Hill Group
Robert Trujillo (859)-361-0662

KEY PERSONNEL ON PROJECT:
Harsha Wijesiri, PE

Located in close proximity to the University of Kentucky's North Campus, this unique project has been the cornerstone of area redevelopment. The majority of the land was covered by old buildings and infrastructure that had deteriorated. With the Developer's vision to revitalize the area, several buildings, along with a parking garage were planned. The entire site design for this mixed used development of commercial and residential condominiums was managed and designed by Integrated Engineering. Harsha Wijesiri was the project manager of the Civil Engineering Plans for Phase I while with another engineering design consultant. Once with Integrated Engineering, Harsha was responsible for the site design of Phase II of Center Court Project. A parking garage was proposed in the center of the site. All the utilities had to be re-routed along Cedar Street, South Upper Street, and Bolivar Street. The redesign and rerouting of storm sewer, sanitary sewer, fiber optic cables, telephone line, and electricity were all part of the project scope. In order to reroute the proposed infrastructure, the existing utilities had to be mapped carefully. Neither the municipalities nor the utility companies had a clear knowledge of the existing utilities surrounding the site. In order to reroute the infrastructure along the existing roads, maintenance of traffic plans were developed to minimize the impact for vehicles as well as the pedestrians. During construction, Harsha Wijesiri performed inspections on the utility construction, as well as addressed all the unforeseen issues along with the developer, LFUCG, and the contractor. He was also responsible for grading plan, BMP & SWPPP plan, establishing FFE, quantifying unsuitable materials, storm sewer design, sanitary sewer design, detention design, maintenance of traffic, signalization of intersection, ADA requirements, pedestrian access, small retaining wall design, and pavement design. Integrated Engineering has finished the design of Phase II of Center Court. Phase II construction was completed in Spring of 2009.

BLUE GRASS AIRPORT WEST SIDE T-HANGAR EXPANSION PROJECT

Lexington, Kentucky

TYPE OF IMPROVEMENT:
New T-Hangar

CLIENT/REFERENCE CONTACT:
Blue Grass Airport
Mark Day (859) 425-3152

KEY PERSONNEL ON PROJECT:
Eddie Mesta, PE
Steve Garland, PE, LEED AP

Integrated Engineering is currently assisting Blue Grass Airport as a sub-consultant to J.R. Miller & Associates in the surveying, site design, and development of their West Side T-Hangar project to serve the newly constructed runway 9-27. The project includes the site planning and design that conforms to current FAA circulars and design standards. Construction has just started on this project and should be completed by the end of 2014.

INTEGRATED ENGINEERING

PROJECT RELATED EXPERIENCE

OAK GROVE VILLAGE

Oak Grove, Kentucky

TYPE OF IMPROVEMENT:
New Mixed Use Development

CLIENT/REFERENCE CONTACT:
Oak Grove Village, LLC
Lucia Albers (925)-779-0397

KEY PERSONNEL ON PROJECT:
Eddie Mesta, PE
Bill Lester, EIT

The staff of Integrated Engineering is currently managing the site design of a 110+ Acre mixed use development in Oak Grove, Kentucky. Responsibilities include the overall site , grading, drainage, and utility design as well as coordination with the Kentucky Transportation for the modifications of Highway 41A (Fort Campbell Boulevard) that is associated with this mixed use development.

BLUEGRASS ASPENDALE HOUSING PROJECT

Lexington, Kentucky

TYPE OF IMPROVEMENT:
Re-Development

CLIENT/REFERENCE CONTACT:
Lexington Housing Authority
Austin Sims (859) 281-5060

KEY PERSONNEL ON PROJECT:
Harsha Wijesiri, PE
Steve Garland, PE, LEED AP

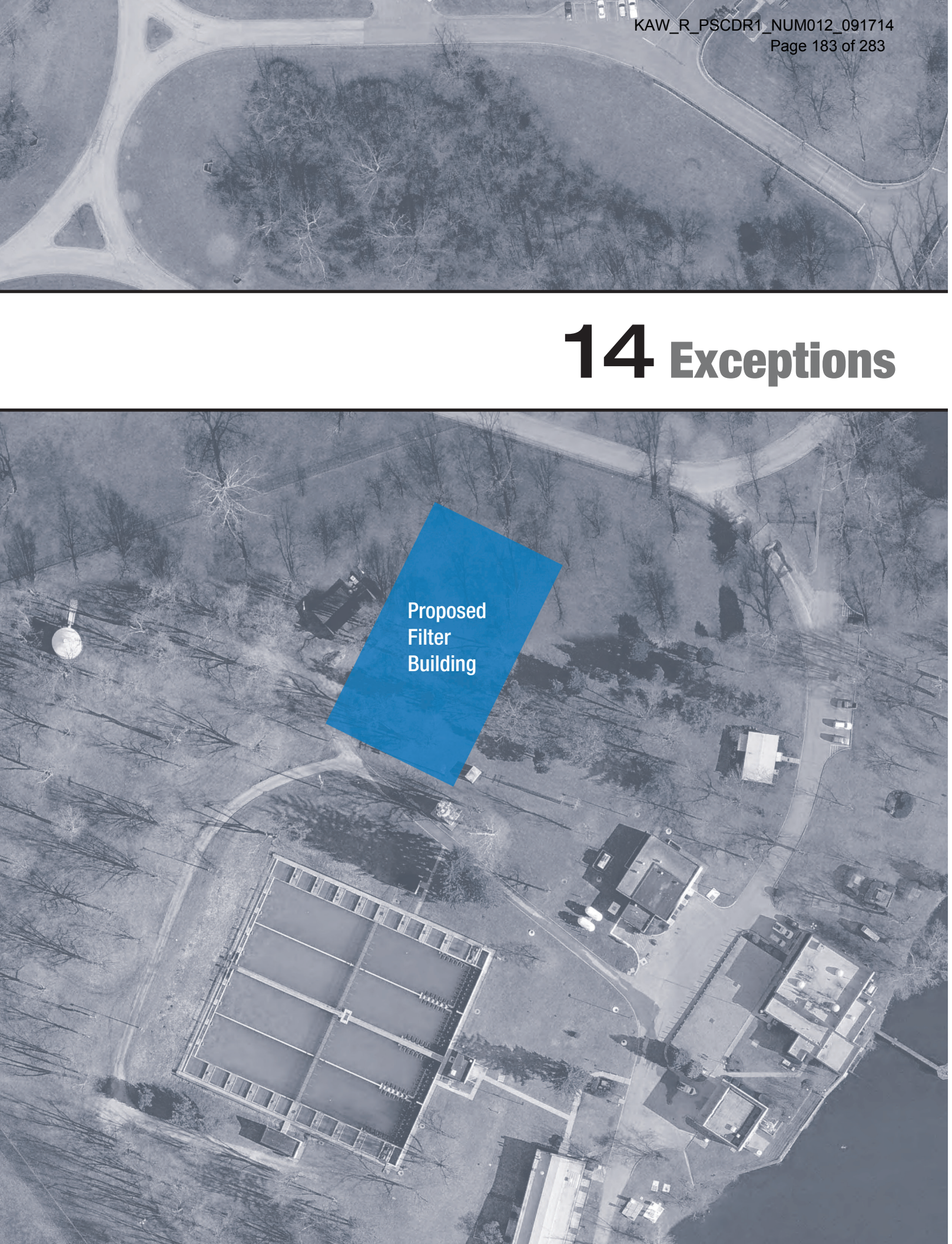
The staff of Integrated Engineering provided the site design for this award winning redevelopment project in Lexington, Kentucky. The scope of this project included the site design of the re-development of 90 acres of infill and redevelopment for the Lexington Housing Authority. Responsibilities involved design calculations for storm water quantity and quality, sanitary sewer collection design calculations and plan design, utility coordination, grading plans; roadway alignments, and coordination with local and state government bodies during design and construction. **Green Initiatives included the largest installation of permeable pavers in the state of Kentucky.** The design approach to save over 100 existing trees averaging 36" in trunk diameter was implemented. A new gateway entrance boulevard including all related sidewalk and community connectivity was also designed as part of this project

13 Concurrence with Terms

SECTION 13: CONCURRENCE WITH TERMS

Hazen and Sawyer is prepared to sign a Task Order for the approved scope of work under the terms of the existing Master Services Agreement should our proposal be accepted by the Water Company.

14 Exceptions



SECTION 14: EXCEPTIONS

Based on our review of the Request for Proposal, we take the following exceptions to the scope outlined in the RFP:

- We exclude costs associated with unforeseen foundations or structures.
- We exclude costs associated with unforeseen soil conditions or contaminated soils.
- The cost does not include any additional permitting beyond what is described in Section I. Scope of Services, A. Design, 8. Permits in the RFP. All existing permits are assumed to be in good standing with the permitting authorities.
- Cost does include power system analysis, short-circuit, protective coordination, and arc flash hazard analysis for the new construction only.
- The additional design fee includes rerouting of post-chemical feed lines to the new chlorine contact basin but no other chemical feed system modifications.
- The additional design fee for the Alternative Design assumes a partially-buried chlorine contact basin, which will require approval by the Kentucky Department of Water (KDOW). This design must be approved by KDOW because it does not meet the recommendations in Ten States Standards for at least 50% of the water stored at full capacity to be above grade.
- We assume the new filter building and proposed chlorine contact basin will not require a deep foundation system.
- We assume 40 hours of effort related to preparing for and presenting cost information to the Public Service Commission.
- We have assumed a total fee for the Phase I archaeological survey of $7,000.

HAZEN AND SAWYER
Environmental Engineers & Scientists

KENTUCKY
AMERICAN WATER

proposal

Professional Engineering Design Services for

NEW FILTER BUILDING DESIGN

RICHMOND ROAD STATION WATER TREATMENT PLANT

Kentucky American Water

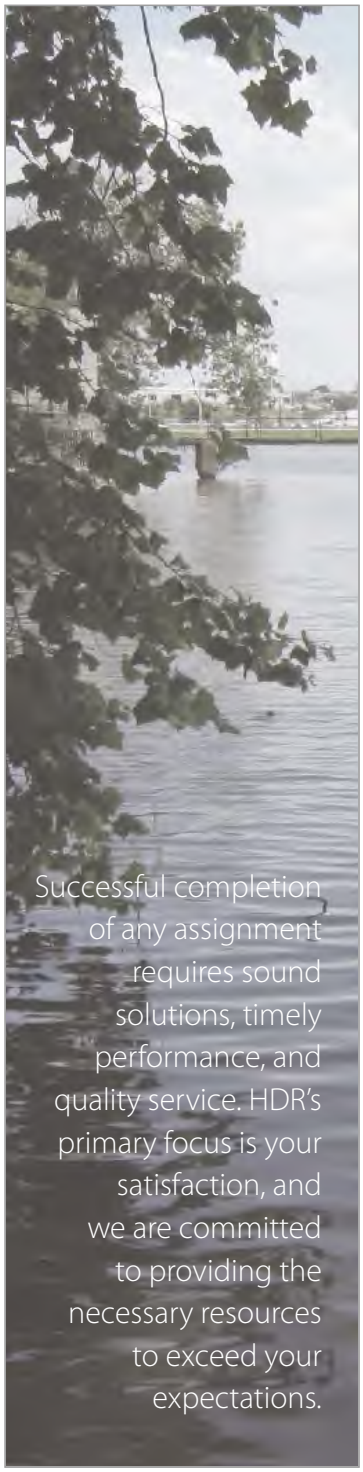
HDR

December 2013

HDR

RICHMOND ROAD STATION WATER TREATMENT PLANT

New Filter Building Design



December 19, 2013

ATTN: Mr. Zach Dukes, P.E.
Project Manager | Kentucky American Water
2300 Richmond Road
Lexington, KY 40502

RE: Proposal for Professional Services for Kentucky American Water (KAW)
RICHMOND ROAD STATION (RRS) WATER TREATMENT PLANT
NEW FILTER BUILDING DESIGN

Dear Mr. Dukes:

HDR Engineering is very pleased to submit this Proposal to KAW for professional services associated with the referenced project. HDR offers the following positive attributes:

- QUALIFICATIONS – HDR has excellent experience, locally and nationally, on filtration optimization, filter construction, and rehabilitation. Locally, we have completed over 20 filter-related projects in the last five years. HDR's recent experience with biofiltration projects is also especially noteworthy.
- PROJECT BACKGROUND – HDR successfully completed the recent study for the rehabilitation or replacement of the RRS Filter Building. Our proposed project team contains many individuals that were involved in the study, which will enable our team to "hit the ground running."
- BLEND OF DEDCIATED LOCAL RESOURCES/NATIONAL EXPERTISE – HDR has a highly qualified local team with an understanding of the Kentucky marketplace. Our relationships with regional contractors and past performance on cost estimating will benefit KAW during this project. We have also included HDR national practice leaders to provide specific, topical expertise as the need arises. This may be especially useful during discussions with KDOW concerning biofiltration and best practices related to alternative project delivery methods.
- KNOWN PROJECT LEADERSHIP – The HDR team has a successful track record on projects of a similar nature. Brent Tippey and Matt Kusnir are well-known and have completed several projects for KAW.
- CONSTRUCTION MANAGEMENT EXPERIENCE – Based on our review of the project goals, we feel this is an excellent application of the Construction Manager At-Risk (CMAR) approach and are very comfortable with working cooperatively with a contractor to put the best design and pricing together for KAW. It is noteworthy that several members of our project team have recently completed a CMAR project for the Columbus Zoo.
- MEETING YOUR SCHEDULE – We are committed to working with the Construction Manager to deliver the Guaranteed Maximum Price to KAW in May 2014 along with project documentation for the Public Service Commission filing. Our performance on KAW's Pool 3 water main design solidifies our track record of meeting KAW's critical scheduling.

We greatly appreciate the opportunity to submit this Proposal and look forward to the possibility of working on this project with you. Thank you for your consideration.

Sincerely,

Brent A. Tippey, P.E.
Vice President

RICHMOND ROAD STATION WATER TREATMENT PLANT

New Filter Building Design

TABLE of CONTENTS

RICHMOND ROAD STATION WTP NEW FILTER BUILDING DESIGN

Section 1 | FIRM QUALIFICATIONS & EXPERIENCE

Unique Advantages of the HDR Team:

- ☑ **Unparalleled experience on projects of this nature in Central Kentucky** assures KAW they are selecting a team whose day-to-day activities are focused on improving water plant operations
- ☑ **Knowledge from previous experience at KAW facilities** will allow HDR to avoid project learning curve
- ☑ **Balanced team of national experts and local resources** to provide out-of-the-box thinking and technical proficiency
- ☑ **Successful construction management at risk delivery experience** of design team members will increase probability of project success
- ☑ **HDR has demonstrated to KAW that we stand behind our work** and will see projects through to successful completion
- ☑ **The team you trust**, including Brent Tippey, Larry Anderson, Matt Kusnir, and Eddie Alexander. Our team has successfully completed more than 10 projects in the last 10 years for KAW

HDR BUSINESS INDICATORS

- Ranked **No. 11** among Engineering News-Record's 2013 "**Top 500 Design Firms**"
- Ranked **No. 6** among Engineering News-Record's 2013 "**Top 20 Water Firms**"
- Ranked **No. 35** among Engineering News-Record's 2013 "**Top 100 Green Design Firms**"

HDR

Total infrastructure solutions to manage your complex projects...

HDR

HDR ENGINEERING, INC.

Firm Name:	**HDR ENGINEERING, INC. (HDR)**
Address:	2517 Sir Barton Way | Lexington, Kentucky 40509
Phone No. | Fax No.:	(859) 629-4800 | (859) 629-4801
Contact | Title | Email:	Brent A. Tippey, P.E. | Vice President | brent.tippey@hdrinc.com

OVERVIEW

HDR is an engineering, planning, and consulting firm that excels at helping clients manage complex projects and makeing sound decisions. HDR's operating philosophy is to be an **expertise-driven firm that delivers tailored solutions through a strong local presence**. Our ability to draw upon company-wide resources and expertise is a great strength in meeting and exceeding your expectations.

Headquartered in Omaha, Nebraska, HDR was founded in 1917, and maintains regional offices in Lexington and Louisville, Kentucky; Cincinnati and Columbus, Ohio; and, Chattanooga, Tennessee. HDR is a service oriented firm with a strong commitment to local communities. We emphasize communication and responsiveness on all of our projects, and work in partnership with our clients to design infrastructure that meets the community's needs.

This year, HDR celebrates its 96th anniversary of providing engineering and architectural services to its clients. We have grown from a small municipal engineering firm to a No. 11 ranking in 2013 by "Engineering News Record (ENR)" as one of the Top 500 Design Firms. More importantly, HDR was ranked No. 6 in Top 20 Water Firms by ENR in 2013. Our steady growth is attributed to being an employee-owned company where each coworker benefits from providing great client service.

*[**HDR STANDS BY OUR WORK – THE SATISFACTION OF OUR CLIENTS DEFINES OUR SUCCESS**. Our past performance has been outstanding based on quality indicators such as client testimonials and our history of compliance with delivery schedule, cost control, and quality of work – as evidenced by our 85 percent repeat customer base.]*

HDR Local Services Overview

Water/Wastewater
- Condition Assessment
- Advanced Water Treatment
- Biofiltration/Ozone
- Organics Reduction
- Disinfection Studies
- Water Distribution/Storage
- Pump Stations
- Rate Studies

Funding/Finance
- Source Identification
- Application Preparation/Administration
- Financial Reviews
- Sustainable Return on Investment (SROI)

Stormwater
- Master Plans/Utility Formation
- Conveyance Systems
- NPDES Permits
- Mapping/Ordinances
- Retention/Detention Basins

Electrical/Instrumentation
- SCADA Systems
- Fiber Optics/Data Networks
- Instrumentation & Controls
- Security/Access Control Systems
- Communication Systems
- Power Distribution/Lighting

GIS
- Data Collection/Creation/Conversion
- Spatial Analysis
- Development/Integration
- Cartography/GPS

Sustainability
- Green Infrastructure
- Renewable Opportunities
- Energy Audits
- LEED Certifications

Impoundments/Reservoirs
- Watershed Planning/Dam Assessment
- Reservoir Monitoring/Yield Studies
- Stream Restoration

Today, HDR employs approximately 8,600 professional and support staff in 210 offices worldwide, including approximately 150 professionals and support staff in our Kentucky, Ohio, and Tennessee offices. Our regional offices provide our clients a full range of services including wastewater, water, and transportation planning, design, and construction services.

While HDR's services have evolved to meet increasingly complex challenges ranging from nanotechnology to infrastructure security, one thing that hasn't changed is our commitment to the values upon which HDR was founded. These values include respect, integrity, empowerment, innovation, teamwork, and responsibility. HDR's mission is to be an excellent professional firm known for vision, value and service to our clients, our communities, and employees.

HISTORY & SIZE
- Founded in 1917
- More than 8,600 employee-owners
- More than 200 locations worldwide
- Full-service, multidisciplinary staff

SERVICE AREAS
HDR provides total infrastructure solutions that help clients manage complex projects in the following areas:

- Water/Wastewater
- Power & Energy
- Transportation
- Sustainable Design
- Civic
- Design-Build
- Community Planning & Urban Design
- Program Management
- Construction Services
- Project Development
- Management & Planning
- Economics & Finance
- Science & Technology
- Security
- Environmental
- Architecture
- Interior Design

SUBCONSULTANTS

FREELAND HARRIS CONSULTING ENGINEERS
Freeland Harris Consulting Engineers of Kentucky, Inc. (FHCE), a Kentucky corporation, founded in 1996, with a unique background in the area of structural condition assessment, will serve as a local subcontractor on the "Richmond Road Station (RRS) New Filter Building Project." The firm is among the industry leaders in providing comprehensive and service-oriented structural consulting services. Their hands-on approach and commitment to our customers have earned us a solid reputation among our clients and the industry.

THE ROBERTS GROUP
Founded in 1989, The Roberts Group, PSC, or TRG, is based in Lexington, Kentucky. From the beginning, our firm was established to handle all phases of a given project. Comprised of architects, civil engineers, mechanical engineers, electrical engineers, and landscape architects, TRG is able to offer a full-service, comprehensive approach to their projects.

The firm is comprised of seasoned professionals with vast experience committed to providing high quality service which meets the aesthetic, functional, and economic goals of their clients.

QUALITY ASSURANCE/QUALITY CONTROL

Unlike most other engineering consultants, HDR has a robust Quality Assurance/Quality Control Process that pervades every aspect of our culture and is tailored specifically to each of our projects. HDR further underscores the critical importance of dynamic and well-executed QA/QC plans to its employees by conducting internal QA/QC audits of each department's individual project QA/QC plans each year. **HDR's Kentucky/Tennessee department is pleased to note that its staff has received the highest QA/QC audit score of offices in HDR's East Region for the past several years**.

For a project to be considered a success, work must be completed on schedule, within budget, and error free. HDR uses a combination of company-developed tools and procedures for ensuring quality and consistency in our work, managing internal tasks, maintaining communication, and staying ahead of schedule and under budget.

Quality is a result of the work process. Therefore, total quality management involves first listening to your needs, then developing a work plan that will achieve your objectives. While final checking is an important part of a quality management program, quality must be built into the process of preparing the design, plans, and specifications and must include:

- Reviewing and approving the work plan developed by the project manager.
- Reviewing the project deliverables at 5-, 30-, 60-, and 90-percent completion to assure that practical, cost-effective approaches have been utilized.
- Adjusting the work plan as the project progresses to ensure compliance with your objectives.
- Supporting the project manager's resource needs to maintain a quality service.

Our close management and stringent quality control results in the production of more complete, technically accurate construction documents. Being presented with high quality construction documents, the contractor knows exactly what is involved in the job and can prepare bids with a lower contingency factor, resulting in lower bids and minimal change orders.

LOCAL PRESENCE & PROJECT EXPERIENCE

HDR's operating philosophy is to be an expertise-driven firm that delivers tailored solutions through a strong local presence. HDR has over 75 qualified professionals to work on the "RRS WTP New Filter Building Design" within Fayette County. It is expected that the work will be performed in HDR's Lexington office.

HDR's Kentucky Water Group has completed more local treatment and condition assessment projects than any other firm in the region. A few of the large-scale (10+ MGD) projects of this nature completed in recent years include:

- Danville, KY | Water Treatment Plant (WTP) Renovation
- Northern KY Water District (NKWD) | Advanced Treatment Projects at Fort Thomas Treatment Plant (FTTP) and Memorial Parkway Treatment Plant (MPTP)
- NKWD | Pretreatment Facility at FTTP
- NKWD | Chemical Feed Building at MPTP
- Ashland, KY | WTP Renovation
- Fort Meade, MD (American Water Military Services Group) | WTP Improvements

Additionally, HDR was pleased to successfully complete the recent "Richmond Road Station Filter Building Study" which serves as the basis for the proposed design and construction project.

01 | HIGH SERVICE TRANSMISSION MAINS

Kentucky American Water

Client Contact

- Linda Bridwell, P.E.
  Manager - Water Supply
  859-268-6373

Cost:

- $52,221,400

Since 1988, Kentucky-American Water has been working towards improving water supply reliability for Central Kentucky. This 20-year effort culminated in 2007 with the design of treatment and transmission facilities to provide an additional 25 MGD of potable water to the region. The new treatment plant was located in southern Owen County in order to utilize Pool 3 of the Kentucky River as the source. In order to transport the finished water to the Lexington area, over 30 miles of 42-inch diameter needed to be installed through historically, culturally and environmentally sensitive areas. HDR provided professional engineering services to KAW in planning, design, bidding, construction administration along with easement development and acquisition. This was a high visibility project with several unique aspects including the following:

- Pipe Materials – As part of the project design and bidding phases, KAW made provisions for bidding ductile iron, steel and concrete piping. The considerations for each of these, along with the impact of a corrosion control analysis will be discussed. Additional considerations include the use of restrained joint pipe compared to thrust blocking.
- Pipe Bedding Provisions– The project will be constructed along private easements, within the state highway right-of-way and under existing state highways. The pipe bedding design for each of these conditions was substantially different based on each of these conditions will be discussed.
- Surge Modeling – The transmission line will be subject to transient hydraulic surges during operation. A model of the line was produced to approximate the impact of surge in order to identify and site appropriate countermeasures along the transmission main.
- Special Construction Areas – The project crossed several areas which presented the engineers and contractors with unusual challenges. This included vertical face rock bluffs, flood-prone river bottoms and Interstate 75. A geologic fault line was also present in the project areas and countermeasures had to be made for possible seismic activity. The project also included innovative construction measures, such as micro-tunneling, to install the transmission line.
- Environmental/Cultural Considerations – The 30 mile transmission main cut thru several sensitive areas. The route of this transmission line went through three counties and three different highway districts, along with traversing over eight miles of horse farms and multiple historic and environmental sites. Temporary horse fencing was a particularly interesting feature of this project. Extensive surface and stream bank restoration activities were also included in this project.

The transmission portion of the overall project was bid in December 2007 with 11 bidders providing responses. The low bid on the transmission main was a slightly over $48,200,000. Construction, pressure testing and initial disinfection was completed on the project in 2010.

HDR

02 | FORT MEADE DESIGN-BUILD WATER TREATMENT PLANT IMPROVEMENTS

American Water Military Services Group, Fort Meade, MD

Client Contact

- Dan Tobocman
  American Water Military Services Group
  443-591-7083

Schedule:

- 2008 - Present

Cost:

- $12,500,000 (Water)
- $56,541,000 (Total)

Fort George G. Meade (FGGM) is a permanent US Army installation located 24 miles northeast of Washington, D.C. The installation encompasses approximately 5,415 acres and is served by both water treatment/distribution and wastewater collection/treatment facilities. HDR prepared studies and design related to the capital improvements of Water Treatment, Utility Services and Wastewater Treatment Plant and Collection Systems on FGGM as outlined below. HDR prepared design and construction documents including plans, specifications, cost estimates, design analyses, and construction services. The proposed $50M capital improvements will be constructed over a three-year period and consist of the following:

HDR assisted on the completion of 22 water system related projects as part of the privatization of utility operations under this contract. Significant projects completed include:

- Conversion of FGGM Water Treatment Plant (WTP) to sodium hypochlorite disinfection and construction of a new storage and feed facility for the disinfectant
- Rehabilitation of filtration equipment at FGGM WTP
- Development of a Water System Evaluation Report to assess the system condition and offer recommendations for improvements
- Development of study of Alternative Water Sources to determine the best long term source for the FGGM campus
- Rehabilitation of multiple pumping stations and related facilities with upgraded equipment
- Piping modifications at the WTP to interconnect two different treatment processes in order to produce redundancy for the entire process
- Rehabilitation or replacement of over 12 miles of waterline associated with FGGM and National Security Administration facilities
- Remediation and rehabilitation of facilities containing mold and asbestos as well as designing preventative measures for waterproofing of historic structures

HDR

03 | FORT THOMAS & MEMORIAL PARKWAY TREATMENT PLANTS

Northern Kentucky Water District (NKWD)

Client Contact

- Ron Lovan, P.E.
  President
  859-816-7458

Cost:

- $24,000,000 (FTTP)
- $14,000,000 (MPTP)

In an effort to meet requirements of Stage 2 of the D/DBP Rule and to provide an additional pathogen barrier for Cryptosporidium and Giardia, Northern Kentucky Water District implemented advanced treatment at its two largest treatment plants (Fort Thomas and Memorial Parkway). To accomplish this, NKWD identified that granular activated carbon (GAC) contactors and ultraviolet (UV) disinfection needed to be installed at both facilities. The design team's responsibility was to take this concept and design the necessary systems and support facilities. Specific elements that were designed as part of these projects include:

FORT THOMAS TREATMENT PLANT (FTTP) | 44 MGD

- Concrete/masonry Advanced Treatment building (22,000 SF footprint)
- Eight Granular Activated Carbon contactors with 12 feet of media depth
- Three medium pressure high output ultraviolet disinfection reactors
- Pump station with three GAC feed pumps, two backwash pumps and two slurry water supply pumps
- Concrete equalization tank beneath the building with submersible pumps
- Rotary positive displacement blower for contactor air scour
- Flow split assembly/control valves
- Controls, security systems, chemical feed, plumbing, heating, air conditioning and ventilating.
- Roofing system that included a pitched vegetated (Green) system with pavers
- Standby electrical power system

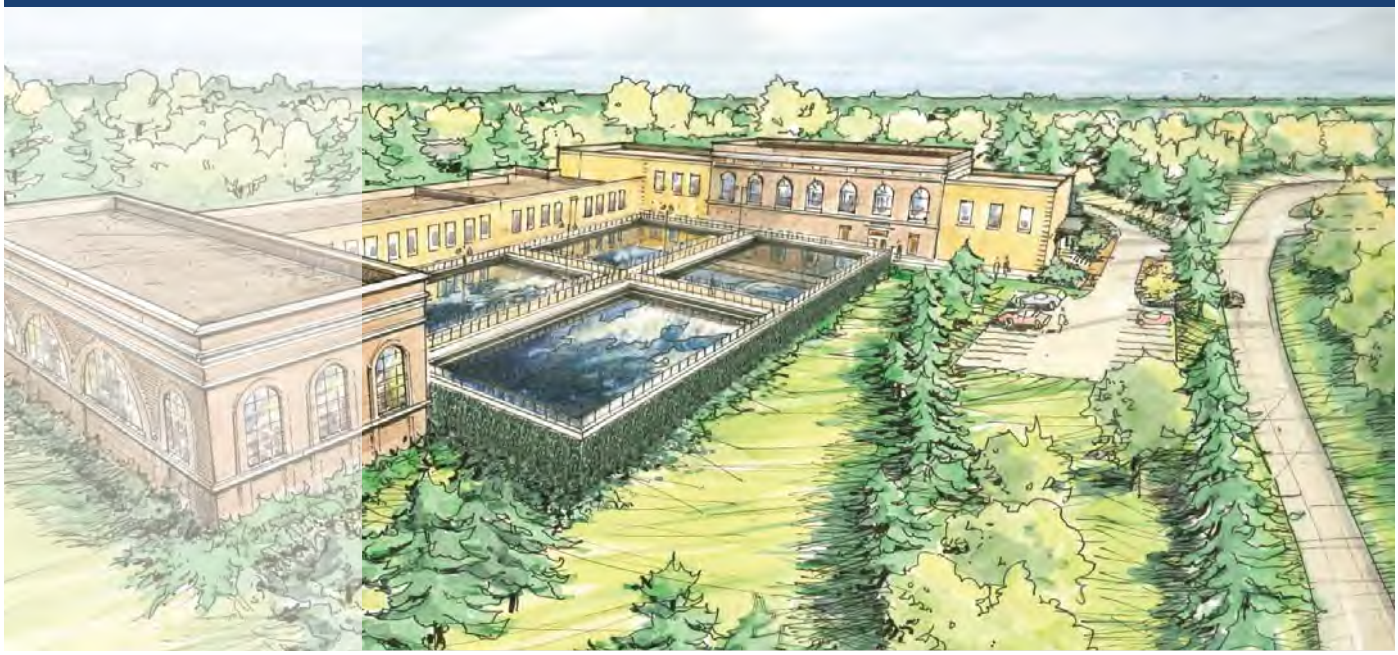
MEMORIAL PARKWAY TREATMENT PLANT (MPTP) | 15 MGD

- Concrete/masonry Advanced Treatment building (14,000 SF footprint)
- Six Granular Activated Carbon contactors with 10 feet of media depth each
- Two medium pressure high output ultraviolet disinfection reactors
- Pump station with four GAC feed pumps and two slurry water supply pumps (all vertical turbines)
- Replacement of two horizontal split case backwash pumps in existing building
- Controls, security systems, chemical feed, plumbing, heating, air conditioning and ventilating.
- Extensive demolition of structures to create space for new facility construction on limited site
- Standby electrical power system in converted old Chemical Building area

HDR

04 | DANVILE WATER TREATMENT PLANT EXPANSION

City of Danville, Kentucky



Client Contact

- Earl Coffey, P.E.
  City Engineer
  859-238-1200

Services Provided:

- ROW/Easements
- Design
- Construction
- Public Meetings
- Regulatory

Danville is currently rehabilitating and expanding their water treatment plant (WTP) to meet regulatory and capacity challenges. The new WTP project will include the installation of plate settlers, granular media filtration, GAC contactors, miox disinfections, on-site clearwell storage, new pumping facilities, and related site work. The re-purposing of a historic filter building into lab/administration space is also included. The estimated construction cost is $19.2 million.

RELIABILITY OF OPERATIONS

The City of Danville's existing WTP, the Coldiron-Watkins Memorial WTP, was constructed in 1924 with subsequent expansions or renovations in 1952, 1957, 1966, 1983, and 1990. No major improvements have been made since 1990, and the WTP's condition is beginning to deteriorate. The WTP has a capacity of 10 million gallons per day (MGD). The average daily treated water in 2010 was approximately 5.6 MGD, with a maximum day of 7.2 MGD (72% of rated capacity).

The City's raw water source is Herrington Lake, a plentiful water source that presents water quality challenges. The City's raw water pump station conveys water from the Lake to the WTP via 18-inch and 24-inch transmission mains.

GROWTH OF WATER SUPPLY NEEDS / REGIONAL IMPACT

The City of Danville is a regional supplier of potable water to over 70,000 people in Central Kentucky. The City's distribution system serves all or parts of the communities of Perryville, Junction City, and Hedgeville. In addition, Danville is a wholesale supplier to six utilities in a three-county area. The cumulative demand of Danville and these systems exceeds 7.0 MGD. Expansion of the WTP will increase the City's economic viability as a regional supplier. WTP expansion will also assist regional planners and the industrial authority in attracting industry and jobs to the Danville/Boyle County region.

REGULATORY REQUIREMENTS

The City of Danville is faced with the need for WTP improvements to meet the EPA's new Stage 2 Disinfectants/Disinfection By-Products (D/DBP) Rule. Disinfection by-products (DBPs) are created when raw water high in organic content is disinfected. DBPs include trihalomethanes (THMs) and haloacetic acids (HAA). Distribution system sampling results indicate ongoing difficulty meeting the HAA regulatory levels. In fact, Danville has been in violation of HAA requirements in three of the last eight quarters. Without enhancements to the conventional WTP treatment process, Danville will likely remain in violation and fail to meet the Stage 2 regulations to be implemented in 2014.

HDR

05 | ASHLAND WATER TREATMENT PLANT & SYSTEM IMPROVEMENTS

Ashland, Kentucky

Client Contact

- Steve Corbitt, P.E.
  Director of Public Services
  606-327-2007

Services Provided:

- ROW/Easements
- Design
- Construction
- Public Meetings
- Regulatory

Ashland realized that their water treatment plant (WTP) needed improvements to insure the city's potable water would meet new USEPA Drinking Water Regulations. In addition, the WTP was consistently running at over 75% of its rated capacity. Based on this, HDR recommended that the WTP also be expanded from 12.0 million gallons per day (MGD) to at least 20.0 MGD. The City decided that the ultimate capacity of the plant would be 26.0 MGD. Ashland was interested in investigating new treatment technologies. Accordingly, HDR arranged for a demonstration pilot study for a high-rate ballasted flocculation clarifier (Kruger-Actiflo) at the WTP. The study allowed Ashland to compare their conventional technology side by side with the pilot unit. As a result, Ashland selected the ActiFlo process for use in the WTP.

Ashland aggressively pursued financing for this project. The area is economically depressed and the residents couldn't afford a significant rate increase. HDR assisted the City in obtaining funding from the Kentucky Infrastructure Authority and Economic Development Administration, as well as preparing for a bond issue to provide the remainder of the necessary funds. The improvements to the WTP, as part of this project, included the following:

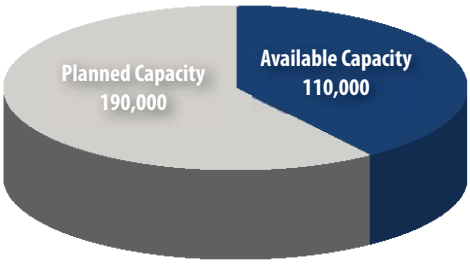
- Replacement of existing raw water pumps and intake modifications
- Installation of Zebra Mussel Control System
- Retrofitting of two existing flocculation chambers with high-rate clarification equipment (Actiflo)
- Construction of four additional filters (10 MGD capacity)
- Replacement of existing filter media, underdrain, and surface wash system (16 MGD)
- Replacement of existing chemical feed systems for PAC, Actiflo polymer, liquid alum, pH adjustment, fluoride
- Replacement of gaseous chlorine with sodium hypochlorite (on-site generation)
- Extensive yard piping renovation
- Installation of new filter control valves and SCADA system
- Installation of training room facilities
- Construction of belt filter press facility
- Creation of handicap accessibility

The bid price for Phase I improvements which included a 3.0 million prestressed concrete clearwell and the 36-inch diameter transmission main was $2.1 million. The project was completed in December 2001. The Phase II project which includes the remainder of work detailed above is complete and cost approximately $13.1 million.

RICHMOND ROAD STATION WTP NEW FILTER BUILDING DESIGN

Section 2 | PROJECT TEAM & COMMUNICATION

Figure 2-1 HDR Kentucky Staff Capacity



STAFF CAPACITY

HDR has an annual Kentucky staff capacity of approximately 300,000 hours, of which approximately 190,000 hours are planned. As shown in Figure 2-1, this leaves 110,000 hours of capacity remaining for future work. Therefore, we do not anticipate any workload problems associated with completing the "RRSWTP New Filter Building Design Project." Brent Tippey, Matt Kusnir, and Larry Anderson, as well as other key personnel, are positioned to begin work immediately. Our local staff of approximately 150 can be supplemented on an as-needed, cost-effective basis with other HDR offices if required, on this project.

HDR

Highly Qualified People Assigned to Lead Tasks...

OVERVIEW

The successful completion of Kentucky American Water's (KAW) "Richmond Road Station Water Treatment Plant (RRSWTP) New Filter Building Design Project" calls for a talented and experienced team of professionals who can dedicate themselves to the project. In response, HDR has assembled a project team that offers unmatched experience conquering challenges identical to those that may be present on this project. Our experience has taught us that the three leading factors to successful projects include:

- Hiring a project team that has a proven track record completing projects that involved similar challenges to the RRSWWTP project to successfully recognize potential pitfalls, avoid surprises, and provide creative solutions that do not add unacceptable risk.
- Ensuring that the key individuals who are shown to lead the project team – the ones with the experience required to complete the work – remain involved in a significant manner throughout the design, bidding, and construction phases of the project.
- Listening to the client's goals, objectives, and equipment preferences, and incorporating regular opportunities for review and input into the project are critical to ensuring the project stays on track and meets your expectations.

PROJECT TEAM

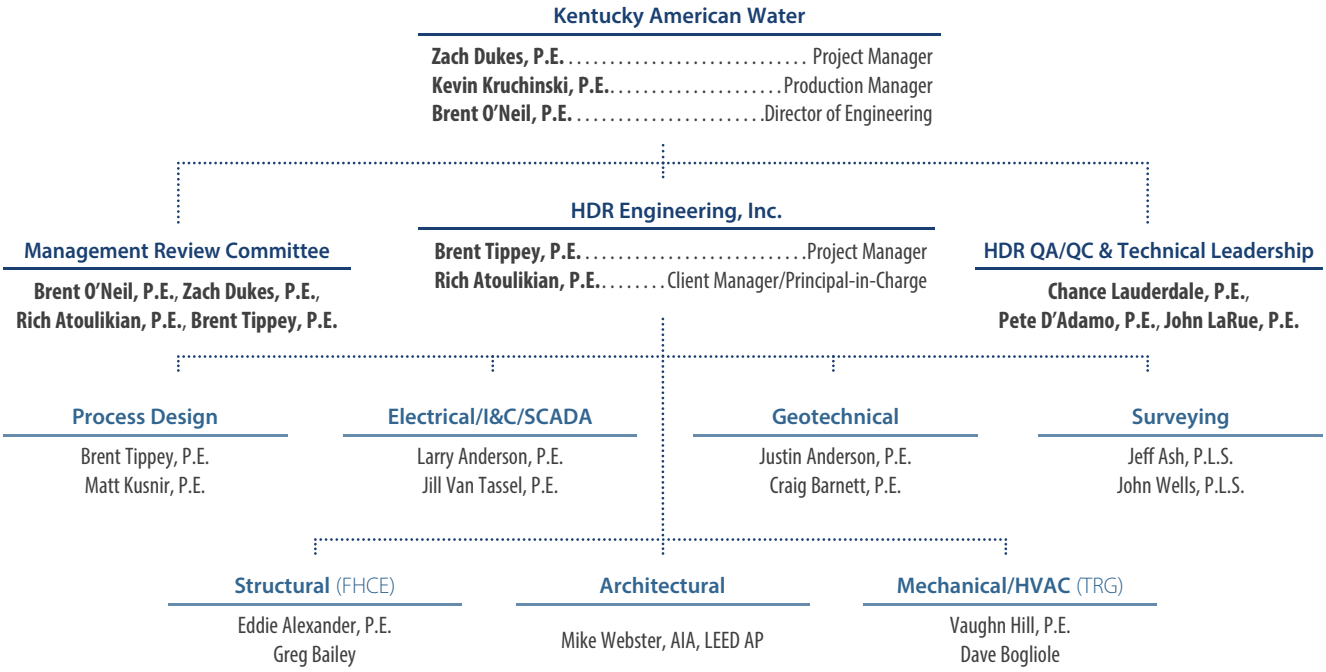
The "RRSWTP New Filter Building Design Project" will involve several different elements, including:

- Surveying.
- Geotechnical exploration.
- Initial design activities (30%).
- Construction Manager (CM) procurement asssitance.
- Integrated design activities with CM (30 - 60%).
- Assist CM with developing Construction Management At Risk (CMAR).
- Finalize design documents for filter building.
- Assist as needed with Public Service Commission (PSC) activities.
- Obtaining necessary permits.
- Services during construction, including construction administration, resident project representation, start-up, and commissioning as well as project close-out activities.

Therefore, a multi-disciplined team has been organized with the necessary expertise to address each of these areas.

The organization chart, Figure 2-2, includes key personnel, assigned project roles, and project workflow. As demonstrated in the subsequent Team Member Qualifications Summary and highlighted in greater detail on their individual resumes, HDR features a strong team of regional experts in these areas.

Figure 2-2 RRSWTP NEW FILTER BUILDING DESIGN ORGANIZATION CHART



PROJECT TEAM MEMBERS QUALIFICATIONS SUMMARY

01 | **BRENT TIPPEY, P.E.** Project Manager, Process Lead

Brent Tippey has a proven record of leadership on complex projects such as KAW's 30-mile High Service Mains to Pool 3, City of Danville WTP Renovation, and installation of advanced treatment (UV & GAC) at two WTPs for Northern Kentucky Water District. He will be involved in overall project management and administration, and will coordinate all phases of the project with KAW staff and key project personnel. He will also serve as the main point of contact with the selected Construction Manager (CM).

02 | **RICH ATOULIKIAN, P.E.** American Water Client Manager

Rich Atoulikian brings more than 36 years of experience in water facilities design including projects for Pennsylvania American Water and other regional American Water projects. Rich will serve as a Principal-in-Charge for this project and assure KAW's satisfaction with the project progress and quality.

03 | **CHANCE LAUDERDALE, P.E.** Technical Leadership, QA/QC

Chance Lauderdale serves as HDR's Water Treatment Business Class Director and has over 10 years of experience in conceptualization, validation, design, and operation of advanced water treatment technologies, including drinking water biological filtration. Chance will be available to address any technical needs that may arise during this project.

Richmond Road Station WTP New Filter Building Design
PROJECT TEAM & COMMUNICIATION

04 | **PETE D'ADAMO, PH.D., P.E.** Technical Leadership, QA/QC

Pete D'Adamo will serve in a Technical Leadership role and brings over 35 years of experience in treatment system evaluation and design. He will also assist with quality assurance and quality control.

05 | **JOHN LaRUE, P.E.** QA/QC

John LaRue will be responsible for quality assurance on the project. He will conduct internal reviews at various points in the process to ensure quality is built into the project as it progresses. John has 39 years of professional engineering experience in planning, design, construction administration, operations, training, and regulatory compliance.

06 | **MATT KUSNIR, P.E.** Process Engineer

Matt Kusnir, HDR Project Engineer, will be responsible for day-to-day design progress of this project. Matt will assist Brent in directing team activities to meet KAW's schedule and expectations.

07 | **LARRY ANDERSON, P.E.** Electrical, I&C Lead

Larry Anderson, with 38 years of professional engineering experience, will lead electrical as well as instrumentation and controls (I&C) components of the project. Larry will interface with KAW's operations and integration groups to deliver electrical and control designs that are acceptable to KAW.

08 | **JUSTIN ANDERSON, P.E.** Geotechnical Engineer

Justin Anderson will lead the geotechnical evaulation of site conditions at RRS and develop recommendations for the structural design of the proposed facilities. He has been involved in the geotechnical aspects of civil works, transportation, water and environmental projects as a geotechnical engineer, project manager, and construction observer.

09 | **JEFF ASH, P.L.S.** Surveying Lead

Jeff Ash will lead the survey activities associated with this project. He has over 36 years of experience in the practice of land survey which includes over 100 major survey projects for water and wastewater infrastructure, highways, airports, land developments, and utility projects throughout Kentucky.

10 | **EDDIE ALEXANDER** Structural Engineer

Eddie Alexander is a 20-year structural engineering subconsultant to HDR and will serve as the structural design lead for this project. During our association, Eddie has been responsible for structural designs on over 75 projects in Kentucky, Tennessee, and Ohio.

11 | **MIKE WEBSTER** Architectural Services Lead

Mike Webster is an Architectural Coordinator with several years of experience working directly with a registered architect with 42 years of experience. Mike's experience includes 3D modeling and renderings.

12 | **VAUGHN HILL** Mechanical/HVAC Engineer

Vaughn Hill is a long-time (over 20 years) subconsultant to HDR in mechanical system design. He has more than 35 years of mechanical, electrical, and plumbing engineering design experience and has completed more than 100 projects with HDR.

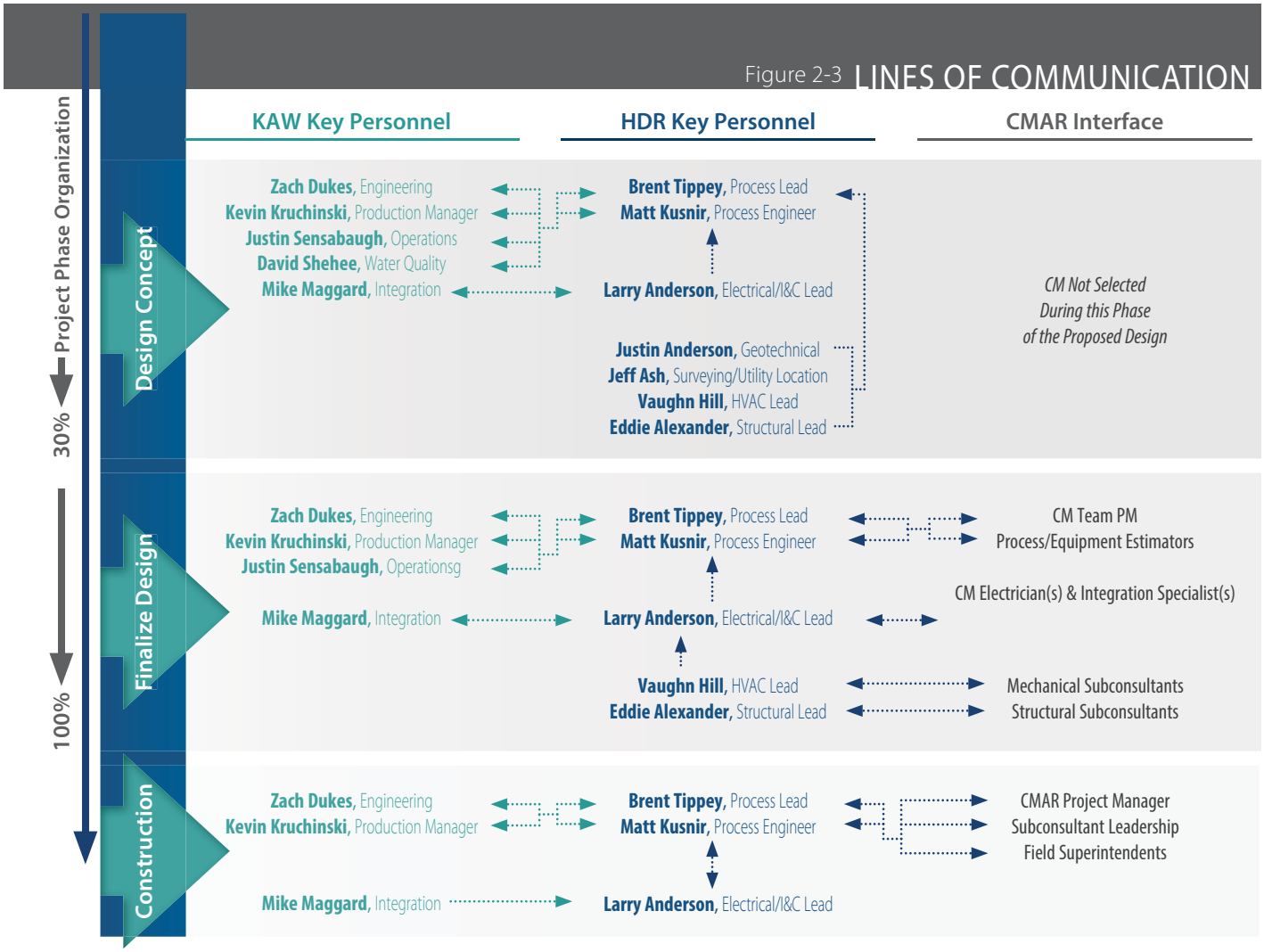
COMMUNICATION

Proactive communication between KAW and the HDR Team is essential to a successful project. Figure 2-1 recommends a Management Review Committee (MRC) as a vehicle to accomplish periodic meetings. The primary purpose of these meetings will be to obtain local input, make key decisions, review alternatives, evaluate progress, and discuss actions to be taken. Detailed minutes will be kept during these meetings and distributed as appropriate. Proactive communication with KDOW and PSC throughout the design will ensure an expeditious review of the design documents.

Further, the addition of a construction manager at the 30% design level will require a good communication plan. HDR has already developed an outline of this by assessing the lines of communication that will be needed during each project phase to assure that project workflow, by discipline, is proceeding. The schedule milestones, identified by KAW, will require continuous project activity and a top-down (command and control) communication approach could reduce team productivitiy and slow progress.

Figure 2-3 illustrates the expected lines of communication. This is not intended to be a fixed structure, but rather to encourage transfer of information and technical discussions between project peers. Discussions such as this require appropriate documentation and consultations with the project manager. This type of communication plan is an integral part of our QA/QC approach for this project and will also enhance the interaction between HDR, the selected CM, and KAW.

Figure 2-3 LINES OF COMMUNICATION



BRENT TIPPEY, P.E.

Project Manager, Process Lead

A licensed professional engineer for nearly 20 years, Brent has been focused on the areas of utility management, potable water treatment and distribution system issues. He also has significant experience in wastewater and stormwater collection projects. Since joining HDR/Quest in 1998, Brent has served as Project Manager on over 135 projects for 43 communities, public utilities or private clients in Kentucky, Ohio, Indiana, West Virginia, Tennessee and Maryland. A number of these projects have earned special merit by being either award-winning or a "first" projects including:

- 1st Actiflo High Rate Ballasted Flocculation System in KY (2nd in US) – 1998
- 1st UV Disinfection System for Potable Water in Kentucky – 2003 (Award Winning)
- 1st MIEX (Magnetic Ion Exchange) Clarifier in Kentucky/Ohio Region – 2007
- 1st GAC Contactors – Large Scale in Kentucky - 2011
- 1st Municipal Design/Build WTP in Kentucky- 2009 (Award Winning)
- 1st OEPA Funded Municipal Design Build WTP - 2007

EXPERIENCE OVERVIEW

- Project Manager for the Kentucky American Water Richmond Road Station (RRS) WTP Filter Building Evaluation Study. In Lexington, KAWC utilizes its Richmond Road Station (RRS) Water Treatment Plant (WTP) to help serve Lexington's 300,000 people on a daily basis. The WTP treats a maximum of 25 million gallons per day. At the heart of the treatment plant is the filter building, originally constructed in 1929. The study reviewed the existing condition of the filter building, including an underwater inspection of the clearwell. Mechanical, electrical, and process elements were reviewed and the overall viability of keeping the current building for continued operation was examined. In addition to rehabilitation, different approaches were studied. These approaches involved the possibility of new buildings and new technologies. A wide net was cast to view the whole treatment process and decide the best and most economical approach for KAWC. The following options were considered:
  - Rehabilitate the existing building for continued use
  - Submersible membranes installed in the existing sedimentation basins
  - Pressure membranes retro-fit into the existing filter building
  - Conventional anthracite/sand filters followed by separate GAC contactors
  - Replace in kind: New filter building with mixed media filtration, including GAC caps
  - Ozone enhanced biological filtration

  The final report outlined 15 different approaches with cost estimates for consideration. The recommended approach was a new filter building with deep GAC dual media beds to improve turbidity removal and continue biofiltration practices.
- Project Manager for Kentucky American Water, Lexington, KY on the High Service Mains project. This project consisted of 31 miles of 42-inch waterline to be constructed through diverse and historic regions of central Kentucky. Responsibilities included primary client contact, regulatory lead, design phase lead and bidding assistance for the $52 million project.

EDUCATION

Bachelor of Science, Civil Engineering,
University of Kentucky, 1992

PROFESSIONAL REGISTRATIONS

Professional Engineer
KY, OH, WV

PROFESSIONAL AFFILIATIONS

- American Water Works Association
- KY Society of Professional Engineers National Society of Professional Engineers

INDUSTRY TENURE

19 Years

- Project Manager for Kentucky American Water on the Newtown Pike Waterline Relocation project. The project consisted of approximately 12,000 LF of 24" line to serve Fasig-Tipton and increase capacity toward the Kentucky Horse Park ahead of the 2010 WEG.
- Project Manager for Kentucky American Water Jacobsen Reservoir Intake Improvements project. Project consisted of new chemical feed equipment, valving, and appurtenances along with structural and electrical upgrades.
- Project Manager for the Danville Kentucky Water Treatment Plant Improvements project. Work included the renovation and expansion of the existing water treatment plant and raw water pump station to increase capacity to 12 million gallons per day. Major work items included in this contract are as follows:
  - New rapid mix, flocculators, plate settler basins, and collection troughs.
  - Renovations and improvements to the existing filter building, including upgrading the decommissioned filter areas to administrative spaces, renovating and expanding the operations/laboratory offices.
  - Construction of a new filter building to include six (6) new mixed media filters along with a new 1.4 million gallon underground clearwell. Two existing filters will also reamin in service and be renovated.
  - Pumping upgrades including a new electrical room, pipe gallery, three (3) new high-service pumps, one (1) backwash pump, two (2) GAC pumps and two (2) slurry pumps.
  - New Chemical Storage and feed building to include new bulk storage feed tanks, transfer pumps, and metering pumps for fluoride, coagulants, polymer, pH adjustments, and disinfection.
  - Construction of a new granular activated carbon (GAC) facility to include four (4) gravity contactors with a pipe gallery, controls, and approximately 500,000 pounds of virgin carbon.
  - Renovation of the existing raw water intake to increase maximum capacity and improve operation. Work includes replacing two raw water pumps with new vertical turbine pumps with VFDs, improving access and site security, and upgrading existing electrical and HVAC services.
- Project Manager for Metro Water Services, Nashville Tennessee on the Omohundro Water Plant On-Site Hypochlorite Generation project. Work consists of the conversion of the current gaseous chlorine system (including railcar storage) into a 0.8% sodium hypochlorite generation facility at the 100 MGD water plant. Major work items included:
  - Conversion of existing railcar storage facility to new OSHG production facility
  - Conversion of existing ton cylinder room to metering pump area
  - Installation of 3- 2,400 PPD OSHG units producing 0.8 % concentration disinfectant
  - (3) 80 ton Brine saturation tanks and (4) 38,000 gallon SHC product storage tanks
  - 11 new peristaltic hose pumps to serve 9 SHC injection locations
- Project manager for the Northern Kentucky Water District, Erlanger KY on the Advanced Treatment Projects for both the Memorial Parkway Treatment Plant (15 MGD) and the Fort Thomas Treatment Plant (44 MGD). This project consisted of the installation of 14 Granular Activated Carbon contactors and 5 ultraviolet (UV) disinfection reactors installed at the two plants indicated. The project also included pump stations, extensive piping and flow control. Work is within the existing treatment plant site` and in some cases new facilities were built within the same footprint as existing facilities. In addition, the project included investigations pertaining to treatment options such as advanced oxidation. Responsibilities included primary client contact for HDR|, preliminary option evaluation, lead design engineer for MPTP, constructability review coordination, bidding assistance, construction administration and funding assistance for the $38 million project (combined cost of MPTP and FTTP).
- Project manager for the Ashland, Kentucky WTP Expansion Project. Work included a new Actiflo process, new filter construction, replacement of existing filter equipment, new chemical feed systems, new 3 million gallon prestressed ground storage tank and 6,000 linear feet of 36-inch transmission main. The expansion increased the WTP production capacity from 12.0 million gallons per day (MGD) to 20.0 MGD. Direct responsibilities included, primary client contact, process design, hydraulic analysis, specification development and funding assistance for the $13 million project.

RICH ATOULIKIAN, P.M.P., P.E.

American Water Client Manager

Mr. Atoulikian has extensive experience in the environmental engineering field, which dates back to 1977 across 24 states and Puerto Rico, all with MWH and its predecessor organization. His experience transcends the various project phases, including the planning phase, detailed design, construction management, and startup/commissioning. His experience includes traditional (design-bid-build) delivery as well as alternative delivery models such as design-build and construction management at risk. Over his career, Mr. Atoulikian has managed a number of projects, and he has a full understanding of the processes and techniques which lead to a successful project, within the triple constraint of schedule, budget and quality.

Mr. Atoulikian is an expert in the discipline of project management, having managed a number of projects of varying sizes over his career. Mr. Atoulikian's project experience encompasses water and wastewater systems, treatment plants and pumping projects, ranging in size from less than 1 MGD to 400 MGD in average day flow capacity

EDUCATION

MS, Civil Engineering,
Cleveland State University, 1980

BS, Civil Engineering,
Cleveland State University, 1977

PROFESSIONAL REGISTRATIONS

Professional Engineer:
KY, PA, OH, WV, FL, IL, IN, MI, NJ, OR, WI, DC

PROFESSIONAL ORGANIZATIONS

- Water Environment Federation
- American Water Works Association
- American Society of Civil Engineers
- American Academy of Environmental Engineers
- Project Management Institute

INDUSTRY TENURE

36 Years

EXPERIENCE OVERVIEW

- Water and Wastewater Design-Build Improvements at Fort Belvoir and Ft. Meade, Bowen Engineering and American Water Military for the US Federal Government. Client Service Manager / Principal-in-Charge. This large design-build project included water and sewer pipeline replacement on both bases, design of new water storage tanks, design of a new biological nutrient removal facility at Ft. Meade, design of a sludge dryer also at Ft. Meade, and Sewer System Evaluation Survey of the collection system at Ft. Meade. A NEPA study is being planned for both Forts.
- Water Treatment Plant, West Virginia American Water Company, Fayette County, WV. Project Manager. Design of a new 4 MGD WTP. This project consisted of a new raw water intake and pump station on the New River, which delivers flow to a new WTP consisting of Superpulsators, GAC filters, clearwells and lagoons. The project was designed such that plant capacity can readily be expanded to 6 MGD with full-scale demonstration testing, and then to 12 MGD by providing a duplicate train. Chemicals included a potassium permanganate, powdered activated carbon, primary coagulant, caustic soda, hydrofluosilicic acid, a flocculent aid, washwater waste polymer, zinc orthophosphate, and gaseous chlorine. The project consisted of completely automatic control with an RTU-based distributed control system and on-site waste septic system. A new operations building and garage were included as part of this project.
- Kentucky American Water, Design of Residual Handling and Chemical Improvements Lexington, KY. Project Director for the design of residual handling and chemical improvements at the 40 MGD Kentucky River Plant in Lexington. Initial project work consisted of sludge sampling and comparative testing on dewatering systems, evaluating residual dewatering systems for cost-effectiveness and applicability, then followed by the design of solid facilities. Design includes two new belt filter presses, polymer conditioning system, sludge well, pumps, conveyors and ancillary facilities. Project also includes design of chlorination and ammoniation for the Kentucky River Plant and nearby 25 MGD Richmond Road Plant.

- Water Treatment Plant, Cleveland, OH. Project Manager for the rehabilitation and expansion design of the Crown Water Works Improvement Project, from 50 to 115 MGD. Modifications to this existing conventional treatment plant were designed in two phases. The rehabilitation phase included new raw and finished water pumping, new electrical power distribution, new in-line mechanical mixers, a new maintenance warehouse addition, ADA related improvements, intake system inspection and rehabilitation, and miscellaneous HVAC, plumbing and electrical improvements. The plant expansion phase included increasing the rated capacity of the existing settling basins with tube settlers and significantly up-rating the unit capacity of the existing filters. The basis for increasing the capacity of the existing units was obtained from the results of a 12-month pilot and full scale demonstration studies. Flocculation basin, hydraulic and sludge handling/process and distributed control system improvements were also included in the expansion phase. Project also included upgrade of the existing sludge handling processing facilities, including chain and flight sludge collectors, gravity thickeners and recessed plate filter presses. Equipment pre-purchase contracts were prepared due to the fast-track nature of this project.
- Pennsylvania American Water Company, Groundwater Treatment Plant, Philadelphia, PA. Project Manager for the design of a new 1.3 MGD groundwater treatment plant near Philadelphia, Pennsylvania. This project consists of an air stripping tower for radon and volatile organic carbon removal, chemical addition for chlorination, corrosion control and pH adjustment and a new clearwell. Modifications to the existing three wells are also included. A new SCADA system was provided for both local and remote control and monitoring. The project also included preparation of a sedimentation and erosion control plan and permits.
- Formerly Arizona American Water Company; Paradise Valley Water, Groundwater Treatment Facility, Scottsdale, AZ. Project Manager on the design of a new water treatment facility in Scottsdale, Arizona. The facility was designed to be constructed in phases, with an ultimate capacity of 18 MGD, delivered from six 3 MGD wells. The first phase is rated at 9 MGD. Treatment process consists of air stripping for volatile organic carbon removal and disinfection using on-site generation of sodium hypochlorite from sodium chloride. Project also included well pump improvements, new distribution pumps and a distributed control system for control/monitoring. Due to the fast-track nature of this project, equipment pre-purchase was utilized for the long-lead items, such as pumps, electrical equipment and air stripping towers. Preparation of Use Permit, NPDES Permit and various County permits was also included. Design of stormwater drainage and recharge system for this facility. Basins provide containment of stormwater flows from the plant to allow these flows to percolate into and recharge the groundwater.
- Water Treatment Plant, Medina, OH. Project Manager for the design of a 4 MGD clearwell and an 8 MGD high service pump station for the City of Medina, Ohio. Clearwell was integrated into the existing water treatment facility and designed to meet the requirements of the Surface Water Treatment Act. A new high service pump was provided along with interconnection of the existing high service pumping station with the new facility. Two new backwash supply pumps are also integrated into the new clearwell. Also, included are new level, flow and chlorine residual monitoring systems as well as new controls.
- Upper Merion WTP Disinfection Alternatives Evaluation. QA/QC. The project involves the evaluation of three disinfection treatment technologies for potential implementation: UV disinfection, free chlorine with pH adjustment and modified clearwell baffling configuration, and chlorine dioxide.
- Water Treatment Plant, Augusta-Richmond Utilities Department, Augusta, GA. Management and Technical Reviewer. Review of conceptual design documents, and value engineering review for the 20 MGD Max Hicks WTP, consisting of mixing, hydraulic flocculation, clarification, filtration, and allowances for UV disinfection.
- Water Treatment Plants, Little Rock, AR. Technical Reviewer on an engineering evaluation to increase the capacity of two conventional water treatment plants for the Beaver Water District, Lowell Arkansas. Project included a regulatory audit capacity audit and facility audits, which lead to development and evaluation of alternatives and recommended improvements including provision of filter backwash handling facilities, miscellaneous process equipment repairs, and electrical and instrumentation/control upgrades.
- Water Treatment Plant, Cleveland, OH. Project Director on the study of icing problems on the 18 MGD Lake Erie West water treatment facility on the shores of Lake Erie. This study investigated both short-term and long-term solutions to the problem of ice clogging the existing intake under certain weather conditions.

CHANCE LAUDERDALE, PH.D., P.E.

Technical Leadership

Based in Denver, Mr. Chance Lauderdale serves as HDR's Water Treatment Business Class Director and has over 10 years of experience engaged in the conceptualization, validation, design, and operation of advanced water treatment technologies, including drinking water biological filtration. Chance has also focused heavily on holistic drinking water treatment process optimization as a means to improve sustainability and decrease operating costs, while meeting all treatment and operational objectives. His project experiences include project engineering and management for facility improvements at water treatment plants ranging in production size from 3 to 770 MGD.

Chance's responsibilities at HDR include leading the water treatment practice and professional discipline groups, while improving the standards and best practices that support the implementation of effective quality assurance. Chance provides subject matter expertise while consistently demonstrating an industry-recognized reputation as a leader in the water treatment field.

EDUCATION

Doctor of Philosophy, Environmental Engineering, University of Florida, 2011

Master of Engineering, Environmental Engineering, University of Florida, 2004

Bachelor of Science, Environmental Engineering, University of Florida, 2001

PROFESSIONAL REGISTRATIONS

Professional Engineer:
FL, TX

PROFESSIONAL ORGANIZATIONS

- American Water Works Association
- American Water Works Association, Biological Drinking Water Treatment Committee
- American Water Works Association, Media Support, Standards, Filtering Materials
- American Water Works Association, Standards Committee #218, Filtering Materials
- American Water Works Association, Florida Section, Biological Contaminants
- Water Environment Association
- WateReuse Association

INDUSTRY TENURE

10 Years

EXPERIENCE OVERVIEW

- Central Utah Water Conservancy District, Utah Valley Water Treatment Process Improvement, UT. Technical Advisor and Lead Process Engineer (Filtration). Responsibilities included pilot plant scope development and implementation, process evaluations, data review and process selection for full-scale design of process changes at the 80 MGD Utah Valley Water Treatment Plant to meet EPA Stage I/Stage II Disinfection By-Product Rules.
- City of Arlington, John F. Kubala Water Treatment Plant Expansion, Arlington, TX. Process Engineer. Responsibilities included owner's engineer for start up performance testing of ozone generation system and validation of plant disinfection schemes. Performed disinfection benchmarking on ozone facilities at both the John F. Kubala and Pierce Burch Water Treatment Plants.
- City of Arlington, Pierce Burch Water Treatment Plant Engineered Biofiltration Demonstration, Arlington, TX. Project Manager/Technical Lead. Responsibilities included project management and design coordination for full-scale implementation of new chemical feed facilities to improve the hydraulic and water treatment performance of a large Texas surface water facility. Study findings demonstrated improved water treatment (manganese and organics removal) and extended filter runtimes.
- City of Houston, North East Water Purification Plant Expansion Program Management, Houston, TX. Technical Lead. Assisted in pursuit proposal and interview development by identifying multiple potential conventional and advanced process schematics that may be capable of treating a challenging water source. Responsibilities include management and implementation of an ongoing bench-scale testing program and an upcoming >$1,200,000 pilot program to identify and validate an optimal treatment train for the facility.
- City of Peoria, Greenway Water Treatment Facility Biofilter Performance Evaluation. Technical Lead. Responsibilities included project development and coordination for facility biofilter performance across multiple hydraulic and water treatment objectives, including Stage I/Stage Disinfection By-Products compliance. Study included the development of a guidance manual on filter operational strategies. Project findings justified a decreased filter media change out frequency, which will ultimately save the utility >$250,000 in annual media costs.

- City of Phoenix, Engineered Biofiltration Demonstration. Technical Lead. Responsibilities included project development and coordination for full-scale implementation of new biofilter chemical feed facilities to improve the hydraulic and water treatment performance of the 120 MGD 24th Street Water Treatment Plant. Initial findings suggest improved disinfection by product control and extended filter runtimes with optimized biofilters.
- City of San Francisco, Recycled Water Feasibility Study, San Francisco, CA. Project Engineer. Performed feasibility analyses of available advanced wastewater treatment technologies and a preliminary process selection. Implemented a cost estimation model to determine capital and operational cost estimates for several membrane reclamation satellite facilities, including a microfiltration facility with ultraviolet disinfection and a membrane bioreactor treatment plant.
- City of Tallahassee, Lake Bradford Road Wastewater Treatment Facility Improvements, Tallahassee, FL. Process/Mechanical Engineer. Responsibilities included the design of wastewater processes including a 4.5 MGD Membrane Bioreactor, biological nutrient removal processes, and all associated chemical feed systems.
- Collier County, Irrigation Quality Water Program Technical Review and Assistance, Collier County, FL. Project Manager. Responsibilities included program management of the Livingston Road Aquifer Storage and Recovery Project. Responsibilities included regulatory coordination with the Florida Department of Health to assess the impacts of the 2006 Arsenic Rule on the existing Collier County Aquifer Storage and Recovery Program. Identified and evaluated potential arsenic mitigation strategies to minimize County risk with aquifer storage and recovery non compliance. Developed business case model and recommendations for a viable cost-effective strategy to resolve potential noncompliance issues with an existing nonoperational $5 million well system.
- Collier County, Northeast Water Reclamation Facility. Process/Mechanical Engineer. Responsibilities included the design of tertiary filtration, disinfection feed, and chlorine contact facilities for a 4.5 MGD water reclamation facility.
- Los Angeles Department of Water and Power, Enhanced Coagulation Study, Los Angeles, CA. Project Engineer. Responsibilities included on-site engineering for a 1 MGD pilot study evaluating microsand enhanced sedimentation at the 600-MGD Los Angeles Aqueduct Filtration Plant. Additional responsibilities included sample collection, data analysis, and reporting.
- North Texas Municipal Water District, Bonham Water Treatment Plant Enhanced Biofiltration Demonstration, TX. Project Manager/Technical Lead. Responsibilities included project management and design coordination for full-scale implementation of new chemical feed facilities to improve the hydraulic and water treatment performance of a large Texas surface water facility. Study findings demonstrated improved water treatment (manganese and organics removal) and extended filter runtimes.
- North Texas Municipal Water District, Wylie Water Treatment Bench-Scale Plant Optimization, Wylie, TX. Technical Lead. Responsibilities included the development and executive of a bench-test protocol that would effectively simulate relative performance for various full-scale performance and biofiltration operational strategies. Project findings are currently being used to develop initial operational parameters for the fullscale process changeover from conventional filters to biofiltration.
- North Texas Municipal Water District, Wylie Water Treatment Plant Filter Rehabilitation and Underdrain Replacement, Wylie, TX. Technical Lead. Responsibilities included process assessment, operational guidance, and recommended design for the filter facilities at the 770-million gallon per day (MGD) North Texas Municipal Water Treatment Plant.
- Sarasota County, Carlton Water Treatment Plant Chemical Feed Optimization Study, Sarasota County, FL. Project Engineer. Evaluated process chemical feed systems for potential optimization. Responsibilities included process evaluation and selection for new operational strategies that may improve effluent water quality while reducing cost. Processes optimization performed for chemical facilities associated with electrodialysis reversal, filtration, and disinfection.
- Tampa Bay Water Authority, Lithia Water Treatment Facility Expansion Predesign, Tampa Bay, FL. Project Engineer. Responsibilities included design of ozonation facilities and contactors for a 45-mgd groundwater hydrogen sulfide treatment plant. Worked closely with manufacturers and outside consultants to develop a novel approach for one of the largest in-line ozonation systems in the state.

PETE D'ADAMO, PH.D., P.E.

Technical Leadership, Quality Assurance

Pete D'Adamo has over 35 years experience as an environmental engineer and scientist, and has been directly responsible for the planning, evaluation, design, and construction management of numerous water and wastewater treatment and utility projects. These treatment systems have ranged in size from 0.1 to 318 mgd. Services provided include master planning and CIP development, process evaluation and selection, pilot testing, operations troubleshooting, training and system start-up, water quality investigations, hydraulic modeling, and design, bidding, and construction phase services. In addition, he has designed and provided construction management services for sanitary sewers, vacuum sewers, low pressure sewers, force mains, water transmission mains, sewage and booster pumping stations, storage facilities, and water distribution systems and appurtenances. Representative project experience is provided below.

EDUCATION

Doctor of Philosophy, Engineering, Johns Hopkins University, 2003

Master of Science, Engineering, University of Delaware, 1984

Bachelor of Science, Biology, Loyola College, 1977

PROFESSIONAL REGISTRATIONS

Professional Engineer:
DE, NC, PA, SC, VA

PROFESSIONAL ORGANIZATIONS

- American Water Works Association

INDUSTRY TENURE

36 Years

EXPERIENCE OVERVIEW

- Bowen Engineering Corporation, Bowen Engineering Corporation, Ultra Pure Water Treatment Plant, Freeport, TX. Design-Build Project Delivery with Bowen Engineers. HDR was selected for design of a high purity water treatment plant in Freeport, TX. The project includes raw water pumping, high rate clarifier, prefilters, ultrafiltration, reverse osmosis, ion exchange, degasification, with associated tank farm, pumping, and chemical off load, storage and feed. Structural and architectural improvements include blast proof control building, prefabricated metal process building and electrical room. The client needs 3,000 gpm by 3rd quarter, 2013. The plant is now under construction.
- Aqua Pennsylvania Inc., Comprehensive Water Treatment Plant Audit, Sharon, PA. Quality Control Reviewer. Audit of a 16-mgd water treatment plant. The audit included an overall assessment of the condition, physical performance, and operation of the water plant, and to provide recommendations for improvements in each of those areas. Based on the findings of the WTP audit, recommended capital improvements projects were established that would improve the overall operation and performance of the plant. A 20-year capital improvements program was developed with estimated planning costs that prioritized the projects in terms of addressing immediate needs, meeting long-term goals, and being prepared for future regulatory requirements.
- City Of Chesapeake Dept. of Public Utili, Raw Water Facilities, Northwest River Water Treatment Plant (NRWTP) Miscellaneous Modifications - Task 1, Chesapeake, VA. QA/QC Engineer. Design of miscellaneous improvements to a 12-mgd surface and groundwater treatment plant. Improvements include replacement of centrifuge dewatering facilities, a new prestressed concrete clearwell, new rapid mix and flocculator equipment, and chemical feed improvements.
- City of Greensboro, Townsend and Mitchell WTPs - Chemical Feed System Improvements - Phase I, Greensboro, NC. Project Principal. The primary elements of this project included design and construction administration of miscellaneous chemical feed improvements including replacing the existing fluoride feed system and orthophosphate system in implementing pre-lime feed at the Townsend and Mitchell Water Treatment Plants.

- City of Wilmington, Brandywine WTP Membrane Upgrade, Wilmington, DE. Project Manager. Responsible for the preliminary design and pilot testing of an 11-mgd membrane filtration upgrade to the City's 90-year-old conventional water treatment plant.
- Greenville Utilities Commission, Water Treatment Plant Facilities Master Plan, GUC, Greenville, NC. This master plan is for development of a comprehensive strategic plan which integrates water supply, treatment, and operations. Key elements of this project include: water treatment facilities process operations and operational efficiencies evaluation; asset management study and plan; future regulatory scenarios analysis; water quality improvement analysis; energy efficiency analysis; water treatment facilities expansion alternatives; long-term water supply strategies; phased CIP with clear project justifications, descriptions, and cost impacts; and comprehensive strategic plan.
- Town of Cary, Cary/Apex Water Treatment Plant Residuals Project, Cary, NC. Project Manager. Evaluation and design of residuals treatment facilities for a 64-mgd water treatment facility. Project components include residuals equalization, settling/thickening, and storage. Other project components include an evaluation of the raw water pumping station, design of improvements to the finished water pumping station, and new chemical feed facilities.
- Town of Cary, Cary/Apex WTF Phase III Expansion, Cary, NC. Design of the plant expansion from 40 mgd to 56 mgd. HDR developed and facilitated workshops in six areas: Process and Regulatory Evaluation, Raw Water Pumping and Intake Evaluation, Capacity Assurance Assessment, Long-Term Space Planning/Architectural Evaluation, Residuals Management Evaluation, and SCADA/Instrumentation and Controls Evaluation. As a result of the workshops, a Preliminary Engineering Report (PER) providing the design basis was developed. Based on the PER, HDR moved forward with the final design and permitting of the intakes, raw water pump station, rapid mix, ozone facilities, Superpulsators, filters, chemical feed facilities, and dewatering facilities.
- Town of Cary, Cary/Apex WTF Phase III Permitting, Cary, NC. Project Manager. Project included completion of two U.S. Army Corps of Engineers (USACE) initial proposed review requests for use of USACE Land / Water for a proposed reservoir destratification mixing system and for proposed raw water intake improvements planned as part of the Phase III expansion to the water treatment facility. Project also includes development of an environmental assessment for the proposed mixing system and the water treatment facility expansion.
- Town of Cary, Residuals and Biosolids Master Plan, Cary, NC. Project Manager. Responsible for completing a comprehensive master plan for treating and disposing of biosolids from three wastewater treatment plants and one water treatment plant. Work included developing mass balance projections; conducting a condition assessment of key facilities including digesters, thermal dryer, belt presses, and centrifuges; identification of contingency plans for handling and disposal; evaluation of composting of biosolids and yard waste; and conducting a residual and biosolids benchmarking and market analysis.
- Greenville Water, Alkalinity/Corrosion Control Study, Greenville, SC. Project included detailed evaluation of the effectiveness of the existing program, including evaluation of corrosion chemistry on pipe scales; identification of program enhancements; pilot scale testing of recommended improvements; and documenting the findings and recommendations for state approval.
- Groundwater Supply and Treatment, Caldwell County, NC. Project Manager. Responsible for preliminary and final engineering of a new 0.5-mgd groundwater supply. Services included water quality characterization; production well design; and design of the water treatment plant, storage facilities, and high service pumping station.
- Devine Tarbell & Associates Inc, Broad River Water Supply Study. Project Engineer. Water Supply Study included an evaluation of future (50-year) water withdrawal and returns for public water supplies, agricultural uses, industries, and power companies that lie within the drainage basins. The study also included coordination of water demand forecasting with hydrologic modeling, preparation of a GIS database, and coordination with a diverse water supply study team.
- City of Greensboro, Townsend and Mitchell WTPs - Chemical Feed System Improvements - Phase I, Greensboro, NC. Project Principal. The primary elements of this project included design and construction administration of miscellaneous chemical feed improvements including replacing the existing fluoride feed system and orthophosphate system in implementing pre-lime feed at the Townsend and Mitchell Water Treatment Plants.

JOHN LaRUE, P.E.

Quality Assurance/Quality Control

Mr. LaRue has over 39 years of engineering background, with extensive experience in design and construction of drinking water, wastewater and solid waste facilities. His technical expertise covers many areas of sanitary and environmental engineering, including planning, design, construction administration, operations, training, regulatory compliance, funding agency liaison and value engineering. Mr. LaRue has served as Project Manager and Project Engineer on numerous drinking water projects, including water supply plans, capital improvement plans, reservoir design and construction, storage tank design and construction, transmission and distribution main design and construction, distribution system hydraulic analysis, booster pump station design and construction and treatment plant design and construction. Mr. LaRue has also served as Project Manager and Project Engineer on numerous wastewater projects, including treatment plant design and construction, collector/trunk sewer and pump station design and construction, wastewater conveyance tunnel design, facility plans, and sewer system rehabilitation projects. In addition, Mr. LaRue has served as Project Manager and Project Engineer on solid waste projects, including permitting and design of three EPA Subtitle D contained landfills and design of several landfill closures. Mr. LaRue has substantial supervisory and business experience, having served for several years in the capacity of engineering group manager and Vice President of a consulting firm.

EDUCATION

Master of Science, Civil Engineering,
University of Kentucky, 1976

Bachelor of Science, Civil Engineering,
University of Kentucky, 1970

PROFESSIONAL REGISTRATIONS

Professional Engineer
KY, OH

PROFESSIONAL AFFILIATIONS

- National Society of Professional Engineers
- Kentucky Society of Professional Engineers
- Water Environment Federation
- KY-TN Water Environment Assoc.
- American Water Works Association
- Diplomate, American Academy of Environ.Eng.

INDUSTRY TENURE

39 Years

EXPERIENCE OVERVIEW

- Northern Kentucky Water District, Erlanger KY - Senior Project Engineer on the Advanced Treatment Project including both the 15 MGD Memorial Parkway Treatment Plant (MPTP) and the 44 MGD Fort Thomas Treatment Plant (FTTP). This project consisted of the installation of 14 Granular Activated Carbon (GAC) contactors and 5 ultraviolet (UV) disinfection reactors at these two plants. Work is within the existing treatment plant sites and in some cases new facilities are to be built within the same footprint as existing facilities. Responsibilities included process mechanical design of GAC contactors, UV reactors and existing filter building modifications for MPTP, process mechanical design of existing filter building modifications for FTTP, bidding assistance, construction administration assistance for the $38 million project ombined cost of MPTP and FTTP).
- Water Treatment Plant Expansion and Upgrade, Williamsburg, Kentucky – Mr. LaRue served as project design manager/engineer for the $5 million expansion of this water plant to 3 MGD capacity. The project included a new 3 MGD raw water pump station on the Cumberland River. The treatment plant expansion included new sand filters, new chemical feed facilities, new flocculation/settling basin, new chemical feed facilities and new pumping facilities.
- Danville, Kentucky, Water Treatment Plant Improvements for SDWA Compliance - Mr. LaRue served as project engineer and project manager for a preliminary engineering project to identify and scope the needed improvements to enable the existing 10 MGD water treatment plant to comply with the Stage 1 Disinfection/Disinfection Byproducts Rule. Mr. LaRue did the sizing, preliminary design, cost estimating and preparation of the Preliminary Engineering Report for this project.
- Mt. Sterling, Kentucky, Water Treatment Plant Upgrade - Mr. LaRue served as project manager and design engineer for a water treatment plant upgrade for the

Mt. Sterling, Kentucky, water system. The plant upgrade components included new mixed media for existing filters, new larger high service pumps to replace existing pumps, refurbishing existing settling and flocculation basins, and addition of a new sludge concentration basin and new belt filter press facility for sludge handling. This upgrade project had to be designed so it could be constructed while keeping the existing treatment plant in service, without affecting quality of treated water. The project included both design and construction services. This project included KIA funding.

- Mr. Larue has led Quality Assurance/Quality Control on the following recent projects:
  - KY American Water, Richmond Road Station WTP Filter Bldg Upgrade Evaluation
  - Ohio American Water Co., Blacklick WTP Improvements
  - Bowen/American Water, Ft. Meade #W22 - Water Line
  - City of Danville, WTP Expansion
  - City of Williamstown, WTP Lagoon Improvements
  - City of Shelbyville KY, WTP Filter Pilot Investigation
  - West Fleming Water District, WTP Improvements, Phase 3
  - City of Delaware OH, WWTP Local Limits Evaluation
  - City of Pickerington OH, Leisure Drive Sewage PS Improvements
  - Ohio Co. Regional Wastewater District, WWTP Local Limits Evaluation
  - City of Findlay OH, WWTP Local Limits Evaluation
  - City of Williamstown, Barnes Road Water Line
  - Bowen/American Water, Ft. Meade #WW26 - Sewer Line Replacement
  - HWEA, Lovers Lane Utility Relocation
  - SSR/Nashville Metro Water, Disinfection Improvements at Two WTPs
  - Louisville Water Company, Brooks Hill Booster Pump Station
  - City of Findlay OH, WTP Clearwell Rehab
  - Hopkinsville Water Environment Association (HWEA), Oak Grove WWTP Phosphorour Removal Evaluation
  - HWEA, Cost of Service Study
  - City of Chattanooga, TN, Tannery Flats Interceptor Rehab
  - City of Findlay, OH, WWTP Bar Screen System
  - City of Dayton, OH, Burkhardt & Germantown Reservoirs Rehab
  - Sanitation District No. 1 of Northern Kentucky (SD1), Verona WWTP Replacement Evaluation
  - City of Chattanooga, TN, Dobbs Branch Basin 3 Rehab
  - SD1, ERWWTP Local Limits Evaluation
  - Louisville Metropolitan Sewer District, Nightingale Pump Station
  - Henderson Co. Water District, Ky 416 Utility Relocation
  - Bowling Green Municipal Utilities, WWTP Local Limits Evaluation
  - SD1, WRWWTP Local Limits Evaluation
  - SD1, Sand Run Pump Station - Added Storage Options

MATT KUSNIR, P.E.

Process Engineer

Mr. Kusnir is a project engineer in the areas of potable water treatment and transmission system design and modeling; and wastewater inspection, collection and treatment systems design. Additionally, Mr. Kusnir has experience developing facilities studies for projects in these fields. Mr. Kusnir is also proficient in computer resources preparing water/wastewater models, data analysis reports, cost estimates, contract documents, and miscellaneous reports.

EDUCATION

Bachelor of Science, Civil Engineering,
University of Kentucky, 2008

PROFESSIONAL REGISTRATIONS

Professional Engineer
KY

PROFESSIONAL AFFILIATIONS

- Kentucky Society Professional Engineers
- National Society Professional Engineers
- American Water Works Association
- Water Environment Federation

INDUSTRY TENURE

4 Years

EXPERIENCE OVERVIEW

- Project Engineer for the Kentucky American Water Richmond Road Station (RRS) WTP Filter Building Evaluation Study. In Lexington, KAWC utilizes its Richmond Road Station (RRS) Water Treatment Plant (WTP) to help serve Lexington's 300,000 people on a daily basis. The WTP treats a maximum of 25 million gallons per day. The process is a conventional approach beginning with flocculation and sedimentation basins followed by filtration. At the heart of the treatment plant is the filter building, originally constructed in 1929. The study reviewed the existing condition of the filter building, including an underwater inspection of the clearwell. Mechanical, electrical, and process elements were reviewed and the overall viability of keeping the current building for continued operation was examined. In addition to rehabilitation, different approaches were studied. These approaches involved the possibility of new buildings and new technologies. A wide net was cast to view the whole treatment process and decide the best and most economical approach for KAWC. The following options were considered:
  - Rehabilitate the existing building for continued use
  - Submersible membranes installed in the existing sedimentation basins
  - Pressure membranes retro-fit into the existing filter building
  - Conventional anthracite/sand filters followed by separate GAC contactors
  - Replace in kind: New filter building with mixed media filtration, including GAC caps
  - Ozone enhanced biological filtration

  The final report outlined 15 different approaches with cost estimates for consideration.
- Project Engineer for Metro Water Services (Nashville, TN) on-site hypochlorite generators project. Work involved replacing chlorine gas feeds at both water treatment plants with an on-site hypochlorite generator. Analysis was performed on various systems and construction drawings and specifications were prepared and put out to bid.
- Project Engineer for Ft Knox Hydraulic Model. Project involved a calibrated model developed in WaterCAD for the Ft Knox campus. Calibration involved hydrant testing and pressure monitoring. Responsibilities including initial model build and assisting project manager in field calibration activities.
- Project Engineer for City of Danville Hydraulic Model Update and New Perryville Tank Design. Updated WaterCAD model with existing operational demand and controls. Utilized pressure recorders and SCADA information to calibrate model. Ran multiple scenarios to determine best available location for new storage tank and operational scenarios to help with tank turnover in existing system. Identified distribution system improvements to eliminate pump station and change distribution system paradigms.

- Project Engineer for City of Danville Popplewell Pump Station Replacement. Project included relocating an existing pump station and upsizing the capacity. Direct responsibilities included design, Division of Water approval, and coordinating details with client. Field tests were also performed to help verify existing conditions.
- Project Engineer for the Henderson County Water System Improvements project. Direct responsibilities include developing hydraulic model, specifications preparation, client contact, and preparing/responding to regulatory requirements. Total project cost $2.1 million.
- Project Engineer for the City of Williamstown Barnes Road Loop Waterline Extension. Direct responsibilities include permitting through Division of Water and specification development. Total project cost $1 million.
- Project Engineer for Northern Kentucky Water District Ft. Thomas WTP Structural Improvements. Work includes architectural, mechanical, and electrical enhancements to existing filter bays. Direct responsibilities include client contact, coordinating various trades, and compiling final memorandums and construction drawings.
- Project Engineer for the Columbus Zoo and Aquarium Stingray Touch Exhibit. Work includes the design of a life support system to continually support the habitation of forty stingrays. Direct responsibilities include design, equipment selection and layout. Other responsibilities included constant coordination with sub-contractors and zoo staff to ensure operational and maintenance expectations were met. Total project cost $1.7 million.
- Project Engineer for Regional Water Resource Agency 2012 Rate Study. Developed spreadsheet model to balance projected expenses with various revenue proposals, including minimum bill scenarios and new customer charges. Calculated BOD, TSS, and FOG industrial surcharge. Worked with client through multiple work sessions and developed final TMs and report to highlight recommendations. Presented findings to RWRA board and city/county commission for final approval.
- Project Engineer for Western Fleming County Water District rate study. Responsibilities include developing hydraulic model for entire system and analyzing flow patterns to determine cost of service. Other responsibilities include developing final report and client contact.
- Project Engineer for City of Ashland water rate study. Project included a cost of service analysis for retail and wholesale water customers. Responsibilities include data collection, developing final report, quality control on data analysis and client contact.
- Project Engineer for Elizabethtown, Kentucky chloramine feasibility study. Responsibilities include writing report outlining benefits and potential issues associated with converting to chloramines and developing cost estimate for future conversion.
- Project Engineer for Shelbyville, Kentucky chloramine feasibility study. Responsibilities include writing report outlining benefits and potential issues associated with converting to chloramines and developing cost estimate for future conversion.
- Project Engineer for Water Plant Expansion, City of Danville, Kentucky. Responsibilities during preliminary phase included assisting in report PER writing and preparing website for public awareness. Design responsibilities included working with electrical and other sub-disciplines for total coordination. Design focuses on chemical building, GAC building, existing renovation, filter building, raw water intake improvements, and site design. Prepared agency submittals and specifications for bid. Total project cost approximately $30 million.
- Project Engineer for Ashland 37th Street Pump Station and Force Main Improvements, Ashland, Kentucky. Responsibilities included design calculations for new force main and gravity sewer sewer. Designed concept for new overflow regulator structures and piping improvements at pump station. Developed specifications for bid and agency approval documents.
- Project Engineer for NSA Water Main Relocation, Fort Meade, Maryland. Developed plans for new water main locations for 50,000 LF line to be replaced as part of design-build team. Responsible for client contact and quick turn-around on design comments.
- Project Engineer for Shelbyville, Kentucky Water Treatment Plant Filter Investigation. Direct responsibilities including field testing water filters through various methods including floc retention analysis, media mapping, bed expansion test and backwash turbidity profile analysis. Test also included evaluation of air scour pilot unit performance. A final report and cost estimate for air scour installation was also included.

LARRY ANDERSON, P.E.

Electrical/I&C Lead

Mr. Anderson's responsibilities include instrumentation and control (I&C) and electrical distribution design. His experience includes wastewater/water treatment plant and pump station design, back-up electrical power system design, indoor/outdoor lighting design, energy calculations, estimating electrical construction costs, electrical design for hazardous locations, overhead and underground distribution of high voltage circuits, instrumentation and control systems including programmable logic controllers (PLCs), computer-based networks, communications, fire alarm and signal systems, lightning protection, security systems, circuit breaker and relay coordination, load studies, fault current and voltage drop calculations and studies, and power factor studies and correction design.

EDUCATION

Bachelor of Science, Electrical Engineering, University of Kentucky, 1978

Associate of Science, Mechanical Engineering, University of Kentucky Comm College, 1975

Associate of Science, Electrical Engineering, University of Kentucky Comm College, 1975

PROFESSIONAL REGISTRATIONS

Professional Engineer:
KY, OH, AL, AZ, CA, GA, IL, IN, LA, MA, NV, NM, NC, PA, SC, TN, TX, VT, VA, WV

INDUSTRY TENURE

38 Years

EXPERIENCE OVERVIEW

Electrical and I&C design for the following water and wastewater treatment plants:

Springfield, KY	2.0 MGD	Ashland, KY	20.0 MGD
Owensboro West	15.0 MGD	London, KY	5.0 MGD
N. KY Water District	10.0 MGD	Findlay, OH	15.0 MGD
Barbourville, KY	5.4 MGD	Owensboro, KY/West	15.0 MGD
Grayson, KY	10.0 MGD	Louisville Water Co.	240.0 MGD
Danville, KY	10.0 MGD	Lexington, KY	22.5 MGD
Falmouth, KY	2.0 MGD	Huntsville, AL	30.0 MGD
Morganfield, KY	6.0 MGD	Elizabethtown, KY	7.2 MGD
Bardstown, KY	4.6 MGD	Jeffersonville, IN	5.3 MGD
Shelbyville, KY	6.0 MGD	Richmond, KY	9.0 MGD
Irvington, KY	0.4 MGD	Georgetown, KY	2.4 MGD
Manchester, KY	1.6 MGD	Middlesboro, KY	2.8 MGD
Hardinsburg, KY	0.8 MGD	Greenville, KY	1.0 MGD
Natural Bridge, KY	1.0 MGD	Kentucky- American	25.0 MGD
Radcliff, KY	4.0 MGD	Bell Co. Prison, KY	0.1 MGD
Owensboro, KY/East	6.8 MGD	Williamsburg	2.9 MGD

- Findlay, Ohio. Project Manager. This project involved replacing an existing Foxboro SCADA system. The existing system had three in-plant RTUs communicating via twisted pair cable. There were 11 remote sites communicating back to the plant via microwave radios. Microwave radios were originally used because there were no available UHF/VHF frequencies. The new system architecture involved the following key components:
  - Six supervisory work stations at the plant to monitor and control the plant and remote sites. Each work station was equipped with a computer, printer, UPS, monitor, RSView software and an Ethernet card for communications.
  - Four in-plant Local Control Panels (LCP) with discrete and analog I/Os. Each LCP had an Allen-Bradley SLC 5/04 processor, panelview with keypad, TVSS, and power supply. Communications back to the main control panel were via an Ethernet backbone with fiber optic cables.
  - There were a total of 12 remote pump station sites communicating back to the treatment plant via spread spectrum radios. A new and larger pump station was added that had an Allen-Bradley SLC 5/04 processor with a Metricom radio and antenna. The smaller pump stations utilized a Westerman CT-4000 microprocessor with Metricom radios.

- Northern Kentucky Water District. Project Manager. This project involves a new SCADA system for the Kenton and Campbell County facilities which consisted of two water treatment plants (WTP), 14 pump stations, 19 storage tank sites, five meter pits, two regulator/valve pits, and six water quality monitoring stations. The design of the SCADA system is based on converting the exiting Aquatrol system to a new PLC-based system. Each pump station will be equipped with Allen-Bradley ControlLogix. All tank sites, meter pits, regulator/valve pits, and water quality stations will be equipped with Allen-Bradley CompactLogix. The system design will be divided into two phases: Bid Phase 1 – Centralized Hub Upgrade and Kenton County Facilities and Bid Phase 2 – Campbell County Facilities WTP demolition and water quality monitoring.
- Ashland, KY. Project Manager. This project involved a new radio SCADA system for 12 remote storage tanks, 13 pump station sites and 2 central monitoring units. Each central panel included an Allen-Bradley SLC 500 PLC assembly, TVSS, power supply with UPS and battery back-up, Motorola SM50 UHF/VHF radios, automatic antenna switching relays, coaxial cables, desktop computer, printers, modem for remote access, HMI software and Yagi antenna. Each remote site included a microprocessor assembly, TVSS, power supply with battery backup, pump station controls coaxial cable and Yagi antenna. The major functions of the system were display operational parameters at the water treatment plant and at the Distribution Center office, monitoring and control of remote pump stations, raw water intake and tank levels, provide pre-set alarm features, provide pre-set alarm features, provide appropriate reports, and provide graphic displays of the distribution system.
- Emergency Generator System Designs. Emergency Generator System Designs have been completed at the following locations:
  - Northern Kentucky Water District ..... Parallel 1500 kW units.
  - Northern Kentucky Water District ..... 125 kW portable unit.
  - Bell County Forestry Camp, Kentucky ..... Four separate units.
  - Blackburn Correctional Institute, Kentucky ..... 600 kW unit.
  - Findlay WWTP, Findlay, Ohio ..... 1500 kW unit.
  - Sayre Christian Village..... Three separate units.
- Passaic Valley Solids Handling Process Upgrade, Newark, New Jersey Electrical/I&C Design. Project Engineer. Project Engineer for new sludge gravity thickeners and thickening centrifuge facility design which includes power distribution, VFD controllers, existing MCC modifications, PLC based SCADA system, instrumentation and controls.
- Northern Kentucky Water District Electrical/I&C design for Chemical Pretreatment Facility. Design included the replacement of an existing chemical pretreatment facility. Instrumentation work included new field instruments for flow, level and analytical measurement, PLC control panels, fiber optic cables, and pump controls. Electrical work included low volltage distribution, lighting, and switchgear.
- Northern Kentucky Water District Advanced Treatment at Fort Thomas and Memorial Parkway Treatment Plants Electrical/I&C Design. Design included the expansion of the existing WTP in include new GAC contactors and UV treatment. Instrumentation work included new field instruments for flow, level and analytical measurement, PLC control panels, fiber optic cables, and pump/blower controls. Electrical work included high/low voltage distribution, lighting, VFDs, hazardous areas, emergency power MCCs and switchgear.
- Northern Kentucky Water District Electrical/I&C Design for WTP Chemical Expansion. Design included the expansion of the existing WTP to include chemical feed systems. Instrumentation work included new field instruments for flow, level and analytical measurement, PLC control panels, fiber optic cables, and pump/blower controls. Electrical work included low voltage distribution, lighting, VFDs, hazardous areas, and modifications to existing MCCs and switchgear.
- Harlan, Kentucky Electrical/I&C Design for WTP Expansion. Design included the expansion of the existing WTP to include chemical feed systems, raw water intake, filters, and flocculators. Instrumentation work included new field instruments for flow, level and analytical measurement, PLC control panels, and pump/blower controls. Electrical work included low voltage distribution, lighting, emergency power, VFDs, and modifications to existing MCCs and switchgear.
- Williamsburg, Kentucky Electrical/I&C Design for WTP Expansion. Design included the expansion of the existing WTP to include new raw water intake, filiters and new clearwell. Instrumentation work included new field instruments for flow, level and analytical measurement, PLC control panels, and pump/blower controls.

JUSTIN ANDERSON, P.E.

Geotechnical Engineer

Mr. Anderson has been involved in the geotechnical aspects of transportation, water and environmental projects as a project engineer and construction observer. His experience covers the analysis, design and construction of deep foundations for bridges, retaining walls, building structures, embankment fills, earth dams, flood control levees, railroad track-beds and bridge approaches, pavements, rock-fall catchments, subgrade stabilization, slope and excavation stability, mine and coal seam location, management of field and laboratory investigations, preparation of geotechnical reports, project specifications, construction plans and cost estimates.

EDUCATION

Master of Science,
University of Kentucky, 2006

Bachelor of Science,
University of Kentucky, 2005

PROFESSIONAL REGISTRATIONS

Professional Engineer:
KY, IA, NE, MD, SD

INDUSTRY TENURE

8 Years

EXPERIENCE OVERVIEW

- Williamstown Lake Dam Existing Condition Assessment, Williamstown, Kentucky. HDR contracted with the City of Williamstown, Kentucky to provide an assessment of the existing condition of the Williamstown Lake Dam and the appurtenant spillway. This investigation included performing a visual site reconnaissance to (1) assess the dam's current condition, (2) identify specific areas of concern, and (3) to plan an investigation to evaluate the subsurface conditions at the site. Project responsibilities involved project management, design and preparation of engineering report.
- LG&E Crouch Property, LaGrange, Kentucky. HDR provided a geotechnical assessment of the potential Louisville Gas and Electric (LG&E) substation site referred to as the "Crouch Property". The site is located near the city of LaGrange, Kentucky. The study consisted of a site reconnaissance, a geophysical survey, a geological-geotechnical hazards risk assessment and foundation alternate evaluation as it pertained to the proposed substation construction.
- Papillion Creek Watershed Regional Detention Structure WP RB-5, Sarpy County, Nebraska. HDR provided planning, permitting, preliminary and final design and construction contract administration services for a proposed regional detention basin located within the West Papillion Creek Subwatershed in Sarpy County, Nebraska. The overall goal of this project is to provide flood control for the greater community as well as enhance water quality. The planning element includes the development of a sub-area plan and a community-based watershed plan in which landowners and stakeholders will develop the vision for integrating the WP RB-5 project into the community. The engineering elements consist of an geotechnical investigation and design, design of the main dam and related water quality basins, the relocation of a sanitary sewer system and preparation of an individual Section 404 permit. Project role consisted of geotechnical design of 45 foot tall main dam over soft alluvium (included staged embankment construction), two water quality basin dams, auxiliary spillway stability, and sanitary sewer trench as well as preparation of plans and specifications.
- City of Omaha CSO LT Control Plan Program Management, Omaha, Nebraska. As part of the program management team, providing expertise in project controls, regulatory and community issues, long term control planning, storage, pumping and treatment that will help the city of Omaha develop a Long-Term Control Plan for its combined sewer overflow/sanitary sewer overflow (CSO/SSO) system. The related Burt-Izard Basin Study, one of the city's largest CSOs, is being led by HDR. Project responsibilities included assistance in preparation of Technical Memorandum discussing impacts of proposed South Interceptor Force Main (SIFM) construction on existing levee system.

HDR

- Red River Watershed Management Board, Hay Creek / Norland Impoundment Preliminary Engineer's Report, Roseau, Minnesota. The Roseau River Watershed District is completing a flood reduction project in which a dry impoundment will be constructed. The impoundment will store floodwater from local ditches as well as accommodate some water diverted from nearby Hay Creek (which will have new setback levees). HDR was contracted to complete a preliminary engineer's report in accordance with Minnesota Statute and Rule. Project responsibilities included design of impoundment embankments and drainage ditches over a thick deposit of very soft peat foundation soils.
- Papillion Creek Watershed Dam Rehabilitation, Sarpy County, Nebraska. Geotechnical Engineer to determine if 3 dam sites located in Papillion Creek Watershed meet the criteria of the NRCS Rehabilitation Program and if so, determine the type of rehabilitation required. Evaluation included hydraulic analysis, breach routing and reservoir sedimentation estimates for hazard classification. SITES, TR-66, and HEC-RAS were used in the routing and analysis.
- Levee Relief Well Replacements, Council Bluffs, Iowa. Designed and developed plans and specifications for approximately 20 new underseepage pressure relief wells, grading design for existing relief in the Avenue G pump station area, and test pumping of the existing wells to verify capacity. Construction services included observation of well installation, development, and testing.
- Rosehill Dam Reconstruction, South Dakota. The HDR team with support of Brosz Engineering, and American Engineering and Testing completed the geotechnical investigation and conceptual design for reconstruction of the dam and associated improvements to the Rosehill property. HDR was responsible for engineering components including site investigation with survey and soil borings, hydraulic modeling with spillway capacity designs, and preliminary design of a new earthen dam and spillway based on NRCS methods. HDR also provided technical assistance to the department for the Environmental Assessment and USACE permitting assistance with wetland delineation for the project. Final design and plan production followed to result in a combined total of 3 months from the Notice to Proceed to final construction plans. This met the department's aggressive project schedule goals and allowed for a fall 2011 construction in order to restore the dam and reservoir for the spring of 2012. Project role consisted of geotechnical design of main dam embankment.
- Papio-Missouri River Natural Resources District, Planning Study and Preliminary Design of Damsite 15A, Omaha, Nebraska. HDR provided planning, permitting, preliminary and final design and construction contract administration services for Dam Site 15A. Dam Site 15A is a regional detention basin to be located on North Branch of West Papillion Creek in Douglas County, Nebraska. Project role included conducting subsurface investigation and performing preliminary settlement and slope stability analyses of main dam section.
- City of Cedar Rapids, WPCF Flood Protection Study, Cedar Rapids, Iowa. Following a devastating flood in 2008 HDR was selected to conduct a study to identify flood protection facilities needed to protect the WPCF from a comparable flood in the future and prevent associated environmental and financial damages. The flood submerged two-thirds of the WPCF, causing incapacitation for 13 weeks and an estimated $100M in damage. The study evaluated various flooding protection scenarios, presented costs for alternatives and set priorities and budgets for improvements. Project role included preliminary design of alternate flood protection levee systems.
- City of Riverside L-385 Levee Redevelopment Area, Riverside, Missouri (USACE Kansas City District). A small town just north of Kansas City, Missouri, the City of Riverside was ready for change. Their desire was to improve their image, develop a popular tourist destination, and create an attractive environment where people would come to work, shop, and play. The designation of a TIF district and the promise of a levee for flood protection allowed the City to open up an area comprising almost one-half of the City's total area for development. The City retained HDR to assess the current conditions and prepare a conceptual development plan and utilization design for the 2,200-acre area north of the Missouri River. The goal was to encourage a variety of land uses including industrial, retail, office, and green space with divided roadways and pedestrian thoroughfares for site-access for the L-385 levee redevelopment area. Project responsibilities included preparation of Minor 408 permit submittal to the USACE Kansas City District to proposed trail improvements along the existing levee system.
- City of Council Bluffs Industrial Park Levee Phase III – Certification Analysis, Council Bluffs, Iowa. HDR contracted with the City of Council Bluffs to conduct a geotechnical investigation and analyses of its Industrial Park Levee. The purpose of this effort is to assess and evaluate the existing levee condition against FEMA criteria for levee certification purposes.

JEFF ASH, P.L.S.

Surveying Lead

Mr Ash currently serves as Survey Manager for HDR's Kentucky Department. His responsibilities include coordination of all survey work for projects supporting water/wastewater, highway, and civil site, in addition to topographic and boundary surveys. He is also responsible for estimating and scheduling surveys, including survey processing and review for quality assurance, and maintaining/tracking project utilizations and deadlines. Additional responsibilities include:

- Establishing existing boundaries and preparation of right of way strip maps/ parcels for acquisition on KYTC Highway projects;
- Providing survey data to support design of projects involving water/waste water treatment plants, water main and sewer lines, and civil and site;
- GPS static/fast static with post-processing to establish aerial and survey control monuments for projects. Civil/Site surveying were performed with conventional methods and GPS RTK surveys when application was appropriate for local site topography;
- ALTA/ACSM Land Title Surveys, Final Record Plats and other boundary surveys were completed throughout Kentucky, Tennessee;
- Management of construction layout for projects with commercial, business, retail, and residential development

PROFESSIONAL REGISTRATIONS

Registered Professional Land Surveyor:
Kentucky

INDUSTRY TENURE

36 Years

EXPERIENCE OVERVIEW

Surveys & Mapping

Several types of surveys have been completed to provide specific needs for clients throughout Kentucky and Tennessee. ALTA/ACSM Tile Land Surveys performed range from 0.5 acre tracts for Starbucks to 20 acre tracts for Wal-Mart. Additional ALTAs have been performed for professional office such as the LFUCG Office Building at 101 West Vine in Lexington, as well as industrial completed for Martek in Winchester. Some additional types of surveys include:

- Bell County - Upper Cumberland Basin for Corp of Engineers Monuments and Mapping - 64 monuments set throughout Bell and Harlan County using static/ fast static GPS sessions and post processing of GPS baseline networks with independent baselines
- Shaker Village of Pleasant Hill - Retracement of historical property established approximately 1840
- Cynthiana Harrison Economic Development Authority CHEDA - boundary, lots, and roadway survey
- Bluegrass Conservancy Conservation Easements - Conservation Easements for farms protecting development rights (LFUCG PDR Program)
- Saint Claire Medical Center - approx. 17 acre boundary survey for medical center
- Williamstown Lake - mapping control and survey for increasing reservoir
- KY Horse Park - topographic and boundary surveys for improvements to support World Equestrian Games over approx. 1100 acres of the Horse Park

Wastewater | Water | Stormwater

A large part of surveying has been completed to support design sanitary, storm, and water treatment plant and lines throughout Kentucky and Ohio. These surveys

consisted of mapping, establishing control monuments, boundary surveys for easement development and fee simple acquisition, utility location, and supplemental topo surveys. Some of the following clients and projects completed are listed below.

Lexington-Fayette Urban County Government:

- Wolf Run FM, approx. 10,000 LF located in Lexington involved survey corridor, and easement development;
- Town Branch Sewer, location and elevations of approx. 400 sanitary manholes throughout Lexington.

Sanitation District No. 1:

- West Regional Conveyance Tunnel, Aerial Mapping control for tunnel corridor approximately 36,000 LF with GPS static-fast static, Control Monuments set throughout corridor, alignment and cores staked, easement development with GIS;
- Interceptor North 54" Sewer (South Gunpowder), approx. 12,000 LF;
- Medium East 36" Sewer (Sunnybrook), approx. 16,000 LF;
- Medium East 24" FM (Turkeyfoot), approx. 17,000 LF;
- Union 30" Sewer, approx. 12,000 LF

Transportation

The surveying portion of these projects have covered areas from initial aerial mapping control completed by static/fast static sessions with post processing to staking right of way for completed roadways after construction. Much of the survey work involved establishing right of ways, both existing and proposed. The following list shows some of the roadways involving these survey tasks.

Kentucky Transportation Cabinet Highway:

- KY 555 from Blue Grass Parkway to Ky SR 248, approx. 4 miles in length through Washington, Nelson and Anderson Counties;
- KY 1247 from US 27 to Somerset Bypass Hwy 914, approx. 4 miles located in Pulaski County;
- I-65 – 4 mile section of interstate located in Hardin and Hart County;
- Nicholasville Bypass (US 27) along the east side of Nicholasville approx. 7.5 miles located in Jessamine County;
- US 27 Interchange with KY 1247 in Pulaski County;
- KYTC Statewide Projects for District 7, District 9, and District 11.

Lexington-Fayette Urban County Government:

- Liberty Todds Road – Aerial mapping control and monuments were set along a corridor approx. 4.5 miles with GPS static/fast static surveying and post-processing;
- Citation Blvd – Surveying completed to establish roadway alignment along an existing corridor running from Leestown Road to Newtown Pike, approx. 3.5 miles.

Airports

Surveys performed for airports were completed for design of airport runway, taxiway and ramp design. Also, boundary surveys were completed for Airport Property Map, development of Avigation Easements, and Navaid and construction layout. Airport surveys are now required to maintain the highest accuracy standards for establishment of Geodetic Control. With these standards set in place, airport survey data collection regulations and guidelines were established for the FAA Surveying and GIS Program. The following surveys are some of the airport surveys that have been completed by these guidelines.

Blue Grass Airport, Lexington-Fayette Urban County Airport Board:

- ALP Property Map – airport property map establishing airport boundary with history of Fee Simple sources of title, determining all Avigation Easement locations and records history;
- Terminal Concourse and Delta Gate Expansion - survey to support construction of concourse and gate extension and ramp improvements;
- FAA Tower Lease and Easement Surveys - establish lease line and easement for runway approaches;
- Terminal Parking Structure - Survey completed supporting design and construction of parking structure;
- Ready Rental - Survey completed supporting design and construction of parking structure

EDDIE ALEXANDER, P.E.

Structural Lead

Principal Engineer at Lexington, Kentucky office. Design Professional, responsible for structural design and construction administration. Experience in structural design of environmental engineering structures including water and wastewater treatment facilities. Experienced in the design and specification of remedial work associated with restoration and modification of existing structures.

Also experienced in structural design of industrial buildings, including the design of steel and concrete structures, building and equipment foundations, crane runways, tilt-up concrete and masonry walls, concrete slabs-on-grade, municipal facilities, schools, retail buildings, churches and residential buildings.

AREAS OF EXPERTISE/SPECIALIZATION:

- Structural Design of Environmental Engineering Structures
- Structural Design of Industrial Buildings
- Structural Design of Multi-story Industrial Process Facilities
- Structural Design of Equipment Foundations
- Structural Design of Crane Runways
- Design of slabs-on-grade
- Design of Masonry Wall Systems
- Analysis and Modification of Existing Structures

EXPERIENCE OVERVIEW

- Danville Water Treatment Plant, Danville, Kentucky
- Fort Thomas Water Treatment Plant, Fort Thomas, Kentucky
- Memorial Parkway Water Treatment Plant, Fort Thomas, Kentucky
- London Water Treatment Plant, London, Kentucky
- Jackson Water Treatment Plant, Jackson, Kentucky
- Shelbyville Water Treatment Plant, Shelbyville, Kentucky
- West Fleming Water Treatment Plant, Ewing, Kentucky
- Harlan Water Treatment Plant, Harlan, Kentucky
- Ashland Water Treatment Plant, Ashland, Kentucky
- Numerous other Wastewater Treatment Plants, Intake Structures, Pump Stations and associated structures.

EDUCATION

Bachelor of Science in Civil Engineering
University of Kentucky

Master of Science in Civil Engineering
University of Kentucky

PROFESSIONAL REGISTRATIONS

Professional Engineer:
KY, OH, AL, CO, IN, OK, WV

PROFESSIONAL AFFILIATIONS

- National Council of Examiners for Engineering and Surveying – No.18000
- Chi Epsilon Civil Engineering Honorary
- Structural Engineering Council of Kentucky
- American Society of Civil Engineers
- Association of Iron and Steel Engineers

HDR

MIKE WEBSTER, AIA, LEED AP

Architectural Coordinator | HDR, Lexington, KY

Mike is an Architectural Coordinator with several years of experience working directly under a registered architect of 42 years. He graduated from the School of Architecture at the University of Kentucky, and specializes in healthcare architecture where he has had a hand in designing local hospitals, retirement homes, and office buildings. Growing up with a construction background has given Mike the understanding and foresight to bridge the gap between drawing board and the built environment. Other projects include 3D modeling and renderings for Bell Place Apartment complex and the redesign of Deep Springs Pump Station.

EDUCATION

Bachelor in Architecture,
University of Kentucky , College of Design, 2007

Professional Registrations

LEED AP Building Design + Construction

Professional Affiliations

- AIA Mentor for the University of Kentucky
- AIAS Member

EXPERIENCE OVERVIEW

- Central Baptist Hospital – design, construction docs, modeling and renderings
- Deep Springs Pump Station – renderings and cost evaluation.
- Bell Place Apartments
- London Medical Office Building
- McCready Manor Retirement community

EMPLOYMENT HISTORY

Project Coordinator (2008-Present) HDR Architecture Inc., Lexington, KY

- Assisted in Healthcare design process (SD, DD, CD and CA)
- Revit and Sketch-up modeling
- Total Service Organization (internal, external, and community service)

Draftsman/ Designer (2008) DCT Design Group, Lexington, KY

- Schematic design
- Digital 3D modeling
- AutoCAD drafting and Construction Documents

Construction Supervisor (1998 - 2006) First Choice Builders, Nicholasville, KY

- Hands-on site construction
- Management of sub-contractors
- Organized critical path methods for residential construction
- Facilitated and conceptualized custom design solutions with clients

Architecture Computer Lab Consultant, (2006 - 2007) University of Kentucky Student Computing Services, Lexington, KY

- Supervised computer lab and printer lab
- Installed computer hardware and software
- Prepared student design layouts with laser cuter software

VAUGHN HILL, P.E.

Mechanical/HVAC Lead

Vaughn has over 35 years of experience in the engineering profession. For the last 24 years, Vaughn has been a principal of The Roberts Group, PSC, an engineering and architectural firm. Vaughn's background and experience enabled him to become proficient in a variety areas including administrative and managerial, client relations, marketing, engineering design, code research, bidding, permitting, shop drawings, progress payments, construction documents, construction observation reports, and general construction administration.

Vaughn's specific experience includes both new construction and renovation work on numerous project types including restaurants, motels, apartments, schools, industrial, warehouse, manufacturing, retail, water and waste water facilities and residential. Continuing education classes and seminars include various courses offered by manufacturers and professional organizations.

EDUCATION

Bachelor of Science, Mechanical Engineering, College of Engineering, University of Kentucky
1979

PROFESSIONAL REGISTRATIONS

Professional Engineer:
KY

NCEE Certified

PROFESSIONAL AFFILIATIONS

- National Council of Examiners for Engineering (NCEE)
- National Society of Professional Engineers
- American Council of Engineering Companies of Kentucky

INDUSTRY TENURE

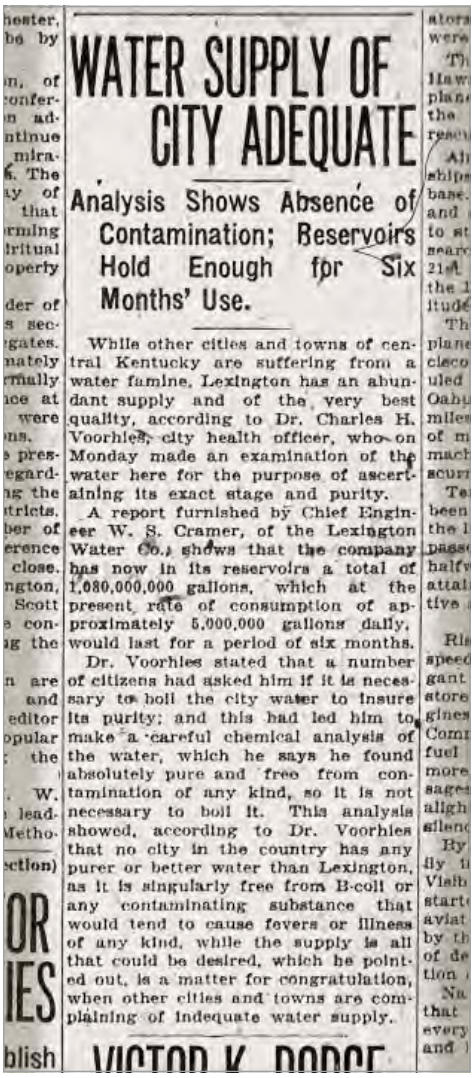
35 Years

EXPERIENCE OVERVIEW

- 1989 – Present: **The Roberts Group, PSC**, Lexington, KY. Principal
- 1989 – 1990: **Hamill & McKinney Associates**, Lexington, KY. Director of Engineering
- 1979 - 1989: **Hamill & McKinney Architects & Engineers**, Lexington, KY. Designer / Director of Engineering
- 1976 - 1979: **Jerrico, Inc.**, Lexington, KY. Draftsman / Designer

RICHMOND ROAD STATION WTP NEW FILTER BUILDING DESIGN

Section 3 | PROJECT UNDERSTANDING & APPROACH



WATER SUPPLY OF CITY ADEQUATE

Analysis Shows Absence of Contamination; Reservoirs Hold Enough for Six Months' Use.

While other cities and towns of central Kentucky are suffering from a water famine, Lexington has an abundant supply and of the very best quality, according to Dr. Charles H. Voorhies, city health officer, who on Monday made an examination of the water here for the purpose of ascertaining its exact stage and purity.

A report furnished by Chief Engineer W. S. Cramer, of the Lexington Water Co., shows that the company has now in its reservoirs a total of 1,080,000,000 gallons, which at the present rate of consumption of approximately 5,000,000 gallons daily, would last for a period of six months.

Dr. Voorhies stated that a number of citizens had asked him if it is necessary to boil the city water to insure its purity; and this had led him to make a careful chemical analysis of the water, which he says he found absolutely pure and free from contamination of any kind, so it is not necessary to boil it. This analysis showed, according to Dr. Voorhies that no city in the country has any purer or better water than Lexington, as it is singularly free from B-coli or any contaminating substance that would tend to cause fevers or illness of any kind, while the supply is all that could be desired, which he pointed out, is a matter for congratulation, when other cities and towns are complaining of indequate water supply.

VICTOR K. DODGE

September 2, 1925 "Lexington Leader" Article on Lexington's Water Supply

OVERVIEW

HDR's recent completion of the study at Richmond Road Station (RRS) has provided confirmation to Kentucky American Water (KAW) that the venerable filtration facility needs to be replaced in order to continue providing high quality drinking water to its customers in Fayette, Scott, Bourbon, Clark and Jessamine and other counties. The deteriorating structural and process conditions of the existing pipe gallery and filter boxes, coupled with the maintenance challenges associated with the complex building have presented KAW with a clear choice. Restoration of the 90-year old facility would be very difficult and costly to achieve also requiring the filter facility (and RRS entirely) to be taken off-line for an extended period. The construction of a new filter complex will enable KAW to upgrade the filter capabilities through design improvements that will improve removal efficiencies for both turbidity and organic matter through deeper (or larger) media bed designs than the 1923 structure could accommodate.

The purpose of this section is to demonstrate HDR's familiarity with the RRS as well as to describe our overall approach to the design, development, and construction of the "New Filter Building." In order to fully describe our familiarity and approach, this section has been divided in to the following sections:

- KAW's Objectives & Project Considerations
- Proposed Project Improvements to RRS
- Critique of Preliminary RRS Filter Building Project Details
- Understanding of Scope of Services to Be Provided
- Interaction with Construction Manager (CM) During Design
- Proposed Project Schedule

KAW OBJECTIVES & PROJECT CONSIDERATIONS

HDR's clear understanding of KAW's goals and objectives associated with this project was gained through multiple conversations with KAW staff during progress meetings, numerous site visits to review field conditions, and the satisfactory completion of the investigation, which evaluated 13 options for consideration by KAW to address the filtration deficiencies. Based on this understanding, we have identified the following "big picture" objectives and general considerations for this project.

- KAW staff and leadership is united around the need for a new filter building capable of processing 25 million gallons per day (MGD) (30 MGD on a temporary basis).
- Minimize customer rate impact. Governance by the Public Service Commission (PSC) and allowable capital expenditures in the rate base is an important element of any design project for KAW. KAW takes its charge to keep rates low very seriously by being cost-effective in the construction of any new facility and justification of design elements.

- Improve filter effluent quality through modern filter design, including:
  - Deepen sand media beds to improve turbidity and particulate removal.
  - Slightly greater volume filters which increases empty bed contact time (EBCT), as well as improving organic carbon reduction effectiveness and duration.
  - Monitoring and instrumentation upgrades to provide better information to operators .
  - Reduction in chemical coagulant feed (and costs) is desired though improved filtration.
- Improve maintenance access for routine tasks.
- Complete construction by April 2016. Schedule is very important to KAW from both a financial management and process reliability standpoint.
- Maintain continuous service. Demand considerations prevent KAW from removing the RRS Filter Building from service for any extended period of time.
- Meet specific project development needs by utilizing an alternative delivery process like Construction Manager at Risk (CMAR) with benefits such as:
  - Improving cost controls by putting the CM together with the design engineer at the 30% level to promote a coordinated project development that mitigates the likelihood of significant change orders and errors.
  - Meeting PSC rate case filing needs by obtaining a maximum price from the CM at 60%.
  - Cooperative design completion between design consultant and construction manager to build value into the project.

PROPOSED PROJECT IMPROVEMENTS TO RICHMOND ROAD STATION

As noted previously, HDR led a multi-discipline investigation of conditions at the existing RRS Filter Building. This investigation included engineers with background in water treatment, structural, electrical, mechanical, and divers (also structural engineers). This diverse team evaluated the existing facility and found numerous deficiencies and obstacles to continued use including but not limited to:

- Deteriorating structural conditions of filters.
- Electrical deficiencies of entire building.
- Undersized mechanical equipment for ventilation.
- Severe maintenance access issues.

While a renovation of the existing facility was considered, it ultimately became clear that any work performed to restore or improve the existing facility would still leave KAW with a 1923 footprint and filter design with major access issues. After consultation with KAW, this option was eliminated and our efforts focused on developing and evaluating options for a modern, but cost-effective, new filter building.

Working closely with KAW staff, HDR was able to identify and investigate 13 potential options for the proposed facility. These options were diverse and included alternative technologies such as membrane filtration and ozone biofiltration, along with more conventional approaches such as gravity filtration in a new filtration facility and renovation of the existing facility. Several of these options had common core elements but slightly different details.

The list of 13 initial potential options was screened through a review process with KAW staff and HDR topical experts. This review consisted of the development of an initial cost estimate and conceptual layout by HDR with a narrative description of the proposed option. The information was provided to KAW staff and discussed during an alternatives evaluation meeting. Discussions of the merits and costs of each option led to a consensus on whether the option was feasible for further consideration and detailing. From the initial list of 13, three options were considered feasible for further investigation including:

- **Option No. 1** - Granular Activated Carbon (GAC) Dual Media Filters.
- **Option No. 5** - Mixed Media Filters and Post-filtration GAC Contactors.
- **Option No. 12** - GAC Dual Media Filters with Pre-filtration Ozone Application.

Further analysis of the cost and treatment benefits led to the ultimate recommendation of Option No. 1 – GAC Dual Media Filters as the filtration approach, which is consistent with KAW's current practices. Enhancements will be included in the new facility as previously described (more sand and GAC volume) to improve the filtration performance. Some of the related equipment preferences and details that were discussed are outlined below.

OPTION NO. 1 – NEW FILTER BUILDING WITH GAC DUAL MEDIA FILTERS

This option involves construction of a new 14,300 square foot filtration building with masonry exterior with details as follows:

- 12 reinforced concrete gravity filter beds capable of treating 25 MGD at current permitted flow per filter with the capability to produce 30 MGD at the maximum filtration rate of 5.0 GPM/SF, if permitted by Kentucky Division of Water (KDOW).
- Media profile to be 24" of GAC underbedded by a minimum 12" of sand to improve turbidity reduction.
- GAC empty bed contact time of approximately three minutes under design maximum flow and five minutes under typical operating conditions.
- HDPE Underdrain with media support cap to reduce profile.
- Air/water backwashing capability similar to current facility.
- Five electrically actuated butterfly valves per filter for operational control including:
  - Filter influent
  - Filter effluent
  - Backwash influent
  - Backwash effluent
  - Filter to waste
- Rate of Flow control (venturi) metering on each filter for filter effluent and filter-to-waste and totalized backwash influent metering on common influent line.
- Motive water system to assist in removing/replacing GAC.
- New facility would be complaint with all modern structural and electrical codes. More robust ventilation to evacuate moisture from building will also be included.
- SCADA interfaces with existing KAW systems allow for local or remote monitoring and control of filters.

KAW's Richmond Road campus is already populated with a number of facilities that serve treatment, distribution, maintenance, operations. and customer service. Considerations for the location and dimensions of the new filtration facility include:

- Developing a new facility that fits aesthetically and proportionately within the environment of the campus.

- Facility operating floor elevations that fit within the current hydraulic grade at the water treatment plant (WTP) and avoid additional pumping.
- Minimizes or avoids conflicts with existing utilities in order to maintain service during construction.
- Minimizing environmental impacts at the site.

In an effort to put context into these ideas, HDR has developed some preliminary exterior elevations for the new RRS Filter Building. HDR is happy to provide similar detailed renderings at appropriate times during the project to help communicate the project to community groups, interested citizens, the PSC or internally. A preliminary elevation is shown, on the following page, in **Figure 3-1**.

CRITIQUE OF PRELIMINARY RRS FILTER BUILDING PROJECT DETAILS

As requested, HDR has provided a critique to the proposed filter building approach in the following paragraphs. HDR knows that it is very important that decisions be sound and able to withstand the scrutiny from outside organizations such as the PSC. Further, we realize that KAW is simply interested in the best solutions, and in that spirit we have attempted to identify any areas that could be candidates for refinement or reconsideration at the beginning of the design phase.

SUFFICIENCY OF BUDGET

HDR is fortunate to have a significant amount of data and experience in the Kentucky marketplace to rely upon when developing cost estimates for WTP construction. We were able to draw from recent (last four years) as-bid projects in Danville, Fort Thomas, Newport, and Elizabethtown with cumulative construction costs in excess of $60 million to ground-truth the costs for items that are anticipated to be included in the RRS Filter Building. This understanding of the local WTP marketplace is without equal, and we feel confident that the $11 million budget identified in the study will be sufficient.

CONCEPTUAL DESIGN CRITIQUE

HDR and KAW worked together for nearly four months, identifying options for considerations and evaluating the merits of each. As noted previously, 13 preliminary options were identified, detailed and costs prepared in order to provide KAW with sufficient information to make decisions. We are very proud of the process that was used and the results that were obtained from the study.

There are a number of ways to address the filter building development and many alternatives may be offered. As part of this proposal development, HDR has reviewed the study to determine if other alternatives are available that could improve the project. The results of that review indicated one area that should be reviewed by the design consultant to optimize the new facility layout and potentially realize some capital cost savings. This is described in detail below.

Optimized Filter Bed Layout

This alternative is not a change to the conceptual approach to the new filter building. Rather, it is an optimization of the filter details which have already been developed during our study. In the study, we assumed that the filtration loading rate would remain at around 3.1 GPM/SF because that is the current loading rate for the GAC Dual Media filters. This assumption was discussed with KAW and resulted in a conceptual filter layouts that are conservative in size compared with potential loading rates identified in the 10 State Standards. This conservative arrangement was done intentionally to cover the possibility that KDOW would restrict KAW to demonstrated loading rates on biofiltration and also as a check to the turbidity removal efficiency of the existing filters. As previously noted, the existing filters struggle to

Figure 3-1 RRSWTP NEW FILTER BUILDING DESIGN **RENDERINGS**

Possible architectural elements for the proposed Filter Building include:

- Masonry veneer with classical design approach
- Lower level access for maintenance of filter gallery (double door access between stairs)
- Highly reflective windows (or Spandrel panels) on Operations Level windows to prevent UV Light entrance but add pleasing building aesthetics
- Clear story with translucent structural skylight to bring natural light into non-filter operational areas providing green energy benefits

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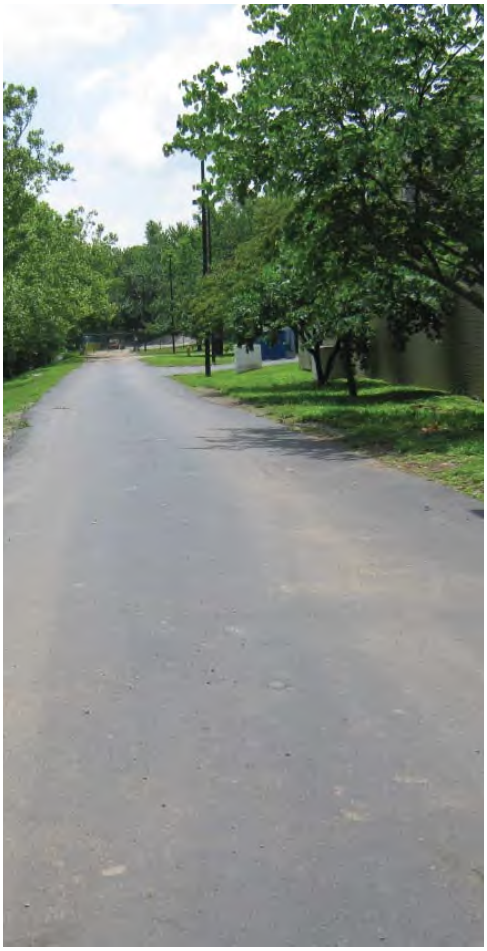
HDR



effectively remove turbidity at their current loading rates. The deepening of the sand bed is expected to help this but KDOW may require some demonstration of this prior to approving an increased filter rating.

HDR is aware that this conceptual design approach can be "optimized" through a layout of the filters at a 5 GPM/SF loading rate. A layout of this nature could reduce the total filter square footage by approximately 20% and still leave the EBCT above 3.5 minutes under peak demand conditions. This opportunity should be further evaluated during final design to ensure it can provide the expected turbidity removal efficiency and that a higher loading rate would be acceptable to KDOW in a biofiltration application.

Cost Impacts of Optimized Filter Bed Layout

If KAW decides to optimize the filter bed arrangement and KDOW concurs, significant savings are expected in the capital costs associated with the filter facility construction. Primary areas of savings would simply be reduced wall length (concrete & CMU), filter underdrain, troughs and media. A direct reduction in these from the HDR estimate provided in the study could (if approved by KDOW) yield a savings over $600,000 as noted below in Table 3-1.

Table 3-1 Savings Associated with Potential Filter Size Optimization

Item	Original Qty	Optimized Qty	Potential Savings
Cast-in place Concrete (Walls/ Floors)	3,050 CY	2,820 CY	$149,500
CMU/Brick Veneer Walls	8,000 SF	7,000 SF	$36,000
Roof	14350 SF	13,000 SF	$33,750
Filter Underdrain	5,700 SF	4,170 SF	$ 84,000
Filter Media (GAC)	525,000 LBS	420,000 LBS	$157,500
Filter Media (Sand)	212 CY	169 CY	$18,000
Filter Troughs	840 LF	675 LF	$50,400
Misc Savings			$75,000
Total Estimated Savings of Optimization			$604,150

Effective and Simplified Construction

The alternative concept identified above is simply an optimization of our approach from the study and would yield no additional benefits related to the methods of construction or the materials used.

Improved Operations of Alternative

As previously described, the alternative would not provide any improvements to operations as it s simply an optimization of the recommended approach. It should be noted that the reduced EBCT could require more frequent GAC media replacements due to expenditure if KAW decides to cease biofiltration and use the GAC solely for its adsorptive capacity.

UNDERSTANDING OF SCOPE OF SERVICES TO BE PROVIDED

HDR has closely reviewed the Request for Proposal (RFP) in order to gain a full understanding of the proposed scope of services and the method of project delivery that KAW has chosen for this project. HDR believes that a CMAR approach is an excellent

project delivery method for the RRS Filter Building project. If selected as the project designer, we are committed to embracing the approach and working closely with KAW and the CM in order to deliver the project on-time and within budget. In order to demonstrate that we have a clear understanding of the work included in the scope of the design consultant, we have summarized the key tasks associated with each of the project phases below.

DESIGN PHASE

Key scope elements during the design phase include:

Meetings

- Engage KAW and lead early design phase meetings (< 30%) to discuss specific project design elements in order to arrive at consensus on equipment, materials, etc.
- Align the activities of our entire design team with early design meetings to establish decision-making lines, communicate KAW preferences to sub-disciplines and define the document development practices for the project.
- Facilitate communication with KAW and the construction manager after procurement to determine information needs to perform constructability reviews and complete cost estimating for the project at 60%.
- Coordinate information requests from CM trade leaders and estimators.
- Reinforce KAW preferences and ensure KAW getting what is wanted.

HDR's goal is to use meetings effectively to encourage communication between the parties during the changing project phases in order to provide timely information and promote continuous activity on the project.

Design Services

- Maintain the design memorandum as a record of the decisions and define the considerations and tradeoffs that may have affected them as well as any cost impacts.
- Structure a workplan that enables the design project to be divided into three phases with different objectives. The workplan must be flexible to accommodate hard or soft stops at the completion of each phase based upon the circumstances of the project.
- Align an experienced team that has successfully completed filtration project similar in scope and nature to this project including disciplines performing key tasks, as described below.

Surveying/Utility Location/Sitework

- Perform topographic site surveys tied into NAVD 88.
- Review as-built drawings and discuss existing utility locations with KAW and other utility operations to identify potential conflicts.
- Secure vacuum excavation or other method to confirm existing field conditions and avoid potential conflicts or accidental line breaks.
- Assist in developing a re-grade and landscaping plans based on utility locations, existing terrain and local environment.

Our recent & relevant experience with KAW enables HDR to understand the technical requirements & documentation needs of this project.

Geotechnical Investigation

- Advance a minimum of four subsurface borings in the recommended filter building location with at least two of these being rock cores.
- Analyze fieldwork and prepare recommendations for the structural design of the facility foundations

Figure 3-2 RRSWTP NEW FILTER BUILDING DESIGN **SHEET LIST**

General Sheets
- Cover Sheet
- Index Of Drawings
- Vicinity Map & Utility Contacts
- Abbreviations
- Legend & Symbology Process Schematices
- Civil Legends, Symbols, & General Notes
- Mechanical Legend
- Plumbing Legend
- Structural Legend
- Structural General Notes
- Demolition Legend & General Notes
- Electrical Legend
- Instrumentation Legend & Symbols
- Hydraulic Profile
- Project Sequencing
- Special Inspections Plan

Site Sheets
- Existing General Site Plan & Notes
- Erosion & Sedimentation Control Plan
- Proposed General Arrangement, Site Plan, & Notes
- Existing Site Piping Plan
- Proposed Site Piping Plan
- Enlarged Area 'A' Site Plan Piping
- Enlarged Area 'B' Site Plan Piping
- Sedimentation Basin Connection Details
- Filter Waste Discharge Details
- Site Piping Profile
- Site Piping Profile
- Proposed Site Grading & Paving Plan
- Erosion Control Details
- Standard Site Plan Details
- Standard Site Plan Details
- Miscellaneous Site Details
- Electrical Site Plan

Demolition Sheets
- Electrical Existing Demolition Plan
- Existing Filter Building Demolition Notes & Staging
- Existing Filter Building Demolition Plan
- Existing Filter Building Demolition Details

Instrumentation Sheets
- Scada System Network Architecture
- Control Panel Details
- Filters Process & Instrumentation Diagram
- Clearwell Process & Instrumentation Diagram

Architectural Sheets
- Architectural Composite Elevations
- Architectural Composite Roof Plan
- Architectural Building Sections

Process Sheets
- Overall Filter Building Floor Plan
- Pipe Gallery Floor Plan
- Pipe Gallery Floor Plan
- Pipe Gallery Enlarged Plan Details
- Operating Level Floor Plan
- Upper Mezzanine Floor Plan
- Operating Room Enlarged Plan
- Mezzanine Enlarged Plan
- Pipe Gallery Section
- Pipe Gallery Section
- Pipe Gallery Section
- Pipe Gallery Section
- Operating Level Section
- Operating Level Section
- Operating Level Section
- Upper Mezzanine Section
- Upper Mezzanine Section
- Pipe Connection Details
- Pipe Connection Details
- Filter Section
- Filter Details

Mechanical / HVAC Sheets
- Mechanical – Pipe Gallery Plan
- Mechanical – Operating Floor Plan
- Mechanical – Upper Mezzanine Plan
- Mechanical Details

Plumbing Sheets
- Plumbing – Pipe Gallery Plan
- Plumbing – Operating Floor Plan
- Plumbing – Upper Mezzanine Plan
- Plumbing Riser Diagram
- Plumbing Details

Electrical Sheets
- Pipe Gallery Lighting Plan
- Operating Floor Lighting Plan
- Upper Mezzanine Lighting Plan
- Pipe Gallery Electrical Plan
- Operating Floor Electrical Plan
- Upper Mezzanine Electrical Plan
- Enlarged View Electrical Plan

Process/ Treatment

- Produce a 30% Preliminary Design for the Filter Building based on previously identified project details from study and meetings with KAW.
- Work cooperatively with CM between 30% and 60% design level to develop intermediate plans and specifications reflective of the project that are suitable for the development of a Guaranteed Maximum (GMAX) Price from the CM.
- Prepare all documents in conformance with KAW Standards (layers, scales, text, etc.) for AutoCad (release 2011) and 16 Division CSI format specifications. Conformance with these standards will be confirmed by HDR through the submission of a standard drawing and specification early in the design phase to KAW for approval.
- Identify multiple acceptable vendors in the specifications where possible for equipment or materials (KAW would prefer three vendors).
- Finalize the process design upon authorization from KAW by detailing the project from the 60% design level to 100%. This detailing will require close coordination with the CM to avoid changes that could result in significant cost impacts.
- Estimated number of plans to be developed as part of this design project is shown in **Figure 3-2**. Submit finalized design plans to KDOW for regulatory review and approval. Shorten the KDOW review period for this submission through regular, pro-active communication with Julie Roney and the KDOW review team to address any questions and provide needed data.

- Obtain or support activities related to permits and approvals including:
  - LFUCG Stormwater Pollution Prevention Plan (SWPPP)
  - LFUCG Erosion and Sediment Control Plan (ESCP)
  - State of Kentucky Housing and Plumbing Approval
  - Kentucky Building Code Review and Approval
  - PSC Certificate of Convenience and Public Necessity (Support KAW activities)
  - Wetlands Delineation for Construction area
  - Phase 1 Archaeological Survey

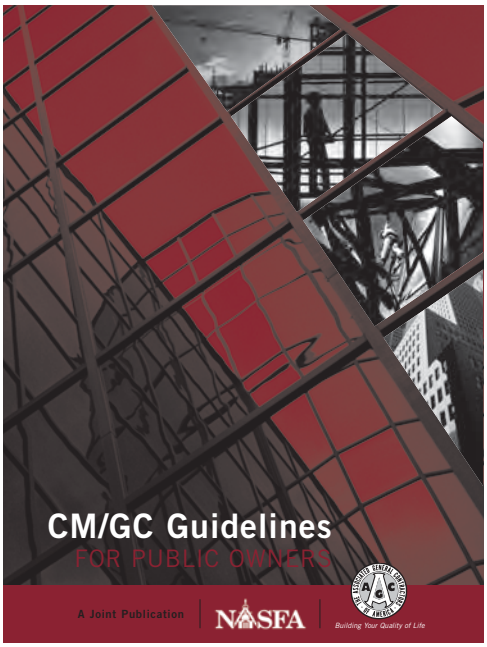
Electrical/Instrumentation/Controls

Prepare design documents in conformance with approach outlined by KAW during the preliminary design phase. The electrical design will incorporate equipment preferences of owner as well as addressing the following key elements of design:

- Prepare drawings that indicate the location of all devices and includes wire/conduit requirements for each.
- Prepare a computerized electrical power system analysis that addresses fault current, protective device coordination and arc flash analysis.
- Prepare single-line diagrams that depict the power distribution system.
- Address emergency power requirements for the facility.
- Develop energy efficient lighting layouts with computer generated software.

The instrumentation and control system design will consider address the filter control system and interface with the existing supervisory control and data acquisition (SCADA) system at the plant. Key features of this design will include:

- Under consideration at this time would be to develop a filter SCADA system around either Emerson Control Wave technology or Allen-Bradley PLC platform. Work with KAW to develop a system that will be compatible with any planned SCADA improvements at the plant.
- Prepare process and instrumentation diagrams (P&ID) in accordance with ISA Standard S5.1.
- Develop remote transmitting unit (RTU) interconnection drawings. The drawings will detail the following:
  - Ladder logic diagrams for each control panel and/or motor control circuits.
  - Panel elevation depicting component layouts.
  - Front-of-panel layouts.
  - Surge protection requirements.
  - Uninterruptable power supply (UPS).
- Develop a control strategy for filter backwash. Address filter valve control and whether the valve is open/close or modulating.
- Develop functional descriptions that address control strategies for each system. Identify manual and automatic control features for each.
- Address SCADA system architecture and how the filter building will interface with the plant control system.
- Develop a complete input/output list.
- Develop an instrument list.
- Provide a list of human-machine interface (HMI) requirements that includes:
  - Graphic displays with a brief description.
  - Report identification.
  - Alarm screens.
  - Trending graphics.



"*CM/GC Guidelines for Public Owners*" jointly distributed by AGC and the NASFA addresses many of the responsibilities for each party in the project. It also provides contractual examples, CM selection recommendations, and other important standard practices designed to improve the project results using CMAR as a delivery method.

HVAC/Structural Subdisciplines

- Prepare design documents in conformance with approach outlined by KAW during the preliminary design phase incorporating KAW's equipment preferences.
- Interact with the CM during the constructability to reduce cost or design complexity where possible.

Estimating/Constructability

- Develop a construction sequencing plan in cooperation with the CM in order to assure that the project schedule is met and the existing water plant remains in operation during the construction period.
- Engage design team with CM during the GMAX preparation in order to balance the quality and function of the project while driving cost-effectiveness and construction-friendly elements into the design.

CMAR Procurement Assistance

With HDR's local background and completion of hundreds of multi-discipline projects in Lexington and Central Kentucky, we are uniquely qualified to assist KAW in the selection of a CM for the RRS Filter Building project. This diversity of experience includes environmental, utility, civil works, transportation, structural, aviation and site development projects enabling us to work with nearly every construction company in the region. As such, we can assist KAW by broadcasting the opportunity to firms that have experience in managing and performing heavy utility/treatment plant as well as to other non-traditional utility firms that have significant experience in CM projects. A preliminary list of contractors in the region that might be interested in the opportunity includes:

- W. Rogers Company, Lexington
- Smith Contracting, Lawrenceburg
- MAC Construction, Louisville
- Building Crafts Incorporated, Wilder
- Bowen Engineering Company, Fishers
- Garney Construction, Nashville
- Judy Construction, Cynthiana
- Hall Contracting, Louisville
- Messer Construction, Lexington
- Kokosing Construction, Columbus
- Layne (formerly Reynolds), Orleans
- Codell Construction, Winchester

HDR has very good relationships with all of these firms and understands their strengths and drawbacks. KAW should expect that our assistance in procuring a CM will attract several proposers.

Our understanding of the regional contracting community and experience with alternative project delivery methods will benefit KAW during the CM selection process

Further, HDR can provide real benefits during the CM selection period based on our own experience with CM projects. HDR has been involved in dozens of projects delivered like this across the country. Several members of our local design team members have recently completed a project for the Columbus Zoo Stingray Life Support System (Water Treatment) that used CMAR for the project delivery.

HDR has often utilized or incorporated the guidelines developed by the Associated General Contractors (AGC) for the implementation of CMAR projects. A publication entitled "*CM/GC Guidelines for Public Owners*" jointly distributed by AGC and the National Association of State Facilities Administrators (NASFA) addresses many of

the responsibilities for each party in the project. It also provides contractual examples, CM selection recommendations, and other important standard practices designed to improve the project results using CMAR as a delivery method.

HDR has identified a few specific tasks that need to be completed during this phase including:

- Develop a RFP for CM Services in consultation with KAW based upon AGC and American Water standards.
- Issue 30% design bid documents with a preliminary estimate of costs as part of the RFP.
- Respond to any requests for information (RFIs) from CM proposers as requested by KAW and issue any addendum to the RFP.
- Acquire and distribute known construction requirements associated with the proposal (wage rates, regulatory approval, etc).
- Attend and participate as directed by KAW in the CM Pre-bid meeting and generally assist as requested during procurement.

SERVICES DURING CONSTRUCTION

Construction Administration

Once the PSC approves the RRS Filter Building project, the CM will be in a position to initiate construction. The expected construction duration is 12 months to substantial completion with an additional four months to final project completion. During this period, HDR, as the design consultant, will provide construction administration services to KAW to ensure that work is done in accordance with project documents, including:

- Review of shop drawings and responses to CM RFIs.
- Facilitate communication with project designers to address any project trouble-shooting that might arise.
- Lead monthly progress review meetings and processing of any pay estimate applications, field orders or change.
- Observe performance testing of materials and equipment (as needed).
- Prepare record drawings and O&M manuals.
- Ensure conformity with design intent by including the design team at a post construction conference and inspection prior to endorsement of the KDOW completion certificate.

Resident Project Representation

As part of our services during construction, HDR will provide on-site, full-time resident project representation. This qualified individual will be selected by KAW from a pool of candidates and shall perform the following tasks:

- Observe all concrete, material and equipment placement.
- Record placement of reinforcement in structures in conformance with project documents.
- Observe the contractor's preparation of concrete cylinders.
- Coordinate interaction with material testing firms as needed under the Kentucky Building Code.
- Prepare daily reports of work completed including photographs.
- Prepare minutes from meetings during construction phase.
- Initiate review of all pay applications, field orders and change orders.
- Maintain a set of as-built document to record changes to work.

HDR's experienced field personnel help mitigate project challenges & promote compliance with design documents.

INTERACTION WITH CONSTRUCTION MANAGER DURING DESIGN

While the RFP does not directly ask for an approach to the interaction between the design consultant and the CM, our past experience has shown that close coordination is needed in all activities to successfully complete the project. The design consultant and CM are not contractually bound in most projects so a team approach must be fostered. As such, HDR will provide the following elements to this proposal to insure the document storage platforms and communication tools are present to underpin the necessary project correspondence, including:

- Access to HDR's document storage site for immediate access to design documents in current conditions.
- Bi-weekly design team web meetings or phone calls with CM during the entire design phase.
- Multiple communication lines between discipline leads to promote workflow during the project.
- Subject matter expert reviewers to assist the CM, as requested.

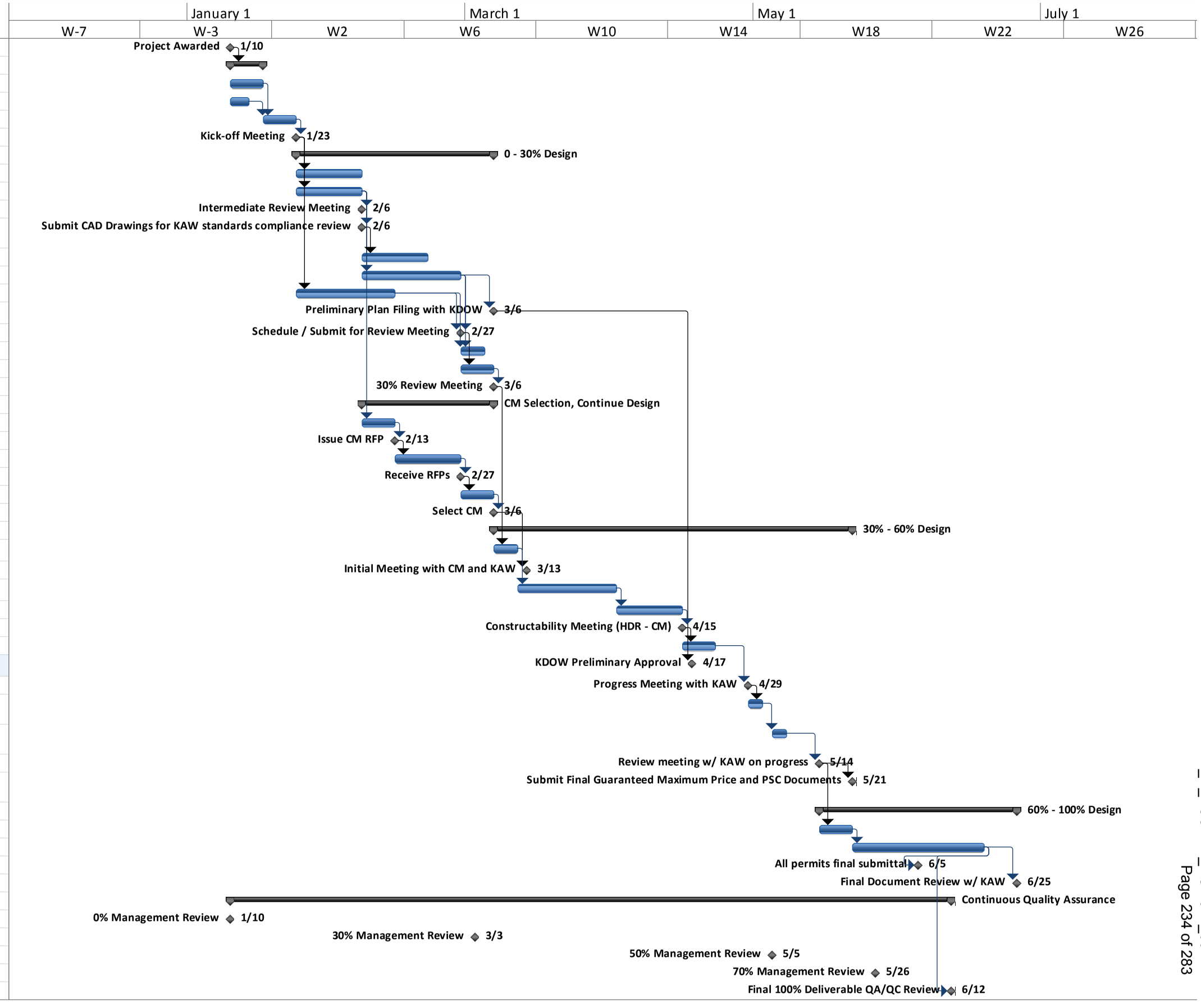
PROPOSED PROJECT SCHEDULE

KAW has emphasized the importance of developing and achieving a design and construction schedule. Key dates provided in the RFP include:

- Project Commencement – January 15, 2014
- 60% Design Completion – May 2014
- 100% Design Phase Completion – June 2014
- Construction Completed- April 2016

HDR has incorporated these milestones into a critical path design schedule which is provided in **Figure 3-3**.

Task Name	Duration	Start	Finish
Project Awarded	0 days	1/10/14	1/10/14
Project Initiation	**5 days**	**1/10/14**	**1/16/14**
Preparation of Design Critique	5 days	1/10/14	1/16/14
Prepare Project Schedule	2 days	1/10/14	1/13/14
KAW REVIEW: Design Critique / Project Schedule	5 days	1/17/14	1/23/14
Kick-off Meeting	0 days	1/23/14	1/23/14
Preliminary Process Design	**30 days**	**1/24/14**	**3/6/14**
Surveying / Geotechnical	10 days	1/24/14	2/6/14
Prepare Design Memorandum	10 days	1/24/14	2/6/14
Intermediate Review Meeting	0 days	2/6/14	2/6/14
Submit CAD Drawings for KAW standards compliance review	0 days	2/6/14	2/6/14
KAW Review for CAD compliance	10 days	2/7/14	2/20/14
Preliminary Filter Building Layout	15 days	2/7/14	2/27/14
Prepare P&IDs	15 days	1/24/14	2/13/14
Preliminary Plan Filing with KDOW	0 days	3/6/14	3/6/14
Schedule / Submit for Review Meeting	0 days	2/27/14	2/27/14
Cost Estimate Review / Update	3 days	2/28/14	3/4/14
KAW Review : 30% Drawings / P&IDs	5 days	2/28/14	3/6/14
30% Review Meeting	0 days	3/6/14	3/6/14
CM Selection	**20 days**	**2/7/14**	**3/6/14**
Assist in Finalizing RFP for CM	5 days	2/7/14	2/13/14
Issue CM RFP	0 days	2/13/14	2/13/14
Respond to RFIs	10 days	2/14/14	2/27/14
Receive RFPs	0 days	2/27/14	2/27/14
Review RFPs	5 days	2/28/14	3/6/14
Select CM	0 days	3/6/14	3/6/14
Prepare Documents for PSC	**54 days**	**3/7/14**	**5/21/14**
Incorporate 30% Comments	3 days	3/7/14	3/11/14
Initial Meeting with CM and KAW	0 days	3/13/14	3/13/14
Continue Design	15 days	3/12/14	4/1/14
CM Review of Intermediate Design Documents	10 days	4/2/14	4/15/14
Constructability Meeting (HDR - CM)	0 days	4/15/14	4/15/14
Implementation of Changes / Progress of Design	5 days	4/16/14	4/22/14
KDOW Preliminary Approval	**0 days**	**4/17/14**	**4/17/14**
Progress Meeting with KAW	0 days	4/29/14	4/29/14
Design Progress / Discipline Coordination between HDR - CM	3 days	4/30/14	5/2/14
Submission of 60% Cost Estimate (Guaranteed Maximum)	3 days	5/5/14	5/7/14
Review meeting w/ KAW on progress	0 days	5/14/14	5/14/14
Submit Final Guaranteed Maximum Price and PSC Documents	0 days	5/21/14	5/21/14
Final Design Completion	**30 days**	**5/15/14**	**6/25/14**
Incorporate 60% comments	5 days	5/15/14	5/21/14
Finalize Drawings / Specifications	20 days	5/22/14	6/18/14
All permits final submittal	0 days	6/5/14	6/5/14
Final Document Review w/ KAW	0 days	6/25/14	6/25/14
Internal Quality Assurance / Controls	**109 days**	**1/10/14**	**6/12/14**
0% Management Review	0 days	1/10/14	1/10/14
30% Management Review	0 days	3/3/14	3/3/14
50% Management Review	0 days	5/5/14	5/5/14
70% Management Review	0 days	5/26/14	5/26/14
Final 100% Deliverable QA/QC Review	0 days	6/12/14	6/12/14



RICHMOND ROAD STATION WTP NEW FILTER BUILDING DESIGN

Section 4 | COST PROPOSAL

Separate Lump Sum costs are provided for each of the following items:

Item	Lump Sum Cost
Design Phase	[redacted]
CM at Risk Bidding Services	[redacted]
Construction Administration	[redacted]
Additional Construction Meeting Attendance	[redacted] meeting
Resident Project Representative	
1. Hourly Rate	[redacted]
2. Overtime Pay	[redacted]
3. Per Diem Rate (based on 40hr week)	N/A

*Assumes full-time, 40-hour per week inspection for construction period.

2517 Sir Barton Way | Lexington, Kentucky 40509
(859) 629-4800

WHY HDR?

HDR offers the following positive attributes to the "Richmond Road Station WTP New Filter Building Design Project:"

- **Project Background -** HDR successfully completed the recent study for the rehabilitation or replacement of the RRS Filter Building.
- **Dedicated Local Resources & National Expertise -** Our relationships with regional contractors, past performance on local filter-related projects, and recent experience with biofiltration will benefit KAW during this project. Several of HDR's National Practice Leaders will be available, as-needed, to provide expertise.
- **Known Project Leadership -** The HDR team has a successful track record on projects of a similar nature. Brent Tippey and Matt Kusnir are well-known and have completed several projects for KAW.
- **Delivery -** HDR has an 85% repeat busniess rate, which is testament to our deliver of quality projects, on-time and within budget.

Thank you for your consideration.

KENTUCKY
AMERICAN WATER

New Filter Building Design
Richmond Road Station Water Treatment Plant

Lexington, Kentucky

REQUEST FOR PROPOSAL

NOVEMBER 2013

KENTUCKY AMERICAN WATER COMPANY
Engineering
2300 Richmond Road
Lexington, Kentucky 40502

KENTUCKY AMERICAN WATER COMPANY
RICHMOND ROAD STATION FILTER BUILDING REPLACEMENT

REQUEST FOR PROPOSAL

Table of Contents

KENTUCKY AMERICAN WATER COMPANY
RICHMOND ROAD STATION FILTER BUILDING REPLACEMENT

REQUEST FOR PROPOSAL AND DESIGN CONCEPT

I. SCOPE OF SERVICES

IA. Design

A separate lump sum proposal for project design must include the following services. Coordination and review of the design will be managed by Zach Dukes of Kentucky American Water, your primary contact throughout the design phase of the project. Any changes in the scope of services during the design phase must be addressed by the Consultant before the work is performed in the form of a Task Order and/or in accordance with the Master Services Agreement, if applicable.

1. Preparation of a brief design critique to identify specific scope modifications which may result in a more cost effective project, simplified construction, and/or improved operating procedures. This document shall be submitted prior to the initial design meeting. Alternative scope items which would result in significant design or construction cost savings, or which deviate significantly from the proposed Design Concept, shall be submitted with your proposal as part of the Conceptual Design Critique as discussed in Section II of this document (Information to be Submitted with the Proposal).

2. Preparation and maintenance of a progress schedule up to Notice of Award to the selected contractor. The schedule can be in either Gantt chart or CPM form and must include all work items as defined in this Request for Proposal. The schedule shall compare actual to scheduled activities and be updated monthly once an award of contract for design is made. As a minimum, the schedule must include specific dates for the following milestones:

    a. Submission of information prior to review meetings. At least one week shall be allotted in the schedule for review of information by the Water Company prior to any meeting.

    b. Each specific review meeting.

    c. Completion of permit applications for each specific permit.

    d. Design phase completion.

    e. Receipt of each specific permit. The Consultant shall ensure that the schedule reflects typical or legal review periods required by each respective regulatory agency to ensure receipt of permits by the required date.

3. Periodic meetings with the Water Company at the Lexington Office. It is expected that five (5) meetings will be required including a pre-design meeting to review the project specifics and design memorandum, a 30% design review meeting to review P&IDs and preliminary

layouts, a 60% design review meeting, a 90% design review meeting, and a meeting to review the instrumentation and control requirements. This last meeting will establish coordination and define responsibilities between the Consultant and Kentucky American Water's in-house system integrators.

4. All land and sub-aqueous survey work as necessary to adequately complete the design, file permit applications and provide reference points for use by the Contractor to layout the work. As a minimum, property lines, topographic information, and locations of existing structures are to be included.

5. All geotechnical investigations including soil borings, rock cores, and auger probing as necessary to adequately complete the design and allow for accurate estimating of construction earthwork.

6. All environmental activities as necessary to adequately complete the design and file permit applications. This will include the following:

    a. A wetlands delineation. The Consultant shall assume at this time that wetland areas will not be encountered and that development of a wetlands mitigation plan will not be necessary.

    b. A Phase I archeological survey. The Consultant shall assume at this time that artifacts will not be encountered and that a Phase II survey will not be necessary.

7. Total interaction with all utility companies to design and specify proper service for the proposed improvements and to coordinate the relocation of existing utilities as required. The consultant shall also determine if any additional capital or usage fees will be imposed by any specific utility.

8. Determining which Local, State, and Federal permits are required for this project, such as drinking water, floodplain, etc; preparing necessary permit applications, and providing technical input as required in securing these permits. The Consultant shall also provide the Water Company with information regarding the approximate length of review time for each permit, and any special requirements that could delay this process (e.g., public hearings). Except for extraordinary revisions required by regulatory agencies, the Consultant is expected to revise reports, plans, and specifications as necessary to secure permits as part of the basic lump sum proposal. The permit applications will be formally submitted and paid for by the Water Company.

9. Preparation and maintenance of a Design Memorandum. The Design Memorandum is a summary of design data presented in outline format along with other pertinent project information. The primary intent of the memorandum is to allow the Water Company to review and comment on the design before the Consultant proceeds with detailed design and drafting. The memorandum shall be updated throughout the design, and resubmitted as necessary at each subsequent review meeting as well as being submitted with permit applications, where applicable. A summary of the information to be included in the memorandum is outlined in the Attachments.

10. Preparation of a preliminary budget construction contract cost estimate broken down by major work item, and a final detailed construction contract cost estimate arranged in CSI format by major process components. The preliminary estimate shall be submitted with the Design Memorandum and the final estimate shall be submitted for the final design review meeting. The preliminary estimate shall be used by the Water Company to evaluate the adequacy of the budget for this project. The final estimate shall be used for evaluation of project costs and subsequent contractor bids. Each cost estimate shall be submitted in both hard copy and electronic (spreadsheet) format.

11. Preparation of a construction sequence plan describing how the new facilities will be constructed and placed in service while keeping the existing facilities in service as necessary. The plan shall consider operational and seasonal limitations and shall specifically define all partial or full outages (including electrical and instrumentation) with an estimated time for each outage. The plan must be reviewed and approved by the Water Company as part of the Design Memorandum submission to ensure that the operations of the existing facilities will be properly maintained during construction. The plan will also be used as a guideline during construction by the Contractor and provided in Division 1 of the technical specifications.

12. Preparation of a complete and coordinated set of design drawings for all engineering disciplines with an adequate level of detail to allow for construction by a General Contractor. Drawings used for permit applications and bidding require the signature and seal of a licensed professional engineer in the applicable State. The drawing sets require segregation by major discipline: site, architectural, structural, mechanical, electrical, instrumentation, etc. Drawings shall not contain extensive notes and written instructions to the General Contractor which are more appropriate for the specifications. Standard detail drawings shall exclude items which are not applicable to the current project.

    The Consultant shall prepare all drawings using the most current version of AutoCAD for Windows. The Company will not accept drawings created in an alternative CAD program, such as MicroStation, and "converted" to AutoCAD format. The Consultant shall use only AutoCAD and AutoLISP routines and no vendor-furnished or third party programs.

    The Consultant is required to use the Company's standard layers, scales, fonts, shapes, hatch patterns, line types, plotting assignments, etc. in accordance with the Attachments. The Consultant must use xrefs and model and paper space, and must plot the drawings in paper space using a scale of 1:1. Existing vs. proposed structures, equipment, etc. shall be defined by line weight instead of using the words "existing", "proposed", or "new". The attached AutoCAD standards, templates, blocks, plot style tables (.ctb R2000) and plot configurations (.pc2 R14) are for the Consultant's use in complying with the Company's AutoCAD standards. If the Consultant desires to utilize a more sophisticated set of AutoCAD standards, this request must be noted as an exception in the Consultant's proposal with a detailed explanation of the differences. The Company reserves the right to reject the Consultant's proposal for non conformance.

    With each submission of the drawing files, the Consultant shall submit a drawing list with the names of the corresponding external references and either a plot style table or a plot configuration created within AutoCAD. All file names, including external references, must conform to the Company's naming convention. The Consultant must set the limits of the

.dwg to (0,0) and (36,24), ZOOM each drawing to full extents, and use the PURGE command prior to each electronic submission to the Company. If two dimensional information is reflected on the plotted drawing, the "z" coordinate must be set at zero even if the drawing was created with three dimensions. When scanning (to raster) and converting (to vector) any of the Water Company's hand-drawn record drawings, the Consultant shall differentiate the existing facilities in accordance with the Company's AutoCAD standards.

It is recommended that the Consultant submit an early review (e.g., 25 percent complete) set of .dwg files for this project. The Company shall review the .dwg files for conformity with the Company's AutoCAD standards and advise the Consultant of any necessary changes. The Company then shall assume that the Consultant completes the remainder of the design in conformity with the Company's AutoCAD standards. If it is later found that final documents do not conform, the Consultant shall revise the final .dwg files at the Consultant's cost. The Consultant shall have the opportunity to discuss the Company's AutoCAD standards with Company staff.

Standards developed by American Water Works Service Company, Inc. and applicable to this project, and selected drawings of the existing facilities are provided in the Attachments. The information provided in the record drawings may not represent actual field conditions. The Consultant has the responsibility to field verify and record the existing conditions as necessary to complete the design phase.

Electrical drafting symbols shall conform to IEEE Standard 315 and 315A. Specific requirements for the design of instrumentation and controls for water treatment processes or water distribution, where applicable, are:

a. Conduct on-site investigations, interface with process engineers/designers, and review design materials and drawings to determine the type and location of primary sensors, control devices, panels and related instruments, and control equipment. The locations, elevations, and mounting details for these devices shall be included on the drawings.

b. Prepare P&ID drawings in accordance with ISA Standard S5.1 and RTU Interconnection drawings (input/output point lists) from the P&IDs. An example RTU Interconnection drawing is provided in the Attachments, and an electronic template will be provided to the selected Consultant upon request. The RTU interconnection drawings must be sufficiently detailed and accurate such that they can be utilized by the System Integrators and provided back to the Water Company as record drawings. The Consultant is responsible for allowing each of the pre qualified System Integrators identified by the Water Company to review the RTU Interconnection drawings prior to the final design review meeting. The minimum information to be included on the RTU Interconnection drawings is as follows:

    i. Wiring from field instruments to the appropriate I/O point on the RTU.
    ii. All signal isolation and signal conditioning equipment as required (e.g., a current to current isolator).

iii. Connections associated with the communications between RTUs (radios, fiber optic modems, etc.).
iv. Contacts and coils on digital outputs.
v. Wiring tags showing the RTU number, I/O type (AI, AO, DI, DO), RTU card number, and I/O point number.
vi. Connections for DC power supplies.

c. Prepare ladder logic diagrams to show the hard wired logic in panels and motor control logic in PLCs. Drawings shall be prepared to show the general configuration of all new panels, consoles, and the wiring between interconnected hardware components.

d. Prepare conduit and wiring drawings showing conduit and signal wire routing using scaled base drawings of all facilities. Where appropriate, the conduit and wiring drawings shall be integrated into the electrical drawings

e. Provide a computerized electrical power systems analysis. Include a Short-Circuit, Protective-Coordination and Arc Flash Hazard analysis.

f. Preparation of technical specifications, Divisions 2 through 16 in the CSI Spec-Text format, and the list of required shop drawings. The Water Company will provide preprinted General Conditions booklets and its Standard Contract Documents and Division 1 General Requirements (excluding a summary description of the project, the list of shop drawings, and "continuity of operations" sections) in final electronic form for printing, copying, and binding by the Consultant. Specifications shall reflect only the scope of work for the current project. Standard specifications shall be modified to exclude items not applicable to the current project.

13. Preparation of technical specifications, Divisions 2 through 16 in the CSI Spec-Text format, and the list of required shop drawings. The Water Company will provide preprinted General Conditions booklets and its Standard Contract Documents and Division 1 General Requirements (excluding a summary description of the project, the list of shop drawings, and "continuity of operations" sections) in final electronic form for printing, copying, and binding by the Consultant. Specifications shall reflect only the scope of work for the current project. Standard specifications shall be modified to exclude items not applicable to the current project.

    Specifications shall be prepared using the most current version of the Microsoft Word for Windows word processor. If your standard specifications are in a format other than Microsoft Word (such as Corel WordPerfect or Lotus Word Pro), they must first be converted to Microsoft Word format, thoroughly checked to ensure that a complete conversion was accomplished (including all tables, charts, headers, footers, etc.), then edited for this project as appropriate within Microsoft Word. The text shall be 12 point Times New Roman font. An electronic file name for each specification section shall include a descriptive name preceding a 5-digit specification section number followed by the Microsoft Word file extension (e.g., PROJECT 11500.doc).

The American Water System Construction Contract Documents prohibit a contractor from submitting substitute or "or equal" materials or equipment when a proprietary product, named manufacturer, or supplier has been specified. Provisions exist for bidders to submit alternatives to these items at bid time only. To ensure competitive pricing is being obtained for material and equipment that is not necessary to be a sole source item, it is recommended that at least three (3) acceptable manufacturers or products be listed in the specifications for each of these items. Specifying less than three (3) manufacturers is acceptable only when approved by the Water Company in cases where the products of additional manufacturers are not deemed to be comparable or do not meet the project requirements. If design details have been used on the drawings that are based on one of the listed products, this should be noted in the specifications. If design revisions are necessary to accommodate the other acceptable products, additional details shall be provided for the other products to facilitate complete and accurate bidding. Where an item is to be furnished on a sole source basis, only one (1) acceptable manufacturer or product will be listed in the specifications. If common items are included in multiple specification sections, language is to be included in the specifications that the same manufacturer is to be used for these common products.

In general one of the two specification methods above shall be used for all process, mechanical, and electrical equipment and other materials that are unique to the design (e.g., certain piping, valve, structural, mechanical, electrical and architectural products). Specifications for other materials or products that can be written prescriptively, by performance, or by reference to applicable standards, do not need to include specific manufacturers or products unless desired by the Consultant or the Water Company.

The specific items and requirements of the specifications for the electrical control circuits and the instrumentation and controls for water processes or water distribution, where applicable, are listed below. The Consultant shall interface closely with the Water Company in the development of these items.

a. Specifications for the digital equipment, and field and panel mounted instruments. Communication protocol between control system equipment and other digital equipment shall be specified by the Consultant and verified that it is compatible with the DCS. Data to be transferred by serial communications with other digital equipment shall also be identified.

b. An input/output point list.

c. Instrument specification sheets which are in accordance with ISA Standard S20.

d. Detailed written control logic and strategies (functional descriptions). Identification of the initial set points to be used at startup when variable set points are required in the control strategy shall also be identified.

e. Graphic display descriptions. Each specific display shall be identified and a brief description provided. Each I/O point (or calculated value) that should appear on each display must also be identified (preferably by indicating the name or number of

the display directly on the I/O list). Sample displays, which will be provided by the Water Company, shall be included in the contract documents.

f. Report definitions. All typical reports that the Water Company will generate shall be integrated with the control system and be accessible via an electronic spreadsheet (Microsoft Excel) or electronic database (Microsoft Access). The Water Company will provide examples of each specific report that shall be provided in the specifications. The I/O point or tag number that corresponds to each entry space in each report shall be identified directly on the example reports with appropriate instructions such as whether the data is an average, taken at a specific time of the day, etc. Entry spaces which the system cannot accommodate and need to be filled in manually shall be identified as such.

g. Alarming strategies for all alarms conditions including both warning alarms and critical alarms. Warning alarms are defined as analog (or calculated) alarms which provide notification that a critical condition is being approached (e.g. high turbidity, low chlorine residual, etc.). Critical alarms initiate automatic action by the system to address a critical condition (e.g. shut down the facility, start a backup piece of equipment, etc.). The specific action associated with each critical alarm shall also be identified. The Consultant shall identify all initial alarm set points to be used at startup.

h. Structured Query Language (SQL) database definition. All analog values, integrated values, and other relevant historical data shall be identified by the Consultant for inclusion in the SQL database and trending by the Systems Integrator. The Integrator shall store all historical data in a Microsoft SQL Server format.

i. Narrative descriptions of all control circuits. These descriptions shall describe in detail the operation of these circuits in the various operating modes (manual, auto, remote, etc.) and shall provide information relating to the purpose of each device (relays, timers, lights, etc.) included in the circuit.

14. Preparation of a narrative description of the operation of the proposed facilities to be used by plant operations personnel to familiarize themselves with the operation, capabilities, and limitations of the proposed improvements. The narrative shall be an extension of the process sections from the Design Memorandum, but in text format. It shall explain the intent and function of each unit process in addition to the system as a whole, and it shall include the detailed written control strategies (functional descriptions) which were prepared for the Design Memorandum submission. Preparation of the narrative shall not begin until the Design Memorandum is finalized and accepted. The narrative shall be submitted as a separate document for review at the final design review meeting. It shall serve as the foundation of the Operations and Maintenance Manual discussed in the Construction Administration section of this document.

15. Distribution of 6 sets of design memoranda, drawings, and specifications to be used during the design period for review purposes prior to each specified meeting. This same distribution, in addition to 4 sets of all design notes and calculations, shall also be made at the end of the design phase of the project. This information shall be submitted in both hard

copy and electronic formats where applicable. All drawing submittals during the design phase shall be true half size. The Design Memorandum and specifications must be submitted in 3-ring binders or other non-bound format to facilitate duplication if necessary. Tabs for each major section should also be provided in the hard copy. Electronic information can be submitted via e-mail or on CD.

16. Maintaining electronic communication capabilities throughout the design, bidding, and construction phases of the project. Access to the Web, and the ability to send and receive e-mail across the Internet, is mandatory for this project. As a minimum, the overall project manager and the project manager for any sub-consultants that will be performing a large percentage of the design work shall have this capability. These electronic communication capabilities shall be in place for each required member of your team prior to the initial design meeting.

IB. Construction Manager at Risk Bid Assistance

The Construction Manager at Risk (CMR) request for proposal will be issued following incorporation of all comments from the 30% design review meeting. KAW will issue, with the Designer assistance, a CMR request for proposal to aid in completion of design and target cost to present to the Public Service Commission for approval. A separate lump sum proposal for project bidding must include the following services.

1. Providing a total of 20 sets of Contract Documents (drawings and specifications) to contractors invited to bid on the project and for other uses during the bidding process.

2. Responding to contractors' or potential equipment suppliers' questions and preparation of addenda as required to document design changes or clarifications. Addenda requiring revisions to the technical specifications shall be prepared by direct revision of the specification and re-issuance of the effected pages. Each revised page shall have the following header: "Revised Per Addendum No. ___", and the specific additions and/or deletions shall be highlighted using the revision marking capabilities of Microsoft Word and submitted electronically. If additional addenda are required, the information from the previous addendum shall be incorporated into the specifications (without highlighting) and only the new information shall be highlighted. Addenda requiring drawing revisions shall be made by direct revision and re-issuance of the electronic file of the effected drawings unless otherwise approved by the Construction Engineer. The use of words in an addendum to revise drawings is strictly prohibited. If time does not allow for direct drawing revisions, the Construction Engineer may allow supplemental sketches for eventual incorporation as drawing (.dwg) revisions prior to a construction Award of Contract. Drawing revisions during the bidding phase shall be clearly marked or highlighted.

3. Maintaining the official plan holders list.

4. Attendance of the Design Project Manager/Engineer at a pre-bid meeting. The Design Project Manager/Engineer shall be thoroughly familiar with the design and be prepared to explain the technical aspects of the project and respond to questions from attendees.

5. Providing the list of bidders to potential equipment suppliers and construction information services as requested. Drawings and specifications, excluding sets provided at no cost to all listed bidders, will be purchased through the Consultant.

6. Providing a written evaluation of all alternative equipment offered by the bidding contractors, including a cost evaluation, as to whether each alternative satisfies the design requirements of the project, and based on objective and/or subjective criteria, provide a recommendation as to the acceptability of each alternative submitted.

IC. Construction Administration

The bidding phase of the project shall end with the signing of the construction contract by the successful bidder and the Water Company. This generally will occur after all permits are received and the construction budget has been approved by the Water Company. Overall construction management of the project will be handled by the System Engineering Construction Engineer which will include all direct dealings with the Contractor. The Consultant will be part of the construction management team and will report to the System Engineering Construction Engineer. All contact on the project, including submittal of invoices for professional services, would be through the designated Construction Engineer. A separate lump sum proposal for construction administration must include the following services for an assumed **12 months** period through substantial completion and an assumed **16 months** period to final completion.

1. General construction administration, including attendance at monthly construction meetings, resolution of construction problems related to the design, and review and interpretation of the design.

2. Shop drawing review and approvals including review and approval of resubmittals, and maintenance of a shop drawing log indicating dates received, returned, and status.

3. Review of contractor pricing of change orders and written recommendation to the Water Company of the reasonableness of the cost. Drawing and/or specification revisions required for change orders shall meet the same criteria as described above for preparation of addenda during the bid phase, including submittal in electronic format.

4. Preparation of supplementary detailed working drawings (meeting the previously specified requirements for AutoCAD drawing preparation), specifications, and written instructions or meetings as necessary throughout the construction period to interpret the contract plans and documents and to resolve changes brought about by actual field conditions encountered.

5. Services of the Design Project Manager/Engineer who will participate in and observe initial operation of the project (startup) and review operation and performance tests required by the contract specifications. At least 2 trips totaling 2 days should be allotted for on-site startup services and resolution of initial operating problems. Engineers from all of the engineering disciplines shall be made available to resolve startup issues as required, and also to resolve problems which may arise during the construction period. The Design Project Manager/Engineer will assist the Resident Observer in the preparation of the punch list and recommend acceptance of the facility by the Water Company.

6. Preparation and submission of electronic record drawings within two (2) months after startup. The record .dwg files shall conform to the Company's AutoCAD standards. If it is found that final documents do not conform to the Company's AutoCAD standards, the Consultant shall revise the final .dwg files at the Consultant's cost. Field data, information, sketches and working drawings, to be incorporated with the record drawings, shall be provided by the Resident Observer. The record drawings shall include all above and below grade changes from the original design drawings for all engineering disciplines. Changes made to reflect the as-installed conditions shall be made in the same level of detail and to the same degree of drafting quality as the original design drawings. The I&C engineer must review record drawings prepared by the wiring contractors to verify their accuracy prior to substantial completion. The Consultant must use the "ETRANSMIT" command in AutoCAD to supply the drawings to the Water Company to ensure that pen configurations, xrefs, etc. are accurately preserved. *In addition to electronic copies, Consultant shall provide three (3) hard copies of full size record drawings to the Water Company.*

7. Four (4) copies of an operations and maintenance (O&M) manual containing operating, maintenance, and repair information from manufacturer's submittals. The O&M manual shall incorporate the final narrative description of the operation of the proposed facility (see Design section) and a complete description of startup and shut-down procedures. The O&M manual shall be bound in 3-ring binders and indexed with tabs according to major process designations in the order of the treatment process. An initial draft of the O&M manual, without manufacturer's data, shall be submitted for review at approximately the 50% point of construction completion. The complete O&M manual containing all manufacturer's data shall be submitted at the 95% point of construction completion but no later than one (1) month before scheduled startup.

8. Services of the Design Project Manager/Engineer to attend a one (1) day postconstruction meeting at the site immediately following demobilization by the contractor.

9. Services of the Design Project Manager/Engineer for a one (1) day inspection of the facilities approximately six (6) months after they are placed into operation.

10. When required by regulation, the Consultant shall provide an affidavit to the Water Company for submission to the applicable regulatory agency confirming the construction of the facility is in accordance with the approved plans and specifications. Your construction supervision proposal shall be prepared based on the Water Company providing the Resident Observer(s) for the project. If either a full time or part time Resident Observer provided by the Consultant is required, the Consultant will be notified near the completion of design. Fees will be based on the engineer's proposal and requirements set forth in the section that follows.

ID. Resident Project Representative (RPR)

The duties, responsibilities and limitations of the authority of the RPR shall be in accordance with the Engineers Joint Contract Documents Committee (EJCDC) Form No. 1910-A, 1984 Edition with the following modifications:

1. The RPR services shall be furnished on a full time basis. For part time services, the frequency and length of visits shall be dictated by the scheduled work of the contractor. To schedule these

visits, the RPR shall communicate with the Contractor's Superintendent. The RPR shall review with the KAW Project Manager the intended work and inspection schedule.

2. The RPR will prepare the minutes of all conferences and meetings for review and circulation by the KAW Project Manager.

3. The KAW Engineer will draft all change orders, work change directives and field orders.

4. The RPR shall maintain one (1) set of plans and specifications for record purposes. The RPR shall record changes made during construction for later incorporation into the project's record documents.

5. The RPR shall provide digital photographs containing the date taken and a description of the photographic view. Photos will be taken on a routine basis to document the construction process, buried or concealed work, defective work (prior to its rework) and any damage to work or property during construction. The photos shall be maintained at the construction site, made available to the KAW Project Manager, and copies released to KAW upon completion of the project.

6. A resume of the RPR to be appointed to the project shall be provided along with a company work history, including similar type projects. The KAW shall have the right to approve or reject the appointment or replacement of the assigned RPR. The proposal should include furnishing the full time RPR as follows:

    a. Per Diem rate based on a 40-hour work week inclusive of expense allowance. The contractor may maintain four (4), ten hour workweeks at their discretion. Direct project expenses shall be billed as a direct expense.

    b. Overtime rate for each weekly hour in excess of 40 hours.

    c. Hourly rate for any part-time inspection on an "as needed" basis. Project expenses such as mileage to and from the project site shall be billed as a direct expense.

II. INFORMATION TO BE SUBMITTED WITH THE PROPOSAL

The following minimum information must be submitted with your proposal for it to be accepted:

1. Your general opinion regarding the adequacy of the Water Company's construction budget for this project based on the information presented in this document. The water company has estimated the construction cost at $11,000,000.

2. A critique of the Conceptual Design to determine what modifications to the concept may result in a more cost effective project, simplified construction, and/or improved operating procedures. Although this is not mandatory as part of your proposal, selection of a Consultant will consider any alternate ideas or concepts that are proposed which are deemed to be appropriate and feasible. This critique should focus on major conceptual ideas whereas the critique required as the first step in the design phase is intended to focus on detailed design items. For each item you may choose to critique, the following information must be provided:

    a. A detailed description of the item including identification of all areas of the proposed facilities that will be effected by the change.

    b. A comparison of the item to that proposed in the attached design concept highlighting non-cost advantages or disadvantages, if any.

    c. An estimate of the proposed construction cost savings. The estimated savings must by justified by comparing the critiqued item to the proposed item with one or more of the following.

        i. A budgetary cost estimate.
        ii. Actual cost information from previous projects.
        iii. Manufacturer or contractor quotations.

    d. An estimate of any potential operational cost savings. The estimated savings must be justified by a cost analysis comparing the critiqued item to the proposed item. Additionally, if any proposed capital cost savings will result in additional operational costs, these added operational costs must also be identified.

3. Separate lump sum fees for design, bidding, and construction services, and record drawings (if applicable). Your costs shall be reflective of the time periods identified in the cover letter of this document. Also provide additional itemized lump sum fee adjustments (+/-), where appropriate, for:

    a. Any critiqued items offered if the associated design, bidding, or construction fees will be different from that in your base lump sum fees.

    b. A separate unit cost for attendance at each construction meeting additional to that specified in the Scope of Services required for construction administration (required).

c. The resulting adjustment to the construction administrative services lump sum fee if a Resident Observers furnished by the Consultant would result in efficiencies for the designated services during construction.

4. Supplemental hourly rates (with overhead) for staff members by discipline (all levels) for use in determining appropriate compensation or reimbursement for any changes in the scope of work. These rates would also be applicable for resident construction observation should the Water Company not provide a Resident Observer. All hourly rates should be based on rates in effect at the time of submission of your proposal. Your proposal should also indicate the time period when rates for your company are typically adjusted.

5. Your understanding of the scope of work as presented in the Design Concept conveyed by way of the specific information listed below. Acceptance of your proposal shall not imply that the information provided has been specifically agreed to by the Water Company. The specific details and layout of the proposed facilities shall be developed in the early stages of the design phase and agreed to by the Water Company prior to or at the time of submission of the Design Memorandum.

    a. Process schematics or hydraulic profiles of the proposed facilities.

    b. Rough site and facility plan sketches. Sketches shall be no larger than 11" x 17". It is acceptable and encouraged to provide brief supplementary text with any of the above to assist in demonstrating your understanding of the required scope of work.

6. The anticipated scope of geotechnical exploration including number and depth of all soil borings.

7. A listing of drawings and specifications required for this project, with titles for each drawing.

8. A listing of all Federal, State, and local permits required for design, construction, and operation of the proposed facility. The listing must state the name of the permit, the respective regulatory agency or municipality, a brief description of the purpose of the permit, and the typical or legal review time required by each respective agency.

9. A preliminary schedule from date of award in either Gantt chart or CPM form. For the purpose of the proposal it is assumed that the design phase of the project will be completed by June 2014. Award of the project based on 60% design target cost is anticipated in May 2014 with construction completed in April 2016. If the time of completion desired by the Water Company is not acceptable, it shall be explicitly stated in the proposal. The schedule shall reflect the requirements previously specified for monthly schedule updates.

10. A project team organizational chart headed up by the proposed design and construction project manager(s) (if different) and including all other engineering personnel from all disciplines who are expected to be directly associated with this project. If subconsultants will be utilized on your project team, the firm that employs each individual in the organizational chart shall also be identified.

11. Résumés and a work experience history of each individual identified in the project team organizational chart. The resumes of the proposed Project Manager and lead Project Engineer are of particular importance and must demonstrate their experience in both project management and design relative to the proposed scope of work. The résumés of those individuals to be associated with the instrumentation and controls design must demonstrate their capabilities in those areas identified in the Scope of Services required for design.

12. Specific identification of any sub-consultants that will be utilized for this project, exclusive of soil boring and survey work. If subconsultants will be utilized, the résumés of the specific individuals will be required as well as a work experience history of their firms, including three (3) references with specific contacts and phone numbers.

13. Concurrence that you are prepared to sign a Task Order for the approved scope of work under the terms of the existing Master Services Agreement should your proposal be accepted by the Water Company.

14. Specifics of any exceptions which are taken to items requested in this document. If the Consultant desires to utilize a more sophisticated set of AutoCAD standards, this request must be noted as an exception with a detailed explanation of the differences. However, the Company reserves the right to reject the Consultant's proposal for non conformance. If no exceptions are taken, it is not necessary to reiterate the information in the Scope of Services Required.

COST PROPOSAL

Provide separate Lump Sum costs for each of the following items:

Design Phase $_____

CM at Risk Bidding Services $_____

Construction Administration $_____

Additional Construction Meeting Attendance $_____

Resident Project Representative

1. Hourly Rate $_____

2. Overtime Rate $_____

3. Per Diem Rate (based on 40hr week) $_____

III. ATTACHMENTS

The following attachments are included:

A. Design Concept
B. Existing Facility Drawings (Drawings on enclosed CD)

KENTUCKY AMERICAN WATER

RICHMOND ROAD STATION WATER TREATMENT FACILITY

FILTER BUILDING REPLACEMENT

DESIGN CONCEPT

KENTUCKY AMERICAN WATER
2300 Richmond Road
Lexington, Kentucky 40502
November 2013

PART 1

PROJECT BACKGROUND

A. INTRODUCTION

Kentucky American Water (KAW) provides water service to most of Fayette County and portions of Bourbon, Clark, Gallatin, Grant, Harrison, Jessamine, Owen, Scott and Woodford counties. The service area is divided into two separate systems. The Central system serves approximately 120,000 customers and accounts for nearly 98% of the total water demand, while the Northern System serves approximately 3,882 customers and accounts for the remaining 2% of demand. The Central System is currently serviced by the three water treatment plants: Kentucky River Station I (KRS-1), Richmond Road Station (RRS), and Kentucky River Station II (KRS-2). The Northern System is currently serviced by the Owenton Water Treatment Plant, however a pipeline to connect the Northern District to KRS-2 is under construction, with plans to take the Owenton Water Treatment Plant off line.

In August of 2013 KAW retained HDR Engineering, Inc. to evaluate the existing RRS filter building and provide recommendations for rehabilitation or replacement. After structural, maintenance, mechanical and electrical assessments it was determined that the most feasible option is to replace the filter building.

B. RICHMOND ROAD STATION

The Richmond Road Station (RRS) was originally constructed in 1885 and is located in the southeastern portion of the City of Lexington, adjacent to both Lake Ellerslie and the Water Company office complex at 2300 Richmond Road. The plant has undergone expansions and improvements in 1988, 1992, and 2003 to bring its current rated capacity to 25 mgd. However, the plant is permitted to treat 30 mgd by the DOW on a temporary basis as long water quality requirements are met. As noted earlier, the DOW does not strictly mandate a plant's maximum permissible production, but rather mandates the maximum filter loading rate (5.0 gpm/sf) to which a plant may operate as long as water quality requirements are met. The DOW focuses on the source water allocation allowance as the primary governor in a plant's operation. The rated capacity of the RRS is 25 mgd since taking one filter would still limit the filter loading rates to less than 5 gpm/sf.

The station is a conventional surface water treatment plant with concrete settling basins and granular activated carbon gravity filters and derives the majority of its source of supply primarily from Pool 9 of the Kentucky River. The supply can be augmented with raw water from Jacobson Reservoir; however, the reliance on Jacobson Reservoir is minimized due to inferior water quality in the reservoir, particularly following rain events. Under emergency conditions, the station can also supplement its source of supply from Lake Ellerslie although this source has limited capacity and also exhibits poor water quality.

C. RAW WATER PUMPING FACILITIES

Pumping facilities are in place at each of the three sources which provide raw water to RRS (Kentucky River Pool 9, Jacobson Reservoir, and Lake Ellerslie). The total pumping rate from either the Kentucky River or Jacobson Reservoir is controlled by two venturi raw water rate-of-flow controllers with one

dedicated to each of the inlets to the plant's two sedimentation basins. These rate-of-flow controllers were installed in 2003 and allow flow to be regulated to each basin (3 – 15 mgd). Although the controllers communicate with the SCADA system, they are not controlled through SCADA but are manually opened and closed by the operators.

The majority of the raw water withdrawn from the Kentucky River is used to supply KRS-1, however, as much as needed is diverted to RRS by means of a transfer pumping station (hereinafter referred to as "KRS Transfer") which is located on the KRS-1 site. KRS Transfer houses two horizontal split case pumps, each with a rated capacity of 18.1 mgd at 270' TDH. However, with both pumps in operation, the flow from KRS Transfer is limited to 24 mgd due to hydraulic limitations. The transfer pumps direct raw water through a 30-inch main to either Jacobson Reservoir or directly to the raw water vault at RRS depending on the valving arrangement at Jacobson Reservoir.

Raw water can also be withdrawn from Jacobson Reservoir and pumped to RRS through three parallel mains by means of three horizontal pumps located in a station below the dam of the reservoir. There is no existing permit restricting withdrawals from Jacobson Reservoir. The suction line to the pumping units from Jacobson Reservoir to RRS tees off of the pipe that supplies water to Jacobson Reservoir from KRS Transfer. Therefore, if water is being transferred into the reservoir from the Kentucky River at a rate less than that which is being pumped from the reservoir, the Kentucky River water will by-pass the reservoir and be transferred directly to the suction of the reservoir pumping units in combination with Jacobson Reservoir water. The name plate capacities of the Jacobson Reservoir pumps are equal to 8.35 mgd for a total capacity of 25 mgd.

The capability to withdraw raw water from Lake Ellerslie, adjacent to the RRS, also exists by means of two horizontal pumps located in the High Service Pump Building. Lake Ellerslie had at one time been the primary source of supply for the City of Lexington. These pumps, however, are only used in emergency conditions, such as drought conditions or during emergency loss of power at the other raw water pump locations, due to the limited safe yield of the lake.

D. WATER QUALITY

Approximately 47% of the plant's annual source of supply is derived from the Kentucky River while the remaining 53% is derived from Jacobson Reservoir. Although the Kentucky River source can experience much higher turbidity spikes, the Jacobson Reservoir source water is more difficult to treat due to the presence of manganese and taste and odor causing compounds. Raw water quality at RRS will vary depending on the flow split between Kentucky River water and Jacobson Reservoir. The quality of the raw water entering RRS is generally good. TOC concentrations are relatively high, and the SUVA concentrations are relatively low reflecting a natural organic matrix that is difficult to remove.

Jacobson Reservoir is aerated by an underwater piping system that distributes compressed air throughout the reservoir with the purpose of oxidizing iron and manganese. Additionally, potassium permanganate, sodium permanganate and copper sulfate can be added for control of taste and odors. The aeration system compressor, sodium permanganate and potassium permanganate feed equipment are all located at the Jacobson Reservoir pumping station. Copper sulfate is applied directly to the reservoir surface from a boat as needed. Permanganate is automatically fed at the Jacobson Reservoir pump intake based on pump operating status.

Pretreatment chemicals at RRS are primarily fed either upstream of or within two-stage rapid mix tanks at the inlets of each of two independent sedimentation basins. These chemicals include chlorine for pre-disinfection, caustic soda for pre-pH control, and polyaluminum chloride (PACl) and a cationic polymer for coagulation.

Powdered activated carbon (PAC) is fed for taste and odor control at the effluent of the flocculation basin in each sedimentation basin. This is the only feed point for PAC. Previously PAC was fed at the rapid mix tank but was relocated because of the affinity between PAC and chlorine. Feeding PAC at this location minimizes residuals build up in the flocculation basins which are not equipped for automatic cleaning however this feed location is not ideal for providing sufficient contact time for PAC to effectively treat taste and odor episodes. KAW has considered switching the feed points for PAC and pre-chlorine to allow for more contact time for the PAC. In addition, this will also slightly reduce some of the chlorine contact time which may help with reduced DBP formation within the plant. Calculations based on historic data indicate that the plant would still be able to meet CT requirements as long as the clearwell underneath the filters is included in disinfection credit. The capability to feed a filter aid directly to the filter influent also exists at RR5 but has not been needed over the last five years.

Two separate chemical buildings house the majority of the pretreatment chemicals. Chemical Building No. 1 houses the chlorine (gas) and caustic soda feed systems. A chlorine scrubber system is located outside of Chemical Building No. 1 in case of a chlorine leak. Chemical Building No. 2 includes the PACl, polymer, fluoride, corrosion inhibitor and powdered activated carbon (PAC) feed systems. Chemical Building No. 2 also houses the ammoniators used to feed ammonia from the storage tanks located outside the building. The filter aid feed facilities are located at the point of application in the filter gallery.

All post treatment chemicals are fed within or at the discharge of Clearwell No. 1. These chemicals include chlorine (if needed) and ammonia for disinfection, caustic soda for pH adjustment, hydrofluosilicic acid for fluoridation, and zinc orthophosphate for corrosion control.

E. FILTRATION

Settled water flows by gravity from the sedimentation basins to sixteen (16) concrete box filters, each 20' x 17' with a surface area of 340 sf. The piping between the sedimentation basins and the filters was improved in 2003, whereby two 30-inch lines were installed to eliminate the potential for surcharging the sedimentation basin effluent weirs at plant flows greater than 25 mgd. The filter media provides filtration and adsorption with 8-inches assorted size silica gravel, 6-inches of 0.45-0.55 mm sand, and 24-inches of 0.8-1.0 mm granular activated carbon (GAC). Each filter is equipped with an outlet rate of flow control valve which is controlled by filter level, and with air wash for backwashing. Each of the RRS filters is equipped with SCADA turbidity monitoring such that a filter can be shut down immediately if its effluent turbidity reaches 0.1 NTU.

The equipment (including valves, operators, electrical, etc.) and piping in the filter gallery are in poor condition due to corrosion. The filter pipe gallery is extremely congested which makes working in this area difficult. Inadequate ventilation and dehumidification has accelerated the deterioration of the piping and valve actuators. Additionally, there is visible cracking of the filter walls and leaking in the filter gallery. In 2003, a dehumidifier was installed in the filter building to try to control the humidity in the filter gallery. However, there is still a considerable amount of moisture in the filter gallery. It is unknown how much of the moisture in the filter gallery is due to air flow conditions and pipe sweating

and how much is related to leaking pipes and filters. There also appear to be leaks between the filter gallery and the chlorine contact chamber that is below the filters as there is a chlorine odor in the room. Expedited corrosion of equipment and piping could be a result of the chlorine. In addition, to the equipment and pipes, the aggressive environment in the filter gallery has resulted in the deterioration of the concrete and structural elements in the filter gallery.

Filter backwash water supply is stored in a 24-foot diameter, 15 foot high, bolted steel tank with a total volume of 50,000 gallons. The tank operates in parallel with a vertical turbine wash water pump located in the filter gallery, with a rated capacity of 1,000 gpm. The flow rate is controlled by a wash water rate of flow controller also located in the filter gallery. A high service connection is available for backwashing filters in emergencies or when the wash water tank is out of service for maintenance. Spent backwash is sent to one of the two wash water waste holding tanks, as detailed in the Residuals section. In early 2003 the filters were equipped with filter-to-waste capability. Filter-to-waste is automated through SCADA and is discharged to the wash water holding tanks.

Table 1-1 below evaluates the process adequacy of the filtration processes at RRS. Over the five year period from 2006-2010, the finished water turbidity has averaged 0.1 NTU and has never been higher than 0.37 NTU, well below the IESWTR values of 0.3 NTU and 1.0 NTU, respectively.

TABLE 1-1
Richmond Road Station
Filtration

Production Rate	Surface Loading Rate			Surface Loading Rate (1 unit out)		
	Actual (gpm/sf)	AWWA/ASCE (gpm/sf)	Ten State (gpm/sf)	Actual (gpm/sf)	AWWA/ASCE (gpm/sf)	Ten State (gpm/sf)
12 mgd	1.5	2.0 - 7.0	n/a	1.6	2.0 – 7.0	n/a
25 mgd	3.2			3.4		
Production Rate	**Empty Bed Contact Time, EBCT**			**Empty Bed Contact Time, EBCT (1 unit out)**		
	Actual (min)	AWWA/ASCE* (min)	Ten State (min)	Actual (min)	AWWA/ASCE* (min)	Ten State (min)
12 mgd	9.8	5 - 25	n/a	9.2	5 - 25	n/a
25 mgd	4.7			4.4		

* The guidelines shown above pertain to only the GAC portion of the media.

The DOW has indicated that filtration rates of 5.0 gpm/sf should not be exceeded. With a plant production rate of 25 mgd and one filter out of service for backwashing, the loading rate is 3.4 gpm/sf. Even with two filters out of service the loading rate is 3.6 gpm/sf at 25 mgd, well below the DOW limit. The filters are equipped with GAC for taste and odor control. Due to limited physical depth of the filter boxes, the EBCT is relatively low at maximum flow. However, as previously discussed the PAC feed capability at the sedimentation basins has been improved to ensure taste and odor issues can be adequately handled when treating Jacobson Reservoir water.

F. EXISTING STUDY

In October of 2013 HDR Engineering completed an evaluation of the RRS filter building. The objective of this study was to provide recommendations for the filter building, and if warranted, options for its replacement.

The scope of the study included the assessment of the existing filter building, pipe gallery and clearwell. Descriptions and observations of current operations and existing conditions were included in the assessment. As part of the study, a new filter building location was included along with considerations for hydraulics, reliability, cost and overall constructability. Various filter technologies were considered. For the existing treatment process, the facility components that need to be replaced or expanded were identified. Construction and project costs were developed for recommendations and the recommended improvements were logically combined into an efficient project for rehabilitation or replacement. Based on HDR's evaluation, the following recommendations were made:

1. The maintenance and process assessment highlighted numerous issues. The poor equipment conditions and hazards in the filter building were detailed. Based on the maintenance and process issues encountered, a new filter building was recommended.

2. The electrical assessment highlighted the poor conditions of the electrical equipment and potential code issues with replacement. Based on the electrical issues encountered, a new filter building was recommended.

3. The structural assessment highlighted the deteriorated condition of the operating floor above the pipe gallery. Other cracks and structural damage was also noted. Based on the structural issues encountered, a new filter building was recommended.

4. An underwater inspection of the clearwell showed relatively minor issues. The overall condition of the clearwell was decent. Based on the clearwell inspection, the clearwell can stay in continued operation with only minor repairs.

Based on a review of the merits of numerous options and discussion with the KAW staff, HDR recommended that a new filter building with GAC dual media filters be constructed.

PART II

DESIGN SCOPE

A. INTRODUCTION

The design and construction of the proposed replacement of the RRS Filter Building shall be based on the background information outlined above and the following design information. In general, the scope of work shall include the following major components:

1. New filter building with twelve filter beds capable of treating 25 MGD.
2. Media profile assumed to be 24" of GAC underbedded by 12" of sand to improve turbidity reduction.
3. Air/water backwashing capability.
4. Adequate space for maintenance and more robust ventilation than currently exist.
5. Process only facility with no administrative, sanitary, chemical storage, advanced treatment or storage space included.
6. Compliant facility with all modern structural and electrical codes.
7. Demolition/decommissioning of existing filter building.

B. BENEFITS FROM PROPOSED IMPROVEMENTS

With the proposed replacement of the RR5 Filter Building, a number of benefits are anticipated. A new filter building will primarily provide RR5 with a safe and reliable structure in which to operate and alleviate maintenance issues such as poor ventilation, perpetual corrosion and lack of access space for inspection/repairs.

A new filter building will improve water quality through additional turbidity removal within the filter and possibly reduce the quantity of chemicals currently necessary for pre-filtration sedimentation.

C. PERFORMANCE GOALS

The new filter building will continue to allow KAW to achieve a high level of finished water quality that complies with all applicable state and federal water quality and treatment requirements.

D. GENERAL

General Design Criteria

1. *Plant Staffing*: No change in plant staffing is planned. The filter building replacement shall be designed with adequate instrumentation and controls, and shall be integrated into the existing plant control system.

2. *Input/Output Lists*: The DESIGNER is required to develop a complete I/O list based on the final design details. This list is to be developed in Microsoft Excel and shall include the following information:

    a. RTU, rack, card, slot and point designation.

    b. Point type (IE, analog input/output, digital input/output) – including spares.

    c. Identification of equipment or device connected.

    d. Wiring/raceway information including wire/cable identification numbering scheme.

    e. Provisions in the list for additional comments to be completed by the water company.

3. *Acceptable Equipment Manufacturers*: Those provided in the appendices at the end of the Design Concept are manufacturers that are acceptable to the Water Company. This does not preclude the DESIGNER from suggesting other manufacturers of comparable or higher quality. It is also the DESIGNER responsibility to recommend other manufacturers to facilitate competition for the specific application. However, final selection of acceptable manufacturers will be determined by the Water Company.

Common Equipment and Materials

1. *General*: Information regarding specific equipment or materials that are common to many areas of the facility is provided in this section.

2. *Process Piping*: Cement lined ductile iron pipe unless otherwise noted. Appropriate pressure class pipe shall be provided for all above and belowground piping at the plant. Pressure class 350 as a minimum shall be provided for all pressurized yard piping on the treatment plant site.

3. *Process Piping Joints*: All onsite below ground pressure-rated process piping shall have proprietary restrained joints. All onsite above ground (plant) pressure-rated process piping shall have flanged joints. Grooved or Victaulic joints are permissible for above ground piping where substantial cost savings may be achieved. Friction type restrained joints (e.g. Megalugs) are only permitted where required to accommodate buried valves or fittings. Set-screw flanges are retainer glands are not acceptable.

4. *Process Valves*: AWWA butterfly valves. Use plug valves for waste lines 8 inches and smaller.

5. *Motorized Operators (Actuators)*: Electric operators rated for 208V, 3-phase power. The actuators shall fully comply with requirements of AWWA CS09 and shall be sized for torque valves established by the valve manufacture.

6. *Motors*: All small (fractional) and medium (integral) squirrel-cage induction motors shall be premium efficiency, "NEMA Premium" rated, and shall be designed, constructed, and tested in accordance with NEMA MG-1 and IEEE 112,Test Method B. In general, all motors, ½ horsepower and larger, shall be rated at 480 volts, three-phase; motors less than ½ horsepower will be rated 120 volts, single phase unless specific application or criteria determines otherwise.

7. *In-plant Water Supply Piping*: Copper (three inches and smaller), except in areas where exposed to corrosive chemicals such as sodium hypochlorite where Schedule 80 PVC piping will be permitted.

8. *In-plant Plant Water Supply Valves*: Bronze ball valves unless otherwise noted.

9. *Backflow Preventers*: Reduced pressure zone type required on all individual connections to in-plant potable water. A common backflow preventer may be provided on the plant water supply.

10. *Metering*: Venturi flow meters with electronic, smart-type type transmitters are preferred in general. Magnetic meters are acceptable provided they are economical. Insert type and strap on type flow meters of any type are not acceptable. The manufacturer's recommendations for minimum straight runs of pipe upstream and downstream of the meter can be strictly adhered to. Locate meters in above ground accessible building locations wherever possible. Below ground meter vaults are discouraged, but if required, shall provide adequate space for meter maintenance and adequate ventilation for confined space requirements.

11. *Level Monitoring*: Ultrasonic level probes for liquid level monitoring. Sensors shall be located away from turbulence.

12. *Sampling Locations*: Specifics defined in each section below. On-line analytical instruments should be located as close as possible to the sample point. Manual taps shall be provided at all sample points to allow for grab samples. Velocities in sample lines where pumping is required should be approximately S ft/sec. Provide insertion-type paddle-wheel flow sensors on the discharge of all sample pumps. Use PVC pipe for all sample lines.

13. *Painting*: All exposed piping to be color coded per Ten State Standard requirements. All mechanical equipment and other potentially corrosive surfaces shall be coated. Stainless steel is not acceptable in chlorinous atmospheres. All piping shall be labeled.

E. PLANT CAPACITY

General Design Criteria

1. *Maximum Day*: 30.0 MGD

2. *Rated Capacity*: 25.0 MGD

3. *Average Day Demand*: 16.0 MGD

4. *Minimum Flow*: 4 MGD

5. *Operating Capability*: All constructed/installed components shall be fully capable of operating over the specified range of flows per manufacturer's recommendations.

6. *Optimum Efficiency of Mechonical/Electrical Equipment*: Based on average day design flow.

F. PLANT SITE

1. *Landscaping*: Provide for new or modified facilities, landscaping plan for approval by the Water Company and conforming to local ordinances and standards. Landscaping shall be minimal to provide aesthetically pleasing view.

2. *Exterior Lighting*: Provide for new or modified facilities, where necessary for security and safety purposes.

3. *Exterior Power Distribution*: Provide where necessary for upgrades and replacements of the power distribution system.

G. FILTER BUILDING DEMOLITION

1. *Filter Building Demolition:* The existing filter building shall be demolished. All relevant process piping shall be disconnected and all debris resulting from the demolition removed from the site.

H. FILTRATION IMPROVEMENTS

1. *New Filter Building*

   a. *Type of Filter:* GAC Dual Media Filters.

   b. *No. of Units*: Twelve (12) filter beds (approximately 475 SF each).

   c. *Capacity of Facility*: 25 MGD (with one unit out of service).

   d. *Maximum Loading Rate of Unit*: 5.0 gpm/ft2.

   e. *Filter Piping*: Flanged Ductile Iron Pipe. Provide closed cell insulation of filter piping to prevent condensation and associated corrosion on exterior pipe surfaces.

   f. *Media*: Filter media depth shall be as follows:

      i. Granular activated carbon (GAC) – 24 inches
      ii. Sand – 12 inches

g. *Location*: The new filter building should be located in a modestly wooded area north of the existing chemical building and bound by several facility roads. The lime facility is also adjacent to this location. The terrain appears to be compatible to accommodate the hydraulic grade of the clarifiers. A review of the as-built drawings resulted in identifying only smaller chemical lines present from the process standpoint. The most significant utility relocation challenge is the overhead electric that traverses the area. The DESIGNER should determine if constructing the filter in this location will pose any significant risk to existing structures/facilities. The DESIGNER shall consider alternate filter locations to determine if construction costs may be significantly reduced due to more favorable building conditions. The existing filter gallery piping (combined filter effluent, backwash waste, wash water supply) should be extended to serve the new filters.

h. *Operational Mode*: Constant rate with influent level control.

i. *Effluent Metering*: Venturi meter with electronic, smart-type type transmitters with adequate upstream and downstream straight runs of pipe.

j. *Loss of Head*: Loss of head measurement shall be provided by electronic, smart-type type differential pressure transmitters.

k. *Backwash Control Schedule*:

i. Filter backwashes shall be initiated by the Operator. The filter sequence shall be automatic once initiated by the Operator. The following criteria shall be used to alert the operator that a filter backwash is necessary:

1. Time
2. Differential pressure (headloss)
3. Effluent turbidity

2. *On-Line Monitoring*: On-line monitoring requirements are as follows:

a. Individual filter effluent flow

b. Loss of head on individual filters.

c. Turbidimeter on individual filter effluent.

d. Combined filter effluent turbidimeter.

3. *Backwash Capabilities:* The minimum filter backwash capabilities shall be as follows:

a. *Backwash Method*: Water wash with concurrent air scour

b. *Capacity of air supply*: Adequate to provide a minimum air flow rate of 2 scfm/sf. Provide sufficient controls to prevent surging of blower on start-up.

c. *Means of Supplying Wash Water*: Supply to be from the existing wash water storage tanks by gravity, however, an alternative is preferred.

d. *Capacity of Wash Water Supply System*: Adequate to provide a minimum bed expansion of at least 30% over the normal operating water temperature range.

e. *Method of Backwash Rate Control*: Use existing wash water rate control system.

f. *Backwash Troughs*: Backwash troughs shall be made of fiberglass reinforced plastic (FRP). The trough shall provide adequate and uniform removal of backwash wastewater during filter backwashing.

g. *Filter-to-Waste Capability*: The proposed filters shall be provided with the capability to filter to waste. It is desirable that the filter-to-waste flow be rated for the full filter capacity and metered.

4. *Chemical Application and Water Sampling:*

a. *Location*: Provide application points for chlorine to the combined filter influent and to combined filter effluent. Provide capability to deliver filter aid to individual filters.

b. *Water Quality Sampling*: Filter effluents.

I. PROCESS CONTROL AND INSTRUMENTATION SYSTEMS

1. General

a. System Architecture: The DESIGNER shall expand the existing system to cover proposed work maintaining the look and feel of the existing system. The existing system is a combination of Emerson ControlWave RTU's. The HMI is Iconics Gensis 32.

2. Modes of Operation

a. Remote Capabilities: Each piece of process equipment will be equipped with a Local Off-Remote selector switch (at the piece of equipment) to allow the location of control to be changed. In order to ensure that the RTU in the Remote Manual or Remote Automatic Mode has control, an additional contact block will be added on the remote leg of the selector switch. The output of the contact block will drive a digital input that will serve as a permissive in the DCS. If the DCS attempts to control a device from the RTU when it is not in the remote mode, a failure condition will be delineated at the operator's interface. Equipment furnished as part of a package system with a local control panel may not require individual LOR selector switches.

b. Local-Manual: An operator at a piece of process equipment will turn the device on and off and make adjustments. Required for all equipment.

c. Local-Automatic: Controls are hardwired into pieces of equipment by a vendor (such as pre-packaged process equipment).

d. Remote-Manual: An operator turns items on and off via the Human Machine Interface (HMI) connected to the DCS. Required for all equipment.
e. Remote-Automatic: The DCS turns items on and off and performs all control while monitored thru the HMI. Required for equipment as necessary for overall plant coordinated control.

3. Remote Telemetry Unit

a. Processors: filters use Emerson ControlWave PAC RTU's.

b. Cabinets: Include compact lighting fixture activated by a door switch. Each RTU shall have a UPS. RTU's shall be located indoors in a controlled environment with fans and heaters wherever possible. RTU's located outdoors shall have outdoor rated enclosures (NEMA 4X, SS) with sunshades, thermostatically controlled heaters and cooling.

c. Terminal Blocks: Multilevel terminal blocks are permitted. Ease of troubleshooting is primary factor in style selection.

d. Spare Wired Terminals: Provide in each cabinet to facilitate future expansion (20% minimum for each I/O type).

e. Convenience Receptacles: Use ground-fault interrupter type or transient voltage surge suppression type as applicable to the installation only unless otherwise directed by the owner.

f. Separation of Power Cable and Signal Wires: 120 VAC control cable shall be physically separated from 4-20 mA signals and 24 VDC cabling as much as practicable inside control cabinets. Provide barriers for compliance with ISA Standards. Field wiring into the control panel, including junction boxes, shall be labeled as per the P&ID drawings; not wiring numbers.

g. I/O Slots: As required plus minimum 20% spare slots for system expansion.

h. 3-Wire Control: Required for all pieces of equipment (one normally closed contact for stop and one normally-open for start, etc.) except for metering pumps (which only require 1 contact for the start and the stop functions).

i. Modulating Valves: Analog control with full open and full closed feed back or open closed control with position feedback and full open and full closed feedback. (Note: Valve operators to be provided suitable for 208 volt, three-phase power.)

j. Analog inputs and outputs shall be 4-20 mA: Interrogation voltage for discrete inputs shall be 24 VDC. Isolated dry relay contacts shall be furnished for all discrete outputs – relays may be integral to the I/O module. Interposing relays shall be furnished in cases where the I/O module relay contacts do not have adequate electrical ratings.

k. Discrete digital I/O will be 24 VDC.

l. I/O Modules: Provide high density I/O modules.

4. Operator Interface Hardware and Software

   a. The DESIGNER shall update the existing Iconics Gensis 32 HMI system to include new process screens as required.

5. Operator Interface Functions

   a. Screens: The DESIGNER shall include paragraph descriptions of the OIT and HMI screens (including a listing of each specific I/O point required on each screen) to give the system integrators an understanding of the level of detail required. Each screen shall utilize the Water Company's standard color conventions for stop, run, open, closed, and intermediate conditions. Text-based screens shall be considered in the design. An operator (or supervisor only) shall have the capability to manually enter data onto the screen that is not generated by the system but is appropriate to be displayed on a screen, such as a manual valve change for a chemical feed point of application. Control programs shall include limiting parameters for operator inputs, such as chemical feed dosages, to prevent excursions. Only supervisors shall have access to modify those parameters. Provide a list of all screens to be created by the system integrator. Provide sample screens to establish the minimum acceptable level of graphic detail.

   b. Reports: Each report that is generated by the Water Company shall be incorporated into the system. This shall be accomplished by creating the forms in Microsoft Access (latest release) format and downloading data directly from the system. When data that is not generated by the system is required on certain forms, the operator shall have the capability to manually enter this information into the report, or overwrite data that the system has downloaded. Provide a list of all reports to be developed by the system integrator.

   c. Alarms: An alarm summary table shall be developed by the DESIGNER and reviewed with the Water Company during design. The table shall include specific initial values for all high and low alarm set points. Analog set points are also to be configurable on the graphic displays. The specific software package that is ultimately selected must have auto dialing capabilities such that alarms conditions can notify on-call personnel without the need for a separate auto dialer. Operators shall not have access to modify alarm set points without special authorization.

   d. Database: Provide an expanded SQL database package to store process data and act as a server to database users outside the process control system. This shall be installed on an existing server and fully integrated into the existing system.

6. System Factory Test

   a. The Water Company and the DESIGNER shall witness a factory acceptance test (FAT) of the filter improvements prior to its shipment to the job site. The DESIGNER shall provide written approval for shipment following acceptance of the factory test.

b. The factory test shall be conducted by the System Integrator using simulated inputs to assure all I/O are provided and all inputs, outputs and application software are functioning according to the intent of the plans and specifications. Additional distributed control units shall be provided, if necessary, to accommodate the project phasing requirements. The test procedure shall include simulated system faults and failures. The factory tests shall be staged in two parts: the first to review all I/O and hardware and the second to assure functionality of the system.

c. The factory test shall demonstrate all graphics, report generation and alarm functions of the system.

d. Provide at least a four week written notification to the Water Company prior to the start of the witnessed factory test. Provide a written FAT procedure for Water Company review prior to the start of the FAT.

7. Training

a. General: The Water Company shall advise the DESIGNER as to the amount of training to be performed relative to the distributed control system. It is expected that the DCS system supplier will furnish videotapes of the training. These videotapes will be turned over to the Water Company at the end of training program.

b. Operator Training: Operating training has the following goals:

i. Use workstations, touch screens, and keyboards

ii. Retrieve and interpret all standards displays including graphics, overview displays, group displays, trends, point summaries, and alarm summaries

iii. Enter data manually

iv. Change control parameters and set points

v. Assume manual control of equipment and control it from the HMI

vi. Print Reports

vii. Acknowledge Alarms

viii. Respond to software and hardware error

ix. Historical Data Collection, archival and retrieval

x. Capabilities and configurability of: reports, alarm reporting, setting passwords, and system hardware configuration

xi. Database backup and recovery

c. Maintenance Training: This training equips Water Company personnel with the skills required to diagnose, trouble shoot, and repair the components of the system. As a minimum, maintenance training shall provide technicians with the ability to:

   i. Power-up, boot strap, and shut down all of the hardware devices

   ii. Perform scheduled maintenance functions on all components

   iii. Describe the theory of operation for all circuit boards

   iv. Setup and use off-line diagnostics to determine hardware failures to the fault board or module

   v. Use workstations, keypads, or keyboards to retrieve and interpret displays which shall provide on-line diagnostic information

   vi. Remove and replace all removable boards/modules

   vii. Maintenance training shall be at least 75% hands-on instruction and shall be designed for personnel that do not have any familiarity with the equipment furnished

d. Supervisor Training: This training is for personnel who will need to make access changes to the DCS. This training consists of the following basic tasks:

   i. Log-on and log-off to the HMI and OIT

   ii. Setting and clearing passwords

   iii. Configuring access levels for various process parameters and set points

   iv. Printing and configuring reports

e. Calibration: It is expected that a detailed calibration plan will be developed during the construction phase of the project. The DESIGNER will review the instrumentation installed and provide guidance to the Water Company as to the number of follow-up visits for calibration, the type of calibration documentation to be furnished, and the calibration equipment to be furnished to allow Water Company personnel to maintain the equipment after project completion.

8. Protection of Sensitive Equipment

   a. General: The DESIGNER shall follow guidelines for the powering and grounding of sensitive electronic equipment listed in I.E.E.E. Standard 1100-1999.

   b. Transient Voltage Surge Suppression (TVSS): Provide TVSS at point ofuse for all instrumentation loads. Required for all 4 wire instruments (such as a chlorine residual

analyzer), and placed on the 120 VAC branch circuit and on the 4-20 mA portion of the circuit. The transient voltage surge suppression on the 4-20 mA wiring shall be located on the RTU end. For all two wire 4-20 mA instruments that have signal cable running from outdoor to indoor locations (or signal wire run between buildings), transient voltage surge suppression on the field side of the 4-20 mA signal is required

c. Grounding: Each RTU cabinet shall be provided with a direct connection to the ground grid via a driven rod in addition to the equipment safety ground required by the National Electrical Code. Daisy chaining of grounds is not acceptable. A grounding detail showing the interface between the RTU cabinet and the proposed grounding system is required. Instrumentation shields shall be grounded at the DCS end only. The electrical grounding specifications must be cross referenced to the instrumentation and control specifications so that it is understood that the system integrator monitors the quality of system grounding. In order to facilitate an electrically conductive ground mass, provide connections to structural steel and interface them to the grounding system.

d. Power Supplies: Separate power supplies shall be provided for analog inputs and RTU's, and digital outputs.

e. Conduit Spacing: Required between power and signal/control cables as listed in I.E.E.E Standard 518-1982.

9. Signal / Control Wiring For Outdoor Areas:

a. Use PVC coated rigid galvanized steel conduit (or Schedule 80 PVC where specifically directed) in all chemical storage areas. Where possible, enclosures for control and electrical components should be located outside of the chemical storage rooms. Where this is not possible, the enclosures shall be fiberglass NEMA 4X type enclosures with non-metallic hinges and latches.

b. Signal / Control Wiring For Outdoor Areas: Use PVC coated rigid steel conduit.

KENTUCKY
AMERICAN WATER

2300 Richmond Road
Lexington, KY 40502
zachery.dukes@amwater.com

P 859.268.6352
F 859.335.3393

November 19, 2013

Mr. Jeffrey L. Raffensperger
207 Senate Avenue
Camp Hill, PA 17011

RE: Request for Proposal: Richmond Road Station Filter Building

Dear Mr. Raffensperger:

Attached you will find a Request for Proposal to design a new filter building at Kentucky American Water Company's ("KAW") Richmond Road Station Water Treatment Plant ("RRS"). As mentioned in the attached document, a compact disc of RRS record drawings will follow in the mail. A pre-proposal meeting will be held at KAW's Lexington office on December 4, 2013 at 10:00 a.m. The final proposal shall be submitted no later than 2:00 p.m. on December 19, 2013 at KAW's Lexington office.

If you have any questions, comments or concerns please feel free to contact me at (859) 268-6352.

Sincerely,

Zachery B. Dukes, P.E.
Project Manager Engineer

ZBD/file

KENTUCKY
AMERICAN WATER

2300 Richmond Road
Lexington, KY 40502
zachery.dukes@amwater.com

P 859.268.6352
F 859.335.3393

November 19, 2013

Mr. Brent A. Tippey, P.E.
2517 Sir Barton Way
Lexington, KY 40509

RE: Request for Proposal: Richmond Road Station Filter Building

Dear Mr. Tippey:

Attached you will find a Request for Proposal to design a new filter building at Kentucky American Water Company's ("KAW") Richmond Road Station Water Treatment Plant ("RRS"). As mentioned in the attached document, a compact disc of RRS record drawings will follow in the mail. A pre-proposal meeting will be held at KAW's Lexington office on December 4, 2013 at 10:00 a.m. The final proposal shall be submitted no later than 2:00 p.m. on December 19, 2013 at KAW's Lexington office.

If you have any questions, comments or concerns please feel free to contact me at (859) 268-6352.

Sincerely,

Zachery B. Dukes, P.E.
Project Manager Engineer

ZBD/file

KENTUCKY
AMERICAN WATER

2300 Richmond Road
Lexington, KY 40502
zachery.dukes@amwater.com
P 859.268.6352
F 859.335.3393

November 19, 2013

Mr. Bret M. Casey, P.E.
444 Lewis Hargett Circle
Suite 260
Lexington, KY 40503

RE: Request for Proposal: Richmond Road Station Filter Building

Dear Mr. Casey:

Attached you will find a Request for Proposal to design a new filter building at Kentucky American Water Company's ("KAW") Richmond Road Station Water Treatment Plant ("RRS"). As mentioned in the attached document, a compact disc of RRS record drawings will follow in the mail. A pre-proposal meeting will be held at KAW's Lexington office on December 4, 2013 at 10:00 a.m. The final proposal shall be submitted no later than 2:00 p.m. on December 19, 2013 at KAW's Lexington office.

If you have any questions, comments or concerns please feel free to contact me at (859) 268-6352.

Sincerely,

Zachery B. Dukes, P.E.
Project Manager Engineer

ZBD/file

Appendix B

AMERICAN WATER

Kentucky American Water Company
Richmond Road Station - Filter Building Design

Scoring Criteria

Item		Description	Weighting (%)
1		**Project Approach**	**30.0%**
1.1		**Technical**	**5.0%**
	a.	Proposer's understanding of Project	2.0%
	b.	Does Proposer understand KAWC Design Requirements	3.0%
1.2		**Project Outline**	**10.0%**
	a.	Adequacy of design concept	3.0%
	b.	Adequacy of proposed meetings	4.0%
	c.	Adequate proposed design layout/structure	3.0%
1.3		**Adequacy of Scope of Work Identified**	**10.0%**
	a.	Adequacy of Construction Budget Task	2.0%
	b.	Adequacy of Conceptual Design Task	2.0%
	c.	Adequacy of Soil Boring Task	2.0%
	d.	Adequacy of Drawing and Specification List Task	2.0%
	e.	Adequacy of Permit Listing Task	2.0%
1.4		**Identification of Potential Challenges**	**2.0%**
	a.	Acceptability of Potential Challenges and possible solutions	2.0%
1.5		**Alternatives/Exceptions**	**3.0%**
	a.	Acceptability of offered alternatives and exceptions	3.0%
2		**Project Schedule**	**20.0%**
	a.	Were critical and key milestones identified?	8.0%
	b.	Were adequate approval times included?	6.0%
	c.	Were realistic periods identified?	6.0%
3		**Fee Proposal**	**10.0%**
	a.	Design Costs	6.0%
	b.	Labor Rates	4.0%
4		**Project Team**	**20.0%**
	a.	Adequacy of proposed team experience on similar projects	5.0%
	b.	Adequacy of team member disciplines	4.0%
	c.	Adequacy of staffing structure	2.0%
	d.	Qualification of team members	5.0%
	e.	Performance on other AW projects	2.0%
	f.	Proposer's Quality Management Plan	2.0%
5		**Firm's Capabilities**	**20.0%**
	a.	Relevancy of similar projects	10.0%
	b.	Are indicated projects similar in scope and magnitude?	5.0%
	c.	Was project team involved in similar roles in indicated projects?	5.0%
Total			**100.0%**

AMERICAN WATER

Kentucky American Water Company
Richmond Road Station Filter Building Design

TEAM 1	**51.4**	Gannett Fleming
TEAM 2	**61.4**	Hazen & Sawyer
TEAM 3	**60.8**	HDR

Proposers' Score Table

Scoring criteria & mechanism are on the previous worksheets
See scoring definitions below

Item	Description	Max. Possible Weighted Score (%)	TEAM 1 Gannett Fleming Score	TEAM 1 Weighted Score	TEAM 1 Comments	TEAM 2 Hazen & Sawyer Score	TEAM 2 Weighted Score	TEAM 2 Comments	TEAM 3 HDR Score	TEAM 3 Weighted Score	TEAM 3 Comments
	COMPOSITE TOTAL	**100.0%**		**51.4**			**61.4**			**60.8**	
1	**Project Approach**	**30%**		**13.8**			**14.8**			**13.8**	
1.1	**Technical**	**5%**		3.0			3.0			3.0	
a.	Proposer's understanding of Project	2%	3.0	1.2		3.0	1.2		3.0	1.2	
b.	Does Proposer understand KAWC Design Requirements	3%	3.0	1.8		3.0	1.8		3.0	1.8	
1.2	**Project Outline**	**10%**		6.0			6.6			6.6	
a.	Adequacy of design concept	3%	3.0	1.8		3.0	1.8		3.0	1.8	
b.	Adequacy of proposed meetings	4%	3.0	2.4		3.0	2.4		3.0	2.4	
c.	Adequate proposed design layout/structure	3%	3.0	1.8		4.0	2.4		4.0	2.4	
1.3	**Adequacy of Scope of Work Identified**	**10%**		1.2			1.6			1.2	
a.	Adequacy of Construction Budget Task	2%	3.0	1.2		4.0	1.6		3.0	1.2	
b.	Adequacy of Conceptual Design Task	2%	3.0	1.2		3.0	1.2		3.0	1.2	
c.	Adequacy of Soil Boring Task	2%	4.0	1.6		4.0	1.6		3.0	1.2	
d.	Adequacy of Drawing and Specification List Task	2%	3.0	1.2	69 sheets	3.0	1.2	62 sheets	3.0	1.2	82 sheets
e.	Adequacy of Permit Listing Task	2%	4.0	1.6	All potential permits identified	4.0	1.6	Good discusion on DOW, some misses on	3.0	1.2	No discussion on permits
1.4	**Identification of Potential Challenges**	**2%**		1.2			1.2			1.2	
a.	Acceptability of Potential Challenges and possible solutions	2%	3.0	1.2		3.0	1.2		3.0	1.2	
1.5	**Alternatives/Exceptions**	**3%**		2.4			2.4			1.8	
a.	Acceptability of offered alternatives and exceptions	3%	4.0	2.4	Use Alt Site 1, New Backwash supply,	4.0	2.4	Filter Rate (8 filters), Backwash Improv,	3.0	1.8	Filter Load Rates
2	**Project Schedule**	**20%**		**9.2**			**13.6**			**12.0**	
a.	Were critical and key milestones identified?	8%	2.0	3.2	60% 3/24, 90% 4/22, Schedule didn't	4.0	6.4	60% 4/24, 100% 6/26	3.0	4.8	60% 5/14, 100% 6/14
b.	Were adequate approval times included?	6%	3.0	3.6		3.0	3.6		3.0	3.6	
c.	Were realistic periods identified?	6%	2.0	2.4	Too compressed schedule	3.0	3.6		3.0	3.6	
3	**Fee Proposal**	**10%**		**4.8**			**6.4**			**6.8**	
a.	Design Costs	6%	2.0	2.4	Design [redacted], Cont Ad [redacted]	4.0	4.8	Design [redacted], Cont Ad [redacted]	3.0	3.6	Design [redacted] Cont Ad [redacted]
b.	Labor Rates	4%	3.0	2.4		2.0	1.6		4.0	3.2	
4	**Project Team**	**20%**		**11.6**			**14.6**			**14.2**	
a.	Adequacy of proposed team experience on similar projects	5%	3.0	3.0		4.0	4.0		4.0	4.0	
b.	Adequacy of team member disciplines	4%	3.0	2.4		4.0	3.2		4.0	3.2	
c.	Adequacy of staffing structure	2%	3.0	1.2		4.0	1.6		3.0	1.2	
d.	Qualification of team members	5%	3.0	3.0		3.0	3.0		3.0	3.0	
e.	Performance on other AW projects	2%	2.0	0.8		3.0	1.2		3.0	1.2	
f.	Proposer's Quality Management Plan	2%	3.0	1.2		4.0	1.6		4.0	1.6	
5	**Firm's Capabilities**	**20%**		**12.0**			**12.0**			**14.0**	
a.	Relevancy of similar projects	10%	3.0	6.0		3.0	6.0		4.0	8.0	
b.	Are indicated projects similar in scope and magnitude?	5%	3.0	3.0		3.0	3.0		3.0	3.0	
c.	Was project team involved in similar roles in indicated projects?	5%	3.0	3.0		3.0	3.0		3.0	3.0	

Score Definitions
5 Far Above Expectations
4 Above Expectations
3 Meets Expectations
2 Below Expectations
1 Far Below Expectations
0 Unacceptable

AMERICAN WATER

Kentucky American Water Company
Richmond Road Station Filter Building Design

Proposers' Score Table

Scoring criteria & mechanism are on the previous worksheets

See scoring definitions below

Item	Description	Max. Possible Weighted Score (%)
	COMPOSITE TOTAL	**100.0%**
1	**Project Approach**	**30%**
1.1	**Technical**	**5%**
a.	Proposer's understanding of Project	2%
b.	Does Proposer understand KAWC Design Requirements	3%
1.2	**Project Outline**	**10%**
a.	Adequacy of design concept	3%
b.	Adequacy of proposed meetings	4%
c.	Adequate proposed design layout/structure	3%
1.3	**Adequacy of Scope of Work Identified**	**10%**
a.	Adequacy of Construction Budget Task	2%
b.	Adequacy of Conceptual Design Task	2%
c.	Adequacy of Soil Boring Task	2%
d.	Adequacy of Drawing and Specification List Task	2%
e.	Adequacy of Permit Listing Task	2%
1.4	**Identification of Potential Challenges**	**2%**
a.	Acceptability of Potential Challenges and possible solutions	2%
1.5	**Alternatives/Exceptions**	**3%**
a.	Acceptability of offered alternatives and exceptions	3%
2	**Project Schedule**	**20%**
a.	Were critical and key milestones identified?	8%
b.	Were adequate approval times included?	6%
c.	Were realistic periods identified?	6%
3	**Fee Proposal**	**10%**
a.	Design Costs	6%
b.	Labor Rates	4%
4	**Project Team**	**20%**
a.	Adequacy of proposed team experience on similar projects	5%
b.	Adequacy of team member disciplines	4%
c.	Adequacy of staffing structure	2%
d.	Qualification of team members	5%
e.	Performance on other AW projects	2%
f.	Proposer's Quality Management Plan	2%
5	**Firm's Capabilities**	**20%**
a.	Relevancy of similar projects	10%
b.	Are indicated projects similar in scope and magnitude?	5%
c.	Was project team involved in similar roles in indicated projects?	5%

Score Definitions

5 Far Above Expectations
4 Above Expectations
3 Meets Expectations
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1 Far Below Expectations
0 Unacceptable

AMERICAN WATER

Kentucky American Water Company
Richmond Road Station Filter Building Design

TEAM 1	**58.8**	Gannett Fleming
TEAM 2	**61.4**	Hazen & Sawyer
TEAM 3	**60.6**	HDR

TEAM 1	**58.8**	Gannett Fleming
TEAM 2	**61.4**	Hazen & Sawyer
TEAM 3	**60.6**	HDR

TEAM 1	**58.8**	Gannett Fleming
TEAM 2	**61.4**	Hazen & Sawyer
TEAM 3	**60.6**	HDR

Proposers' Score Table

Scoring criteria & mechanism are on the previous worksheets

See scoring definitions below

Item	Description	Max. Possible Weighted Score (%)	TEAM 1 Gannett Fleming Score	TEAM 1 Weighted Score	TEAM 1 Comments	TEAM 2 Hazen & Sawyer Score	TEAM 2 Weighted Score	TEAM 2 Comments	TEAM 3 HDR Score	TEAM 3 Weighted Score	TEAM 3 Comments
	COMPOSITE TOTAL	**100.0%**		**58.8**			**61.4**			**60.6**	
1	**Project Approach**	**30%**		**16.8**			**19.4**			**16.6**	
1.1	**Technical**	**5%**		4.4			4.4			5.0	
a.	Proposer's understanding of Project	2%	5.0	2.0	Mentions ozone allowance	5.0	2.0	Accounts for organics and cost reductions	5.0	2.0	Clear understanding from planning phase
b.	Does Proposer understand KAWC Design Requirements	3%	4.0	2.4		4.0	2.4		5.0	3.0	
1.2	**Project Outline**	**10%**		7.2			8.4			6.6	
a.	Adequacy of design concept	3%	4.0	2.4	KII has filter set up and likes it	5.0	3.0	Like design and new contact chamber	4.0	2.4	Original plan with allowance for mods
b.	Adequacy of proposed meetings	4%	3.0	2.4		3.0	2.4		3.0	2.4	
c.	Adequate proposed design layout/structure	3%	4.0	2.4	Specifics included on savings.	5.0	3.0	Specifics included for savings. Like this one best.	3.0	1.8	Like building design, but like other filter designs better.
1.3	**Adequacy of Scope of Work Identified**	**10%**		1.2			1.6			1.6	
a.	Adequacy of Construction Budget Task	2%	3.0	1.2	Similar to H&S with improvements	4.0	1.6	Identifies potential increased costs	4.0	1.6	Cheapest design
b.	Adequacy of Conceptual Design Task	2%	3.0	1.2	Not a lot of detail here	5.0	2.0	Best detail	4.0	1.6	Accounts for reduction in filter #
c.	Adequacy of Soil Boring Task	2%	5.0	2.0		3.0	1.2		3.0	1.2	
d.	Adequacy of Drawing and Specification List Task	2%	3.0	1.2		3.0	1.2		3.0	1.2	
e.	Adequacy of Permit Listing Task	2%	3.0	1.2		3.0	1.2		3.0	1.2	
1.4	**Identification of Potential Challenges**	**2%**		1.6			2.0			1.6	
a.	Acceptability of Potential Challenges and possible solutions	2%	4.0	1.6		5.0	2.0		4.0	1.6	
1.5	**Alternatives/Exceptions**	**3%**		2.4			3.0			1.8	
a.	Acceptability of offered alternatives and exceptions	3%	4.0	2.4		5.0	3.0		3.0	1.8	
2	**Project Schedule**	**20%**		**12.0**			**12.0**			**12.0**	
a.	Were critical and key milestones identified?	8%	3.0	4.8		3.0	4.8		3.0	4.8	
b.	Were adequate approval times included?	6%	3.0	3.6		3.0	3.6		3.0	3.6	
c.	Were realistic periods identified?	6%	3.0	3.6		3.0	3.6		3.0	3.6	
3	**Fee Proposal**	**10%**		**6.0**			**6.0**			**8.0**	
a.	Design Costs	6%	3.0	3.6	Similar to H&S	3.0	3.6	Similar to GF	4.0	4.8	Cheapest
b.	Labor Rates	4%	3.0	2.4	Similar to H&S	3.0	2.4	Similar to GF	4.0	3.2	Cheapest
4	**Project Team**	**20%**		**12.0**			**12.0**			**12.0**	
a.	Adequacy of proposed team experience on similar projects	5%	3.0	3.0		3.0	3.0		3.0	3.0	
b.	Adequacy of team member disciplines	4%	3.0	2.4		3.0	2.4		3.0	2.4	
c.	Adequacy of staffing structure	2%	3.0	1.2		3.0	1.2		3.0	1.2	
d.	Qualification of team members	5%	3.0	3.0		3.0	3.0		3.0	3.0	
e.	Performance on other AW projects	2%	3.0	1.2		3.0	1.2		3.0	1.2	
f.	Proposer's Quality Management Plan	2%	3.0	1.2		3.0	1.2		3.0	1.2	
5	**Firm's Capabilities**	**20%**		**12.0**			**12.0**			**12.0**	
a.	Relevancy of similar projects	10%	3.0	6.0		3.0	6.0		3.0	6.0	
b.	Are indicated projects similar in scope and magnitude?	5%	3.0	3.0		3.0	3.0		3.0	3.0	
c.	Was project team involved in similar roles in indicated projects?	5%	3.0	3.0		3.0	3.0		3.0	3.0	

Score Definitions

5 Far Above Expectations
4 Above Expectations
3 Meets Expectations
2 Below Expectations
1 Far Below Expectations
0 Unacceptable

AMERICAN WATER

Kentucky American Water Company
Richmond Road Station Filter Building Design

Proposers' Score Table

Scoring criteria & mechanism are on the previous worksheets

See scoring definitions below

Item	Description	Max. Possible Weighted Score (%)
	COMPOSITE TOTAL	**100.0%**
1	**Project Approach**	**30%**
1.1	**Technical**	**5%**
	a. Proposer's understanding of Project	2%
	b. Does Proposer understand KAWC Design Requirements	3%
1.2	**Project Outline**	**10%**
	a. Adequacy of design concept	3%
	b. Adequacy of proposed meetings	4%
	c. Adequate proposed design layout/structure	3%
1.3	**Adequacy of Scope of Work Identified**	**10%**
	a. Adequacy of Construction Budget Task	2%
	b. Adequacy of Conceptual Design Task	2%
	c. Adequacy of Soil Boring Task	2%
	d. Adequacy of Drawing and Specification List Task	2%
	e. Adequacy of Permit Listing Task	2%
1.4	**Identification of Potential Challenges**	**2%**
	a. Acceptability of Potential Challenges and possible solutions	2%
1.5	**Alternatives/Exceptions**	**3%**
	a. Acceptability of offered alternatives and exceptions	3%
2	**Project Schedule**	**20%**
	a. Were critical and key milestones identified?	8%
	b. Were adequate approval times included?	6%
	c. Were realistic periods identified?	6%
3	**Fee Proposal**	**10%**
	a. Design Costs	6%
	b. Labor Rates	4%
4	**Project Team**	**20%**
	a. Adequacy of proposed team experience on similar projects	5%
	b. Adequacy of team member disciplines	4%
	c. Adequacy of staffing structure	2%
	d. Qualification of team members	5%
	e. Performance on other AW projects	2%
	f. Proposer's Quality Management Plan	2%
5	**Firm's Capabilities**	**20%**
	a. Relevancy of similar projects	10%
	b. Are indicated projects similar in scope and magnitude?	5%
	c. Was project team involved in similar roles in indicated projects?	5%

Score Definitions

5 Far Above Expectations
4 Above Expectations
3 Meets Expectations
2 Below Expectations
1 Far Below Expectations
0 Unacceptable

AMERICAN WATER

Kentucky American Water Company
Richmond Road Station Filter Building Design

TEAM 1	**56.8**	Gannett Fleming
TEAM 2	**65.2**	Hazen & Sawyer
TEAM 3	**60.0**	HDR

Proposers' Score Table

Scoring criteria & mechanism are on the previous worksheets

See scoring definitions below

Item	Description	Max. Possible Weighted Score (%)	TEAM 1 Gannett Fleming Score	TEAM 1 Weighted Score	TEAM 1 Comments	TEAM 2 Hazen & Sawyer Score	TEAM 2 Weighted Score	TEAM 2 Comments	TEAM 3 HDR Score	TEAM 3 Weighted Score	TEAM 3 Comments
	COMPOSITE TOTAL	**100.0%**		**56.8**			**65.2**			**60.0**	
1	**Project Approach**	**30%**		**14.8**			**15.4**			**13.6**	
1.1	**Technical**	**5%**		3.0			3.0			3.4	
a.	Proposer's understanding of Project	2%	3.0	1.2		3.0	1.2		4.0	1.6	
b.	Does Proposer understand KAWC Design Requirements	3%	3.0	1.8		3.0	1.8		3.0	1.8	No mention of washwater adequacy
1.2	**Project Outline**	**10%**		6.0			6.6			6.0	
a.	Adequacy of design concept	3%	3.0	1.8		4.0	2.4		3.0	1.8	Concern with filter washes and existing clearwell
b.	Adequacy of proposed meetings	4%	3.0	2.4		3.0	2.4		3.0	2.4	
c.	Adequate proposed design layout/structure	3%	3.0	1.8		3.0	1.8		3.0	1.8	
1.3	**Adequacy of Scope of Work Identified**	**10%**		1.2			1.2			1.2	
a.	Adequacy of Construction Budget Task	2%	3.0	1.2		3.0	1.2		3.0	1.2	Concern with expense related to relocating existing piping and utilities
b.	Adequacy of Conceptual Design Task	2%	3.0	1.2		3.0	1.2		3.0	1.2	
c.	Adequacy of Soil Boring Task	2%	3.0	1.2		3.0	1.2		3.0	1.2	Concern with rock
d.	Adequacy of Drawing and Specification List Task	2%	3.0	1.2		3.0	1.2		3.0	1.2	
e.	Adequacy of Permit Listing Task	2%	3.0	1.2		3.0	1.2		3.0	1.2	
1.4	**Identification of Potential Challenges**	**2%**		1.6			1.6			1.2	
a.	Acceptability of Potential Challenges and possible solutions	2%	4.0	1.6		4.0	1.6		3.0	1.2	Not a strong mention of challenges
1.5	**Alternatives/Exceptions**	**3%**		3.0			3.0			1.8	
a.	Acceptability of offered alternatives and exceptions	3%	5.0	3.0	Recycle blower system, dual bay filters.	5.0	3.0	Well thought out, CT basin and wash water station	3.0	1.8	Potential to rate filters at 5gpm/sqft and reduce $
2	**Project Schedule**	**20%**		**9.2**			**12.0**			**12.0**	
a.	Were critical and key milestones identified?	8%	2.0	3.2	PSC???	3.0	4.8		3.0	4.8	
b.	Were adequate approval times included?	6%	3.0	3.6		3.0	3.6		3.0	3.6	
c.	Were realistic periods identified?	6%	2.0	2.4	PSC???	3.0	3.6		3.0	3.6	
3	**Fee Proposal**	**10%**		**6.8**			**8.8**			**6.0**	
a.	Design Costs	6%	3.0	3.6	Design is low $ but others are much higher	4.0	4.8	Potentially most cost effective overall	3.0	3.6	Relative to others
b.	Labor Rates	4%	4.0	3.2	MSA with American water	5.0	4.0	Appears lower cost than GF	3.0	2.4	Lacking in proposal but MSA on file
4	**Project Team**	**20%**		**14.0**			**14.0**			**14.4**	
a.	Adequacy of proposed team experience on similar projects	5%	4.0	4.0		4.0	4.0		4.0	4.0	
b.	Adequacy of team member disciplines	4%	3.0	2.4		3.0	2.4		3.0	2.4	
c.	Adequacy of staffing structure	2%	3.0	1.2		3.0	1.2		3.0	1.2	
d.	Qualification of team members	5%	4.0	4.0		4.0	4.0		4.0	4.0	
e.	Performance on other AW projects	2%	3.0	1.2		3.0	1.2		4.0	1.6	Great work on the 42 pipeline and the filter study
f.	Proposer's Quality Management Plan	2%	3.0	1.2		3.0	1.2		3.0	1.2	
5	**Firm's Capabilities**	**20%**		**12.0**			**15.0**			**14.0**	
a.	Relevancy of similar projects	10%	3.0	6.0		4.0	8.0		4.0	8.0	
b.	Are indicated projects similar in scope and magnitude?	5%	3.0	3.0		4.0	4.0		3.0	3.0	
c.	Was project team involved in similar roles in indicated projects?	5%	3.0	3.0		3.0	3.0		3.0	3.0	

Score Definitions

5 Far Above Expectations
4 Above Expectations
3 Meets Expectations
2 Below Expectations
1 Far Below Expectations
0 Unacceptable

AMERICAN WATER

Kentucky American Water Company
Richmond Road Station Filter Building Design

Proposers' Score Table

Scoring criteria & mechanism are on the previous worksheets

See scoring definitions below

Item		Description	Max. Possible Weighted Score (%)
		COMPOSITE TOTAL	**100.0%**
1		**Project Approach**	**30%**
1.1		**Technical**	**5%**
	a.	Proposer's understanding of Project	2%
	b.	Does Proposer understand KAWC Design Requirements	3%
1.2		**Project Outline**	**10%**
	a.	Adequacy of design concept	3%
	b.	Adequacy of proposed meetings	4%
	c.	Adequate proposed design layout/structure	3%
1.3		**Adequacy of Scope of Work Identified**	**10%**
	a.	Adequacy of Construction Budget Task	2%
	b.	Adequacy of Conceptual Design Task	2%
	c.	Adequacy of Soil Boring Task	2%
	d.	Adequacy of Drawing and Specification List Task	2%
	e.	Adequacy of Permit Listing Task	2%
1.4		**Identification of Potential Challenges**	**2%**
	a.	Acceptability of Potential Challenges and possible solutions	2%
1.5		**Alternatives/Exceptions**	**3%**
	a.	Acceptability of offered alternatives and exceptions	3%
2		**Project Schedule**	**20%**
	a.	Were critical and key milestones identified?	8%
	b.	Were adequate approval times included?	6%
	c.	Were realistic periods identified?	6%
3		**Fee Proposal**	**10%**
	a.	Design Costs	6%
	b.	Labor Rates	4%
4		**Project Team**	**20%**
	a.	Adequacy of proposed team experience on similar projects	5%
	b.	Adequacy of team member disciplines	4%
	c.	Adequacy of staffing structure	2%
	d.	Qualification of team members	5%
	e.	Performance on other AW projects	2%
	f.	Proposer's Quality Management Plan	2%
5		**Firm's Capabilities**	**20%**
	a.	Relevancy of similar projects	10%
	b.	Are indicated projects similar in scope and magnitude?	5%
	c.	Was project team involved in similar roles in indicated projects?	5%

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TEAM 1	**54.6**	Gannett Fleming
TEAM 2	**55.8**	Hazen & Sawyer
TEAM 3	**54.6**	HDR

Proposers' Score Table

Scoring criteria & mechanism are on the previous worksheets

See scoring definitions below

Item	Description	Max. Possible Weighted Score (%)	TEAM 1 — 3.0 — Gannett Fleming			TEAM 2 — 1.0 — Hazen & Sawyer			TEAM 3 — 2.0 — HDR		
			Score	Weighted Score	Comments	Score	Weighted Score	Comments	Score	Weighted Score	Comments
	COMPOSITE TOTAL	**100.0%**		**54.6**			**55.8**			**54.6**	
1	**Project Approach**	**30%**		**12.6**			**13.8**			**12.6**	
1.1	**Technical**	**5%**		3.0			3.0			3.0	
a.	Proposer's understanding of Project	2%	3.0	1.2		3.0	1.2		3.0	1.2	
b.	Does Proposer understand KAWC Design Requirements	3%	3.0	1.8		3.0	1.8		3.0	1.8	
1.2	**Project Outline**	**10%**		6.0			6.0			6.0	
a.	Adequacy of design concept	3%	3.0	1.8		3.0	1.8		3.0	1.8	
b.	Adequacy of proposed meetings	4%	3.0	2.4		3.0	2.4		3.0	2.4	
c.	Adequate proposed design layout/structure	3%	3.0	1.8		3.0	1.8		3.0	1.8	
1.3	**Adequacy of Scope of Work Identified**	**10%**		1.2			1.2			1.2	
a.	Adequacy of Construction Budget Task	2%	3.0	1.2		3.0	1.2		3.0	1.2	
b.	Adequacy of Conceptual Design Task	2%	4.0	1.6	Wash water	4.0	1.6	Wash water	3.0	1.2	
c.	Adequacy of Soil Boring Task	2%	3.0	1.2		3.0	1.2		3.0	1.2	
d.	Adequacy of Drawing and Specification List Task	2%	3.0	1.2		3.0	1.2		3.0	1.2	
e.	Adequacy of Permit Listing Task	2%	2.0	0.8		3.0	1.2		3.0	1.2	
1.4	**Identification of Potential Challenges**	**2%**		1.2			1.2			1.2	
a.	Acceptability of Potential Challenges and possible solutions	2%	3.0	1.2		3.0	1.2		3.0	1.2	
1.5	**Alternatives/Exceptions**	**3%**		1.2			2.4			1.2	
a.	Acceptability of offered alternatives and exceptions	3%	2.0	1.2		4.0	2.4	Wash water	2.0	1.2	
2	**Project Schedule**	**20%**		**12.0**			**12.0**			**12.0**	
a.	Were critical and key milestones identified?	8%	3.0	4.8		3.0	4.8		3.0	4.8	
b.	Were adequate approval times included?	6%	3.0	3.6		3.0	3.6		3.0	3.6	
c.	Were realistic periods identified?	6%	3.0	3.6		3.0	3.6		3.0	3.6	
3	**Fee Proposal**	**10%**		**6.0**			**6.0**			**6.0**	
a.	Design Costs	6%	3.0	3.6		3.0	3.6		3.0	3.6	
b.	Labor Rates	4%	3.0	2.4		3.0	2.4		3.0	2.4	
4	**Project Team**	**20%**		**12.0**			**12.0**			**12.0**	
a.	Adequacy of proposed team experience on similar projects	5%	3.0	3.0		3.0	3.0		3.0	3.0	
b.	Adequacy of team member disciplines	4%	3.0	2.4		3.0	2.4		3.0	2.4	
c.	Adequacy of staffing structure	2%	3.0	1.2		3.0	1.2		3.0	1.2	
d.	Qualification of team members	5%	3.0	3.0		3.0	3.0		3.0	3.0	
e.	Performance on other AW projects	2%	3.0	1.2		3.0	1.2		3.0	1.2	
f.	Proposer's Quality Management Plan	2%	3.0	1.2		3.0	1.2		3.0	1.2	
5	**Firm's Capabilities**	**20%**		**12.0**			**12.0**			**12.0**	
a.	Relevancy of similar projects	10%	3.0	6.0		3.0	6.0		3.0	6.0	
b.	Are indicated projects similar in scope and magnitude?	5%	3.0	3.0		3.0	3.0		3.0	3.0	
c.	Was project team involved in similar roles in indicated projects?	5%	3.0	3.0		3.0	3.0		3.0	3.0	

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1.4	**Identification of Potential Challenges**	**2%**
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	a. Were critical and key milestones identified?	8%
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3	**Fee Proposal**	**10%**
	a. Design Costs	6%
	b. Labor Rates	4%
4	**Project Team**	**20%**
	a. Adequacy of proposed team experience on similar projects	5%
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	d. Qualification of team members	5%
	e. Performance on other AW projects	2%
	f. Proposer's Quality Management Plan	2%
5	**Firm's Capabilities**	**20%**
	a. Relevancy of similar projects	10%
	b. Are indicated projects similar in scope and magnitude?	5%
	c. Was project team involved in similar roles in indicated projects?	5%

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