



BLACK & VEATCH

City of Hagerstown

Water and Wastewater Master Plan Project

January 22, 2026 | Proposal No. P1868.26





BLACK & VEATCH

Black & Veatch Corporation
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January 22, 2026

City of Hagerstown
Office of the City Clerk
1 East Franklin Street, 2nd Floor
Hagerstown, MD 21740

RE: Water and Wastewater Master Plan Project (P1868.26)

Dear Ms. French and Selection Committee Members:

Black & Veatch appreciates the opportunity to partner with the City of Hagerstown on this important initiative. We understand your vision: a single, integrated master plan that unifies water and wastewater systems, **delivered on time, within budget, and with flexibility** for future needs. Our team has listened carefully to your priorities, and we are confident that our experience and approach will help you achieve them.

Why Black & Veatch? We are recognized leaders in water and wastewater master planning and hydraulic modeling. Our proven methodologies deliver accurate, defensible, and value-driven solutions that shape capital improvement programs for utilities nationwide. We combine technical excellence with practical tools that empower your staff to actively manage models and your CIP long after project completion.

A Trusted Partner for Hagerstown. Our team knows Hagerstown. Project Manager Betsy Baldwin, PE has successfully led your Wastewater Treatment Plant Improvements Phase 1 design project, secured SRF funding, and guided it through design. Betsy has been a part of the long history Black & Veatch has with Hagerstown and began her work with the city in 2003. This experience gives us insight into your systems, processes, and expectations. Supported by a team of regional and national experts, Betsy will ensure your master plan is tailored to your needs, leveraging best practices from large utilities while scaling solutions appropriately for your system.

Dynamic, Adaptable Planning Tools. We recognize that priorities evolve with economic conditions, regulations, and development. That's why we pioneered dynamic CIP planning tools like iCIP, which allow utilities to adjust project timing based on real-world triggers. Combined with advanced visualization through PowerBI, these tools will give Hagerstown a master plan that is not only accurate and cost-effective but also flexible and future-ready.

Collaborative Approach. Your success is our priority. We will work closely with City leadership, engineering, and operations staff through workshops and feedback sessions to ensure every perspective is heard and incorporated. Our approach is built on transparency, responsiveness, and partnership, because the best plan is one created together.

Black & Veatch is committed to delivering a master plan that meets your goals and positions Hagerstown for long-term success. Joseph Stromwall will be the signatory for any contract documents executed with the City. We welcome the opportunity to discuss our proposal further. Please contact Betsy Baldwin at (571) 366-6953 or BaldwinB@bv.com at your convenience. Thank you for your time and consideration. We look forward to partnering with you on this transformative project.

Very truly yours,

Black & Veatch Corporation

Joseph Stromwall, PE
Vice President

Priscilla Brown-Buchalla
Client Services Manager

Project Manager

09/18/2025

6,509,368

STATE BOARD FOR PROFESSIONAL ENGINEERS

23 07 47829 BLACK & VEATCH CORPORATION

6079 09-17-2025

MESSAGE(S):

YOU CAN NOW RENEW YOUR PROFESSIONAL ENGINEER FIRM PERMIT ONLINE. YOU WILL RECEIVE AN AUTOMATIC NOTIFICATION ONCE YOU ARE WITHIN 60-DAYS OF YOUR EXPIRATION DATE. IF IT IS YOUR FIRST TIME RENEWING ONLINE, YOU WILL RECEIVE YOUR PASSWORD IN THE MAIL 1-2 WEEKS FOLLOWING THE RENEWAL NOTIFICATION. IF YOU PREVIOUSLY RENEWED ONLINE, YOU CAN USE THE PASSWORD THAT YOU PREVIOUSLY CREATED.

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STATE OF MARYLAND
MARYLAND DEPARTMENT OF LABOR

Wes Moore
Governor
Aruna Miller
Lt. Governor
Portia Wu
Secretary

STATE BOARD FOR PROFESSIONAL ENGINEERS
CERTIFIES THAT:
BLACK & VEATCH CORPORATION

IS AN AUTHORIZED: 07 - PE FIRM - CORPORATION

LIC/REG/CERT
47829

EXPIRATION
11-10-2027

EFFECTIVE
N/A

CONTROL NO
6509368

Signature of Bearer

Secretary

WHERE REQUIRED BY LAW THIS MUST BE CONSPICUOUSLY DISPLAYED IN OFFICE TO WHICH IT APPLIES

23 07 47829

6,509,368

23 07 47829
STATE BOARD FOR PROFESSIONAL ENGINEERS
100 S. CHARLES ST. TOWER 1
BALTIMORE, MD 21201

BLACK & VEATCH CORPORATION
11401 LAMAR AVE

OVERLAND PARK

KS 66211

		LICENSE * REGISTRATION * CERTIFICATION * PERMIT		STATE OF MARYLAND		MARYLAND DEPARTMENT OF LABOR		Wes Moore Governor Aruna Miller Lt. Governor Portia Wu Secretary	
STATE BOARD FOR PROFESSIONAL ENGINEERS CERTIFIES THAT: BLACK & VEATCH CORPORATION									
IS AN AUTHORIZED: 07 - PE FIRM - CORPORATION									
LIC/REG/CERT	EXPIRATION	EFFECTIVE	CONTROL NO						
47829	11-10-2027	N/A	6509368						
Signature of Bearer				Secretary					

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Part 1 - Executive Summary

Black & Veatch is honored to partner with the City of Hagerstown to develop an integrated Water and Wastewater Master Plan that provides a practical, data-driven roadmap for the next 5, 10, and 20 years. Built upon decades of direct service to the City and deep regional expertise, our proposed approach delivers a **unified, defensible planning framework** that aligns with Hagerstown's regulatory, operational, financial, and long-term system performance objectives.

Our team understands the City's vision for a master plan that is **accurate, flexible, future-ready, and designed to empower staff** long after the project is completed. Through dynamic planning tools, advanced hydraulic modeling, transparent decision-making processes, and collaborative engagement, Black & Veatch will help the City make informed, sustainable infrastructure investments that protect ratepayers and ensure reliable water, wastewater, and environmental stewardship for decades.

Qualifications, Experience & Technical Capability

Black & Veatch brings more than 110 years of water and wastewater planning experience and a long history of successful projects across Maryland and the Mid-Atlantic. Our Gaithersburg-based team has supported Hagerstown for more than 20 years, including its current WWTP Improvements – Phase 1 Program, BNR/ENR upgrades, I/I investigations, sewer rehabilitation efforts, and critical regulatory coordination.

Our national planning practice has delivered more than 160 water distribution system models and 75 wastewater collection system models in the last decade. These projects include comprehensive master plans for Charlotte Water, Fairfax County, Beaufort-Jasper Water & Sewer Authority, WSSC Water, and others.

Project Team & Organizational Structure

Black & Veatch has assembled a senior-level, multidisciplinary team with the specific experience needed to deliver Hagerstown's Master Plan. The team structure ensures strong leadership, technical rigor, and seamless coordination across modeling, facilities planning, asset management, regulatory evaluation, and CIP development. Key personnel include:

Betsy Baldwin, PE, Project Manager, is responsible for overall management of the project including directing the teams'

activities to achieve all deliverables on schedule and on budget.

Priscilla Brown-Buchalla, Client Services Manager, is responsible for supporting Betsy with ensuring the resources assigned are committed and available at the right time to support the successful delivery of the water and wastewater master plan.

Amanda Schwerman, PE, QA/QC, will ensure the city receives the highest quality deliverables. Amanda brings insights, experience, skills from work on nearly 60 planning and asset management studies and projects, which include over 25 full master planning projects.

Kevin Laptos, PE, Water Distribution Modeling, will lead our hydraulic modeling team to develop and calibrate a reliable model you can own, maintain, and trust.

Chris Ranck, PhD, PE, Wastewater Hydraulic Modeling, will lead our collection system modeling team to develop and calibrate a reliable model you can own, maintain, and trust.

Ahmet Ozman, PE, Strategic Planning, will lead our team in developing the phased CIP for the planning horizons: Short-term (5 years), Medium-Term (10 years), Long-Term (20 years). Applying his expertise, project recommendations will address identified system deficiencies to comply to regulations and meet the City's level of service goals.

Mike Hanna, PE, Facilities Planning Leader, will work to ensure our team carries out technically precise and easy to understand facility evaluations to inform decision-making.

Project Team Availability

Our key team members are ready and available to dedicate the necessary effort to execute the evaluations and analysis required to deliver a water and wastewater master plan in 12 months. The following table shows availability.

KEY STAFF	AVAILABILITY
Betsy Baldwin, PE	60%
Amanda Schwerman, PE	40%
Kevin Laptos, PE	40%
Chris Ranck, PhD, PE	40%
Ahmet Ozman, PE	40%
Mike Hanna, PE	40%
Madison McGuire	60%
Mat Powis, PE	45%
Jeff Stillman, PE	30%
Katy Weidner, PE	60%
JingJing Dai, PhD, PE	60%
Ali Nakhli, PhD, PE	60%
Amanda Canida, PE	40%
Chris deBarbadillo, PE, BCEE	40%

Black & Veatch has considered how to support the Master Plan project as well as the ongoing projects like the Pelletizer Facility Up-Front Capital Project construction phase and the start of construction of the WWTP Improvements Project - Phase 1, by ensuring those projects have dedicated local construction inspectors and the focus of key team members like David Wilkinson and Matt Crow.

Subconsultants



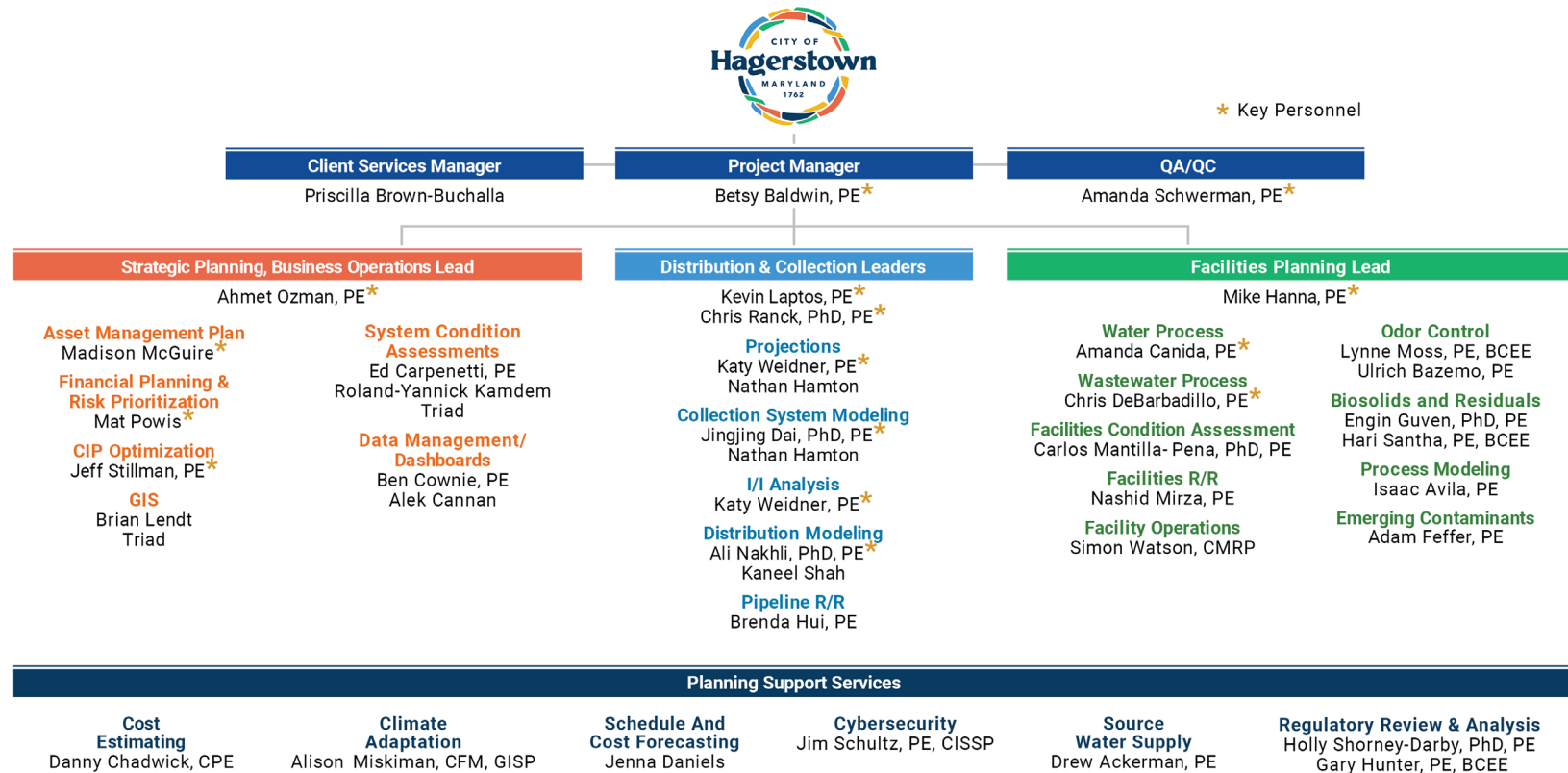
Triad Engineering, Inc., founded in 1975 in Morgantown, West

Virginia, is a 100% employee-owned, multi-disciplinary engineering firm serving the Mid-Atlantic region. Having served Hagerstown, the City knows it will benefit from Triad's expertise in geotechnical, civil, and utility engineering; surveying and GIS; construction materials testing and inspection; environmental consulting; drilling; and related earth sciences. With approximately 190 professionals across nine offices in five states, the Triad team includes engineers, scientists, surveyors, CADD draftsmen, technicians, and support staff, all dedicated to delivering high-quality services on projects of varying size and complexity.

Integrated Expertise Delivering a Comprehensive Water and Wastewater Master Plan

Our team has been deliberately assembled to deliver the full scope of Hagerstown's water and wastewater master planning effort, including any additional services required to develop a fully integrated, actionable plan. The project will be led by Black & Veatch utility planning specialists with proven expertise in water and wastewater treatment and conveyance, hydraulic modeling, financial planning, and utility management. This depth of experience ensures Hagerstown benefits from practical, forward-looking solutions grounded in industry best practices. Our team will be fully accessible to the City throughout the project.

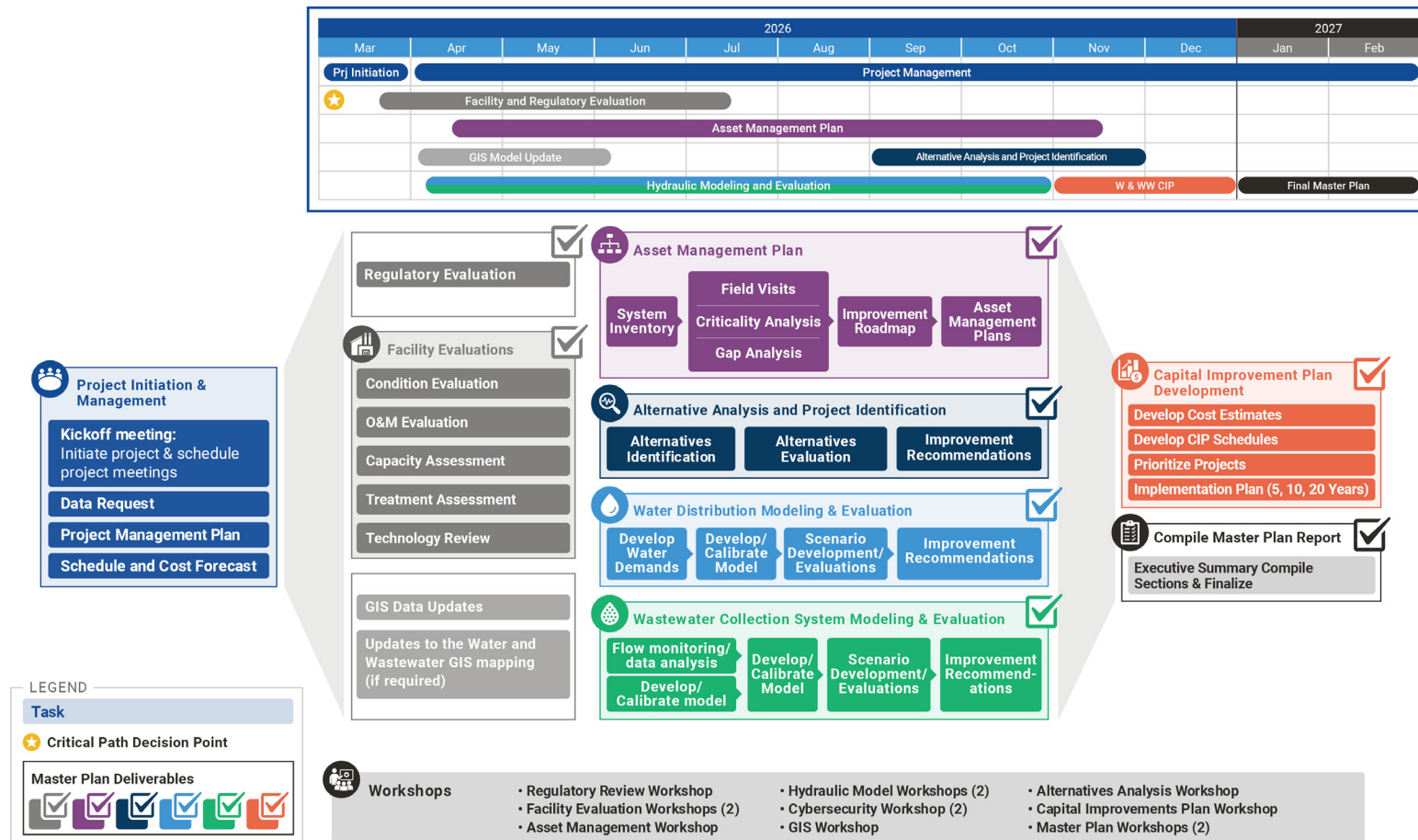
In alignment with the project goals, we have structured our team to provide comprehensive coverage of all critical planning focus areas—water, wastewater, and municipal governance and organizational strategy. The team is purposefully organized to promote collaboration across these disciplines, allow for simultaneous completion of tasks, ensuring strong integration and synergy from project initiation through completion. This coordinated approach enhances communication, supports informed decision-making, and results in a master plan that is technically robust, financially sound, and aligned with the City's operational and organizational needs.



Coordination of Work Components

Black & Veatch's management approach ensures seamless execution across facility evaluation, hydraulic modeling, asset management, CIP planning, and data integration. We will work with you to refine the scope such that it focuses on your immediate needs while providing a road map for the City to achieve longer term modeling and planning goals. Designated leaders will coordinate workflows as shown in the Overall Roadmap below, review results, and integrate findings into a unified, defensible Master Plan.

This executive summary reflects the qualifications, structure, and approach detailed in the proposal. Black & Veatch's combination of technical excellence, collaborative partnership, and long-standing familiarity with Hagerstown's systems will deliver an actionable, reliable Master Plan.



Overview of Master Plan Approach and Sequence

Part 2 - Experience and Technical Capability

Leveraging previous experience and knowledge provides the highest value to Hagerstown.

Black & Veatch brings unmatched experience and insight to the City of Hagerstown's Water and Wastewater Master Plan. For decades, we have partnered with the City to deliver critical infrastructure improvements, and we are committed to ensuring that this next phase provides the highest value to your community and stakeholders.

Our team has been assembled to leverage the deep knowledge gained through years of collaboration, including the successful delivery of the Wastewater Treatment Plant Improvements – Phase 1 Project and numerous initiatives dating back to the mid-1990s. These include BNR and ENR upgrades, I/I analysis, sewer rehabilitation design, and more. This history gives us a unique understanding of your systems, priorities, and challenges—knowledge that cannot

be replicated by firms without this legacy of partnership.

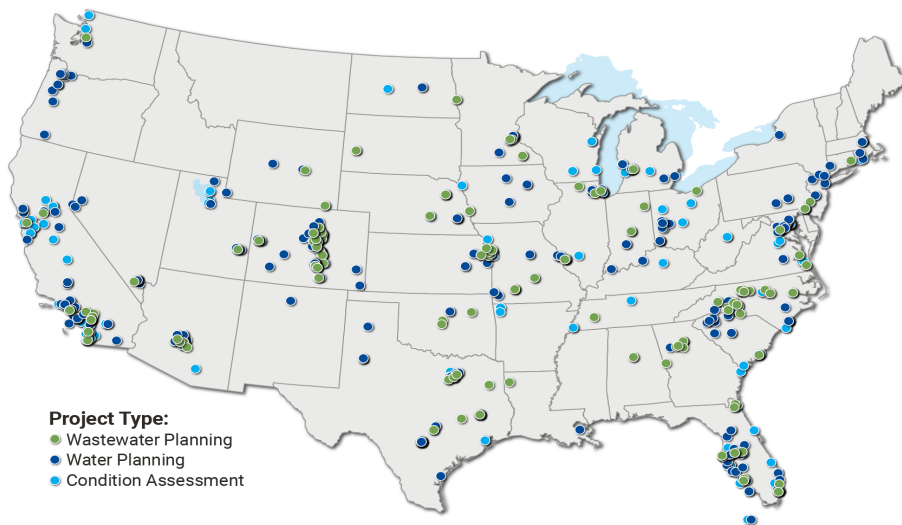
Building on this foundation, we will integrate lessons learned from recent master planning efforts across the DC region **to provide Hagerstown with a forward-looking roadmap**. This plan will help you achieve operational excellence, prioritize capital improvements, and sustainably manage resources well into the future.

As a global leader in water and wastewater solutions, Black & Veatch offers industry-leading technical expertise backed by world-class resources. Yet, **we remain committed to a personalized approach** through our local team—providing hands-on leadership and diverse engineering capabilities to ensure your Master Plan is practical, actionable, and tailored to the City's vision.

Hagerstown Needs	Black & Veatch Solution	Benefit to the City
Responsive Partnership	- Highly collaborative project team well known to the City. - Access to local master planning experts that will provide personalized service while leveraging our knowledge and capabilities.	- Transparency working as an extension of the City's staff. - Project schedule/budget met.
Hydraulic Modeling Tool to Deliver Accurate Results	- Leverage our experience with most modeling packages to select a modeling software and hydraulic model approach that aligns with the City's long-term usage. - Validated system-wide model calibrated with historical data.	- A tool that accurately represents available capacity in the system. - Confidence that recommended projects address the highest priority capacity constraints.
Justifiable CIP with Data Driven Inputs	- Leverage the City's existing data to inform decision making. - Apply an integrated asset management framework to ensure transparent decision making.	- A CIP that supports growth and sustainability of the system. - Effective roadmap to support the next generation of the City.
Proper Planning and Budgeting of Capital Investments	Stagger large investment CIP projects with consideration of funding and operations.	Maintaining affordability for ratepayers.

Firm Experience

Since 1915, we have helped our clients improve the lives of people around the world by addressing the resilience and reliability of our most important infrastructure assets. We plan, design, and build the energy, water, and telecommunications systems that strengthen community resilience, reduce carbon footprints, drive sustainability, and enable growth. **In the past 10 years our planning teams have delivered more than 160 water distribution and 75 wastewater collection system modeling and planning projects.** Our Gaithersburg based team is committed to serving as your trusted partner with innovative, end-to-end services and full project delivery solutions that are Building a World of Difference®. Regardless of the scope or size of the project, our execution is centered on safety and characterized by cost and schedule certainty.



National Master Planning Experience

Black & Veatch has extensive master planning experience involving water modeling, wastewater modeling, and condition assessment. We are committed to delivering high quality projects, working as your partner to understand your goals to deliver projects that position you for the future.

BLACK & VEATCH

OVERVIEW

110+

YEARS CREATING

WATER

INFRASTRUCTURE

FOUNDED IN

1915

100+

OFFICES

12K+

GLOBAL WORKFORCE

270 Planning and Asset Management Team with over 25 Years of Multi Sector and International Asset Management Experience

1,000+ System Planning Projects Supporting over 100M People

160+ Water Distribution and 75+ Wastewater Collection Modeling Projects

9,100 Miles of Pipeline Assessments Since Year 2000

10TH **LARGEST**

EMPLOYEE-OWNED

COMPANY

IN THE U.S.

Relevant Planning Projects Completed by Black & Veatch:

Water

- Charlotte Water Distribution System Master Plan
- Anne Arundel County Water Benchmarking Study
- Fairfax Water Storage Analysis
- Tampa Water System Master Plan

Water & Wastewater

- Gloucester County Water and Wastewater Master Plan
- Beaufort -Jasper Water and Wastewater Master Plan

Wastewater

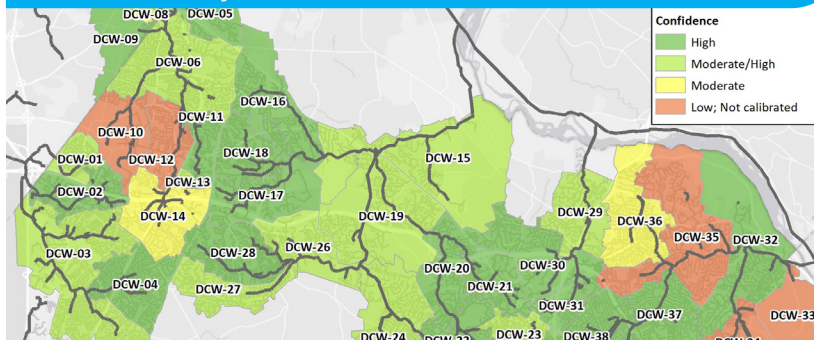
- Fairfax County Wastewater Utility Management Plan
- WSSC Wastewater Master & Facility Plan
- WSSC Wastewater Master & Collection System Plan
- WSFCU ArcGIS Data Cleanup and ArcGIS Utility Network Migration

Experience Overview

Experience Overview		Master Planning					Asset Management					Business Enablement			
CLIENT	PROJECT NAME	Water Supply	Population and Demand Projections	Water Model Update and Calibration	Wastewater Model Update and Calibration	Capacity Planning	Condition Assessment	Risk Assessment	AM Implementation Support	CIP Prioritization/ Optimization	Data Analytics and Dashboards	Maintenance and Life Cycle Strategies	Strategic Vision & Levels of Service	Financial Assessment, Rates, Capital Planning	Stakeholder Engagement
		Detailed descriptions included in this section for projects in bold.													
Fairfax County, VA	Wastewater Utility Management Plan		■		■	■		■		■	■	■	■		
Beaufort Jasper Water & Sewer Authority, SC	Water and Sewer System Master Planning, Financial Planning, and System Development Charges Support	■	■	■	■	■	■	■		■	■		■	■	■
Winston-Salem/Forsyth County Utilities Commission, NC	Collection System Master Plan		■		■	■				■			■		
Gloucester County, VA	Water and Wastewater Master Planning	■	■	■	■	■				■					
Charlotte Water, NC	Water Distribution System Master Plan, McDowell Creek Drainage Basin Study		■	■	■	■	■	■		■	■		■		
Tulsa Metropolitan Utility Authority, OK	Utility Enterprise Initiative, AM Program, Water Master Plan, Wastewater Master Plan		■	■	■	■		■	■	■		■	■	■	
Hampton Roads Sanitation District, VA	Asset Management Program and CIP Optimization, AM Gap Analysis, AM Assessment Plan						■	■	■	■	■	■	■		■
City of Glendale, AZ	Integrated Water Master Plan Update, Asset Mgmt Assessment Services, On-Call Water and Wastewater Hydraulic Modeling Support	■	■	■	■	■	■	■	■	■		■	■		■
City of Rapid City, SD	Water and Wastewater Utility System Master Plans	■	■	■	■	■	■	■	■	■		■	■		
City of Winter Haven, FL	Integrated One Water Master Plan, Wastewater and Water Needs Analysis	■	■			■						■	■	■	■
Metro Water Recovery, CO	2015 - 2022 Annual Model Update and On-Call Services		■		■	■	■	■	■	■	■	■			
Vallecitos Water District	Integrated Master Plan, Asset Management Plan	■	■	■	■	■	■	■		■	■		■	■	
Washington Suburban Sanitary Commission, MD	Advanced Asset Mgmt., PCCP Engineering Services BOA, Misc Fees & Charge Review Study, Wastewater Master Plan				■	■	■	■	■			■	■	■	
Tampa Bay Water, FL	Integrated Program Mgmt Consultant, Long Term Master Water Plan Update, System Hydraulic and Emergency Scenario Analysis	■	■	■		■				■	■	■	■	■	■
California Department of Water Resources, CA	Asset management Program Development and Implementation						■	■	■	■	■	■	■	■	■
Milwaukee Metropolitan Sewerage District, WI	2050 Facilities and Asset Management Program						■	■	■	■	■	■	■		
Fayetteville PWC, NC	Asset Management Gap Assessment and Program Support						■	■	■		■	■	■		■
Irvine Ranch Water District, CA	CIP Asset Mgmt Program						■	■	■	■	■	■		■	
Lehigh County Authority, PA	Kline's Island WWTP Master Plan	■				■	■	■	■	■	■		■		
Irvine Ranch Water District, CA	Prioritized Capital Improvement Plan						■	■	■	■	■				
Charleston Water System, SC	Asset Management Support Services	■				■	■	■	■		■	■	■	■	■
North Port Utilities, FL	Asset Management Program Support							■	■	■	■	■	■		■
Pinellas County, FL	Water System Master Plan and Asset Management Support	■	■	■		■	■	■	■		■	■	■		

Wastewater Utility Management Plan

Fairfax County, VA



Fairfax County engaged Black & Veatch to develop a transformational 30-year strategic plan and operational roadmap for its Wastewater Management Program (WWM), positioning it as a Utility of the Future—resilient, efficient, and sustainable for decades ahead. Our approach combined technical expertise, benchmarking, and innovative planning tools to deliver a framework for data-driven, defensible decisions. The project addressed organizational, operational, and infrastructure challenges through integrated tasks:

- **Organizational Readiness & Governance:** Assessed structure, staffing, and governance to align resources with strategic objectives and integrated asset management.
- **Business Process Modernization:** Identified workflow inefficiencies and benchmarked against industry best practices to drive operational excellence.
- **Advanced System Planning & Modeling:** Built a dynamic hydraulic model (InfoWorks ICM), updated GIS, and implemented flow monitoring for accurate forecasting under dry- and wet-weather conditions.
- **Capacity & Resilience Strategies:** Simulated storm scenarios to guide capacity upgrades and planned water reuse expansion for sustainability.
- **Integrated Asset Management:** Developed condition- and capacity methodology and prioritization criteria incorporating service levels, condition, and DEI principles for transparent decision-making.
- **Capital Planning Optimization:** Delivered a CIP tool using business-case evaluations and Monte Carlo analysis to maximize value and minimize risk.

Fairfax County now has a unified strategic framework integrating multiple models and data sources, enabling WWM to:

- Anticipate and mitigate system risks.
- Simulate operational and financial scenarios.
- Optimize capital investments for resilience.
- Advance confidently toward its Utility of the Future vision.

Contract Number

- WW-000032-005

Firm Role

- Prime

Key Team Members

- Priscilla Brown-Buchalla - Project Director
- Mike Hanna - Project Manager
- Kevin Laptos - Planning Advisor
- Madison McGuire - Planning Support
- Chris Ranck - System Capacity and Flow Routing
- Katy Weidner - System Capacity and Flow Routing
- Ahmet Ozman - Strategic Planning; System Condition Analysis and Risk-based CIP Development
- Mat Powis - Scenario Selection, Optimization, and Recommendations

Owner Contact Information

Junaid Malik, PE
Fairfax County
P: 703-239-8490
e: junaid.malik@fairfaxcounty.gov

Period of Performance

- 11/17/2020 to 11/30/2024 (contract)
- 12/1/2020 to 7/6/2024 (actual)

Contract Value

- \$3,630,504 (original contract value)
- \$3,210,579 (after change order to remove scope)

Project Performance

- Four deduct change orders due to client preference to not develop the dynamic platform.

Water and Sewer System Master Planning, Financial Planning, and System Development Charges Support

Beaufort Jasper Water & Sewer Authority, SC



In 2017, Black & Veatch completed a Water and Sewer System Master Plan Study for BJWSA and this study was updated in 2022 to account for the anticipated increase in water and sewer system capacity as a result increase building starts request and the growth in the customer base served by BJWSA. In addition, the impacts of supply chain and inflation considerations were incorporated into the 2022 Master Plan update to demonstrate the cost and resource implications associated with implementing specific Master Plan projects. In addition, Black & Veatch completed several studies to address capacity improvements, transmission and collection system upgrades and the feasibility and impacts of incorporating specific large developments into the BJWSA service base.

While the studies detailed above were conducted, Black & Veatch provided specific financial and business planning support to diligence and understand the impact of system expansion on the existing water and sewer system resources. The Black & Veatch team conducted multiple rounds of Water and Sewer System Rate Studies, System Development Charge evaluations which included assessing incremental charges for specific service areas, System Development Charge and Developer Policy reviews, and supported the BJWSA Executive Management team to interface with specific development stakeholder related to matter concerning the development of System Development Charges.

The Black & Veatch teams worked closely with BJWSA and integrated results of the Master Planning and other engineering efforts into the respective financial analysis projects to determine the financial aptitude of BJWSA to appropriately fund and support all annual requirements. As such, specific attention was placed on the contribution of System Development Charge revenue and the impact of these revenues on the water and sewer system financing plan.

Contract Number

- CIP-1531

Firm Role

- Prime

Key Team Members

- Kevin Laptos - Technical Lead
- Brian Lendt - GIS Lead

Owner Contact Information

Michael Hansen
BJWSA
P: 843-987-8061
E: michael.hansen@bjwsa.org

Period of Performance

- 2016 to 2017

Contract Value

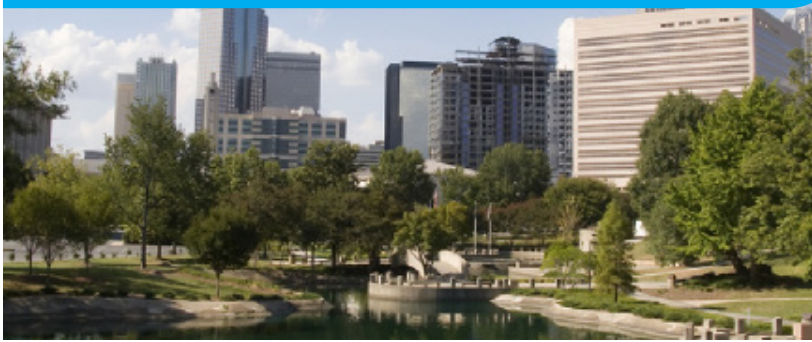
- Current Project: \$395,000 (original 2017 master plan only)

Project Performance

- No change orders, project completed on-schedule and completed on-budget

Water Distribution System Master Plan

Charlotte Water, NC



Black & Veatch is currently assisting Charlotte Water with updating their Water Distribution System Master Plan which was also prepared by Black & Veatch. The 2018 Master Plans included many traditional system planning elements including water demand projections, distribution and treatment facilities evaluation, hydraulic model update and calibration, hydraulic capacity evaluation, CIP development, and preparation of a master plan report. In addition, the project also included unique elements which provided Charlotte Water with an enhanced, optimized and adaptable master plan:

- Development of multiple levels of system performance criteria based on industry benchmarks and state/local regulations to assess system adequacy and determine system improvement priorities.
- Use of historical decreasing per capita usage trends in demand projections.
- Development of a risk-based pipeline prioritization using GIS, historical pipe break/ maintenance data, geometric network traces, Weibull deterioration curves and hydraulic criticality modeling.
- A system resiliency evaluation to assess the ability of distribution system to provide reliable water service under various system outage scenarios.
- Planning methodology which considered hydraulics, water quality and energy to deliver a cost-minimized CIP.



Black & Veatch has extensive experience working with complex distribution systems such as Charlotte Water's. This experience will help ensure any complexities encountered during Hagerstown's Master Plan project will be readily solved. Black & Veatch routinely scales our solutions for large and complex system to meet the more modest needs of smaller systems.

Contract Number

- Current: 2023000522
- Original: 2015001648

Firm Role

- Prime

Key Team Members

- Kevin Laptos - Project Manager and Technical Lead
- Katy Weidner - Water Demand Projections Lead and CIP Lead
- Ahmet Ozman - Asset Management Lead
- Brian Lendt - GIS Lead
- Nathan Hampton - Water Demand Projections Support
- Kaneel Shah - Water Modeling
- Madison McGuire - Asset Management Planning

Owner Contact Information

Bhavana Swayampakala, PE
Charlotte Water
P: 980-240-8801
E: Bhavana.Swayampakala@CharlotteNC.Gov

Period of Performance

- Current: April 2023 to Ongoing
- Original: April 2015 to December 2018

Contract Value

- Current: \$2.3M
- Original: \$2.1M

Project Performance

- No change orders, project completed on-schedule and completed on-budget

Water & Wastewater Master Planning

Gloucester County, VA



Photo courtesy of gloucesterva.gov

Gloucester County Department of Public Works is a client Black & Veatch served through an Engineering Services Agreement. Black & Veatch was re-selected for a second Engineering Services Agreement. Under the initial agreement, Black & Veatch assisted Gloucester County for the following services:

Water & Wastewater System Master Plan. Black & Veatch provided a water distribution and wastewater collection system master plan that included:

Software Selection. Different commercially available water distribution and wastewater collection system modeling platforms were reviewed and compared for the County. The ultimate decision was to use InfoWater for the water distribution modeling activities and a consultant for the wastewater collection system analysis.

Model Development. A new water distribution system model was built primarily from the County's GIS database along with record drawings for the high service pumps and elevated storage tanks. The existing collection system model was updated for recent project as well.

Future Population and Flow Projections. The future population and flow projections for the water and wastewater service areas were developed largely based on TAZ data through the 2040 planning horizon.

Water Distribution and Wastewater Collection System Master Plan. Current and future system improvements were developed to address level of service issues in the water distribution and wastewater collection system.



Black & Veatch has experience working with smaller water distribution and sewer collection systems in the region and assisting them with making fundamental decisions such as the selection of the best software to use for various system evaluations and assessments.

Contract Number

- 16-010-BL

Firm Role

- Prime

Key Team Members

- Mike Hanna - Planning Support
- Katy Weidner - Wastewater Model
- Brian Lendt - GIS Lead

Owner Contact Information

Katey Legg
Gloucester County
P: 804-693-4044
E: klegg@gloucesterva.info

Period of Performance

- June 2016 to December 2016

Contract Value

- \$117,000

Project Performance

- No change orders, project completed on-schedule and completed on-budget

ArcGIS Data Clean-up and ArcGIS Utility Network Migration

Winston-Salem/Forsyth County Utilities, NC



As part of Black & Veatch's I.S. On-Call Contract with Winston-Salem / Forsyth County Utilities a task order was issued for Black & Veatch to lead a comprehensive ArcGIS Utility Network (UN) data readiness, data cleanup, UN prototype, and migration effort for the Utilities' water distribution and wastewater collection system utility assets. This effort includes business process and workflow review and recommendations; leveraging Esri suite of ArcGIS tools to support data readiness, cleanup; and migration automation including Data Reviewer, Interoperability extension, ETL tools, and Python to support iterative data review and data loading activities. Additional project components include:

- UN data model schema mapping
- Data clean-up
- UN prototype development
- UN migration and implementation planning
- ArcGIS Enterprise deployment support
- UN pilot project
- ArcGIS attribute rule development
- System integration support
- Full-scale migration

This project demonstrates the trust the City can have in Black & Veatch as an Esri Gold Partner with Network Management and State and Local Government Specialties. This close relationship with Esri uniquely equips us to solve any scale or complexity of GIS model needs.



esri

Partner Network
Gold



Network Management
Specialty



State and Local
Government
Specialty

Contract Number

- WSFCU - Esri Utility
Network Migration PO
PO000040511

Firm Role

- Prime

Key Team Members

- Brian Lendt - GIS Lead

Owner Contact Information

Matthew Whitman
Winston-Salem/Forsyth
County Utilities
P: 336-747-7314
E: mattheww@cityofws.org

Period of Performance

- November 2024 to
Ongoing

Contract Value

- \$365,000

Project Performance

- No change orders, work is ongoing

Key Personnel Experience

Key to fulfilling the City's objectives is a team that understands the technical, regulatory, financial, and operational requirements of effectively implementing a realistic and holistic improvement program to serve as a roadmap for many years. Black & Veatch will deliver a master plan that proposes cost savings through innovative solutions for the implementation of R&R improvements that best manage the likelihood and consequences of failure of the City's infrastructure, reducing risk and allowing for proactive, reliability-centered maintenance.

Project Manager, Betsy Baldwin, PE, is a local leader deeply committed to the success of the Hagerstown community. Betsy began her work with the City in 2003 on a WWTP disinfection study to meet consent decree requirements, designed improvements to the oxygen/ozone system and has assisted with many miscellaneous services tasks since 2023 and led the current WWTP Improvements project. She excels at facilitating subject matter experts in a way that channels objectives into tangible, actionable results. Betsy prioritizes frequent communication, maintains ongoing dialogue to address challenges proactively, and ensures services are delivered on time and within budget. Her rigorous QA/QC process reflects her unwavering commitment to excellence. **With Betsy's leadership, the City can be confident that your master plan will be developed and implemented with precision and care.**

Responsive, Local Leadership

Betsy Baldwin, PE

Project Manager



With over 25 years of project management experience, team leadership, and water and wastewater facility delivery, Betsy brings a wealth of expertise to the City. Her extensive work in the region has equipped her with a deep understanding of operational and infrastructure needs of local water systems.



Black & Veatch is Helping a Local Utility to Plan for Future Water Regulations, Optimize Water Treatment, and Minimize Impact on the Wastewater Treatment Plant.

Black & Veatch is supporting Anne Arundel County in a comprehensive evaluation and optimization of its drinking water treatment systems. The effort includes performance and operations reviews for seven water treatment plants, benchmarking them against industry standards, regulatory requirements, and best practices from peer utilities. A key outcome of the project is identifying opportunities to improve finished water quality, reduce energy and chemical consumption, and increase overall process efficiency. Three production facilities are undergoing treatment alternatives evaluations to address site specific contaminants, including radium, cadmium, and iron/manganese. Black & Veatch is also planning for future pilot testing to validate treatment approaches.

The effort is led by Betsy Baldwin, who is directing a multidisciplinary team of water and wastewater treatment specialists. The project has strong parallels to the needs of Hagerstown, and insights from the effort will directly inform a more efficient and comprehensive development of Hagerstown's integrated water and wastewater master plans.

Technical Leaders

Hagerstown will have access to industry-leading expertise in master planning.

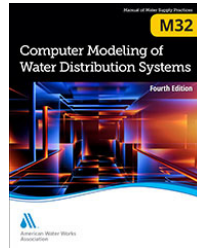
Technical specialists are recognized experts in their field of expertise, possessing detailed knowledge in their areas of expertise. They will support Betsy and the team to deliver the technical quality required for a successful master plan.



Amanda Schwerman, PE

Quality Assurance/Quality Control

Amanda is a dedicated planning and asset management professional who focuses solely on master planning, hydraulic modeling, and asset management projects. Amanda has served as the manager and lead modeler for numerous water, wastewater, and reclaimed water planning projects across the southeastern United States, and the country. She has “written the book” on hydraulic modeling, as an author of three chapters in the *AWWA Manual 32 - Computer Modeling of Water Distribution Systems*.



Value to Hagerstown

Amanda tirelessly works to provide quality deliverables to meet client expectations and enable them to adapt to future conditions. She will apply her planning skills to ensure the City gets a water and wastewater system that serves you for the next 20 years and beyond.



Kevin Laptos, PE

Water Distribution Modeling Expert

Kevin is the National Distribution & Collection System Planning Practice Leader for Black & Veatch. He specializes in planning and modeling of water distribution and hydraulic transient analysis. He has experience in engineering practice and management involving the planning, design, construction, operation, and rehabilitation of water and wastewater systems. Over his career, Kevin has supported or led over 200 hydraulic modeling and system planning projects throughout the U.S. including the Water Distribution Master Plan for Charlotte Water and the Fairfax County Wastewater Utility Management Plan.

Value to Hagerstown

Kevin will use his extensive experience to frame a vision for the future of the Water and Wastewater system while providing expert guidance to the team on all technical aspects of executing this master planning project. Betsy and Kevin recently collaborated with Fairfax Water on their Water Storage System Analysis.



Chris Ranck, PhD, PE

Wastewater Hydraulic Modeling Expert

Chris has expertise in numerous aspects of wastewater hydraulic modeling and has provided his modeling knowledge on master plans throughout the country, including Fairfax County, VA. His focus on technical excellence, operational efficiency, and a desire to continually improve will provide the city with high-quality models that include the tools to understand and interpret results and support City staff's learning needs as he did for Fairfax County on the Wastewater Utility Management Plan.

Value to Hagerstown

An expert in hydraulic and water quality modeling, Chris will provide City Staff with insight on data interpretation and the best methods for project execution.



Ahmet Ozman, PE

Strategic Planning, Business Operations Lead

Possessing extensive experience in asset management planning, including risk-based prioritization, and capital improvement planning, Ahmet will serve as the lead for Strategic Planning.

Based in Gaithersburg, Ahmet is a Civil Engineer with 30 years of experience in the water industry, specializing in asset management, ISO55000, strategy and program development, risk-based prioritization, and capital improvement planning. Ahmet is a Member of the Institute of Asset Management (IAM), one of Black & Veatch's IAM Endorsed Assessors for asset management program assessments and holds an IAM Diploma.

Relevant Experience:

- Wastewater Utility Management Plan | Fairfax County
- Wastewater Facility and Master Plan | WSSC Water
- Water Distribution System Master Plan | Charlotte Water
- Advanced Asset Management Services | WSSC Water

Value to Hagerstown

Ahmet serves as Black & Veatch's Strategic Asset Management Leader focused on assessment and planning for critical infrastructure. In his 30+ years of experience he has assisted more than 100 clients focusing on determining the true state of assets and their road mapping more than \$1B in improvements. Ahmet has shaped asset management programs and processes for utilities regionally and nationally and will help Hagerstown achieve a risk-based prioritized CIP.



Mike Hanna, PE

Facility Planning Lead

With an acute understanding of Hagerstown infrastructure, Mike will serve as the lead for Facilities Planning.

Mike has over 30 years of experience in water and wastewater planning and design throughout Virginia, Maryland, and the mid-Atlantic region. He has managed projects ranging from small collection system expansions to major projects including various Master Planning and Business Case development projects for Fairfax County, Gloucester County, Loudoun Water, and WSSC Water. As a result, Mike understands the needs of utilities in developing a rational, comprehensive master plan.

Relevant Experience:

- Wastewater Utility Management Plan | Fairfax County
- Water and Wastewater Master Plan | Gloucester, VA
- Wastewater Facility and Master Plan | WSSC Water
- Water Storage Analysis | Fairfax Water
- Re-Rating Study | Upper Occoquan Service Authority

Value to Hagerstown

Mike understands the City's vision for this project and will ensure that Black & Veatch works as a partner to help the City evaluate and establish a plan for your facilities that aligns with your future needs. Mike worked closely with Betsy and the City on the early prioritization of improvements included in the WWTP Improvements – Phase 1. Mike began his work for the City in 2001 and 2011 Primary and Denitrification Upgrades.

Key Staff	Qualifications
Madison McGuire Asset Management Plan 5 years experience	Madison brings her experience gained working on a multitude of projects in the water and wastewater industry, spanning both design and asset management driven efforts. Her asset management work experience spans the development of strategic asset management plans, business case evaluations, gap assessments, and master planning efforts.
Mat Powis, PE Financial Planning & Risk Prioritization 21 years experience	Mat has national experience with the development of short and long-term Capital Improvement Plans that help utilities balance their revenue requirements over time while maintaining a strong financial position. He has helped clients plan for \$25 plus billion of investment. This has been accomplished with the use of lifecycle costs analyses and investment plans; project capital prioritization and budget optimization; affordability studies; financial forecasting; and cost of service rate studies. Mat led the development of Fairfax County's CIP tool on the Wastewater Utility Master Plan.
Jeff Stillman, PE CIP Optimization 28 years experience	Jeff has led a variety of variety of asset management and infrastructure planning projects and programs, including risk-based facility prioritization; computerized maintenance management systems; sewer system evaluation surveys; and capacity, management, operations, and maintenance (CMOM) programs.
Katy Weidner, PE Flow Projections and I&I Analysis 13 years experience	Katy specializes in on flow and demand projections, hydraulic modeling of gravity and pressure pipeline systems, and planning of wastewater collection systems. Katy is a Senior Infrastructure Planning Engineer and recently led collection system planning efforts for Fairfax County, Charlotte Water, and Winston-Salem Forsyth County Utilities.
JingJang Dai, PhD, PE Collection System Modeling 8 years experience	Dr. Dai has a strong technical background in hydrologic and hydraulic modeling for wastewater and stormwater collection system projects. She is proficient in a variety water and sewer modeling programs, including the latest software. Dr. Dai specializes in the development of automation tools using Python with a focus on predictive analytics through machine learning.
Ali Nakhli, PhD, PE Distribution Systems Modeling 14 years experience	Ali brings 14 years of experience in water resources engineering and research. He specializes in planning, modeling water distribution systems, data analytics, hydrologic and water quality modeling, and wastewater treatment modeling and operations. Ali is dedicated to enabling smarter utility decisions and advancing the development of digital twins and data-driven water infrastructure planning and management.
Amanda Canida, PE Water Process 16 years experience	Amanda has 14 years of experience in process design and technology selection for water treatment plants across the country. She has assisted with projects related to taste & odor, enhanced coagulation, and emerging regulations such as cyanotoxins and PFAS with project scopes ranging from regulatory compliance assessments to detailed engineering.
Christine deBarbadillo, PE, BCEE Water Process and Optimization 36 years experience	Chris is a seasoned process engineer and local resource, Chris has conducted in-depth assessments for more than fifty wastewater treatment facilities, focusing on performance optimization and upgrade strategies. Chris has worked closely on the Re-rating study, process improvement options considered in the Wastewater Improvements – Phase 1 project and is a trusted advisor on discharge permit issues.

Part 3 - Project Understanding & Management Approach

Project Understanding

The master plan must provide a roadmap for making smart investments that will allow the City to continue providing reliable and cost-effective services to its customers. Success will require an approach and team that aligns with the City's vision that balances priorities in a manner that allows the City to stagger investments in 5, 10, and 20 years, and maintains level of service for its rate payers.

One of the key factors for the selected consultant is to facilitate the Master Plan development and balance stakeholder engagement. Black and Veatch will provide the resources that the City knows and trusts, to deliver a Master Plan that answers the critical questions in your schedule.



Management Approach

Too often utilities embark on an effort like this and spend a significant amount of time and money but never quite reach the goal of attaining an actionable long-range plan. Black & Veatch has found that proper management of resources is critical, to coordinate and keep the technical elements moving toward the goal: on-time and on-budget.

Not only does this require assignment of skilled leaders to direct tasks, but also a Project Manager who can orchestrate the work, deploying teams to perform tasks in a simultaneous manner that avoids duplication of effort and results in efficient project execution. For planning projects to be useful they must be carried out in a timely fashion. Over many years of experience on similar projects we have developed a suite of tools and processes that help ensure project success. Betsy Baldwin has demonstrated her leadership of multi-disciplinary teams during the conceptual and detailed design phase of the City Wastewater Improvements Project – Phase 1. Black & Veatch can tackle complex projects and deliver on-time while keeping in step with the City on the need for changes to the scope.

The completed master plan will provide actionable insights and long-term value. As described in detail in this section, our management approach will follow these guiding principles:

- **Engage all stakeholders** in the planning process to ensure input is heard and concerns addressed. Building consensus and support strengthens buy-in and promotes successful implementation.
- Implement a **consistent decision-making** process to enhance efficiency and minimize delays. Documenting key decisions helps maintain schedule and budget throughout the planning process.
- Spacing Technical Memorandums and Workshops to allow **effective review** to avoid fatigue.
- **Dedicated staff** working alongside City team members (in person bi-weekly) to help facilitate information more effectively maximizing master planning efforts.

- Managing Master Planning efforts to deliver a high-quality end product **on time and on budget** as seen in ongoing and past design projects with the City.

Commitment to Quality

Hagerstown is an important client to Black & Veatch, and we are committed to continuously improving our services to support the City's future success. Black & Veatch has a strong track record of providing quality professional services. We recognize that quality is a perpetual improvement process updated through a continuous feedback method to incorporate successful techniques and insights from our project execution practices.

Cost Tracking and Invoicing

Black & Veatch will prepare a monthly invoice including breakdowns for each active Master Plan task. The monthly invoice will track the earned value and actual cost against the planned value. Included to the right is a sample figure that shows the monthly tracking of the earned value and actual cost. Our monthly invoices include brief reports providing information regarding the status of major tasks.

Project Management

KEY MEETINGS

- Project Kick-Off
- Bi-Weekly Progress Meetings

DELIVERABLES

- Project Management Plan
- Scope
- Change Orders
- Budget
- Schedule

MONTHLY PROGRESS REPORTS

- Work Complete
- Problems Encountered
- Delays in Execution Of Work
- Change Management
- Schedule Update
- Approval Actions and Information Required
- Earned Value Reporting



Earned Value Management Curve demonstrating Black & Veatch delivering value on every task.



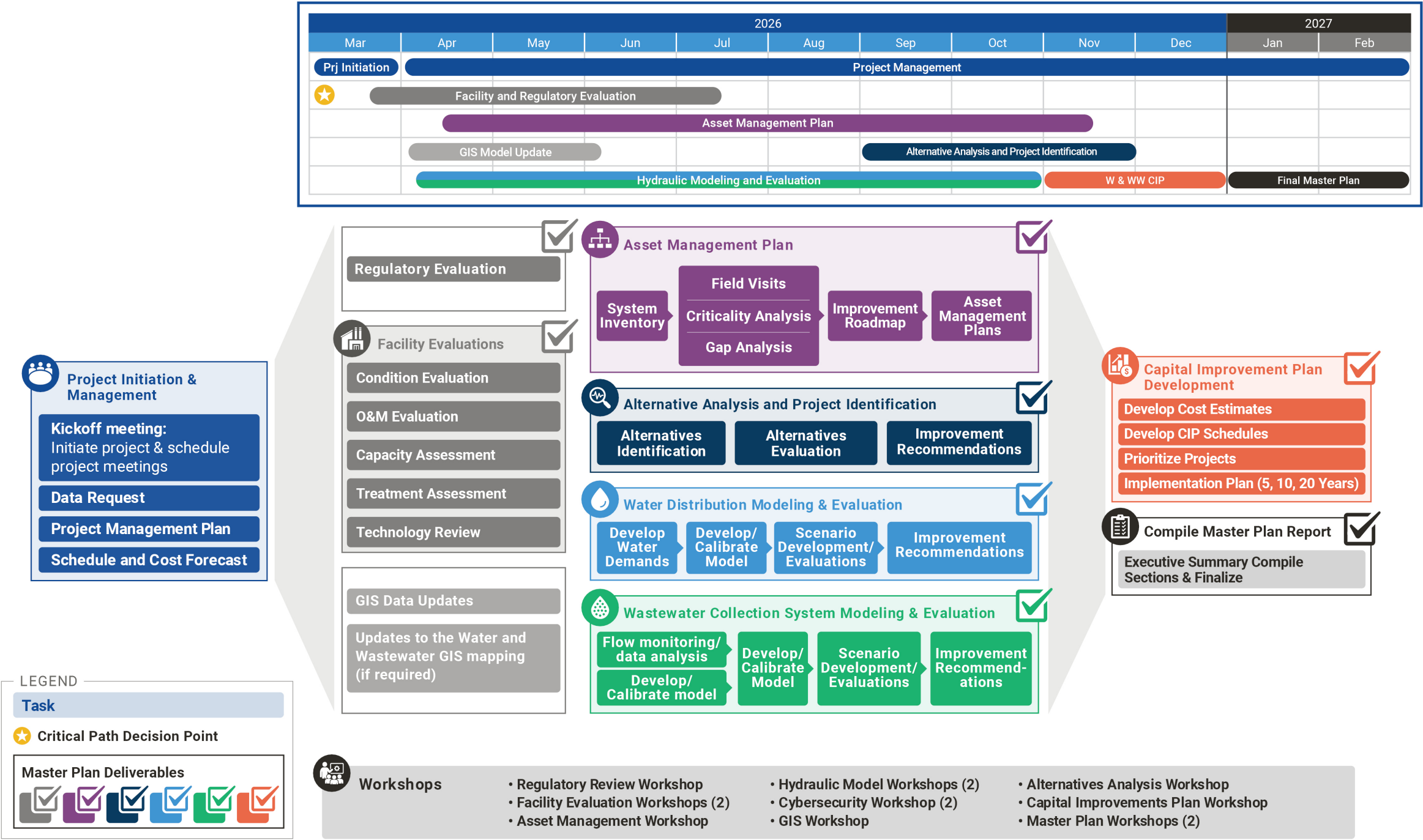
Hagerstown Roadmap for the Future

The graphic to the right illustrates Black & Veatch’s comprehensive approach to partnering with the City in the development of its Master Plan. Our approach is organized into a series of interrelated components that collectively provide a complete view of the planning process and the key steps required for successful execution. Many tasks will be performed concurrently to meet the requested schedule, with outcomes from select activities informing and shaping others. As such, recommendations will be developed holistically to ensure alignment with ongoing efforts while maintaining focus on the overall objectives and long-term vision of the Master Plan.

To meet these challenges, Black & Veatch has assembled a highly qualified team with extensive master planning experience, complemented by in-depth local knowledge of the City’s facilities and operational processes. Our approach integrates sound engineering analysis with proactive stakeholder engagement to build consensus and deliver a Master Plan that clearly identifies the actions required to maintain desired levels of service.

The resulting plan will be technically defensible, forward-looking, and supportive of long-term planning decisions that benefit the City and its ratepayers.

The following pages provide additional detail on the individual task areas—such as Facility and Regulatory Evaluation, Asset Management, and related efforts—along with the associated schedule and key deliverables.



Facility Evaluations

The Master Planning effort begins with a thorough understanding of the City's existing water and wastewater facilities. Building on our familiarity with Hagerstown's systems, staff, and operations—and supported by our local team of technical specialists—Black & Veatch can initiate the effort immediately and efficiently to meet the schedule.

We will update the work previously completed at the Hagerstown Wastewater Treatment Plant to provide a current assessment of treatment systems and performance. Comparable evaluations will be conducted at the Water Treatment Plant and key pumping stations. These efforts will include facility walk-throughs with City staff to capture operational insights, institutional knowledge, and identified challenges. Engaging the appropriate professionals with direct experience in facility design and operations is critical to efficiently assessing conditions and documenting key findings.

While a detailed, asset-level condition assessment is ultimately in the City's long-term interest for maintenance planning and capital programming—and will be addressed as part of the Asset Management element of the Master Plan—schedule and budget constraints limit the feasibility of such detailed evaluations during the initial phases. Accordingly, we propose to focus the Facility Evaluations at the system level.

This system-level approach has proven effective for Black & Veatch, including in our recent criticality assessment at the Wastewater Treatment Plant. Rather than evaluating every individual asset and estimating the likelihood and consequence of failure at a component level, we will evaluate treatment, pumping, and conveyance systems by unit process and overall system performance. Emphasis will be placed on assets that are aging, operationally challenging, or maintenance-intensive, and that represent the greatest risk to reliability and service.

This practical and focused methodology—combined with our local expertise and familiarity with the City's infrastructure—will allow the team to work efficiently while establishing a strong technical foundation for the subsequent Master Plan tasks.



Driving WSSC Water's Wastewater Future

Black & Veatch is supporting WSSC Water's initiative to deliver a single, integrated roadmap for the next 20 years.

Our work will consolidate all planning efforts into a comprehensive Wastewater Master Plan, covering collection, conveyance, pumping, storage, treatment, and biosolids management, and pairs it with 10-year Facility Plans for major facilities like Western Branch WRRF, Parkway WRRF, and the entire conveyance system.

Why it matters:

- Meets regulatory and service mandates
- Protects health, safety, and the environment
- Enhances reliability and resilience
- Sustains operational efficiency

From modeling and condition assessments, to visioning and compliance strategies, we are helping WSSC Water reduce risk, optimize investments, and deliver exceptional service for decades to come. Black & Veatch's local team of technical specialists allows us to efficiently evaluate facilities, determining both condition and functionality. Our recent work for the WSSC Wastewater Master Plan included focused site surveys at multiple facilities, demonstrating how we will quickly gain an understanding of each facility and set a strong foundation for further work.

Facility and Regulatory Evaluation Approach

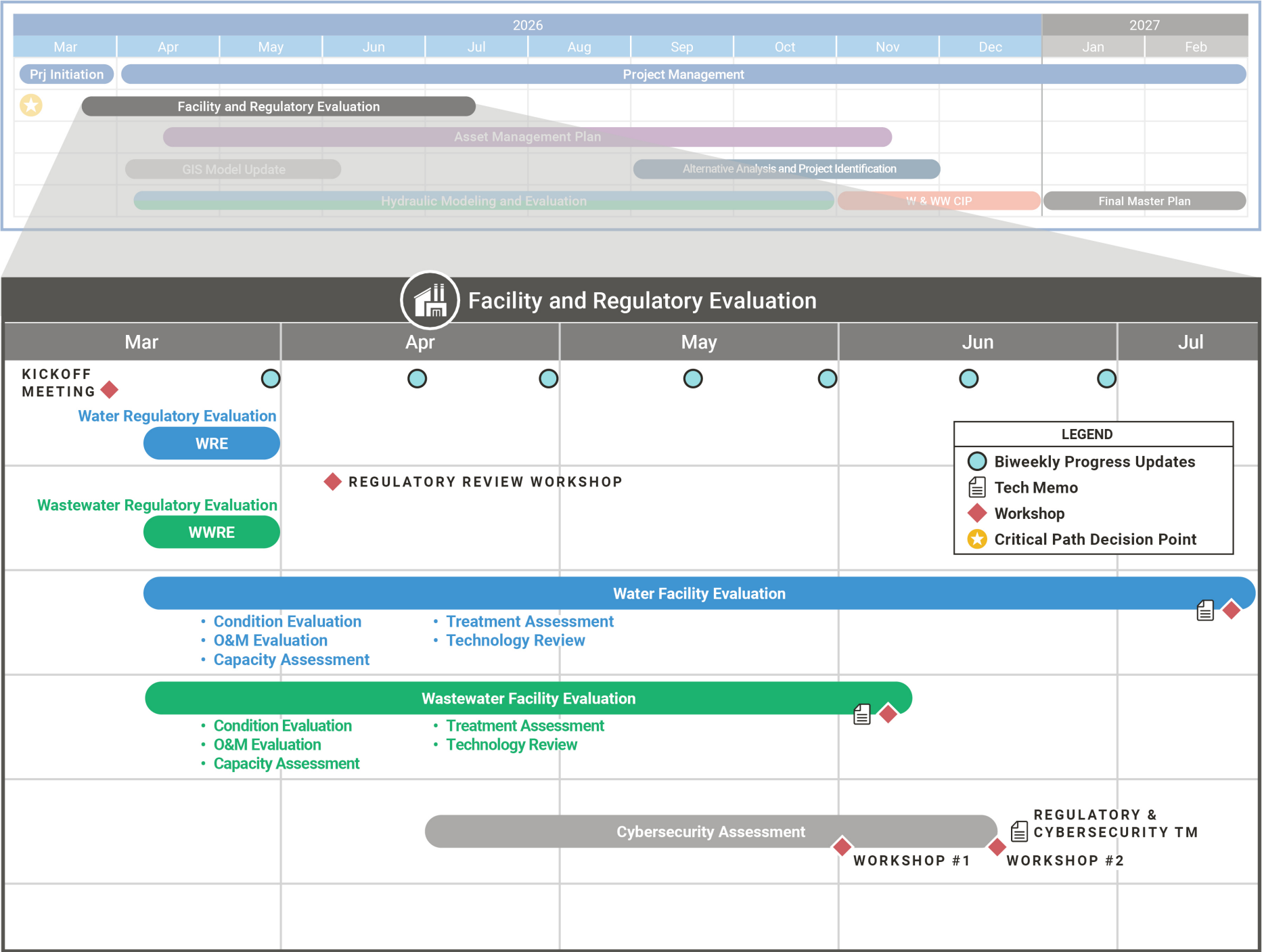
Leveraging our previous work with Hagerstown, Black & Veatch will commence the Master Plan effort with a strong understanding of the City’s systems, priorities, and regulatory environment. On the wastewater side, we have already completed substantial regulatory evaluations, including coordination with the MDE on existing and anticipated permit limits. These findings will be reviewed alongside current and emerging drinking water regulations—including contaminants of emerging concern and anticipated future requirements—to establish a regulatory framework for evaluating the City’s facilities.

We will assess the City’s existing water and wastewater facilities with respect to age, condition, and functional performance. This effort will include on-site evaluations conducted collaboratively with City staff to capture operational experience, institutional knowledge, and identified challenges. At the wastewater treatment plant, we will update the criticality assessment completed in 2024 and perform comparable system-level evaluations for pump stations and the water treatment plant. Our familiarity with the City’s infrastructure, personnel, and operating practices—combined with our local team of specialists—allows us to efficiently advance this work and maintain the schedule.

Through this integrated and concurrent approach, Black & Veatch will provide both an accelerated project start and a strong technical foundation—supporting the current Master Plan development while positioning the City for effective long-term management of its critical water and wastewater infrastructure.

Cybersecurity

Black & Veatch will perform a regulatory and facility documentation review to assess applicable federal and state cybersecurity requirements and evaluate provided system information. This includes reviewing existing regulations—aligned with CISA’s Cross Sector Cybersecurity Performance Goals (CPGs) as a baseline for HB1205 and SB871—and documenting findings and recommendations in a technical memorandum. Facility documentation will also be reviewed to identify improvement opportunities, and the results of all activities will be incorporated into a consolidated memorandum that includes existing and proposed network to network topologies along with a remediation appendix.



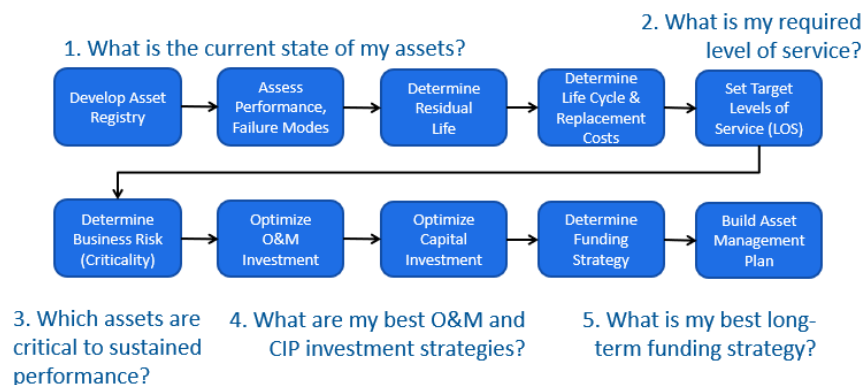
Operational Technology (SCADA) Cybersecurity Workshops (Virtual). Black & Veatch will facilitate two virtual workshops (up to 4 hours each) with City IT and SCADA SMEs. The first will document network to network connectivity and relevant data flows across the City’s water, wastewater, and collection systems.

The second will refresh the cybersecurity risk assessment performed in November 2023 using EPA’s WCAT, which closely aligns with CISA’s CPGs referenced in SB871. Outputs from these workshops will be integrated into the water and wastewater evaluation technical memorandum with recommendations.

Asset Management

There are many approaches to asset management planning. The City intends to follow the USEPA 5 questions / 10 step approach (shown below) to developing asset management plans for the water and wastewater systems. The goal of this task is to develop the components of the asset management plan for water and wastewater facilities. These are outlined below:

- **Asset Inventory:** Defines system inventory at facility and process level.
 - **Current State of the Asset:** Documents available data on asset age, expected useful life and observed physical condition.
 - **Required Sustainable Level of Service:** Specific level of service goals and KPIs for facilities and processes will support evaluation of asset performance and identification of improvement needs.
 - **Assets Critical to Sustained Performance:** Criticality analysis identifies and evaluates criticality facilities and processes to inform improvement prioritization.
 - **Minimum Life-cycle Costs:** Asset replacement costs and maintenance costs are required to evaluate lifecycle costs and make determinations for repair, rehab, and replacement decisions.
 - **Long-term Funding Strategy:** Compiles O&M and capital needs into 5- and 10-, and 20-year plans.
 - **Optimal Operations and Maintenance (O&M) Program:** Includes a risk-based preventive maintenance program.
- **System Inventory:** We will start with a review the City's MVP-One CMMS software and supplemented by review of record drawings and facility walkthrough.
 - **Field Visits:** Our team will conduct field visits to the water treatment plant, wastewater treatment plant, representative finished water storage tanks, pumping stations and lift stations, to gather information and observe operating conditions.
 - **Criticality Analysis:** We will evaluate consequence of failure for facilities and processes to inform improvement prioritization
 - **Gap Analysis:** Our team will conduct a series of structured interviews with the City at various levels to help identify gaps for developing asset management plans for water and wastewater systems. A report will summarize the findings from the interviews and identify the specific gaps and improvements.
 - **Improvement Roadmap:** Based on the assessment results, we will work with the City to develop and prioritize improvement actions to support asset management planning.
 - **Asset Management Plans:** Templates will be developed for water and wastewater systems separately, identifying gaps in data, process, and technology to allow the City to prioritize these improvement activities.



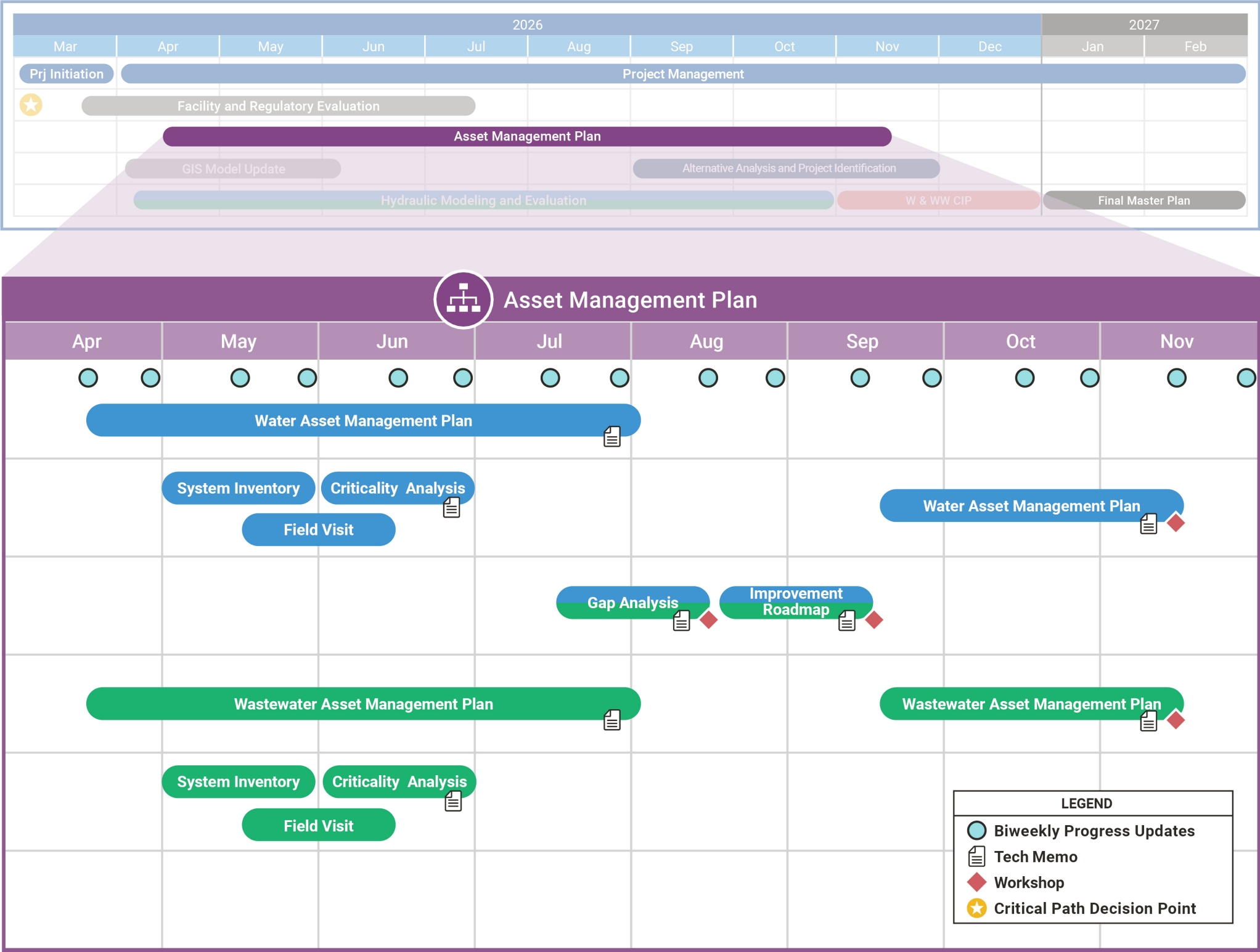
Asset Management Plan Approach

To support the City’s goals of long-term sustainable Asset Management Plans, our team will leverage both industry standards and a dedicated team of asset management professionals. This effort begins by establishing a clear understanding of the City’s existing water and wastewater infrastructure.

- Through desktop analyses and a detailed review of the City’s CMMS system, our focus will be to build out **an accurate and reliable system inventory**.
- Field visits will help to validate the system inventory and gain an understanding of risks at the facility level.
- A Criticality Analysis will ensure that future improvements are prioritized in a way that will meet the City’s needs.

Our approach to developing the Asset Management Plans is to perform a **comprehensive Gap Analysis**, honing in on the key components of an asset management plan and what is needed to achieve it. Guided conversations with staff at all levels will help Black & Veatch to understand current asset management practices, challenges, and resourcing needs. This effort will inform an achievable and sustainable Improvement Roadmap, where Black & Veatch will collaborate with the City to map out the steps they need to take.

Tailored templates will be developed for both water and wastewater, providing the City with clear guidance on what is needed to develop Water and Wastewater Asset Management Plans. Through the Gap Analysis, Improvement Roadmap, and Asset Management Plan Templates, Black & Veatch will provide the City with **a structured framework to guide future planning and support continuous improvement**.



Water and Wastewater Hydraulic Modeling

Key elements of our phased hydraulic modeling approach are:

Phase 1 System Data Review and Assessment

Software Selection: An important early task will be to work with the City to select hydraulic modeling software for both the water and wastewater systems. It will be important to ensure the software is not only capable of performing the system modeling required for the master plan but is also a platform that staff are comfortable using, has affordable licensing and support costs, and obtained from a proven vendor.

Data Review and Assessment: Another important early task includes an extensive review of all available system data and information for the project. We will refine our modeling approach as needed to leverage available data/information as much as possible. We will also determine if there is any critical data/information that is not readily available and work with the City to determine how best to obtain this data/information.

Phase 2 Hydraulic Model Development/Update and Calibration

A significant portion of the project budget will be dedicated to developing a new model of the wastewater collection system and updating the existing water system model. Based on the findings of the Phase 1 Data Assessments, we will work with the City to determine the optimal level of development detail and the calibration plan for each model. Our approach will optimize related efforts to ensure the models are accurate enough for the purposes of this project and to avoid model development and calibration work that is unnecessary.

Water Demands and Wastewater Flows: To ensure planning consistency between each system, it will be important to develop water demand and wastewater flow projections

for the 5-, 10-, and 20-year periods based on the same future growth information and consistent projection assumptions including estimates of future service area boundaries for each system. Accurate projections will help ensure recommended future system improvements are “right-sized” to meet the City’s capital infrastructure needs.

Phase 3 Model Scenarios and System Improvements Evaluations

Level of Service Goals: An important step in any master plan is to develop system performance criteria and level of service goals for each system that will ultimately dictate the sizing and timing of the capital improvements. We will work with the City to ensure the criteria and goals are consistent with City standards and water industry best practices.

Optimized Improvements: For the 5-, 10-, and 20-year periods, we will utilize the models for each system to recommend capacity-driven system improvement projects that will ensure the City meets its level of service goals. Project “triggers” will be defined for each project that can be monitored by the City in the future to determine if a project can be deferred or if a project needs to be accelerated.

Training and SOPs: As part of our onsite model training, we will provide SOPs for City staff to reference when performing needed updates and/or targeted modeling evaluations of either system. Prior to the training, we will work with City staff to understand exactly how they wish to use the models so that we target the training.

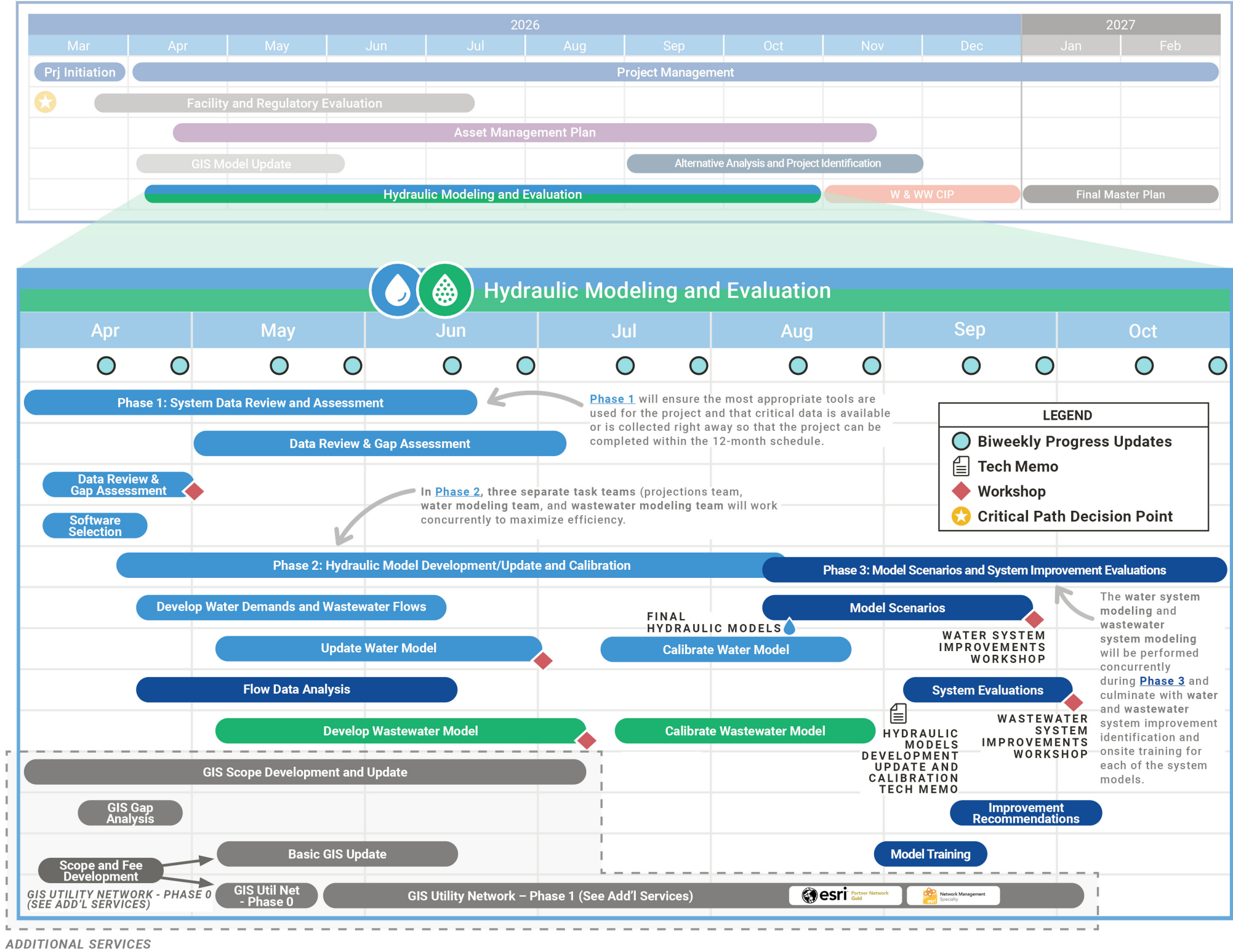
Data Management: To facilitate the City’s model ownership, we will develop SOPs for connecting the calibrated model to GIS and SCADA data. The City can maximize return on its investment in the models by connecting them to existing databases for model updates. Projected flows for individual planning years are maintained as model scenarios.



GIS Update, Water Distribution and Wastewater Collection Hydraulic Modeling

One of the critical factors for success of the Master Plan is confirmation of the GIS modeling scope and efficient update of the GIS model for use by the hydraulic modelers. Black & Veatch recommends that immediately following NTP the GIS model be reviewed and interviews scheduled with the key staff using GIS to determine the gaps and needs. Using this assessment information a scope and fee will be developed for review and approval by the City. By prioritizing the model update scope the hydraulic modeling schedule will be confirmed with a goal to complete the system evaluations by mid-October to contribute to the alternative analysis and project identification. Black & Veatch has the capability to mobilize multiple teams to complete the site verification with Triad Engineering, GIS model updates, flow projections and hydraulic modeling. The hydraulic modeling is planned to have the following three phases:

- 1. **Phase 1** will ensure that the most appropriate tools are being used for the project and that critical data needed for the project is available or is collected right away so that the projected can be completed within the 12-month schedule.
- 2. In **Phase 2**, three separate task teams (projections team, water modeling team, and wastewater modeling team will work concurrently during this phase to maximize project execution efficiency.
- 3. In **Phase 3**, the water system modeling and wastewater system modeling will also be performed concurrently during this phase and culminate with water and wastewater system improvements identifications and workshop onsite training for each of the system models.



Alternatives Evaluation, Project Identification and Master Plan

Building on the results of the Facility Evaluation, Hydraulic Modeling, and Asset Management Planning efforts, Black & Veatch will perform a detailed alternatives analysis. These alternatives will address a range of drivers for improvements, upgrades, viable treatment process alternatives, general or facility specific recommendations, and rehab and replacement needs. Decision trees will be developed to guide optimal decision making for cases where multiple alternatives (such as upgrade, rehabilitation, replacement) exist for a given need.

A set of evaluation criteria will be developed and applied to proposed alternatives to ensure recommended improvements are subject to a rigorous and transparent evaluation of their benefits to the City.

Based on results of the evaluation of project benefits, Black and Veatch will prepare a draft Technical Memorandum summarizing alternatives analysis recommendations. This deliverable will be updated incorporating City review comments.

Capital Improvement Plan

The project recommendations from the alternatives analysis will be further developed with planning level cost estimates and implementation timelines. Recommended projects will be documented in one page project forms (or abbreviated business case evaluation) which outline project scope, benefits, prioritization scores and cost estimates for ease of communication and stakeholder feedback. A draft technical memorandum will document the proposed CIP with recommended projects for 5, 10 and 20-year planning horizons including project dependencies, sequencing and funding sources. The final CIP will be optimized to incorporate budget and implementation constraints as identified by the City.

Evaluation Criteria

Establish consensus among stakeholders to set priorities for project implementation.

Black & Veatch will collaboratively establish evaluation criteria and priorities for CIP development early to ensure key stakeholders' voices are heard and integrated into the results.

During this step our team will facilitate meetings with your team to collaboratively develop the project evaluation criteria and weighting. Productive discussions will gain consensus on criteria such as risk reduction, operational efficiency, health and safety, regulatory compliance, environmental impact, financial efficiency, and capacity.



Alternatives Analysis, Project Identification, Capital Improvement Plan Development, and Final Master Plan

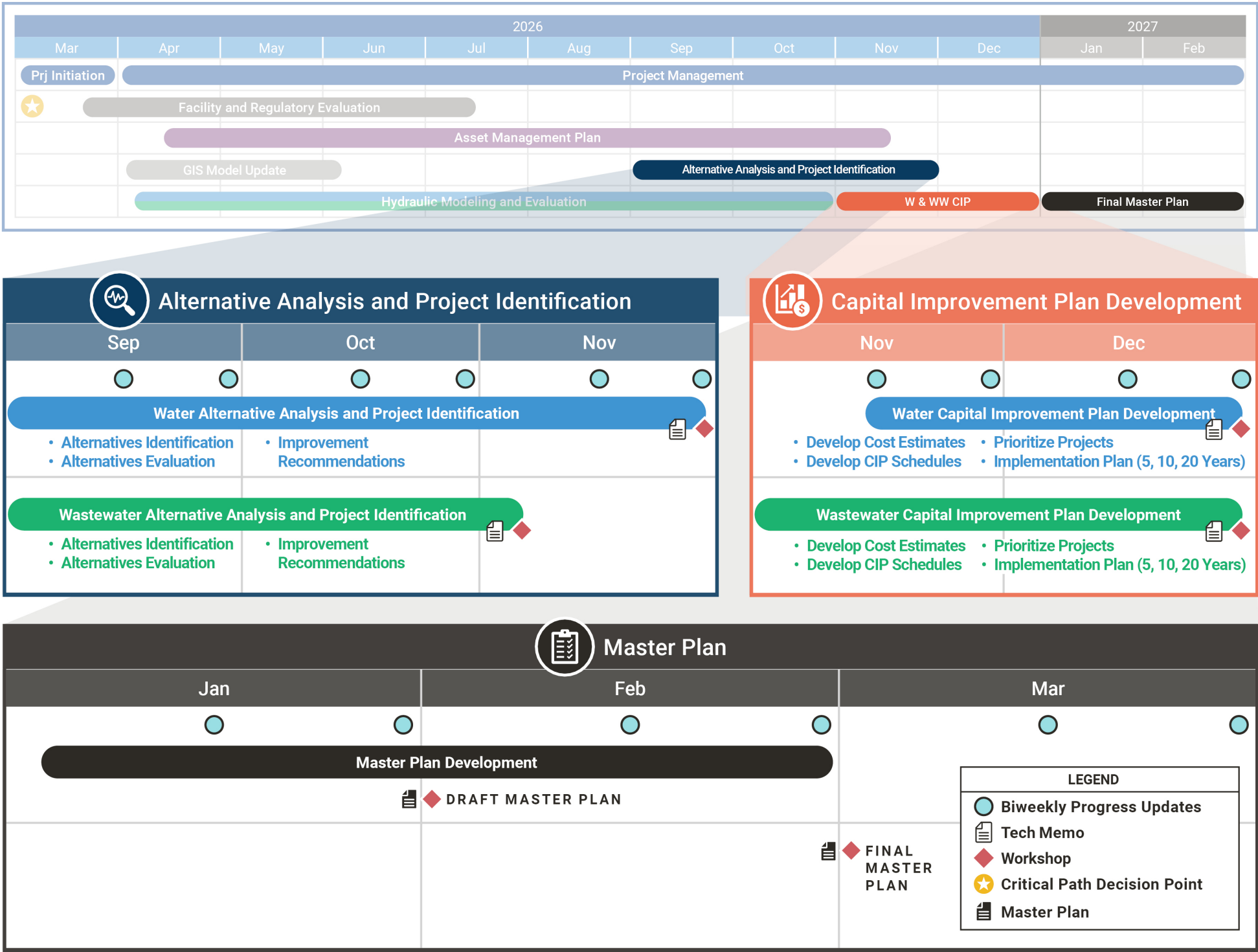
Building on the results of the Facility Evaluation, Hydraulic Modeling, and Asset Management Planning efforts, Black & Veatch will perform a detailed alternatives analysis. Insights, concerns, and recommendations resulting from each of the three prior tasks will be used to inform the analysis. This approach ensures that the projects recommended for the Capital Improvement Plan will meet the City’s near and long-term planning needs. We will work collaboratively with the City to identify the necessary improvements at critical water and wastewater facilities, and look further in-depth at both established and emerging treatment technologies and processes to inform the alternatives analyses. As a result, our approach will provide the City with confidence that the projects going into the Capital Improvement Plan are justified and actionable.

CIP and Master Plan

Under this task, Black & Veatch will work with the City to build a comprehensive and sound Water and Wastewater Capital Improvement Plan. Each alternative identified under the Alternatives Analysis and Project Identification task will be further detailed and cost estimates developed, providing the City with key information needed for successful future implementation. **A risk-based approach will be taken, with each of the projects prioritized considering project benefits, costs, and any regulatory and implementation constraints.** This process will benefit the City by:

- Providing a defensible CIP considering project benefits, costs and regulatory and implementation related constraints that balances and optimizes the allocation of funds and resources for capital projects.
- Assuring levels of service/performance goals are met.
- Defining a process of quantifying risk and project benefits that can be applied to all CIP projects and that is repeatable, allowing the staff maintain and adjust based on evolving conditions.

In a culmination of each of the previous efforts, the work performed will be compiled into a Master Plan document. This will provide the City with a summary of all studies, analyses, findings, and recommendations, giving the City the tools needed to confidently guide future decision-making.



Additional Services

Black & Veatch proposes the following additional services be considered to improve the efficiency and quality of the Project.

1. **Dynamic Asset Management Plan:** City of Hagerstown will receive a Dynamic Master Plan based in PowerBI that will allow its staff to proactively prioritize its CIP every fiscal year. This will result in time and cost savings as the City will have certainty that its capital investments are assigned to the assets that will maximize risk reduction at the lowest possible cost. The Plan will also be adaptive to the requirements of the regulatory agencies, environmental, social and capital needs, maximizing the City's sustainability benefits to the people served by the Hagerstown Utilities Department.
2. **CIP Prioritization Optimization Tool:** Following the initial CIP Update planned for the Master Plan. A CIP Prioritization Optimization Tool will allow the City to view a more dynamic graphic of an optimized CIP and compare various "what if?" scenarios (e.g. annual budget of \$5M versus \$10M) and view the associated impact on risk reduction over time directly. This is complementary to the Dynamic Asset Management Plan.
3. **GIS Utility Network – Data Readiness Assessment (Phase 0):** This initial planning task will confirm the City's interest, desired complexity, and readiness for establishment of an Esri ArcGIS Utility Network. This task will include strategic planning, data readiness assessment and development of a water and wastewater prototype. This task is a suggested precursor to scope Additional Service #4. This can be done during the initial stages of the Master Plan Project or following its completion; however, there are efficiencies if this phase is completed in parallel with the GIS update phase of the Project.

4. **GIS Utility Network Implementation (Phase 1):** Building upon the Data Readiness Assessment and prototypes in Phase 0, this phase begins with pilot migration of data to ensure rules, subnetworks, and workflows function effectively. The production deployment, system integrations, operational workflows, training, and continuous improvement complete the transition to a fully operational, network aware GIS that supports modeling, asset management, and long term utility planning.
5. **Computerized Maintenance Management System Improvements:** Following the initial review of the functionality of MVPOne in the project, this task will identify capability gaps, and tailor workflows to increase efficiency and data reliability.

Additional Details for these tasks are provided in the Price Proposal:

6. Inclusion of Edgemont Reservoir and W. M. Breichner WTP in the Master Plan
7. Source Water Analysis for a Secondary Intake for R.C. Willson WTP or a new WTP
8. Surveying
9. Flow Monitoring
10. Data Center Owner's Advisor

Appendix A - Key Personnel Resumes

Betsy Baldwin, PE

Project Manager



Betsy has 25 years of experience in water treatment engineering, project, and program management in a diverse set of contexts. In her current role, she supports clients and design teams in executing according to project scope, schedule and budget. She has led design projects for water and wastewater plant improvements, pipeline upgrades, and supported on the delivery of the recent Loudoun Water PSO Cost Estimating Guidelines Manual.

Project Experience

City of Hagerstown | Plant Improvements; Hagerstown, MD

Engineering Manager. Currently serving as the Engineering Manager and is responsible for coordinating the technical aspects of the overall design which includes supervision of internal disciplines and our subconsultants, attending and hosting client meetings and QA/QC of project deliverables. The City retained Black & Veatch following the successful delivery of the Preliminary Engineering Report for design services to address aging infrastructure and provide enhanced reliability to meet operational demands and aid in maintaining permit compliance. These improvements consist of: replacement of existing screening and headworks building, in-plant pump station, RAS pumping, oxygen flow control valve, new chemical building, various electrical and structural improvements, and HVAC.

City of Hagerstown | WWTP Miscellaneous Engineering Services; Hagerstown, MD

Engineering Manager. Provided regular advice and support on contract management of third-party facility operators, procurement of maintenance providers, permit compliance, cybersecurity assessment and early-stage planning alternatives for water and wastewater operations. The City has requested Black & Veatch's (Engineer's) professional services for miscellaneous current and potential small-value tasks. The small scale of the assignments and their short-to immediate turnaround times.

Education

- MS, Civil Engineering, Environmental Engineering and Water Treatment
- BS, Civil Engineering, Environmental Engineering

Years Experience

25

Professional Registration

- PE - MD, No. 64072
- PE - VA, No. 0402041465
- PE- DC, No. 40002623

City of Hagerstown | Biosolids Dryer Facility Coordination; Hagerstown, MD

Engineering Manager. The City requested additional professional services to support contract oversight for the Pelletizer Facility's operations and maintenance agreement. Currently supporting the City by monitoring NEFCO's contact, providing engineering reviews of planned capital projects, and misc. tasks as requested by the City.

Anne Arundel County | Water Utility Benchmarking; Anne Arundel County, MD

Engineering Manager. Directing a multidisciplinary team of water and wastewater treatment specialists. Black & Veatch is supporting Anne Arundel County in a comprehensive evaluation and optimization of its drinking water treatment systems.

City of Hagerstown | WWTP MS4 20SW Stormwater Permit Renewal; Hagerstown, MD

Engineering Manager. Coordinated team to identify steps needed to regain compliance with current stormwater regulations for the WWTP. Interviewed plant staff and provided step by step requirements for compliance.

Fairfax Water | Frederick P. Griffith Jr. WTP Alternate Power Feed; Lorton, VA

Engineering Manager. Led detailed design for 120 MGD water plant redundant power connection. Collaborated with Dominion Energy and Owner to design new substation and ensure circuit reliability.

Fairfax Water | Noman M. Cole Jr. WRF Raw Wastewater Pumping System B3 Improvements Project; Lorton, VA

Engineering Manager. Led construction phase services for 20 MGD primary effluent equalization tank rehabilitation. Collaborated with Owner and CMAR to identify and solve project issues to facilitate project completion.

Fairfax Water | Frederick P Griffith WTP; Lorton, VA

Staff Engineer. Assisted in construction administration, coordinated submittal review with all disciplines, and process startup. Managed writing and production of the plant O&M manual documenting the treatment process facility and operation.

City of Fishersville | WWTP ENR Upgrade; Fishersville, VA

Staff Engineer. Managed daily design tasks for a \$20M wastewater treatment plant upgrade, involving several on and off-site engineers and drafters. Evaluated the treatment capacity for four wastewater treatment plants to determine the necessary upgrades/expansion for enhanced nutrient removal.

DC Water | PIERS - Online Plant O&M Manual; Washington, DC

Staff Engineer. Managed 10,000+ page on-line plant O&M Manual at Blue Plains Advanced Wastewater Treatment Plant, oversaw collection of drawings, field verified equipment data, and trained operators. DC Water and Sewer Authority.

City of Manassas | WTP Improvements; Manassas, VA

Staff Engineer. Coordinated design for sulfuric acid system and addition of a rapid mix tank. Evaluated the capacity of the entire water treatment process.

Loudoun Water | Goose Creek Reservoir Dredging Concept; Leesburg, VA

Engineering Manager. Coordinate team of sediment transport engineers to develop concept for dredging and management of dredged material and related environmental impact for the Goose Creek Reservoir. Identified key decisions for executive leadership.

Amanda Schwerman, PE

QA/QC



Amanda's experience is focused on water and wastewater-related planning projects. Her expertise lies in water and wastewater hydraulic modeling, but she has experience with process/mechanical design as well. She is involved with professional societies including chairing the WEF Collections System Committee's workshop group, working on the WEF Envision Taskforce, participating with AWWAs Engineering Modeling Applications Committee (EMAC) and M32 Updates, is a Trustee and the Membership Chair for WaterReuse Florida and is a certified Envision Sustainability Professional.

Project Experience

Broward County | Regional Wastewater Master Plan; Pompano Beach, FL

Planning Manager. In consideration of aging infrastructure and to best allocate the limited capital funds for the rehabilitation, repair or replacement of such infrastructure, which would cost significantly less than emergency mobilization repairs, Black & Veatch completed a Regional Wastewater Master Plan focusing on the regional transmission mains and master pump stations. The Master Plan allows Broward County to effectively provide risk analysis and prioritization with the objective of maintaining a desired level of service for its customers, communities and the environment at an acceptable level of risk and low cost for the rehabilitation, repair or replacement of its assets. Tasks included hydraulic and transient modeling, risk prioritization and condition assessment plan for the force mains, and inspection/condition assessment of the master pump stations. The ultimate delivery is an adaptive capital improvement plan tied to project triggers tied to decision support tools to track the triggers.

City of Canton | Water & Wastewater Master Plan; Canton, GA

QA/QC Engineer. Black & Veatch was selected by the City of Canton, GA to prepare a Water and Wastewater Master Plan. Project tasks include building hydraulic models of the City's water and wastewater systems using WaterGEMs

Education

- MS, Environmental Science and Engineering
- BS, Engineering

Years Experience

20

Professional Registration

- PE - FL, No. 70751

Professional Associations

- American Water Works Association
- Water Environmental Federation
- Florida Water Environment Association
- WaterReuse Association

and SewerGEMs software, developing flow forecasts through planning year 2040, performing condition assessments of the City's largest wastewater pump stations, conducting system evaluations and selecting capital improvements, preparing master planning documents and conducting project workshops with key stakeholders

Plant City | Wastewater Master Plan; Plant City, FL

Engineering Manager. Plant City's Utilities Department collection system services a population of approximately 38,000 people. The goal and objective of the Wastewater Master Plan (Project) is to assist City staff in providing a reliable and robust system with adequate capacity to accommodate future growth within the City's sewer service area. Their collection system includes more than 140 miles of gravity pipes, 20 miles of forcemain, and 44 lift stations using InfoWorks ICM. Tasks included: field data collection, population and demand projections, sewer treatment capacity, model update and calibration, hydraulic analysis, asset management strategy development, risk-based facilities assessment, CIP planning and master plan documentation.

Lee County | Wastewater Master Plan; Lee County, FL

Engineering Manager. Lee County's Utilities Department collection system services a population of approximately 250,000 people. The goal and objective of the Wastewater Master Plan (Project) is to assist County staff in providing a reliable and robust system with adequate capacity to accommodate future growth within the City's sewer service area. Their collection system includes 10 service areas more than 650 miles of gravity pipes, 350 miles of forcemain, and 690 lift stations. The model was developed in InfoWater because the Master Plan hydraulic analysis was only conducted for the forcemain portion of the collection system. Tasks included: field data collection, population and demand projections, sewer treatment capacity, model

update and calibration, hydraulic analysis, CIP planning and master plan documentation.

City of Venice | Venice Water Master Plan Update; Venice, FL

Engineering Manager. The City of Venice's Utilities Department treats groundwater and distributes the treated water to service a population of approximately 22,000 people in the City of Venice/South Sarasota County area. The goal and objective of the Water Supply Master Plan (Project) is to assist City staff in providing a reliable and robust water system with adequate capacity to accommodate future growth within the City's water service area. The City of Venice uses an average of approximately 2.0 mgd of drinking water from one WTP. Their distribution system includes more than 76 miles of piping, 1 booster station and 2 elevated storage tanks and is an all-pipes model, using InfoWater. Tasks included: field data collection, population and demand projections, water supply and treatment capacity, model update and calibration, hydraulic analysis, water age and chlorine residual correlation, water quality evaluation, CIP planning and master plan documentation.

City of Fort Lauderdale | Comprehensive Plan Update; Fort Lauderdale, FL

Engineering Manager. The City of Fort Lauderdale (City) has requested Black & Veatch update the comprehensive plan. The City's Comprehensive Plan strives to be a Plan that addresses the needs and aspirations of the community while addressing the requirements of Florida's growth management system. Tasks included developing goals, objectives and policies for the following elements: Future Land use, housing, infrastructure development, coastal management element, conservation, inter-governmental capital improvement, transportation, park & recreation, historic preservation, and public-school facilities.

Kevin Laptos, PE

Distribution & Collection Task Lead



Kevin serves as the National Distribution & Collection System Planning Practice Leader for Black & Veatch Water Americas. Kevin specializes in planning and modeling of water distribution and wastewater collection systems and hydraulic transient analysis. He has experience in engineering practice and management involving the planning, design, construction, operation, and rehabilitation of water and wastewater systems. Over his 36 year professional career, Kevin has supported and/or managed over 200 hydraulic modeling and system planning projects throughout the U.S.

Project Experience

Fairfax County | Wastewater Utility Management Plan; Fairfax County, VA

Planning Advisor. Responsible for technical oversight of planning tasks. Project includes development of a strategic plan for one of the largest suburban counties in the DC metropolitan area with an operational road map for the next 30 years. Key tasks include strategic planning, system hydraulic modeling, risk-based CIP development, and dynamic utility planning and management.

Beaufort-Jasper Water & Sewer Authority | Master Plan Update; Beaufort, SC

Technical Advisor. Responsible for advising project team on certain technical elements of the project. Project included planning and engineering services to develop a 5-year update to BJWSA's water and wastewater master plan and 25-year CIP. This project evaluated water treatment and distribution capacity, as well as wastewater reclamation facility and collection systems. The updated master plan and 25-year CIP facilitated long-term system planning for both water and wastewater systems by evaluating future capacity and water quality requirements, and identifying capital improvements necessary to comply with specified performance criteria. The project included an update, expansion, and validation/calibration of existing hydraulic models for both the water and wastewater systems to reflect current system infrastructure and operating parameters, including diurnal flow patterns.

Education

- MS, Civil Engineering
- BS, Civil Engineering

Years Experience

36

Professional Registration

- PE – FL, No. 87966
- PE – NC, No. 035367
- PE – PA, No. 045490E

Professional Associations

- American Society of Civil Engineers
- American Water Works Association
- Water Environmental Federation

Charlotte Water | Water Distribution System Master Plan; Charlotte, NC

Project Manager. Responsible for preparing a 30-year Master Plan for Charlotte Water's water distribution system. Project included development of system performance criteria, water demand analysis and projections, existing facilities evaluation, a comprehensive field testing program, hydraulic model update and calibration using InfoWater software, distribution system modeling and analysis, water quality modeling and analysis, CIP documentation and prioritization, master plan report and ESRI HUB, coordination dashboards, and model management protocol and basic scenarios. At the time of the project, the CLTW water system served a population of just over 1 million people in 3 major pressure zones at an average day system demand of approximately 120 MGD.

York County | Eastern Water Distribution System Master Plan; York County, SC

Technical Lead. Responsible for technical oversight of water distribution system hydraulic modeling (using InfoWater Pro software), system capacity assessments, and preparation of a 30-year master plan with CIP. Project work included establishing base and future year water demands, water model update and calibration, and hydraulic modeling of existing and future year system conditions to identify system capacity deficiencies and recommend needed pumping, storage, and pipeline CIP improvements.

Town of Harrisburg | Water and Wastewater Capital Improvement Plan (CIP) Planning Update; Harrisburg, NC

Technical Advisor. Responsible for technical oversight of water distribution system hydraulic modeling (using WaterGEMS software), system capacity assessments, and preparation of a 20-year CIP update. Project work included projections of system growth, water demands, and wastewater flows, water model development and calibration, and hydraulic modeling of the water distribution

system and wastewater collection system to identify system capacity deficiencies and recommend needed pumping, storage, and pipeline CIP improvements.

WSACC | FY 2022 Master Plan; Cabarrus County, NC

Planning Leader. Responsible for oversight and QA/QC of planning task deliverables. Providing engineering services to update WSACC's water supply and wastewater master plan to assess the impact of growth on current water resources and permitted inter-basin transfer, wastewater treatment plant capacity, and collection system capacity.

City of Hendersonville | Sanitary Sewer Asset Inventory and Assessment; Hendersonville, NC

Planning Manager. Responsible for preparation of a sanitary sewer collection system planning study. Project included hydraulic modeling and system capacity analysis under current and future projected system flows. Phase 1 of the project included flow metering analysis and model calibration using Innovyze InfoSewer. Phase 2 included capacity assessment and development of a long-term Master Plan for the Collection System.

City of Greensboro | Water Resources Capacity Development Study; Greensboro, NC

Planning Manager. Responsible for review and finalization of water demand and wastewater flow projections, water distribution system modeling, and preparation of a capital improvement plan (CIP). The project included evaluation of the City's water supply, treatment, and distribution systems and wastewater treatment and collection systems with the objective of preparing a long-term evaluation of capacity adequacy and development of alternative water sources and discharge options to meet future demands and regulatory requirements.

Chris Ranck, PhD, PE, ENV SP

Distribution & Collection Task Lead



Chris is the national planning leader for collection systems and wet weather programs for Black & Veatch. He has expertise in numerous aspects of wet weather programs including hydraulic and water quality modeling, tunnel surge and air movement modeling, combined sewer overflow (CSO) regulatory compliance, Long-Term Control Plan (LTCP) development, artificial intelligence and machine learning (AI/ML) and the application of the Envision rating system.

Project Experience

Charleston Water System (CWS) | West Ashley Sewer Tunnel Extension; Charleston, SC

Technical Advisor. Developed the methodology and provided oversight to develop wastewater flow projections for the West Ashley collection system and the basis of design for the West Ashley tunnel extension. Processed CWS SCADA data in Python and PCSWMM to establish historical average and peak flows. Also provided oversight to the development of the design hydraulic profile of the tunnel, including verification to metered flow and depth data.

City of Oakland | Sanitary Sewer Master Plan Update; Oakland, CA

Collection System Modeling Lead. Served as the technical lead for the expansion and recalibration of the City of Oakland's InfoSWMM model to include all pipes 8-inches and larger. Specific tasks included model and GIS review, methodology development, oversight of the model expansion and calibration, and development of the approach for evaluating I/I reductions.

Broward County | Wastewater Service (WWS); Retail Wastewater Master Plan; Pompano Beach, FL

Technical Lead. Serving as the technical lead for the wastewater modeling of the local conveyance and pumping systems in Broward County. Specific tasks include the conversion of the legacy InfoSWMM models to InfoWorks ICM, development of a hydrological modeling approach to allow for evaluations of sea level rise, calibration of the retail system, and the application of the

Education

- MSE, Environmental and Water Resources Engineering
- BSE, Civil and Environmental Engineering

Years Experience

25

Professional Registration

- PE - IN, No. 10403228

Professional Associations

- Water Environment Federation
- Indiana Water Environment Association
- American Society of Civil Engineers

calibrated ICM model to develop capacity improvement alternatives.

Citizens Energy Group (formerly Indianapolis DPW) | Consent Decree & Dig Indy Tunnel Program, Wastewater Modeling Program; Indianapolis, IN

Collection System Modeling Technical Advisor. Currently providing technical oversight for Citizens' Underground Asset Management (UAM) staff use of the InfoWorks ICM hydraulic model. Responsibilities include methodology development, technical review of work performed by UAM staff, and model troubleshooting. Developed predictive operational dashboards using machine learning, embedded python scripts in Power BI, with full cloud deployment in Citizens' Azure Synapse environment. The DigIndy operational dashboard deployed in May 2022, one month before startup of the tunnel system.

Town of Waterville Valley | CMOM Development; Waterville Valley, NH

Technical Lead. Prepared Collection System Operation and Maintenance (O&M) Plan per Town NPDES requirements. Specific activity included population of EPA's CMOM self-assessment checklist to characterize current activities, and developed preventative monitoring, inspection, and maintenance plans for the Town. The O&M Plan was submitted to EPI and New Hampshire DES in September 2024.

San Diego County | As-Needed Services; San Diego, CA

Technical Lead. Led the hydraulic assessment of a section of the Spring Valley Interceptor to evaluate potential wet-weather improvements. Performed rainfall and flow meter data review and processing, and developed the hydraulic profile for a section for the interceptor. Oversaw the temporary flow monitoring at 20 locations to identify areas of elevated inflow and infiltration (i/i) in the client's collection system, including processing of the flow monitoring data in

EPA's SSOAP toolbox. To facilitate data review, developed a customized Python script to convert the irregular data from an outside agency into a standard five-minute resolution.

City of Lawrence | Southwest Conveyance Corridor Improvements; Lawrence, KS

Technical Advisor. Project involved update to the City's capital plan for the southwest corridor of its collection system. Specific tasks included collection system software selection, hydrologic method for representing inflow and infiltration (i/i), model resolution, and the overall approach to model calibration.

Eastern Municipal Water District (EMWD) | Temecula Valley Inflow and Infiltration (i/i) Investigation / Wastewater Modeling Program; Perris, CA

Technical Lead. The Temecula Valley collection system experienced a 100-year storm event in February 2019. Developed an InfoWorks ICM model of the four lift stations and force mains and verified the model to available monitoring data at the lift stations. Applied the verified model to evaluate future growth flows against the client's current capital improvement plan (CIP) for the wastewater transmission system and wrote the hydraulic assessment sections of the technical memorandum. The model application identified an operational change to reduce peak velocities in the force mains during large storm events.

City of Savannah | Casey 2A Tunnel; Savannah, GA

Hydraulics Lead. Led the hydraulic design of the Casey 2A stormwater tunnel to alleviate neighborhood flooding in Savannah. Specific tasks included drop shaft sizing, development of a design hydraulic model in PCSWMM, evaluation of the 2-year to 100-year storm under 2-year to 100-year Casey Canal boundary conditions, and setting the operating conditions for a potential future pump station to operate under 100-year canal boundary conditions.

Ahmet Ozman, PE

Strategic Planning, Business Operations Lead



Ahmet serves as a technical lead within Black & Veatch's Strategic Asset Management group and a solution lead focused on Systems and Facilities Resilience. He is focused on integration of risk and resilience aspects of infrastructure planning, capital prioritization, and asset management for water and wastewater utilities. He is a civil engineer with 33 years of experience in the water industry, specializing in asset management, ISO5500X, strategy and program development, risk and resilience, business case evaluations, risk-based prioritization and capital improvement planning. Ahmet is one of Black & Veatch's IAM Endorsed Assessors for asset management program assessments, is a Member of the IAM (MIAM), and holds an IAM Diploma.

Project Experience

Fairfax County DPWES | Wastewater Utility Management Plan; Fairfax County, VA

Task Manager. Prioritization of condition and capacity-driven projects for collection system, development of risk assessment process, and prioritization tools. Supported gap analysis and the development of strategic plan.

WSSC Water | Advanced Asset Management Services BOA; Laurel, MD

Project Manager. Managing multiple task orders WSSC's Asset Management Division, including preventive maintenance framework improvements and condition assessment protocol updates for facility assets.

WSSC Water | Business Case Evaluation BOA - Wastewater Process Consulting; Laurel, MD

Project Manager. Managing multiple task orders for WSSC Water's Asset Management Division for the business case evaluation of capital improvement proposals and evaluating alternatives, based on life cycle costs and risk reduction. Key business case evaluations included: Water Main Replacement Selection Process and Optimization, Western Branch Water Resource Recovery Facilities (WRRF) Denitrification Upgrades, Parkway WWRF Electrical Upgrades, Western Branch WWRF Main Substation and Substation No. 6 Replacement.

Education

- ME, Environmental Engineering
- BS, Civil Engineering

Years Experience

33

Professional Registration

- PE - MD, No. 50599
- PE - KS, No. 16044
- IAM Certificate
- IAM Diploma
- MIAM

Professional Associations

- American Water Works Association
- The Institute of Asset Management

Loudoun Water | Risk and Resilience Assessment; Ashburn, VA

Project Manager. Risk and Resilience Assessment covering the Central Water System (serving 286k population) to comply with the America's Water Infrastructure Act of 2018 (AWIA) requirements. The assessment was based on the AWWA J100 standard. Work included determination of critical assets, threat characterization (malevolent acts and natural hazards), consequence analysis, vulnerability analysis and threat analysis.

Loudoun Water | Asset Lifecycle Plan Development; Ashburn, VA

Project Manager. Development of dynamic asset lifecycle dashboards to support efficient management of assets. Developed LW's 'desired state' for asset lifecycle plans, contents and requirements, and evaluated high priority dashboards for dynamic dashboard implementation.

Hampton Roads Sanitation District | Asset Management Program; Virginia Beach, VA

Asset Management Consultant. Asset Management gap assessment based on ISO 55001 and program development. Program implementation support for the development of AM strategy, framework, levels of service and KPIs. Developed enhanced capital planning process.

Charleston Water System | Asset Management Gap Assessment and Strategy Update; Charleston, SC

Lead Assessor. Asset Management gap assessment of water and wastewater operations based on ISO 55001 standard. Led on-site interviews, gap analysis and AM policy update.

Greater Cincinnati Water Works | Risk and Resilience Assessment; Cincinnati, OH

Technical Advisor. Review and update of AWIA Risk and Resilience Assessment for GCWW water system, serving more than

1.1 million customers. Assessment includes cybersecurity assessment of IT and OT systems, threats against natural hazards and dependency risks.

North Port Utilities | Water Master Plan; North Port, FL

Task Manager. Development of condition assessment guide and data collection plan, risk-based renewal and replacement model for facility assets as part of water master plan.

Polk County | Vertical Asset Risk Assessment; Polk County, FL

Technical Advisor. Data review, consequence of failure (COF) development, likelihood of failure (LOF) development through multi-disciplinary condition and performance assessments, risk assessment and prioritization for vertical assets, and development of business intelligence dashboards for the reporting and management of results. The project includes water production facilities, wells, wastewater treatment facilities, lift stations and booster stations within the County's service area.

Central Arizona Water Conservation District | Maintenance, Reliability and Asset Management Assessment; AZ

Assessor. Performed an overall independent assessment of CAWCD's maintenance, reliability, and asset management programs to identify prioritized recommendations for CAP to continue its journey to asset excellence.

Fayetteville Public Works Commission | Asset Management Gap Assessment; Fayetteville, NC

Lead Assessor. Asset Management gap assessment of Water Resources Division operations based on ISO 55001 standard.

Mike Hanna, PE

Facilities Planning Lead



Mike serves as a Project Manager responsible for water and wastewater treatment system design. His experience includes water supply planning, water treatment and distribution systems, and wastewater treatment and collection systems. Mike specializes in energy efficiency and energy production at water and wastewater facilities.

Project Experience

Fairfax County | Wastewater Utility Management Plan; Fairfax County, VA

Project Manager. Responsible for project development, initiation and management. Project includes development of a strategic plan for one of the largest suburban counties in the DC metropolitan area with an operational road map for the next 30 years. Key tasks include strategic planning, system hydraulic modeling, risk-based CIP development, and dynamic utility planning and management.

WSSC Water | Water and Wastewater Process BOA; Laurel, MD

Project Manager. Oversaw a wide range of studies and small designs ranging from toxicity of Water Filtration Plant effluent due to polymer use, to preliminary design of biosolids lime slurry systems, biosolids odor studies, water residual end-use, water distribution lead and copper stability to source water protection.

WSSC Water | S2EBPR Parkway Pilot; Laurel, MD

Project Manager. Sidestream Enhanced Biological Phosphorus Removal Pilot at the Parkway WRRF. Pilot consisted of repurposing an abandoned clarifier as a Return Activated Sludge (RAS) Fermenter and associated pumping, piping, and instrumentation. Responsible for civil/mechanical design of the pilot. Assisted in supporting WSSC Water during pilot operations and coordinated sampling recommendations, data review, and recommendations to improve pilot operations.

Appomattox River Water Authority | Water Supply Master Plan; Petersburg, VA

Project Manager. Regional water supply planning study for the member localities of ARWA, including the Cities

Education

- MS, Environmental Engineering
- BS, Agricultural Engineering

Years Experience

32

Professional Registration

- PE - MD, No. 29466
- PE - VA, No. 30981

Professional Associations

- Water Environmental Federation
- International Water Association
- American Water Works Association

of Petersburg and Colonial Heights and the Counties of Chesterfield, Prince George and Dinwiddie. The plan included projections of future water supply needs, evaluation of existing water sources and identification of potential new sources. The plan also included water demand control measures such as water conservation and drought planning. The plan was designed to comply with State water supply planning regulations and to prepare the localities for the permitting and development of new water sources.

Frederick-Winchester Service Authority | Energy Services Performance Contract; Winchester, VA

Project Manager. As a consultant on an Energy Performance Contract team, provided design services for a new “Green Energy” codigestion facility to receive organic industrial waste streams, as well municipal biosolids to produce electricity. The Green Energy facility included anaerobic digestion, waste receiving facilities and 1.2 MW of power generation capacity. In addition, the project includes new aeration blowers and modifications to the aeration system to reduce energy costs, new biosolids dewatering facilities and numerous other facility improvements. Estimated first year annual savings and new revenue from the total project is \$1,700,000.

Upper Occoquan Service Authority | Energy Conservation Audit; Centreville, VA

Project Manager. As a consultant on an Energy Performance Contract team, provided energy audit, design services and construction phase services for several projects to reduce energy use and operating expenses at the 54 mgd UOSA advanced wastewater treatment plant. The final project included installation of a combined heat and power cogeneration facility producing 850 KW or electricity from biogas, and installation of new high-efficiency aeration blowers.

WSSC Water | Energy Savings Performance Contract (Contract F); Laurel, MD

Project Manager. As a consultant on an Energy Performance Contract team, provided energy audit and design services for improvements at the Piscataway WWTP, Parkway WWTP and Anacostia II Pumping Station. Energy saving improvements include aeration system improvements, aeration blower replacement/augmentation, mixer replacement, pumping improvements, and wastewater treatment process modifications.

Fairfax County | Professional Wastewater Engineering Services Basic Ordering Agreement (BOA); Fairfax, VA

Project Director. The Professional Engineering Services BOA is used for tasks related to wastewater treatment at the NCPCP, the wastewater collection system, and other related projects as needed. Task Orders to date include the following: Small diameter sewer replacement/rehabilitation, inspection, design, permitting, public outreach, and construction phase services; jack and bore sewer replacement to address capacity issues; Greenhouse Gas Inventory Update; Solar Demonstration Project; Pumping Station CMAR Support, PER Review and Update, and Alternatives Development; Pumping Station Condition Assessments and Energy Audits.

Upper Occoquan Service Authority | Building H1 Improvements; Centreville, VA

Project Manager. As a member of a design-build team provided design services for the replacement of three dewatering frame presses, replacement of electrical and control systems and complete rehabilitation of the building and supporting systems to ensure 20 additional years of life.

Madison McGuire, EIT

Asset Management Plan



Madison brings her experience gained working on a multitude of projects in the water and wastewater industry, throughout all phases of design. She has experience supporting design projects from preliminary design through the construction phase, working to drive project success through communication and coordination efforts. Her work experience spans development of strategic asset management planning, business case evaluations, and gap assessments.

Project Experience

Fairfax County | Wastewater Utility Management Plan; Fairfax County, VA

Project Engineer. This project encompassed a wide range of tasks, including strategic planning. Provided support as a design engineer focused on development of deliverables and documentation. Primary responsibilities included supporting the development of prioritization tools for a comprehensive CIP, integrating both vertical and linear assets, and supporting prioritization of condition and capacity-driven projects for collection system.

WSSC Water | Western Branch High Flow Mitigation Phase III Business Case Evaluation; Upper Marlboro, MD

Project Engineer. The Western Branch High Flow Mitigation project is a business case evaluation to examine multiple alternatives to treat high flows at the Western Branch Water Reclamation Facility. Responsible for assisting with client coordination and performing the analysis and design of alternatives for the business case.

WSSC Water | Condition Assessment Protocols Phase II; Laurel, MD

Project Engineer. Phase II of an effort to establish failure modes and associated causes, establish higher confidence level condition assessment protocols, and more. Assisted the project team with developing deliverables and project documentation tasks.

Education

- BS, Civil Engineering

Years Experience

5

Professional Registration

- EIT

Professional Associations

- American Water Works Association

City of Hagerstown | Biosolids Dryer Facility Coordination; Hagerstown, MD

Project Engineer. Project consists of an Owner's Advisory role to support the City of Hagerstown in management of their Pelletizer Facility through a third-party contract. Assists as a liaison between the Owner and NEFCO, aiding in document control and submittal review tasks.

Fayetteville Public Works Commission | Asset Management Program Phases 1 & 2; Fayetteville, NC

Asset Management Engineer. This consists of a phased approach to develop an asset management program for the Client. In the first Phase, Participated in the gap assessment and development of the subsequent report. The ongoing second Phase includes aiding in the development of an Asset Management Policy, Strategic Asset Management Plan, Levels of Service, and more.

North Port Utilities | Asset Management Program Phases 1 & 2; North Port, FL

Asset Management Engineer. The project consists of a phased approach for the implementation of recommended improvements resulting from a gap assessment. Assisted in a number of tasks during Phase 1, including the development of a Strategic Asset Management Plan, an Asset Risk Management Procedure, and in a Document Management Procedure.

WSSC Water | Wastewater Facility Master Plan; Laurel, MD

Project Engineer. Assisting the team as the project engineer for the Wastewater Facility Master Plan effort.

Greater Cincinnati Water Works | Risk and Resilience Assessment; Cincinnati, OH

RRA Project Support. Assisted the team in performing the risk and resilience assessment for AWIA compliance.

Charleston Water System | Strategic Asset Management Plan Update and Maturity Assessment; Charleston, SC

Asset Management Engineer. Project consisted of a Maturity Assessment and Strategic Asset Management Plan Update. Responsibilities included assisting the team in data collection, document control, and related asset management tasks.

Metropolitan Sewer District of Greater Cincinnati | Muddy Creek WWTP EHRT-PS Upgrade; Cincinnati, OH

Design Engineer. Project consists of a business case evaluation to examine multiple conveyance, pumping, and treatment alternatives to meet future capacity requirements of the Muddy Creek Wastewater Treatment Plant. Assisted in the development and documentation of the business case evaluation.

Coachella Valley Water District | Risk and Resilience Assessment Update; Coachella Valley, CA

Asset Management Engineer. CVWD updated its ERPs and completed an initial Risk and Resilience Assessment in 2020 to comply with AWIA requirements. CVWD hired Black & Veatch to review and update the assessment for their domestic water system, including treatment facilities, storage tanks, pump stations, and pipelines. Black & Veatch performed a gap analysis by reviewing the current RRA report, assessment tool, and supporting documentation, as well as other relevant documentation such as the 2024 Local Hazard Mitigation Plan. Based on the consequence, vulnerability, and threat likelihood of selected critical threat-asset pairs within the CVWD's systems, Black & Veatch delivered a Technical Memorandum summarizing the RRA update process and results. Responsible for making revisions to the assessment tool and aiding in development of the Technical Memorandum.

Mathew Powis, PE

Financial Planning & Risk Prioritization



Mat serves as a manager in the Planning and Asset Management group that supports Black & Veatch's Water Division. He has project and modeling experience in helping utilities balance their revenue requirements while maintaining a strong financial position and addressing their aging infrastructure using asset and project capital prioritization and budget optimization; affordability studies; financial forecasting; cost of service rate studies; bond feasibility studies; and valuation analyses.

Project Experience

Fairfax County | Wastewater Utility Management Plan; Fairfax County, VA

Lead Consultant. Development of a plan to provide Fairfax County's Wastewater Management Program (WWM) with a strategic plan and operational roadmap for the next 30 years. The integrated project tasks include developing a dynamic hydraulic model of the gravity and force main collection system using InfoWorks ICM software (model development activities include extensive updates to the County's GIS). This model will integrate the preliminary capacity capital improvements plan with the existing condition-driven improvements to produce a more comprehensive capital plan.

HRSD | Organizational Risk Framework; Virginia Beach, VA

Lead Consultant. The project involved the development of an ISO 55001 gap assessment and improvement roadmap. Assisted in implementing the program by helping develop an Organizational Risk Framework that included risk policy, roles and responsibilities, risk management processes, consequence criteria, and likelihood criteria for senior management decision making.

Hetch Hetchy Water and Power (HHWP) | Risk-Based Capital Planning; San Francisco, CA

Lead Consultant. Currently the Lead Consultant for developing a short- and long-term capital planning processes and supporting models. This will be accomplished by adopting a three-phase approach of definition (data review, scope definition, schedule,

Education

- ME, Environmental Engineering
- BS, Civil Engineering

Years Experience

21

Professional Registration

- PE - PA, No. In Progress
- PE - WA, No. 45205

Professional Associations

- American Water Works Association
- Water Environment Association
- Pennsylvania Water Environment Association
- Pennsylvania Municipal Authority Association

and fees), investment plan (risk model development and investment plan development), and provide support to communicate with decision makers. The output of this study will form the core of the HH WP's strategy to address investment drivers such as growth, regulatory, safety, efficiency or cost savings, repair and rehabilitation, and customer service asset replacement strategy.

City of Wilmington | Wastewater Asset Management Plan; Wilmington, DE

Lead Consultant. Lead Consultant for the Capital Prioritization and Optimization task for the development of an asset management plan for their wastewater assets. Assisted in the implementation of Black & Veatch's innovated and proven Risk Based Project Prioritization and Optimization solution for their wastewater projects. Responsible for developing the model, performing the optimization simulations, and developing strategies for the utility's CIP to manage multiple budget scenarios.

Department of Water Resources (DWR) | Capital Prioritization and Optimization; Sacramento, CA

Lead Consultant. This project is for Capital Prioritization and Optimization Pilot Study that includes over 500 projects from the existing CIP. Risk reduction was developed and evaluated for each project that include capital costs and required labor. An optimization model was used to schedule projects to maximize the risk reduction benefit while maintaining existing budget and resource constraints. Several budget constraint levels will be assessed to evaluate any cost savings or risk mitigation benefits.

Milwaukee Metropolitan Sewerage District | Facilities Plan; Milwaukee, WI

Lead Consultant. Lead Consultant for the capital prioritization and optimization task for the development of a comprehensive facilities plan. Assisting in the implementation of Black & Veatch's innovated and proven Risk

Based Project Prioritization and Optimization solution for their wastewater projects. Responsible for developing the model, performing the optimization simulations, and developing strategies for the Utility's CIP to manage multiple budget scenarios.

Tulsa Metropolitan Utility Authority (TMUA) | Utility Enterprise Initiative; Tulsa, OK

Lead Consultant. Lead Consultant for the Capital Prioritization and Optimization task of TMUA's Asset Management implementation initiative, Utility Enterprise Initiative. Assisting in the implementation of Black & Veatch's innovated and proven 'Project Prioritization and Optimization' solution for several water and wastewater projects. Responsible for leading workshops with engineering and maintenance staff, developing business case approaches for each water/wastewater project, performing Monte Carlo and optimization simulations, and developing strategies for the utility's capital improvement plan (CIP) during a period of tight budget constraints to minimize rate increases. TMUA is currently expanding the Capital Prioritization and Optimization process to their Stormwater CIP.

City of Grand Rapids | Comprehensive Master Plan Update Financial Analysis; Grand Rapids, MI

Lead Consultant. Lead Consultant for an update to the city's water and sewer master plans. The city provides water and sewer utility service to multiple neighboring communities and has an established methodology for determining rates and charges. Using this methodology, Black & Veatch developed a forward-looking model that determines the impact to community revenue requirements of proposed water and sewer capital improvements that result from the master planning process. The model also estimated the impact to the city's water and sewer enterprise fund debt service coverage.

Jeff Stillman, PE

CIP Optimization



Jeff is a Practice Leader in Asset Management and Infrastructure Planning. He has executed a wide variety of asset management and infrastructure planning projects and programs, including risk-based facility prioritization; computerized maintenance management systems; sewer system evaluation surveys; and capacity, management, operations, and maintenance (CMOM) programs. Throughout his career, Jeff has focused on building tools, developing processes, and conducting training and workshops to facilitate ultimate use by clients. Such tools have included hydraulic and water quality models, prioritization databases, relationships with SCADA and maintenance management systems, flow/capacity allocation, and more.

Project Experience

Winston-Salem/Forsyth County Utilities Commission | Wastewater Master Plan; Winston-Salem, NC

Technical Director. \$2.4 million comprehensive wastewater master plan that includes development and implementation of asset management principles including a PAS-55 gap analysis, developing and leading a comprehensive condition assessment program for pump stations and pipes, assessment of maintenance management practices, utilization of the maintenance management software (Hansen and Maximo), and incorporating a risk-based prioritization procedure into the capital improvements planning process for long-term system planning. These activities are actively linked with the traditional master planning activities of hydraulic model construction, sanitary sewer overflow analysis, sewer system evaluation surveys, and alternatives analysis, to provide a unique and comprehensive system assessment.

Water Services Department | Comprehensive Water System Master Plan; Kansas City, MO

Lead Asset Management Consultant. Black & Veatch was retained to provide the first comprehensive update to WSD's master plan in 15 years. The project included evaluations of supply, demand, hydraulic and treatment performance as well as physical asset condition. WSD is

Education

- MS, Civil Engineering and Environmental
- BS, Civil Engineering and Environmental
- Certificate, Finance

Years Experience

28

Professional Registration

- PE - MA, No. 45416

Professional Associations

- American Water Works Association
- Water Environmental Federation
- Collection Systems Committee

planning substantial investment to reduce the number of pipe breaks in its distribution system and requires a capital planning method to ensure these funds are allocated efficiently. Led the implementation of a risk-based capital planning method using complimentary break and economic models. The break forecasting model was based on the I-WARP method published by the Water Research Foundation and allows the modeler to consider both static (pipe diameter, soil type, etc.) and dynamic attributes (climate, cathodic protection, etc.). The output is a predicted break frequency for each individual pipe segment. These break frequencies were then fed into an economic model that considered annual budget limits, direct and indirect break costs, and cost savings for road work coordination and adjacent pipe segment replacement. Together, these models were used to develop defensible, cost-efficient annual pipe rehabilitation projects over a 5-year planning period.

Helix Water District, California | Capital Improvement Program Master Plan Update; La Mesa, CA

Technical Director. Led the technical efforts of the team in updating the CIP Master Plan for Helix Water District. Tasks included the development of risk criteria, development of a risk model to prioritize capital spending and developing and evaluating the financial investment for multiple spending scenarios for risk-informed decision making in the capital planning process.

County of San Diego | Wastewater System Asset Management Consulting; San Diego, CA

Asset Management Director. Led asset management-related activities in the As-Needed Water and Wastewater Engineering Services contract. This has included risk-based prioritization of assets in the collection system, development of a CCTV inspection plan and business intelligence dashboards to review inspection results and plan

renewal activities, development of business intelligence dashboards for O&M data, linked to the County's Cityworks system (also implemented as part of the project), and risk-based prioritization of projects in the capital improvements plan.

City of Olathe | Water Treatment Plant 2 Rehabilitation Project; Olathe, KS

Lead Asset Management Consultant.

Black & Veatch assisted the City in applying asset management principles to prioritize capital investment in WTP2. Jeff led the development of an Excel prioritization template that integrates asset inventory, condition, and criticality information collected during the study. The City will be able to maintain and use this tool to prioritize future asset planning needs and condition assessment programs.

Tulsa Metropolitan Utilities Authority | TMUA Comprehensive Assessment; Tulsa, OK

Lead Asset Management Consultant.

Managed the development of a Strategic Asset Management System (SAMS) software tool based in MS Access. This tool, capable of seamless synchronization with the Antero Computerized Maintenance Management System (CMMS) system, provides an intuitive, user-friendly interface to enhance the tracking of the consequence and probability of failure for wastewater facility assets while enhancing the ability of TMUA to make important decisions regarding their Capital Improvement Plan. Responsible for asset management activities, including a gap assessment and development of a recommended plan for further asset management program implementation.

Katy Weidner, PE

Projections/I/I Analysis



Katy specializes in on flow and demand projections, hydraulic modeling of gravity and pressure pipeline systems, and planning of wastewater collection systems. Katy is a Senior Infrastructure Planning Engineer and recently led collection system planning efforts for Charlotte Water, Winston-Salem Forsyth County Utilities, WSACC, and Hendersonville, NC, in addition to those described below.

Project Experience

Fairfax County | Wastewater Utility Management Plan; Fairfax County, VA

Lead Modeler. Leading a team of four hydraulic modelers through model build, flow monitoring, calibration, and system planning of the county wastewater system model. The all pipes model includes over 3,300 miles of pipes representing a system that conveys 100 mgd to five unique jurisdictions for treatment. The capacity analysis recommendations will be integrated with condition driven recommendations to develop a comprehensive plan.

Winston-Salem/Forsyth County | Wastewater Master Plan Update; Winston-Salem, NC

Project Manager. Led the team on the update of the 2015 Master Plan for the sanitary sewer system. Project Tasks include flow monitoring, flow projections, hydraulic model update (InfoWorks ICM), model calibration and capacity analysis. WSFC Utilities serves approximately 120,000 residential customers and operates two wastewater treatment facilities with a combined capacity of 51 mgd. The system includes over 1,800 miles of sewer mains and 49 pump stations.

Charlotte Water | Water Distribution System Master Plan; Charlotte, NC

Planning Engineer. Supported Master Planning activities such as Demand Projections, Field Testing, Facilities Assessments, Model Calibration and CIP development. The model results along with facilities assessments were used to construct a Capital Improvements Plan, which included the capacity based improvements identified in the model as well as condition driven projects. Charlotte Water provides water and sewer service to all of Mecklenburg County.

Education

- MS, Civil Engineering
- BS, Civil Engineering

Years Experience

13

Professional Registration

- PE - NC, No. 042164
- PE - OH, No. 90056

Professional Associations

- American Water Works Association

**City of Raleigh Public Utilities
Department (CORPUD) | Wastewater
Treatment Master Plan; Raleigh, NC**

Senior Planning Engineer. Updated CORPUD's sanitary sewer system hydraulic model using InfoWorks ICM. Worked to determine the impact of selected treatment alternatives on collection system. The calibrated model from the Sanitary Sewer Capacity Study was used to refine the capacity driven projects to accommodate changes to the baseline treatment assumptions. CORPUD serves approximately 156,000 customers in an area with a population of 485,000 people.

**City of Tampa | Water Master Plan;
Tampa, FL**

Infrastructure Planning Engineer. Updated the water distribution system hydraulic model using Innovyze InfoWater. Worked to allocate average day and maximum day demand throughout the system. Additionally, non-revenue water was allocated based on known main break locations.

**Union County Public Works | Wastewater
Treatment Planning Update;
Union County, NC**

Planning Engineer. Completed a long term evaluation of future Wastewater Treatment Scenarios. Estimated 2050 and build out sewer flows for the future service area in Union County. Identified and evaluated alternative collection system strategies and required improvements. Recommended a future treatment strategy and developed opinions of cost for the collection system improvements for the selected strategy and incorporated the new strategies into Union County's InfoWorks ICM model.

**Winston-Salem/Forsyth County Utilities
Commission | Wastewater Master Plan;
NC**

Planning Engineer. Planning Engineer. Developed an InfoWorksCS model of the CCUC's sanitary sewer system. Calibrated the model for dry weather and for wet weather RDII and used the model for determining deficiencies in the current system. The model results along with facilities assessments were used to construct a Capital Improvements Plan, which included the capacity based improvements identified in the model as well as condition driven projects. At the time of the project, the system served approximately 95,000 customers in Winston-Salem and surrounding communities across three sewer basins at an average daily flow of approximately 34 mgd. The planning model was converted to InfoWorks ICM at the end of 2015.

**Union County Public Works | New
Development Reviews; Union County, NC**

Planning Engineer. This ongoing work for Union County includes multiple task orders to review new sewer connections from proposed developments. Worked on completing the flow assessments and writing the final recommendations memo for many of the task orders. Flows from new developments were added to the InfoWorks model to evaluate the impact on the downstream collection system. Recommendations were based on the short term impact to the collection system and the long term impact to future master plan projects.

Jingjing Dai, PhD, PE

Collection System Modeling



Dr. Dai is a water resources engineer with a strong technical background in hydrologic and hydraulic (H/H) modeling for engineering projects involving wastewater and stormwater collection systems. She is proficient in a variety water and sewer modeling programs, including the latest software from Bentley, Innovyze, and U.S. EPA. She specializes in the development of automation tools using Python with a focus on predictive analytics through machine learning.

Project Experience

WSSC Water | Parkway WRRF Process and Hydraulic Modeling; Laurel, MD

Modeler. Built the hydraulic model of the Parkway WRRF from plant influent to discharge point using InfoWorks ICM. Also responsible of model validation and calibration. The model is used to determine the hydraulic capacity of Parkway WRRF.

Gulf Coast Authority (GCA) | Facility Master Plan; Houston, TX

Hydraulic Modeler. Responsibilities include review of hydraulic model development in Visual Hydraulics. The hydraulic models are used to identify bottlenecks and critical measurement points for existing and future flow conditions.

La Grange | La Grange Sewer Capacity Study; La Grange, NC

Modeler. Built the hydraulic model of the La Grange sanitary sewer network using PCSWMM. Conducted the model validation and used the model to determine the impact of inflow increase from development.

Little Hope Creek | Little Hope Creek Sanitary Sewer Phase 3 Model Update and Calibration; Charlotte, NC

Modeler. Updated the hydraulic model of the Little Hope Creek sanitary sewer network using InfoWorks ICM. Also responsible of model dry weather and wet weather calibration. The model is used to determine the maximum hydraulic capacity.

Education

- PhD, Civil & Environmental Engineering
- MS, Civil & Environmental Engineering
- BS, Environmental Engineering

Years Experience

8

Professional Registration

- PE - NJ, No. 24GE05657900

Professional Associations

- Water Environmental Federation

St. Johns County | Inflows and Infiltrations Reduction Support; St. Johns County, FL

Developer. Developed a GIS-based Python tool to process pump runtime data to identify lift stations with higher inflow contributions. The tool helps identify basins and lift stations with potential inflow-related stress, supporting timely investigation and prioritization of capital improvements.

City of Dayton | Dayton Broadway Pump Station/Flow Meter Condition Assessment; Dayton, OH

Modeler. Updated the hydraulic model of the Dayton sanitary sewer network using PCSWMM. Also conducted the dry weather and wet weather calibration. The model is used to evaluate influent flows to Broadway Pump Station for various design storm events.

Eastern Municipal Water District | Hemet Winchester Odor Control Study; Perris, CA

Modeler. Conducted the water quality modeling for liquid sulfide in the hydraulic model converted from InfoSewer into InfoWorks ICM. Analyzed new operational alternatives and determined the flow rate for the odor control operations.

City of Topeka | Lead and Copper Rule Compliance Program; Topeka, KS

Modeler. Conducted the data review of the inventory of service lines and provided investigation sites. Also responsible for exploratory data analysis and helps with building the predictive machine learning models.

Citizens Energy Group | Lead Service Line Prediction Machine Learning Model and Deployment; Indianapolis, IN

Developer. Responsible of the development of a machine learning (ML) model to predict lead service line based on existing known service lines material types, GIS data and census data. Developed GIS-based Python Tools for hands-on utilization by CEG staff.

Milwaukee MSD | Forecasting Predictive Wastewater Flow Forecasting for Wet Weather Operations; Milwaukee, WI

Engineer. Conducted data review and assessment of existing flow forecasting methodologies to identify gaps and improvement opportunities. Evaluated predictive forecasting approaches and assisted in developing implementation plans for MMSD's machine-learning-based flow forecasting system. Also supported interviews with weather forecast and flow forecast vendors to assess capabilities and align solutions with project needs.

Trinity River Authority | Denton Creek Regional Wastewater System (DCRWS) Plant Expansion; Roanoke, TX

Modeler. This project is required to provide additional treatment capacity to meet the demands of its growing service area. Responsibilities include updating the Authority's current DCRWS WWTP hydraulic model in InfoWorks ICM, incorporating expansion design to build new models and developing various flow rate scenarios.

City Utilities Engineering | PCSWMM Forecast Modeling & Cloud Application; Fort Wayne, IN

Modeler. Developed embedded Python tools in Fort Wayne's PCSWMM model to simulate the next 48 hours into the future by automated import of the NOAA 18-hour High Rapid Resolution Refresh (HRRR) forecast and NWS River stage forecasts. The project included the development of an Azure Function App for City Utilities Staff to run long-term PCSWMM simulations in the cloud.

Ali Nakhli, PhD, PE**Distribution Modeling**

Ali brings 14 years of professional experience in water resources engineering and research. He specializes in planning and modeling water distribution and wastewater collection systems, as well as data analytics, hydrologic and water quality modeling, and wastewater treatment modeling and operations. Passionate about bridging engineering and data science, Ali is dedicated to enabling smarter utility decisions and advancing the development of digital twins and data-driven water infrastructure planning and management.

Project Experience**Two Rivers Utilities | Gastonia Water Distribution System Master Plan; Gastonia, NC**

Technical Lead. Responsible for the technical execution of hydraulic modeling for the water distribution system using WaterGEMS software. The project included the development of 10-year, 20-year, and build-out master plans with corresponding CIP. Responsibilities included oversight of field activities, including tank surveys, pump tests, C-factor testing, hydrant pressure monitoring, and subsurface utility engineering. Additional tasks involved updating the GIS database, preparing baseline and future water demand projections, and developing and calibrating water models. Analyses included fire flow evaluations and water quality assessments under existing and future system conditions. The results were used to identify capacity deficiencies and recommend improvements to pumping, storage, and pipeline infrastructure as part of the CIP.

Town of Elkin | West Tank Replacement; Elkin, NC

Technical Lead. Provided technical execution of water distribution system hydraulic modeling using WaterGEMS to verify and refine design parameters for a planned elevated storage tank. The modeling assessed the new tank's impact on system hydraulics, operations, and water quality to evaluate long-term performance and reliability.

Education

- PhD, Civil and Environmental Engineering
- MS, Data Analytics
- MS, Chemical Engineering
- BS Chemical Engineering

Years Experience

14

Professional Registration

- PE - NC

Professional Associations

- American Water Works Association
- Water Environment Federation

Town of White Lake | Water AIA Engineering; White Lake, NC

Technical Advisor. Provided technical support for the development of the existing water distribution system hydraulic model using WaterGEMS software. Tasks included managing field data collection, collection and analysis of SCADA data, and analysis of customer demands and water loss. The hydraulic model was developed and calibrated to reflect current system conditions, followed by analyses of fire flow and water quality. Model results were integrated with asset management through LoF and CoF risk analyses, leading to the development of CIP strategies to improve system operations and level of service.

City of Rocky Mount | Water Modeling On-Call Services; Rocky Mount, NC

Technical Lead. Served as technical lead for on-call services using the existing water distribution system hydraulic model (WaterGEMS). Support included evaluating system capacity for new developments, assessing vertical and horizontal asset upgrades, and preparing fire flow certifications.

City of Goldsboro; Water Modeling On-Call Services; Goldsboro, NC

Technical Advisor. Served as technical lead for on-call services using the existing water distribution system hydraulic model (WaterGEMS). Support included evaluating system capacity for new developments, analyzing interconnection impacts, assessing vertical and horizontal asset upgrades, conducting water quality analyses, and refining and updating hydraulic model calibration.

Town of Fuquay-Varina | Sewer AIA Engineering Services and Master Planning; Fuquay-Varina, NC

Technical Lead. Responsible for the technical execution of hydraulic modeling for the sewer collection system using PCSWMM software, along with the development of 10-year,

20-year, and build-out master plans with CIP. Project tasks included overseeing flow monitoring and data analysis, pump station evaluations, manhole surveys, and existing and future system demands projection. Existing and future system models were developed and calibrated, with model results under design storms integrated into asset risk assessments using Likelihood of Failure and Consequence of Failure metrics. CIP strategies emphasized the decommissioning of pump stations where feasible and prioritized system improvements based on hydraulic performance and asset risk scores.

City of Hamlet | Preliminary Water Investigation; Hamlet, NC

Technical Advisor. Supported development and calibration of the existing water distribution system hydraulic model (WaterGEMS). Responsibilities included oversight of field data collection and performance of alternative analyses. Results informed the CIP by addressing known system deficiencies and supporting operational improvements.

Town of Cary | Water System Innovation; Cary, NC

Technical Lead. Led the technical execution of a water distribution system innovation study designed to establish a framework for collecting, processing, and bridging gaps between data silos to enable proactive system management. This included evaluation of the hydraulic model (InfoWater Pro) alongside SCADA information, comparison of data collection technologies, and in-depth system analysis to improve overall understanding. Strategic guidance on emerging technologies, including IoT solutions, vendor-agnostic platforms, machine learning/AI applications, and digital twins, was provided. Deliverables included recommendations for future technology investments to improve data processes, enhance predictive capacity, and anticipate long-term system needs.

Amanda Canida, PE

Water Process



Amanda is a process engineer in the Black & Veatch Water Treatment Technology Group. Since joining Black & Veatch, Amanda has gained diverse project experiences serving Black & Veatch and clients across the US and in Singapore. Amanda has assisted with projects related to cyanotoxins, taste & odor, enhanced coagulation, and disinfection/disinfection byproduct formation with project scopes ranging from regulatory compliance assessments to detailed engineering. She has been involved in desktop, bench-scale and full-scale process optimization, in addition to process commissioning/startup efforts.

Project Experience

Hampton Roads Sanitation District | James River SWIFT Facility; James River, VA

Process Engineer. Assisted with the design of the James River SWIFT advanced water treatment facility. The SWIFT Facility will produce effluent water that will recharge the Potomac Aquifer for indirect potable reuse. Improvements include new facilities for equalization, rapid mix, flocculation, sedimentation, ozone-advanced oxidation, biofiltration, granular activated carbon, and ultraviolet (UV) disinfection.

Cape Fear Public Utility Authority | Sweeney WTP Phase II Ozone Upgrades; Wilmington, NC

Process Engineer. Assisted with preparation of the source water resilience and response plan (SWRRP). This project consists of upgrades to the existing ozone generators at the WTP. Specifically, two of the existing generators will be upgraded to increase the generation capacity through dielectric replacement with more efficient IGS dielectrics and the PSU high voltage transformers will be replaced. Additional safety features will be included for fire protection within the PSU panels. Supporting design and construction phase services for this project. Responsible for overseeing functional and performance warranty testing for the upgraded ozone generators.

Education

- MS, Civil Engineering, Environmental Engineering
- BS, Civil Engineering, Environmental Engineering

Years Experience

16

Professional Registration

- PE - IN, No. PE11700386

Professional Associations

- Indiana American Water Works Association
- Water Environment Federation
- American Water Works Association
- Indiana Water Environment Association

City of Bloomington Utilities | Water Resiliency Plan; Bloomington, IN

Process Engineer. Evaluated alternative sources of supply and treatment facilities to increase water resiliency and system redundancy. Responsible for developing conceptual-level designs, including a Class 5 Opinion of Probable Construction Costs, for three different source water alternatives. The outcome will likely be several smaller water treatment facilities that can replace or supplement treatment at the existing water treatment plant, allowing the City to meet system demands during unplanned outages.

City of Columbia | Treatment Plants Process Optimization Evaluation; Columbia, SC

Process Engineer. Assisted with development of approaches to optimize treatment. The evaluation consisted of demand projections to forecast needs, review of the raw water turbidity and TOC data with recommendations to optimize coagulation during changing water quality, and review of the per- and polyfluoroalkyl substances (PFAS) level.

City of Fort Wayne Utilities | Corrosion Control Evaluation Study; Fort Wayne, IN

Process Engineer. Black & Veatch evaluated an optimized corrosion control plan for the City of Fort Wayne's Three Rivers WTP. Black & Veatch reviewed the City's historical corrosion control treatment processes and water quality data, including lead and copper compliance data, evaluating the current operational conditions/water quality parameters to assess the aggressiveness of the finished water and lead solubility, and exploring potential operational changes by computational modeling (using WaterPro) to optimize the corrosion control treatment practices at the Three Rivers Water Filtration Plant. The outcome of this study recommended optimized corrosion control treatment practices that were verified using a demonstration study.

Citizens Energy Group | Moses WTP Chemical Improvements Project; Indianapolis, IN

Process Engineer. Black & Veatch developed a conceptual-level design for an optimized chemical building layout, including a new corrosion inhibitor chemical storage and feed system and potential relocation of the sodium hypochlorite system. The design includes various stages of implementation, considering the remaining useful life of the existing storage tanks. Provisions for ease of future removal and replacement of the chemical storage tanks was included.

Citizens Energy Group | White River WTP Chemical Improvements; Indianapolis, IN

Process Engineer. Black & Veatch conducted a holistic evaluation of the chemical storage and feed systems required at the White River WTP. A conceptual level design will be developed for an optimized chemical building layout, including a new corrosion inhibitor chemical storage and feed system and consolidation of the existing chemical systems. The design includes three stages of implementation, considering the remaining useful life of each tank, the required in-service date for the new corrosion inhibitor system. Provisions for ease of future removal and replacement of the chemical storage tanks was included.

Charlotte Water | Source Water Resiliency and Response Plan; Charlotte, NC

Process Engineer. Assisted with preparation of the source water resilience and response plan (SWRRP). Developed standard operating procedures to isolate the intake in the event a contaminant is in the water source or within the intake itself. Identified the top five contaminants that may require treatment in the future after review of UCMR sampling data and developed conceptual-level costs for treatment solutions for those contaminants. Documented best approaches for public involvement and education.

Chris deBarbadillo, PE

Wastewater Process



Chris has 36 years of experience in the water resource recovery field, including process engineering, operations, and research, and serves as Black & Veatch's Plant Optimization Practice Leader. As a process engineer, Chris performed detailed assessments for more than 50 wastewater treatment facilities to optimize performance and develop upgrade strategies, with many of them focused on achieving stringent nutrient limits. She is well versed in conventional and developing processes and has a keen interest in integrating biosolids and liquid stream processes for optimal performance.

Project Experience

Charlotte Water | McDowell Creek WWTP Re-rating Studies and Expansion to 12 mgd; Charlotte, NC

Lead Process Engineer. Conducted re-rating study for Biological Treatment Basins 3 and 4 which are rated at 6 mgd to assess feasibility of treating another 1 mgd that would be diverted from another plant via collection system changes. Conducted detailed wastewater characterization, process evaluation, modeling, and design for expansion from 6 to 12-mgd. Evaluated and prepared documentation for the State of NC to rerate the existing BTB-1 and 2 from 6 to 6.6 mgd to cover increasing flows during the construction period.

Harford County Department of Public Works | Design of Enhanced Nutrient Removal Upgrades for Sod Run WWTP; Harford County, MD

Lead Process Engineer. Responsible for process design for upgrade of 20 mgd Sod Run WWTP to meet enhanced nutrient removal limits of 3 mg/L total nitrogen and 0.3 mg/L total phosphorus. New facilities include an additional activated sludge BNR basin, conversion of existing A2O configuration to operate in Johannesburg configuration, denitrification filters, dewatering filtrate equalization basin and chemical addition, and static fermenters for primary sludge fermentation to provide volatile fatty acids for the biological phosphorus removal process. Evaluating application of struvite crystallization process to dewatering filtrate for phosphorus recovery and to reduce nitrogen and phosphorus loads in the sludge liquor return to the WWTP.

Education

- MS, Environmental Engineering
- BS, Civil Engineering

Years Experience

36

Professional Registration

- PE - VA, No. 0402065453
- PE - DE, No. 9643

Professional Associations

- Water Environment Federation
- International Association of Water Quality

DC Water | Blue Plains Secondary Treatment Upgrades and Dewatering Filtrate Treatment; Washington, DC

Process Team Lead. Lead engineer for evaluation of alternatives to upgrade the high-rate step-feed aeration system for Blue Plains. Responsible for evaluating capacity alternatives, aeration equipment alternatives, and configuration alternatives as required to improve treatment reliability and accommodate operation for bioaugmentation to achieve some total nitrogen removal in the secondary system for the purpose of minimizing downstream methanol dosages. Project includes design of SBR system capable of operating for nitrification/denitrification and deammonification for nitrogen removal from sludge dewatering filtrate.

HRSD | VIP SWIFT Tertiary Projects: Hampton Roads, VA

Optimization Lead. Assisted in development of a feasibility study to evaluate cloth media filters and ballasted sedimentation to reduce phosphorus discharges to 0.1 mg/L at the 40 mgd VIP Treatment Plant.

Winston-Salem / Forsythe County Utilities | Elledge and Muddy Creek WWTPs; Winston-Salem, NC

Plant Optimization Practice Lead. Working with business intelligence, process, and O&M teams for development of Power BI based system for data management, operations cost, and process performance optimization.

Raleigh Water | Neuse River Bioenergy and Recovery Project; Raleigh, NC

Commissioning. Led coordination of Engineering, CMAR contractor, and plant operations teams to prepare for upcoming commissioning activities, training, and integration of new biosolids processes to the existing operation. Focus includes preparation/organization of multiple required trainings into delivery as a meaningful curriculum, THP/digestion process commissioning plans, MOPO

considerations, biosolids and sidestream sampling and monitoring plans, outreach and incorporation of lessons learned from other full-scale facilities.

Mount Pleasant Waterworks | Rifle Range Road WWTP Expansion; Mount Pleasant, SC

Process Engineer. Lead process engineer for evaluation of alternatives to upgrade and expand the existing 6 mgd Rifle Range Road WWTP to 9 mgd and upgrade of 3.7 mgd Center Street WWTP. The existing Carrousel oxidation ditch system at Rifle Range Road WWTP will be upgraded to include external membrane bioreactor zones. This will allow expansion of the existing capacity to 14 mgd within the same footprint. The membrane manufacturer has been pre-selected and design is underway.

Augusta County Service Authority | ENR Evaluation and Design for Four WWTPs; Augusta County, VA

Lead Process Engineer. Lead engineer for evaluation of alternatives to upgrade the Fishersville, Middle River, Stuarts Draft and Weyers Cave WWTPs to meet nutrient limits of 3 mg/L total nitrogen (TN) and 0.3 mg/L total phosphorus (TP). Evaluation work included process modeling and calibration, nitrification rate testing and solids settleability testing. Upgrade alternatives evaluated included 4-stage and 5-stage activated sludge processes, membrane bioreactors, integrated fixed-film activated sludge processes, and denitrification filters. The study phase is nearing completion, and the first of the design projects, for the Fishersville WWTP is currently underway. Treatment processes include

Appendix B - References and RFP Submission Forms

References

① Fairfax County, VA

Junaid Malik, PE, Planning Manager, Projects and Assets Branch

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12000 Government Center Parkway, Suite 463, Fairfax, VA 22035

Sara Ferrance, PE, Engineer V- CIP Lead - Projects and Assets Branch

P: 571-549-9356 | E: sara.ferrance@fairfaxcounty.gov

12000 Government Center Parkway, Suite 463, Fairfax, VA 22035

② Beaufort Jasper Water & Sewer Authority, SC

Michael Hansen, Chief of Engineering

P: 843-987-8061 | E: michael.hansen@bjwsa.org

6 Snake Road, Okatie, SC 29909

③ Charlotte Water, NC

Bhavana Swayampakala, PE, Division Manager - Planning

Phone: 980-240-8801 | e-mail: Bhavana.Swayampakala@CharlotteNC.Gov

5100 Brookshire Blvd., Charlotte, NC 28216

④ Gloucester County, VA

Katey Legg, Director

P: 804-693-4044 | E: klegg@gloucesterva.info

7384 Carriage Court, P.O. Box 329, Gloucester, VA 23061

⑤ Winston-Salem/Forsyth County Utilities, NC

Matthew Whitman, Information Systems Supervisor

Phone: 336-747-7314 | e-mail: mattheww@cityofws.org

P.O. Box 2511, Winston-Salem, NC 27102

Proposal No. P1868.26
 Water and Wastewater Master Plan Project
 RFP Submittal Form
To be submitted with Appendix B

Black & Veatch Corporation
 Bidder's Company Name

SIGNATURE TO BID

NOTE: Bidders shall use this page as a cover page when submitting their bid.

Each bid must show the full business address and telephone number of the Bidder and be signed by the person legally authorized to sign contracts. All correspondence concerning the bid and contract, including notice of award, copy of contract and purchase order, will be mailed or delivered to the address shown on the bid in the absence of written instructions from the Bidder to the contrary. Bids by partnerships must be signed in the partnership name by one of the members of the partnership or by an authorized representative, followed by the signature and designation of the person signing, who shall also state the names of the individuals composing the partnership. Bids by corporations must be signed with the name of the corporation, followed by the signature and designation of the officer having authority to sign. When requested, satisfactory evidence of authority of the officer signing in behalf of the corporation shall be furnished. Anyone signing the bid as agent shall file satisfactory evidence of his/her authority to do so.

All documents, materials, or data resulting from this contract are the City's property. The City has the right to use and reproduce any documents, materials, and data, including confidential information, used in or developed as a result of this contract. The Bidder warrants that it has title to or right of use of all documents, materials, or data used or developed in connection with this contract. All erasures and/or changes shall be initialed by the individual making modifications to the Bid.

BIDDER MUST SIGN HERE AND RETURN THIS PAGE AND THE BID FORM IN ADDITION TO SUBMITTING ANY DOCUMENTS CALLED FOR BY THE GENERAL CONDITIONS AND INSTRUCTIONS TO BIDDERS, SPECIFICATIONS, AND ANY OTHER DOCUMENTS HEREIN CONTAINED.

By signing here, Bidder does hereby attest that he/she has read fully the general conditions and instructions, specifications, and any other documents herein contained, and does understand them and will furnish and deliver all labor and materials in accordance with the specifications for the price as listed on the proposal form.

SIGNATURE:  Date: 1/22/2026

Bidder acknowledges receipt of Addenda by initialing the following. Addenda published by City and reviewed by Bidder. Do NOT initial all boxes unless six (6) Addenda published. Failure to initial appropriate boxes is grounds for disqualification.

Addendum No. 1	1/5/2026	Addendum No. 2	1/8/2026	Addendum No. 3	
Addendum No. 4		Addendum No. 5		Addendum No. 6	

Proposal No. P1868.26
 Water and Wastewater Master Plan Project
 RFP Submittal Form
To be submitted with Appendix B

AFFIRMATION REGARDING COLLUSION

I AFFIRM THAT:

Neither I nor, to the best of my knowledge, information, and belief, the below stated business has:

- (a) Agreed, conspired, connived, or colluded to produce a deceptive show of competition in the compilation of the accompanying bid or offer that is being submitted.
- (b) In any manner, directly or indirectly entered into any agreement of any kind to fix the bid price or price proposal of the Bidder or of any competitor or otherwise taken any action in restraint of free competitive bidding in connection with the contract for which the accompanying bid or offer is submitted.

AFFIRMATION REGARDING BRIBERY CONVICTIONS

I FURTHER AFFIRM:

Neither I nor, to the best of my knowledge, information, and belief, the below business (as is defined in Section 16-101 (b) of the State Finance and Procurement Article of the Annotated Code of Maryland), or any of its officers, directors, partners, or any of its employees directly involved in obtaining or performing contracts with public bodies (as is defined in Section 16-101(f) of the State Finance and Procurement Article of the Annotated Code of Maryland), has been convicted of, or has had probation before judgment imposed pursuant to Article 27, Section 641 of the Annotated Code of Maryland, or has pleaded nolo contendere to a charge of, bribery, attempted bribery, or conspiracy to bribe in violation of Maryland law, or of the law of any other State or federal law, **except as follows** (indicate the reasons why the affirmation cannot be given and list any conviction, plea, or imposition of probation before judgment with the date, court, official or administrative body, the sentence or disposition, the name(s) of person(s) involved, and their current positions and responsibilities with the business):

BIDDER'S COMPANY/FIRM: Black & Veatch Corporation

ADDRESS: 9801 Washingtonian Blvd., Suite 100, Gaithersburg, MD 20870

AUTHORIZED SIGNATURE: 

NAME AND TITLE PRINTED: Joseph Stromwall, PE, CCM, Vice President

TELEPHONE & FAX NUMBER: P: 301-556-3486 | F: 301-556-4452

EMAIL: stromwalljr@bv.com

DATE: 1/22/2026 FEDERAL EMPLOYER'S IDENTIFICATION NO. 43-1833073

For Informational Purposes: Has your company/firm been certified by the State of Maryland as a Minority Business Enterprise? (Please check below.)

 Yes X No

Proposal No. P1868.26
Water and Wastewater Master Plan Project
RFP Submittal Form
To be submitted with Appendix B

Notice: Bid Information Subject to Inspection Under Maryland's Public Information Act

All bid information submitted to the City of Hagerstown is considered public record pursuant to Maryland's Public Information Act and may be subject to inspection and copying by the public. When the required written request is filed, the City's Communications staff will make a reasonable effort to contact your company in order to identify trade secrets and confidential commercial or financial information that may need to be redacted from the submitted bid information. Those recommendations will be reviewed by Communications staff and the City attorney before copies are produced for the requestor.

Trade secrets and confidential commercial or financial information are defined in the Public Information Act and by the numerous appellate court and Attorney General opinions interpreting the act.

The City of Hagerstown is committed to granting the people broad access to public records while protecting your company's interests.

By signing below, you confirm that you have read and acknowledge the above notice regarding Bid information subject to Inspection under Maryland's Public Information Act:

	1/22/2026
_____ Signature	_____ Date

Black & Veatch Corporation
Company Name

Termination for Default, Criminal Convictions, and Debarment

Black & Veatch, together with its affiliates constitutes a large, international engineering and construction firm. Like similarly-sized firms, at any given point in time, we may be involved with claims and litigation. Black & Veatch maintains a program of insurance to protect against claims arising out of its work. In the opinion of Black & Veatch management, no pending claim or litigation will have a material impact on Black & Veatch's ability to execute this project.

Appendix C - Evidence of Ability to Obtain Insurance



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

11/1/2026

1/8/2026

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

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

PRODUCER	Lockton Companies, LLC DBA Lockton Insurance Brokers, LLC in CA CA license #0F15767 444 W. 47th St., Ste. 900 Kansas City MO 64112-1906 (816) 960-9000 kcasu@lockton.com	CONTACT NAME:	
		PHONE (A/C, No, Ext):	FAX (A/C, No):
		E-MAIL ADDRESS:	
		INSURER(S) AFFORDING COVERAGE	NAIC #
		INSURER A : Zurich American Insurance Company	16535
		INSURER B : National Fire and Marine Insurance Co	20079
		INSURER C :	
		INSURER D :	
		INSURER E :	
		INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** 22888514 **REVISION NUMBER:** XXXXXXXX

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

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	☒ COMMERCIAL GENERAL LIABILITY	N	N	GLO 4641358	11/1/2025	11/1/2026	EACH OCCURRENCE \$ 2,000,000
A	☐ CLAIMS-MADE ☒ OCCUR			GLO 1365630	11/1/2025	11/1/2026	DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 300,000
							MED EXP (Any one person) \$ 10,000
							PERSONAL & ADV INJURY \$ 2,000,000
							GENERAL AGGREGATE \$ 4,000,000
							PRODUCTS - COMP/OP AGG \$ 4,000,000
							\$
A	☒ AUTOMOBILE LIABILITY	N	N	BAP 4641355 (AOS)	11/1/2025	11/1/2026	COMBINED SINGLE LIMIT (Ea accident) \$ 3,000,000
	☒ ANY AUTO						BODILY INJURY (Per person) \$ XXXXXXXX
	☒ OWNED AUTOS ONLY						BODILY INJURY (Per accident) \$ XXXXXXXX
	☒ HIRED AUTOS ONLY						PROPERTY DAMAGE (Per accident) \$ XXXXXXXX
	☒ SCHEDULED AUTOS NON-OWNED AUTOS ONLY						\$ XXXXXXXX
	☐ UMBRELLA LIAB			NOT APPLICABLE			EACH OCCURRENCE \$ XXXXXXXX
	☐ EXCESS LIAB						AGGREGATE \$ XXXXXXXX
	☐ DED ☐ RETENTION \$						\$ XXXXXXXX
A	☒ WORKERS COMPENSATION AND EMPLOYERS' LIABILITY	N	N	WC 4641353 (AOS)	11/1/2025	11/1/2026	☒ PER STATUTE ☐ OTH-ER \$
A	☐ ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH)	Y/N	N/A	WC 4641354 (ID, MA, WI)	11/1/2025	11/1/2026	E.L. EACH ACCIDENT \$ 1,000,000
A	If yes, describe under DESCRIPTION OF OPERATIONS below			WC 1365632	11/1/2025	11/1/2026	E.L. DISEASE - EA EMPLOYEE \$ 1,000,000
							E.L. DISEASE - POLICY LIMIT \$ 1,000,000
B	PROFESSIONAL LIABILITY	N	N	42-EPP-324748-04	11/1/2025	11/1/2026	\$10,000,000 PER CLAIM \$10,000,000 ANNUAL AGGREGATE

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
RE: PROPOSAL NUMBER: 9060057; PROJECT NAME: WATER & WASTEWATER MASTER PLAN; PROJECT MANAGER: BALDWIN, BETSY; UPON AWARD OF CONTRACT, ADDITIONAL INSURED AND WAIVER OF SUBROGATION WILL BE PROVIDED. 30 DAY NOTICE OF CANCELLATION APPLIES, 10 DAYS NOTICE FOR NON-PAYMENT OF PREMIUM.

CERTIFICATE HOLDER	CANCELLATION
22888514 CITY OF HAGERSTOWN, MD 1 EAST FRANKLIN STREET, 2ND FLOOR HAGERSTOWN MD 21740	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.
	AUTHORIZED REPRESENTATIVE

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ACORD 25 (2016/03)

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Appendix E - Draft Professional Services Contract Review

ATTACHMENT A

**CITY PROJECT NUMBER P1868.26
CONTRACT AGREEMENT BY AND BETWEEN THE
CITY OF HAGERSTOWN, MARYLAND**

AND

I. CONTRACT

This Agreement is made and entered into by and between **City of Hagerstown, Maryland**, a body corporate and politic and a subdivision of the State of Maryland (the “City”), and the firm of _____ (the “Firm”).

II. WORK EFFORT

A. The Firm hereby agrees to undertake the work efforts, generally and specifically defined within the Request for Proposal (“RFP”) dated _____, and all addenda, and the Firm’s “Proposal” dated _____, the contents of said “RFP” and “Proposal” are incorporated herein by reference, and to adhere to, comply with and respond to all performance requirements, conditions, restrictions and provisions stated therein.

B. The Firm agrees to comply with all applicable Federal, State and local laws in the conduct of the work hereunder.

III. SCHEDULE

The Firm may commence work within seven (7) days upon receipt of written Notice to Proceed from the City, such notice being contingent upon the execution of this Agreement by the City and the Firm. The work shall be completed in an expeditious manner and in such sequence as agreed upon between the Firm and the City and as set forth in the accepted Project schedule as contained in the “RFP.”

Failure to maintain the scheduled level of effort as proposed and prescribed and/or deviation from the aforesaid schedule without prior approval of the City shall constitute a ground for issuance of a Termination Notice in accordance with Section IV of this Agreement, except in cases in which the City agrees in writing that circumstances beyond the control of the Firm shall warrant alteration, adjustment or deviation from the schedule.

IV. TERMINATION

The City may, upon written notice to the Firm, terminate the performance or work under this Agreement, in whole or part, in accordance with the following criteria:

A.1 Except as provided in A.2 below, if the Firm shall default in performance of this Agreement in accordance with its terms and fails to cure the default within a period of ten (10) days after receipt from the City of a notice specifying the default, the City may terminate the Agreement.

A.2 If the Firm fails to provide an approved replacement as required by the “RFP” within five(5) working days of the departure of the individual being replaced, the City shall have the right to terminate the Agreement, immediately, without notice or opportunity to cure.

B. If the City shall determine that termination is in the best interest of the City the City may terminate the Agreement. Any termination shall be effected by delivery to the Firm of a Notice of Termination specifying the basis for the termination, the extent to which performance of work is terminated, and the effective date of such termination.

If after termination of this Agreement or any part thereof for default under “A.1” or “A.2” above it is determined that the Firm was not in default pursuant to “A.1” or “A.2”, or that failure to perform satisfactorily is due to causes beyond the control and without fault or negligence on the part of the Firm, the Notice of Termination shall be deemed to have been issued under subparagraph “B” above, and the rights and obligations of the parties involved shall be governed and resolved accordingly.

Upon receipt of a Notice of Termination and except as otherwise directed by the City, the Firm shall stop work under the Agreement on the date and to the extent specified in the Notice of Termination; shall take all necessary or appropriate steps to limit disbursements and minimize costs; and will furnish a report, as of the date of receipt of notice of suspension or termination, of the status of all activities conducted under the terms of this Agreement, including the work effort, funds, results accomplished, conclusions resulting therefrom and such other matters as the City may require.

Notwithstanding the above, the Consultant shall not be relieved of liability to the City for damages sustained by virtue of any breach of this Agreement by the Consultant. The City may withhold any payments to the Consultant for the purpose of set-off until such time as the exact amount of damages due to the City from the Consultant is determined.

V. DISPUTES

Except as otherwise provided in this Agreement, any dispute concerning a question of fact arising under this Agreement which is not disposed of by agreement between the Consultant and City shall be decided by the Director of Utilities, who shall reduce the decision to writing and mail or otherwise furnish a copy thereof to the Consultant. Either party may appeal the decision of the Director of Utilities to any court of competent jurisdiction under the rules for judicial review of agency decisions.

VI. AUDITS

A. The Consultant shall maintain books, records, documents and other evidence directly pertinent to the performance under this Agreement and any Federal, State or local law, rule or regulation, in accordance with accepted professional practice and appropriate accounting procedures and practices. The City, or any of its duly authorized representatives, shall have access to such books, records, documents and other evidence for the purpose of inspection, audit and copying. The Consultant will provide proper facilities for such access and inspection.

B. Audits conducted pursuant to this provision shall be in accordance with generally accepted auditing standards and established procedures and guidelines of the American Institute of Certified Public Accountants. The Consultant agrees to the disclosure of all information and reports resulting from access to records pursuant to subparagraph (A) above.

Where the audit concerns the Consultant, the auditing agency will afford the Consultant an opportunity for an audit exit conference and an opportunity to comment on the pertinent portions of the draft audit report. The final audit report will include the pertinent written comments, if any, of the audited parties.

C. Records under subparagraph (A) above shall be maintained and made available during performance under this Agreement and until three (3) years from the date of final completion of the project. In addition, those records which relate to any dispute or litigation, or the settlement of claims arising out of such performance, or costs or items to which an audit exception has been taken, shall be maintained and made available until three (3) years after the date of resolution of such dispute, litigation, claim or exception.

VII. DEFECTIVE WORK

The performance of services or City acceptance of required reports shall not relieve the Consultant from the obligation to correct any defective work, whether previously or subsequently noted, and all incomplete, inaccurate or defective work shall be remedied by the Consultant on demand, within a reasonable time, and at no cost to the City. “Defective work” includes, without limitation, such matters as erroneous tabulations, incomplete surveys, maps, or reports and incorrectly assembled reports, publications, etc. caused by error or omission, for a period of twelve (12) months after the final report delivery by the Consultant.

With regard to any construction resulting from services rendered to the City by the Consultant, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued not later than the relevant Date of Substantial Completion of the Work, and as to any acts or failures to act occurring after the relevant Date of Substantial Completion, not later than the date of issuance of the final Certificate for Payment.

VIII. CHANGES

The City may, from time to time, require changes in the scope of the services of the Consultant to be performed hereunder. Any such change, including any increase or decrease in the amount of compensation to the Consultant, shall be incorporated in a written change order to this Agreement and payment or adjustment effected as set forth in Section XIV of this Agreement.

IX. WAIVERS

The failure of the parties to enforce, at any time, the provisions of this Agreement or to exercise any option that may be provided herein shall in no way be construed to be a waiver of such provisions nor in any way to affect the validity of this Agreement or any part thereof or the right of the parties to enforce thereafter each and every provision.

X. CITY FURNISHED DATA

All information, data, reports, records, and maps as are existing and identified by the Consultant, available to the City without significant cost, and necessary for the work, shall be furnished to the Consultant without charge by the City. The City shall cooperate with the Consultant in every reasonable manner in carrying out the planning work, providing, however, that the needs of the Consultant for such support are made known to the City in advance of such need.

The City will not provide clerical assistance to the Consultant for this project and City personnel will not be asked to undertake surveys, analysis, tabulations, summaries, etc., of Consultant-produced data or documentation. However, City employees are free to participate in Consultant-conducted surveys as questionnaire recipients or survey groups for the purpose of providing information and opinions.

XI. DATA RELEASE

The type and quantity of data to be provided by the Consultant as the product of this effort is defined in the incorporated “Proposal”. The City reserves the right to use, duplicate and disclose this data, in whole or in part, in any manner for any purpose whatsoever and to authorize others to similarly do so. The Consultant shall not release the results of this study or any reports or other material pertaining to it without the express written consent of the City except to comply with appropriate State and Federal requirements. In such instances, the Consultant shall confer with the City before doing so. Materials approved for release by the Consultant cannot be distributed for profit.

The Consultant may publish information pertaining only to its services rendered under this Agreement but shall not release copies of its documentation or final report to any other parties without the prior written approval of the City.

XII. REPORTS

Reports are to be provided as specified in the “RFP.”

XIII. MEETINGS

When requested by the City Project Manager, selected employees of the Consultant shall attend meetings, conferences and presentations with City staff, public agencies, private organizations and others concerned with this project.

XIV. PAYMENT

The Consultant hereby agrees to undertake the project for the following Total Fee of _____ Dollars and _____ Cents \$_____ as set forth in the “RFP” and the “Proposal.”

City-directed adjustments in direction or emphasis of the work effort will not be considered as adequate justification for re-negotiation of the Total Fee, provided such adjustments do not constitute change in the general scope of the project.

In the event that changes in the general scope of effort are mutually agreed upon by the parties, the degree of change of scope in terms of person-hours (number and type) will be negotiated to a satisfactory solution between the parties and payment or credit for this adjustment will be made part of this Agreement by written change order.

XV. METHOD OF PAYMENT

The Consultant will, at the designated time set forth in the project schedule incorporated into this Agreement, submit on its standard form an invoice for services rendered. The invoices shall indicate the percentage completion of each of the major tasks and the total amount due for the billing period. In addition, the Consultant shall submit a monthly report that shall indicate progress during the billing period of each of the principal tasks, and the status of the various work products that the Consultant is required to furnish as part of the Agreement.

The Consultant will submit the original and two copies of the invoice directly to the City of Hagerstown Utilities Department, 1 Clean Water Circle., Hagerstown, Maryland 21740. This invoice will be reviewed and verified for work accomplished as set forth in the statement of work and schedule (Sections II and III of this Agreement) and, when certified as acceptable, will be forwarded to the City Finance Officer for payment.

In event of dispute or defective work (Section V and VII of this Agreement), the City reserves the right to withhold payment until such time as the dispute is resolved, the defective work corrected, or settlement is achieved through other means.

XVI. PERSONNEL

The Consultant represents that it has or will secure, at its own expense, all necessary personnel required to perform the services under this Agreement. Such personnel shall not be employees of or have any contractual relationship with agencies providing funds for the project.

XVII. EQUAL EMPLOYMENT

The Consultant agrees and affirms that it accepts and will conform to Maryland anti-discrimination law, as follows:

The Consultant will not:

1. fail or refuse to hire or to discharge any individual, or otherwise to discriminate against any individual with respect to his compensation, terms, conditions, or privileges of employment, because of such individual's race, color, religion, sex, age, national origin, marital status, or disability unrelated in nature and extent so as to reasonably preclude the performance of the employment; or
2. limit, segregate or classify his employees or applicants for employment in any way which would deprive or tend to deprive any individual of employment opportunities or otherwise adversely affect his status as an employee, because of the individual's race, color, religion, sex, age, national origin, marital status, or disability unrelated in nature and extent so as to reasonably preclude the performance of the employment.

In addition, the Consultant further certifies that it now complies and will continue to comply with all Federal, State and local laws and regulations pertaining to equal opportunity and equal employment practices.

XVIII. CONFLICT OF INTEREST

A. No officer or employee of the City and no member of its governing body, and no other public official of the governing body of the locality or localities in which the work is situated or being carried out, or of other local public agencies, who exercises any functions or responsibilities in review or approval of the undertaking or carrying out of this work, during his tenure or one year thereafter shall have any personal interest, direct or indirect, apart from his official duties, in this Agreement or the proceeds thereof.

B. The Consultant covenants that it has presently no interest and shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance of services required to be performed under this Agreement. The Consultant further covenants that in the performance of this Agreement no person having such interest shall be employed.

XIX. EXECUTION OF AGREEMENT

This Agreement may be simultaneously executed in several counterparts, each of which shall be deemed to be an original having identical legal effect. This Agreement shall be construed to bind the parties hereto in accordance with the Constitution and laws of the State of Maryland.

XX. CITY SAVED HARMLESS/INSURANCE REQUIRED

A. Professional Liability

The Consultant shall defend, indemnify and save the City harmless from all claims, suits, judgments, expenses, actions, damages and costs of every name and description arising out of or resulting from the negligent performance of the professional services of the Consultant, its servants or agents, under this Agreement.

Monies to become due the Consultant under the Agreement as may be considered necessary by the City shall be retained by the City until such suits or claims for damages shall have been settled or until the Consultant furnishes to the City satisfactory evidence of insurance coverage with respect to such suits or claims.

B. General Liability

The Consultant shall defend, indemnify and save the City harmless from all claims, suits, judgments, expenses, actions, damages and costs of every name and description to which the City may be subject or put by reason of injury to persons (bodily injury, including death, or any personal injury) or property damage as a result of its work, caused or alleged to be caused by negligence or fault on the part of the Consultant, its servants, or agents (other than that arising out of Consultant's professional services).

Monies to become due the Consultant under the Agreement as may be considered necessary by the City shall be retained by the City until such suits or claims for damages shall have been settled or until the Consultant furnishes to the City satisfactory evidence of insurance coverage with respect to such suits or claims.

C. The Consultant will not hold the City liable for any injuries to employees, servants, agents, subcontractors or assignees of the Consultant arising out of or during the course of services relating to this Agreement.

D. The Firm will provide to the City evidence of insurance coverage satisfactory to the City providing coverage, including but not limited to, coverage in the amount of \$1,000,000 *per claim and in the aggregate (Professional Liability) and per occurrence and in the aggregate (General Liability)* for the liabilities arising out of those matters mentioned in subparagraph (A), (B) and (C) of this section.

XXI. COVENANT AGAINST CONTINGENT FEES

The Firm warrants that it has not employed or retained any person, partnership, corporation, or other entity, other than a bona fide employee working for the Firm, to solicit or secure this Agreement, and that he has not paid or agreed to pay any person, partnership, corporation, or other entity, other than a bona fide employee, any fee or any other consideration contingent on the making of this Agreement. For breach or violation of this warranty the City shall have the right to terminate this Agreement without liability, or, in its discretion, to deduct from the Agreement price or consideration, or otherwise recover the full amount of such fee, commission, percentage, brokerage fee, gift or contingent fee.

XXII. SUBCONTRACTING OR ASSIGNMENT

The benefits and obligations hereunder shall inure to and be binding upon the parties hereto and their respective successors, provided that any such successor to the Firm, whether such successor be an individual, partnership, corporation, or other legal entity is acceptable to the City, and neither this Agreement nor the services to be performed thereunder shall be subcontracted, assigned or otherwise disposed of, either in whole or in part, except with the prior written consent of the Department.

XXIII. DELAYS AND EXTENSIONS OF TIME

The Firm agrees to prosecute the work continuously and diligently and no charges or claims for damages shall be made by it for any delays or hindrances, from any cause whatsoever during the progress of any portion of the services specified in this Agreement. Such delays or hindrances, if any, may be compensated for by an extension of time for such reasonable period as the City may decide. Time extensions will be granted only for excusable delays such as delays beyond the control and without the fault or negligence of the Firm.

XXIV. CHANGES, ALTERATIONS OR MODIFICATIONS IN THE SERVICES

The City shall have the right, at its discretion, to change, alter or modify the services provided for in this Agreement and such changes, alterations or modifications may be made even though it will result in an increase or decrease in the services of the Firm or in the cost thereof. Such changes, alterations or modifications to the services provided for in this Agreement shall be made by written change orders.

Any such change, alteration or modification which either separately or in combination results in a change in the scope of services or an increase in the amount payable to the Firm will be processed by a written change order requisition and is effective only when the change order is issued.

XXV. AVAILABILITY OF DATA

Each party hereto shall make available to the other party, without cost, all nonproprietary technical data under its control reasonably necessary to the performance of the services required under this Agreement.

XXVI. OWNERSHIP OF DOCUMENTS

The Firm agrees that all data including but not limited to reports, drawings, studies, specifications, estimates, maps, photographs and computations prepared by or for it under the terms of this Agreement shall at any time during the performance of the services be made available to the City upon request and shall become and remain the property of the City upon termination or completion of the services. The City shall have the right to use the same without restriction or limitation and without compensation to the Firm other than that provided in the Agreement. *Nothing contained herein shall be construed as limiting or depriving the Firm of its rights to use its basic knowledge and skills to design or carry out other projects or work for itself or others, whether or not such other projects or work are similar to the work to be performed pursuant to this Agreement. Rights to intellectual property developed, utilized, or modified in the performance of the Services shall remain the property of the Firm. Any re-use of the documents by the City for any other purpose shall be without liability to the Firm.*

XXVII. DISSEMINATION OF INFORMATION

During the term of this Agreement, the Firm shall not release any information related to the performance of the services under this Agreement nor publish any final reports or documents without the prior written approval of the City.

XXVIII. SANCTIONS UPON IMPROPER ACTS

If the Firm, or any of its officers, partners, principals, members or agents, or if an employee of the Firm acting with its acquiescence, is convicted of a crime arising out of or in connection with the procurement of this Agreement or the services or any payment under it, the Agreement may be terminated as provided in Section IV. In the event of a conviction occurring after the expiration or termination of this Agreement, the Firm shall be liable for the refund of all fees or profit paid under the Agreement. The rights and remedies set forth herein shall be in addition to, and the exercise thereof shall in no way be considered or construed as a waiver of, any other rights or remedies granted or available to the City.

XXIX. RESPONSIBILITY OF FIRM

- A. The Firm shall perform the services with that standard of care, skill, and diligence normally provided by a Firm, Architect or Engineer in the performance of services similar to the services hereunder.
- B. Notwithstanding any review, approval, acceptance or payment for the services by the City, the Firm shall be responsible for professional and technical accuracy of its work, design, drawings, specifications and other materials furnished under this Agreement.
- C. If the Firm fails to perform the services, or any part of the services, in conformance with the standards set forth in subparagraph A above, and such failure is made known to the Firm within two years after expiration of this Agreement, it shall, if required by the City, perform at its own expense and without additional cost to the City, those services necessary for the correction of any

deficiencies or damage resulting, in whole or in part, from the Firm's failure. This obligation is in addition to and not in substitution for other remedies available to the City under Section IV.

- D. The Firm shall be required to furnish, upon request by the City, proof that it has the financial capacity to provide the services and that it is financially able, through its own resources or through a qualified surety, to protect the City from errors and omissions that might arise from the direct performance of the services or the performance of the services by third parties relying on the completed design or work product.

XXX. CHOICE OF LAW/VENUE

- A. This Agreement was made and entered into in Maryland, and is to be construed under the laws of Maryland. As to the Firm, this Agreement is intended to be a contract under seal and a specialty.
- B. The laws of Maryland shall govern the resolution of any issue arising in connection with this Agreement, including, but not limited, to all questions concerning the validity of this Agreement, the capacity of the parties to enter therein, any modification or amendment thereto, and all rights and obligations of the parties hereunder
- C. The parties agree that any legal proceedings arising out of this contract shall be litigated in Circuit Court of Maryland, Washington County, if appropriate, or otherwise, any court of competent jurisdiction in the State of Maryland.

XXXI. COMPLIANCE WITH LAWS

The Firm hereby represents and warrants:

- A. That it is qualified to do business in the State of Maryland and that it will take such action as, from time to time hereafter, may be necessary to remain so qualified;
- B. That it is not in arrears with respect to the payment of any monies due and owing the City, or any department or agency thereof, including but not limited to the payment of taxes and employee benefits, and that it shall not go into arrears during the term of this Agreement;
- C. That it shall comply with all Federal, State and local laws, ordinances, and legally enforceable rules and regulations applicable to its activities and obligations under this Agreement;
- D. That it shall procure, at its expense, all licenses, permits, insurance and governmental approval, if any, necessary to the performance of its obligations under this Agreement;
- E. That the facts and matters set forth hereafter in the Affidavit and Signature Page attached to this Agreement and made a part hereof are true and correct. In addition to any other remedy available to the City, breach of any of subparagraphs A through E of this Section shall, at the election of the City, be grounds for termination as provided for in Section IV, provided, however, that failure of the City to terminate this Agreement shall not be considered or construed as a waiver of such breach nor as a waiver of any rights or remedies granted or available to the City.

XXXII. NOTICE OF POLITICAL CONTRIBUTIONS

The Firm agrees, in accordance with Maryland Code, State Finance and Procurement Article, §17-402, to comply with the political contribution reporting requirements under Maryland Code, Article 33, Title 14, as amended from time to time, to which the Firm may be subject.

IN WITNESS WHEREOF, The parties have caused this Agreement to be executed on _____, 2026, by affixing hereon their respective seals and signatures of the proper officers.

APPROVED AND AGREED TO:

_____(FIRM)

ATTEST:

(SEAL)
Secretary

BY: _____

Title

Address _____

ATTEST
MARYLAND

CITY OF HAGERSTOWN,

Donna Spickler, City Clerk

BY: _____
William B. McIntire, Mayor



BLACK & VEATCH