City of
ANN ARBOR

RFP #23-16

Public Works/Systems Planning General Engineering Services

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TETRA TECH

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MARCH 30, 2023

City of Ann Arbor, Procurement Unit
301 E. Huron Street
Ann Arbor, MI 48104

RE: Public Works/Systems Planning General Engineering Services | RFP # 23-16

Dear Selection Committee:

Planning for municipal utility needs and implementing public works is an enormous responsibility. There are emergency needs, dozens of technical subjects to grasp, funding constraints, and hundreds of other challenges that City staff face every week. A critical partner to meet these challenges is the General Engineering Consultant retained by the City. Tetra Tech has appreciated our past opportunities to serve Public Works/Systems Planning and continues to adapt to improve the value we provide. We are excited for you to read our proposal and the vision we have to serve our hometown. A few of the characteristics that you will read about are:

Local Service & Leadership with National Resources

Our Ann Arbor-based project manager, Brian Rubel, PE, PMP is a city resident and is available around the clock to serve the City. He has more than 120 staff in Ann Arbor and over 200 professionals within a 1-hour drive of the City to support him. Tetra Tech's Ann Arbor office supports a full complement of disciplines including: civil, electrical, mechanical, environmental, and transportation engineers, construction managers, and geologists. Tetra Tech has the ability and expertise to deliver personalized and specialized services to meet the City's needs. Chances are excellent that whatever need Ann Arbor has, Tetra Tech will have a local expert to work with to serve that need. In the unlikely event we do not possess a local specialist, we bring more than 27,000 national and international associates with a broad range of expertise to solve any problem.

Extension of Staff

We pride ourselves in adapting to the norms and expectations of each client. As we did before the pandemic, Tetra Tech staff can work whole days in City spaces. We can also work from our nearby office, cost-effectively splitting time between City and Tetra Tech spaces. Furthermore, our office is located five minutes from the Wheeler Center and 15 minutes from City Hall, thereby making emergency responses or impromptu meetings efficient.

Familiarity Lowers Staff Burden

While we always want to understand the City's needs for each project, we also do not need to be directed in executing a project. Tetra Tech will hit the ground running on any assignment. We are familiar with the sewer inspection procedures and software. We have run the City's sanitary sewer, storm sewer, and water distribution software. Tetra Tech is experienced in working with Mr. Spencer in the purchasing office. We understand the processes for advertising, bidding, bid evaluation, and awarding a contract, and understand the City's drawing standards. This understanding will allow City staff to work most efficiently.

We welcome the opportunity to further discuss Tetra Tech's approach to serve our hometown.

Sincerely,

Brian M. Rubel, PE, PMP | Senior Project Manager, Senior Vice President | Tetra Tech of Michigan, PC

We acknowledge receipt of Addendum No. 1 (dated 3/15/2023).

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A Professional Qualifications

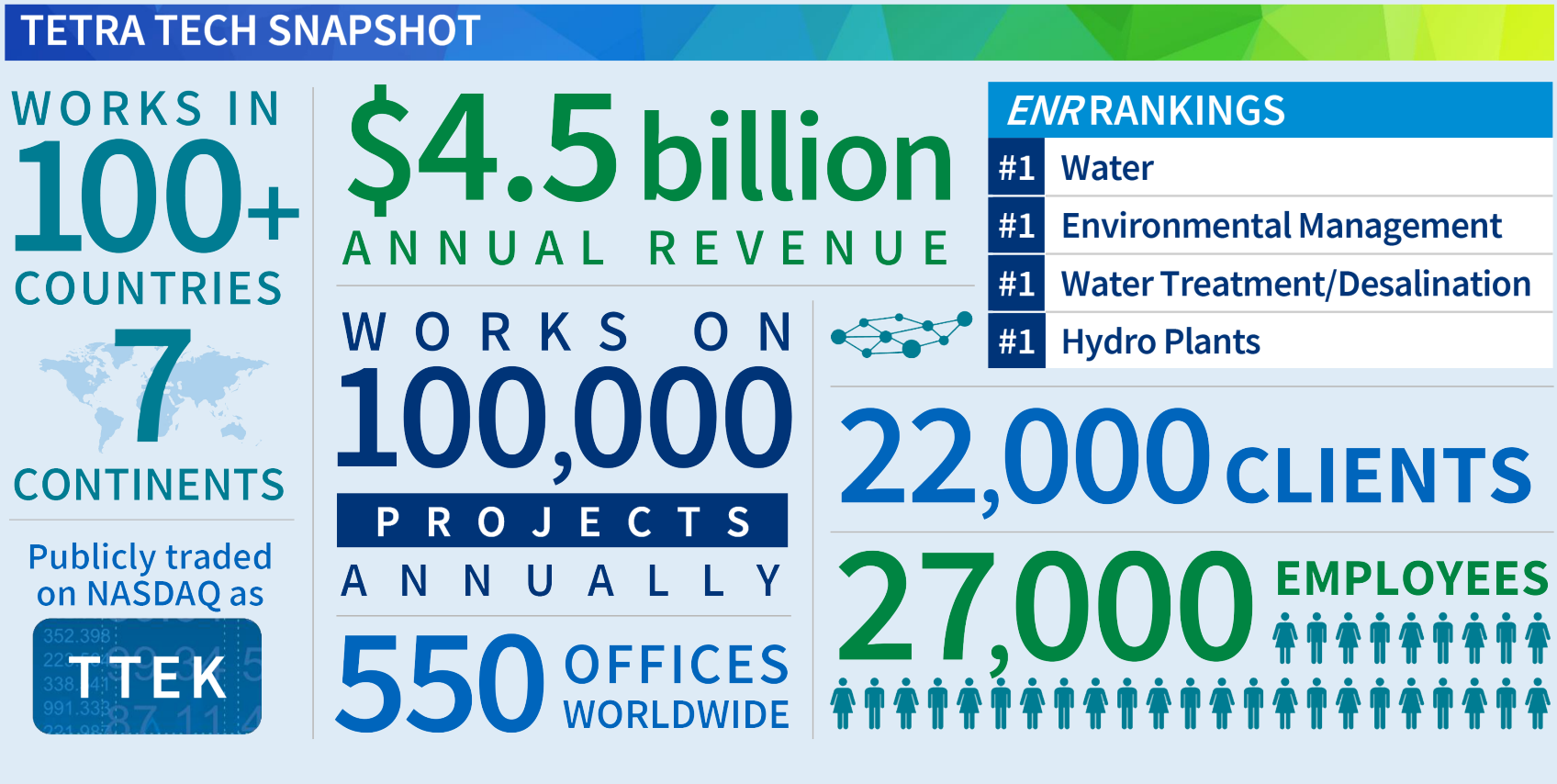
FIRM PROFILE

Tetra Tech provides consulting engineering services, environmental and energy services, infrastructure design, and construction services. We have 27,000 employees located in 550 offices worldwide. The firm is headquartered in Pasadena, California and incorporated in Delaware. Tetra Tech is a publicly traded corporation listed on the NASDAQ stock exchange (symbol: TTEK). Tetra Tech's Midwestern Regional Design Center is located in Ann Arbor, Michigan. Tetra Tech is licensed to provide professional engineering and surveying in Michigan. To meet Michigan's licensing laws, Tetra Tech operates as Tetra Tech of Michigan, PC.

Primary Office Location

1136 Oak Valley Drive, Suite 100
Ann Arbor, MI 48108
Tel: 734.213.4081 | www.tetratechmichigan.com

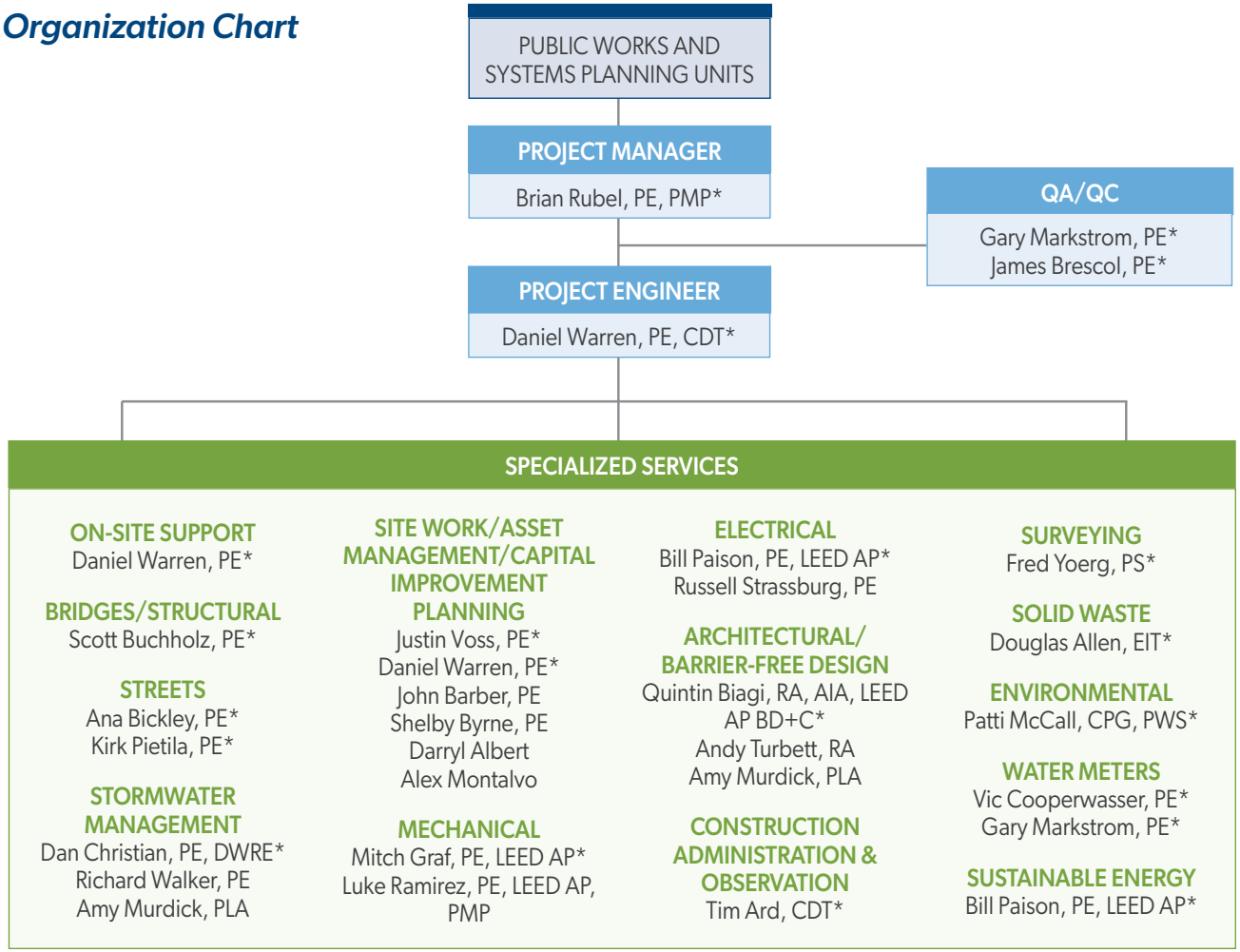
The Ann Arbor office is a full-service office capable of completing the majority of projects. A few specialty services may need to be completed by staff located in other offices.



THE TETRA TECH TEAM

The Tetra Tech team is presented in the organization chart and is followed by brief biographies and resumes. A synopsis of key staff, their physical locations and the credentials that make them uniquely qualified to serve Ann Arbor are demonstrated within the next few pages and in the resumes, provided in Appendix A.

Organization Chart



*Key Staff

STAFF AVAILABILITY & COMMITMENT

The Tetra Tech team is available and fully committed to the City of Ann Arbor for your projects! Our commitment to our clients is demonstrated in our policy to provide the right people and the appropriate resources for every project for the life of the project. Our Ann Arbor team will remain available for this contract. Our project management team and key personnel have committed to serving as an extension of the City's staff throughout the duration of this general engineering services contract.

Tetra Tech's ability to handle each aspect of the scope of services is proven by our longevity of client relationships and retention of contracts. Our successful performance is a result of effective communication, responsive service, and working with the client's staff and stakeholders in a collaborative manner. Currently, Tetra Tech serves multiple municipal entities throughout Michigan, providing a wide variety of services within the utility infrastructure. Tetra Tech's tenure of service for these entities ranges from several months to over five decades, and many of our current contracts have been renewed on multiple occasions. This level of client retention can only be achieved by providing superior service, meeting cost and scheduling goals, and establishing sound working relationships with our clients.

BRIAN RUBEL, PE, PMP

PROJECT MANAGER | 33 YEARS OF EXPERIENCE

Mr. Rubel is a Senior Project Manager and Senior Civil Engineer. He has successfully managed numerous large, complex multidisciplinary projects and performed as Tetra Tech's contract manager for as-needed contracts with Michigan municipalities. He is also an Operations Manager, overseeing client satisfaction, engineering and project management in the Ann Arbor, Detroit, Lansing, Port Huron, Louisville, and Toledo offices. He has a passion to ensure Tetra Tech provides exemplary service to both our clients and our clients' client. He receives high accolades from clients as a result of project success and responsive customer service. Relevant experience includes general municipal engineering, where he oversees all Tetra Tech services in the following communities through as-needed contracts: Ann Arbor, Madison Township, Saline, Adrian, Lenawee County, Tecumseh, and Northfield Township. Typical services he provides include utility design and construction, utility master planning, electrical and instrumentation, site plan reviews, stormwater management, hydraulics/hydrology studies, and water/wastewater treatment improvements. Mr. Rubel is one of the few engineering consultants who has earned the Project Management Institute's Project Management Professional (PMP) certification. He has managed over 50 successful study, design, and construction projects for the City of Ann Arbor.

"Ann Arbor is my hometown. I am a City resident and property owner, and live one mile from the Wheeler Center. I am dedicated to delivering quality projects on time and within budget to my hometown."

– Brian Rubel, PE, PMP

GARY MARKSTROM, PE | QA/QC Manager/Water Meters | 37 Years of Experience**.** Mr. Markstrom has extensive professional experience as a project manager, QA/QC manager, client representative, project engineer, and design engineer. He has worked on numerous diverse projects that involve: wastewater collection systems and treatment facilities; water supply, storage, and treatment facilities; stormwater management systems; as well as rate studies, commercial building projects, transportation engineering, feasibility plans, and site plan reviews.

JAMES BRESCOL, PE | QA/QC | 25 Years of Experience**.** Mr. Brescol has extensive experience in the planning and implementation of wet weather control programs, including modeling, alternatives analysis, planning-level estimates, conceptual and detailed design, and operations and maintenance manuals. His experience includes the analysis and evaluation of wastewater and storm sewer collection systems. He specializes in applications of hydrology and hydraulics as it relates to open-channel flow, urban stormwater runoff, and separate sanitary and combined sewer systems. He leads projects involving green infrastructure, CSO long-term control planning, SSO elimination, collection system master planning, hydraulic modeling, flow monitoring, pipeline hydraulic transients, WWTP hydraulics, and floodplain analyses.

DANIEL WARREN, PE, CDT | Project Engineer/On-Site Support | 19 Years of Experience**.** Mr. Warren specializes in municipal projects involving the preparation of construction plans, specifications, and cost estimates for state, municipal, and county projects. Mr. Warren has been involved in numerous public improvement projects including water distribution, wastewater collection, pump station rehabilitation, and a large-scale utility relocation efforts related to major transportation projects.

SCOTT BUCHHOLZ, PE | Bridges/Structural Engineer | 36 Years of Experience**.** Mr. Buchholz is an expert in bridge design, scoping, load rating, and maintenance and construction inspections. He has served as the lead designer or project manager on numerous Michigan Department of Transportation and local agency bridges. His experience includes designing and load-rating concrete, pre-stressed concrete, steel and timber structures. His construction experience includes managing bridge projects as a resident engineer as well as a bridge construction area supervisor. As a Qualified Team Leader, he has performed bridge safety inspections, detailed bridge inspections, and funding applications for many local agencies.

ANA BICKLEY, PE | Street Design Engineer | 15 Years of Experience**.** Ms. Bickley is experienced in the areas of roadway and highway design, scoping and CADD. Overall project responsibilities have included generating plans, profiles, typical sections, traffic signing and pavement marking plans, signal plans, maintenance of traffic and detour plans, and preparing cost estimates. Ms. Bickley is skilled with MicroStation, Geopak, Auto Turn (AASHTO Vehicle Turning Software), SignCAD (Sign Design Software). She is familiar with MDOT and AASHTO standards for road design and plan preparation.

KIRK PIETILA, PE | Street Design Engineer | 22 Years of Experience**.** Mr. Pietila is experienced in road design using MDOT, AASHTO, and Federal Highway Administration (FHWA) standards, including complex urban freeways, rural freeways, interchanges, arterial roadways, pavement rehabilitation, intersection design, GeoPak, and CADD. He is familiar with MDOT standards for road design and plan preparation. His expertise also includes generating profiles, typical sections, alignments, traffic signing and pavement marking plans, right-of-way plans, and preparing special provisions, design exceptions, cost estimates, and construction.

DAN CHRISTIAN, PE, DWRE | Stormwater Management | 33 Years of Experience**.** Mr. Christian's expertise includes hydraulics, hydrology, computer modeling, stormwater management, stormwater permitting, low impact development design, master plans, water quantity and quality monitoring, rate development, project development and project management. He has worked on a wide variety of projects including NPDES permitting, watershed management, hydrologic and hydraulic studies, and design and construction projects. Stormwater master/management plan development is a regular part of Mr. Christian's work. Plans are written at a wide variety of scales, from individual sites and neighborhoods, to larger sewershed areas and for complete communities.

RICHARD WALKER, PE | Stormwater Management | 40 Years of Experience**.** Mr. Walker has a broad range of experience in civil and water resources engineering, hydrologic/hydraulic modeling, stormwater/floodplain management, water/wastewater engineering, and landfills. He developed stormwater design manuals for municipalities that contain requirements for post-construction runoff, erosion prevention and sediment control, and green infrastructure. He has assisted cities with implementing stormwater utilities. He is currently the Municipal Separate Storm Sewer System (MS4) program manager for the Lexington-Fayette Urban County Government, where he is responsible for ensuring the City complies with the MS4 permit and stormwater EPA Consent Decree.

AMY MURDICK, PE, PLA | Stormwater Management/ Architectural/Barrier-Free Design | 17 Years of Experience**.** Ms. Murdick is an accomplished water resources engineer and landscape architect with a solid history of guiding all phases of the planning and design processes and execution of diverse projects. She has extensive multidisciplinary knowledge of integrated site design, stormwater management, and green stormwater infrastructure techniques. She is proficient in analyzing client needs, translating those needs into cohesive plans, and crafting innovative solutions that approach problems from a comprehensive and multi-faceted approach. Her core competencies include: site/civil design, grading and drainage, stormwater management, green stormwater infrastructure, urban design, and master planning.

JUSTIN VOSS, PE | Site Work/Asset Management/Capital Improvement Planning | 18 Years of Experience**.** Mr. Voss is a hydraulics and hydrology professional, focusing primarily in computer modeling applications for hydraulic systems, including collection systems, pressure flow systems, and open channel flow. His collection system experience includes flow monitoring, modeling, I/I studies, and sewer evaluation surveys for sanitary, storm, and combined sewer projects. He is familiar with EPA-SWMM, InfoSWMM, InfoSWMM 2D, Storm and Sanitary Analysis (formerly StormNet), PCSWMM, SewerGEMS, XP-SWMM, and InfoWorks ICM. Mr. Voss has successfully run Ann Arbor's water and stormwater models.

JOHN BARBER, PE | Site Work/Asset Management/Capital Improvement Planning | 30 Years of Experience**.** Mr. Barber has 30 years of experience as a project manager and project engineer. His expertise lies in finding innovative, cost-effective solutions for various types of water and wastewater systems and their components. His responsibilities include execution of engineering projects from conception through design to construction, as well as related studies, reports, bidding documents, and development and maintenance of technical specifications. He handles consultant / agency contracts, permit requirements, insurance and liability provisions, quality assurance / quality control measures, grant and funding applications, and meeting agency expectations.

SHELBY BYRNE, PE | Site Work/Asset Management/Capital Improvement Planning | 5 Years of Experience**.** Ms. Byrne is a civil and environmental engineer with experience in municipal and civil engineering project design, engineering report formulation, quantity and cost estimation, field inspection, municipal asset management programs and studies, AutoCAD drawing, InfoWater modeling software, and GIS software. As a project engineer, Ms. Byrne has experience with the

following: water distribution and sewer collection system project design; site plan/grading plan preparation; yard piping design; water system hydraulic modeling and calibration; construction and site plan reviews; permit application generation; field inspection of water and sanitary distribution installation; generating engineering reports; and generating construction specifications.

DARRYL ALBERT | Asset Management | 17 Years of Experience**.** Mr. Albert is responsible for implementing the use of Geographic Information System (GIS) software for analytical purposes, data collection, as well as asset management purposes. His knowledge of GIS software includes ESRI's ArcGIS for Desktop, ArcGIS Pro, ArcSDE, ArcGIS for Server, ArcHydro hydrology tools, ArcGIS Online, ArcGIS Enterprise, Microsoft SQL Server, Field Maps (mobile application), ArcGIS Survey123, and other mobile applications. Mr. Albert is also experienced in complex geospatial analysis and providing results visually, in a clear and concise manner. He is experienced in collecting data in the field using various software and techniques. Mr. Albert performs as a database administrator on a variety of projects to ensure best practices for long- and short-term data management and storage. He is also experienced implementing and using asset management software, including Lucity Asset Management systems.

ALEX MONTALVO | Asset Management | 27 Years of Experience**.** Mr. Montalvo has extensive data analytics, GIS, and asset management experience. He currently serves as the GIS Group Manager and has been instrumental in the expansion of GIS services offered by Tetra Tech. Mr. Montalvo has extensive experience in master planning, condition assessment, capital improvement planning, and repair and rehabilitation efforts. Much of this work has involved automating and integrating technology platforms to reduce client labor.

MITCH GRAF, PE, LEED AP | Mechanical Engineer | 23 Years of Experience**.** Mr. Graf is an experienced mechanical engineer with a focus on commercial and industrial engineering in the areas of HVAC, piping, plumbing, and industrial capital improvements. He is highly proficient in Revit, AutoCAD, Trane Trace, manufacturer equipment selection software, and Microsoft Office. He has a familiar knowledge of the International Code Council Mechanical, Plumbing, Building, Energy Code, and Fuel Gas Codes and the American Society of Heating, Refrigeration, and Air Conditioning Engineers Publications.

LUKE RAMIREZ, PE, LEED AP, PMP | Mechanical Engineer | 17 Years of Experience**.** Mr. Ramirez provides clients with a variety of HVAC and plumbing designs as well as life-cycle assessment of systems and products. His projects have included designs for municipal, industrial, and commercial facilities, as well as construction administration services for WTPs and WWTPs. He completed the HVAC renovations for the Ann Arbor WTP currently under construction.

BILL PAISON, PE, LEED AP | Electrical Engineer/Sustainable Energy | 29 Years of Experience**.** Mr. Paison is experienced in electrical and instrumentation designs and specifications for municipal infrastructure. He has extensive experience in the design of government and industrial buildings that feature power distribution systems, automatic light control to conserve energy, LEED design recommendations, video-based security with remote monitoring, communications, lightning protection, and addressable fire systems. Mr. Paison has completed dozens of complex electrical projects for Ann Arbor facilities including the Steere Farm Well Field.

RUSSELL STRASSBURG, PE | Electrical/Street Lighting Engineer | 36 Years of Experience**.** Mr. Strassburg is experienced in the design of municipal street lighting projects and complex electrical and process instrumentation systems for municipal water/wastewater and industrial facilities. His projects range in complexity from simple sewage lift stations to water and wastewater treatment facilities. He led the design of lamp replacements for the Wheeler Center. He has also held positions in project management and executive level IT leadership for several organizations. He led the design of lamp replacement for the Wheeler Center.

QUINTIN BIAGI, RA, AIA, LEED AP BD+C, PE | Architectural/ Barrier-Free Design | 38 Years of Experience**.** Mr. Biagi is an architectural group leader for Tetra Tech's Water, Environmental and Infrastructure Division of our United States Infrastructure group. Mr. Biagi has great skill listening to and evaluating clients' needs to create informed designs that address the priorities of their projects. Coordinating team efforts among all the design disciplines through all design phases, he offers solutions tailored to each client's unique program requirements and needs. Mr. Biagi completed successful architectural revisions of Ann Arbor's well field.

ANDY TURBETT, RA | Architectural/Barrier-Free Design | 40 Years of Experience**.** Mr. Turbett offers 40+ years of experience in building and construction projects. He has led multi-discipline teams on projects for municipal, commercial, industrial, and private clients. He has a thorough understanding of site, architectural, structural, HVAC, plumbing, electrical, and technology systems. Mr. Turbett is proficient in local zoning ordinance as well as model code research and interpretation. His expertise encompasses Michigan and International Building Codes (particularly for construction types I, II, III, and V), NFPA 101, ADA, and State of Michigan Fire Marshal regulations. He has extensive experience in the preparation of document sets, development of details, and construction cost budgeting and estimating. Mr. Turbett was the lead architect for renovating the Ann Arbor WTP's control room.

TIM ARD, CDT | Construction Administration & Observation | 35 Years of Experience**.** Mr. Ard is an expert in construction management. He provides supervision during all phases of construction, including contract document interpretation; monitoring construction conformance to contract documents; serving as liaison between contractor, owner, and engineer; and providing project progress documentation and information to the owner. As a construction project manager and resident project representative, Mr. Ard has diverse project experience to include numerous road, water main, sanitary, storm, and water tower improvements, as well as development projects. He has overseen construction of over a dozen projects at the Ann Arbor WTP.

FRED YOERG, PS | Surveyor | 23 Years of Experience**.** Mr. Yoerg has extensive surveying experience including project estimating, field crew scheduling and coordinating, data processing, and reporting; legal descriptions for property boundaries, easements, restricted-use areas; stability-evaluation control surveys; landfill surveying and mapping; utility easement mapping; spill-containment evaluation surveys; industrial plant utility surveys; map datum evaluation and adjustments; restrictive covenant maps and descriptions; property boundary surveys; geodetic control surveys; field layout of utility lines, subdivisions, malls, mobile home communities, apartment complexes, schools, roads and homes; topographic surveys; ALTA/ACSM surveys; and remonumentation surveys.

DOUGLAS ALLEN, EIT | Solid Waste | 26 Years of Experience**.** Mr. Allen is experienced in the planning, siting, design, and permitting of solid waste management facilities, including municipal solid waste landfills and transfer stations. As corporate liaison for waste facility programming services, he has served as project manager on numerous transfer station facility projects for both public and private sector clients alike. He has led multi-disciplined project teams consisting of solid waste planners, designers, traffic engineers, landscape architects, real estate valuation experts, and general contractors. He conducts site feasibility and geometric evaluations and assesses candidate sites for compliance with applicable local, state, and federal regulations. Mr. Allen served as chief editor of the Solid Waste Association of North America (SWANA) transfer station systems training course and has participated in establishing many of the first LEED certified transfer stations in the United States. Mr. Allen has managed and/or contributed to numerous Phase I and II environmental site assessments, due diligence analyses, and site remediation/restoration projects.

PATTI MCCALL, CPG, PWS | Environmental | 21 Years of Experience**.** Ms. McCall has managed site characterization, remediation, hydrogeological, geotechnical, wetland and landfill projects, ecological risk assessments, regulatory compliance investigations, Michigan Department of Environment, Great Lakes, and Energy (EGLE) Part 201 and 213 investigations, Phase I and Phase II environmental site assessments (ESAs), and baseline environmental assessments (BEAs) due care plans. Her responsibilities include underground storage tank compliance activities, implementing landfill monitoring projects, groundwater sampling and methane monitoring, wetland delineations and mitigation monitoring. Ms. McCall has completed and certified United States EPA greenhouse gas reporting for municipal landfills and completed numerous reports including aquifer analyses, remedial investigations, hydrogeological investigations, initial and final assessment reports, work plans, closure reports, remedial action plans, statistical analysis, wetland delineation reports, wetland mitigation monitoring plans and reports, Joint Permit Applications, and natural resources assessments.

VIC COOPERWASSER, PE | Water Meters | 51 Years of Experience**.** For more than 50 years, Mr. Cooperwasser has assisted over 100 communities to establish and/or update water, wastewater, and stormwater rate methodologies. These methodologies have allowed clients to raise over $1 billion for water, wastewater, and stormwater infrastructures. He is an intermunicipal rate negotiator, economic comparison specialist, and nationally recognized utility rate specialist. He has been involved with virtually every stormwater utility adopted in Michigan. He has assisted dozens of Michigan communities with obtaining water, wastewater, and stormwater grants and low–interest loans. He has also assisted many communities establish rate methodologies to fund their operations, maintenance, equipment replacement and capital improvement expenses. These approaches have been incorporated into the financial planning for asset management programs.

FIRM HISTORY & UNIQUE QUALIFICATIONS

Tetra Tech's Michigan operations were founded by two professors from the University of Michigan to provide consulting services to Michigan municipalities. For more than 100 years, our project portfolio has been built upon providing reliable service to the communities within which we live.

Tetra Tech and its predecessors have provided professional consulting engineering services to the City of Ann Arbor since 1914. Our team of dedicated and experienced project engineers and field personnel has the technical and managerial capabilities required by the City of Ann Arbor. Our project managers, engineers, and field personnel will coordinate and communicate among the project team to ensure successful accomplishment of all the City's needs for this project.

Tetra Tech's mission is to be the premier worldwide consulting and engineering firm focusing on natural resources and infrastructure by providing the following services:

- Asset management and utility planning
- Underground utility design and construction
- Water supply, treatment, and storage
- Water, wastewater, and stormwater ordinance development and rate analysis
- Environmental services, including remediation, laboratory testing, and regulations assistance
- Stormwater management
- Green infrastructure design
- Mechanical, electrical, structural and architectural services
- Infrastructure master planning for long-term capital improvement programming of water, wastewater, and stormwater
- Geographic information Systems
- Project financing assistance
- Planning and design of recreational facilities (sports fields, parks, swimming pools)
- Transportation services, including streets and bridges

Local Focus — National Presence

Tetra Tech is a full-service professional organization with specialized in-house expertise in civil, surveying, structural, electrical, mechanical, sanitary, environmental, and geotechnical engineering. We have built a reputation in the industry as a leader in developing effective solutions to constantly changing, tough engineering challenges. Despite a large worldwide presence, we understand that our clients require a local focus. Tetra Tech's Ann Arbor Office will be managing this contract. We have been in Ann Arbor since 1914 and have extensive knowledge of completing successful design and construction projects for Michigan municipalities. We maintain long-term relationships with regulatory agencies in the area. Tetra Tech is proud of our record and recognizes that our success depends on meeting or exceeding our client's expectations for delivery, innovation, quality, and service.

Tetra Tech offers the following services and staff on the City of Ann Arbor as-needed contract. The numbers below are representative of the Tetra Tech offices located in Michigan (the majority of these people are based in our Ann Arbor office). However, if needed, we can pull from over 27,000 professionals nationally.

TYPES OF SERVICES	STAFF NUMBER
Utility Engineers	30
Structural Engineers	3
Geotechnical Engineers	1
Mechanical Engineers	12
Electrical/Controls Engineers	15
Plant Operators	10
Water Resource Engineers	20
Water Treatment Evaluation & Design Engineers	30
Transportation Engineers	25
Surveyors	8
Construction Inspectors	15
Geologists	20
Miscellaneous Support Staff	10

Engineering News-Record Rankings

#1 WATER	#1 CONSULTING STUDIES	#1 ENVIRONMENTAL MANAGEMENT	#2 SEWER & WASTE	#2 WIND POWER	#8 SOLAR POWER	#2 SOLID WASTE
19 years in a row!						

B Past Involvement with Similar Projects

RELEVANT EXPERIENCE

This section provides a sampling of projects Tetra Tech has implemented for similar municipal projects for a variety of municipal clients including references.

PROJECT	Ann Arbor Experience	Asset Management	Stormwater Detention Ponds	Emergency Response	Water, Stormwater, or Sanitary Extension	Streetlights/Lights	Topographic Survey	Pool Services	Water Meters	Facility Renovations	Easement Preparation	Transportation	Construction Administration	Recreational Facilities	Utility Planning/ Modeling	CIP	Renewable Energy & Conservation	Solid Waste
As-Needed Water Treatment Services, Ann Arbor, MI	✓	✓		✓			✓			✓			✓			✓		
DPW & Systems Planning As-Needed Data Collection, Ann Arbor, MI	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓		✓	✓		
As-Needed Services, Brighton, MI		✓		✓	✓		✓			✓	✓		✓		✓	✓		
Michigan & Quay Streets Reconstruction, Port Huron, MI					✓	✓	✓					✓	✓		✓	✓		
Steere Farm Engine Replacement, Ann Arbor, MI	✓					✓				✓			✓			✓		
Manchester Tank Coating Project, Ann Arbor, MI	✓						✓			✓			✓			✓		
Green Stormwater Infrastructure Program Management, Detroit, MI			✓															
Univ. of MI Donald B. Canham Natatorium Improvements, Ann Arbor, MI	✓							✓						✓				
Rock Creek Sanitary Sewer Repair, Ann Arbor, MI	✓			✓							✓		✓					
Ann Arbor Township Island Utility Plan, Ann Arbor, MI	✓				✓										✓	✓		
Storm Sewer Asset Management Plan, Grand Rapids, MI			✓									✓						
Plymouth & Green Roads Water Main Replacement, Ann Arbor, MI	✓	✓			✓		✓				✓	✓	✓		✓			
Recreational Facilities Design & Construction Mgmt., Oceola Township, MI			✓											✓		✓		
Wastewater Asset Management Plan, Various MI Agencies		✓																
Water Meter Replacement, Brighton, MI									✓							✓		
Wings & Waves Aquatics Facility, McMinnville, OR								✓						✓				
Barton Water Main Location, Ann Arbor, MI	✓	✓					✓								✓			
Water Meter & Reading System Replacement, East Lansing, MI		✓							✓							✓		
LFUCG Detention Basin Maintenance Program, Fayette County, KY		✓	✓													✓		
Wheeler Center Lighting Improvements, Ann Arbor, MI	✓	✓				✓										✓	✓	
Midtown Booster Station, Ann Arbor, MI	✓	✓								✓					✓		✓	
Capital Improvement Funding, Ann Arbor, MI	✓		✓		✓							✓				✓		
Gravity Sewer Rehabilitation & Replacement, Phases I & 2, Toho, FL		✓		✓											✓	✓		
WWTP Expansion & Secondary Treatment Improvements, Saline, MI																	✓	
20-year Water System Master Plan, Quincy, MA					✓										✓	✓		
Anchorage Transfer Station, Anchorage, AK																✓		✓
Wheeler Center ADA Improvements, Ann Arbor, MI	✓											✓	✓					

As-Needed Water Treatment Services

Ann Arbor, MI

PROJECT DATES

2013-present

PROJECT VALUE

$200,000+ Annually

KEY STAFF

Brian Rubel, PE, PMP
Project Manager

Daniel Warren, PE
Civil Engineer

Roger Kaliman, PE
Process Design Engineer

Bill Paison, PE
Electrical/SCADA Engineer

Andy Turbett, RA
Architectural

Mitch Graf, PE
Mechanical Engineer

Luke Ramirez, PE
Mechanical Engineer

Tim Ard, CDT
Construction Manager

CLIENT REFERENCE

City of Ann Arbor
Glen Wiczorek, PE,
Senior Utilities Engineer
301 E. Huron St.
Ann Arbor, MI 48107
734.794.6350 ext. 43311
gwiczorek@aagov.org

Tetra Tech holds as-needed contracts with Ann Arbor's Water Treatment Services allowing the City to retain us to complete as-needed services on short notice. Our Ann Arbor office allows us to mobilize quickly and solve all encountered project challenges.

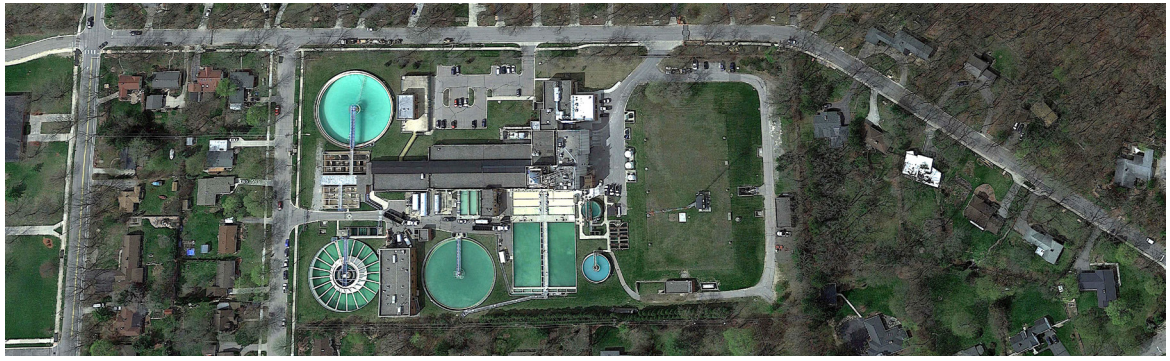
Through these contracts, Tetra Tech has become familiar with City design standards and purchasing/bidding practices that streamline a completed project.

Tetra Tech has tapped into national experts to complete a FERC-required vulnerability analysis for the Barton, Argo, Geddes, and Superior Dams. This analysis was completed using FERC's DAMSVR software and allowed the City to generate ideas to protect the dam from threats. Some other completed projects include:

- WTP clarifier drive and VFD replacement, SCADA programming, and filter backwash system work
- South Industrial water tank inspection and coating
- Lime residual removal program (including topographic and bathymetric surveys)
- Valve replacements
- Groundwater analysis to support industrial remediation
- Complete WTP HVAC improvements
- Floor drain design and improvement
- Chemical tank replacement
- Site plan reviews

Tetra Tech has often provided value without charging fees. For instance, we have provided cost opinions on several projects that guided the City to complete a more thorough project in a Capital Improvement Plan having a longer design life than a quick fix with a much shorter, useful life. We have identified several instances of new technologies to increase value and reduce costs, such as manhole scanning and force main inspection probes.

Tetra Tech has been retained to administer the construction contract and serve as daily resident project representative for all design and construction processes. We utilize City processes (pay applications, RFIs, etc.) on all projects. In 2021, Tim Ard was retained to provide full-time construction management services for all projects at the WTP during the 2021 construction season.



PROJECT RELEVANCY

- Clarifier drive replacement
- Dam vulnerability analysis
- Water tank inspection and rehabilitation
- Lime residual removal
- Utility planning
- VFD replacement
- ADA parking lot design
- Raw water transmission main assets management plan
- HVAC Renovations
- Federal funding

DPW & Systems Planning As-Needed Data Collection

Ann Arbor, MI

PROJECT DATES

2017-present

PROJECT VALUE

Varies by Project

KEY STAFF

Brian Rubel, PE, PMP
Project Manager

Russ Strassburg, PE
Electrical Engineer

Daniel Warren, PE
Civil Engineer

Darryl Albert
GIS

Tim Ard, CDT
Construction Manager

CLIENT REFERENCE

City of Ann Arbor Department of Public Works & Systems Planning
Kyle Pettibone
Public Works Engineer
Wheeler Center
Ann Arbor, MI 48108
734.794.6350x43318
kpettibone@a2gov.org

Troy Baughman
Project Manager
301 E. Huron St.
Ann Arbor, MI 48104
734.794.6350x43798

Tetra Tech holds an as-needed contract with Ann Arbor's Department of Public Works and Systems Planning Units allowing the City to retain Tetra Tech to complete as-needed services on short notice. Tetra Tech's Ann Arbor office allows us to mobilize quickly and solve all encountered project challenges.

The main project completed was continuing support of the City's sewer televising contracts and assisting with importing the data collected by TV contractors into the city's automated software for record keeping and improvement needs (Cityworks and SCREAM).

Other projects have included design and construction of utility improvements. Many of those are summarized separately in this documents and a comprehensive list follows:

- Pittsfield Township sewer audit
- Inspection of underground (pipe) stormwater and secondary detention assets
- Rock Creek sewer repair
- Plymouth/Green Road sewer repair
- Ann Arbor Township Islands Utility Plan
- Sanitary sewer manhole assessments and repairs
- Water meter evaluations
- Wheeler Center Lighting Improvements
- Huron River Drive culvert improvements
- Scio Township & Water Meter Replacement
- Wheeler Center ADA Compliance

PROJECT RELEVANCY

- Familiar with DPW and Systems Planning staff, policies, and procedures
- Familiar with City's sanitary sewer condition assessment workflow

As-Needed Services

Brighton, MI

PROJECT DATES

1984-present

PROJECT VALUE

Varies by Project

KEY STAFF

Gary Markstrom, PE
Project Manager

Brian Rubel, PE, PMP
Hydraulic Analysis

Bill Paison, PE, LEED AP
Electrical Engineer

CLIENT REFERENCE

City of Brighton
Marcel Goch
DPW Manager
200 N. First Street
Brighton, MI 48116
810.225.9282
gochm@brightoncity.org

In recent years, the City of Brighton has been one of the fastest growing communities in Michigan. For over 25 years, the City has turned to Tetra Tech to assist with maintaining its infrastructure to meet growing community needs. Tetra Tech attends City Council and committee meetings to provide advice on infrastructure. We review site plans from proposed developments to ensure sites meet community requirements. Furthermore, Tetra Tech completes studies and designs to identify and construct infrastructure needs, including the administration of the construction contract.

Tetra Tech developed the City's first Master Utility plan in 1985. It contains Master Plans for water service, transportation of wastewater, and stormwater management for all areas of the City. System for each utility was reviewed; capabilities and deficiencies noted, and improvement options discussed. A unified plan for utility development of large tracts of undeveloped land within the City was also included. During the Master Plan development (1984), the City supplied drinking water from wells with no central treatment. As part of the Master Pplan, a treatment facility, water transmission system improvements, and a plan for providing water service to new developments and future City annexations was developed. WWTP expansions were also identified. Proposed sanitary service area improvements were defined to reduce the burden on overloaded sewers and to utilize sewers with available capacity to support new development. Tetra Tech updated the 1985 Master Utility Plan including updating hydraulic models for infrastructure improvements completed since 1985 and discussions on providing water and wastewater services to areas outside the City. Tetra Tech has participated on the City's Capital Improvements Program (CIP) Committee that prepares a recommended six-year CIP for Council approval for budgeting large-scale public expenditures.

Utility improvements implemented:

- $12M New WWTP
- $4.0M Challis Road WTP & Wells
- $1.2M Challis Road Sanitary Collection System & PS
- $0.5M Water Main Extensions
- $1.5M Elevation Water Storage Tank and Booster Station
- $0.25M Challis Road WTP Exp.
- $1.2M Pierce WTP Rehabilitation
- $0.75 Water Main, Storm Sewer & Sanitary Sewer Upgrades
- $8M Pine Creek Ground Water Storage Tank & Booster Station
- $0.8M Lindbom Storm Sewer & Constructed Wetland

Tetra Tech has assisted the City's growth from a community of 2,500 people to one that now totals 7,611!

Major transportation services provided to the City include:

- Traffic signal warrant studies, progression analyses, and modernization, interconnection, and synchronization
- Roadway and intersection design for realignment and/or safety projects
- Review of traffic impact studies and proposed site plans
- Site circulation studies
- Traffic calming measures
- Pedestrian access/circulation reviews

PROJECT RELEVANCY

- Sanitary storm sewer and water utilities
- Road reconstruction
- Master planning

Michigan & Quay Streets Reconstruction

Port Huron, MI

PROJECT DATES

2019

PROJECT VALUE

$3,500,000

KEY STAFF

John Barber, PE
Project Engineer/QA/QC

Russ Strassburg, PE
Street Lighting

CLIENT REFERENCE

City of Port Huron
Eric Witter, PE
City Engineer
100 McMorran Blvd.
Port Huron, MI 48060
810.984.9730

The project consisted of construction of approximately 3,300 feet of 8- through 15-inch sewers, 2,700 feet of 4- through 12-inch ductile iron water main, and 0.45 miles of asphalt paving reconstruction of Michigan and Quay Streets located in the downtown business district of the City.

Work under this project included pavement reconstruction, traffic flow, and parking layout improvements, utility lead improvements, subsurface vault assessments and abandonments, decorative street lighting, drainage improvements, code compliance ADA accessibility upgrades, traffic detours, maintaining business accessibility during construction, schedule work around community events and permanent restoration measures.

One unique project constraint was working with the City to select and design decorative, LED-based street lights to compliment the streetscape.

Tetra Tech's services included:

- Decorative, energy efficient street lighting
- Field investigations, surveys, and topographic base mapping
- Vault field assessments and abandonment coordination with owners
- Multi-discipline design team including incorporation of City design elements
- Schematic planning coordination with City and local businesses
- Permitting and private utility coordination
- Construction phase staking layout, inspection, and observation

PROJECT RELEVANCY

- Decorative, energy efficient street lighting

Steere Farm Engine Replacement

Ann Arbor, MI

PROJECT DATES

2015-2018

PROJECT VALUE

$3,100,000

KEY STAFF

Brian Rubel, PE, PMP
Project Manager

Bill Paison, PE, LEED AP
Electrical Engineer/SCADA

Tim Ard, CDT
Construction Manager

Quintin Biagi, RA, GPCP, NCARB, CDT, LEED AP BD+C
Architect

Justin Voss, PE
Hydraulic Engineer

CLIENT REFERENCE

City of Ann Arbor
Glen Wiczorek, PE,
Senior Utilities Engineer
301 E. Huron St.
Ann Arbor, MI 48107
734.794.6350 ext. 43311

The City of Ann Arbor's well field used natural gas engines to power three well pumps. Seeking a more reliable energy source, Tetra Tech was selected to design electric motors and a power feed to the site. The project included reconstruction of the three well houses to modernize them concurrent with the new electrical service. Tetra Tech designed, bid, and managed construction. Close coordination with numerous entities was required. Agencies involved include: City of Ann Arbor Building Department; Pittsfield Township Planning (site plan); DTE Energy; Ann Arbor Municipal Airport; Ann Arbor DPW (fiber optic); and Ann Arbor Water Treatment Unit.

The project is operational and has exceeded the expectations of WTP staff. The new electrical well field has allowed the City to reduce O&M time/costs while improving the reliability to supply well water to the WTP.

The completed project stands ready to serve the next generation of Ann Arbor water customers.

PROJECT RELEVANCY

- SCADA control of the new system
- Backup energy generation
- Familiarity with well field and well field transmission line

Manchester Tank Coating Project

Ann Arbor, MI

PROJECT DATES

2019

PROJECT VALUE

$140,000 (Fee)
$79,000 (Construction)

KEY STAFF

Brian Rubel, PE, PMP
Project Manager

Tim Ard, CDT
Construction Manager

CLIENT REFERENCE

City of Ann Arbor
Brian Steglitz, PE
WTP Manager
301 E. Huron St.
Ann Arbor, MI
734.794.6426

The City of Ann Arbor's Manchester Road water tank was constructed in 1959. The exterior paint was failing and a project to recoat the tank was initiated. In addition, the City elected to rehabilitate dozens of mechanical, electrical, instrumentation, and the facility site features.Tetra Tech was selected to lead this work. Major items incorporated into the project include:

- Tank exterior and dry interior painting including a contest to include public art
- Lighting improvements
- Safety Improvements (platform railings)
- New hatches and door locking mechanisms
- Replacement process piping and isolation valves
- Overflow channel improvements
- Modernization of telemetry from radio to fiber optic

Tetra Tech coordinated for the telecommunication companies in the removal of cellular equipment prior to the project. Two construction contracts were used to optimize the project cost. Tetra Tech also assisted the City in holding a design contest to identify the final tank artwork. The completed tank was selected as the Tnemec Corporation's "Tank of the Year" in a national contest, and serves as a new landmark on the City's skyline.

PROJECT RELEVANCY

- Tank coating for corrosion control
- Bid documents prepared to accommodate art content
- Improved safety and functionality

Green Stormwater Infrastructure Program Management

Detroit, MI

PROJECT DATES

2013-2019

PROJECT VALUE

$16,000,000

KEY STAFF

Dan Christian, PE, DWRE
Project Manager

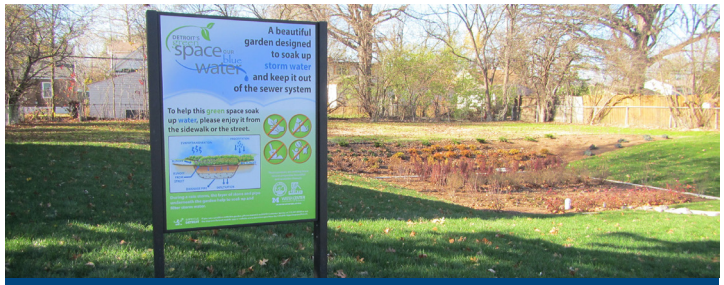
CLIENT REFERENCE

Detroit Water & Sewerage Dept.
Palencia Mobley, PE
(former DWSD Deputy Director & Chief Engineer)
Present Contact Information:
1333 New Hampshire Avenue NW
Washington, DC 20036
313.605.6554

In 2010, the Detroit Water & Sewerage Department (DWSD) and MDEQ negotiated a Green Stormwater Infrastructure (GSI) program to reduce CSOs to the Rouge River. This program would replace the proposed Upper Rouge Tunnel (URT). The green infrastructure (GI) program was part of DWSD's NPDES permit and included a requirement to invest $15 million in GI over 5 years (from 2013-2017), and a performance expectation of 2.8 MG of stormwater removed from the combined sewer system during a 2-year, 24-hour storm event.

Tetra Tech worked with DWSD to implement its GI program and NPDES permit requirements. The primary purpose of the program was the reduction of combined sewage flows through stormwater management. The project was coordinated with DWSD, City of Detroit, and a wide variety of other institutional partners. Services included:

- **Program Management –** Tetra Tech provided program management including project planning, standards development, coordination with agencies and entities, code and ordinance review, and drainage charge credit system. We managed the design and construction of the implemented GSI projects.
- **Policy Development & Update –** Tetra Tech reviewed the City's municipal code and made recommendations regarding GI requirements and incentives. Using an internal city technical advisory committee and extensive external stakeholder involvement, we developed a new post-construction stormwater management ordinance and updated the code in numerous other places to remove barriers and incentivize GI. An aspect of the post construction stormwater ordinance is a mechanism to allow alternative compliance by implementing stormwater management in other locations that may aid the developer in the financial viability of their project and aid DWSD in the control of stormwater to those CSO discharges that are not yet controlled.
- **Standards & Manual Development –** To supplement the ordinance, a series of policy and design manuals were prepared with checklists, standards, specifications, and details, specifically geared at conditions present in the City of Detroit, considering a primary goal of volume control (including retention and detention) that will reduce the potential for CSOs. This contrasted with many GSI manuals that primarily focused on water quality aspects versus volume reduction. Information was developed for parcels and public (right-of-way) projects.
- **Performance Assessments** included a broad array of issues such as GI practice sustainability, community acceptance, comprehensive flow monitoring to determine the change in hydrologic characteristics and plant and vegetation health and growth (for practices with vegetation), accumulation of sediment, accumulation of trash and debris, and soil characteristics. Lessons learned through the assessment process were incorporated into program revisions as part of an adaptive management approach to the GI program. Tetra Tech collaborated with the University of Michigan on a research project that addressed social impact of GSI implementation and approaches to maximize social benefits.



PROJECT RELEVANCY

- Green Infrastructure program for CSO control
- Plan, design, implementation, and public involvement

University of Michigan Donald B. Canham Natatorium Improvements

Ann Arbor, MI

PROJECT DATES

1999

PROJECT VALUE

$100,000

KEY STAFF

Bill Paison, PE, LEED AP
Electrical Engineer

Tim Ard, CDT
Resident Project Representative

CLIENT REFERENCE

University of Michigan
Mark Lambert
Director of Aquatics
500 S. State St.
Ann Arbor, MI 48109
734.647.0500

The University of Michigan Donald Canham Natatorium at is a 59,000-sf facility housing a 50-meter pool, a diving well with an Olympic Tower, one- and three-meter springboards, and locker room facilities.

Tetra Tech evaluated and designed infrastructure to the natatorium to improve water and air quality and correct other infrastructure deficiencies.

The natatorium had been plagued with poor water quality, high humidity, and other infrastructure problems.

Improvements included:

- New HVAC system consisting of dehumidification equipment, air handling equipment, chillers, ductwork, and related appurtenances
- New filtering system for the competition and diving pools including new bottom drains, recirculation piping, pumps, filters, and related equipment
- Diving and competition pool renovation including new ceramic tile
- Architectural renovations in the building accommodated the infrastructure improvements and remodeling of locker rooms, weight training rooms, and related areas
- Miscellaneous improvements to the HVAC systems serving the training and weight rooms

This project improved the water quality and clarity as well as environmental conditions. The former high-humidity, odorous environment was replaced by ideal environmental conditions for swimmers and spectators.

The facility is now considered among the finest natatoriums in the nation.

PROJECT RELEVANCY

- Infrastructure improvements needed to reduce high building humidity and odors and to improve water quality
- Designed adequate air quality and water filtering systems and appurtenances

Rock Creek Sanitary Sewer Repair

Ann Arbor, MI

PROJECT DATES

2018

PROJECT VALUE

$231,000

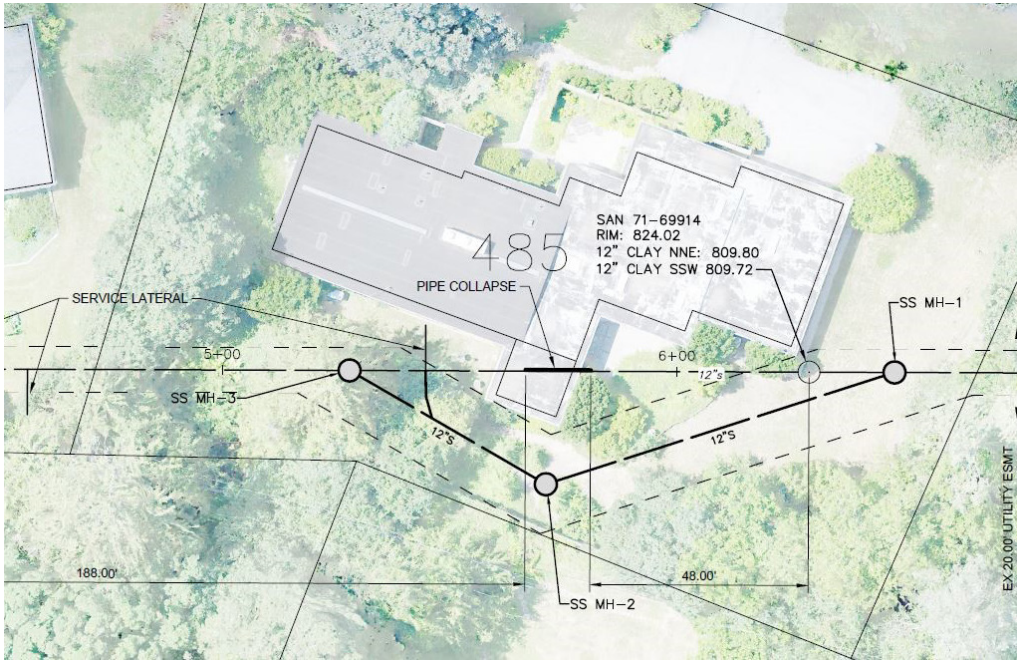
KEY STAFF

Brian Rubel, PE, PMP
Project Manager

CLIENT REFERENCE

City of Ann Arbor
Paul Matthews
Assistant Manager
4251 Stone School Road
Ann Arbor, MI 48108
734.794.6350, ext. 43386

In July 2017, the City of Ann Arbor discovered a pipeline beginning to collapse potentially located beneath a portion of a home addition. The home is in an area with unimproved streets posing significant accessibility concerns. There were multiple known issues with the sewer system in this area. Long-term plans to correct these problems with new sewers relocated into the road right-of-way were needed. Unable to accelerate these plans, the City needed a solution to remove a temporary bypass pump system that was relieving the collapsing sewer line.



The City completed CCTV inspections from each side, and the video was reviewed with several different trenchless construction companies to explore potential solutions. Conditions had progressed to the point where a trenchless option would not be feasible, and an open-cut repair would be required. Due to the location of the collapsed pipe section being beneath the home, a short portion of the sewer would need to be relocated. To preserve several mature trees on the property, a 90-foot-long portion of the sewer offset was to be installed using jack-and-bore construction methods.

Multiple meetings were held with the property owner to discuss construction alternatives and the need for a new, permanent easement. A drone was utilized to obtain site information for developing explicitly detailed site access and removal and restoration drawings.

Upon completion of the sewer relocation, the existing sewer portion was to be abandoned in-place and filled with grout. To avert any ongoing concerns about loss of soil beneath the structure above the sewer pipe, a geotechnical investigation was conducted and all voids beneath the structure were pressure grouted.

A field representative was on-site during construction to relay information to the homeowner/neighbors and to ensure the contractor worked within the limitations afforded through the contract.

PROJECT RELEVANCY

- Emergency Project
- Public Engagement
- Private Property Coordination

Ann Arbor Township Island Utility Plan

Ann Arbor, MI

PROJECT DATES

2018

PROJECT VALUE

$13,014

KEY STAFF

Brian Rubel, PE, PM
Project Manager

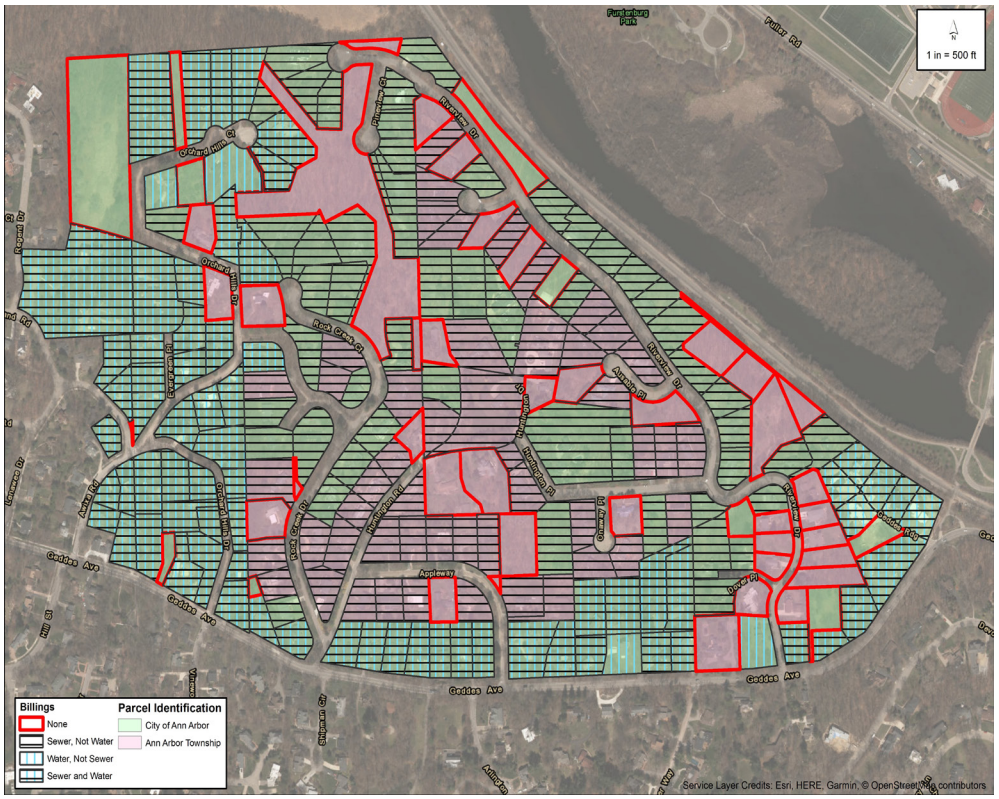
CLIENT REFERENCE

City of Ann Arbor
Troy Baughman, PE
Project Manager
301 E. Huron St.
Ann Arbor, MI
734.794.6430 ext.43798

There are numerous parcels within the current City of Ann Arbor limits that are under the jurisdiction of Ann Arbor Township and have not been annexed into the City. One of these areas is north of Geddes, west of Huron Parkway, south of the Huron River, and East of Orchard Hills.

Tetra Tech developed a comprehensive plan to provide sanitary and drinking water service to these parcels. One of the challenges to developing the plan was the lack of right-of-way to construct utilities. There are numerous shared driveways and private roadways to access the homes. Furthermore, some parcels receive utility service from utilities found within easements and the route and material of the lateral services are not well documented.

The City provided property information including City or Township status, sewer and water bills, as well as maps of all known utilities in the area for review.



PROJECT RELEVANCY

- Infrastructure planning
- Wastewater/potable water systems
- Water system modeling

Through this, utility needs were developed and several construction alternatives were reviewed to identify the most efficient and cost-effective routes for providing full utility service to the area. Tetra Tech utilized the City's water model to confirm the performance and sizes for the proposed system.

These improvements were then isolated into discrete, constructible projects. A project sequencing plan was subsequently developed and opinions of cost prepared. The work was successfully completed under an aggressive schedule to meet the City's FY20 capital improvement planning window.

Storm Sewer Asset Management Plan

Grand Rapids, MI

PROJECT DATES

2013

PROJECT VALUE

$350,000

KEY STAFF

Dan Christian, PE, DWRE
Project Manager

Jamie Brescol, PE
Modeling

CLIENT REFERENCE

City of Grand Rapids
Chuck Schroeder
Assistant Manager Environmental Services Department
1300 Market Avenue, SW
Grand Rapids, MI 49503
616.456.3625
cschroeder@ci.grand-rapids.mi.us

Tetra Tech updated the Stormwater Master Plan to meet transformation goals for this critical infrastructure. The City made investments to improve quality of life, while making wise financial decisions. The stormwater system was evaluated to prolong the life of assets, benefit quality of life in the community, and prepare the City for pending strict stormwater regulations.

The Master Plan update was completed in four months and identified the aspects most critical to developing a solid foundation for future actions. These components included establishing priorities based on stakeholder input and defining the criticality of various stormwater assets.

Community stakeholders provided input on performance expectations for the system, while the input of City staff identified activities that would enable them to keep the system functioning on a day-to-day basis. The plan considered the criticality of various assets, including the risk associated with inaction. The plan also considered each asset type and defined the impact of failure.

The five project elements included:

1. **Public Outreach –** Planned and implemented a public outreach program to solicit information and present findings during development of the Master Plan. We followed the principles that we developed under contract with the USEPA for watershed based planning programs.
2. **Asset Evaluation –** Tetra Tech considered each of the storm system components: pipes; ditches; streams; catch basins; pump stations; flood protection; and green infrastructure practices. This activity included conditions based on a limited sampling of assets and considered structural, capacity, and functional elements.
3. **Capital Improvements –** Alternatives and costs were developed on a unit basis for defining anticipated levels of investment. This included pipe lining or ditch stabilization actions, quantity of assets believed to be in poor condition, and resultant cost of rehabilitation.
4. **Stormwater Master Plan Update –** Updated integrated capital needs for asset sustainment into the broader objectives of the stormwater program. Plan was developed with the ability to update portions as conditions change.
5. **Technical Reference Manual –** Provided practical approaches to project implementation, standardizing activities, and gaining efficiencies. Due to the short timeline for completion, we focused on activities that would rapidly determine the condition of the stormwater system assets. We used ESRI® ArcGIS extension/add-on that leveraged the GIS, EAM/CMMS, and third-party data investments, and thus extended the functionality of the City's current work and asset management system. A major benefit of the software was the ability to quickly test multiple alternatives, so the information could be updated for rapid evaluation of assets.

A Capital Improvement Plan (CIP) was created based on the results of the Asset Management Plan (AMP). The CIP prioritized storm system improvements required during the next 20 years. An accurate and defensible AMP was the first step in creating a CIP. The AMP evaluated the assets and established a condition score, estimated remaining life, and probability and consequence of failure for each system element. The condition assessments ranked and prioritized each item. Tetra Tech confirmed the Level of Service preference through extensive interaction with the stakeholder group. The alternative analysis identified to increase the level of service, condition, and remaining useful life of the system.

PROJECT RELEVANCY

- Stormwater master plan update
- Asset management plan development
- Capital improvements plan
- Technical reference manual
- Level of Service (LOS)

Plymouth & Green Roads Water Main Replacement

Ann Arbor, MI

PROJECT DATES

2017

PROJECT VALUE

$100,000 (Fee)
$2,040,000 (Construction)

KEY STAFF

Brian Rubel, PE, PMP
Project Manager

Justin Voss, PE
Hydraulic Engineer

Kirk Pietila, PE
Transportation Engineer

CLIENT REFERENCE

City of Ann Arbor
Paul Matthews
Assistant Manager
4251 Stone School Road
Ann Arbor, MI 48180
734.794.6350, ext. 43386

The City of Ann Arbor experienced five separate water main breaks along a 12-inch diameter main located in Plymouth Road, a key corridor in and out of the City's northeast side and services a large volume of University of Michigan (University) traffic. After another water main break in August, 2016, the City retained Tetra Tech to provide design services to replace this water main at the critical intersection of Plymouth and Green Roads to avoid additional breaks.

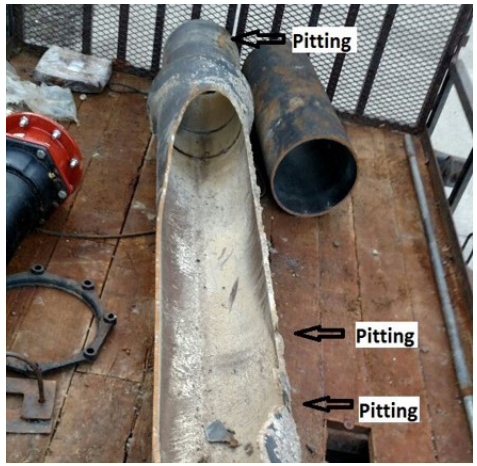
Tetra Tech quickly identified that traffic control would be the greatest project challenge. The City required maximum mobility be maintained at all times and provided a strict project construction window for reduced traffic lanes based on summer months with no school traffic. Because this intersection is near US-23, the project required MDOT's approval to address their traffic impact concerns and signage requirements along the US-23 exit ramps. Tetra Tech's design team worked closely with the City. The City's public engagement department contacted local businesses and communicated the needs and concerns of the University to Tetra Tech staff. They produced a traffic control plan acceptable to the City, MDOT and the University.

The water main experienced another break just west of the intersection midway through the design. The City decided to add 1,400 feet of 12-inch water main lining to the project, designed and specified by Tetra Tech.

Many of the valves located in and near the intersection were inoperable during design, and several of the pipe segments had never been isolated under the current water main configuration. To avoid any potential errors during construction sequencing, Tetra Tech proposed reviewing the hydraulic model of the City's system during the various interim construction conditions to ensure adequate supply flows could be maintained at all times and that no elevated pressures would be introduced to the system. Tetra Tech developed a detailed sequence of construction, including temporary water main line stops, to expedite the repair work. The final design alignment and valve locations were selected to accommodate future capital improvement plans to replace the water main.

The project was executed successfully and led to no additional service or traffic disruptions. The intersection was open to traffic within the proposed contract time. In total, approximately 1,350 feet of 8-, 12- and 16-inch water main and nine valves were replaced, and an additional 1,250 feet of 12-inch water main was lined.

Under a separate authorization, Tetra Tech completed a transient model of the water system. This analysis was conducted to determine the likely cause of the break and if modifications to the City's operating procedures were needed to control future failures. The analysis concluded that pipe corrosion (and not transients) was the likely cause of failure. This analysis was presented at the 2018 Michigan AWWA Conference.



PROJECT RELEVANCY

- Significant traffic control challenges
- Met City, MDOT and University of Michigan requirements

Recreational Facilities Design & Construction Management

Genoa and Oceola Townships, Livingston County, MI

PROJECT DATES

2010

PROJECT VALUE

$100,000

KEY STAFF

Gary Markstrom, PE
Project Manager

CLIENT REFERENCE

Oceola Township
William Bamber
Supervisor
1577 N. Latson Rd.
Howell, MI 48843
517.546.3259

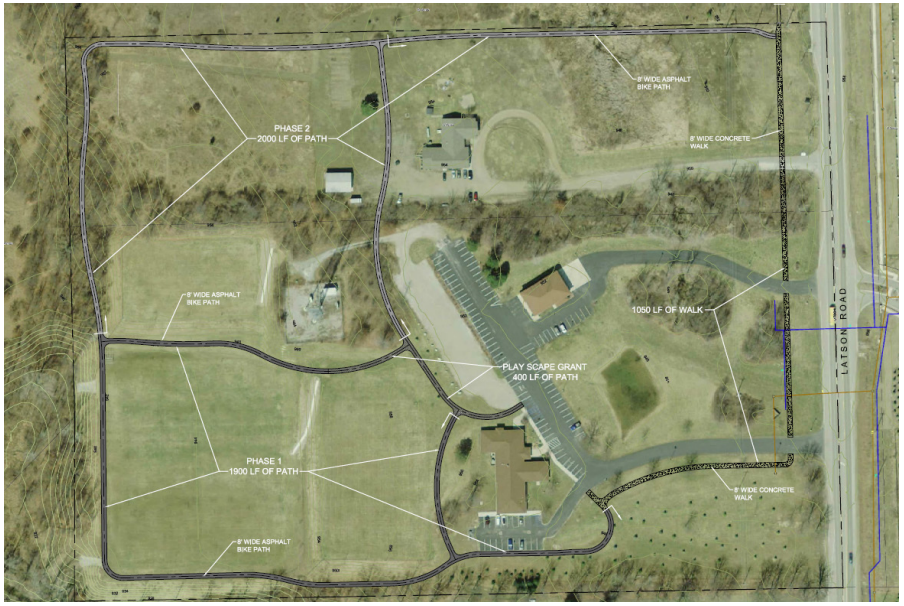
Tetra Tech has been involved in the conceptual planning, design and construction administration of municipal recreational facilities including soccer fields, play grounds, walking/bike paths and winter sledding hills.

In Genoa and Oceola Township, Livingston County, Tetra Tech provided all phases of engineering services to develop multi-field soccer facilities and walking trails at both Townships.

The soccer field contained an irrigation system. These facilities also include playground areas, pavilions and associated parking facilities for the users.

Significant grading and drainage improvements were necessary to create the athletic fields and ADA compliant access.

Tetra Tech has also provided conceptual master planning services for developing baseball fields and football/rugby fields on additional municipally owned lands in both Genoa and Oceola Townships.



PROJECT RELEVANCY

- Municipally owned soccer field (2-Genoa Township, 3-Oceola Township)
- Walking/Bike trails around facility
- Playscape at Genoa Park with Pavilion

Wastewater Asset Management Plan

Adrian, Brighton, Dundee, Tecumseh, Marine City, Souther Clinton County Municipal Authority, Ypsilanti Communities Utility Authority, MI

PROJECT DATES

2014-2019

PROJECT VALUE

$5,000,000

KEY STAFF

Brian Rubel, PE, PMP
Project Manager (Adrian, Saline, Tecumseh)

CLIENT REFERENCE

Will Sadler
Utilities Director
135 E. Maumee St.
Adrian, MI 49221
517.264.4821

PROJECT RELEVANCY

- Evaluation of relevant assets (sanitary sewer collection system, WWTP)
- AMP ensures WW system sustainability

Tetra Tech completed asset management plans with the following scopes of work:

Asset Inventory and Condition Assessment

Collection System Inventory: Each sanitary/combined sewer manhole was visited to measure pipe sizes, obtain pipe materials, inverts, and to determine manhole construction materials. Data was entered into the community's GIS package.

WWTP Inventory: A comprehensive list of facility assets was compiled.

Collection System Condition Assessment

Pipe and Manhole Condition: Cleaning and televising of representative sewer was subcontracted. This covered the older and most suspect pipes. Inspection results were recorded using Pipeline Assessment Certification Protocol (PACP) procedures, and sewers were rated using PACP guidelines. Manhole conditions were determined using Manhole Assessment and Certification Protocol (MACP). In several communities, a manhole scanner was used to take photographic and dimensional records of each structure.

Pump Station Evaluation: Each station was visited and the condition visually inspected. Pump stations were assigned condition codes using, "Asset Management Plan Workbook for Water Utilities," as listed on the MDEQ asset management web page.

Asset Inventory and Condition Assessment Software: Met with the community to review AMP software compatible with the community's GIS. The software allowed the O&M data to be recorded and be used to generate work orders.

Sewer Metering/Modeling: Assessed wet weather flows using this data and prepared a calibrated model of the sanitary sewer system. Model replicated conditions for EGLE's 25-year, 24-hour design storm for sanitary sewer systems and identified any capacity deficiencies to be addressed. Alternatives to control the wet weather flows to be developed.

Level of Service: LOS involved setting utility goals and reviewing with client. Input was sought from the public regarding expectations and needs for the utility. Tetra Tech led a public engagement program to educate sewer users on wastewater and sewer policy and to solicit comments regarding the wastewater system and developing AMP. Handouts and web pages were created for client use. We assisted in enhancing the community's sewer use ordinance. We researched means to strengthen the City's authority to control fats, oils, and grease contributed to the sewer system. To address the community's concerns with industrial contributions and their impact on the WWTP, the industrial pretreatment ordinance was updated by performing headworks loading calculations and determining allowable local limits.

Criticality of Assets

Condition Rating: A condition rating was developed for each asset based on the data collected, visual inspections, and information provided by community staff.

Probability and Consequence of Failure Ratings: The condition rating, combined with other factors such as performance, reliability, and parts availability was used to determine a probability of failure. Additionally, a consequence of failure rating will be determined for each asset. The probability and consequence of failure ratings was combined to determine a business risk exposure rating. Asset redundancy was also reviewed and applied to the criticality rating if applicable.

Prioritization: The business risk exposure rating was used along with the probability/consequence of failure ratings to develop a priority list for all assets.

Capital Improvement Plan

Each project concluded with the development of a 5-year and 20-year CIP. Tetra Tech worked closely with each community to develop an affordable plan and updated utility rate models to assist in demonstrating affordability to elected officials. Tetra Tech also used comparisons to other communities and EPA guidance to allow client staff to further demonstrate affordability.

Water Meter Replacement

Various Locations

PROJECT DATES

2010-2020

PROJECT VALUE

Varies by Project

KEY STAFF

Gary Markstrom, PE
Project Manager

CLIENT REFERENCE

City of Brighton
Greg Tatara
Utilities Director
2911 Door Rd.
Brighton, MI 48116
810.227.5225

Tetra Tech provides smart water solutions from intelligent master planning, to SCADA solutions; from smart grids to data analytics. We assist government agencies with intelligent water enhancements that address reliability, safety, and system optimization. We are well versed in the progressing field of water meter technology. We assist municipalities with water meter auditing, condition assessment replacement, program and construction management, and data management.

Tetra Tech has provided multiple meter projects under Collier County, FL Public Utilities Department (PUD) on-call services contract, including the initiation of a Meter Accuracy Program (Program) . Tetra Tech developed a Program to test the meters in the system. The Program requires the periodic field testing of approximately 10 percent of the meters 2 inches and smaller in the water system. Testing is conducted using a combination of MUN-1 Utility Service Analyzers and PUD's bench testing facilities. Since the Program initiation, PUD has implemented processes and activities to improve the overall accuracy of system meters and systematically verify meter data in the Customer Information System. In addition, PUD is in the process of completely changing out customer meters. Tetra Tech assisted PUD with planning and procurement for an Automatic Meter Reading (AMR) to Advanced Metering Information (AMI) System Conversion Program. PUD desires to procure and standardize the ongoing operation of the County's AMR system in two phases: (1) implementation of a small-scale AMI system for a period of one year to enable the County to evaluate AMI technology; and (2) ongoing operation and replacement of meters from 5/8 to 2 inches in diameter with either AMI or AMR technology depending upon phase one results.

As Owner's Engineer for the Eagle Pass Water Works System, TX, Tetra Tech has provided engineering services for the Meter Replacement Program, including: condition assessment; feasibility study; preliminary design and performance specification development; manufacturer coordination and qualification-based procurement; construction and funding support; and program management. Three alternatives were considered for meter replacement: replacement with identical meters; replacement with remote read/automatic read meters; and no replacement. Remote read/automatic read meters were the selected alternative.

For the MHOG Water Authority in Livingston County, Tetra Tech guided the Authority in customer meter selection. We assisted the Authority in budgeting and scheduling meter installation. The meter program was completed on-time and has been reliably serving MHOG for more than 20 years.

PROJECT RELEVANCY

- Three communities served

Wings & Waves Aquatics Facility

McMinnville, OR

PROJECT DATES

2012

PROJECT VALUE

$101,000,000

KEY STAFF

Bill Paison, PE, LEED, AP
Electrical Engineer

CLIENT REFERENCE

Hoffman Construction Company
Dave Garske
805 SW Broadway, Suite 2100
Portland, OR 97205
503.221.8811
dave-garske@hoffmancorp.com

Tetra Tech developed full construction documents using the design/bid/build process for the Wings & Waves Aquatic Facility—Oregon's largest indoor aquatics facility. The enclosed, climate-controlled, chemically balanced, temperate, ventilated facility features a 91,000-gallon pool and numerous interactive structures, such as climbing walls. The facility also houses administrative areas and an attached hotel. The team's services additionally included full design of a neighboring aviation museum and lodge. Collectively, the facilities constitute the Evergreen Aviation Complex. Tetra Tech provided mechanical, electrical, value engineering, and construction-phase services.

The facility is a Type 1B, fully sprinklered building composed of concrete foundations/basement, concrete tilt walls with exposed aggregate finish, insulated exterior glazing and skylight system, steel roof structure, single-ply roof membrane and a metal panel fascia. Interior and exterior columns are structural steel wrapped with an aluminum panel system. Floating above the roof on a steel gantry structure is a decommissioned Boeing 747 aircraft, which serves as the entry to four of the ten water slides.

The ground floor is 45,000 sf, containing pools and slides, toilet/shower rooms, lockers, lifeguard area, and administrative and support spaces. Two stairs and one hydraulic telescoping elevator provide access to the basement and to the mezzanine spaces. Directly north of the building is an exterior mechanical yard where air handling units, dehumidifiers and other equipment are housed behind 12'-15' high concrete tilt panels with steel support framings.

Tetra Tech designed a 70,000-sf aviation museum and an approximate 170,000-sf lodge for this amusement-style park. The facility features 2500-amp service at 480/277V, 3-phase, 4-wire; and 10.5KVA inverter for all emergency lighting. Lighting on the pool deck and areas open to the pool deck are natatorium-rated to keep the fixtures safe from the pool chemicals and corrosion.

315W HID prismatic high bay pendants, UL listed for wet location, are hung in groups of four or five to provide uniform lighting levels on the pool deck. Most of the electrical load support the pool equipment and mechanical loads.

Using CFD, Tetra Tech was able to analyze the air-distribution effectiveness throughout the aquatics facility and make adjustments to airflow quantities at the pool surface and perimeter windows to limit energy use and condensation. The model was also used to reduce overall air changes by 30 percent, saving more than $250,000 in air handlers and ductwork.

PROJECT RELEVANCY

- Design of aquatic facilities
- Design of mechanical system providing proper dehumidification in pool area to prevent condensation on enclosure structure and limit rate of evaporation and pooling of chloramine near pool surface

Barton Water Main Location

Ann Arbor, MI

PROJECT DATES

2018

PROJECT VALUE

$21,400

KEY STAFF

Brian Rubel, PE, PMP
Project Manager

CLIENT REFERENCE

City of Ann Arbor
Paul Matthews
Assistant Manager
4251 Stone School Road
Ann Arbor, MI 48180
734.794.6350, ext. 43386

The City of Ann Arbor's WTP is primarily supplied with raw water from Barton Pond on the Huron River. The WTP is fed water from the intake pump station originally through a 24-inch cast iron water main, which was supplemented with a 42-inch pre-stressed concrete cylinder pipe water main to meet increasing demands in 1965. Problems with air entrapment during the re-filling of the 24-inch water line after repair work had City crews contemplating installing an air release valve on the main; however, no clear records existed for the water line locations.

Tetra Tech developed a work plan to locate and map the water lines. A graduated approach was suggested to maximize the usefulness of existing information and minimize project costs. Tasks would begin with investigations of existing documents, then proceed to field verification and location, then re-mapping of the mains if necessary.

The City had record drawings from the 1965 installation, as well as legal descriptions of the easements obtained for each main. Tetra Tech surveyors set control field control, and using the metes and bounds survey description, drew the water lines in AutoCAD and generated coordinates for locating key features of the mains in the field. This effort was successful, as the descriptions were accurate enough to locate the main using standard GPS equipment.

Due to the route crossing the heavily wooded Bird Hill Park nature conservancy, field location was quite difficult. Tetra Tech used an aerial drone to capture mapping with no foliage, which made key landmarks and reference features visible. The digital mapping was then overlaid on the map and provided to the City.

Since additional location efforts were not needed, the City asked that Tetra Tech use the remaining budget to explore options for inspecting and assessing the condition of the existing mains, and options for potential rehabilitation methods. Tetra Tech contacted and consulted with three inspection companies, receiving proposals for various cutting edge inspection technologies so the City can better evaluate how to address these critical assets in the future.

PROJECT RELEVANCY

- Cost-effective Approach
- Survey/Aerial Drone
- Technology Assessment

Water Meter & Reading System Replacement

East Lansing, MI

PROJECT DATES

2021-present

PROJECT VALUE

$301,200

KEY STAFF

Vic Cooperwasser, PE
Project Manager

Justin Voss, PE
Hydraulics Engineer

Bill Paison, PE, LEED AP
Electrical

CLIENT REFERENCE

City of East Lansing
Nicole McPherson, PE
Deputy Director of Public Works
410 Abbot Rd.
East Lansing, MI 48823
517.319.6928
nmcpherson@cityofeastlansing.com

The City of East Lansing decided to invest in new remote-read meter system. Tetra Tech was retained to develop a Request for Proposals, analyze bids, and provide one year of support during construction to replace the City's water meter and reading system with a fully automatic meter reading (AMI) system. This project was needed because:

- The City was having difficulty with meter and radio suppliers. The reading hardware company was sold to another company and the radio company went out of business
- The existing meter reading system was failing. A portion of the existing radios were inoperable and required battery replacements. The City could not obtain replacement radios
- The radios were not communicating with the City's financial software

Project benefits included:

- Piggy-backing the cross-connection and lead/copper rule compliance program when properties are accessed to replace meters (typically in the basement) to allow them to proceed with the customer plumbing material survey required by EGLE
- Provided for more granularity for residents with high water bills
- The new system will seamlessly interface with the City's financial accounting system

The original project had three components:

1. RFP Development: Prepare a Request for Proposals (RFP) for the City to issue to select a contractor to replace the City's water meters and meter reading system and, while this work is being done, complete water service lines, interior plumbing material, and cross connection control surveys.
2. Issue RFP and Review Proposals: Assist the City in evaluating the proposals, making a recommendation for contract award, and negotiating a contract with the contractor.
3. Implementation Phase: Assist the City during the first year of the work implementation on an as-needed basis.

Subsequently the City decided to apply for a low interest Michigan State Revolving Fund (SRF) loan to pay the capital cost of replacing the meters and installing the new meter reading system, estimated to be $7 million. Tetra Tech prepared the required Clean Water SRF Project Plan for the City's submittal to the Michigan Department of Environment, Great Lakes, and Energy (EGLE).

PROJECT RELEVANCY

- Comprehensive meter replacement
- Low interest loan

LFUCG Detention Basin Maintenance Program

Fayette County, KY

PROJECT DATES

2002-2003

PROJECT VALUE

$90,000

KEY STAFF

Richard Walker, PE
Project Manager

CLIENT REFERENCE

Lexington-Fayette Urban County Government
Greg Lubeck, PE
Project Manager
101 E. Vine St.
Lexington, KY 40507
859.258.3446

Tetra Tech conducted an evaluation of approximately 50 privately owned detention basins in residential areas in Fayette County. The purpose of the project was to address complaints from citizens and neighborhood associations about their ownership and maintenance responsibilities.

The work included completing a checklist during a field investigation to record erosion problems, standing water, and repairs that needed to be made to the spillway and embankment.

Photographs were taken of each pond and the plat was reviewed at the county clerk's office to determine who owned the basin. Tetra Tech prepared a cost estimate for making the necessary repairs to each basin and the annual maintenance costs for each basin.

Tetra Tech assisted the LFUCG with developing a comprehensive plan for systematically upgrading the management of existing detention basins and retention ponds in the county. The plan included the following:

- Procedure for citizens and neighborhood associations to petition the LFUCG to take over ownership and maintenance of their basins
- Corrective action plan to make repairs to basins
- An ongoing maintenance program conducted by the LFUCG
- An ongoing inspection program for each basin conducted by the LFUCG
- Matching grant program to help citizens and neighborhood associations maintain retention ponds.

The program was enthusiastically supported and implemented by the Urban County Council.

PROJECT RELEVANCY

- Evaluation of approximately 50 privately owned detention basins in residential areas

Wheeler Center Lighting Improvements

Ann Arbor, MI

PROJECT DATES

2022-2023

PROJECT VALUE

Engineering: $11,824

KEY STAFF

Brian Rubel, PE
Project Manager

Russ Strassburg, PE
Lead Engineer

CLIENT REFERENCE

City of Ann Arbor
Kyle Pettibone
Engineer
301 E. Huron Street
Ann Arbor, MI
734.794.6350, ext. 43318
kpettibone@a2gov.org

The Wheeler Center houses Ann Arbor's DPW operations. The building reached an age where hundreds of interior and exterior electric lamps needed replacement. Additionally, improvements such as a new lighting controller and new occupancy sensors were needed.

Tetra Tech collaborated with DPW staff to prepare bidding documents for the work. A significant effort was placed in recruiting electrical contractors to bid. Two bids were subsequently received and Tetra Tech assisted in evaluating the bids using Ann Arbor's new contractor scoring system.

The project will soon be awarded to the highest scoring contractor and the Wheeler Center working environment will be dramatically improved.

PROJECT RELEVANCY

- Project completed on time and within engineering budget
- Familiarity with Wheeler Center infrastructure

Wheeler Center ADA Improvements

Ann Arbor, MI

PROJECT DATES

2018

PROJECT VALUE

Engineering: $9,527

KEY STAFF

Brian Rubel, PE
Project Manager

Daniel Warren, PE
Lead Engineer

CLIENT REFERENCE

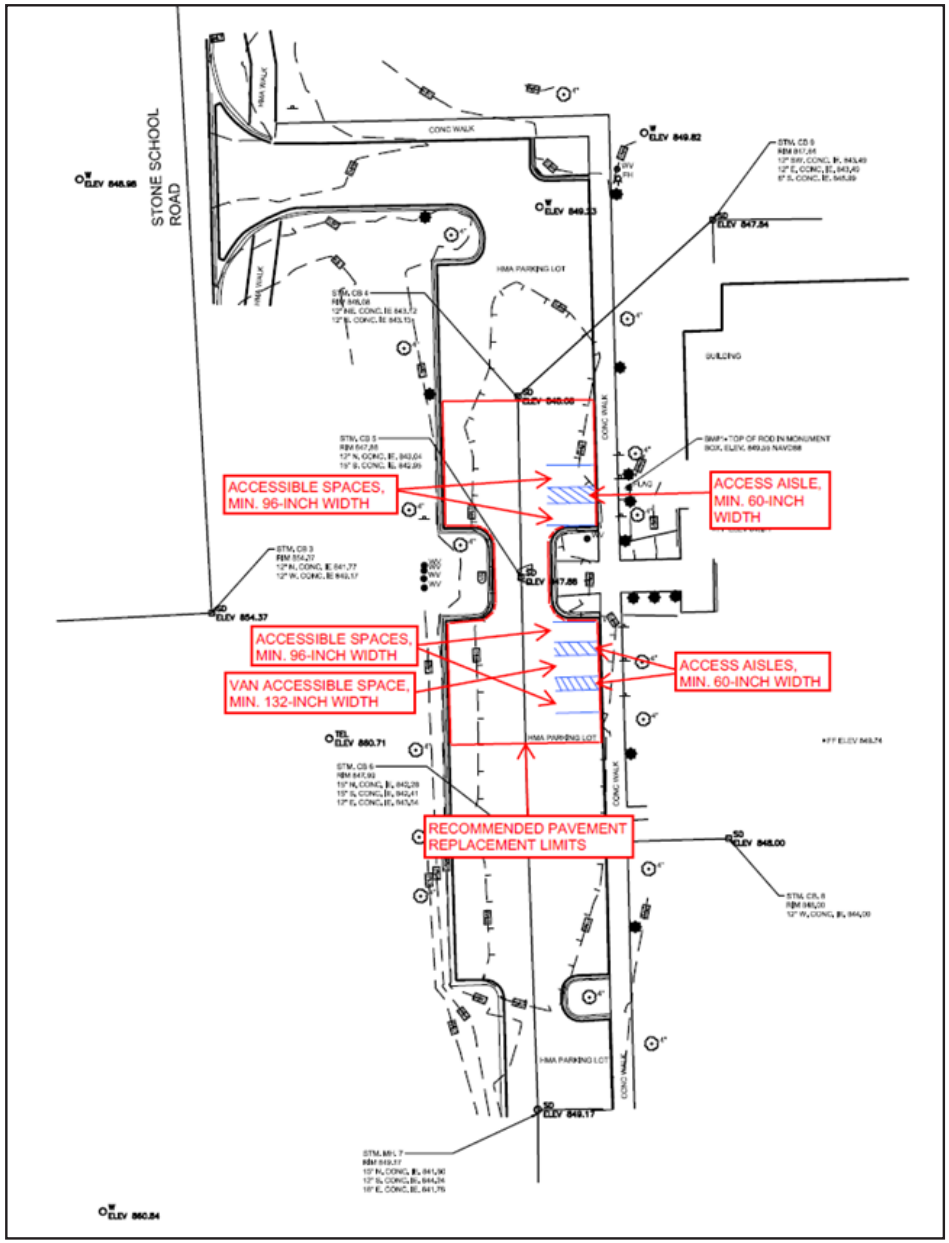
City of Ann Arbor
Paul Matthews
Assistant Manager
4251 Stone School Road
Ann Arbor, MI 48108
734.794.6350, ext. 43386

The Wheeler Center had an audit conducted to assess compliance with the Federal ADA Act requirements for access. The audit showed that much of the parking lot and sidewalk entrances were not in compliance

In response, Tetra Tech prepared design documents to revise the facility. Both concrete and bituminous pavements were revised. Revisions were primarily to flatten slopes, improve ramps, and re-stripe parking areas. The construction was completed by one of the City's as-needed construction contracts.

PROJECT RELEVANCY

- Project completed on time and within engineering budget
- Familiarity with Wheeler Center infrastructure



Midtown Booster Station

Ann Arbor, MI

PROJECT DATES

2019-present

PROJECT VALUE

Engineering: $40,000

KEY STAFF

Brian Rubel, PE
Project Manager

Justin Voss, PE
Water System Analysis Engineer

Roger Kaliman, PE
Process Engineer

Andy Turbett, RA
Architectural

Mitch Graf, PE
Mechanical Engineer

Bill Paison, PE, LEED AP
Electrical Engineer

CLIENT REFERENCE

City of Ann Arbor
Brian Steglitz, PE
Public Service Administrator
Water Treatment Services Manager
919 Sunset Rd.
Ann Arbor, MI 48103
734.794.6426
water@a2gov.org

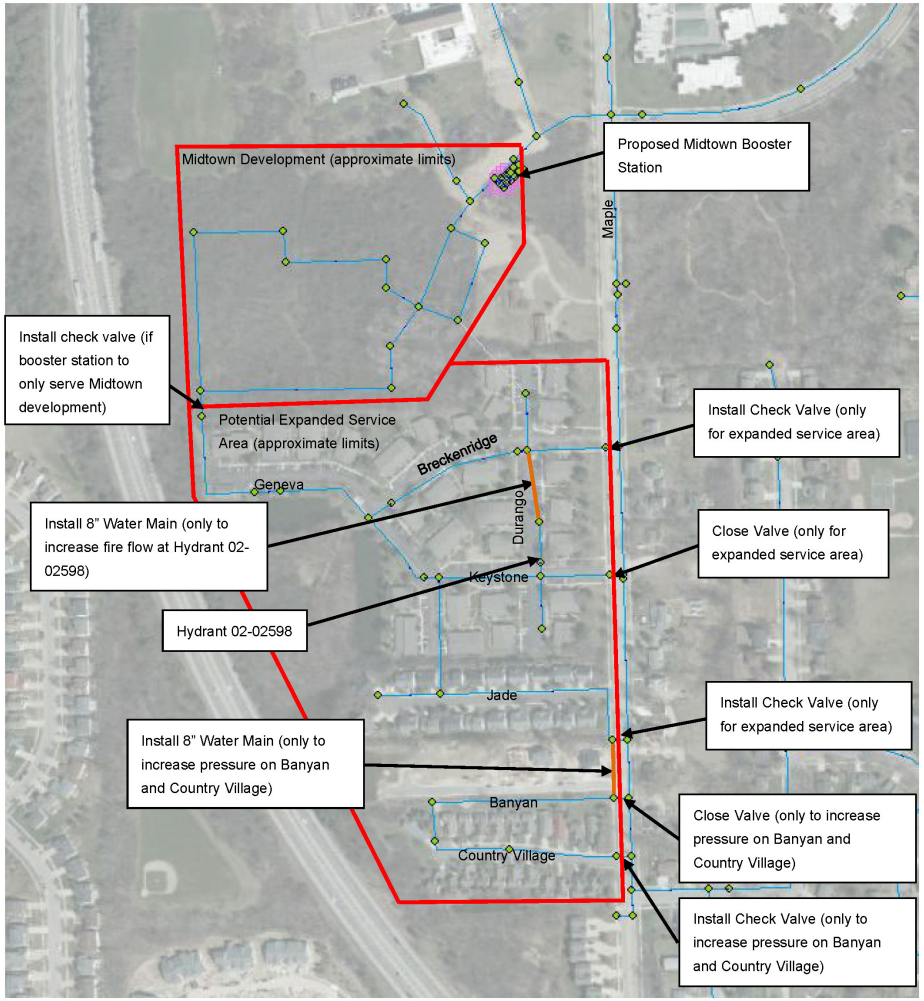
Troy Baughman, PE,
Systems Planning
301 E. Huron St.
Ann Arbor, MI
734.794.6430, ext. 43798
tbaughman@a2gov.org

The Midtown Development is located on one of the highest ground elevations in Ann Arbor. A booster pump station is needed to provide adequate pressures and fire flow to the development. This was also an opportunity to improve service to some existing residential development next to the new development.

Tetra Tech was retained by the City to review the developer's proposed pump station design. These reviews consisted of architectural, mechanical, process and electrical reviews to ensure the completed station, which would be owned and operated by the City, met the long-term needs of the city. Tetra Tech collaborated with Water Treatment Plant staff throughout the project reviews and relied upon Tetra Tech's experience designing previous complex systems with the City.

Concurrent with this review, Systems Planning staff requested Tetra Tech's assistance to validate the improvements expected in the adjacent existing system which would be improved by the proposed station. Tetra Tech utilized the City's InfoWater model to analyze the improved pressure and identify control valves needed in the distribution system. This result was summarized in a brief report.

The design is nearing completion and construction of this improvement with start later this year.



PROJECT RELEVANCY

- Use of City's water system
- Comprehensive water system model design review

Capital Improvement Funding

Ann Arbor, MI

PROJECT DATES

2022-present

PROJECT VALUE

$50,000

KEY STAFF

Brian Rubel, PE
Project Manager

The Ferguson Group Staff

CLIENT REFERENCE

City of Ann Arbor
Skye Stewart
Systems Planning
301 E. Huron St.
Ann Arbor, MI
734.794.6430, ext. 43105
skstewart@a2gov.org

The City of Ann Arbor wished to capitalize on existing and future state and federal grant assistance. Tetra Tech teamed with The Ferguson Group (TFG), federal lobbyists and funding experts, to form a team of Michigan and federal funding experts to serve the City.

The project focuses on five major capital need areas. On a quarterly basis, Tetra Tech and TFG updates funding opportunities for each of these five needs and disseminates a memo describing the available funding opportunities and key dates. From this, city staff can determine whether to invest additional effort (staff or consultant) in preparing grant applications.

A key component of these memos is identifying emerging programs from the Infrastructure Investment and Jobs Act for which Ann Arbor may wish to pursue.

PROJECT RELEVANCY

- Knowledge of City's Capital Improvement Plan
- Identification of emerging funding opportunities

Gravity Sewer Rehabilitation & Replacement, Phases I & 2

Kissimmee, FL

PROJECT DATES

2016-present

PROJECT VALUE

$162,000 (Phase 1 Fee)
$523,000 (Phase 2 Fee)
$6,120,000 (Construction)

KEY STAFF

Alex Montalvo
GIS Asset Manager

CLIENT REFERENCE

Tohopekaliga Water Authority
Tim Noyes
Asset Manager
951 Martin Luther King Blvd.
Kissimmee, FL, 34741
407.944.5040
tnoyes@tohowater.com

PROJECT RELEVANCY

- $82M WIFIA funding
- GIS automation of rehabilitation plans and budgeting
- Over 10 miles of sewer rehabilitation

The maintenance cost related to operating Tohopekaliga Water Authority (TWA)'s wastewater collection system, were becoming of concern. Emergency calls and repairs were consuming most of the annual maintenance budget, leaving limited funds for preventative system maintenance.

Tetra Tech partnered with TWA oversee the Gravity Sewer Rehabilitation Program as the engineering program manager focused on gravity sewer system improvements in areas previously prioritized based on risk of failure. As part of this contract, Tetra tech is providing survey, design, permitting, bidding, construction management, and funding compliance for Phases 1 and 2, totaling over 550,000 LF of sewer. Tetra Tech also assisted in obtaining a $82M Water Infrastructure Finance and Innovation Act (WIFIA) Loan to continue with the program execution. Additionally, we've integrated GIS and asset management tools to create customizable dashboards for TWA to see project progress.

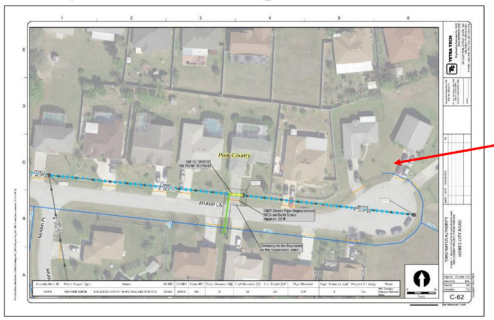
TWA maintenance crews targeted several areas of their system, including downtown Kissimmee and Poinciana, with an aggressive inspection program including sewers and manholes in these areas. Their crews had amassed over 550,000 feet of sewer inspections and several hundred manhole inspections before contracting with Tetra Tech to evaluate, make recommendations, and complete a preliminary design report for repairs. Inspections used the National Sewer Service Company Pipeline Assessment Certification and Manhole Assessment Certification Program (NASSCO PACP and MACP) standards.

To take advantage of available loan funding, TWA had to have construction contracts executed by 2017, leaving little time to complete the evaluations, recommendations, and prioritization of projects. Tetra Tech developed a method for compiling the PACP and MACP database information and displaying the defect spatially using TWA's sewer collection system GIS maps. To meet tight time constraints for review of the inspections, Tetra Tech had several NASSCO-certified engineers simultaneously working on the project using a web-based version of the GIS mapping. The map was set up to symbolize based on different potential recommendations, including replace, point repair, and cured-in-place pipe (CIPP) lining. A senior engineer QA/QC the work and accepted the recommendations.

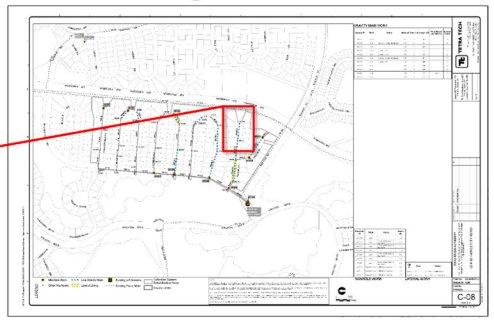
In recent years, Tetra Tech has automated a GIS process to assess, prioritize, budget, and plan future projects from obtained CCTV data and maintenance work orders. This has allowed the client to select projects and reduce consultant fees more objectively.

The solution that Tetra Tech developed fully automates the data collection (from vendors), database storage, and rehabilitation identification and prioritization. The workflow involves utilizing software packages (Info360) from Innovyze (now AutoDesk) to follow a customized flowchart that leads to the evaluation of rehabilitation techniques and a sort through all records to prioritize the needs within the system. From this automation, staff can briefly review and promptly prepare work orders and construction drawings for construction contractors.

Open Cut – 20 ft Sag and Lateral



CIPP Lining and MH Seal and Coat



WWTP Expansion & Secondary Treatment Improvements

Saline, MI

PROJECT DATES

2022-Present

PROJECT VALUE

$2,600,000 (Fee)
$62,000,000 (Construction)

KEY STAFF

Brian Rubel, PE, PMP
Project Manager

Pete Daukss, PE
QA/QC

Brent Bode, PE
Process Design Engineer

Bill Paison, PE, LEED AP
Electrical/SCADA Engineer

Alan Flak, PE
Structural Engineer

Andy Turbett
Architect

CLIENT REFERENCE

City of Saline
Colleen O'Toole
City Manager
100 N. Harris St.
Saline, MI 48176
734.429.4907
cotoole@cityofsaline.org

Saline provides dozens of public services including wastewater treatment for approximately 9,500 residents. The Saline WWTP was nearing design capacity and needed to be expanded. In addition, much of the infrastructure was beyond the useful life, and substantial facility improvements were needed to sustain the WWTP over the next 20-year planning horizon. The proposed WWTP facility improvements were developed to provide a 4.0 MGD average daily flow capacity.

Tetra Tech was retained by the City to design the selected WWTP improvements and to prepare the construction contract documents for a Design-Bid-Build project delivery method. The proposed improvements utilized the WWTP treatment processes and infrastructure as much as possible. Improvements include a new Headworks building with influent screening and pumps, equalization basin, primary clarifier improvements. The secondary treatment expansion utilized an activated sludge treatment process with new aeration tanks, Blower/RAS pumping building, secondary clarifier improvements and expansion, digester improvements, along with other facility and solids handling improvements. The expansion utilized the existing anaerobic digestion system to provide stabilized biosolids that will allow for flexibility of disposal either at landfill or land application.

A key component of the project was to provide a solar electric generation facility. This was an important project for the Saline City Council to demonstrate a sustainable energy commitment to the community. Tetra Tech developed a performance specification to allow solar equipment vendors to compete.

The project will soon bid and the solar project is a key contributor to a large project where every component assists in protecting the environment.

PROJECT RELEVANCY

- Renewable energy generation
- Project and staff local to Ann Arbor

20-Year Water System Master Plan

Quincy, MA

PROJECT DATES

2019-Present

PROJECT VALUE

$225,000

KEY STAFF

Justin Voss, PE
Project Engineer

CLIENT REFERENCE

City of Quincy
Paul Costello
City Engineer
Public Works Building
55 Sea Street
Quincy, MA 02169
617.376.1950
pcostello@quincyma.gov

Tetra Tech is developing a 20-Year Water Master Plan for the City of Quincy Engineering Department. The City is a coastal city directly south of Boston with an estimated population of 102,000. The City is experiencing significant redevelopment and population growth and intends to plan for water system improvements. Due to aging infrastructure and other factors, the City has experienced numerous water main breaks. The 20-Year Master Plan intends to provide a water system rehabilitation/ replacement program to address breaks. As part of the project, Tetra Tech is responsible for assessing the water distribution system, system demands and future needs, confirming system dynamics, and determining the cause of numerous water main brakes. Tasks include:

- Water system GIS data layer updates
- Review, update, and calibration of Innovyze InfoWater water system hydraulic model
- Data collection, including MWRA meter data, record drawings, City pressure gage data, perform hydrant flow tests,
- Hydraulic model revisions to reflect current/future conditions
- Review of system unaccounted for water with recommendations for reduction
- Perform various model scenarios to assist with various developments within the City
- Water age analysis
- Water main flushing program development
- Consideration for long-term corrosion protection
- Development of a risk model establishing various Quincy specific "risk" of failure and "consequence" of failure factors
- Water booster station and storage tank review
- Final development of a 20-year water system capital improvement plan

The plan was completed in September 2022, but the City has already implemented some of the recommendations of the report.

As part of the project, Tetra Tech served as a water system on-call engineer where numerous current and future development scenarios were processed to confirm water system availability, pressures, and fire flows that will serve large scale developments. A significant effort went into updating and maintaining the City GIS water system data layers. As a result, the City considers Tetra Tech an extension of the GIS department and will contract us on an annual basis for GIS and hydraulic model updates.

The total capital investment developed for the 20-Year Water Master Plan is estimated at $115M. This measured plan will improve the City's short and long-term water distribution system and address system reliability, non-revenue water and future water demands.

PROJECT RELEVANCY

- Develop a 20-Year Water System Master Plan to address city-wide system reliability, non-revenue water, and future water demands
- Developed a risk model to prioritize improvements

Central Transfer Station

Anchorage, AK

PROJECT DATES

2019-Present

PROJECT VALUE

Engineering: $11,724,574

KEY STAFF

Douglas Allen, PE
Project Manager

CLIENT REFERENCE

Michael Rhodes
Manager of Engineering and Planning
Municipality of Anchorage
Solid Waste Services
1111 E. 56th Avenue
Anchorage, AK 99518
907.343.6250

As Anchorage continues to grow in population, the need to make systemic operational efficiency improvements to the City's rapidly filling Anchorage Regional Landfill (ARL) and replace 30+ year old aging infrastructure becomes priority. The 2018 SWS Integrated Solid Waste Master Plan (Plan), completed by Tetra Tech, identified the need for a new Central Transfer Station (CTS) which improves safety, customer service, efficiency and materials management, and provides long-term resource management that results in both extending the life of Anchorage Regional Landfill and improving overall environmental stewardship.

Tetra Tech partnered with the Department of Solid Waste Services (SWS) for the conceptual design, final design, and construction support services for the new CTS campus including a new transfer station, administration, maintenance and warm storage building, and public drop-off facilities. Our scope includes site layout, structural, mechanical, electrical, plumbing, commissioning engineering as well as public outreach to create a facility that incorporates flexibility, technology, adaptability, and expansion capability of the spaces for ease of potential future changes.

The new campus consists of eight facility buildings, including the new 75,000 square foot transfer station building which is double the size of the existing facility. The new facility will be fully enclosed which reduces sound, odor, and wind-borne debris from the public. The new administrative building includes offices for SWS management, finance and engineering for on-site management and direct access for immediate campus needs. Other elements include:

- Maintenance building with 6 bays, a parts shop, lube room, and overhead bridge crane.
- Warm storage facility for 20 collection vehicles
- Underground tunnel with warm storage for six vehicles overnight
- Thermal panels on the south side of building to heat water for the radiant floor system in the winter and domestic water in the summer.

Public accessibility and safety are also top priority for this project. As such, a separate access road is provided for commercial vehicles to create separation of commercial activities sand the general public. Residential access is provided through three queuing lanes and two transaction booths, providing faster que times. Additionally, the new facility includes 18 customer unloading zones and larger drive paths for large vehicle mobility and accessibility.

Tetra Tech is also working with SWS for repurposing the existing CTS site as Anchorage's recycling drop off and collection center. The existing administration and maintenance building would be used to house a bailer for bulkier metals and plastic items. The existing TS building would be used for commercial wood and tires, organics, and bulk cardboard with a shredder added to the floor to better densify material before going to the landfill. Located in the middle of the site would be a residential recycling drop-off facility – a covered canopy configured to accept 10 different types of commodities from the public. And lastly, a proposed building that would be used for receiving and bundling various types of fiber such as office paper, mixed paper, newsprint, and corrugated fiber.

PROJECT RELEVANCY

- Solid waste management
- Recycling facility

C Proposed Work Plan

Our Philosophy can best be described as:
Listen, Think, Act, Adjust.

We organized this section by major services offered. We start with an overview of our project management philosophy followed by more detailed descriptions of the technical discipline approaches. Tetra Tech anticipates that the City will contract directly for material testing services, but we have relationships with these firms should the City desire us to subcontract these services.

PROJECT MANAGEMENT

A. Staffing & Personnel

Staffing and personnel were discussed in Section A. Additional thoughts on our vision for working with the City of Ann Arbor are provided below.

Project Management

Tetra Tech delivers our commitment to be available 24/7 to the City. Tetra Tech's approach to each project has the same bottom-up methodology—we complete each service entirely focused around the needs and constraints of our clients.

Listen: Each project Tetra Tech completes is a custom project soley focused on meeting the specific needs of each client. Therefore, we will initiate each project by listening to the needs of the citizens, businesses, elected officials, and staff who will be using the completed project. We recognize that these individuals will be using the completed project long after the consulting engineer has finished. Therefore, our project execution must be based on the needs of the project users.

Think: A successful project must be properly conceived and studied or designed only once. Therefore, we must carefully plan the work and work our plan. Each project begins with a detailed work plan prepared by a senior discipline leader. This way the proper, most efficient procedures can be implemented throughout the development of the project. While most projects we envision for the City will be completed by Michigan-based staff, this could involve the use of national experts if the project is especially complex or unique.

Act: This step involves the study, design, or construction of the project. Each engineering step is done under the guidance of a senior engineer. Although we do use junior engineers to help lower costs, the supervision of a senior engineer ensures the completed project is technically sound, on time, and within budget. We have also included a description within this submittal outlining Tetra Tech's quality assurance and project management approach.

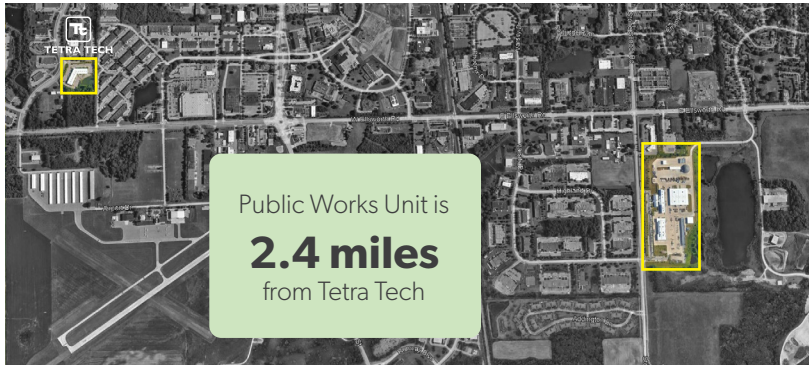
Adjust: This is the step that separates Tetra Tech from our competitors. The adjustment involves team members listening to the client throughout the project to ensure what we are delivering meets the City's needs. It also involves oversight by senior management to ensure our team is on track. This takes the form of a few periodic interviews with City staff responsible for the project and subsequent corrections. Most of the project references provided have gone through these interviews and can attest to their effectiveness at delivering final projects that exceed expectations.

Additional details of these interviews are described in the QA/QC write-up elsewhere in this submittal.

B. Communication & Coordination

Tetra Tech tailors our communication to the needs of each client and project. We will review the approach desired by the City prior to starting any assignment. Our communication norms are listed below:

- Monthly progress meetings with written agendas and minutes documenting the status of every assignment
- Conduct/Attend pre-construction and progress meetings and prepare minutes for distribution, which are transmitted within 24 hours to ensure accurate information and a timely review.
- Attend/Participate in public information meetings.
- Daily Construction Progress Reports e-mailed at the conclusion of each business day.
- Client staff interviews to ensure our project team is meeting client expectations.



C. Compatibility with City's Standards, Goals, & Objectives

As an Ann Arbor-based company, we follow the standards and goals of our hometown. A few City initiatives and how we may assist are described below.

Environmental Commitment

Tetra Tech has long focused on helping its clients address water, environment, infrastructure, resource management, energy, and international development needs. We lead and support programs that minimize our collective impacts on the environment—through the solutions we provide for our clients; through our procurement and subcontracting practices; by the processes we use within the Company to promote sustainable practices, reduce costs, and minimize environmental impacts; and through employee-supported activities such as volunteer work and fundraising campaigns.

Our vision of the future is to incorporate the concepts of sustainability more fully into our daily operations and to follow the United Nations World Commission on Environment and Development goal to "meet the needs of the present without compromising the ability of future generations to meet their own needs." Tetra Tech is in a unique position to further this vision and has the ability to provide innovative solutions to meet pressing global challenges. On a daily basis and on a global scale, our work plays a direct role in helping to achieve the balance that will allow future generations to access the necessary resources to meet all of their needs. The focus of Tetra Tech's Sustainability Program is to sustain the growth of its business, reduce greenhouse gas emissions, and provide an exceptional employee work environment, while providing better solutions for its clients.

Ann Arbor Vision Zero

This vision is to eliminate deaths and serious injuries on City streets by 2025. As one of MDOT's most widely used consultants, Tetra Tech is familiar with all safety design standards including speed management tools. We also believe this design consideration extends to such practices as green stormwater infrastructure which can impact vehicular safety if not properly completed.

Ann Arbor Zero Carbon-Neutrality Goal

Tetra Tech is excited about a 2030 Ann Arbor that is carbon neutral. Brian Rubel, an Ann Arbor resident, voted for the millage assisting in funding this program. As one of the largest solar and wind consultants, Tetra Tech is ideally suited to assist Ann Arbor reach this goal. On our current project for the Midtown Booster Station, Tetra Tech recommended the building use electric heat, a renewable energy source and thus comply with Ann Arbor's electrification ordinance.

Commitment to Sustainability

On the 40th anniversary of Earth Day in 2010, Tetra Tech formalized our Sustainability Program to advance our environmental, social, and governance (ESG) goals through our projects, operations, and employee-supported charitable activities and volunteer work. Tetra Tech has long focused on providing our clients with industry-leading sustainable solutions that support development of safe water supplies, net zero energy programs, and biodiversity protection through habitat preservation and restoration

Tetra Tech established a Sustainability Council to help coordinate and track our Sustainability Program, oversee development of an annual corporate Sustainability Report, and support communication of best practices across the Company. Our Sustainability Program focuses on supporting Tetra Tech's mission to be a premier worldwide consulting and engineering firm, focusing on water, environment, sustainable infrastructure, renewable energy, and international development.

1 BILLION PEOPLE CHALLENGE

Our goal is to improve the lives of 1 billion people by 2030. Because our biggest impact on the world is through the projects we perform for our client, we are tracking the total number of lives improved from our projects. We align our project impact analysis with the Global Reporting Initiative (GRI) standards and the UN Sustainable Development Goals (SDGs), which measure social benefit and aim to reduce poverty in communities around the world.

MEASURE	2021 BASELINE
Lives Improved	411 million people
PROJECT METRICS / SDG	
Water/SDG 6	328,000 mL/year of water treated, saved, or reused
Renewable Energy/SDG 7	16,800 MW/year of renewable energy identified, planned, or generated
Ecosystems/SDG 14 and 15	178 million ha/year of land and water protected, managed, or restored
GHG Emission Reduction/SDG 13	20.6 million CO_2e MT/year avoided or captured
Social and Governance/SDG 3, 4, 5, 16	35 million lives improved/year from social and governance programs

"Tetra Tech received six Environmental Business International (EBI) awards for excellent performance, innovation, and industry leadership in 2022. The annual awards from EBI's Climate Change Business Journal and Environmental Business Journal were presented at the Environmental Industry Summit XXI on March 22, 2023, in San Diego, CA."

D. On-Call Services Plan

Tetra Tech envisions a working relationship where we are an extension of the City of Ann Arbor's staff. This relationship will be especially crucial for the staff supplementation roles identified in the RFP. Our consistent team members will lead to a working understanding of the City's expectations and technical practices. The relationship we enjoy with communities like Brighton and Northfield Township allow us to coordinate project execution within multiple departments/units of each community, thereby reducing the burden of the staff of clients we serve.

Tetra Tech's Ann Arbor office is located two miles from the Wheeler Center next to the Ann Arbor Airport. Mr. Rubel drives by the Wheeler Center to and from the office each day. This proximity makes it convenient and efficient for Tetra Tech's staff to meet. Tetra Tech's Ann Arbor office and the proximity to all City buildings make us ideally suited to schedule a needed meeting with any City employee. We invite our clients to review our performance annually (or more frequently) so we can make necessary adjustments to improve and exceed our clients' expectations.

We can make numerous staff members available to work from City offices. We have identified Daniel Warren in the organization chart, but many others can be made available at least part-time.

Commitment to 24/7 Availability

Tetra Tech is committed to being available 24/7 to the City. We will serve the City from our office in Ann Arbor. Our Project Manager, Brian Rubel, PE, is an Ann Arbor resident. He can generally be mobilized to any Ann Arbor site within 10 minutes. He is a dedicated employee who monitors his cell phone and e-mail in the evenings and weekends.

Mr. Rubel is an Operations Manager for Tetra Tech's Michigan services and thus has the authority to assign Tetra Tech resources to best meet the needs of the City both during regular office hours and beyond. We invite you to contact him at any time to confirm his commitment at 734.649.4546 or brian.rubel@tetratech.com. Daniel Warren will be Mr. Rubel's deputy and has the same level of commitment monitoring his correspondence.

E. Consultant Capabilities

Tetra Tech's approach for this contract includes:

- Developing a thorough scope of work and schedule at the beginning of each assignment for mutual agreement to avoid conflicts regarding the project definition.
- A project start meeting at the beginning of each assignment to further refine the problem statement and to understand our clients' goal and objectives.
- A Tetra Tech internal kickoff meeting where the specific project technical standards are discussed (i.e., review of drawing standards and client specifications).
- In-person progress meetings (monthly or more) to discuss the project and adjust Tetra Tech's execution to arrive at our clients' goals. These periodic workshops allow clients to give their technical input to ensure satisfaction with the work.
- To the extent practical and acceptable to the City, Tetra Tech will assign the same staff to subsequent projects so that we consistently understand and meet the expectations and standards of the City.

Project Execution

Tetra Tech's approach to managing projects is depicted in the graphic on the following page that shows our QA/QC procedures used to produce a technically sound product. Since each project we complete is customized to our clients' needs, client input is clearly defined to ensure a successful project outcome.

Quality Assurance/Quality Control

Tetra Tech's QA/QC program is exercised on all projects to ensure our deliverables are technically sound, high-quality, cost-effective, and tailored to project objectives. The QA/QC program includes several milestones prior to submittal of deliverables. We will review each document in accordance with the program and document each review to verify implementation of the procedures. The QA/QC program consists of two distinct but interdependent components:

Quality Assurance (QA): The QA process is used to understand the project from the client's perspective, and that their goals and objectives have been met. QA representatives consist of individuals not directly involved in the project who provide an independent perspective. Each reviewer will document their results on a checklist or questionnaire, which is then shared with the project team for possible implementation. This provides a means to continually identify opportunities for improvement. The QA process consists of:

- Client Satisfaction Process Interview: A Tetra Tech representative, not associated with the project, meets with the client at the beginning of the project to establish measurables and periodic milestones to evaluate our performance. We also perform a follow-up evaluation with the client upon completion of the project to confirm that we met or exceeded their expectations. Our clients consistently tell us few consulting firms have

Project Management Approach

1 Project Workshop Initiative
- Proposal/Scope of Services
- Project Budget
- Project Schedule

2 Client Satisfaction Interview

3 Work Plan
- Basis of Design (Prelim.)
- QA/QC Plan/Deliverables
- Project Tracking
- Budget/Hours/Schedule

4 Project Start Meeting
- Present Work Plan Items
- Budget/Hours/Schedule
- Confirm Commitments/ Schedule Meetings
- Client Priorities

5 Key Concept Review
- Project Team Review
- Concurrence from Clients on Basis of Design
- Cost Est. Review/Validation
- Ongoing Project Status Communication to Client

6 Project Initiation Audit
- Internal Auditor
- Make Work Plan Adjustments

7 Preliminary Drawings/ Reports
- Land Survey
- Develop Contractor Pre-qual
- Ongoing Team Workshops

8 QA/QC Reviews
- Technical Checks
- Constructability Review
- Report Enhancement
- Cost Est. Review/Validating

9 Preliminary Document Distribution to Client/ Outside Agencies
- Confirm Meeting Scope of Services
- Permit Application

10 Project Audit (50 to 60% Complete)
- Same as #6

11 Final Design/Report
- Ongoing Team Workshops

12 QA/QC Reviews
- Technical Checks
- Report Enhancement
- Cost Estimating Validation

13 Distribution of Deliverables

14 Construction Bidding
- Consider Contractor Pre-qual

15 Construction Services
- Resident Services
- Bidding
- Shop Drawing Reviews
- O&M Manuals/ Operator Training

16 Project Closeout
- Prepare Final Project Summary
- File Design Notes and File Drawings/Reports
- Client Satisfaction Interview

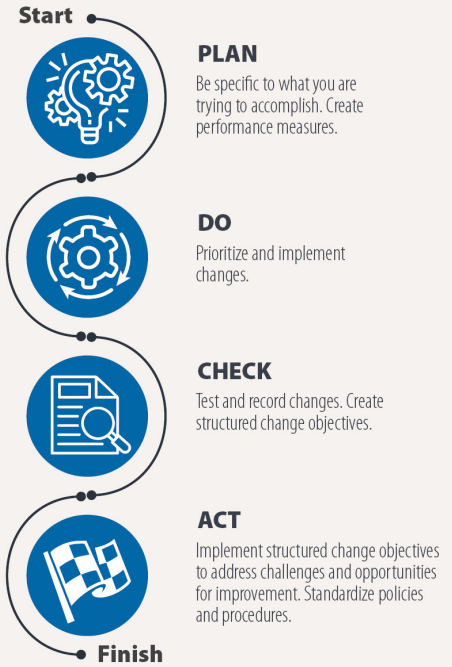
such a process and these interviews do deliver projects with a higher level of satisfaction.

- Report Enhancement Process: A representative reviews the report outline and draft report and compares the client's objectives with our approach to ensure clarity and thoroughness.
- Key Concept Review: A team of discipline experts review project concepts, looking for design ideas and alternatives that may not have been considered or potential innovative solutions to enhance the project.
- Constructability Review: Reviewers look specifically for cost-avoidance opportunities to make sure that the design promotes the most cost-effective construction operations.

Quality Control (QC): The QC process consists of detailed checking procedures and is performed by experienced professionals who are familiar with the client's standards and practices. It consists of:

- Technical Reviews: Each discipline is represented by a Lead Engineer who is responsible for developing, updating, and maintaining our document and design standards.
- Calculations: We review all calculations to ensure proper application of design criteria and technical standards and to verify the mathematical correctness of the results.
- Checklists: We use checklists during the review of calculations and report/construction documents to ensure proper application of city, state, and federal design criteria and standards.
- Report Consistency: All report documents developed by Tetra Tech are reviewed for consistency of format and standards.
- Construction Documents: We check construction plans and supplemental specifications for accuracy, consistency, constructability, and conformance with the standards of our clients.
- Conforming to Construction Record Drawings: Our construction inspectors, design engineers, and independent CAD staff review final record drawings to confirm accuracy, consistency, and conformance with client standards.

PLAN-DO-CHECK-ACT MODEL



Tetra Tech's Quality Assurance Plan Model

DETAILED APPROACHES FOR CITY OF ANN ARBOR

Underground Utilities (Planning & Design)

Tetra Tech is familiar with all underground utilities that may be present in a municipality. Our staff routinely plans and designs sanitary, storm and potable water systems.

Tetra Tech has a history of participating in many of the nation's largest utility planning programs. Most of our planning projects involve preparing or revising and subsequent calibration of computerized models to analyze existing capacity and to properly size and analyze needed capacity improvements.

For a potable water system, the most prevalent models are based on USEPA's EPANET Software. Tetra Tech owns licenses to all of the commercially available software including those produced by Innovyze and Bentley. Tetra Tech has used Ann Arbor's model several times including our work at Plymouth/Green Roads and for the Ann Arbor Township Islands Utility Planning.

For sanitary and stormwater collection systems, models are based on USEPA's SWMM software. Likewise, Tetra Tech owns licenses to all commercially available software. For stormwater applications, Tetra Tech's skill set extends to developing two-dimensional models. Successful collection system modeling projects are created by developing an in-depth understanding of how flow rates and water depths respond to large storm events. This understanding is gained through the collection of both quantitative (flow measurements, depth measurements, model results) and qualitative (operator experience, customer observations) data. Tetra Tech is unique among Michigan-based consultants by having an Ann Arbor-based crew who can quickly and cost-effectively install and service flow meters.

Our modeling skill set also extends to creating water quality models including models to simulate the effectiveness of sustainable stormwater infrastructure. Many of these tools were developed by Tetra Tech for the USEPA. These professionals are available to the City of Ann Arbor for their planning needs.

Planning services include developing conceptual solutions and capital improvement plans (CIPs) and costs. Tetra Tech annually receives bids for over $100 million in utility improvements within the Michigan market. This provides us a wealth of accurate cost data to yield accurate cost opinions for our CIPs.

Tetra Tech has completed major utility planning projects over the past 10 years for the following major Midwestern communities:

- Cincinnati, OH
- Pittsburgh, PA
- Lansing, MI
- Kansas City, MO
- Toledo, OH
- Tulsa, OK
- East Lansing, MI
- Omaha, NE
- Louisville, KY
- Detroit, MI
- Port Huron, MI

Design: We have an equally diverse skill set in the design of underground utilities. Our design experience includes trenchless techniques for both new construction and rehabilitation including pipe bursting, directional drilling and cured-in-place lining. Because no two projects have the same goals and constraints, pipe materials and construction techniques are carefully selected for each project to provide the most valve at the lowest life cycle cost.

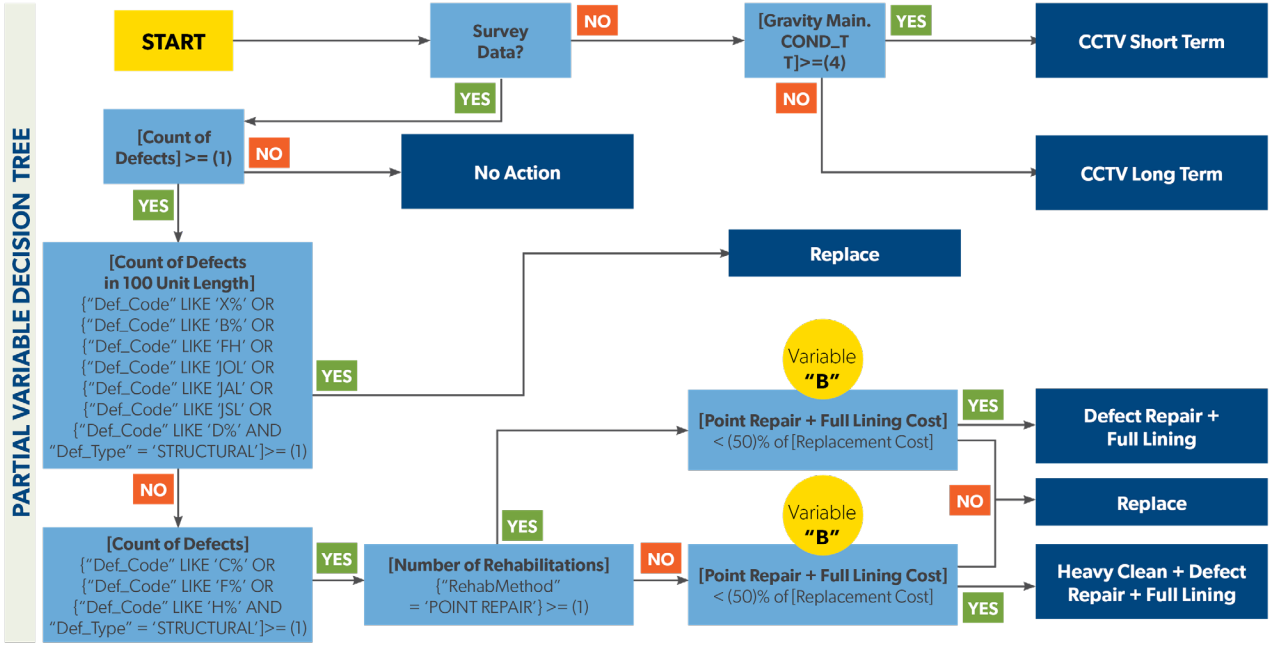
Asset Management

Tetra Tech has been at the forefront of asset management plans having prepared an MDEQ-approved asset management plan in 2006 for Bay County. We have prepared asset management plans for storm sewers, sanitary sewers water mains and wastewater treatment plants. Some plans have been prepared entirely with Tetra Tech labor and some with Tetra Tech's oversight using client staff. Tetra Tech is familiar with all asset management components and has developed databases that facilitate gathering of needed data. Members of the team also have direct familiarity with GIS-compatible software such as CityWorks and experience in analyzing these types of data for use in asset management plans.

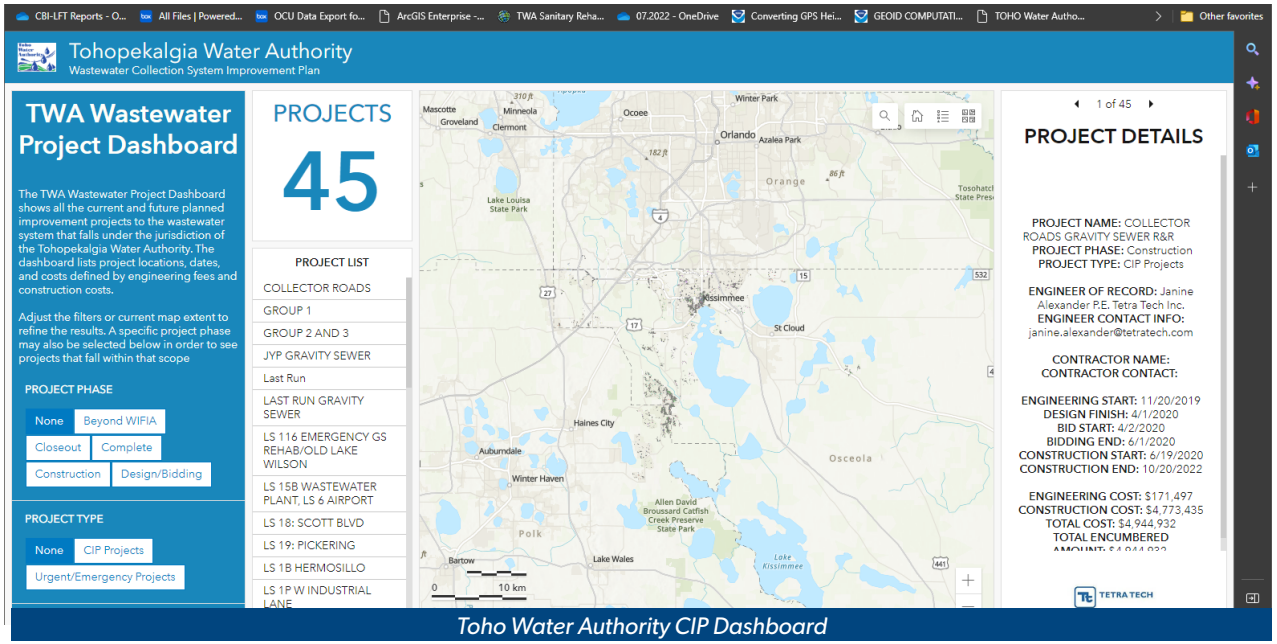
Sewer Asset Management

Tetra Tech understands that Ann Arbor is re-evaluating the workflow of sewer condition assessment and rehabilitation. While ITpipes is a reliable database application, the City uses SCREAM to prepare improvement priorities. This software is proprietary which makes ensuring cybersecurity difficult.

We understand that Ann Arbor may wish to consider converting SCREAM to a commercial software package. Tetra Tech has had significant success using Innovyze (newly acquired by AutoDesk) to perform the same functions as SCREAM. The Toho Water Authority Gravity Sewer Rehabilitation & Replacement project description summarizes one approach completed by Tetra Tech that Ann Arbor may find valuable.



Toho Water Authority Sewer Condition Assessment Flow Chart



Toho Water Authority CIP Dashboard

Water Meter Replacement

Tetra Tech has experience administering water meter programs using numerous manufacturer telemetry technologies. Water meter replacement services can involve technical input to select and size meters and project management to schedule and manage meter installation/repair activities.

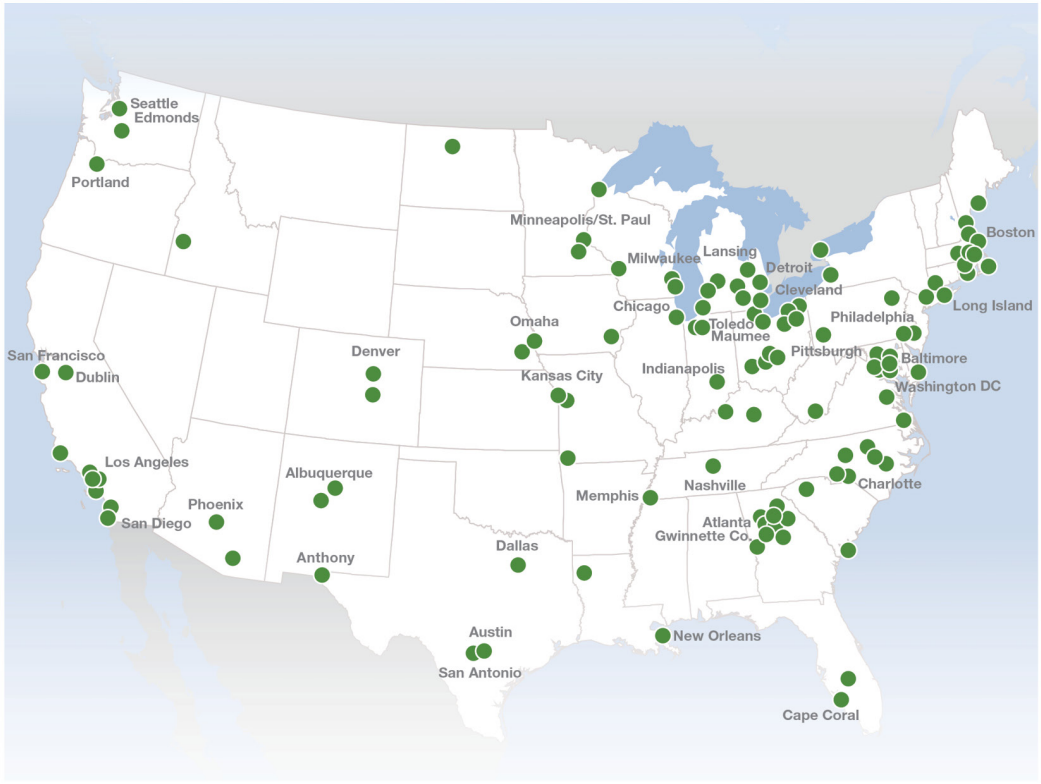
Stormwater Management

Stormwater management includes a wide range of efforts, including quantity and quality issues, and ranging from small storms to flooding events. Clients with a variety of objectives on the planning, coordination and implementation of green infrastructure, including CSO communities, large multi-municipal agencies, and large and small MS4 stormwater communities. Tetra Tech has supported these programs to address a variety of environmental, climatic, economic and social issues, providing solutions that are cost effective, reduce the volume and frequency of CSO events, support local social enhancements, and are coordinated with a wide variety of municipal agencies, NGOs, and community stakeholders. In addition, Tetra Tech has worked with communities and agencies under the EPA Community Partners Program to focus on the development of resource documents, policy guidance and concept designs. *The map on the following page summarizes our national experience in green infrastructure stormwater experience.*

Detention Basin Condition Assessment & Improvement

We understand that a project will likely complete condition assessment and repairs of proposed and publicly-owned stormwater detention basins.

GREEN INFRASTRUCTURE - STORMWATER NATIONAL EXPERIENCE MAP



Lansing, MI
Designed and integrated GI practices citywide for stormwater treatment as part of ongoing CSO mitigation program.

Detroit, MI
Managing $50M+ GI Program and planning and designing green practices to reduce flooding and CSOs.

Detroit, MI
Designed and constructed ten GI practices located within the median of Oakman Boulevard, providing space for the system.

Cleveland, OH
Evaluated and ranked 156 stormwater retrofit sites and designed GI practices for top sites.

Toledo, OH
Implemented stormwater management in pocket parks to promote infiltration and provide recreational space.

Maumee, OH
Developed SWMP and designed flood relief system as part of Ohio Turnpike upgrades to optimize the cost benefit.

Omaha, NE
Designed retrofits of stormwater runoff facilities at a park with innovative green infrastructure facilities.

Omaha, NE
Designed stormwater management concepts for 987 acres, including 35,000 CF of subsurface storage.

Camp Atterbury, IN
Stormwater design including stream channel restoration and large scale bioretention.

Boston, MA
Designed 300,000 CF of infiltration galleries using GeoStorage Technology, able to infiltrate 43.5 MG of annual volume.

Long Island, NY
Designed regional and local stormwater management using bioretention and subsurface storage galleries.

Gillette Stadium, MA
Stormwater design for the stadium included daylighting 3,000 feet of river channel and 9 acres of wetland.

Los Angeles, CA
Designed and constructed multiple GI practices throughout the City.

Washington, DC
GI planning and design for private landowners to access stormwater retention credits.

Gwinnett, GA
Stormwater management manual development/ planning, design, outreach, construction inspection, and monitoring for GI.

Edmonds, WA
Designed retrofit LID stormwater alternatives to enhance water quality and reduce runoff in a residential neighborhood.

San Antonio, TX
Strengthened LID use through manual development, staff training, code development, and project design.

Tetra Tech developed such a program for Lexington, Kentucky, that is used annually. The program included screening the structures for breaches in the sidewalls, burrowing animals, erosion, integrity of the outlet structure, odors, and dozens of other criteria. The program also focused on strengthening the City's ordinance so the City had the ability to require needed improvements from homeowner associations and other property owners.

In February 2023, Tetra Tech initiated a project to develop a detention basin inspection program for Genesee County. This program will utilized many of the criteria of the Lexington program while utilizing tablets and cell phones to record the field observations.

Bridges

Through our experience with NBI bridge inspections, bridge load ratings, and scour action plans, we have become familiar with both the Michigan Bridge Inventory System (MBIS) and the Michigan Bridge Reporting System (MBRS). Our staff experience in performing bridge/culvert load ratings is second to none in the state, and our recent load rating projects reflects MDOT's confidence in our skills. We routinely design and rehabilitate road and pedestrian bridges for municipalities throughout southeastern Michigan and Northwest Ohio. Tetra Tech performs structural engineering on all types of municipal projects including building design, retaining wall repair, and roof replacement.

Tetra Tech embraces new technology, which is shown by our extensive experience in three-dimensional modeling of structures using REVIT. This software is a valuable tool for bridge rehabilitation projects and/or new complex projects. Tetra Tech can deliver projects as a traditional design-bid-build project, design-build project, or maintenance crew project. Additional transportation structure-related capabilities includes designing specialty walls, pedestrian structures and unique foundations, and performing technical reviews.

Mechanical Engineering

Tetra Tech has a mechanical engineering group located in Ann Arbor and can assist in heating, ventilating, air conditioning, and plumbing need for any type of building. Our mechanical engineers work closely with our electrical engineers to ensure the HVAC systems are properly controlled. Our experience includes infrastructure for such facilities as water/wastewater treatment, office buildings, and recreational facilities (pools, ice arenas, etc.).

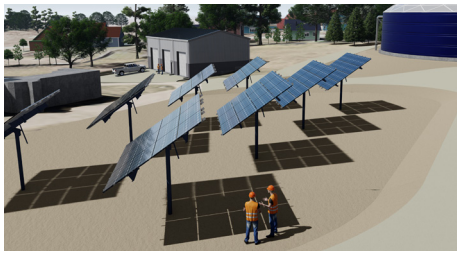
Electrical Engineering

Tetra Tech has a full-service electrical engineering department specializing in providing reliable electrical systems for municipal infrastructure. This includes designing exterior lighting systems for security, parking lots, and roads. Our team is familiar with the most energy efficient lighting and control systems (such as occupancy actuation) to reduce the cost of operating clients' infrastructure. Our staff can perform studies to determine the likely hazard and required personal protective equipment.

Streetlight Replacement

Tetra Tech has been involved in numerous streetlight replacement projects for local municipal clients. We have included a project summary for one in Port Huron. Tetra Tech is familiar with the use of energy efficient lamps and the specification of many different types of light poles to meet architectural goals.

Solar Power



Tetra Tech has experience in permitting and design of over 100 solar projects in North America, comprising over half a million acres of proposed and implemented development. We partner with solar energy developers to quickly and cost-effectively evaluate potential sites; successfully negotiate the regulatory environment; design finance-able, highly productive facilities; and ensure construction is completed within schedule and complies with applicable delivery and performance requirements. Locally, Tetra Tech is designing a significant solar project at the Saline WWTP. We are following recent federal legislation that provides rebates to local governments for solar and sustainable energy projects.

Wind Power

Tetra Tech is the first truly full-service wind energy environmental, engineering, and construction firm in North America. Within the last few years, we have worked on approximately 500 wind projects worldwide, with over 25,000 MW presently in operation or under construction. We provide support to 20 of the top 25 wind power project developers and owners in North America. With extensive experience in the wind construction market, we have provided construction

services to 30 wind projects since 2007, totaling over 3,000 MW and nearly $1 billion in revenue. Our complete and integrated range of services—from initial siting through resource studies, permitting, engineering, procurement, construction, operations, and even retrofitting turbines—is provided by some of the most experienced wind energy experts in the industry.

Geotechnical Engineering

Tetra Tech employs geotechnical engineers who can provide services such as building foundation design, retaining wall design, and other specialty geotechnical engineering services. Tetra Tech may subcontract with local drillers to obtain soil data for some types of projects.

Energy Efficiency

Tetra Tech is frequently retained by municipalities to conduct energy evaluations for its infrastructure and to provide recommendations for reducing energy consumption. Adrian, Ypsilanti Community Utilities Authority, and Albion are three of the numerous local communities we have served in this capacity. Our local multidisciplinary experts allow us to complete these evaluations efficiently and effectively. Our evaluations have identified improvements in lighting, HVAC systems, control methodologies, insulation, electrical motors and many other systems.

Surveying

Tetra Tech has an outstanding surveying department in support of its architectural and engineering activities. Our survey staff is made up of licensed professional surveyors and support personnel to handle a variety of surveying operations. Our surveying staff has demonstrated strong experience in planning, directing, and performing field surveys and office work for horizontal and vertical control surveys for a wide variety of projects. This experience includes establishing primary and secondary horizontal and vertical control networks for local governmental agencies, photo control surveys, MDOT design and construction surveys, route/right-of-way surveys, and private development projects.

Tetra Tech's survey department uses seven robotic and reflectorless total stations, with on-board electronic data collectors that give simultaneous distance and angle measurements with a single pointing; eight GPS units tied to the MDOT Continuously Operating Reference Station towers for the establishment of horizontal control, based on the Michigan State Plane Coordinate System (Michigan SPCS), and the North American Vertical Datum of 1988 (NAVD88), (which is quickly becoming the standard for most municipal and federal projects); and five digital levels with on-board data collection for efficient, error-free recording of level loops to a higher level of accuracy than can be achieved by conventional leveling methods.

Parking Lots/Site Design/Transportation

Tetra Tech is well qualified to complete site improvements needed for underground utility repair, city parks, or city buildings. Our MDOT experience speaks to our transportation skills. MDOT requires that consultants pass through a rigorous prequalification process in engineering categories before being allowed to complete state projects. MDOT has recognized Tetra Tech's credentials and have prequealified us to complete work in 39 categories of work. Tetra Tech is well versed in ADA rules and projects. Our completed work evaluating the Wheeler Center parking lot is evidence of this skill.

Environmental Permitting

The Tetra Tech team has extensive experience working with federal, state and local regulatory and permitting agencies, such as the Environmental Protection Agency, Federal Emergency Management Agency, Michigan Department of Environmental Quality (MDEQ), and the U.S. Army Corps of Engineers. We employ wetland scientists in our Ann Arbor office who are respected by the MDEQ and can define the wetland and wetland permit requirements for any project. We can facilitate meetings with regulatory agencies and with the City to negotiate the terms and conditions for any permits or permit modifications necessary. We invite you to review our work for wetland mitigation for Detroit Edison. This was one of the most complex permit applications submitted to MDEQ and it was approved without a single public comment. A key approach was holding preapplication meetings with MDEQ so the complex permit application could be prepared in an approvable manner

Construction Observation & Administration

Construction observation, administration, and inspection are responsibilities that Tetra Tech takes seriously. We recognize the construction professional has a large role in managing risk and minimizing cost overruns and scheduling delays on projects. They are the last set of eyes on a project before and during the construction, and should be able to anticipate issues and resolve them before they become

problems. Additionally, construction professionals must accurately and diligently document issues that occur during construction so the client's risk is managed. For many projects, the construction professional maintains the records of elevations and locations for the completion of an accurate, reliable set of conforming-to-construction-records drawings (i.e., as-builts). However, the construction professional's role is more than that. They must be the liaison between the public and the City and must possess interpersonal skills to listen to the public, understand their concerns, and resolve issues that impact them.

We have a proven track record of working with clients to determine a role for construction professionals that fit the client's needs. Some examples include:

- Providing experienced engineering and construction professionals to represent clients as "expert witnesses" on their behalf
- Emailing daily reports to our clients
- Using laptops to reference record drawings useful to the project
- Conducting post construction review meetings with client staff to identify and document issues discovered during construction that lead directly to improved design documents/construction procedures
- Meeting with commercial businesses and private homeowners in affected areas to educate, inform, and discuss project issues such as access, safety, etc.
- Preparing newsletters, press releases, and letters for the public and businesses that may be affected by the construction activities

Daily construction observation is performed by a resident project representative (RPR). Some responsibilities include:

- Observe/Monitor contractor's installation methods and operations to ensure conformance with contract requirements/ approved submittals
- Liaison between the contractor and the public
- Review shop drawings to verify materials on site are correct per specifications
- Coordinate material testing and survey staking
- Perform quality checks on staking/cut sheets
- Monitor material testing and assure that they are completed in accordance to standards
- Review contractor's proposed costs for changes in work

Public Engagement

Tetra Tech recognizes the importance of an involved and educated public. We incorporate public engagement in most of our design projects and many important studies. We can complete this service internally or involve specialty consultants like Kerry Sheldon of Bridgeport Consulting if the project warrants a dedicated public engagement professional and intensive effort.

Architecture

Tetra Tech has a deep bench of engineers and architects who understand the needs of municipal buildings, including construction and maintenance. Our architects and mechanical, structural, and electrical engineers stand ready to serve the City of Ann Arbor's needs. Recent projects include:

- Design of well houses of Ann Arbor's Steere Farm well field
- Renovation of Ann Arbor WTP's control room
- Major pump station improvements (structural and mechanical) for YCUA and Oakland County
- Architectural improvements at Selfridge National Guard Base

Ann Arbor WTP Control Room

Understanding that some of Ann Arbor's facilities date back to the 1930s and earlier, extending older facilities' useful life will be a challenge until significant upgrades can be made. Tetra Tech has experience with various engineering studies on maintenance, operation, and construction feasibility for repairs and restoration. Tetra Tech's recent experience ensures we have a detailed cost database which allows us to prepare accurate and dependable cost opinions.

Tetra Tech has experts in concrete repair and rehabilitation, with the ability to solve almost any issue that may be encountered. Our professionals understand local and federal

codes and regulations and are able to pull from international experience to offer unique solutions to common infrastructure and building integrity problems. For instance, our thorough understanding of the Americans with Disabilities Act ensures the proper accessibility is incorporated into each project. Our architects keep abreast of the latest construction materials and specialize seamless blending of improvement into an existing building.

Tetra Tech's services extend to landscape architecture. In particular, our landscape architects have a specific aptitude to design green stormwater infrastructure facilities using vegetation native to Michigan. However, these professionals are equally adept at designing park and building landscapes.

Recreational Facilities

Tetra Tech can assist with the improvement to city parks and the rehabilitation of Ann arbor's public swimming pools. Such things as boilers, pumps, and mechanical systems are completed routinely on our projects. Our mechanical staff in our Ann Arbor office is well suited to complete these assignments.

Tetra Tech has assisted several communities and institutions to rehabilitate their filtering systems, including our work for the University of Michigan on the Canaham Natatorium. Tetra Tech has also teamed with specialty pool consultants in various geographies to solve complex water quality concerns and we can bring this expertise to the City of Ann Arbor.

Tetra Tech employees site engineers, architects, landscape architects who stand ready to assist improving park facilities. Such features as playing fields, restrooms facilities, and landscaping are routinely designed for our municipal clients.

Solid Waste

While not listed in the RFP, we do know that solid waste is a responsibility of Ann Arbor DPW, and this is also one of Tetra Tech's strengths. Tetra Tech is ranked #1 in solid waste engineering by *ENR* with capabilities in all aspects of solid waste including landfills (siting, design, and closure), recycling and collection. A particular strength is material recycling facilities (MRF) with senior staff having experience in transfer station and MRF design and operations. Our skilled staff assists clients who collect, transport, transfer, and process a wide array of waste and material types, that range from municipal solid waste (MSW) and construction and demolition (C&D) waste, to both conventional and unconventional recyclables. Our priority remains focused on developing facilities that meet or exceed our clients' expectations; understanding their goals; addressing past, present, and future needs and concerns to collaborate on solutions that are durable, operate efficiently, minimize environmental impacts, and meet the needs of local communities.

Tetra Tech's services include operational assessments, facility siting and design development, equipment evaluation/specification, vertical integration, client/owner representation, construction document preparation, equipment design and specification, bid support and development, construction administration, and construction oversight and certification.

Environmental

Tetra Tech has decades of experience providing environmental solutions that are both feasible for our clients and sustainable for our future. Tetra Tech is consistently recognized by Environmental Business Journal and Engineering News-Record (ENR) as one of the top large businesses working in the environmental industry today. Tetra Tech is currently ranked number 1 in Environmental Management and number 2 in Environmental Science by *ENR*. Our fully integrated range of environmental and engineering services allows us to quickly and cost-effectively address our public and private clients' environmental issues. Our services include:

Due Diligence:

- Phase I and Phase II Environmental Assessments
- Federal Environmental Assessments

Natural Sciences:

- Wetland delineation and mitigation
- Wetland design
- Climate change studies
- Water resource and wetland permitting

Material Characterization:

- Hazardous material characterization

Air Quality:

- Greenhouse gas reduction
- Energy recovery
- Permitting
- Compliance
- Support services

Groundwater:

- Aquifer yield studies
- Contaminant monitoring and transport modeling
- Remediation and treatment
- Deep well injection
- Site closures

D Fee Proposal

As requested in the RFP, Tetra Tech's Fee Proposal has been submitted in a separate envelope.

E Authorized Negotiator

The project manager and person on in our organization authorized to negotiate the agreement with the City of Ann Arbor Public Works/Systems Planning General Engineering Services RFP # 23-16 is as follows:

Brian M. Rubel, PE, PMP
Vice President and Senior Project Manager

Tetra Tech of Michigan, PC
1136 Oak Valley Drive, Suite 100
Ann Arbor, MI 48108
Telephone: 734.213.4063
Fax: 734.213.3003
Email: brian.rubel@tetratech.com

F Attachments

- Legal Status of Offeror
- Living Wage Ordinance Declaration of Compliance
- Non-Discrimination Form
- Vendor Conflict of Interest Disclosure Form

ATTACHMENT A
LEGAL STATUS OF OFFEROR

(The Respondent shall fill out the provision and strike out the remaining ones.)

The Respondent is:

- A corporation organized and doing business under the laws of the state of Michigan, for whom Brian Rubel bearing the office title of Vice President, whose signature is affixed to this proposal, is authorized to execute contracts on behalf of respondent.*

  *If not incorporated in Michigan, please attach the corporation's Certificate of Authority

- A limited liability company doing business under the laws of the State of _____, whom _____ bearing the title of _____ whose signature is affixed to this proposal, is authorized to execute contract on behalf of the LLC.

- A partnership organized under the laws of the State of _____ and filed with the County of _____ , whose members are (attach list including street and mailing address for each.)

- An individual, whose signature with address, is affixed to this RFP.

Respondent has examined the basic requirements of this RFP and its scope of services, including all Addendum (if applicable) and hereby agrees to offer the services as specified in the RFP.

Brian M. Rubel
_____ Date: 3/24/2023 ,
Signature

(Print) Name Brian Rubel, PE, PMP Title Vice President

Firm: Tetra Tech

Address: 1136 Oak Valley Drive, Suite 100, Ann Arbor, MI 48108

Contact Phone 734.213.4081 Fax 734.213.3003

Email brian.rubel@tetratech.com

ATTACHMENT B
CITY OF ANN ARBOR DECLARATION OF COMPLIANCE

Non-Discrimination Ordinance

The "non discrimination by city contractors" provision of the City of Ann Arbor Non-Discrimination Ordinance (Ann Arbor City Code Chapter 112, Section 9:158) requires all contractors proposing to do business with the City to treat employees in a manner which provides equal employment opportunity and does not discriminate against any of their employees, any City employee working with them, or any applicant for employment on the basis of actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight. It also requires that the contractors include a similar provision in all subcontracts that they execute for City work or programs.

In addition the City Non-Discrimination Ordinance requires that all contractors proposing to do business with the City of Ann Arbor must satisfy the contract compliance administrative policy adopted by the City Administrator. A copy of that policy may be obtained from the Purchasing Manager

The Contractor agrees:

(a) To comply with the terms of the City of Ann Arbor's Non-Discrimination Ordinance and contract compliance administrative policy.

(b) To post the City of Ann Arbor's Non-Discrimination Ordinance Notice in every work place or other location in which employees or other persons are contracted to provide services under a contract with the City.

(c) To provide documentation within the specified time frame in connection with any workforce verification, compliance review or complaint investigation.

(d) To permit access to employees and work sites to City representatives for the purposes of monitoring compliance, or investigating complaints of non-compliance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services in accordance with the terms of the Ann Arbor Non-Discrimination Ordinance. The undersigned certifies that he/she has read and is familiar with the terms of the Non-Discrimination Ordinance, obligates the Contractor to those terms and acknowledges that if his/her employer is found to be in violation of Ordinance it may be subject to civil penalties and termination of the awarded contract.

Tetra Tech
Company Name

Brian M. Rubel 3/24/2023
Signature of Authorized Representative Date

Brian Rubel, PE, PMP, Vice President/Project Manager
Print Name and Title

1136 Oak Valley Drive, Suite 100, Ann Arbor, MI 48108
Address, City, State, Zip

734.213.4081 / brian.rubel@tetratech.com
Phone/Email address

Questions about the Notice or the City Administrative Policy, Please contact:
Procurement Office of the City of Ann Arbor
(734) 794-6500

Revised 3/31/15 Rev. 0 NDO-2

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ATTACHMENT C
CITY OF ANN ARBOR
LIVING WAGE ORDINANCE DECLARATION OF COMPLIANCE

The Ann Arbor Living Wage Ordinance (Section 1:811-1:821 of Chapter 23 of Title I of the Code) requires that an employer who is (a) a contractor providing services to or for the City for a value greater than $10,000 for any twelve-month contract term, or (b) a recipient of federal, state, or local grant funding administered by the City for a value greater than $10,000, or (c) a recipient of financial assistance awarded by the City for a value greater than $10,000, shall pay its employees a prescribed minimum level of compensation (i.e., Living Wage) for the time those employees perform work on the contract or in connection with the grant or financial assistance. The Living Wage must be paid to these employees for the length of the contract/program.

Companies employing fewer than 5 persons and non-profits employing fewer than 10 persons are exempt from compliance with the Living Wage Ordinance. If this exemption applies to your company/non-profit agency please check here [___] *No. of employees__*

The Contractor or Grantee agrees:

(a) To pay each of its employees whose wage level is not required to comply with federal, state or local prevailing wage law, for work covered or funded by a contract with or grant from the City, no less than the Living Wage. The current Living Wage is defined as $14.82/hour for those employers that provide employee health care (as defined in the Ordinance at Section 1:815 Sec. 1 (a)), or no less than $16.52/hour for those employers that do not provide health care. The Contractor or Grantor understands that the Living Wage is adjusted and established annually on April 30 in accordance with the Ordinance and covered employers shall be required to pay the adjusted amount thereafter to be in compliance with Section 1:815(3).

Check the applicable box below which applies to your workforce

[___] Employees who are assigned to any covered City contract/grant will be paid at or above the applicable living wage without health benefits

[X] Employees who are assigned to any covered City contract/grant will be paid at or above the applicable living wage with health benefits

(b) To post a notice approved by the City regarding the applicability of the Living Wage Ordinance in every work place or other location in which employees or other persons contracting for employment are working.

(c) To provide to the City payroll records or other documentation within ten (10) business days from the receipt of a request by the City.

(d) To permit access to work sites to City representatives for the purposes of monitoring compliance, and investigating complaints or non-compliance.

(e) To take no action that would reduce the compensation, wages, fringe benefits, or leave available to any employee covered by the Living Wage Ordinance or any person contracted for employment and covered by the Living Wage Ordinance in order to pay the living wage required by the Living Wage Ordinance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services or agrees to accept financial assistance in accordance with the terms of the Living Wage Ordinance. The undersigned certifies that he/she has read and is familiar with the terms of the Living Wage Ordinance, obligates the Employer/Grantee to those terms and acknowledges that if his/her employer is found to be in violation of Ordinance it may be subject to civil penalties and termination of the awarded contract or grant of financial assistance.

Tetra Tech	1136 Oak Valley Drive, Suite 100
Company Name	Street Address
Brian M. Rubel — 3/24/2023	Ann Arbor, MI 48108
Signature of Authorized Representative — Date	City, State, Zip
Brian Rubel, PE, PMP, Vice President/Project Manager	734.213.4081 / brian.rubel@tetratech.com
Print Name and Title	Phone/Email address

ATTACHMENT D

VENDOR CONFLICT OF INTEREST DISCLOSURE FORM

All vendors interested in conducting business with the City of Ann Arbor must complete and return the Vendor Conflict of Interest Disclosure Form in order to be eligible to be awarded a contract. Please note that all vendors are subject to comply with the City of Ann Arbor's conflict of interest policies as stated within the certification section below.

If a vendor has a relationship with a City of Ann Arbor official or employee, an immediate family member of a City of Ann Arbor official or employee, the vendor shall disclose the information required below.

1. No City official or employee or City employee's immediate family member has an ownership interest in vendor's company or is deriving personal financial gain from this contract.
2. No retired or separated City official or employee who has been retired or separated from the City for less than one (1) year has an ownership interest in vendor's Company.
3. No City employee is contemporaneously employed or prospectively to be employed with the vendor.
4. Vendor hereby declares it has not and will not provide gifts or hospitality of any dollar value or any other gratuities to any City employee or elected official to obtain or maintain a contract.
5. Please note any exceptions below:

Conflict of Interest Disclosure*	
Name of City of Ann Arbor employees, elected officials or immediate family members with whom there may be a potential conflict of interest.	( ) Relationship to employee ( ) Interest in vendor's company ( ) Other (please describe in box below)
N/A	

*Disclosing a potential conflict of interest does not disqualify vendors. In the event vendors do not disclose potential conflicts of interest and they are detected by the City, vendor will be exempt from doing business with the City.

I certify that this Conflict of Interest Disclosure has been examined by me and that its contents are true and correct to my knowledge and belief and I have the authority to so certify on behalf of the Vendor by my signature below:		
Tetra Tech		734.213.4081
Vendor Name		**Vendor Phone Number**
Brian M. Rubel	3/24/2023	Brian Rubel, PE, PMP
Signature of Vendor Authorized Representative	**Date**	**Printed Name of Vendor Authorized Representative**

Brian Rubel, PE, PMP

Project Manager

33 years of experience

Mr. Rubel is a Senior Project Manager and Senior Civil Engineer. He has successfully managed numerous large, complex multidisciplinary projects and performed as Tetra Tech's contract manager for as-needed contracts with Michigan municipalities. He is also an Operations Manager, overseeing client satisfaction, engineering and project management in the Ann Arbor, Detroit, Lansing, Port Huron, Louisville, and Toledo offices.

EDUCATION:

MS, Civil Engineering, University of Michigan, 1990

BS, Civil Engineering, University of Michigan, 1989

REGISTRATIONS:

Professional Engineer:
Michigan, No. 39196
Ohio, No. E-64384

Michigan Certified Industrial Stormwater Operation

Project Management Professional

AFFILIATIONS:

Water Environmental Federation

Project Management Institute

OFFICE:

Ann Arbor, MI

SELECT RELEVANT EXPERIENCE

Manchester Elevated Tank Rehabilitation, City of Ann Arbor, MI. Project Manager. Rehabilitation of 500,000-gallon elevated tank. Project included pipe replacement, instrumentation upgrades, site work, and painting of tank.

WTP Clarifier Drive Replacement, City of Ann Arbor, MI. Project Manager. Replacement of a drive mechanism on a clarifier. Evaluated manufacturers to select most suitable equipment.

Steere Farm Well Engine Replacement, City of Ann Arbor, MI. Project Manager. Replacement of natural gas engine generators using electrical motors. Project is in the study phase and design is planned for later this year.

South Industrial Water Storage Tank Coating, City of Ann Arbor, MI. Project Manager. Coating replacement design for a 4-MG, steel, ground storage tank. Managed construction contract.

Lime Residuals Removal, City of Ann Arbor, MI. Project Manager. Evaluated alternatives to remove residuals from sedimentation pond. Project was challenging as the site was landlocked and residuals had never been removed from the facility.

Sanitary Manhole Asset Management, City of Ann Arbor, MI. Project Manager. Completion of an asset management plan for 300 of the City's manholes most susceptible to inflow/infiltration. Project utilized panoramic televising and scanning to identify defects and prioritize needed repairs.

Asset Management Plan, City of Saline, MI. Project Manager. Completed an asset management plan for the City's drinking water system including both distribution and treatment systems.

Civil Engineering Hydraulics, University of Michigan. Adjunct Lecturer of Civil Engineering in the Department of Civil and Environmental Engineering at the University of Michigan. Instructed Civil Engineering Hydrology and Hydraulics.

Midtown Booster Station, City of Ann Arbor, MI. Project Manager. Review of water booster station designed by developer. Used City InfoWater model to analyze impact on City's system.

Water Distribution Reliability Study, Marion-Howell-Oceola-Genoa Water Authority, City of Brighton, MI. Quality Control. Updated a hydraulic model of the four-township system to include recent developments and scenarios for future developments. Completed model calibration based on hydrant tests throughout the system. Completed both pressure and available fire flow analyses.

Master Plans for Numerous Clients, MI. Project Manager/Project Engineer. Performed QA/QC services, project management, and engineering on water system master planning projects for numerous communities, including Tecumseh, Saline, Lapeer, Madison Township, Richmond, Iron Mountain, Mount Clemens, Hartland Township, Onaway, Lapeer, Richmond, Marion-Howell-Oceola-Genoa (MHOG), and Sunfield. Developed a calibrated hydraulic model that simulates existing and future conditions within the distribution system. Used the model to identify areas having insufficient fire suppression or daily pressures and developed recommendations to alleviate the concerns. All projects were approved by MI EGLE and most were completed to meet the requirements of Michigan's Reliability Study requirement.

Wheeler Center Lamp Replacement, Ann Arbor, MI. Project Manger. Comprehensive lamp and controller replacement.

Brian Rubel, PE, PMP *(continued)*

Ann Arbor DPW As-Needed Services. Project Manager. Manged dozens of projects pertaining to sanitary sewer, storm seer, and site work. COmpleted designs, coordinated bidding with Purchasing, and scored proposals with City's new process. Projects included:

- Green/Plymouth Water Main Repair
- Rock Creek Sewer Repair
- Wheeler Center ADA Improvements
- Sewer Condition Assessment WOrkflow
- Pittsfield Township Sewer Audit
- Inspection fo Underground Pipe Detention
- Ann Arbor TOwnship Islander
- Sanitary Manhole Assessment
- Huron River Drive Culvert Improvements

WTP HVAC Renovation City of Ann Arbor, MI. Project Manager. HVAC renovation of the water treatment plant systems. Replaced eight air handlers.

WTP SCADA Modernization Design-Build, City of Ann Arbor, MI. Project Manager. During SCADA control room renovations, the need to improve HVAC systems was identified. Initiated a study phase to determine space to be conditioned and unit size. Design included evaluation of ultraviolet disinfection and air ionization to improve air quality. Identified construction sequencing to conduct work during the spring when outside air was a moderate temperature. Led WTP staff training for new unit and control systems.

Northeast High Service District Water Main Replacement and Hydraulic Transient Evaluation, City of Ann Arbor, MI. Project Manager. Tetra Tech Designed 1,100 feet of 12- and 16-inch water main to repair a failed reach through a 7- by 5-lane intersection adjacent to freeway access caused by two pipe breaks along 1960s-era cast iron pipe within one year. Investigated the causes of the water main breaks including an evaluation of hydraulic transients. Reviewed historical water main break data and performed investigative review of the City's SCADA data from the days the two water main breaks occurred. Impulse monitoring was completed to detect transients. The City's water distribution network was trimmed and modeled in InfoSurge to evaluate conditions that could have caused transients under normal operation and extreme conditions. Tetra Tech concluded that corrosion of the pipe weakened the water main and eventually caused the pipe to fail.

Craig Road Area Utility Study, City of Ann Arbor, MI. Project Manager. Study of the needs to serve a proposed 108-unit development. Evaluated potential pipeline routes and the impacts of new demand on existing utilities.

Wastewater Siting Study, City of Saline, MI. Project Manager. Responsible for the development of a comprehensive plan for the evaluation of wastewater treatment alternatives to determine the best long-term approach for the City, addressing wastewater treatment needs due to aging infrastructure and growth demands. Reviewed flow projections for future capacity and loading requirements; evaluated existing site for feasible expansion opportunities and developed new wastewater treatment site location alternatives.

Water and Wastewater Engineering, City of Saline, MI. Project Manager. Responsible for as-needed operational assistance while the city had appointed an interim superintendent. Assisted with the completion of 28 preventative maintenance and equipment replacement projects. Sought Michigan EGLE construction permits and assisted with various communications with EGLE.

Pump Station Modernization Project, City of Saline, MI. Project Manager. Responsible for the development of a comprehensive plan for the rehabilitating 4 of the city's largest pump stations. Work included pipe, pump, and control panel replacement. Backup generators were installed at two stations and stations were connected to City's SCADA system.

Infiltration/Inflow Study and Sewer System Evaluation Survey, City of Saline, MI. Project Manager. Conducted a fast-track Infiltration/Inflow study using a calibrated computer model of the collection system to assess the impact of I/I on the collection system and WWTP. Both studies were completed within an 11-month schedule and made the city eligible for the SRF loan one year before the previous plan. Over 500 I/I sources were located, and the analysis demonstrated that $2.4 million could be saved in capital cost through sewer rehabilitation. The Michigan Department of Environment, Great Lakes, and Energy (EGLE) subsequently approved the I/I studies without a single comment.

Nine Mile Pump Station, 8 ½ Mile Relief Drainage District, Macomb County, MI. Project Manager. The largest and most complex project for Macomb County in the last 50 years, this project includes the alternative analysis, hydraulic modeling and final design for a 600 cfs combined sewage pump station within the Chapaton Retention Treatment Basin. Project components included new pumping, screening, mechanical, electrical, structural, geotechnical and architectural considerations.

Low Impact Development and Rain Garden Evaluation, Numerous Projects, Adrian, MI. Project Manager. Rain garden and low impact development evaluation for Adrian's central business district. Identified the feasibility, costs, and benefits of implementing green stormwater practices. Completed report also identified the grant and low interest financing available for implementation.

Gary Markstrom, PE

QA/QC

37 years of experience

Mr. Markstrom has extensive professional experience as a Project Manager, QA/QC Manager, Client Representative, Project Engineer, and Design Engineer. He has worked on numerous diverse projects that involve: wastewater collection systems and treatment facilities; water supply, storage, and treatment facilities; stormwater management systems; as well as rate studies, commercial building projects, transportation engineering, feasibility plans, and site plan reviews.

EDUCATION:

BS, Civil Engineering, Michigan Technological University, 1985

REGISTRATIONS:

Professional Engineer:
Michigan, No. 36424
Wisconsin, No. 39853-006
California, No. 44066
Ohio, No. 75795

Certified Construction Specifier, 1994

AFFILIATIONS:

Water Environment Federation

American Society of Civil Engineers

American Water Works Association

OFFICE:

East Lansing, MI

SELECT RELEVANT EXPERIENCE

Consulting Engineering, Genoa and Oceola Townships, MI. Engineering Consultant. Site and construction plan reviews, ordinance review and preparation, engineering design standard preparation, road inspections, and capital improvement planning.

Authority Engineer, Marion, Howell, Oceola, Genoa (MHOG) Water Authority and Genoa Oceola Sewer Authority, Livingston County, MI. Engineering Consultant. Construction plan reviews, ordinance review and preparation, construction inspection, capital improvement planning, budgeting, and general consulting.

Engineering Services, City of Brighton, MI. Engineering Consultant. Site and construction plan reviews, ordinance review and preparation, engineering design standard preparation, road inspections, capital improvement planning and general consulting.

MHOG Water Authority, City of Howell, MI. Project Manager. Led a team to evaluate the metering technologies system. Project considered both radio-read and locally-read systems evaluated displacement (disc), combination and turbine meters.

Pressure Reducing Valve Replacement in West Regulated and Alger Pressure Districts, City of Grand Rapids, MI. QA/QC. Developing improvements to pressure reducing stations in two pressure districts, West Regulated Pressure District, and Alger Pressure District. Improvements are necessary based on the age and condition of vaults, pressure reducing valves, and isolation valves. The City identified several pressure reducing stations that could be eliminated based on results of hydraulic modeling conducted to support the 2020 Comprehensive Master Plan. Project is intended to reduce O&M requirements and improve vault safety for routine maintenance work.

Surface Water Intake Protection Program, City of Muskegon, MI. Project Manager. Developed the City's Surface Water Intake Protection Plan (SWIPP) in accordance with Michigan Department of Environmental Quality (now EGLE) Grant requirements. Performed a search of government environmental databases, reviewed historical aerial photographic documentation, and updated the Potential Contaminant Source Inventory Map to update the 2003 MDEQ Source Water Assessment for land uses to be considered for inclusion in the SWIPP. Reviewed the emergency response plan and provided recommendations for the most likely contaminants that might occur. A list of recommendations was developed, prioritized, and a timeline was proposed to implement the recommendations.

St Joseph Highway Water Main Design and Non-Motorized Facility Evaluation, Delta Township, MI. Project Manager. Project included the preliminary design for replacement of an aged pipe along St Joseph Highway from Waverly Road to Creyts Road (2 miles). In addition, the project included the evaluation of alternatives for a non-motorized pathway from Waverly Road to Market Place Boulevard (3.5 miles). The pathway alternatives included repurposing existing travel lanes to bike path, pathways off the road on each side and then a single dedicated pathway one side of the road. A traffic study was prepared by the team to determine the feasibility of on road facilities and impacts to the traffic patterns. The water main design included routing considerations, cross street tie ins and phasing of the work.

James Brescol, PE

QA/QC

26 years of experience

Mr. Brescol is Tetra Tech's Chief Engineer for Hydraulic Modeling and has extensive experience with the analysis and evaluation of wastewater and storm sewer collection systems. He specializes in applications of hydrology and hydraulics. He leads and manages projects involving green infrastructure, CSO long-term control planning, SSO elimination, collection system master planning, hydraulic modeling, flow monitoring, pipeline hydraulic transients, WWTP hydraulics, and floodplain analyses.

EDUCATION:

BS, Biosystems Engineering, Michigan State University, 1997

REGISTRATIONS:

Professional Engineer:
MI, No. 6201049792
OH, No. 67981
KY, No. 29059
FL, No. 85489
GA, No. 043716
NY, No. 100077
TN, No.121366
TX, No. 132422

AFFILIATIONS:

Water Environment Federation

OFFICE:

Cincinnati, OH

SELECT RELEVANT EXPERIENCE

Swan Creek North Sewer Separation and Green Infrastructure, City of Toledo, OH. Project Manager/Lead Engineer. The City's LTCP included a tunnel project to provide CSO control in the Swan North area. Tetra Tech worked with the City to gain a consent decree modification to use sewer separation and green infrastructure in place of the tunnel. The modification will provide a higher level of control, reduce pollutant loads to Swan Creek, and save the City $3M. Project includes separation of 190 acres of combined sewer area to reduce the frequency of CSO discharge to three to four occurrences per year. Smoke testing and private property investigations were performed to identify inflow sources and recommendations for removal. Green infrastructure (GI) practices will be provided to polish the newly separated stormwater discharges. GI improvements include a combination of linear bioswales within the street right-of-way and neighborhood-level bioretention practices on contiguous vacant parcels to create a pocket park setting.

Chartiers Creek Facility Planning, Allegheny County Sanitary Authority, Allegheny County, PA. Technical Modeling Leader. Facility plan to address 60 combined and SSOs in the Chartiers Creek service area. Hydraulic model development for 98 miles of sewers in a 97-square-mile service area; model calibration at over 100 flow meter locations; and an alternatives/cost-benefit evaluation, including separation, green infrastructure, conveyance, storage, and treatment technologies. Recommended alternative included 16 miles of relief interceptor and new conveyance, 2,000 feet of 12-foot-diameter tunnel, and a 1.2-MG storage basin. Recommended alternative was detailed to a 10-percent level of design, including a detailed hydraulic profile to ensure the facilities will operate against 25-year river levels and elevated levels at the WWTP wet well.

Stormwater Collection System Modeling, City of Grand Rapids, MI. Led calibration optimization analyses, overseeing the use of the Integrated Planning and Optimization Program (iPOP) to calibrate a stormwater model to observed flow metering data. Using iPOP, performed more than 650,000 model simulations to calibrate the stormwater model to 63 flow metering sites in a period of two months. Developed the stormwater collection system model covering more than 45 square miles with 500 miles of storm sewer and open channels to convey stormwater to the Grand River or one of its tributaries. A detailed impervious area coverage and radar rainfall were applied to improve the spatial and temporal accuracy of the model. Capacity analysis included identifying system bottlenecks using a 10-year, 24-hour design storm and flooding frequency analysis for a long-term simulation with 53 years of rainfall records. Capacity analysis included an assessment of sewers, open channels, pump stations, and storage facilities. Multiple river stages were evaluated to understand the impacts to the collection system in low lying areas behind the floodwall.

Sanitary Sewer Master Plan, City of East Lansing, MI. Technical Leader. Sanitary sewer master plan to provide capacity for anticipated future development and eliminate any identified sanitary sewer overflows. Project included developing a hydraulic model of the sanitary sewer system for all pipes larger than 12 inches and incorporating flows from the combined sewer system and combined sewer overflow control tunnel. A master plan was developed to provide additional conveyance capacity to the City's wastewater treatment plant.

Daniel Warren, PE, CDT

Project Engineer/On-Site Support

19 years of experience

Mr. Warren's experience is primarily focused on municipal projects. He is involved in the preparation of construction plans, specifications, and cost estimates for state, municipal, and county projects. Mr. Warren has been involved in numerous public improvement projects including water distribution, wastewater collection, pump station rehabilitation, and a large-scale utility relocation efforts related to major transportation projects.

EDUCATION:

BS, Civil Engineering, University of Michigan, 2002

REGISTRATIONS:

Professional Engineer:
Michigan, 6201069357
Virginia, No. 0402047321

NASSCO Pipeline Assessment Certification Program (PACP) Certification

NASSCO Manhole Assessment Certification Program (MACP and LACP) Certification

Construction Documents Technologist

OFFICE:

Ann Arbor, MI

SELECT RELEVANT EXPERIENCE

Water Treatment Plant Lime Residual Removal, City of Ann Arbor, MI. Project Engineer. Developed specifications and design documents for dredging the lime storage lagoon. Design included utilizing piping to pump lime sludge back to the plant parking lot where temporary presses would dewater the material and to be hauled offsite.

Carrier Creek Interceptor Sewer, Delta Township, MI. Technical Lead. Design of a replacement 36-inch sanitary sewer along a failed reach from St. Joseph Highway to 1,300 LF north. The alignment crosses Carrier Creek and has poor soil conditions for pipe bedding. Pipe was placed on piles for additional support. Large diameter PVC pipe was selected for its weight and strength. Permitting involved wetlands, inland lakes and streams and environmental impact survey.

Michigan and Harrison Road Sanitary Sewer Improvements, City of East Lansing, East Lansing, MI. Project Engineer. Developed technical specifications, reviewed pre-construction CCTV videos documenting current conditions, and provided recommendations for rehabilitation. Provided shop drawing reviews and construction engineering support for critical sanitary sewer infrastructure upgrades that included the construction of a new inverted siphon river crossing, new conveyance piping ranging in diameter from 8 to 54 inches, two new combined sewer regulator structures, as well as the modification of several control structures, new storm sewers, and rehabilitation of 24-inch sanitary sewers within the limits of Michigan State University campus. Coordinated with utility companies to remove conflicting infrastructure.

West Warren Green Stormwater Infrastructure and Sewer Separation, Detroit Water and Sewerage Department, Detroit, MI. Project Engineer. Sewer separation of 218-acres of urban neighborhood to meet wet weather reduction goals. Completed 60 percent plans to date, including sewer route, sizing analyst, and cost estimation. The Parkland neighborhood is currently served by a combined sewer system which discharges to the Rouge River. Design included "opportunist separation" by removing storm flows from the street network, but not any underdrain connections or yard drains, due to the system layout. Reviewed CCTV footage for portions of the storm drain system that connects into the combined system to determine suitability for reuse as a cost saving measure. Made recommendations to add manholes to the system for future maintenance access.

Sidewalk Improvements, Grand River Avenue Phase VII, Genoa Township, MI. Project Engineer. Updated years-old design documents to reflect current conditions and completed updated cost estimate. Design included replacing 1000+ SF of timber retaining wall with a Redi-Rock concrete block wall system.

Stormwater Mitigation, Green Infrastructure and Climate Change, City of Grand Rapids, MI. Project Engineer. Oversaw inventory and data collection of the City's storm water culverts. Coordinated CCTV inspections for additional asset data collection of the lowest scoring culverts. Coordinated and input newly acquired PACP inspection data to update the City's GIS system.

Wheeler Center ADA Design, Ann Arbor, MI. Project Engineer. Developed design drawings for replacement of sidewalk ramps to improve compliance with ADA mobility requirements.

Scott Buchholtz, PE

Bridges/Structural Engineer

36 years of experience

Mr. Buchholz is experienced in bridge design, scoping, load rating, and maintenance and construction inspection. He has served as the lead designer or project manager on numerous MDOT and agency bridges, including designing and load-rating concrete, pre-stressed concrete, steel, and timber structures. As qualified team leader, he's performed safety and detailed bridge inspections and funding applications. Design and construction project types have been split between new and rehabilitation work.

EDUCATION:

BS, Civil Engineering, Michigan Technological University, 1987

REGISTRATIONS:

Professional Engineer:
MI, No. 37498
OH, No. E-65399
CA, No. C45530
FL, No. 58332

FHWA National Highway Institute, Two-week Course

Safety Inspection of In-service Bridges

Bridge Inspection Refresher

OFFICE:

Brighton, MI

SELECT RELEVANT EXPERIENCE

Hessen Road over Rattle Run Creek and Swan Creek Bridge Replacements, St. Clair County, MI. Project Manager/Senior Bridge Engineer. Bridge replacement design projects, funded by Michigan Local Agency Bridge Program, included replacing single-span structures with 3-sided precast concrete arch culvert with precast wingwalls at Swan Creek and an aluminum box culvert at Rattle Run Creek. Roads were designed with additional width and road profile improvements.

Wales Center Road over Apply Drain Bridge Replacement, St. Clair County, MI. Project Manager/Senior Bridge Engineer. Bridge replacement design project, funded by Michigan Local Agency Bridge Program, included replacing a single-span concrete structure with 3-sided precast concrete arch culvert with precast wingwalls.

Cypress St. Outfall Regional Stormwater Improvements Design-Build, Tampa, FL. 2018. Lead Structural Engineer. Designed two large stormwater junction boxes and one transition structure. The junction structures included a 15 ft wide x 20 ft long and 11 ft high box and a 20 ft wide x 25.5 ft long and 13.5 ft high box. Each junction structure connected three large box culverts. The wall openings for each connected box culvert was designed as a frame. The top and bottom slabs were designed as cast-in-place box culverts according to FDOT standards. The project includes more than 8,000 ft of box culvert for stormwater. The project also includes replacing the existing water and wastewater facilities; installing a new 36-inch transmission main and improving/adjusting the existing transportation infrastructure facilities.

Complex Structures and Quality Control Contract, Michigan Department of Transportation, Statewide, MI. Project Manager/Lead Load Rating Engineer. The load rating analysis and/or QA/QC tasks on two separate contracts that included ratings for 75 complex or unique bridges. Most of the load ratings can be described as complex, deteriorated or damaged structures. The complex bridge types have included, concrete arches, timber arches, steel trusses, moveable bridges (bascule & swing truss), curved steel girder, and tied arch. Thirteen of the bridges have been concrete arch type structures including, open spandrel arches, earth filled spandrel arches, precast arch units and long span 3 sided concrete frames. The required structural analysis' conform to National Bridge Inspection Standards (NBIS) and MDOT policies and procedures. Reviewing load rating results that do not meet standards.

Second Ave over Thunder Bay River, Alpena, MI. Project Manager/Senior Bridge Engineer. Responsible for leading a bridge preventative maintenance design project funded by Michigan Local Agency Bridge Program. Prior to beginning the design, led a detailed structural, mechanical, electrical and underwater inspection as the inspection Team Leader. The detailed inspection was used to determine the scope and quantities of repairs. The Second Ave over Thunder Bay River Bridge is a bascule bridge with fracture critical members. The project included structural steel repairs and painting, concrete repairs, joint replacements, MIOSHA upgrades, and miscellaneous mechanical and electrical repairs. Tetra Tech prepared the 2013 Michigan Local Bridge Program funding application.

City of Alpena Bridge Inspections, Alpena, MI. Inspection Team Leader. Responsible for the routine and detailed inspection of the Second Avenue Bridge.

Ana Bickley, PE

Streets Engineer

14 years of experience

Ms. Bickley is experienced in the areas of roadway and highway design, scoping and CADD. Overall project responsibilities have included generating plans, profiles, typical sections, traffic signing and pavement marking plans, signal plans, maintenance of traffic and detour plans, and preparing cost estimates. Ms. Bickley is skilled with MicroStation, Geopak, Auto Turn, and SignCAD. She is familiar with MDOT and AASHTO standards for road design and plan preparation.

EDUCATION:

BS, Civil Engineering, Michigan State University, 2008

REGISTRATIONS:

Professional Engineer: Michigan, No. 059363

OFFICE:

Brighton, MI

SELECT RELEVANT EXPERIENCE

US-24, I-696 to West Quarton, MDOT, Oakland County, MI. Project Engineer for assisting with the street rehabilitation design for eight miles of divided urban arterial with directional crossovers. Construction plan preparation included a structure HMA overlay, pavement conditioning, permanent signing/pavement marking, traffic signal modernization, guardrail replacement, sidewalk/ADA improvements and maintenance of traffic. Right-of-way plans were also prepared for this project to facilitate geometric improvements.

I-275, US-12 to Hines Drive, MDOT, Wayne County, MI. Project Engineer for design/build of seven miles of street rehabilitation/ reconstruction along I-275. Project consists of replacing four bridge structures and widening/ rehabilitating a bridge structure over area streams. Two boardwalks were designed to minimize wetland impacts. Path design included widening and improvements to the horizontal and vertical alignment, as well as the design of new bridge approaches to all of the structures. A railroad crossing design was also performed to improve sight distance and safety. Modifications to the four bridge structures were undertaken to facilitate widening the path without impacting the existing spread footings. Path was designed under these bridges to meet vertical clearance requirements. Work also included preparation of a TMP, signal modifications for installation of countdown signals, permanent signing, utility coordination, and traffic maintenance for I-275 lane/shoulder closures.

I-96 WB from M-19 to Taylor Road, Michigan Department of Transportation, St. Clair County, MI. Road Engineer. Design services for the rehabilitation and select reconstruction of nearly 10 miles of rural freeway. The project included a three-course hot mix asphalt overlay (including an asphalt crack relief layer), freeway reconstruction underneath bridges to maintain the required underclearance, ramp surfacing, drainage, signing, guardrail, and safety improvements.

US-24 over Upper Rouge Bridge Approach, Macomb County, MI. Project Engineer. Design of partial bridge approach replace on NB US-24. The project included curb replacement, guardrail design, permanent signing and maintaining traffic plans. Maintaining traffic plans were developed for the part width construction work and well as for the full closure of NB US-24 utilizing a temporary crossover and a detour.

Belleville Road Sidewalk, Van Buren Township, Wayne County, MI. Project Engineer. Design of a 10' sidewalk/ shared use path along the east side of Belleville Road from EB I-94 Service Dr to WB I-94 Service Dr. The work included designing and modeling new sidewalk that crosses three I-94 freeway ramps and ties into the new widened bridge structure. Proposed signing was added along the proposed sidewalk, on Belleville Road and the adjacent ramps to ensure safety for all modes of transportation. The project also included drainage design, guardrail design, pavement marking, and maintaining traffic plans.

I-94, WB I-94 over Old M-25 Connector, Michigan Department of Transportation, St. Clair County, MI. Lead Road Engineer. Design new embankment roadway over old M-25 Connector. Work includes light weight fill embankment with EPS blocks. Modeling of the proposed roadway and temporary ramp was done to model temporary and proposed grading to ensure adequate drainage.

Kirk Pietila, PE

Street Design Engineer

22 years of experience

Mr. Pietila is experienced in road design using MDOT, AASHTO, and FHWA standards, including complex urban freeways, rural freeways, interchanges, arterial roadways, pavement rehabilitation, and intersection design. His experience includes generating plans, profiles, typical sections, alignments, traffic signing and pavement marking plans, right-of-way plans, and preparing special provisions, design exceptions, cost estimates, and construction.

EDUCATION:

BS, Civil Engineering, Michigan Technological University, 2001

REGISTRATIONS:

Professional Engineer: Michigan, No. 55131

Work Zone Traffic Control Supervisor (ATSSA)

OFFICE:

Brighton, MI

SELECT RELEVANT EXPERIENCE

Plymouth & Green Roads Water Main Replacement, Ann Arbor, MI. Project Engineer. Provided design services to replace water main at the critical intersection of Plymouth Road and Green Road to avoid additional breaks. Maintained traffic during construction.

I-275 from US-12 to Hines Drive, Wayne County, Michigan. Lead Road Engineer. Project consisted of 7 miles of trail rehabilitation/reconstruction including the replacement of four bridge structures and the widening/rehabilitation of one bridge structure over streams within the project limits. Two boardwalks were also designed to minimize wetland impacts. Path design included widening and improvements to the horizontal and vertical alignment as well as the design of new bridge approaches to all the structures. A railroad crossing design was performed to improve sight distance and safety. Design also included modifications to four bridge structures over I-275 to facilitate widening of the path without impacting the spread footings. The path was designed under these bridges to meet vertical clearance requirements. Prepared a Transportation Management Plan (TMP), signal modifications for the installation of countdown signals, permanent signing, utility coordination, and traffic maintenance for I-275 lane/shoulder closures.

M-8 (Davison), Oakland to Conant, Wayne County, MI. Lead Road Engineer. Design of 1.5 miles of urban depressed freeway and urban arterial reconstruction. Included roadway re-alignment, enclosed drainage, extensive hydraulic analysis, subsurface utility investigation, and site investigation. Concrete median barrier, single face barrier, valley gutter, and urban freeway curb was also utilized in the typical section. Coordination with a separate MITS contract and MDOT lighting replacement. Project included extensive geometric design study to develop alternatives to improve vertical clearance, reduce crashes at a freeway service drive merge point, improve sight distance, and improve the freeway to arterial transition. The work also included design of approaches to three bridge structures over the freeway.

I-94, Freer Road to Parker, Washtenaw County, MI. Lead Road Engineer. Design of 6 miles of freeway rehabilitation, ramp reconstruction/geometric improvements, drainage modifications, and safety improvements. Work included HMA surfacing, cold milling, patching, pavement condition survey, and guardrail replacement. Gap graded superpave mix was utilized for the wearing course. Interchange ramp geometrics were studied and upgraded to current standards. The outside shoulders were reconstructed, requiring extensive ditch relocation and intermittent drainage enclosure.

I-94 Interchange at Baker Road, Washtenaw County, MI. Road Design Engineer. Design of new eastbound and westbound entrance ramps to I-94, reconstruction and geometric improvements of two existing ramps, and Baker Road reconstruction in conjunction with the bridge replacement over I-94. The project included a geometric study to determine alternative ramp alignments, right-of-way acquisition, and vertical alignment design in conjunction with the bridge replacement. The design included preparation of HMA sections for the ramps and concrete sections for the cross road reconstruction. Extensive bridge approach design was performed to facilitate the Baker Road reconstruction, widening and vertical clearance improvements.

Dan Christian, PE, DWRE

Stormwater Management

33 years of experience

Mr. Christian's expertise includes hydraulics, hydrology, computer modeling, stormwater management, stormwater permitting, low impact development design, master plans, water quantity and quality monitoring, rate development, project development and project management. Stormwater master/management plan development is a regular part of Mr. Christian's work. Plans are written at a wide variety of scales, from individual sites and neighborhoods, to larger sewershed areas and for complete communities.

EDUCATION:

MS, Civil Engineering, Michigan State University, 1995

BS, Civil Engineering, Michigan State University, 1990

REGISTRATIONS:

Professional Engineer:
MI, No. 6201040522
IL, No. 062.061801
KY, No. 29189
NE, No. E-13033
OH, No. 74054
WI, No. 34187-006
MN, No 53466

Diplomate, Water Resources Engineer

AFFILIATIONS:

American Society of Civil Engineers

American Water Resources Association

Michigan Water Environment Association

Water Environment Federation

OFFICE:

East Lansing, MI

SELECT RELEVANT EXPERIENCE

Green Infrastructure (GI) Program Management, Detroit Water & Sewerage Department, Detroit, MI. Senior Technical Lead/Project Manager. Overall program includes planning, evaluation, design, and implementation of green infrastructure projects in the Upper Rouge watershed and other locations within the City identified by DWSD. Designed and constructed many green infrastructure projects on vacant lots, along roadways, at schools and in parks. Project component addressed post-construction stormwater management control. The City had no formal ordinance or policy documents regulating stormwater management as a part of site development and redevelopment activities.

Stormwater Management Technical Assistance, Grand Rapids MI. Senior Technical Lead. Stormwater management and GI technical assistance has been provided to the City for many years through several contracts. At present, a stormwater collection system model is being developed for the entire city. Model is being calibrated to over 70 flow meters throughout the City and is using radar rainfall information along with a comprehensive impervious cover classification. In the early 1990s, NPDES MS4 Phase 1 permit applications (parts 1 & 2) were prepared for the City. At that time, a stormwater ordinance, a technical reference manual and a stormwater master plan were prepared.

Climate Resiliency and Flooding Mitigation Study, SEMCOG and MDOT, MI. Project Manager. The first task examined the Metro Region's current transportation flooding problems, investigated changing climate, and explained implications of anticipated future weather conditions. An updated risk assessment is conducted to identify and prioritize transportation assets subject to flooding. Recommendations are made for long-range transportation planning and stormwater design criteria. An integrated holistic approach is taken to consider runoff sources and present ideas that address the flooding in a sustainable and resilient way going well beyond bigger pumps and pipes.

USEPA GI Technical Assistance Program, Nationwide. Senior Technical Lead. Municipalities were awarded technical assistance from USEPA through a competitive proposal process. The assistance was tailored to each community based on their individual needs. Processes and tools to improve consistency in decision making and reduce barriers for inclusion were developed for Omaha NE. In Gary IN, strategies and conceptual designs were developed to reduce stormwater to their overwhelmed combined sewer system through GI incorporated into streets and vacant parcels. For St. Paul MN, a centralized GI system incorporating natural stream-like water features with adjacent wetlands was designed as a shared public-private stormwater management facility. In Pittsburgh PA, project developed educational materials for technical professionals, public officials, and the public to address perceived and real barriers to designing, installing and maintaining GI. For SEMCOG, a stormwater management framework was developed to set GI implementation targets and the identification of critical areas. Conceptual design plans for three neighborhoods were developed for 3 Rivers Wet Weather in Pennsylvania. For La Crosse WI, green street BMPs were sized to manage street flooding. In the Denver CO area, for the Urban Land Conservancy, GI practices were designed for a blighted infill redevelopment project.

Richard Walker, PE, CFM

Stormwater Management

40 years of experience

Mr. Walker has a broad range of experience in civil and water resources engineering, hydrologic/hydraulic modeling, stormwater/floodplain management, water/wastewater engineering, and landfills. He developed stormwater design manuals for municipalities that contain requirements for post-construction runoff, erosion prevention and sediment control, and green infrastructure. In addition, he has assisted cities with implementing stormwater utilities.

EDUCATION:

Master of Civil Engineering (Water Resources), University of Kentucky, 1989

BS, Agricultural Engineering, University of Kentucky, 1982

REGISTRATIONS:

Professional Engineer:
Kentucky, No. 15345
Ohio, No. 77599

Certified Floodplain Manager

AFFILIATIONS:

National Society of Professional Engineers

Association of State Floodplain Managers

Water Environment Federation

OFFICE:

Lexington, KY

SELECT RELEVANT EXPERIENCE

Municipal Separate Storm Sewer System Compliance, Lexington-Fayette Urban County Government, Lexington, KY. Program Manager. Provides program management services to ensure compliance with the MS4 permit and stormwater requirements of the EPA Clean Water Act consent decree. Develops procedures for the permitting, plan review, inspection, and enforcement of construction sites and post-construction stormwater management for new development and redevelopment. Directs the development of procedures for illicit discharge investigations, inspections of municipal facilities, and inspection/enforcement of industrial facilities. Develops training programs for staff involved in the inspection of construction sites, illicit discharges, and industrial facilities. Developed stormwater low impact development (LID) guidelines for new development and redevelopment. Directs the water quality monitoring program and development of TMDL implementation strategies. Assists the city with implementing the updated Stormwater Manual that contains the post-construction stormwater management requirements for new development and redevelopment. Developed private and public property detention basin inspection program.

Stormwater Manual Update, Lexington-Fayette Urban County Government, Lexington, KY. Program Manager. Developed new requirements for post-construction stormwater management in new development and redevelopment that addressed flood control, runoff reduction using green infrastructure, and water quality volume treatment. Revised sections on floodplain management, erosion and sediment control, hydrology, inlets, storm sewers, culverts, and open channels. Developed a compliance spreadsheet summarizing the required water quality volume/runoff reduction volume and the proposed water quality controls.

Stormwater Utility and Master Drainage Plan, City of Hopkinsville, KY. Project Manager. Developed a stormwater master drainage plan that identified projects to address river flooding and surface drainage problems with a construction cost of $22 million. Assisted the City with implementing a stormwater utility to generate $1 million in annual revenues. Prepared a feasibility study for a flood control structure on the South Fork of the Little River.

Walhampton Stormwater Improvements, Lexington-Fayette Urban County Government, Lexington, KY. Principal-in-Charge. Stormwater improvements project involving the design of a detention basin and storm sewers to reduce flooding in the neighborhood. Provided QA/QC on the hydrologic/hydraulic model.

Stormwater Management Plan, Economic Development Campus, Oldham County Economic Development Authority, La Grange, KY. Project Manager. Developed a stormwater management plan using a combination of detention ponds and LID practices such as pervious pavement, bioswales, and bioretention.

Water Quality Management Fee, Lexington-Fayette Urban County Government, Lexington, KY. Program Manager. Directed the stormwater rate study that involved the creation of the impervious area database and development of the enabling ordinance. The fee generates $13 million annually.

Amy Murdick, PLA

Stormwater Management/Barrier-Free Design

17 years of experience

Ms. Murdick is an accomplished water resources engineer and landscape architect with a solid history of guiding all phases of the planning and design processes and execution of diverse projects. She has extensive multidisciplinary knowledge of integrated site design, stormwater management, and green stormwater infrastructure techniques. Her core competencies include: site/civil design, grading and drainage, stormwater management, green stormwater infrastructure, urban design, and master planning.

EDUCATION:

MSE, Civil Engineering: Hydraulic and Hydrologic Engineering, University of Michigan, 2015

MS, Natural Resources and Environment: Aquatic Sciences, University of Michigan, 2015

BLA, Landscape Architecture, Michigan State University, 2006

REGISTRATIONS:

Professional Engineer:
Michigan, No. 68861

Professional Landscape Architect:
Colorado, No. 1372
Michigan, No. 1506
Washington, No. 1594
Wisconsin, No. 660-14

LEED AP

OFFICE:

Denver, CO

SELECT RELEVANT EXPERIENCE

Woodward Crisis Center, Detroit Wayne Integrated Health Network, Detroit, MI. Lead Landscape Architect/ Project Engineer. Sized and designed all stormwater management features for the site to meet the requirements of the City's Post Construction Stormwater Management Ordinance and Stormwater Design Manual standards. Completed all permitting documentation for the Post-Construction Stormwater Management Plan to document the design of two underground detention practices, a pervious paver parking lot, three green stormwater infrastructure practices, and all proposed piping to the existing combined sewer system. Designed landscaping for the site to match the early 1900s architecture of the building and to meet the requirements of all City ordinances.

Green Stormwater Infrastructure Program for CSO (CS-1522), Detroit Water and Sewerage Department, City of Detroit, MI. Lead Landscape Architect and Project Engineer. The City of Detroit embarked on an Alternative Rouge River CSO Control Program that would result in reduced costs for CSO control and would take into account the significant changes that have occurred regarding land use and vacancy within the City. An investment of $30 million in green stormwater infrastructure solutions to reduce the volume of runoff into the combined sewer system by 2.8 million gallons during the 2-year, 24-hour event was required by Michigan EGLE.

Bioretention Curb Extension, Barnes Avenue, Phase V, Segment 2, CSO 034C Project Area, City of Lansing, MI. Lead Landscape Architect. Redesigned green infrastructure components as part of a sewer separation project. Project included vegetation selection and design of bioretention curb extensions located at the street's low point to filter and infiltrate runoff from the street. These systems were redesigned with depressed bioretention as opposed to the raised turf grass construction, and the completed system handles a total of 1,000 gallons of storage, equivalent to 0.58 inches of runoff from the impervious surfaces.

Green Infrastructure for Diehl Park, City of Defiance, OH. Lead Landscape Architect and Project Engineer. Assisted in the layout of a 13,000-SF bioswale at the entrance of Diehl Park. Project included on-site tree evaluation and protection and native plant design, including a native seed mix for the center of the bioswale and colorful native plugs near the entrance of the park. Also included a redesign of the park entrance sign and plantings.

East Quay Street Municipal Parking Lot Improvement Project, City of Port Huron, MI. Lead Landscape Architect. Designed concepts for green infrastructure improvements that would meet water quality and landscaping requirements of local ordinances with little to no loss of existing parking spaces. Selected vegetation for the final design of the parking lot.

Conceptual Green Infrastructure Project Development, City of Defiance, OH. Project Engineer. Performed a preliminary evaluation of the use of green infrastructure to either accomplish inflow reduction or to reduce the amount of new storm sewer associated with the planned inflow reduction projects in targeted areas in support of the City's CSO Control Policy and Long-Term Control Plan.

Justin Voss, PE

Site Work/Asset Management/Capital Improvement Planning

17 years of experience

Mr. Voss is a hydraulics and hydrology professional, focusing primarily in computer modeling applications for hydraulic systems, including collection systems, pressure flow systems, and open channel flow. His collection system experience includes flow monitoring, modeling, I/I studies, and sewer evaluation surveys for sanitary, storm, and combined sewer projects. He is familiar with EPA-SWMM, InfoSWMM, InfoSWMM 2D, Storm and Sanitary Analysis, PCSWMM, SewerGEMS, XP-SWMM, and InfoWorks ICM.

EDUCATION:

MSE, Civil Engineering, University of Michigan, 2005

BSE, Civil Engineering, University of Michigan, 2004

REGISTRATIONS:

Professional Engineer:
Michigan, No. 6201056026
Ohio, No. 77598
Florida, No. 87245
Indiana, No. 11900272

OFFICE:

East Lansing, MI

SELECT RELEVANT EXPERIENCE

Plymouth and Green Roads Hydraulic Transients Analysis, City of Ann Arbor, MI. Hydraulic Engineer. Two major water main breaks occurred on a 12-inch transmission main in a 6-month period in the intersection. Study was to determine if hydraulic transients could have contributed to the failure. Breaks occurred on a cast iron pipe installed in the late 1960s, which had visible exterior corrosion through about half the thickness of the pipe wall. A review of SCADA from the days of the two water main breaks ruled out transients created by the dewatering of the nearby North Campus Reservoir. Final conclusion: pipe corrosion weakened it, causing it to fail. The City's 16,000 link model was trimmed to 3,000 to be modeled efficiently in InfoSurge to test possible conditions that could have caused transients in the system. The model showed minor transients in the vicinity of Plymouth and Green Roads even during more extreme conditions such as a sudden pump shutdown due to a power failure or a rapid valve slam.

Steere Farm Well Field Hydraulic Transients Analysis, Ann Arbor, MI. Hydraulic Engineer. Three gas engine pumps were replaced with electrical motor pumps to improve reliability. With the gas engines, pump failures were unlikely to occur simultaneously, but the risk would increase with a single electrical supply. InfoSurge was used to evaluate the potential for waterhammer to occur following the rapid pump shutdown during a power failure.

Midtown Booster Station, City of Ann Arbor, MI. Project Engineer. Review of water booster station designed by developer. Used City InfoWater model to analyze impact on City's system.

Urban Development Authority Feasibility Analysis, City of Saline, MI. Lead Hydraulic Engineer. Developed a conceptual water distribution plan to provide services to up to 2,000 acres in neighboring Saline and Lodi Townships that would double the service area. Proposed water distribution plan included conceptual layout of water main throughout the UDA and a more detailed analysis to optimize a booster station and ground storage to create a new pressure district to an area of higher elevation.

Water Reliability Study Update, City of Brighton, MI. Lead Engineer. Updated City's InfoWater model with changes to the system. Developed an 18-site hydrant testing plan to update the model calibration to current conditions. Used model's extended period simulation feature to assess pressures and fire flow in the infrastructure and develop recommendations and opinions of cost for current and future needs. Completed a water reliability study report to meet Michigan EGLE reporting requirements.

Drinking Water Master Plan, City of Quincy, MA. Quality Review. Provided review at key steps in the master plan development, specifically with respect to the development of the City's InfoWater hydraulic model, calibration of the model, alternatives, water age simulations, and report.

Drinking Water Asset Management Plan, Marion, Howell, Oceola, Genoa Water Authority, Genoa Township, MI. Hydraulic Engineer. Developed MHOG's first drinking water asset management plan in accordance with State regulations.

Water Reliability Study, East Lansing–Meridian Water and Sewer Authority, MI. Project Engineer. Oversaw publication of a water reliability study to meet EGLE requirements. Updated infrastructure condition, demand projections, and General Plan mapping.

John Barber, PE

Site Work/Asset Management/Capital Improvement Planning

30 years of experience

Mr. Barber's expertise lies in finding innovative, cost-effective solutions for water and wastewater systems and their components. He executes engineering projects from conception to construction, as well as related studies, reports, bidding documents, and development and maintenance of technical specifications. He handles consultant / agency contracts, permit requirements, insurance and liability provisions, QA/QC measures, grant and funding applications, and meeting agency expectations.

EDUCATION:

BS, Civil Engineering, Environmental/ Water Resources, University of Michigan, 1992

REGISTRATIONS:

Professional Engineer: Michigan, No. 6201034856

Certified Construction Specifier

AFFILIATIONS:

American Society of Civil Engineers

Water Environment Federation

OFFICE:

Ann Arbor, MI

SELECT RELEVANT EXPERIENCE

WWTP Tertiary Filter Renovations, City of Ann Arbor, MI. Civil Engineer. Prepared a study report and basis of design for renovations to the plant's tertiary filters. Recommendations included air/water backwash and media replacement. The recommendations were then used in the subsequent design documents.

Loch Alpine WWTP Improvements, City of Ann Arbor, MI. Civil Engineer. Designed facilities for increased capacity and improved treatment capability. Coordinated development of project documents.

15th Street Water Main, City of Port Huron, MI. Project Manager. Design of 600 feet of water main to service a new assisted living facility.

Saline Sewer System Evaluation Study, City of Saline, MI. Civil Engineer. Project included smoke testing, manhole inspections, dye testing, sewer TV inspection analysis and an SSES report.

Mayberry Silverstone Estates Water Main and Road Improvements, Okemos, MI. Civil Engineer. Engineering services in support of surveying and construction support at the Mayberry Silverstone development in Meridian Township that included improvements to Powell Road and connections of force main sewer and water main to lines off-site.

Water System Capital Improvements, City of Brighton, MI. Project Engineer. Designed water main system and a 375-gpm booster pump station to improve system hydraulics and to provide service to a new elevated water storage tank.

Northwest Neighborhoods Road and Utility Improvements, City of Brighton, MI. Civil Engineer. Civil design for improvements and upgrades to the sanitary sewer, storm sewer, water main, curb and gutters, ADA ramps, site grading and restoration.

Macomb Interceptor Drain Drainage District and North Gratiot Interceptor Drain Drainage District Odor and Corrosion Control, Macomb County, MI. Civil Engineer. Engineering support including budget preparation and staffing needs.

WPC Battery B Grit Removal and Primary Clarifier Improvements, City of Flint, MI. Project Manager. Structural rehabilitation design for the primary clarifier to provide effective clarification of the influent flow.

WWTP Grit and Primary Control Panel (CP-2) and Secondary Building Control Panel (CP-3) Replacement; Added Control Panel (CP-4), City of Port Huron, MI. Project Manager. Design and construction engineering services for grit and primary control panel replacement.

Gratiot/Keewahdin Meter Pit Replacement, City of Port Huron, MI. Project Manager. Designed replacement water meter pit and associated piping and valves.

Carrier Creek Interceptor Sewer Repair, Delta Township, MI. Civil Engineer. Civil design, QA/QC services, and construction cost opinion review.

WWTP Storage Tank, Northfield Township, MI. Civil Engineer. Civil design and QA/QC services for a new storage tank.

WWTP South Grit Channel Rehabilitation and Odor Control System Replacement, City of Port Huron, MI. Project Manager. Design, construction plan preparation, and CCRs for the rehabilitation. Evaluated existing odor control system including airflow balance, air quality, ventilation, odor control and SCADA integration.

Shelby Byrne, PE

Site Work/Asset Management/Capital Improvement Planning

5 years of experience

Ms. Byrne is experienced in: water distribution and sewer collection system project design; site plan/grading plan preparation; yard piping design; water system hydraulic modeling and calibration; construction and site plan reviews; permit application generation; field inspection of water and sanitary distribution installation; generating engineering reports; and generating construction specifications. She is familiar with AutoCAD, InfoWater, and GIS software.

EDUCATION:

BS, Environ. Engineering, Michigan Technological University, 2018

REGISTRATIONS:

Professional Engineer: Michigan, No. 6201311277

NASSCO

Pipeline Assessment Certification Program

Lateral Assessment Certification Program

Manhole Assessment Certification Program

OFFICE:

East Lansing, MI

SELECT RELEVANT EXPERIENCE

Collection System Infiltration/ Inflow Study, City of Saline, MI. H/H Engineer. Reviewed flow monitoring data for areas of the City with fast-track infiltration/inflow (I/I) study and used the results to develop a Sewer System Evaluation Survey with an investigation plan to locate and remove cost-effective I/I in accordance with the State of Michigan's rules in order to obtain low interest funding through the State's Revolving Fund program. Evaluated I/I removal alternatives using InfoSWMM software, prepared cost estimates for present value of I/I investigation and removal alternatives, and prepared report to be submitted to Michigan Department of Environment, Great Lakes, and Energy (EGLE). The recommended investigative tasks are projected to save the City $3 million in new infrastructure. The EGLE subsequently approved the I/I study without a single comment.

WRRF Aeration Basin and Clarifier Improvements, City of East Lansing, MI. Project Engineer. Project includes replacement of primary and secondary clarifier sludge collection mechanisms, construction of two 75-foot diameter secondary clarifier tanks, and a building addition for new return activated sludge pumps. Design included work within 100-year floodplain, requiring a floodplain mitigation plan and permitting.

Asset Management Plan Annual Report, Genoa, Oceola Sewer and Water Authority, Livingston County, MI. Project Engineer. Prepared annual report detailing status of Asset Management Plan implementation for submittal to the Michigan EGLE. Calculated and summarized values for consequence of failure, probability of failure, and asset criticality for each manhole, sanitary valve, air release, gravity main, and force main assets.

Central Interceptor / Sycamore Lindbergh Interceptor Sewer Rehabilitation Phase II, City of Lansing, MI. Project Engineer. Design and specification for the rehabilitation of approximately 7,000 feet of 48-inch by 72-inch, 54- and 60-inch sanitary interceptor including manholes and chambers. Utilized streamlined system to review sewer televising and provide sewer rehabilitation recommendations. Project includes multiple trenchless renewal technologies and incorporates significant bypass pumping plans and other accommodations along the sewer route.

Michigan Avenue/Harrison Road Sewer Improvements and Rehabilitation, City of East Lansing, MI. Project Engineer. Rehabilitation, replacement and new construction design for sanitary and storm sewer in the Michigan Avenue-Harrison Road Areas. Aided in sanitary sewer asset management data reorganization services, data verification, design assistance and cost estimation.

Saline Water Model Evaluation, City of Saline, MI. Project Engineer. Analyzed City's existing hydraulic model in InfoWater to determine areas where high velocity occur in the system during various flow scenarios. Developed maps in ArcMap to show areas of high velocity and provided conceptual alternatives for these areas. Evaluated City's existing storage capacity to determine when additional storage may be necessary.

Water Reliability Study Update, Marion, Howell, Oceola, Genoa Water Authority, Livingston County, MI. Project Engineer. Calibrated Township's hydraulic model (in InfoWater) to current conditions focusing on areas that were expected to have growth or new infrastructure.

Darryl Albert

Site Work/Asset Management/Capital Improvement Planning

17 years of experience

Mr. Albert implements the use of GIS software for analytical purposes, data collection, as well as asset management purposes. GIS software includes ESRI's ArcGIS for Desktop, ArcGIS Pro, ArcSDE, ArcGIS for Server, ArcHydro hydrology tools, ArcGIS Online, ArcGIS Enterprise, Microsoft SQL Server, Field Maps (mobile application), ArcGIS Survey123, and other mobile applications. He is also experienced in complex geospatial analysis and providing results visually, in a clear and concise manner.

EDUCATION:

BS, Geographic Information Science, Michigan State University, 2007

BS, Fisheries and Wildlife Management, Michigan State University, 2002

REGISTRATIONS:

Data Management in the Multi-User Database, ESRI, 2010

AFFILIATIONS:

Association of American Geographers

OFFICE:

East Lansing, MI

SELECT RELEVANT EXPERIENCE

Water Reliability Study and Asset Management, City of Brighton, MI. GIS Analyst. Developed GIS database schema and process for GPS location and attribute collection of water distribution assets. Customized GIS database schema to combine ESRI Local Government Model and Lucity asset management software data storage models. Developed water distribution system map atlas product for final display and presentation of data. Digitization of new assets from as-built drawings into GIS database. Use of ArcGIS Online, ArcGIS Collector, and high precision GPS.

Stormwater SAW, City of Grand Rapids, MI. GIS Analyst. QA/QC for impervious surface generation by a third-party subcontractor. Developed a web mapping application to serve draft impervious surface GIS features to client with visual mark-up tools. Developed web application to use and view GIS data relative to the project. Automated delineation of catchbasin catchment areas using ArcHydro hydrology tools. Developed geoprocessing model to highlight suitable areas conducive to green stormwater infrastructure construction. Provided GIS analysis to locate areas with stormwater culverts that did not exist in current City GIS stormwater GIS database. Performed field verification and inspection of stormwater culverts using the ArcGIS Collector application and MDOT's "Transportation Asset Management System" recommended culvert inspection method.

Climate Resiliency and Freeway Flooding, SEMCOG, MI. GIS Analyst. Developed GIS geoprocessing model to analyze and process hundreds of raster rainfall datasets. Output included tabular summaries resulting from the geoprocessing tasks as well as visual map products. Used ArcHydro hydrology tools to automate the delineation of catchbasin catchment areas within pump station basins.

As-Needed Water Treatment Services, Ann Arbor, MI. GIS Analyst. As-needed contracts for the City's water treatment services including projects involving WTP clarifier drive and VFD replacement, water tank inspection, lime residual removal program, valve replacements, groundwater analysis, HVAC improvements, floor drain design, chemical tank replacement, and site plan reviews. Construction management and administration were also provided.

City of Richmond SAW Asset Management Program, Richmond, MI. GIS Analyst. GIS database design and master network atlas for print. Prepared all data for import into asset management software. Prepared data for asset inventory and location updates. Configuration of mobile applications and data to facilitate field data collection, including GPS locates and asset inspections and inventory.

SAW Asset Management Program, City of Brighton, MI. GIS Analyst. GIS database model and configuration of client GIS software. Provided data analysis in calculation of probabilities of failure, consequences of failure, and business risk exposures for all GIS assets according to engineer-prescribed variables. Coordinated data for import into asset management software and advisement on most efficient usage of software.

Alex Montalvo

Site Work/Asset Management/Capital Improvement Planning

27 years of experience

Mr. Montalvo has extensive ata analytics, GIS, and asset management experience. He currently serves as the GIS Group Manager and has been instrumental in the expansion of GIS services offered by Tetra Tech. Mr. Montalvo has extensive experience in master planning, condition assessment, capital improvement planning, and repair and rehabilitation efforts.

EDUCATION:

AA, University of Florida, 1995

REGISTRATIONS:

URBAN and Regional Information Society of America

NASSCO MACP/PACP/LACP Certified

OFFICE:

Orlando, FL

SELECT RELEVANT EXPERIENCE

Gravity Sewer CIPP Rehabilitation Phase 2, Toho Water Authority, FL. GIS Lead. Database development and application design. An ArcSDE database was developed that allowed for multiple PACP certified engineers to review of over 530,000 linear feet of sanitary CCTV data through a web map interface, Engineers provided repair and rehabilitation recommendations directly in web map. QA/QC system was integrated into the online map interface allowing review of recommendations and adjustments. Design drawings were created in the GIS environment rather than the traditional CAD environment using the ArcGIS production mapping extension. This allowed for fast tracking the project design to meet the clients aggressive schedule.

CS-1831 Drainage Charge Assistance, City of Detroit, MI. GIS Consultant. Assist in development of the impervious area based drainage charge that will be used to fund a variety of Green Infrastructure projects throughout the City of Detroit.

Master Plan for Water Supply and Treatment Facilities, City of Dayton, OH. GIS Lead. Master plan development to guide infrastructure needs, budget, and schedule of capital projects over the next 20 years. Through this process, we will evaluate the Division's infrastructure, make recommendations for repairs and improvements, and prioritize resulting projects. The Master Plan will take into consideration existing and developing EPA regulations, current and future water demands, and necessary adjustments to operations that will move the City on a path towards a sustainable future. Scope included Levels of Service Statement and alternatives analysis, electrical infrastructure risk mitigation, controlling water loss, analysis of staffing levels, energy survey audit, opinion of probable construction cost, energy savings, and economic analysis. The emergency plan, risk management plan, and asset management plan will also be updated.

North 1 Utilities Extension Program, City of Cape Coral, FL. GIS Manager. The North 1 Utility Extension Program (UEP) is part of the City's ongoing UEP that intends to provide water, wastewater, and irrigation services to all residents of the City. Provided preliminary design and layout of a new portable water transmission and distribution system, a wastewater collection and transmission system, and an irrigation water transmission and distribution system as well as stormwater and roadway improvements and rehabilitation. GIS responsibilities included ensuring all as-built requirements meet Uuility's GIS and asset management standards.

Comprehensive Wastewater Master Plan, City of Orlando, FL. GIS Manager. New Master Plan will address the entire water reclamation system in a single planning effort to identify system needs and projects for a planning horizon through 2045 with a base year of 2020. Phase I of the Master Plan covers the wastewater collection system, specifically the gravity mains, manholes, force mains, and lift stations that collect and transfer the wastewater generated by the customer base to one of the City's three WRFs. Phase II covers the three WRFs and their means of effluent disposal exclusive of the reclaimed water system.

20-Year Collection System Master Plan, City of Clearwater, FL. GIS and Condition Assessment Lead. The field work for the master plan consisted of a condition analysis and drawdown test of all lift stations and air release valves as well as a review of gravity sewer CCTV data and identification of areas with high incidences of SSOs.

Mitch Graf, PE, LEED AP

Mechanical Engineer

23 years of experience

Mr. Graf's focus is on commercial, municipal, and federal building construction projects. His areas of expertise lie in the areas of heating, ventilation, air conditioning, and plumbing design. He is highly proficient in the use Revit and AutoCAD. He is familiar with building construction codes such as the: International Code Council Mechanical, Plumbing, Building, Energy Code, and Fuel Gas Codes, NFPA, Unified Facilities Codes and American Society of Heating, Refrigeration, and Air Conditioning Engineers Publications.

EDUCATION:

BS, Mechanical Engineering, Virginia Tech, 2000

REGISTRATIONS:

Professional Engineer:
Michigan, No. 6201062528
Virginia, No. 402042632
Oregon, No. 91407PE
Nebraska, No. E-16448

LEED AP, No. 0010085691

AFFILIATIONS:

American Society of Heating and Refrigeration Engineers

OFFICE:

Ann Arbor, MI

SELECT RELEVANT EXPERIENCE

Steere Farm Pump Station Generator and HVAC Upgrade, City of Ann Arbor, MI. QA/QC and Construction Administration. Mechanical and plumbing designs for three well pump buildings (1,400, 560, and 500 sf). Project included replacement of a packaged air conditioning unit, exhaust and supply fans, gravity ventilators, louvers, and radiant heaters.

Water Supply Pump VFD Replacement, City of Ann Arbor, MI. Mechanical Engineer. Assessment of existing and new HVAC loads for the room housing the VFDs and the air conditioning system. Addressed potential noise concerns and identified corrective strategies. Assessment concluded the system was adequate to maintain cooling and ventilation and noise pollution would be no worse than the current system.

WTP HVAC Improvements, Great Lakes Water Authority (GLWA), City of Port Huron, MI. Engineer-of-Record/ Lead Mechanical Engineer. Mechanical scope included: replacement of fire tube steam boilers with efficient condensing boilers (previously, boilers only produced steam for the absorption chiller, which only served the air handling unit); replacement of multi-zone chilled water air handling unit with a VAV water cooled heat pump; and VAV terminal units for each zone. Demolished absorption chiller which only served the air handling unit. Replaced of two dehumidification units with newer technology, gas-fired generative desiccant dehumidifiers. Provided circulation fans for pipe gallery. Replaced all unit heaters. Replaced all fin-tube radiators in filter gallery and provided supply and exhaust fans. Replaced unit heaters in high-lift pump station with gas-fired radiant heaters. Provided CRAC units to cool the VFD and electrical rooms (previously only cooled with unconditioned outdoor).

Midtown Booster Station, City of Ann Arbor, MI. Mechanical Engineer. Review of water booster station designed by developer. Used City InfoWater model to analyze impact on City's system.

WTP Air Handler Replacement, City of Ann Arbor, MI. Mechanical Lead. During SCADA control room renovations, the need to improve HVAC systems was identified. Initiated a study phase to determine space to be conditioned and unit size. Design included evaluation of ultraviolet disinfection and air ionization to improve air quality. Identified construction sequencing to conduct work during Spring 2021 when outside air was a moderate temperature. Led WTP staff training for new unit and control systems.

WTP Dehumidification System, Jackson, MI. Mechanical Engineer. Performed a feasibility study addressing humidity control in the pipe gallery of the City's WTP, where piping was corroding in multiple locations with corrosion substantial enough to cause at least one pipe leak. Study included the design of a mechanical system to control humidity in the pipe gallery; provided power to new mechanical systems and modified lighting; closed off entry points with walls and man doors; and provided structural support for the mechanical system and assessed the impact on the building. Proposed mechanical dehumidification system will maintain an ambient dewpoint below the pipe surface temperature to prevent condensation as a source of corrosion. Designed the mechanical equipment and provided construction administration and as-needed resident project representative services during construction.

Luke Ramirez, PE, LEED AP, PMP

Mechanical Engineer

17 years of experience

Mr. Ramirez provides clients with a variety of HVAC and plumbing designs and life-cycle assessment of systems and products. His projects have included designs for municipal, industrial, and commercial facilities, construction administration services for water and wastewater treatment plants, energy audit reports, quality assurance measurement for a utility provider, pump replacement analyses and design for the U.S. Fish and Wildlife Service, and mechanical renovation of dorms at Misawa Air Force Base in Japan.

EDUCATION:

BS, Mechanical Engineering, University of Washington, 2006

REGISTRATIONS:

Professional Engineer:
Colorado, No. PE.0045696
Wyoming, No. 18695
Washington, No. 47812
California, No. 36190
Hawaii, No. PE-15544
New Mexico, No. 22177
Oklahoma, No. 29559
Texas, No. 128371
New York, No. 099098
Ohio, No. PE.83647

LEED® Accredited Professional

Project Management Professional

AFFILIATIONS:

American Society of Heating, Refrigerating, and Air Conditioning Engineers

OFFICE:

Denver, CO

SELECT RELEVANT EXPERIENCE

WTP HVAC Replacement, City of Ann Arbor, MI. Mechanical Engineer. Designing replacement of multiple air handling units and other equipment to support the WTP. Areas served include laboratory, chemical storage, and offices. Laboratory unit include 100% outside air with a plate and frame energy recovery unit. Chemical storage spaces include NaOH, Fluoride, and Lime. HVAC design, including chemical area ventilation and heating, bid support, and construction administration.

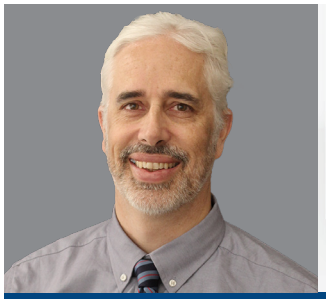
Water Resource Recovery Facility (WRRF), Phosphorus Removal, City of Grand Rapids, MI. Mechanical Engineer. Designed the addition of Phosphorus removal for tertiary treatment at the existing plant. This addition included ventilation design for chemical storage. Chemicals stored included NaOH, NaOCl, and Polymer. To save energy, the ventilation system uses a plate and frame heat exchanger and operates at full capacity while occupied and is reduced to half airflow capacity during unoccupied operation.

WRRF, Biodigestion with Combined Heat and Power, City of Grand Rapids, MI. Mechanical Engineer. Design for new biodigestion facility that included ventilation for the chemical storage addition. Chemicals stored included NaOH, NaOCl, and Polymer. To save energy, the ventilation system uses a plate and frame heat exchanger and operates at full capacity while occupied and is reduced to half airflow capacity during unoccupied operation. Power generated from the combined heat and power recovery system will be cleaned and converted to RNG and sold back to the utility.

Combined Heat and Power Unit Design, WRRF, City of Grand Rapids, MI. Mechanical Engineer. Designed addition of combined heat and power units (CHP) to serve the City's WWTP plus new additions. HVAC system consisted of hydronic hot-water heating and ventilation units using heat recovery for classified areas. Hydronic system also provided redundant heating to the sludge digesters for CHP back-up. HVAC, biogas, and plumbing designs.

Boulder WRRF Biogas Use Enhancement Project, Boulder, CO. Mechanical Engineer. . Project Manager/Mechanical Engineer. Design/Build delivery of a new 110-cubic-feet-per-minute biogas upgrade project that converts digester gas from the City's anaerobic biosolids digester to pipeline-quality, renewable natural gas marketed to Xcel Energy. Project included installing a BioCNG™ gas conditioning system, demolishing cogeneration engines and heat recovery systems, installing one new boiler, upgrading hydronic system used to heat digesters and other buildings, installing new waste gas handling and treatment system, installing new electrical distribution, and integrating the new controls with the City's system.

Eagle River Water and Sanitation District, Avon Drinking Water Facilities, Administration Building Upgrades, Avon, CO. Mechanical Engineer. HVAC and plumbing designs for renovation and expansion of the facility's administration building. Design included use of produced water for an efficient water-cooled heat pump system. Worked closely with facility staff to document conditions and capture project needs.



William Paison, PE, LEED AP

Electrical Engineer

28 years of experience

Mr. Paison is experienced in electrical and instrumentation designs and specifications for municipal infrastructure. He has extensive experience in the design of government and industrial buildings that feature power distribution systems, automatic light control to conserve energy, LEED design recommendations, video-based security with remote monitoring, communications, lightning protection, and addressable fire systems.

EDUCATION:

BS, Electrical Engineering, University of Michigan, 1994

REGISTRATIONS:

Professional Engineer:
Michigan, No. 50403, 2003
Georgia, No. 037940, 2013
Nebraska, No. 14302, 2012
New York, No. 091208, 2012
Pennsylvania, No. 079884
Ohio, No. 80028, 2015
Oklahoma, No. 25888, 2012
Texas, No. 118317, 2014
Missouri, No.2014034940

Construction Documents Technologist, Construction Specifications Institute, 1999

DoD Secret Clearance

DoE Q Clearance

LEED® Accredited Professional

OFFICE:

Ann Arbor, MI

SELECT RELEVANT EXPERIENCE

Steere Farm Engine Replacement, City of Ann Arbor, MI. Electrical/Controls Engineer. Designed electrical power distribution for a system of three new wells and associated well houses, including control strategies for a VFD on each well pump. Utilized security system communication infrastructure to transmit upgraded PLC system control and monitoring to WTP SCADA system.

University of Michigan Natatorium, City of Ann Arbor, MI. Electrical Engineer. Design incorporated up and down lighting via metal halide lights and natural light via skylights for pool renovation.

Water Treatment Facility, City of Saline, MI. Senior Electrical/Controls Engineer. Designed the power distribution system for the facility containing local and remote well pumps, reverse osmosis (RO) systems, and filter systems. Power distribution has generator backup to the utility and tied in through low voltage switchgear with built-in automatic transfer switch. Designed a SCADA system that incorporated licensed radio communication between remote well sites, elevated tower, and wastewater treatment facility.

Midtown Booster Station, City of Ann Arbor, MI. Project Engineer. Review of water booster station designed by developer. Used City InfoWater model to analyze impact on City's system.

WTP Sodium Hypochlorite Bulk Storage Replacement, City of Ann Arbor, MI. Electrical/Controls Engineer. Replaced electrical and instrumentation systems related to two 12,500-gallon Sodium Hypochlorite storage tanks, transfer piping, valves, actuators, and containment area sump pump.

Pressure Reducing Valve Replacement in West Regulated and Alger Pressure Districts, City of Grand Rapids, MI. Senior Electrical and Controls Engineer. Developing improvements to pressure reducing stations in two pressure districts, West Regulated Pressure District, and Alger Pressure District. Improvements are necessary based on the age and condition of vaults, pressure reducing valves, and isolation valves. The City identified several pressure reducing stations that could be eliminated based on results of hydraulic modeling conducted to support the 2020 Comprehensive Master Plan. Project is intended to reduce O&M requirements and improve vault safety for routine maintenance work.

WTP Backwash Improvements, City of Ann Arbor, MI. Electrical/Controls Engineer. Designed electrical upgrades for pump/motor replacements of backwash pumps. Provided control strategies for each backwash pump. Replaced single flow meter and control valve with meters and control valves on each pump.

In-System Storage Devices, Macomb County, MI. Electrical/Controls Engineer. These new in-system storage devices safely store wastewater flow rates starting at the beginning of a wet weather event and allowing peak flows to be conveyed through the in-system storage devices without significantly raising the peak hydraulic grade lines. Project purpose is to increase the use of storage volume, improve water quality of treated CSO discharges, and safely pass wet weather flow rates from large storms.

WWTP Improvements, Saline, MI. Electrical/Solar Engineer. Developed design documents for comprehensive WWTP improvements. Designed solar improvement to reduce electrical costs for sewer users.

Russell Strassburg, PE

Electrical Engineer

36 years of experience

Mr. Strassburg is experienced in the design of complex electrical and process instrumentation systems for municipal water/wastewater and industrial facilities. Projects range in complexity from simple sewage lift stations to water and wastewater treatment facilities. He is also experienced in IT management and has held positions in project management and executive level IT leadership for several organizations. His expertise also includes designing municipal street lighting projects.

EDUCATION:

BS, Electrical Engineering, Michigan Technological University, 1987

REGISTRATIONS:

Professional Engineer:
Michigan, No.38272
Tennessee, No.124665
Virginia, No.402064045

DoD Secret Clearance

Lean Manufacturing Certificate

AFFILIATIONS:

ESD - The Engineering Society
InfraGard

OFFICE:

Ann Arbor, MI

SELECT RELEVANT EXPERIENCE

Wheeler Center Lighting Improvement, Ann Arbor, MI. Lead Electrical Engineer. Developed projects to replace hundreds of lamps and fixtures throughout DPW campus.

Michigan and Quay Streets Reconstruction, City of Port Huron, MI. QA/QC. Performed QA/QC for LED street light design.

Donax WRF Process Improvements, City of Sanibel, FL. Electrical/Controls Engineer. Developed plans and specifications for conversion of WWTP facilities to incorporate new flow equalization, fine screening, and membrane bioreactor processes. Electrical design included new motor control centers and permanent generator.

Oceola Township Pumping Station, City of Howell, MI. Electrical Engineer. Developed plans to install a new packaged pumping station with radio communications for SCADA.

CSO Retention Basin, City of Grand Rapids, MI. Control System Programmer. Developed HMI System to control the retention basin using FactoryLink and Modicon 984 PLCs. Integrated pump station system and extended control HMI to the WWTP operations facility. Provided design, control system programming, contractor oversight, and on-site system start-up/checkout.

Rouge River Basins, Wayne County, MI. Electrical, Controls and Instrumentation Engineer. Designed electrical, instrumentation and controls system for new storm water retention facilities.

Milk River Retention Basin Improvements, Wayne County, MI. Electrical, Controls and Instrumentation Engineer. Designed electrical, instrumentation and controls system for storm water retention facility.

City of Port Huron Pump Station Generator Improvements, Port Huron, MI. Electrical QA/QC. Oversaw the design of permanent standby generator solutions for two wastewater pump stations located in residential areas.

City of Port Huron Elmwood Pump Station Improvements, Port Huron, MI. Electrical Startup. Worked with contractor in the field to conduct electrical/instrumentation startup of a new wastewater pump station located in a residential area.

YCUA Incinerator Improvements, Ypsilanti, MI. Electrical QA/QC. Oversaw the design of sludge incinerator instrumentation equipment replacements.

Maple Road Pump Station Improvements, City of Saline, MI. 2019. Electrical Design. Designed addition of a new natural gas (NG) generator for an existing wastewater pumping station to support a new residential development.

City of Port Huron Quay Street Reconstruction, Port Huron, MI. Electrical QA/QC. Oversaw the design of power distribution for street lighting and electrical panels to supply local event power. Design included street/sidewalk lighting distribution and lighting controls.

SEMCOG/MDOT Southfield Freeway Pumping Station Assessments, Wayne County, MI. Electrical, Instrumentation and Controls Engineer. Conducted electrical/controls analysis and assessment for pumping stations located along M-39 freeway as part of an overall study to identify causes of freeway flooding during rain events.

Quintin Biagi, RA, AIA, GPGP, NCARB,CDT, LEED AP BD+C

Architectural/Barrier-Free Design

37 years of experience

Mr. Biagi is an architectural group leader for Tetra Tech's Water, Environmental and Infrastructure Division of our United States Infrastructure group. Mr. Biagi has great skill listening to and evaluating clients' needs to create informed designs that address the priorities of their projects. Coordinating team efforts among all the design disciplines through all design phases, he offers solutions tailored to each client's unique program requirements and needs.

EDUCATION:

BA, Architecture, University of Kentucky, 1985

REGISTRATIONS:

Registered Architect: Michigan, 13010-56968

National Council of Architectural Registration Boards, No. 43061

LEED® Accredited Professional BD+C, US Green Building Council, No. 10424763

Green Building Initiative

Construction Specifications Institute, No 2043809

AFFILIATIONS:

National Council of Architectural Registration Boards

American Institute of Architects

OFFICE:

Louisville, KY

SELECT RELEVANT EXPERIENCE

Ann Arbor Service Center WTI Program, DTE Energy, Ann Arbor, MI. Project Architect. Renovation modified the facility to modernize and enhance the work environment for the client's service personnel as part of an organization-wide improvements program. Programming phase included a design charrette to bring all vested parties to the design table to achieve consensus on programming priorities. The 7,800-sf renovation includes new restroom and locker rooms, open-office administration spaces, 40-to-60-person meeting hall, breakroom/café, and support areas.

Warren WWTP Influent Screen Replacement, MI. Architect of Record. Provided design and construction documentation for a new one story 508 GSF brick masonry insulated Utility Building Addition to the existing wastewater treatment plant for the City of Warren, MI. The primary function of the building will be to expand the existing water screen room. Duties included preparation of the architectural design and construction documents, including the technical specifications, internal interdisciplinary technical reviews of the document packages at various phases of design, and administration services during the bidding and construction phases.

WWTP Phosphorus Recovery Building, Grand Rapids, MI. Architect of Record. Provided design and construction documentation for a new one story 3,255 GSF brick masonry insulated Utility Building. The primary function of the building is for the treatment of waste water (phosphorus recovery) for the City of Grand Rapids, MI. Duties included preparation of the architectural design and construction documents, including the technical specifications, internal interdisciplinary technical reviews of the document packages at various phases of design, and administration services during the bidding and construction phases.

Mt Clemens Service Center, Workplace Transformation Initiative Program, DTE Energy, City of Mt. Clemens, MI. Architect of Record. Architectural renovations for a 17,000-sf office space and 13,000-sf new addition. Design work included leading design charrette and facility programming. Design space included new regional training rooms and "town center" community area for team building. Design was conducted to comply with the requirements of DTE Energy's WTI program.

Steere Farm Well Engine Replacement, Ann Arbor, MI. Project Architect. Replacement of natural gas engine generators using electrical motors. Project is in the study phase and planned to transition to design later this year.

East Lansing WWTP Solids Handling Improvements with Digestion, MI. 2019-2020. Architect of Record. Provided design and construction documentation for a new multi-level 3,649 GSF Solids Loading Pre-Engineered Steel Equalization Building Addition and 5,168 GSF two story load bearing concrete and masonry Digester Building including support spaces for the City of East Lansing, MI Water Resource Recovery Facility. Project included preparation of the architectural design and construction documents, including the technical specifications, internal interdisciplinary technical reviews of the document packages at various phases of design, and administration services during the bidding and construction phases.

Andrew Turbett, RA

Architectural/Barrier-Free Design

40 years of experience

Mr. Turbett has a thorough understanding of site, architectural, structural, HVAC, plumbing, electrical, and technology systems and is an organized, forward-thinking problem solver, able to quickly assimilate information and develop solutions. He is proficient in local zoning ordinance as well as model code research and interpretation. His expertise encompasses building codes, NFPA 101, ADA, and State of Michigan Fire Marshal regulations.

EDUCATION:

Master of Architecture, Facilities Design Concentration, University of Michigan, 1983

BS, Architecture, Lawrence Institute of Technology, 1981

REGISTRATIONS:

Licensed Architect:
Michigan, No. 1301032637
Texas, No. 28666

OFFICE:

Detroit, MI

SELECT RELEVANT EXPERIENCE

WTP Control Room, Ann Arbor, MI. Project Designer/Architect. Responsible for the development of the functional layout for the control room along with the management of the architectural team preparing construction documents and the development of the details. The interior renovation of the WTP Control Room upgraded both the function and aesthetics of the space – a 24/7 operation. The functional improvements focused on adapting the space to accommodate needs such as training and meetings, while maintaining the primary water system operations. The aesthetic improvements implemented ergonomic and lighting upgrades to deliver a more comfortable working environment.

Pump Station Rehabilitation, Wayne County, MI. Lead Architect. In a series of stormwater events that flooded local underpasses within Wayne County, it was determined the nearby stormwater pump stations required significant system upgrades. Architectural work included coordination with several technical disciplines, including structural modifications, civil site work, electrical upgrades, mechanical upgrades, SCADA design and process pipe engineering design for optimal efficiency and use. A total of 41 pump station rehabilitations, along with full-scale SCADA programming and operational implementation is planned over a seven-year timeframe.

Elevator Repairs, Derek R Guthrie Water Quality Treatment Center, Louisville and Jefferson Metropolitan Sewer District, KY. Lead Architect. Provided an elevator assessment, design, bid support, and construction administration. Project included two elevators; an operational traction elevator located in the in the facilities Wet Weather Pump Station, and an inoperable hydraulic elevator located in the facilities wet weather screening building. Assessment phase included inspection of both elevators to determine the extent of work necessary to modernize the elevators and development of a preliminary opinion of cost.

Administration Building Feasibility Study, Water Resource Recovery Facility, City of East Lansing, MI. Architect. The WRRF Administration Building housed the influent raw sewage pump station, sludge storage tanks and pumping, incinerators, sludge dewatering equipment, laboratory, maintenance shop, locker room, and staff offices. Evaluated feasibility of reprogramming the interior of the Administration Building after four recent major WRRF construction projects are completed.

Anchorage Solid Waste Transfer Station CTS, Anchorage, AK. Independent Technical Review (Architecture). Responsible for pre-milestone-issue technical reviews of architectural documents. The CTS is a new municipal and residential solid-waste transfer station. The facility includes five different buildings, the largest consisting of the residential/commercial unloading and transfer space, administration, and vehicle storage.

WTP Dehumidification, Jackson, MI. Project Designer/Architect. Responsible for the management of the architectural team preparing construction documents along with the development of the details. The primary objective of this project at the water treatment plant was to add dehumidification in the pipe gallery to reduce corrosion on the pipes and equipment. The scope included adding partitions to isolate the high-humidity open-tank areas from the pipe gallery areas.

Tim Ard, CDT

Construction Administration and Observation

34 years of experience

Mr. Ard is an expert in construction management. He provides supervision during all phases of construction, including contract document interpretation; monitoring construction conformance to contract documents; serving as liaison between contractor, owner, and engineer; and providing project progress documentation and information to the owner. He has diverse project experience to include numerous road, water main, sanitary, storm, water tower improvements, and development projects.

EDUCATION:

Multiple Courses on Personnel Management and Project Management

Water Distribution and Treatment, MDOT Road Construction

REGISTRATIONS:

Construction Site Storm Water Management

Construction Document Technician

OFFICE:

Ann Arbor, MI

SELECT RELEVANT EXPERIENCE

Backwash Filter Improvements, City of Ann Arbor, MI. Construction Administration/Field Resident Project Representative. Rebuilding pumps, addition of control valves and flow monitoring, SCADA, and other minor improvements.

Steere Farm Well Engine Replacement, Ann Arbor, MI. Construction Manager/Resident Project Representative. Managed construction execution for the $3M well house rehabilitation projects.

South Industrial Tank Coating, City of Ann Arbor, MI. Construction Manager. Design and specifications for the exterior recoating and interior repainting of a 4-MG ground storage tank. Project included identifying interim system operations during tank downtime, designating dewatering locations and restrictions for construction and QA/QC prior to tank startup.

WWTP Aeration System Improvements, Ypsilanti Community Utility Authority (YCUA), MI. Construction to determine the best solution to implement new, more efficient blower technology to fit the process requirements for the plant. Following selection of recommended aeration system improvements, prepared the final design and construction documents consisting of civil, structural, architectural, mechanical, electrical, and instrumentation drawing sheets and specifications. Provided construction administration.

Water Tower Improvements, City of Ann Arbor, MI. Construction Manager/Resident Project Representative. Lead paint remediation, new coatings, new control panels and controls, new piping, and various site improvements.

Manchester Tank Improvements, City of Ann Arbor, MI. Construction Manager and Resident Project Representative. Project includes lead paint remediation, new coatings, new control panels and controls, new piping, and various site improvements.

Water System Improvements, Chelsea, MI. Construction Manager. Construction of the new water mains for the City's potable water requirements. Duties included contract requirements, interpretations, change orders, payment applications, meeting, and RPR oversight.

WWTP Grit Handling System Improvements, YCUA, MI. Construction Manager and Resident Project Representative. Removed and replaced grit handling mechanism, restored existing unit, replaced equipment in grit tanks including deflectors, drives, and skimmers. Coated concrete to protect against corrosion.

In-System Storage Devices, Macomb County, MI. Construction Manager. These new in-system storage devices safely store wastewater flow rates starting at the beginning of a wet weather event and allowing peak flows to be conveyed through the in-system storage devices without significantly raising the peak hydraulic grade lines. The project purpose is to increase the use of storage volume, improve water quality of treated CSO discharges, and safely pass wet weather flow rates from large storms.

WTP Improvements, City of Saline, MI. Construction Manager. Construction of the new 2.5-MGD reverse osmosis and iron filtering system for the City's potable water requirements. Work included structural concrete, masonry, piping, all pumps and appurtenances, electrical, controls, and piping. Provided contract requirements, interpretations, change orders, payment applications, meeting, RPR oversight, and served as liaison between owner and Contractor.

Fred Yoerg, PS

Surveyor

18 years of experience

Mr. Yoerg has extensive surveying experience including project estimating, field crew scheduling and coordinating, data processing, and reporting; legal descriptions for property boundaries, easements, restricted-use areas; stability-evaluation control surveys; landfill surveying and mapping; utility easement mapping; spill-containment evaluation surveys; map datum evaluation and adjustments; restrictive covenant maps and descriptions; property boundary surveys; field layout of utility lines, and ALTA/ACSM.

EDUCATION:

BS, Surveying Engineering Technology, State University of New York, 2007

BM, Education, Mansfield University, 1995

REGISTRATIONS:

Professional Land Surveyor:
Michigan, No. 56048
Indiana, No. 21000198
Ohio, No. 8477
Idaho, No. 14827

Former Certified (PA) High School Teacher

AFFILIATIONS:

Michigan Society of Professional Surveyors

OFFICE:

Brighton, MI

SELECT RELEVANT EXPERIENCE

I-69 from Island Road to Millet Road, MDOT Lansing Design, Eaton County, MI. Lead Surveyor. Road design survey for 12.5 miles of freeway. Land Corner Recordation Certificates research, establishment of horizontal and vertical control tied to first or second order benchmarks, generation of a non-legal alignment, preparation of property lines within the mapping limits, and topographic mapping. Alignments prepared for northbound and southbound I-69 as well as 16 separate cross road alignments. Drainage features mapped and separate sketches prepared for 23 structures including plan/profile views with reference points elevations, vertical clearance, top of deck elevations, crossing angles, and pier reference lines.

Wastewater Treatment Facility Surveying, East Lansing, Grand Rapids, Dundee, Ann Arbor, and Saline, MI. Project Surveyor. Plants primarily required mapping for design of renovation and expansion; sites also required legal boundary surveying, construction staking, and structure stability monitoring.

Inventory of Village of Dundee Sewer System, Dundee, MI. Project Surveyor. Survey of all sewer structures within city limits, surface and subsurface investigation, plan analysis.

Green and Ann Arbor Roads Water Main Installation, Ann Arbor, MI. Project Surveyor. Topographical and utility mapping and establishment of alignment. Provided construction staking.

Wastewater Treatment System Lime Pond Survey, Ann Arbor, MI. Project Surveyor. Project required control survey, verification of utilities, and mapping of pond bed (surveying from boat).

Creyts Road Water Main Extension, Delta Charter Township, MI. Land Surveyor. Design, bidding assistance, and construction engineering services to develop an emergency interconnect with the Lansing Board of Water and Light (BWL) water system. Project consisted of installing approximately 1,250 feet of 16-inch ductile iron water main along Creyts Road and US-27 Lansing Road with a normally closed isolation valve. Coordinated and developed design in accordance with BWL standards. Coordinated work with the adjacent MDOT maintenance facility to minimize disruption. Interconnect construction completed in November 2020.

Steere Farm Well Field Engine Replacement, City of Ann Arbor, MI. Lead Surveyor. Replacement of natural gas engines with electric motors at the City's three well houses. Project involved well testing, well rehabilitation and well pump replacement as subcontracts to Tetra Tech's engineering services contract. Design included replacing the well houses with new well houses having improved structures and fully automated with the City's SCADA system.

Lime Residual Disposal, City of Ann Arbor, MI. Lead Surveyor. Project evaluated alternatives to remove residuals from sedimentation pond. Project was especially challenging as the site was landlocked and residuals had never been removed from the facility.

Water Pollution Control Aeration System Process Improvements, City of Flint, MI. Lead Surveyor. Include surveying tasks. Aeration system process improvements for the 50-MGD WPC. Three of the four multi-stage centrifugal blowers within the blower building will be replaced with high-efficiency, high-speed turbo blowers sized to match the current air demand for treatment with a wider range of operation to provide a more efficient aeration system.

Douglas Allen, EIT

Solid Waste Engineer

26 years of experience

Mr. Doug Allen is a senior client manager experienced in the planning, siting, design, and permitting of solid waste management facilities, including municipal solid waste landfills and transfer stations. As corporate liaison for waste facility programming services, he has served as project manager on numerous transfer station facility projects for public and private sector clients. He has led multi-disciplined project teams consisting of solid waste planners, designers, traffic engineers, landscape architects, and contractors.

EDUCATION:

MS, Geotechnical Engineering, University of Illinois, Urbana- Champaign

BS, Civil Engineering, University of Illinois, Urbana-Champaign

REGISTRATIONS:

Engineer-in-Training

AFFILIATIONS:

American Society of Civil Engineers

OFFICE:

Warrenville, IL

SELECT RELEVANT EXPERIENCE

Solid Waste Services Division, Anchorage, AK. Program Manager. Managed the evaluation and concept design alternative development of a new solid waste transfer and waste hauling operation. Assisted with technical review of the design development set through the design process to help assure that program needs were carried through the final design process. Also assisted in concept design and evaluation of repurposing the existing transfer station facility for adaptation into a beneficial use supporting recycling and diversion operations.

Solid Waste Authority of Central Ohio, Columbus, OH. Program Manager. Responsible for the programming, concept design, final design, and construction oversight support for a phased reconstruction of a 7-acre transfer station/vehicle maintenance hauling support facility. The selected concept enabled continuous transfer operations of 550 tons per day (tpd) on site while maintaining hauling operations for 60 on-site collection vehicles while allowing over 90,000 square feet (sf) of new buildings to be constructed contemporaneously. The facility program and design enabled the Authority to avoid costs in procuring a new location and secured state permits through public hearings without a single negative comment from the citizenry. The site redevelopment is conducted as a joint project between the Authority and the City of Columbus.

Linn County Cedar Rapids Solid Waste Agency, Marion, IA. Program Manager. Responsible for the programming, concept design, final design, and construction oversight support for a phased 12-acre resource recovery facility at the Agency's existing MSW landfill. The resource recovery facility will be equipped with an approximately 47,000 sf building that will house residential and commercial curbside recycling drop-off, household hazardous waste drop-off and swap-shop, and floor sorting of construction debris. The facility provides acres for the outdoor processing and stockpiling of bulk commodities such as wood, concrete, asphalt shingles, and landscape wastes. The project will also redevelop the existing on-site administrative building to include classroom areas to promote and educate elementary and middle school students about recycling and sustainable practices.

Waste Management of Nevada, Reno, NV. Program Manager. Responsible for conducting 20-year waste shed evaluation of the greater Washoe County to project future waste generation and transfer station demand. Drafted map amendment zoning application for modification of potential site zoning classification and participated in virtual Planning Commission and City Council hearings. Assisted in the development of conceptual site plans for the development of a combined MSW transfer station, administration, and commercial waste hauling facility.

Waste Management of Northern California, Stockton, CA. Program Manager. Managed development of concept designs of a $12M capital improvement plan for a large-scale waste hauling and maintenance operation. Site plan development included site development scenarios, which preserved the ability to develop waste transfer station operations on site in the future, while preserving developed infrastructure. Assisted in the drafting of proposed modifications to the site use agreement so it was consistent with the proposed improvements and operations of the capital plan.

Patti McCall, CPG, PWS

Environmental Scientist

21 years of experience

As an Associate Hydrogeologist and Professional Wetland Scientist, Patti McCall has managed and completed site characterization, remediation, hydrogeological, geotechnical, wetland and landfill projects, ecological risk assessments, regulatory compliance investigations, Michigan EGLE Part 201 and 213 investigations, Phase I and Phase II ESAs, baseline environmental assessments (BEAs) due care plans and prepared proposals.

EDUCATION:

BS, Geology, Indiana University Northwest, Gary, Indiana, 1999

University of Minnesota Hydrogeology Field Camp 1998

BS, Public Policy (Environmental Science), Indiana University, Bloomington, Indiana, 1993

REGISTRATIONS:

Certified Professional Geologist, No. 11695, AIPG

Professional Wetland Scientist, No. 2497

AFFILIATIONS:

American Institute of Professional Geologists (AIPG)

Geological Society of America

Society of Wetland Scientists

Michigan Wetland Association

Huron River Watershed Council

Michigan Association of Environmental Professionals

OFFICE:

Ann Arbor, MI

SELECT RELEVANT EXPERIENCE

Municipal Waste Landfill, Ann Arbor, MI. Associate Geologist/Project Manager. Responsible for overseeing the completion of sampling and reporting requirements for the Ann Arbor Landfill (AALF) including groundwater, wastewater and gas sampling events, methane collection system operations, database management and evaluation, wastewater discharge mass balance calculations, maintenance repairs and subcontractor coordination budget tracking and task management.

PFAS Sampling, City of Ann Arbor, MI. Project Manager/Geologist. Responsible for coordination with City of Ann Arbor personnel to design and implement a perfluorinated alkylated substances (PFAS) sampling plan for the influent at the wastewater treatment plant, water treatment plant and five wastewater outfall locations at the Ann Arbor Landfill. Samples were collected using PFAS-free materials and the data was analyzed for 24 PFAS compounds using method 537 modified, with stable isotope dilution. Data tables and flow rates were prepared for use by City of Ann Arbor personnel. A subsequent sampling was requested by City personnel for their compost and storm water retention ponds.

Capture Zone Analysis at Municipal Landfill, Ann Arbor, MI. Project Manager/Geologist. Successfully updated the site conceptual model and completed a capture zone analysis of the existing extraction well configuration in 2010. Activities included updating the geological interpretation, installing observation wells and completing an aquifer analysis and numerical groundwater model. The results provided a significant cost savings to the City of Ann Arbor by allowing one extraction well to be turned off. A modification to the IUP was completed and approved by the City of Ann Arbor to reduce the sampling requirements of the extraction well. The CZA was updated in 2019 to include the regulatory changes in the 1,4-dioxane drinking water criteria, the replacement of two extraction wells, additional lithological data and recent analytical results.

Green Infrastructure Support, Detroit Water and Sewerage Department, MI. Professional Wetland Scientist responsible for implementing wetland delineation investigations and reporting, coordination and site meetings with EGLE, oversight of geotechnical soil borings to evaluate lithology; assisting with overall conceptual wetland design planning and providing reviewing of planting success, maintenance needs and recommendations for existing sites.

Phase I and II Environmental Site Assessments, Numerous Clients, MI. Completion of Phase I and Phase II ESAs for residential, commercial, and industrial clients within Southeast Michigan using ASTM standards and All Appropriate Inquiry (AAI) for site assessments. Additional scope of work included wetland delineations where appropriate.

Part 213 Investigations, Numerous Clients, MI. Completion of EGLE Part 213 Leaking Underground Storage Tank Closure reports for sites with reported petroleum releases. Tasks completed included preparation of Interim Action Reports (IARs); supervision of UST removal activities; collection of verification of soil remediation samples; quarterly groundwater monitoring events and data evaluation, monthly LNAPL monitoring events, system operation and maintenance, development of corrective action plans, preparation of EGLE Part 213 Site Assessment, and preparation of Final Assessment Reports (FAR) for Tier I and II sites.

Vic Cooperwasser, PE

Water Meters Specialist

51 years of experience

Mr. Cooperwasser has served as the Principal-in-Charge for several large Michigan community projects. For more than 40 years, Mr. Cooperwasser has assisted over 100 communities to establish and/or update water, wastewater, and stormwater rate methodologies. These methodologies have allowed them to raise, in total, over $1 billion for the operation, maintenance, equipment replacement, and capital costs associated with their water, wastewater, and stormwater infrastructures.

EDUCATION:

BS, Civil Engineering, Cornell University, 1969

REGISTRATIONS:

Professional Engineer: Michigan, No. 24713

AFFILIATIONS:

American Water Works Association: Member Rates and Charges Committee

Water Environment Federation: Member Task Force for User Fee Funded Stormwater Utilities Manual, 2nd Edition

Oakland County Stormwater Management Finance Group

Michigan Water Environment Association: Stormwater Utility Committee

Michigan Water Environment Association/Michigan Section: Asset and Infrastructure Management Committee

OFFICE:

Ann Arbor, MI

SELECT RELEVANT EXPERIENCE

WWTP Design: Ann Arbor, Ypsilanti, Grand Rapids, Howell, South Lyon, Lapeer, and Negaunee, MI. Project Engineer. Designed phosphorus removal and chlorine feed systems.

Stormwater Utility Feasibility Study and Implementation, City of Ann Arbor, MI. Project Manager. Prepared study and assisted in implementation. This stormwater utility was the first in Michigan in 1984 and utilized the Equivalent Hydraulic Area method developed by Mr. Cooperwasser.

Water Meter and Reading System Replacement, City of East Lansing, MI. Principal-in-Charge. Developed an RFP to replace the water meter and reading system with a fully automatic meter reading (AMI) system. Analyzed bids and provided one year of support during construction. Supported the City's efforts to obtain low interest loan funding by preparing a Michigan Department of Environment, Great Lakes, and Energy Drinking Water SRF Project Plan.

Water Meter System Replacement, City of East Lansing, MI. Project Manager. Projected $35M Project Plan and User Charge System. Replacement of the City's entire water meter and meter reading system using AMI technology, new elevated water storage tank, water main replacement and lead service line replacement.

Water and Sewer Rate Methodologies, Ypsilanti Community Utility Authority (YCUA), MI. Project Manager. Development of water and sewer rate methodologies for the contract and member communities served by YCUA. In addition, prepared a unique, long–term cost apportionment rate method between YCUA and the Western Townships Utility Authority. Reviewed three potential combinations of rates and the total cost attribution approach for calculating system development charges to equitably recover YCUA's investment in the water and sewer systems when new users connect and to not burden existing users with the cost required to provide service to new users. Tetra Tech used its SmartRate rate calculation tool to calculate rates and capital cost recovery fees in accordance with guidelines included in the Bolt Opinion. Prepared several iterations over three phases of a new water and sewer rate structure designed to recover YCUA's expenses in a fair and equitable manner. Used SmartRate rate calculation tool to calculate these potential rate combinations. Rates were designed to meet the valid user fee guidelines included in the Michigan Supreme Court's 1998 Bolt Opinion. The new rate structure was adopted. It consists of a fixed readiness to serve charge that increases with meter size and a commodity (consumption) charge for every 100 cubic feet of usage.

Sewer System-Wide Model Update and Recalibration, City of Fort Wayne, IN. Principal-in-Charge. Updated model for projects constructed since 2010 and recalibrated model to over 120 flow meters. Recalibrated sanitary system using aquifer/groundwater routines in EPA-SWMM. Calibrated combined sewers using SWMM Runoff method. Employed Tetra Tech's iPOP optimization program to automate the calibration of separate and combined sewer sites.

Asset Management Plan for Sanitary Sewers, Storm Sewers, WWTP, and Pump Stations, City of Brighton, MI. Rate Consultant. Prepared an Asset Management Plan (AMP) for sanitary sewer system, stormwater conveyance system and WWTP in accordance with EGLE requirements for the SAW Grant Program.

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