VILLAGE OF FREEBURG

FREEBURG MUNICIPAL CENTER
14 SOUTHGATE CENTER, FREEBURG, IL 62243
PHONE: (618) 539-5545 • FAX: (618) 539-5590
Web Site: www.freeburg.com

September 14, 2018

NOTICE

COMMITTEE AS A WHOLE MEETING
VILLAGE OF FREEBURG

A Committee as a Whole Meeting of the Village of Freeburg will be held at the Municipal Center, Executive Board Room, **Tuesday, September 18, 2018, at 5:30 p.m.**

COMMITTEE AS A WHOLE MEETING AGENDA

I. Items to be Reviewed

A. Old Business

B. New Business
   1. 5:30 p.m.: Burns & McDonnell Statement of Qualifications for Wastewater System Improvements
   2. 6:30 p.m.: Crawford Murphy & Tilly Statement of Qualifications for Wastewater System Improvements

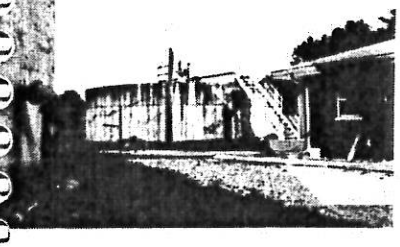
C. General Concerns

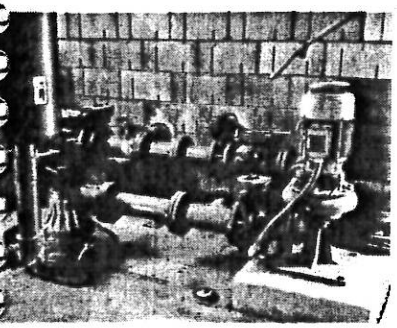
D. Public Participation

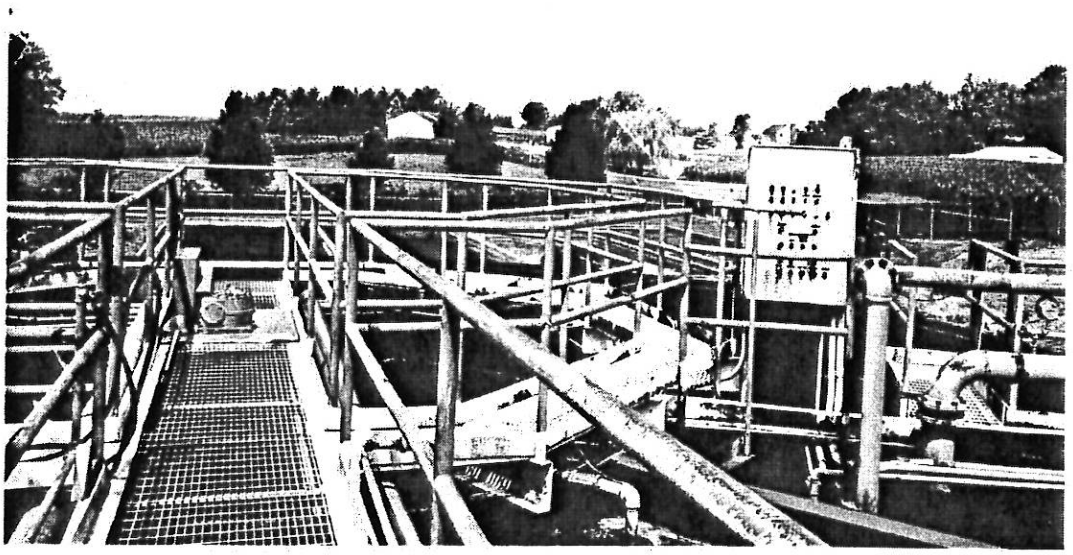
E. Adjourn

At said Committee Meeting, the Village Trustees may vote on whether or not to hold an Executive Session to discuss the selection of a person to fill a public position [5 ILCS, 120/2 – (c)(3)]; litigation [5 ILCS, 120/2 - (c)(11)] personnel [5 ILCS, 120/2 – (c) (1)]; real estate transactions [5 ILCS, 120/2 - (c)(5)]; or collective negotiating matters between the public body and its employees or their representatives [5 ILCS 120/2 – (c)(2); discussion of executive session minutes, 5 ILCS, 120/2 – (c)(21)

BURNS McDONNELL







WASTEWATER SYSTEM IMPROVEMENTS

VILLAGE OF FREEBURG, ILLINOIS

JULY 27, 2018

BURNS McDONNELL

July 27, 2018

Mr. Tony Funderburg
Village Administrator
Village of Freeburg
14 Southgate Center
Freeburg, Illinois 62243

Re: Statement of Qualifications for Wastewater System Improvements

Dear Mr. Funderburg:

For the last several years, the Village of Freeburg has worked to gain a better understanding of needs within your Wastewater Treatment Plant (WWTP) and collection system. Burns & McDonnell recognizes the time and effort that has gone into developing the current plan, and we know that the upgrade and construction of a new Wastewater Treatment Plant is no small task. **Your Burns & McDonnell team will bring a fresh perspective founded in technical excellence that embodies a holistic approach to the Village's wastewater utility needs. Some advantages of our project team include:**

Holistic Approach. Our approach was developed with your current and future needs in mind. In addition to improvements to the existing WWTP, the Village has expressed concerns about peak flow influent to the WWTP and in the collection system during rainfall events. Burns & McDonnell understands that reducing infiltration and inflow (I/I) flow is a critical factor and will typically result in lower capital and operational costs at the WWTP. We have provided a holistic approach that will evaluate your WWTP and collection system to best identify the appropriate solution for the Village. We understand that the best way to provide an effective solution is by understanding everything we can about your system, and we intend to do that for the Village of Freeburg.

Fresh Perspective. The Burns & McDonnell team will bring a fresh perspective to the project. We have designed Sequencing Batch Reactor (SBR) treatment facilities for some of the most difficult applications that exist, but our skill set extends beyond WWTP design in a unique way. We are knowledgeable about the ever-changing regulatory climate in Illinois and can support the Village of Freeburg with difficult decisions about these complex issues. Our experience providing turnkey design-build solutions for wastewater treatment facilities across the Midwest means we know what it takes to deliver a successful project expeditiously. Lastly, we also understand what this means from the owner's point of view. We do this every day as the program manager for the Village of Frankfort's $60 million WWTP Consolidation Program. In this role, we regularly provide support on master planning, public relations, permitting, rate impact analysis, financing, State Revolving Fund (SRF) loan coordination, easement acquisition, design, and construction issues. We will provide a programmatic perspective that considers the whole utility in lieu of individual collection, conveyance, and treatment components.

Technical Excellence. Our team provides highly-experienced technical knowledge to the Village of Freeburg WWTP upgrade design and construction. Our team has experience designing and operating SBR and other wastewater treatment technologies, so we understand what it takes to deliver a successful project. Burns & McDonnell plans to provide the Village with technical solutions that consider a broader vision than simply meeting today's needs.

1075 Eastgate Drive, Suite 1 \ O'Fallon, Illinois 62269
618-632-0354 \ burnsmcd.com

BURNS McDONNELL

Selecting the right team will be critical to the overall success as you face the project challenges and meet your long-term goals. We are the team that understands the process to identify your facility and collection system needs, the key regulatory and permitting requirements and project drivers, the importance of an interactive approach, and the engagement of decision-makers that is paramount to the success of this project. Our team is eager to start developing a plan that will provide the Village of Freeburg a cost-effective solution for your treatment facility, and collection system that provides longevity and is sustainable for current use and future growth.

We look forward to serving the Village of Freeburg and invite you to reach out to us for additional questions or clarifications regarding our submittal. Please don't hesitate to contact me at jbarnard@burnsmcd.com or 314-682-1626.

Sincerely,

Jeff Barnard

Jeff Barnard, PE
Project Manager

1075 Eastgate Drive, Suite 1 \ O'Fallon, Illinois 62269
618-632-0354 \ burnsmcd.com

OUR TEAM

BURNS & MCDONNELL

At Burns & McDonnell, our engineers, construction professionals, scientists and consultants do more than simply plan, design and construct. With a mission unchanged since 1898 — make our clients successful — our more than 6,000 professionals partner with you to take on the toughest challenges, constantly working to make the world an even more amazing place. **Having completed preliminary studies, evaluations, design, and design-build services on over 100 WWTPs in the past 10 years, Burns & McDonnell is prepared to complete your project with confidence.**

Local Presence & Depth of Staff
We have people with the knowledge and background to complete virtually any project and address any challenges — whether known or unforeseen — in a timely, integrated, and efficient manner. This translates to project consistency, lower costs, and the ability to maintain your project schedule. Headquartered in Kansas City, Burns & McDonnell has more than 50 offices nationwide, allowing us to provide innovative, timely and cost-effective service to clients. We have provided water services to municipal clients in the St. Louis metropolitan area for over 25 years. We have offices in O'Fallon, Illinois, and Chesterfield, Missouri, with a combined staff of over 260 professionals.

Burns & McDonnell, SCI Engineering and Kuhlmann Design Group are not M/W/DBE certified firms but we have relationships with many certified firms, if needed.

SCI ENGINEERING

Since its founding in 1978 as Soil Consultants, Inc., SCI Engineering has grown steadily to become a multi-discipline firm with nearly 150 employees in seven offices, three in the St. Louis metro area. From its beginning, the company has provided geotechnical and construction services to architect and engineering design professionals. Over the past 40 years, capabilities have been added in environmental, natural resources, and cultural resources to provide a full suite of consulting services, to better meet the needs of our clients. SCI's experience includes providing services for sewers, waterlines, and associated collection, treatment, and distribution systems for not only the initial exploration and design recommendation phases, but also for the preparation for and implementation of routine and unique construction-phase activities.

Contact: Tom Casey, PE / 618-624-6969
650 Pierce Blvd., O'Fallon, Illinois 62269
tcasey@sciengineering.com

KUHLMANN DESIGN GROUP

Kuhlmann Design Group (KdG), founded in 1974, is a full service, multidiscipline A/E firm headquartered in St. Louis, Missouri, with a local office in Belleville, Illinois. The firm is comprised of approximately 40 individuals and has four main divisions: architecture, interior design, building engineering, and infrastructure engineering. KdG has a wide range of experience and knowledge of various types of surveying, including precision and electronic leveling, celestial observations, and network adjustments, as well as having access to the appropriate equipment and man power for the type of service required. We presently employ licensed surveyors, surveyors-in-training, and CST field technicians in order to provide 2, 3, or 4 man survey crews depending on the task required.

Contact: Christine Beasley, PLS / 618-233-8898
15 East Washington St., Belleville, Illinois 62220
chris.beasley@kdginc.com

PROJECT TEAM

The Burns & McDonnell approach to organizing our team is to provide the Village of Freeburg with a group of professionals that understand your facility and collection system needs. While developing our project team, our intent was to align the necessary people with your needs in mind, and we know that our experience and technical engineering skill set will make your project a success.

We have prepared a large project team to cover the breadth of services necessary for the design, upgrades and construction of both the Wastewater Treatment Plant and existing collection system. Below we have listed our entire project team capabilities. Over the next few pages, we have provided a project organization chart and resumes for the critical teaming members of this project. Although resumes have not been provided for each project team member, they are available upon request.

Project Team Capabilities

Name	Company	Years of Experience	Discipline	Collection Systems	Lift Stations	WWTP	Regulatory & Permitting	Design-Build
Jeff Barnard, PE	Burns & McDonnell	17	Civil- WWTP	●	●	●	●	●
Randy Patchett, PE	Burns & McDonnell	33	Civil - Collections & WWTP	●	●	●	●	●
Joe Darlington, PE	Burns & McDonnell	7	Civil - Lead Process & Regulatory	●	●	●	●	●
Dustin Hill, PE, ENV SP	Burns & McDonnell	13	Civil - Hydraulic Modeling & Collections	●	●		●	
Mike Halbur	Burns & McDonnell	20	Construction	●	●	●		●
Bill Nash, PE, ENV SP	Burns & McDonnell	27	Civil - Pump Stations		●		●	●
Caitlin Collins, PE, ENV SP	Burns & McDonnell	5	Civil - WWTP		●	●	●	●
Allison White, PE	Burns & McDonnell	5	Civil - Hydraulic Modeling & Collections	●	●			
Christine Beasley, PLS	Kuhlmann Design Group	25	Survey	●	●	●		
Tom Casey, PE	SCI Engineering	17	Geotechnical	●	●	●		
Steve Jonson	Burns & McDonnell	17	Field Services	●	●			
Bryan Claxton	Burns & McDonnell	18	GIS	●				
Kevin Heffern, PE, SE	Burns & McDonnell	19	Civil/Structural		●	●		●
Erik Dienberg, PE	Burns & McDonnell	12	Electrical		●	●		●
Jess Borries, EIT	Burns & McDonnell	15	Mechanical		●	●		●

Village of Freeburg, Illinois
Wastewater System Improvements

Jeff Barnard, PE
Project Manager and Lead Process

Randy Patchett, PE
QA/QC Manager

Joe Darlington, PE
Lead Process & Regulatory

Mike Halbur
Construction Lead

Dustin Hill, PE
Collection System and Hydraulic Modeling Lead

Allison White, PE
Collection System Support

Bill Nash, PE
Lift Station Design Lead

Caitlin Collins, PE
WWTP Design Lead

SCI Engineering

Tom Casey, PE
Geotechnical

Kuhlmann Design Group

Christine Beasley, PLS
Surveying

PROJECT TEAM

Education
- MS & BS, Civil Engineering

Registration
- Professional Engineer (MO, KS, IL pending)

Years Experience
- 17

Jeff Barnard PE
Project Manager and Lead Process

Jeff began his career performing nutrient removal projects for wastewater utilities in Southwest Missouri and on the east coast in the Chesapeake Bay area. Projects completed by Jeff include integrated fixed film activated sludge, membrane bioreactors, and suspended growth activated sludge. He has an ongoing project with the City of Springfield, Missouri to optimize energy efficiency relative to nutrient removal at their Southwest Wastewater Treatment Plant with a discharge limit of 0.5 mg/L. Further, Jeff has been the lead engineer for a number of collection system evaluations that have inlcuded flow monitoring, hydraulic modeling, and inflow and infiltration mitigation. Jeff will bring a holistic understanding and thorough technical understanding to the Village Freeburg's wastewater needs.

Relevant Experience
- Design-Build WWTP Improvements, City of Trenton, Missouri
- Wastewater System Improvements, Duckett Creek Sanitary District, O'Fallon, Missouri
- WWTP Improvements, City of Harrisonville, Missouri
- Fishing River WWTP Improvements, Kansas City, Missouri
- Planning WWTP Improvements, City of Wichita, Kansas
- Planning WWTP Improvements, City of Republic, Missouri
- Design-Build WWTP Improvements, City of Edgerton, Kansas

Education
- BS, Civil Engineering

Registration
- Professional Engineer (IL)

Years Experience
- 33

Randy Patchett PE
QA/QC Manager

Randy has extensive experience providing consulting engineering services on civil, environmental and hazardous waste projects to municipal, industrial, state and federal clients. His responsibilities include developing and managing projects involving a wide range of services in the areas of water, wastewater, stormwater and flood management, hazardous/mixed waste management and general civil works. His experience includes performing investigations, feasibility studies, computer modeling, global information system projects, master planning, design and construction management.

Relevant Experience
- WWTP Improvements, Village of Rantoul, Illinois
- Infrastructure Asessment and Design, Village of Rantoul, Illinois
- Owner's Engineering/Program Management for WWTP Consolidation Program, Frankfort, Illinois
- Sanitary Sewer System Evaluation, Mount Prospect, Illinois
- WWTP Nitrate and Phosphorus Feasibility Study, Village of Rantoul, Illinois
- Wet Weather Flow Treatment Facility Operation & Maintenance Schedule Development, Village of Villa Park, Illinois

PROJECT TEAM

Joe Darlington PE, ENV SP
Lead Process & Regulatory

Joe focuses on wastewater projects for municipal and industrial clients. He is a project manager with experience in evaluation, design, permitting, and construction management. He has a successful track record coordinating projects with third parties such as regulatory agencies, property owners, impacted businesses and residents.

Education
- BS, Civil Engineering

Registration
- Professional Engineer (IL, IN)
- Envision Sustainability Professional (ENV SP)

Years Experience
- 7

Relevant Experience
- WWTP Improvements, Village of Rantoul, Illinois
- Infrastructure Asessment and Design, Village of Rantoul, Illinois
- Owner's Engineering/Program Management for WWTP Consolidation Program, Frankfort, Illinois
- Sanitary Sewer System Evaluation, Mount Prospect, Illinois
- Sequence Batch Reactor (SBR) Treatment System for former Manufactured Gas & Coke Plant Site, Northern Illinois
- WWTP Nitrate and Phosphorus Feasibility Study, Village of Rantoul, Illinois
- Wet Weather Flow Treatment Facility Operation & Maintenance Schedule Development, Village of Villa Park, Illinois

Dustin Hill PE, ENV SP
Collection System and Modeling Design Lead

Dustin focuses on project management and project engineering of sanitary and stormwater collection systems as well as hydraulic modeling. His technical experience includes master planning, hydraulic and hydrologic modeling, design of sanitary and stormwater collection and Public & Private I/I Program Management. Software modeling experience includes: InfoWorks ICM, XPSWMM, Pizer Hydra, EPANET, SWMM and the Bentley Suite of modeling software.

Education
- MS & BS, Civil Engineering

Registration
- Professional Engineer (MO, IL pending)
- Envision Sustainability Professional (ENV SP)

Years Experience
- 13

Relevant Experience
- Hydraulic Modeling for Multiple CIP projects, Metropolitan St. Louis Sewer District, St. Louis, Missouri
- Consent Decree Program Management - Hydraulic Model: Jackson, Mississippi and Kansas City, Missouri
- Systemwide Model & Wastewater Master Planning: Laramie, Wyoming; Republic, Missouri; and Macon, Missouri
- Lemay Watershed Program Management - Private & Public I/I Reduction, Metropolitan St Louis Sewer District
- Hydraulics Engineer for PSWD#1 of Lincoln County, Missouri
- Preparation of 25+ Sanitary Sewer Evaluation Studies (SSES) and I/I Reduction Reports: Metropolitan St. Louis Sewer District
- I/I Strategic Plan, St. Joseph, Missouri

PROJECT **TEAM**

Mike Halbur
Construction/Cost Estimating

Mike brings a wealth of knowledge to our Construction/Design-Build Global Practice. Prior to joining Burns & McDonnell, Mike was the key facilitator in the implementation of Garney Construction's Water Facilities Group. The group started with a single project in 1999 and grew to be the seventh largest water treatment supply contractor in the country. Mike understands the water industry and his experiences related to cost estimating complex facility rehabilitation projects will equate to accurate cost estimates for the Village of Freeburg.

Education
- BS, Civil/Construction Engineering

Years Experience
- 20

Relevant Experience
- Coca-Cola Wastewater Treatment Plant Improvements, Lenexa, Kansas
- Southwest Diversion Pump Station Improvements, Des Moines, Iowa
- Blue River Main Wastewater Treatment Plant Expansion, Overland Park, Kansas
- Mid-Continent Water Reclamation Facility Improvements, Wichita, Kansas
- Wastewater Treatment Plant Improvements Design/Build, Brighton, Colorado

Bill Nash PE, ENV SP
Lift Station Design Lead

Bill provides municipal wastewater services to public and private organizations, including pump station evaluation studies and design, and acts as project manager on several wastewater related projects. Previously, Bill worked for a major wastewater treatment equipment manufacturer, and he was involved with product design and development for large underground pump stations and various wastewater treatment component.

Education
- BS, Mechanical Engineering

Registration
- Professional Engineer (MO, KS)
- Envision Sustainability Professional (ENV SP)

Years Experience
- 27

Relevant Experience
- Pump Station Optimization Study, Independence Missouri
- Faraon Street Pump Station, St Joseph, Missouri
- North Headworks Pump Station and Force Main, Atchinson Kansas
- South St. Joseph Industrial Sewer District Pump Station Wet Well, St Joseph, Missouri
- Owen Good Pump Station, City of Raymore, Missouri
- Bee Creek New Wastewater Collections System, City of Branson, Missouri
- Pump Station Optimization Study, Little Blue Valley Sewer District, Independence, Missouri
- Grand River Relief Sewers, City of Raymore, Missouri
- Pump Station 61 Study, City of Kansas City, Kansas

PROJECT TEAM

Education

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

Registration

- Professional Engineer (IL, MO)
- Envision Sustainability Professional (ENV SP)

Years Experience

- 5

Caitlin Collins PE, ENV SP

Wastewater Treatment Plant Design Lead

Caitlin is an environmental engineer with experience in municipal wastewater treatment plant design, especially in the areas of process optimization, nutrient removal, lagoon rehabilitation and upgrades, facility planning, aeration design, and solids handling. She has worked on a number of retro-fit type projects as well as green field plant designs.

Relevant Experience

- Design-Build WWTP Improvements, City of Trenton, Missouri
- Wastewater System Improvements, Duckett Creek Sanitary District, O'Fallon, Missouri
- Design-Build WWTP Improvements, City of Hays, Kansas
- Wastewater Master Plan, City of Wichita, Kansas
- WWTP Improvements, Clay County, Missouri
- Water and Wastewater Plant Evaluation, City of Gardner, Kansas
- WWTP Evaluation, Knoxville Utilities Board, Knoxville, Tennessee
- Design-Build WWTP Improvements, City of Emporia, Kansas

Education

- BS, Civil Engineering

Registration

- Professional Engineer (IL)

Years Experience

- 5

Allison White PE

Collection System and I/I Reduction Support

Allison focuses on stormwater and wastewater collection systems and has experience in Private and Public I/I Reduction and Removal, hydraulic modeling, collection systems, cost estimation, and project management. She has experience with ArcGIS, AutoCAD and Civil 3D and software modeling experience with Sewer GEMS, Storm CAD and InfoWorks ICM.

Relevant Experience

- Collection Systems Design and Private I/I Reduction for Multiple Projects, Metropolitan St. Louis Sewer District (MSD)
- Public I/I Removal and Reduction for Multiple Projects, MSD
- Modeling Support for Public Water Supply District #1 of Lincoln County, Missouri
- Modeling Support for Joplin I/I Reduction Program, Joplin, Missouri
- Modeling Support for Wastewater Master Plan of Laramie, Wyoming
- Modeling Support for Wastewater Master Plan, Republic, Missouri

PROJECT TEAM

Christine Beasley PLS
Survey Manager

Chris has over 25 years of experience in land surveying, civil engineering, and project management. Her project experience includes GIS mapping, GPS surveying, residential, commercial, municipal, and roadway projects, as well as many different types of environmental projects. She has experience that includes boundary surveys, record plats, topographic surveys, bathymetric surveys, construction surveys, ALTA/NSPS surveys, scanning surveys, and UAV (drone) surveys.

Education
- BS, Environmental Science

Years Experience
- 25

Relevant Experience
- Metropolitan St. Louis Sewer District (MSD): St. Louis, MO - GPS surveys, GIS, as-builts, easement documents, strip maps
- Duckett Creek Sanitary District: St. Charles County, MO - GPS surveys, GIS, various mapping, as-builts, topographic surveys, easement documents, property descriptions, sanitary sewer design, and review
- On-Call Surveying: Belleville, Illinois - Topographic and ROW surveys
- City of Maryland Heights: Missouri - Topographic and property surveys for park and sewer improvements
- IL 159 Streetscape: Belleville, Illinois - Construction staking
- 3rd and Main Street: Belleville, Illinois - Alley vacation
- Survey Projects for Village of Dupo: Village of Dupo, Illinois - Miscellaneous surveys for improved drainage along roadways

Thomas Casey PE
Geotechnical Engineering

Tom has over 17 years of experience providing services for geotechnical explorations and geotechnical related construction projects. His expertise includes technical management of geotechnical projects, seismic hazard analyses, In-situ soils investigations, instrumentation, load testing, and design consulting services including drilled shaft foundations, non-redundant drilled shaft foundations, driven piles, shallow foundations, roadway pavements, as well as slope stability and underseepage evaluations.

Education
- MS, Geotechnical Engineering
- BS, Civil Engineering

Registration
- Professional Engineer (IL, MO, CO, FL, SC, KY, IN, AR, KS)

Years Experience
- 17

Relevant Experience
- MidAmerica Cargo Building, Mascoutah, Illinois
- WWTP Improvements, Jerseyville, Illinois
- WWTP Improvements, Fayetteville, Illinois
- MSD Coldwater Creek WWTP Upgrades, Florissant, Missouri

OUR APPROACH

The Burns & McDonnell team brings a clear understanding of the Village of Freeburg's needs related to both your Wastewater Treatment Plant (WWTP) Improvement Project as well as your peak flow concerns. Burns & McDonnell recognizes that the existing WWTP requires upgrades to address capacity-related concerns and upcoming NPDES discharge regulations. As your design consultant, we will prioritize both the WWTP Improvements as well as peak flow related concerns within your collection system and treatment facility. At Burns & McDonnell, we believe in utilizing an interactive approach to project execution and prioritizing data-driven decisions, and we complete all projects with the intent of making our clients successful. Our project approach was developed with the Village of Freeburg's current and future needs in mind. We have developed a project approach that will provide:

- Design and construction of an upgraded WWTP that can sustain peak flows while meeting Illinois code and NPDES permit requirements.
- A holistic approach that involves acquiring a thorough understanding of system-wide wastewater flows by means of a hydraulic analysis which will provide the Village data-driven decision-making capability.
- A clear plan to identify upgrades to your existing collection system, lift stations and force mains, and provide I/I reduction strategies for reducing peak flows during wet weather events. The information and data collected during this process can be used to develop and implement the Capacity, Management, Operations, and Maintenance (CMOM) plan that is required per the draft NPDES permit.

Our approach has been developed with the future of Village of Freeburg in mind. We will provide you with a solution that will prove to be an effective investment and will provide longevity for the Village of Freeburg.

Collaboration

Our team members were selected for their technical experience, as well as their availability to commit the time necessary to complete the anticipated project tasks. We are excited to support the Village of Freeburg (the Village) with the engineering, planning, analysis, and construction management services for this important project.

Burns & McDonnell favors an interactive approach to project execution that serves to engage appropriate stakeholders throughout the process (Figure 1). We have identified at least three key decision-makers for this project: The Village of Freeburg (Public Works, Elected Officials and Village Board), Illinois Environmental Protection Agency (IEPA), and the community businesses and residents. Additional stakeholders will be further defined as impacted utilities, roadways, etc. are identified through the design process.

Figure 1 - We favor an interactive approach to project execution that engages the appropriate decision-makers throughout the project.

Great communication is key to the success of projects. This will require a project team that is well-versed in regulatory requirements, knows how to coordinate with the Village and third-parties, and understands the big-picture of how a project like this can affect a community. Alongside the Village, we are prepared to initiate project coordination workshops with the stakeholders described above to outline the project objectives and identify the applicable codes and regulations (community/local, state or national). In addition, we plan to prioritize utility and right-of-way coordination throughout the design process.

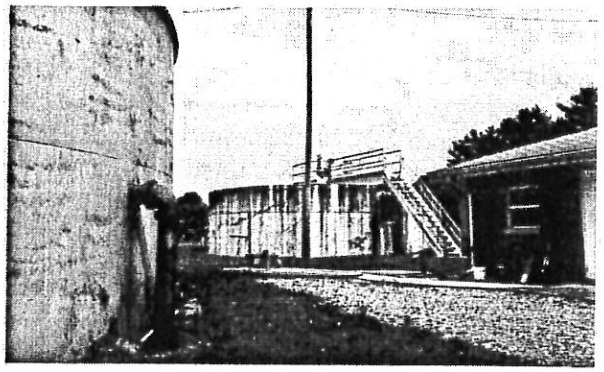
We understand that the Village is considering financing this project through the SRF loan program. This will require a project team with a proven record supporting communities with securing these funds. We are very familiar with the requirements since we are currently providing SRF support to Frankfort, Illinois for their $60 million WWTP Consolidation Program that was split into 3 phases over approximately 6 years to accommodate cash flow considerations. Each phase is being funded by SRF. Furthermore, we understand that the Village intends on increasing utility rates to pay for the loan, and we have in-house capability to assess your financial capabilities, so we can assist you with every step of the way. Our project team will provide frequent and consistent communication to determine that this project meets all state and regulatory requirements while fulfilling the needs of the Village with a cost-effective approach.

Technical Application

The chance to plan for, expand and improve your WWTP is unique and may only present itself on rare occasions. To that end, mitigating the I/I within the Village's sewer system and upgrading your existing WWTP with the best solution will be paramount to your success. You need a team that will meet all known goals for the Village as well as overcome future challenges identified throughout the design and construction process.

WWTP Improvements

The Village needs WWTP improvements due to current capacity limitations and upcoming NPDES discharge requirements. Upgrading a WWTP is a major undertaking, and a clear plan is required to make sure it will be capable of serving the community for the next 30 to 40 years and meet current and potential future effluent limitations. We intend to implement various data-driven solutions that will be best-suited for the Village's current and future needs.



Existing Wastewater Treatment Plant

The existing WWTP has several issues that need to be addressed, including:

- Capacity-Related Concerns: A high level comparison of the permitted average design flow and average annual flow rates are shown in the table below.

Average Design and Annual Flow Comparisons		
Permitted	2015 average	2016 average
.4 MGD	.4058 MGD	.4155 MGD

  The average influent flow to the WWTP exceeded the average design flow in 12 months during both 2015 and 2016. Furthermore, the peak influent flow to the WWTP exceeded the permitted peak design flow of 1 MGD in 4 months during those years. By implementing an effective I/I reduction strategy within the collection system, capacity related concerns could be mitigated both at the treatment plant and within the Village sewer system.

- Treatment-Related Concerns: The WWTP has had difficulty meeting its effluent requirements. In 2015 and 2016 the permit limits for ammonia-nitrogen were exceeded 10 times. The effluent BOD from the excess flow clarifier exceeded permit limits in January 2015, February 2015, and June 2016. Effluent TSS from the excess flow clarifier exceeded permit limits in January and February 2015.

We will evaluate the current proposed Sequencing Batch Reactor (SBR) solution included within the Project Plan as well as an Activated Sludge Plant solution. In addition, we plan on retaining information from the Operators to better understand the current flaws within the existing plant as well as learning what they would prefer for a future plant.

Our intent is to design an all-encompassing WWTP solution for the Village of Freeburg that will be sized with realistic rates of growth in mind, while also not over-designing a treatment facility that will cost more to use and maintain.

Burns & McDonnell understands that the current WWTP is being run by an experienced staff of operators. The Draft NPDES Permit limits are similar to that of the existing permit, with the exception of lower maximum daily concentration limits for ammonia. We know that the existing treatment processes occasionally have difficulty meeting the current NPDES discharge requirements, and we plan to implement a strategy that will be developed on the understanding of upcoming discharge requirements.

Water Quality and Regulatory Evaluations

Based on our experience a proactive and aggressive permit strategy can result in schedule acceleration and minimize project delays related to permit acquisition and regulatory reviews. The first step is to review the current NPDES permit and potential regulatory requirements. IEPA is in the process of adjusting Illinois' nutrient removal strategy. For example, most facilities are expected to be issued a phosphorus effluent limit of an annual geometric mean of 0.5 mg/l, but some variation will be considered depending on a number of factors. These changes need to be understood so they can be incorporated into the Project Plan.

Another regulatory consideration that needs to be carefully considered involves the potential presence of natural resources at the project site. The current plan proposes constructing the WWTP expansion east of the existing WWTP in an area that is heavily wooded and adjacent to the Kinney Branch Creek.**The previously completed West WWTP Project Plan notes that several Threatened and Endangered Species are located in St. Clair County, including two species of bats that typically nest in environments similar to the project site.** Disturbance of bat habitats can require regulatory coordination with the US Army Corps of Engineers and IDNR. Some bat habitats can be disturbed only during certain times of the year. If not identified early, these items could result in project delays.

Another natural resource that needs to be considered is whether wetlands exist on the project site. Disturbance of wetlands can trigger the need for federal and state permits and again may result in project delays.

These items will be discussed with the Village and applicable regulatory agencies to validate permitting requirements for the project. A comprehensive schedule will be developed to track the agencies, type, status, and expected approval timeline for each required permit. This information will be incorporated into and used to maintain the project schedule.

Permits will likely be required from multiple agencies; however, we anticipate that construction permit(s) from the IEPA will be the permits on the critical path, specifically the permit for expansion of the WWTP. We will coordinate closely with IEPA to identify and manage critical permit items for maintaining the project schedule.

State Revolving Fund (SRF)

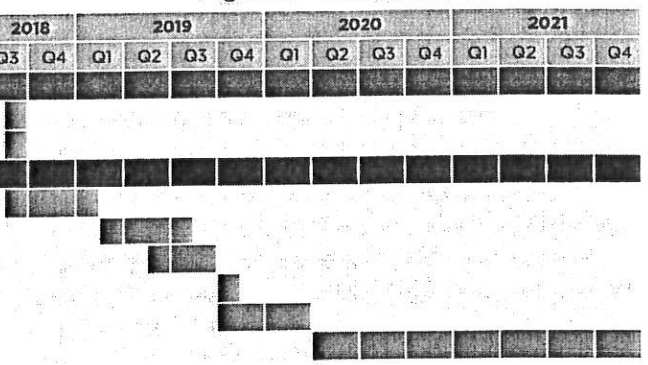
We understand that the Village intends to pursue low-interest loan funding through the IEPA SRF program. The SRF program requires development of a project plan; IEPA planning approval; submission and approval of a complete financial package; and submittal of various forms, certifications, and checklists in the planning, pre-design, design, and construction phases of a project. We are very familiar with the requirements since we are currently providing SRF support to Frankfort, Illinois for their $60 million WWTP Consolidation Program. Each phase is being funded by SRF.

It is important to note that financing obtained through the SRF program typically results in an extended project schedule because of the time required for IEPA approval of various documents. For example, it is common for 2-3 months to pass between bid opening and notice to proceed to allow the formal loan offer to be finalized. We will prioritize early and consistent coordination with IEPA to limit the amount of time required for approvals.

Organizations obtaining funding through the SRF program are required to submit a complete financial package, including an enforceable water or sewer ordinance, a user charge ordinance, a certified local debt authorization ordinance, and a dedicated revenue stream that is adequate to assure loan repayment. Burns & McDonnell can help develop a projected cash flow schedule that the Village can use to access its financial capabilities and to plan for utility revenues and expenses during the project.

Figure 2 - Design-Bid-Build Schedule

Task	Duration (days)	Start	Finish
Wastewater System Improvements	772	18-Sep-18	30-Sep-21
Notice to Proceed	0	18-Sep-18	
Kickoff Meeting	1	25-Sep-18	25-Sep-18
West WWTP Improvements	767	25-Sep-18	30-Sep-21
Preliminary Design	89	25-Sep-18	31-Jan-19
Detailed Design	127	01-Feb-19	31-Jul-19
Permitting	84	03-Jun-19	30-Sep-19
Bidding	36	01-Oct-19	19-Nov-19
IEPA SRF Loan Application/Approval	82	01-Nov-19	28-Feb-20
Construction	404	02-Mar-19	30-Sep-21



Project Schedule

A proposed project schedule for the WWTP portion of the project is shown in **Figure 2** above. This figure presents the WWTP portion of the project being delivered through the traditional design-bid-build approach. A schedule for the collection system portion of the project has also been developed, and it is discussed in following sections.

Alternative Delivery

If the Village wishes to consider expediting the project schedule, an alternative delivery method like design-build should be considered. **Design-build integrates design and construction to create a single point of accountability, reducing schedule and cost and producing higher-quality results in less time than traditional methods, as described in Figure 3 below.** It also facilitates collaboration among the project's stakeholders to turn the vision of the project into reality. Another advantage of design-build is that it provides an owner with cost certainty much earlier in the process than design-bid-build. With design-build comes a transparent fixed price, or guaranteed maximum price (GMP), typically at the 30- to 60-percent design stage. This allows the team to tailor the project scope to meet the community's budget and schedule expectations, also providing upfront information for the owner to make confident and informed decisions regarding budgeting, project financing, and public education on potential cost and rate impacts. Design-build spans the entire project delivery cycle, driving integration, collaboration and innovation from the beginning. This process allows a team to identify and remove potential roadblocks early to significantly reduce a project's timeline and cost. If the design-build approach is something the Village of Freeburg is interested in, Burns & McDonnell will provide a proposed project schedule comparing the traditional design-bid-build approach with the design-build approach.

Collection Systems Engineering

The Village of Freeburg collection system is well maintained and reliable; however, improvements are needed to facilitate better performance of wastewater conveyance during wet weather. The Village of Freeburg's current Facility plan identifies that excessive I/I is present (exceeds 275 gpcpd) within the collection system based on review of peak flows compared to average daily flows at the wastewater treatment facilities. The Facility plan also identifies that smoke testing should

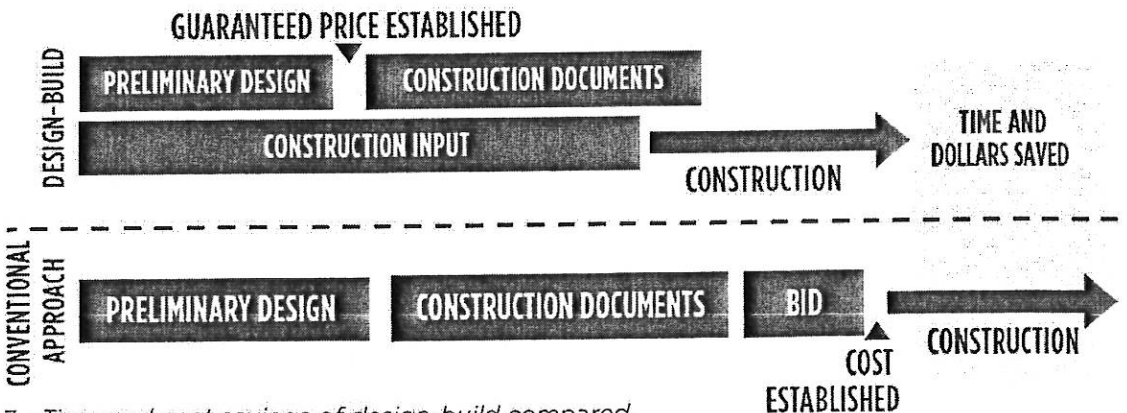


Figure 3 - Time and cost savings of design-build compared to the conventional design-bid-build model.

be explored to identify suspect sewers. Burns & McDonnell recommends a more robust approach through the development of a Collection System Adaptive Management Plan (CSAMP). The CSAMP will provide the Village of Freeburg the ability to make data driven decisions with regard to evaluating and constructing collection system improvements and will provide the data collection to help the Village establish an effective CMOM program. That will generate success to improving wet weather conveyance considering both current capacity constraints and future growth. Project success revolves around the identification and prioritization of projects that effectively and cost efficiently tackle wet weather conveyance, bringing the greatest value to Freeburg in providing the highest level of wastewater service to their rate payers.

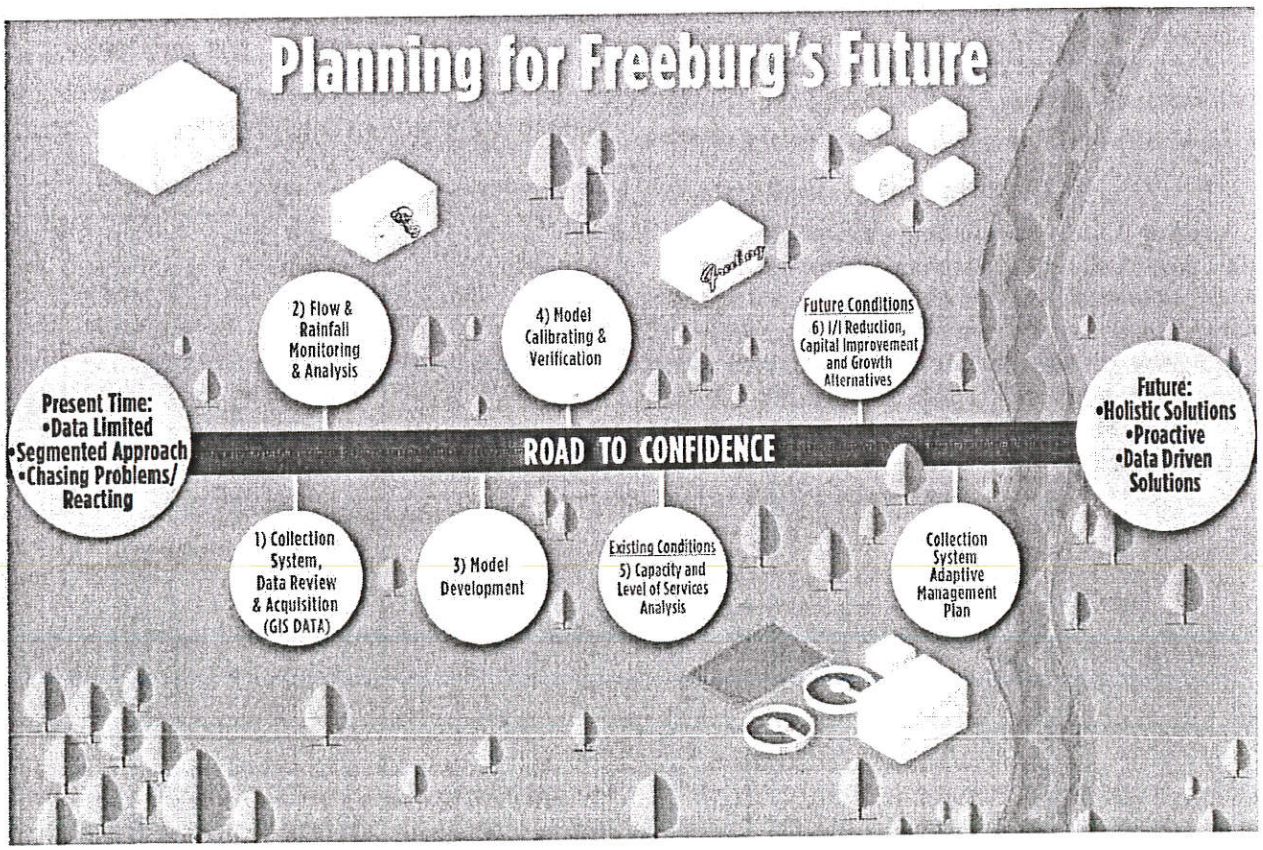
Collection System Adaptive Management Planning

Burns & McDonnell plans to use a holistic approach based on data-driven decisions to evaluate the Village of Freeburg collection system. Our team brings both local and technical knowledge that is highly qualified and experienced. In **Figure 4** (shown below) you will see a visual representation of our planned project approach to developing the Collection System Adaptive Management Plan.

Collection Systems Data Review & Acquisition

Our plan will be founded on a repeatable process of collection system and wastewater planning evaluations. We will start our process by developing a firm understanding and review of existing asset data. Once reviewed, Burns & McDonnell will prepare a Data Gap Analysis (DGA) outlining relevant data that will need to be acquired to facilitate construction of the systemwide sanitary sewer hydraulic model. Following the preparation of the DGA, Burns & McDonnell will assist the Village in acquiring the necessary manhole and lift station data. This will be the foundation of our planning effort. Once all necessary data is acquired, we will build upon the Village's existing GIS system to confirm system connectivity and provide the horizontal and vertical layout of the collections system. The GIS data will later be utilized in development of a hydraulic model. During this stage water quality information of the receiving streams and wastewater characterization data will also be acquired and reviewed.

Figure 4



Flow and Rainfall Monitoring

A key aspect to understanding systemwide collection system issues is developing the relationship between rainfall, runoff and entry of stormwater into the wastewater collection system. This relationship needs to be established at multiple locations throughout the entire collection system to gain a better understanding of where these wet weather issues originate. To gain this understanding, a flow and rainfall monitoring program must be implemented as part of the CSAMP. A robust flow and rainfall monitoring provides:

- Development of dry weather weekday and weekend diurnal patterns;
- Establishment of depth and velocity profiles at each meter locations across multiple events allowing evaluation of collection system performance;
- Isolation of wet weather volume generation at each meter location for wet weather events of varying intensity and duration;
- Ability to effectively prioritize meter basins for sanitary sewer evaluation survey (SSES) that include smoke testing, dye flooding, closed caption television (CCTV) surveys and manhole inspections; and
- Provides the necessary hydraulic data for calibrating and verifying a systemwide hydraulic model.

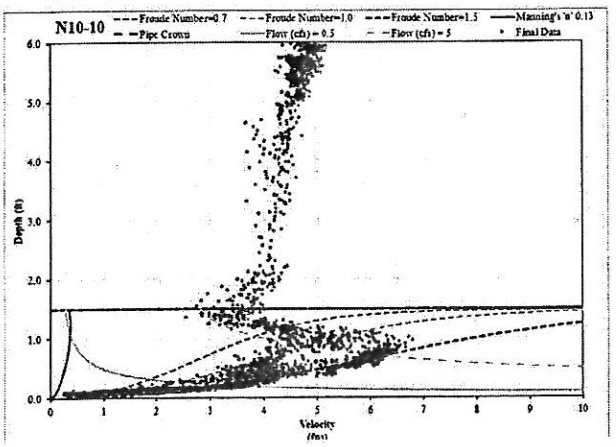


Figure 5 - Flow Scattergraph showing backwater and surcharging within the system that was created from flow monitor export data.

Figure 5 provides an example of a scattergraph developed based on the data acquired from flow metering data that identifies the presence of sanitary sewer surcharging due to inefficient downstream capacity.

Facilities Evaluation

We understand the Village of Freeburg has a total of 10 pump stations. It is important to integrate necessary pump station upgrades to overcome maintenance, operational, and hydraulic deficiencies when considering a comprehensive approach to systemwide collection system improvements. Burns & McDonnell proposes to include field inspections and condition assessments of your pump stations to evaluate the following information:

- Maintenance & operation access/safety features
- Pump Station Capacity / Draw down testing
- Hydrogen sulfide (H2S) attack and odor control
- Structural condition assessment
- Electrical and SCADA systems evaluations

At Burns & McDonnell, we are in regular communication with all of the top pump station equipment vendors and frequently meet with them to discuss the latest technological innovations, product line changes, industry trends and regulations, safety features and budgetary pricing. We are committed to and focused on safety and safe access for your staff. This is paramount in our approach to pump station renovations. We understand there is not a "one size fits all" approach to pump station improvements and will meet with your staff to understand your needs, preferences and concerns.

Sanitary Sewer Hydraulic Model

Burns & McDonnell's modeling capabilities brings a national level of experience to the support the Village and their desire to improve wastewater conveyance. We have the capabilities and experience necessary to understand how to leverage various modeling software packages to assess cost-efficient means of conveying wastewater flows for both existing and future conditions. The hydraulic model will be developed through integration of the first steps of the CSAMP including:

- Importing of GIS based collection system data (horizontal and vertical system profiles);
- Importing of Pump Station data from Facility Evaluations;
- Delineation of sanitary sewer catchments and distribution of population data; and
- Incorporation of flow and rainfall monitoring data to support model calibration and verification.

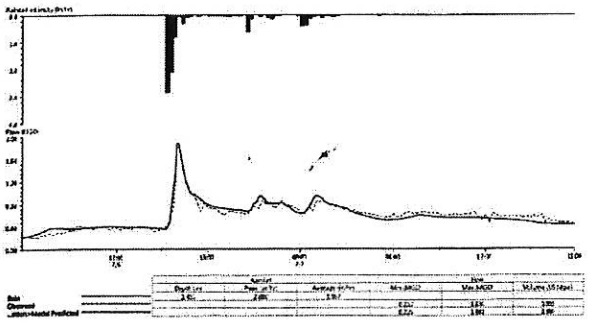


Figure 6 - Wet Weather Calibration Hydrograph

Hydraulic Model Calibration and Verification

Model calibration and verification is the process of refining hydraulic and hydrologic model parameters so the model predicts acceptable levels of wastewater flow generation during both wet-weather and dry weather periods as compared against the measured flow metering data at each meter location. The two primary components calibrated and then verified during this process is peak flow and volume which are critical characteristics in determining capabilities of the existing system to convey wastewater.

Figure 6 illustrates a typical hydraulic model (predicted) generated wet weather hydrograph compared to a metered (observed) hydrograph at a monitoring location.

Existing Conditions Analysis (Capacity and Level of Service)

After completing model calibration and verification, the model is ready for evaluation of the current (existing) ability of the Freeburg collection system to convey wastewater flows and evaluate the area of risk of basement backups and system overflow activity against different rainfall events. Typically, the 1-year, 2-year and 5-year - 24-hour design storms will be simulated with results analyzed for each event. The location, duration and volume of sanitary sewer overflows (SSO) activity will be able to be predicted during these simulations. In addition, the hydraulic grade line (HGL) will be established throughout the system which will aid in evaluating the cities highest areas of risk of basement back-ups or system overflow activity. Through this evaluation, the level of service, or in other words, the villages capability of conveying wastewater throughout the system will be known and can be quantitatively be evaluated for collection system improvements.

Future Conditions & Collection System Adaptive Management Planning

Once the existing conditions evaluation is completed, the model can then be used to develop the CSAMP which will aid in establishing the following:

- Detailed prioritization plan including the identification of performance-based goals for SSES and removal of wet weather inflow and infiltration within each metered basin;
- Identification of Capacity Improvement Projects (CIP) necessary to facilitate current and future growth; and
- Identification of Pump Station Improvements project based on Hydraulic and physical performance metrics.

SSES Basin Prioritization Projects will include the technical approach to evaluating inflow and infiltration through field services including: smoke testing, CCTV, dye flooding, building inspections and manhole inspections based on evaluation of wet weather hydrographs. Project schedules and construction budgets will be developed and will integrate Post-Construction Flow Monitoring to measure success of I/I Rehabilitation efforts before proceeding with any sanitary relief projects.

Capital Improvement Projects will identify infrastructure upgrades that will be necessary to mitigate capacity constraints within the system or projects necessary to facilitate future growth based on an agreed upon planning horizon.

Pump Station Improvements Projects will include upgrades based on findings through the hydraulic modeling efforts or deficiencies based on Facility Evaluation Surveys.

The CSAMP will identify goals and project budgets for each identified project and these will be scheduled and prioritized through coordination and collaboration with the Village of Freeburg. Project dependencies will also be identified to allow for project re-alignment based on future needs. The CSAMP is set up to identify a comprehensive approach to collection system upgrades while maximizing the cost-efficiency and timing of the project to focus the Village of Freeburg infrastructure spending on the 'right' projects. Burns & McDonnell understands that even the

most comprehensive and robust plans require the ability to adaptive to facilitate unforeseen growth, budget or infrastructure modifications. The Burns & McDonnell Collection System Engineering Approach, provides not only the CSAMP, but also develops a data driven decision making tool in the form of a collection system hydraulic model. This gives the Village of Freeburg the ability to efficiently evaluate future 'what-if' scenarios to determine how to effectively manage the modifications to the CSAMP.

Collection System Modeling – Project Schedule

Burns & McDonnell recommends beginning a flow and rainfall monitoring program in Fall 2018 as this serves as a catalyst to development of the CSAMP. The project schedule in **Figure 7** below identifies the timeline for the development of CSAMP.

Project Goals and Quality Control

Our project manager, Jeff Barnard, will continually communicate with the team, Village staff, project stakeholders, and regulatory entities during all phases of the project to successfully deliver within budget and on time. The following key factors, when diligently applied will allow us to execute this project successfully for the Village:

- Planning
- Long-term Partnership
- Clear Communication
- Technical Excellence
- Quality Management
- Budget Control
- Schedule Control

Quality Assurance

The Burns & McDonnell team knows the quality of our service is integral to our business success and the achievement of our mission. Our actions must provide solutions that meet client needs and their expectations, while fulfilling stakeholder expectations. As shown in **Figure 8**, a six-step interdisciplinary review takes place on all Burns & McDonnell projects.

Figure 8

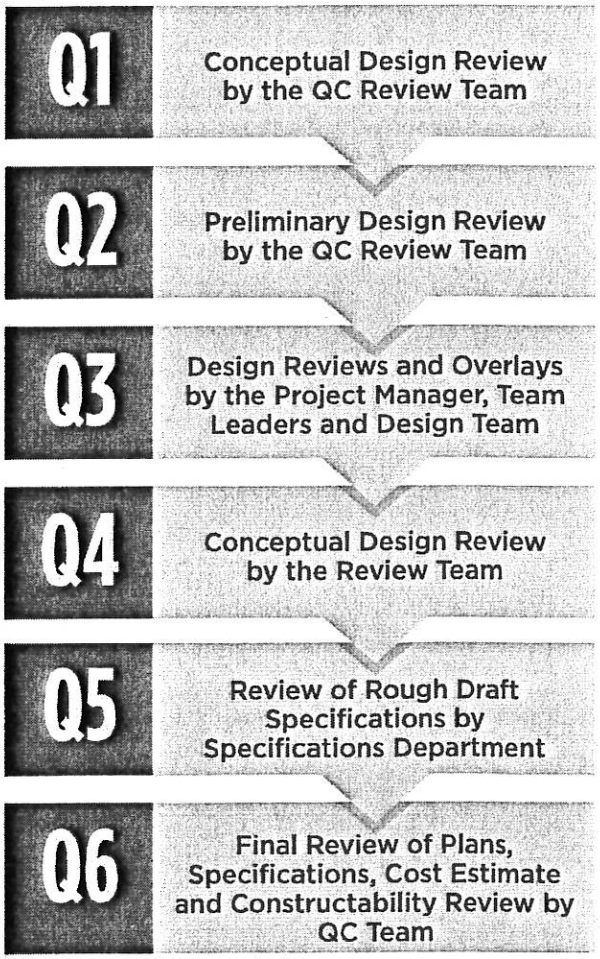


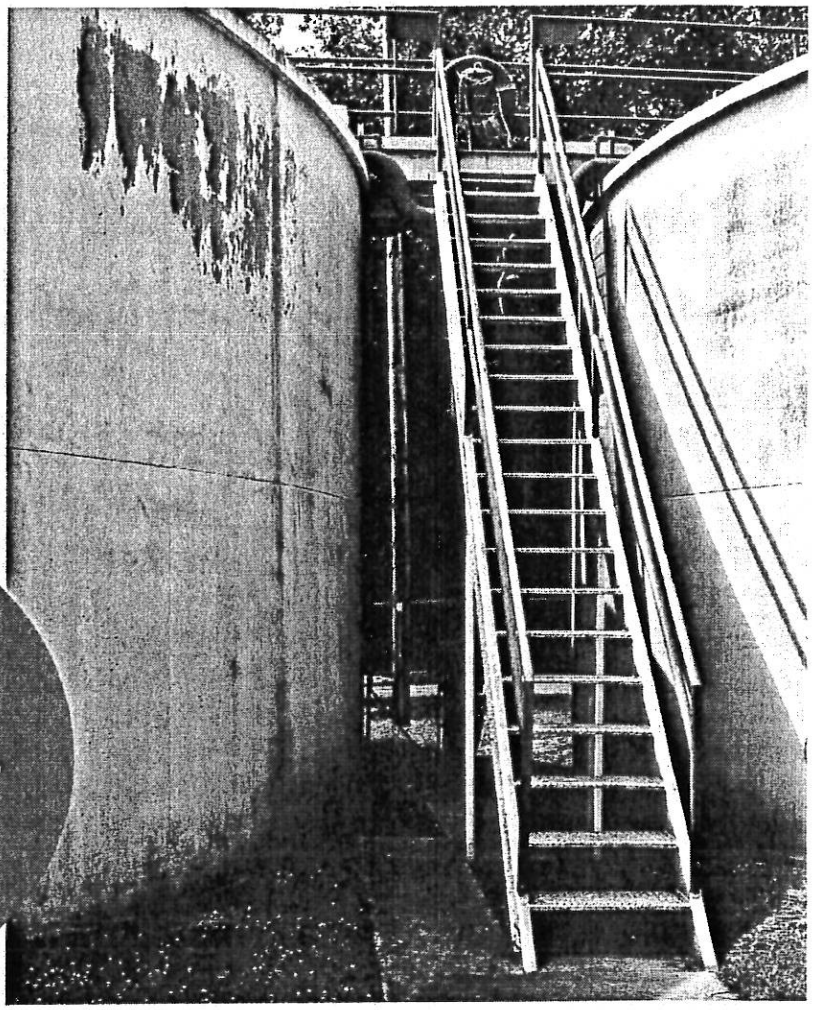
Figure 7

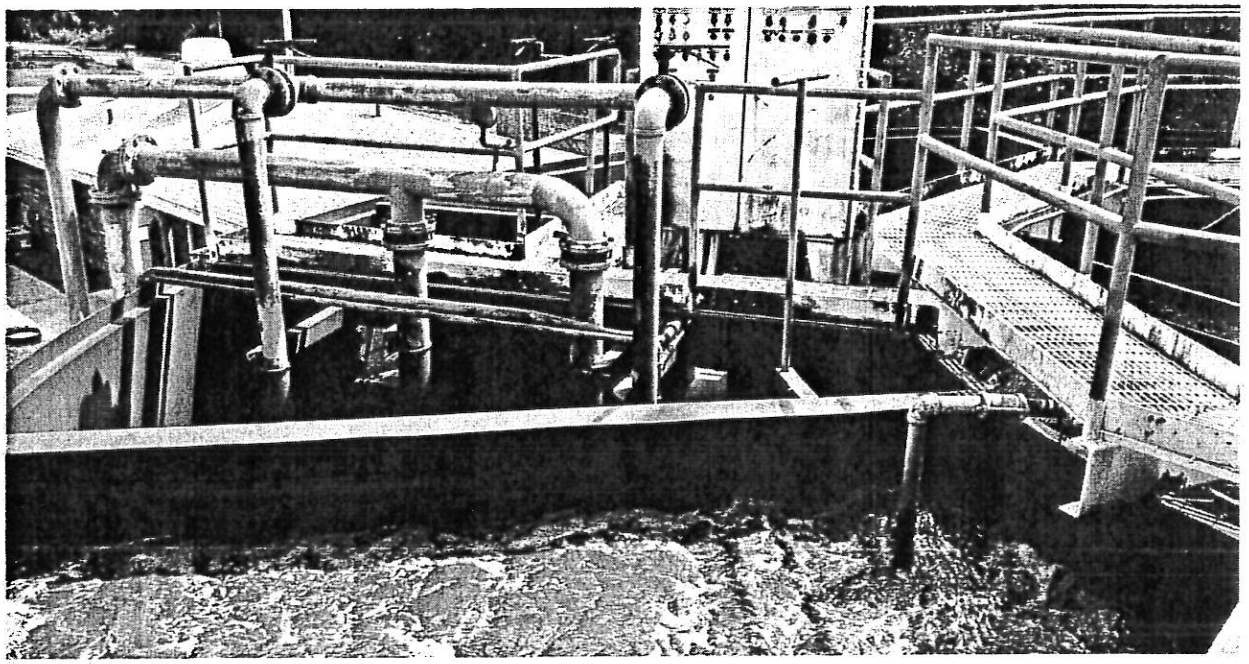
Task	Duration (days)	Start	Finish	2018 Q3	2018 Q4	2019 Q1	2019 Q2	2019 Q3	2019 Q4
Collection System Evaluation	**223**	**25-Sep-18**	**09-Aug-19**						
Flow Monitoring	38	25-Sep-18	15-Nov-18						
Field Services Support	10	16-Nov-18	30-Nov-18						
Model Development & Calibration	82	03-Dec-18	29-Mar-19						
Capacity and Level of Service Analysis	22	01-Apr-19	30-Apr-19						
Collection System Adaptive Management Plan Development	71	01-May-19	09-Aug-19						

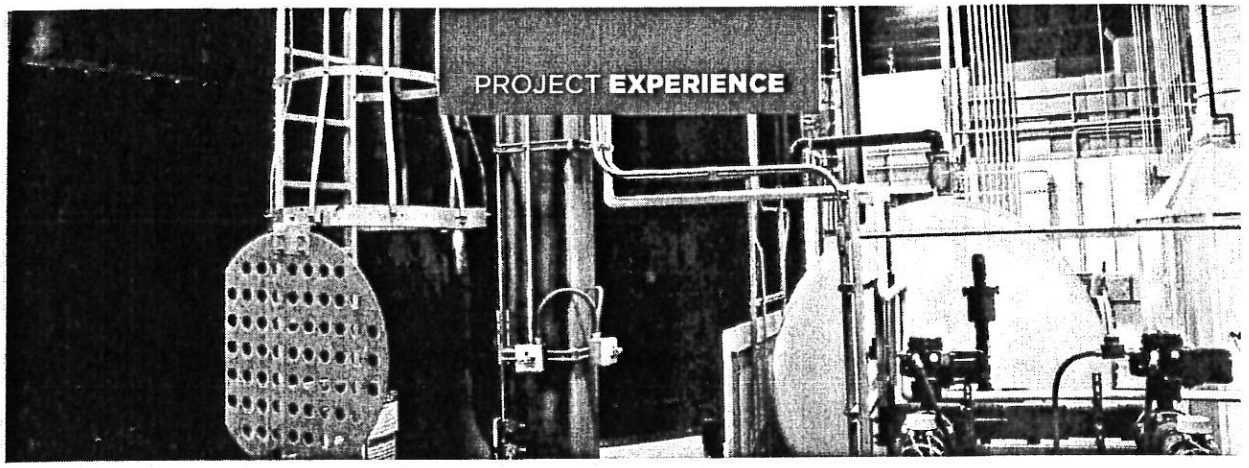
OUR GOAL

As your consultant team, our goal is to provide a plan that considers both treatment and collection and offers the Village an overall return on investment. Return on investment by virtue of optimized collection, conveyance and treatment that positions the Village to address future growth, regulations, and aging infrastructure.

At Burns & McDonnell, we believe that **our client's success** determines our success, and we look forward to partnering with the Village on this project.







ALASKA NORTH SLOPE WASTEWATER TREATMENT FACILITY

Confidential Client, North Slope Borough, Alaska

Oil and gas exploration on the North Slope of Alaska supports multiple facilities and man-camps that require water and wastewater services. The North Slope Borough retained our team in the Fall 2017 to evaluate the feasibility of a 200,000-gallon per day wastewater treatment facility within the Arctic Circle to support oil and gas exploration efforts.

Our evaluation began by coordinating with the oil and gas companies to forecast long-term demand for services. The isolated nature of the facilities and man-camps, as well as the seasonal swings in workforce added to the complexity of the project. Due to tundra conditions, the wastewater must be collected and transported via truck and delivered to the central wastewater treatment plant. It was determined that **Sequenced Batch Reactors (SBR) units** would allow for the most flexibility for operations and maintenance.

The modularized treatment plant considered included: truck unloading, equalization, SBRs, filtration, disinfection, a tundra pond, natural gas turbines, locker room, and office space all of which were installed within buildings. The evaluation also included forecasting with the oil and gas companies long-term demand of services.

Our assessment determined that modularization was very important to the client for a number of reasons. Modularized equipment is easier to ship to the remote site and allows for an accelerated construction schedule. It will also allow the treatment facility to be easily expanded in the future if operational needs increase.

The modular components of the facility included SBR units, filtration, disinfection, and solids handling. These components were all designed to be located within a building. The building was also designed to accommodate space for a locker room, offices, a maintenance area, storage, on-site power generators, and indoor parking for trucks. The building was a pre-engineered structure with an insulated fabric exterior installed over fabricated metal support framing.

Engineering services provided as part of this project included developing a basis of design, process equipment sizing, and utility requirements. Plot plans and general arrangement drawings were also prepared. Cost & rate analysis was performed to inform cost/benefit decisions. The total estimated cost for the facility was $26 million.

Project Details

Client Reference | **Confidential Client**

Completion Date | **Ongoing**

Cost | **$26 million**

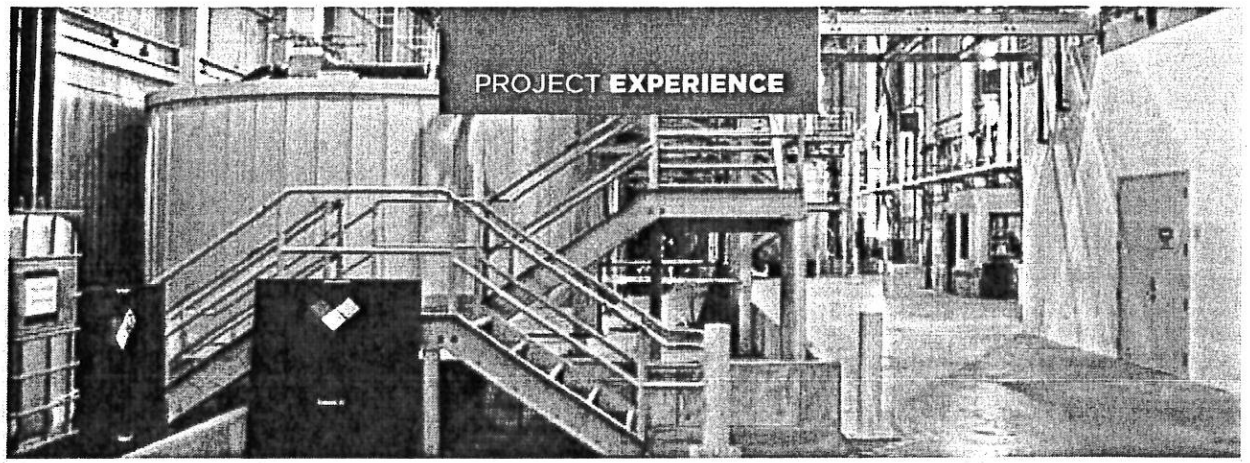
Key Personnel

Scott Pasternak – Project Manager

Sean O'Mara

Brian Foy

Andrew Fabin



SBR GROUNDWATER TREATMENT SYSTEM

Confidential Client, Northern Illinois

Burns & McDonnell was contracted to provide design phase peer review, bid phase support, and to operate and maintain a SBR system at a former manufactured gas (MGP) and coke plant site in Northern Illinois. Project features include:

- Design review and bid phase services
- Operation of extraction and reinjection system
- **Sequenced Batch Reactors (SBRs)** used to treat ammonia and phenols
- System enhancements implemented to optimize performance
- Project under USEPA supervision through a consent order
- Remediation goal of 80% reduction in ammonia mass

An approximately 10-acre area is currently impacted with ammonia, phenols and arsenic. The work plan requires that the groundwater be extracted, treated and reinjected in a series of cells within the groundwater remediation zone. Each cell has five extraction wells down the middle and 10 reinjection wells (five on each side of the extraction wells). The majority of the contaminants are at the bottom of the aquifer at 30 feet below ground surface and low flow pumping at this depth minimizes dilution from lesser impacted groundwater from above.

Treatment was accomplished by using biological treatment through the use of **Sequenced Batch Reactors (SBRs)**. The SBRs allow the flexibility of feeding different influent contaminant concentrations coming for the three cells that were operated at the same time. Sequenced cell startup results in one cell near completion, one cell in the middle of the remediation cycle, and one at the beginning. Based on fluctuations in groundwater contaminant strength throughout the groundwater remediation zone, influent concentrations to the SBRs are not consistent.

Arsenic treatment was accomplished by introducing ferric chloride in the SBRs and an ion exchange system to reduce any additional dissolved arsenic in the treatment plant effluent. A total of 36 cells were remediated through this process. Remaining contaminants will be addressed through long-term monitored natural attenuation, which is ongoing.

Project Details

Client Reference | **Confidential Client**

Completion Date | **2012 (Treatment); Long-term Attenuation Ongoing**

Cost | **$12 million**

Key Personnel

Randy Patchett – Project Manager

Joe Darlington

WASTEWATER TREATMENT PLANT CONSOLIDATION PROGRAM

Village of Frankfort, Illinois

Burns & McDonnell is providing owner's engineering and program management services to the Village of Frankfort for its Wastewater Treatment Plant (WWTP) Consolidation Program. The Village currently owns and operates three WWTPs. Due to high capital and operating costs required to continue operating all three WWTPs, the Village is in the process of abandoning and demolishing two of the WWTPs and transferring flow to the third WWTP, which is being expanded. The program began in 2015 and is scheduled to be completed in 2020.

Demolition of the 2 existing WWTPs required construction of a total of 3 pump stations to transfer flow to the expanded Regional WWTP. The pump stations were rated for design average flows of 0.87-MGD, 1.5-MGD and 3.6-MGD, respectively. The pump stations were rated for maximum wet weather flows of 15.34-MGD, 18.58-MGD and 19.4-MGD, respectively. Approximately 4,400 feet of 16-inch diameter force main, 3,700 feet of 24-inch diameter force main, 4,400 feet of 24-inch diameter sanitary sewer and 2,700 feet of 30-inch diameter force main are also being constructed to transfer flow from the new pump stations to the expanded Regional WWTP.

The program also involved the expansion of the Regional WWTP from an average day capacity of 3.5-MGD to 4.67-MGD. The expansion included oxidation ditch improvements, new aerobic digesters, a new centrifuge and biosolids handling equipment, dewatered biosolids storage facilities, tertiary filter improvements, ultraviolet disinfection system improvements and other ancillary improvements at the WWTP.

Lastly, the program included construction of two excess flow storage ponds. The ponds are sized to store 5.8-MG and 11.5-MG of wet weather flow storage, respectively. Both ponds were constructed with high-density polyethylene (HDPE) liners and provided with non-potable water wash-down systems. The total value of the program is approximately $60 million.

Project Details

Client Reference | **Tony Minette, Village of Frankfort, 432 W. Nebraska Street, Frankfort, Illinois, 60423, 815-469-2177**

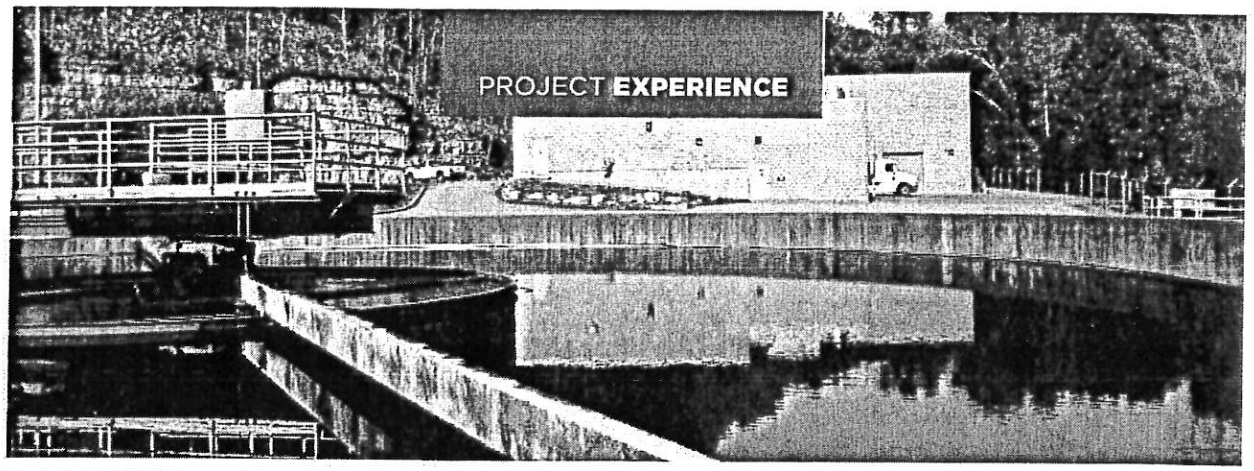
Completion Date | **2020 (estimated)**

Cost | **$60 million**

Key Personnel

Randy Patchett – Project Manager

Joe Darlington



WASTEWATER SYSTEM IMPROVEMENTS

Duckett Creek Sanitary District, O'Fallon, Missouri

Burns & McDonnell recently developed a preliminary engineering report for the Duckett Creek Sanitary District for improvements at their Treatment Plant No. 1 (TP1) and Treatment Plant No. 2 (TP2) facilities. The preliminary engineering report included planning for upgraded headworks, liquid stream treatment, disinfection, and solids handling. Improvements are scheduled to be completed in multiple phases in order to align project requirements with available funding.

Phase 1 projects include new fine screens, upgraded grit removal, new aeration equipment, disinfection, emergency backup power (2MW), and solids handling capacity improvements. Phase 1 projects were completed in December 2017 for $4 million under the anticipated budget of $11 million. Additional improvements, including nutrient removal, are planned and will be designed and constructed in subsequent phases.

During the design of Phase 1 improvements, Burns & McDonnell assisted with the emergency repair of the Highway K Lift Station. Improvements included the addition of bypass piping and replacement of a leaking pipe joint. The Highway K Lift Station accounts for the majority of the influent flow to TP2 and is located approximately three miles from the plant site. We worked with Duckett Creek Sanitary District and the prime contractor to develop project requirements and construction sequencing minimize downtime such that continuous operation was achieved. Total project cost for the emergency repair at the Highway K Lift Station was $300,000.

Project Details

Client Reference | **Keith Arbuckle, Duckett Creek Sanitary District, 550 Highway K, O'Fallon, Missouri, 63368, 636-498-8151**

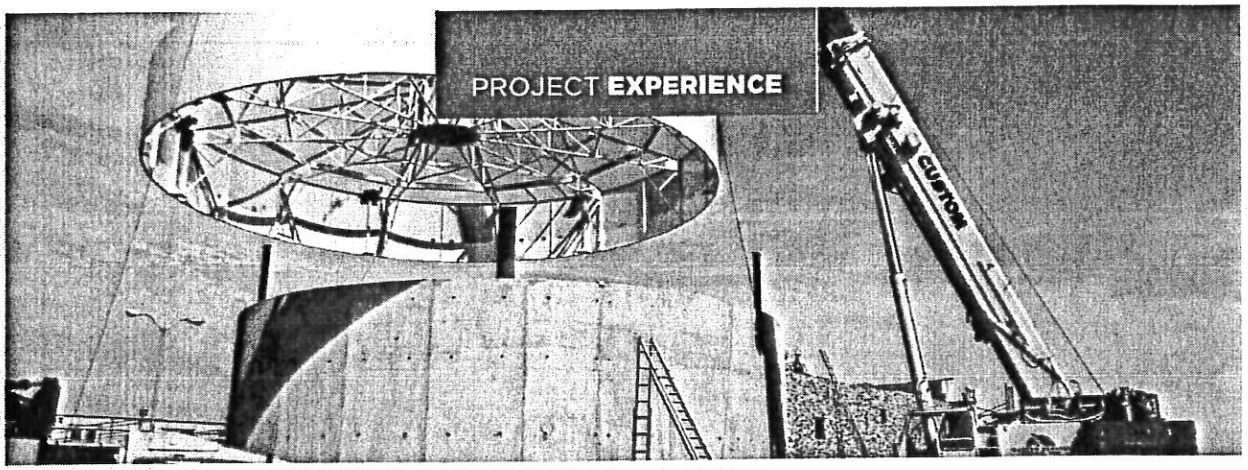
Completion Date | **December 2017 (Phase 1)**

Cost | **$7 million (Phase 1)**

Key Personnel

Jeff Barnard – Project Manager

Caitlin Collins



WASTEWATER TREATMENT PLANT IMPROVEMENTS

Village of Rantoul, Illinois

The Village of Rantoul was facing new nutrient limits in its NPDES permit for its wastewater treatment plant. Burns & McDonnell provided planning, design, and construction engineering services beginning with development of a Nitrate and Phosphorus Feasibility Study. Achieving nutrient removal within this plant is complicated by the fact that the facility uses a two stage trickling filter process that is limited in its biologic nitrate and phosphorus removal capacities. In addition, a local pork processing facility contributes approximately twenty percent of the total plant influent with a phosphorous concentration averaging approximately 20 mg/l. A Biowin Model of possible additional activated sludge processes was used to develop alternatives for different nutrient removal scenarios.

During the preparation of the report, the IEPA modified the Village's discharge permit to include a phosphorus limit of 1 mg/l. The report identified alternatives for meeting the new limit which included chemical precipitation or the replacement of the fixed film process with a biological nutrient removal activated sludge process. The selected process was chemical precipitation due to cost effectiveness.

Burns & McDonnell developed a pilot study for determining the best method for chemical precipitation at the plant. The study investigated locations that the chemical should be introduced, dosage response relationships and the impact of influent variability due to changing industrial loads and wet weather flows on within the treatment plant.

In addition to the chemical storage, pumping, mixing and controls necessary to implement the chemical phosphorus removal process, the facilities project also included a new anaerobic digester, modifications to the existing SCADA system, replacement of disinfection system controls, replacement of specified mechanical equipment and covers for final clarifier effluent troughs. Construction of the $4 million project was completed in 2015.

Project Details

Client Reference | **Greg Hazel, Village of Rantoul, 200 W. Grove Avenue, Rantoul, Illinois, 61866, 217-892-6526**

Completion Date | **2015**

Cost | **$4 million**

Key Personnel

Randy Patchett – Project Manager

Joe Darlington

PROJECT **EXPERIENCE**

In addition to the five project descriptions, the table below lists additional relevant project experience. Burns & McDonnell has the necessary project experience in Wastewater Treatment Plants and Collection Systems (including CMOM planning and SSES projects) to partner with the Village of Freeburg to both resolve current issues and plan for the future.

Additional Relevant Project Experience

PROJECT	Public Involvement	GIS	I/I Removal	Master Planning	Wastewater Process	Hydraulic Analysis & Modeling	Sanitary Sewer Evaluation Surveys	Flow Monitoring	Construction Phase Services
Infrastructure Study & Design, Village Of Rantoul, Illinois	●	●	●				●	●	
Sanitary Sewer Evaluation, Village Of Mount Prospect, Illinois	●	●	●				●	●	
Smoke Testing, City Of Naperville, Illinois	●	●	●				●		
Sanitary Sewer Evaluation, Village Of Arlington Heights, Illinois	●	●	●				●		
Sanitary Sewer Evaluation. Village Of Elk Grove, Illinois	●	●	●				●		
Wastewater Master Plan, City Of Republic, Missouri	●	●	●	●	●	●	●	●	●
Wastewater Master Plan, Macon Municipal Utilities	●	●	●	●	●	●	●	●	●
University City I/I Reduction - East (Hanley Hills & Bel-Nor), Metropolitan St Louis Sewer District	●	●	●			●			●
Apple Orchard - Singerson - Bayless Place I/I Reduction, Metropolitan St Louis Sewer District	●	●	●			●			●
I/I Strategic Plan, City Of St Joseph, Missouri	●	●	●	●		●		●	
Alaska North Slope Wastewater Treatment Facility, Confidential Client					●	●			
SBR Groundwater Treatment System, Confidential Client, Northern Illinois	●				●	●			●
Wastewater Treatment Plant Consolidation Program, Village Of Frankfort, Illinois	●	●		●	●			●	●
Wastewater System Improvements, Duckett Creek Sanitary District	●			●	●	●			●
Wastewater Treatment Plant Improvements, Village Of Rantoul, Illinois	●	●	●	●	●				●

HONORS & TESTIMONIALS

Industry Rankings & Recognitions
Burns & McDonnell has a reputation for providing quality service and innovative solutions to clients. Engineering News-Record (ENR) ranks Burns & McDonnell in the top 5 percent of the leading 500 U.S. design firms and the top one-third of the leading program management firms, design-build firms, construction management-for-fee firms and construction management-at-risk firms.

Burns & McDonnell INDUSTRY RANKINGS 2018

#1	**Top Design Firms**	*Engineering News-Record Midwest*
#9	**Top Design Firms**	*Engineering News-Record*
#11	**Wastewater Treatment**	*Engineering News-Record*
#12	**Top 50 Program Management Firms**	*Engineering News-Record*
#15	**Sewer and Solid Waste**	*Engineering News-Record*
#20	**Sanitary and Storm Sewers**	*Engineering News-Record*

Burns & McDonnell has earned acknowledgment that calls attention to our industry leadership and stability, growth and low turnover, experience, and financial strength. We have appeared on Fortune magazine's 100 Best Companies to Work For list for seven consecutive years, ranking No. 50 for 2018.

FORTUNE 100 BEST COMPANIES TO WORK FOR®

For the sixth consecutive year, the Professional Services Management Journal (PSMJ) has presented Burns & McDonnell with the Premier Award for Client Satisfaction for receiving award-winning ratings in key client service categories. PSMJ, the leading publisher, trainer and consultancy to the A/E/C industry, annually conducts an independent survey of A/E/C service provider clients to determine overall satisfaction levels in seven categories: helpfulness, responsiveness, quality, accuracy, schedule adherence, budget adherence and scope and fees.

PSMJ's PREMIER AWARD FOR CLIENT SATISFACTION

"I'm excited for the opportunity to partner with Burns & McDonnell on what our team considers Republic's most pivotal project. The selection process was intentional and focused as we set out to hire the absolute best that fit both professionally and matched our new mission, vision, and values. We want only the best deliverable, with the best minds and creative thinking possible. Burns & McDonnell was the obvious choice by a very wide margin.

— DAVID CAMERON
City Administrator | City of Republic, Missouri

HONORS & TESTIMONIALS *continued*

KdG
Kuhlmann design Group, Inc.

We believe the quality of our work and our client relationships are best expressed by our clients themselves. Recent references from clients included the following quotes:

"I would like to personally thank you for working with Clifftop on the boundary and easement surveys. Not only was the work done well, but you brought the project in under budget."
- Carl Daubauch, Executive Director, Clifftop Conservation, 618.458.4674

"I have had good experiences with Kuhlmann design Group, Inc. They are thorough, creative, and project personnel have been personable and professional."
- Mike Geisel, Director of Public Services, City of Chesterfield, 636.537.4762

"Kuhlmann design Group proved to be very responsive and easy to work with...The City of Creve Coeur will certainly include Kuhlmann design Group on future requests for qualifications for engineering design services."
- Matt Wohlberg, City Engineer, City of Creve Coeur, 314.442.2084

"Quality work and design. Very responsive to needs of City and residents."
- Happy Welch, Former City Administrator, City of Festus, 636.937.4694

"KdG did an excellent job on a project that had a short timeline and limited budget. The firm was very responsive to our needs."
- Michael Wooldridge, Asst. to the Mayor/City Clerk, City of Ladue, 314.993.3439

SCI
SCI ENGINEERING, INC.

SCI has an office located in St. Clair County and has years of in-depth knowledge of the soils around Freeburg. **SCI looks forward to the opportunity to partner with the Village of Freeburg.**

I commend you and the entire SCI team on the outstanding environmental consulting work that they have performed for me and my clients. I feel compelled to express my gratitude for the outstanding customer service and client support that I, personally, have received over the course of several projects throughout the past several years. Both locally and across the country, SCI has consistently provided outstanding results in the areas of asbestos and radon testing, excavation of contaminated soils, abatement oversight, their expansive knowledge of state and federal environmental regulations and their familiarities with regulatory agencies. The fact that your folks are willing to even jump on a plane at a moment's notice to fly across the country to help us meet deadlines, shows the dedication SCI has to excellence in all areas. Thank you for being an outstanding partner, and please feel free to utilize me as a reference for future projects. I look forward to continuing collaborations.

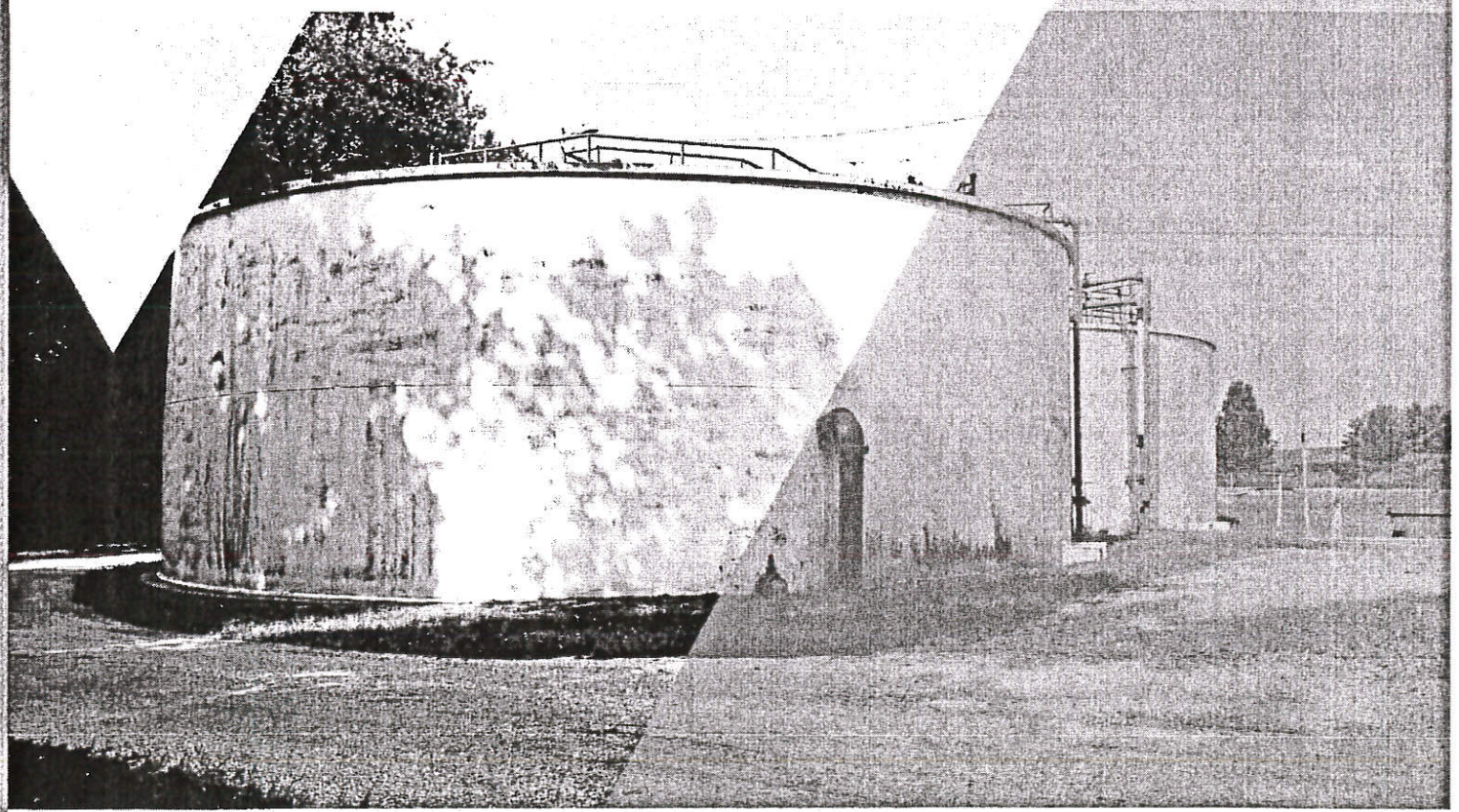
— ADAM WALL
Partner | Efficio Group, LLC

Village of Fredonia

Statement of Qualifications

Wastewater System Improvements

July 27, 2018



CMT

In Association With:
ADS Environmental Services
TSI Geotechnical, Inc

CMT

July 27, 2018

Mr. John Tolan, Public Works Director
Village of Freeburg
14 Southgate Center
Freeburg, IL 62243

Re: **Request for Statements of Qualifications/Wastewater System Improvements**

Crawford, Murphy & Tilly, Inc. (CMT) is well-positioned to deliver this important project for the Village of Freeburg. We believe that our local, St. Louis-based team of professionals offers distinct advantages.

Experienced Project Team – Our team consists of design engineers who have worked together on multiple award-winning wastewater treatment plant projects, including recent projects with many similarities to Freeburg:

Box Canyon WWTP – 0.4 MGD SBR WWTP with nutrient removal capabilities, tertiary filters, UV disinfection and separate aerobic digestion facilities.

Germantown Hills, IL – combined influent screening and influent pumping facilities with the screening ahead of the pumps for a WWTP of a similar size to Freeburg's West WWTP.

Highland, IL – comprehensive wastewater improvements including a successful collection system evaluation and rehabilitation program and WWTP improvements funded with an SRF loan.

A Highly Collaborative Approach – On a project this important, we are recommending regular communication between CMT and the Village. This will encourage the level of participation we are seeking from the Village in order to make this project a success. Through CMT's ongoing Client Satisfaction Interview Process, we have learned that one of our greatest strengths is the level to which we engage and collaborate with our clients to ensure satisfaction with the process and end results.

A Better Solution for Freeburg – CMT has a unique understanding of IEPA regulations, with staff who are participating through stakeholder groups in ongoing revisions to NPDES permitting associated with phosphorus limits, as well as changes to the SRF loan rules. CMT also has significant biological nutrient removal (BNR) design experience, including one of the largest BNR WWTPs in the Midwest. Based on our experience, we would recommend an SBR facility if it were the only solution that would allow the expansion to occur on the existing plant property because of its small footprint. For an expansion on the recently acquired property to the south/southeast, CMT recommends a plant configuration better suited to accommodate wet weather peaks and future regulations involving phosphorus and nitrogen.

Commitment to Deliver Your Project – As the St. Louis Water Resources Group manager, as well as the project manager for your project, I can ensure that the Freeburg project will be a top priority at CMT, and that it will be completed on time and within budget. We understand that IEPA coordination to obtain Facility Plan approval – including any desired revisions – by January 31, 2019 is critical to the schedule for this project. We will use our close relationships with IEPA to help meet this deadline.

We thank the Village for the opportunity to submit our qualifications and are hopeful that we will be able to discuss our views concerning the project with you in more detail. Please contact me at 314.571.9057 or by email at sknight@cmtengr.com if there are questions about this submittal.

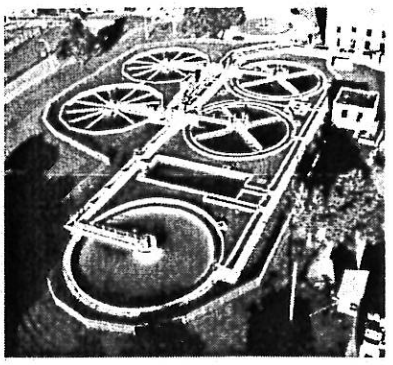
Respectfully,

Crawford, Murphy & Tilly, Inc.

Scott Knight

Scott Knight, PE, ENV SP | St. Louis Water Resources Group Manager
Crawford, Murphy & Tilly

Centered in Value



CMT

MIDWEST DESIGN FIRM OF THE YEAR
— Engineering News Record —

Award-Winning Wastewater Projects

Liberty WWTP
Liberty, MO
2017 Grand Award - ACEC - Missouri
2017 National Award of Merit Design-Build Institute of America

Coldwater Creek Storage Facility
St. Louis MSD
2014 Grand Award - ACEC - Missouri
2014 National Recognition Award ACEC

CSO Long Term Facility Plan
Ottawa, IL
2014 Honor Award - Illinois

New Spring Creek WWTP
Sangamon County Water Reclamation District, Springfield, IL
2013 Special Achievement Award - ACEC - Illinois
2013 Public Works Project of the Year ($10M-$100M) - APWA Illinois

New Wastewater Treatment Plant
City of LaSalle, Illinois
2012 Honor Award - ACEC

Wastewater Treatment Plant Retrofit
Peru Utilities, Peru, Indiana
2012 Merit Award - ACEC

Saline Creek Regional WWTP
Northeast Public Sewer District
Fenton, Missouri
2010 Grand Award - ACEC - Missouri

Leaders in Wastewater Treatment

Wastewater facility owners and operators face growing challenges given the pressures of increased regulations, aging infrastructure, evolving technologies and budgetary constraints. CMT understands these trends and offers the comprehensive award-winning expertise to help you address current needs while also preparing for the future.

Client-Focused Collaboration Drives Success

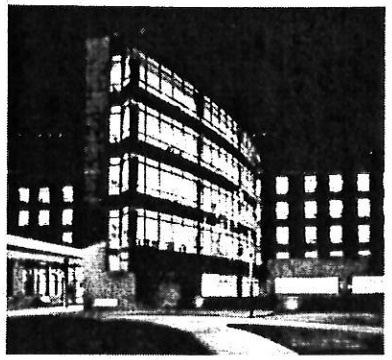
Established in 1946, Crawford, Murphy & Tilly (CMT), brings integrated and balanced approach to addressing water resource needs in all phase of the water cycle. We have a long history in wastewater treatment planning and design including recent construction of one of the largest BNR facilities in the Midwest. Our reputation for transformative and award-winning design was a factor in our selection by Engineering News-Record as the Midwest Design Firm of the Year in 2014, a result of the collaborative manner in which we engage their clients for project success. With over 70 Midwest-based Water Resource professionals, CMT provides a high level of capacity and responsiveness for your project needs.

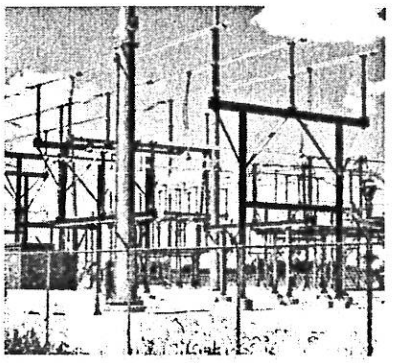
FULL SERVICE CAPABILITIES:

- Treatment process evaluation & design
- Structural engineering
- Electrical engineering
- SCADA design and integration
- HVAC design
- Plumbing design
- Architectural design
- Energy evaluation
- LEED & Envision evaluation and integration
- Resident engineering & inspection
- Surveying & layout
- Construction materials testing
- Construction special inspections

WASTEWATER SERVICES

- Facilities planning
- Wastewater treatment plants
- Collection systems
- Pump stations
- Construction phase services
- Combined Sewer Overflow (CSO) facilities
- Instrumentation
- Permitting
- Financial studies
- Funding assistance
- Bidding & construction phase services
- Resident engineering/inspection





Founded:
1989

Staff:
60

Testing Laboratories Locations:
St. Louis, MO
Kansas City, MO
Normal, IL

Services:
Geotechnical Engineering
Drilling and Sampling
Laboratory and Materials Testing
Construction Observation and Documentation

Certifications:
AASHTO-, AMRL-, CCRL-, DOT- and USACE-Certified Laboratories
M/W/DBE Certified Firm

TSi geotechnical, inc.

Founded in 1989, TSi Geotechnical, Inc. (M/W/DBE) is a specialized practice in geotechnical engineering, drilling, laboratory testing, field materials testing, and construction observation and documentation. Their team of professional engineers and certified technicians offers extensive geotechnical expertise and technical skills to effectively manage geotechnical risk for our clients' projects. They identify potential design- and construction-related concerns, then recommend sound engineering solutions by applying appropriate technologies.

A key component of their construction observation and materials testing services is quality assurance, as we deliver the data needed to verify that the materials and techniques being used meet the standards required for the project. TSi engineers and technicians provide a vital link between the owner, the design team, and the contractor.

Founded:
1975

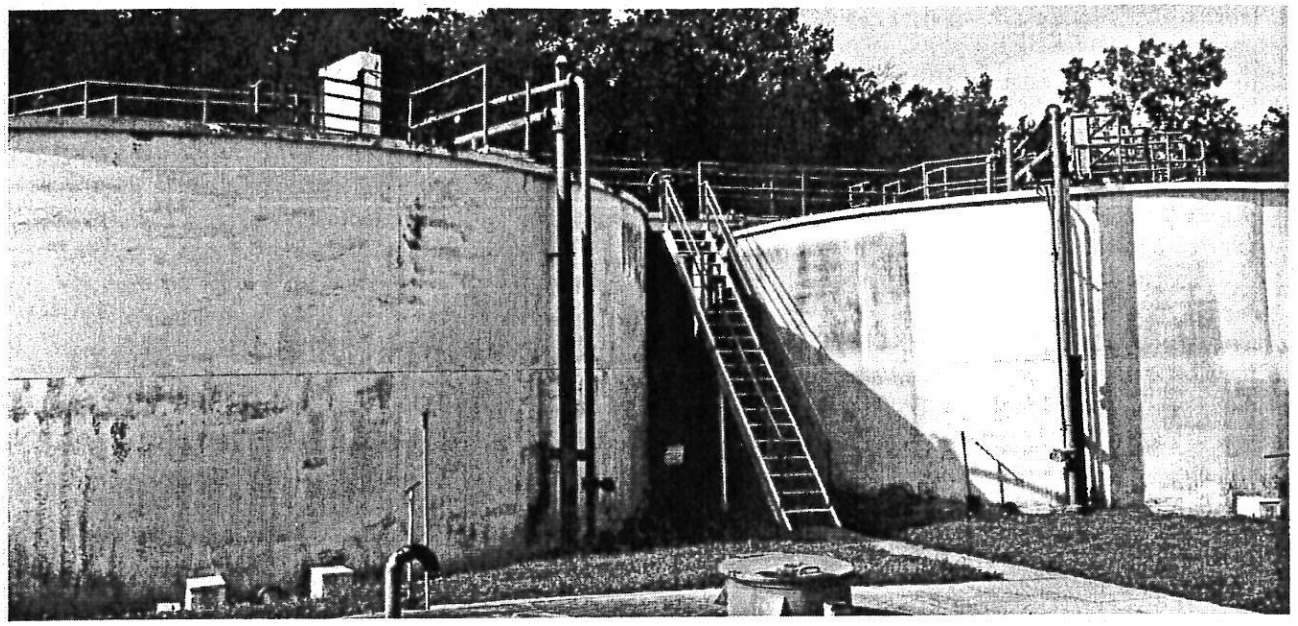
Services:
Flow Monitoring
SSES & Condition Assessment
Online Data Delivery
D-Site Level-Only Measurement Solutions

ADS ENVIRONMENTAL SERVICES

With more than 40 years of experience in wastewater collection system evaluation, ADS Environmental Services has a vast experience in comprehensive sewer system services (flow monitoring to identify and prioritize affected basins, SSES field activities to obtain sewer inventory, condition and performance knowledge, point source identification of inflow/infiltration, project management, and rehabilitation recommendations), pipeline services (water audits, hydraulic modeling, master planning, water quality modeling, master meter tests, meter accuracy tests, consumption analysis, loss of head tests), and rehabilitation services (line tapping, and line stopping).

ADS's management philosophy of earning customer loyalty demonstrates that they are not only committed to providing clients with the industry's very best services, but they are also committed to grow and innovate to meet clients evolving needs.

They have been a partner on some of the largest and most successful water and wastewater programs ever documented and have an experienced and mobile staff to assure the success of your project.



Understanding of the Project

Introduction

CMT will help Freeburg balance wastewater needs with respect to capacity and anticipated regulatory requirements while taking into considerations budgetary and site constraints. Based on anticipated short-term and long-range regulations, we believe a well-planned series of comprehensive improvements is the answer to finding the right balance for expanding and upgrading the Village's West WWTP.

Our main goal is to help Freeburg implement the right solution and develop an approach that results in the right timing for capital improvements, considering both current and future demands on the treatment capacity, the need to consistently meet current and future ammonia limits in the short-term, the possible need to meet total phosphorus and total nitrogen in the future, and the potential future change in disinfection rules regarding the indicator organism criteria.

Review of the Facility Plan

Having reviewed a copy of the Facility Plan as provided by the City, we would like to offer the following general comments:

- Activated Sludge Treatment Alternatives
  - Only two activated sludge treatment alternatives were discussed, Oxidation Ditches and Sequencing Batch Reactors (SBR). It seems as if the report jumped to SBRs as the recommended alternative without adequate supporting justification.
  - We do not agree with the comment on page 33 "The SBR process was chosen in part because of its ability to handle wet weather flows." Our experience suggests that handling wet weather flows in an SBR is not cost-effective and has a greater tendency to result in upsets to the biological treatment process compared with other activated sludge configurations.
  - We do not agree with the comment "The advantage of SBR units are their ability to remove nutrients from the wastewater with nitrogen removal at levels less than 3 mg/l and phosphorus removal at less than 0.3 mg/l." We believe biological nutrient reduction is far more effective in other activated sludge configurations, and this is supported industry-wide.
  - We do not agree with the oxidation ditch disadvantage listed in Table 7A-1 "Effluent suspended solids concentrations are relatively high compared to other activated sludge processes." Based on our experience having designed and constructed 12 oxidation ditches over the past 25 years, we know this statement is not accurate.
  - We do not agree with the oxidation ditch disadvantage listed in Table 7A-1 "Typically will not meet effluent requirements that may be stipulated in the future, including phosphorus or nitrogen." This statement is not accurate, based on our past design and implementation experience.
  - Concerning the SBR advantage listed in Table 7A-1 "Equalization, primary clarification, biological treatment, and secondary clarification can be achieved in a single reactor vessel." This may also be considered a drawback, where all treatment plus settling has to occur in a single reactor within a limited timeframe. To achieve biological nutrient removal

the conditions in the tank must shift from anaerobic to anoxic to aerobic and then settling – this is a significant amount of change within the required time cycle.

- Tertiary Filtration Technologies
  - For the anticipated permit values, tertiary filters should not be necessary. Eliminating or deferring the construction of tertiary filters is a potential capital and O&M cost savings worth consideration.
- Alternative Wastewater Treatment Facilities Compatibility
  - SBR Units: On page 42, why were the activated sludge reactors oversized by 60%? The required volume according to the Illinois Recommended Standards for Sewage Works is 66,720 cf, whereas 107,386 cf is proposed. No explanation was provided. One of the SBR's main advantages is footprint, so oversizing them seems counter-productive.
  - Clarification: The gates that are described on page 42 are required by IEPA in order to receive a permit. IEPA will only issue a permit to "true batch" type SBRs. Despite several attempts by Sanitaire/ABJ, they have not been able to convince IEPA that continuing to receive flow after the treatment cycle is complete during the settling cycle will not affect effluent quality and disrupt settling.
  - Aerobic Digestion: The aerobic digesters should be sized based on the organic PE, not the hydraulic PE.
  - Aerobic Digestion: On page 43, why is additional aerobic digester volume being constructed when converting the two existing contact stabilization basins is adequate? The logistics of having aerobic digestion spread out in such a way (i.e. both sides of the creek) seems unnecessary and complicated. In addition, since the digester is being added on to the SBRs, it further oversizes them and removes any chance of fitting the SBRs on the existing plant property.
  - Tertiary Filtration: On page 44, tertiary filters would not be required with a conventional activated sludge process (i.e. with separate clarifiers). Filters may be suggested in this Facility Plan due to periodic upsets and resulting effluent quality associated with the SBRs proposed.
  - UV Light Disinfection: Concerning disinfection, discussions with IEPA has indicated that the entire disinfection section of the Illinois Recommended Standards for Sewage Works is going to be revised in the near term, which may include a new indicator organism (enterococci). CMT's suggestion is to defer the design of new disinfection facilities until the new standards are published and the Village is required to disinfect by permit.
- Cost Estimates for Chosen Treatment Option
  - Based on conversations with Village staff during the site visit, there is a preference for construction of a deep screen ahead of influent pumping. The Bar Screen Building/Structure cost of $125,000 is not sufficient for a deep screen ahead of influent pumping.
  - Tertiary filter costs could be deferred.
  - UV Disinfection System and Controls costs could be deferred.
  - Effluent Parshall Flume costs should be increased to reflect adding a cascade aerator to aid in meeting the dissolved oxygen permit requirements.
- General Questions:
  - Regarding the existing Excess Flow Clarifier, will it still be in operation following the upgrade, and if so, how will the two flow streams be blended prior to disinfection and discharge?

SBR Technology

CMT has recent experience with Sequencing Batch Reactor (SBR) technology. As noted on the project page for the Box Canyon WWTP, an SBR was the best option to replace a failing WWTP that discharges to Table Rock Lake in Branson, MO, but only because of a very small footprint available to construct the new facility. In this unique situation, the SBR also provided a large, gradual turndown (10:1) to accommodate the large range of flows between peak tourist season and the off-season that was difficult to match with other plant configurations.

If CMT were to suggest implementing the SBR technology at the West WWTP, it would only be to avoid expanding the facilities across the creek to the south and southeast. New SBR facilities may be the best choice if the plant could be expanded within the current property boundary, for example, in the vicinity of the existing drying beds. That may have been possible if the proposed SBRs are not oversized by 60% and did not have additional aerobic digestion tacked on that isn't necessary. However, since the decision has already been made to acquire the adjacent property and construct the new facilities on the new parcel, the type of activated sludge process to implement is no longer driven by available footprint, and in that case, we believe there are better alternatives than the SBR in terms of flexibility, reliability and meeting future permit needs.

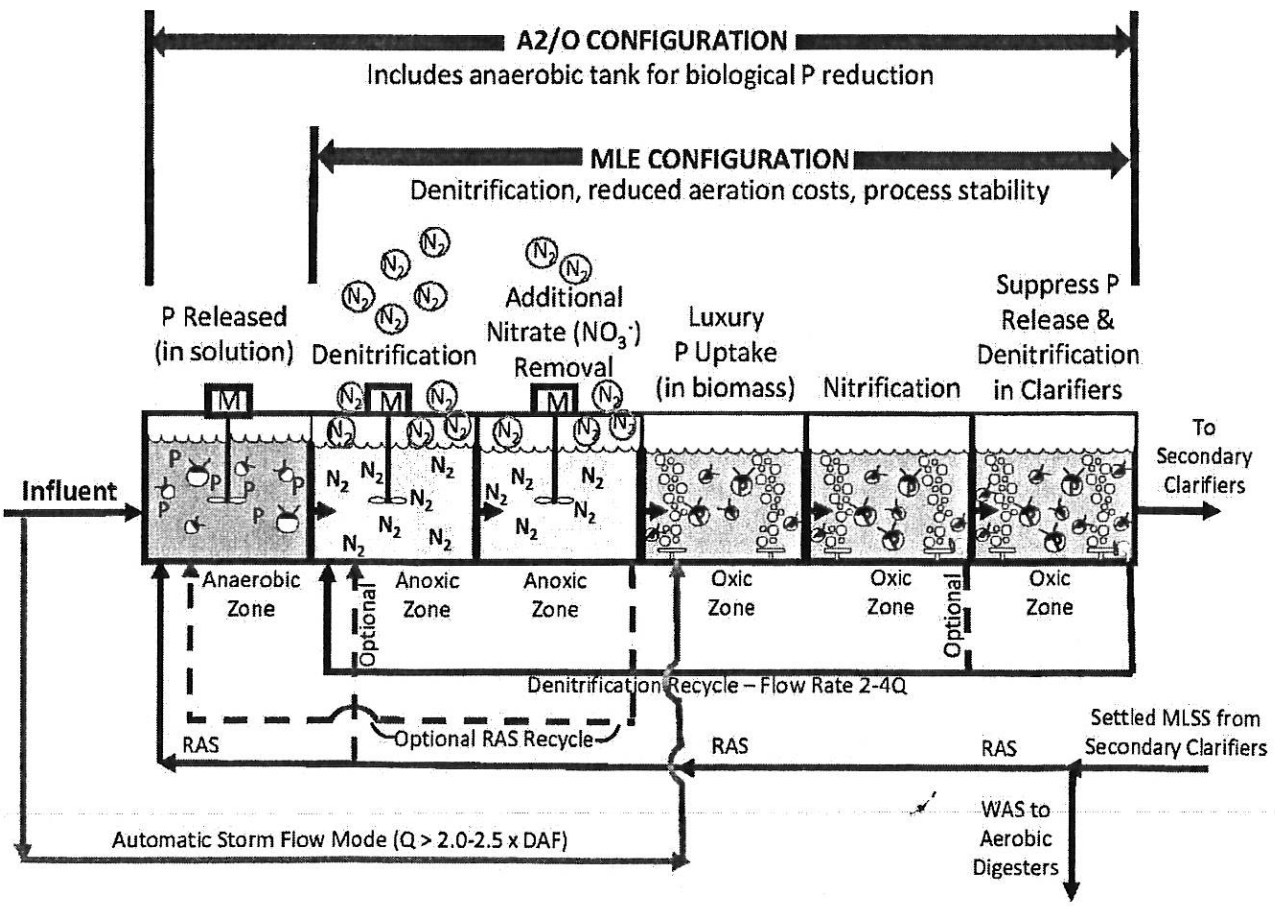
Sizing the SBR for peak flows, to allow the peak wet weather flows to pass through the treatment tanks, decanters, etc. is not the best solution, because the entire facility would be oversized for a wet weather event that occurs a small fraction of the time. When biological reactors are oversized in this way, it is sometimes problematic with having the MLSS distributed over too large of a volume. The result is a weak MLSS concentration, problems with F:M ratio and over-aeration of the contents, all of which leads to inefficient operation and the potential for not meeting effluent permit requirements. If SBR tanks are

taken off-line during normal flows to better manage the solids under aeration, the facility cannot accommodate a sudden increase in flow associated with a wet weather event. The SBR does have a unique ability to accommodate a wide range in flows - CMT's Box Canyon is a good example of that with a 10:1 turndown, however, that is with a gradual transition over a period of several weeks as opposed to a sudden increase in flows as would be experienced during a wet weather event. Wet weather peaks can be very disruptive to the SBR process.

A Better Solution for Freeburg

An example of a better solution is CMT's recent Sugar Creek WWTP design. Sugar Creek is the most efficient, most flexible plant that CMT has ever implemented. It is non-proprietary, meaning process equipment can be competitively bid outside the common manufacturer packages. Aeration is accomplished in the most energy efficient way possible, using energy efficient blowers and diffused aeration equipment. Mixing is accomplished in the most energy efficient way, and is completely separate, or de-coupled from aeration. There are no surface aerators providing mixing as is done in many oxidation ditches, and diffused aeration is not relied on for mixing, which can result in over-aerating the contents, as is often the case with SBR technology.

Multiple tanks in series accomplish dedicated tasks in a unique environment and are not subject to the limitations imposed by the defined time cycle of the SBR. Anaerobic tanks are designed to provide biological phosphorus removal by promoting optimal phosphorus release, such that the uptake downstream in the aerobic tanks (biological P reduction) will be maximized. Anoxic zones located between the anaerobic and aerobic zones act as a selector to promote growth of "good bugs", recover alkalinity, reduce oxygen demand in the process and denitrify to reduce the total nitrogen in the effluent. Denitrification also promotes good settling in the clarifiers, improving effluent quality. The presence of an anoxic zone can reduce the overall power requirements by 15% or more by reducing the downstream aeration requirements needed to achieve ammonia and BOD reduction. These benefits are why many facilities implement denitrification despite not having a requirement for total nitrogen in their permit.

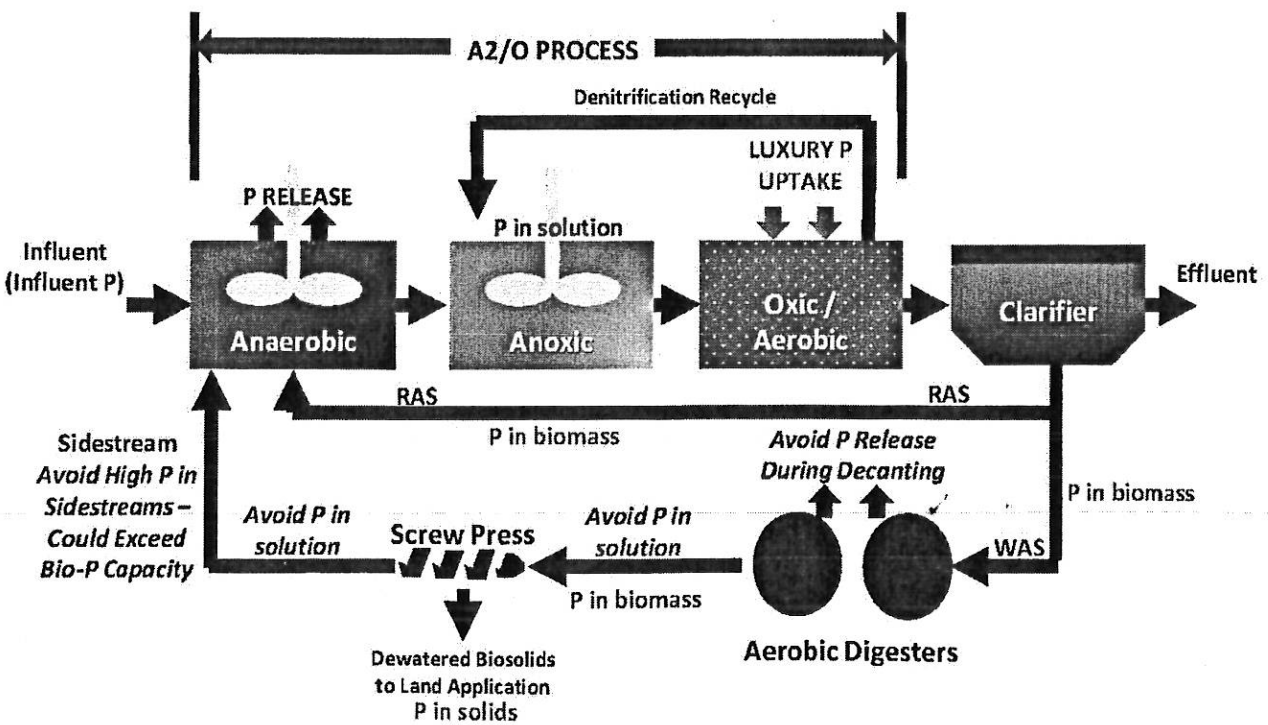


The utilization of multiple tanks also offers the ability to operate in a "Storm Flow Mode" that will automatically divert diluted, wet weather flows around the anaerobic and anoxic tanks to the aerobic zone. Return activated sludge will continue to be routed to the anaerobic and anoxic zones as normal. Storm Flow Mode preserves solids during high flows, avoids wet weather upsets to the biological treatment facilities, and avoids slug loads to the clarifiers that can potentially result in solids washout. This feature is not possible with SBRs, since all the flow has to pass through the biological treatment tanks.

The IEPA is nearing completion of negotiations with USEPA and various third-party stakeholders to arrive at a state-wide approach for issuing phosphorus limits in NPDES permits. The permit language that was negotiated resulted in an annual average of 0.5 mg/L, whereas previous language had required a monthly average of 1.0 mg/l. However, both the old and new language only applies to "major" dischargers, which are plants with a DAF of 1.0 MGD or greater, or that are being expanded to over 1 MGD. Since the West WWTP will have a DAF of 0.8 MGD, a phosphorus limit may be avoided in the near term. However, it could still be possible that Freeburg is subject to some type of limit based upon water quality, since the discharge is tributary to a stream with impairment issues (per page 2 of the NPDES Permit Public Notice/Fact Sheet). To date, IEPA has not proposed technology-based standards for any plant less than 1.0 mg/L. In summary, it is not clear at this point whether the facility will receive a P limit, and if so whether it would be a 1.0 mg/l monthly average or a 0.5 mg/l annual average.

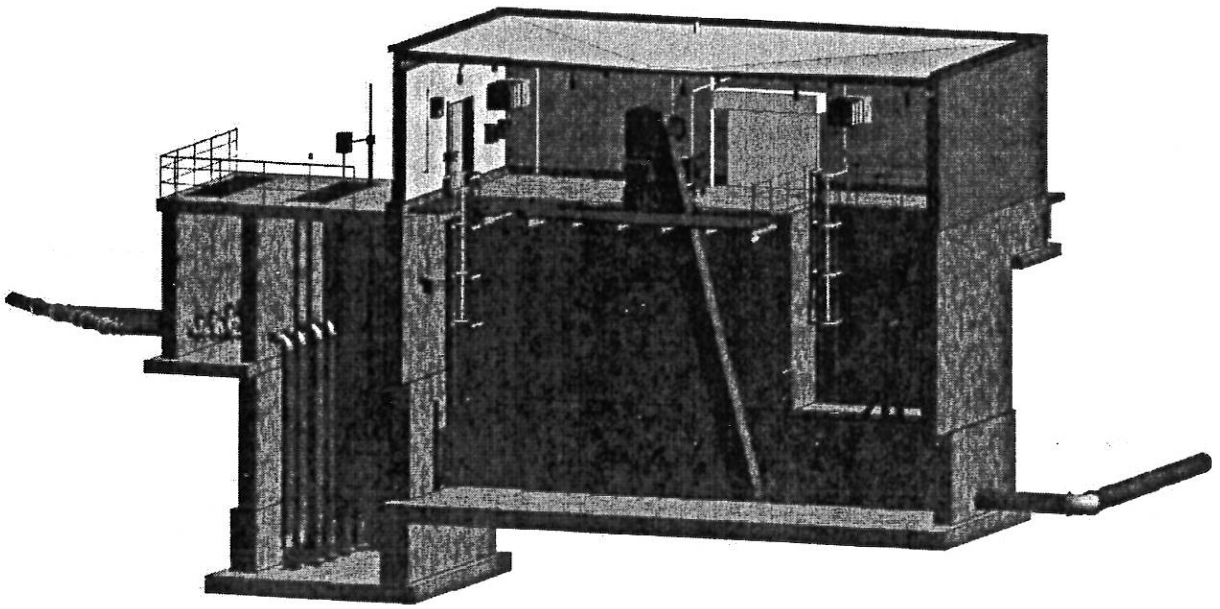
The best BNR performance that would include biological phosphorus reduction would be offered by an A2/O configuration, which includes an anaerobic zone, followed by an anoxic zone, and finally an aerobic or oxic zone (Figure 1). If the facility does not receive a phosphorus limit initially, the anaerobic tank could either be deferred for later addition or operated as an anoxic reactor initially. In that situation, the plant would be operating in Modified Ludzack-Ettinger (MLE) mode. MLE mode would still provide the benefits of the anoxic zone (selector, power savings, etc.) and could reduce the waste activated sludge generated by as much as 30%-50%. The anaerobic tank could be added if and when a numeric phosphorus limit is incorporated into the NDPES permit.

Any comprehensive process improvements at the treatment plant must address not only the liquid side of the treatment process, but the biosolids portion as well. These two uniquely separate processes are linked and a deficiency in one will eventually result in a deficiency in the other. When the Village's future discharge permit contains limits for total nitrogen and total phosphorus, the two systems, liquid and biosolid, must be designed and operated as a unified system, otherwise both of these two constituents, collectively referred to as 'nutrients', will be bound for non-compliance. As most efficient nutrient removal treatment plants attempt to accomplish this by biological methods, saving large amounts of energy in the process, it can all go to waste if the processes are not designed to operate together to contain the biologically held nutrients. Failure of the biology to hold onto these nutrients in the biosolids process can result in a nutrient-laden side stream returning to the liquid process, resulting in the increasing possibility of a non-compliant effluent discharge. CMT would design the retrofit of the existing package plant into aerobic digesters to include the necessary instrumentation and monitoring to minimize the impact of side streams on the liquid treatment process.

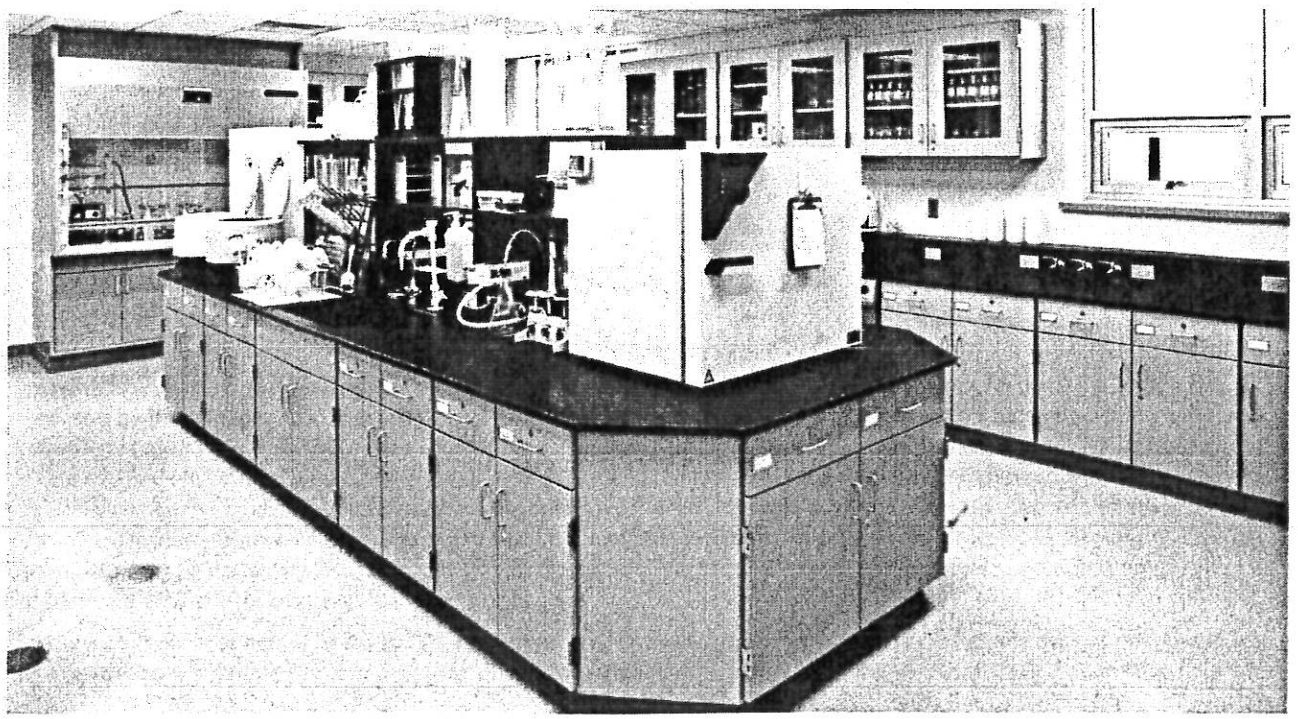


CMT PROPOSAL

Influent Screening and Influent Pumping: As requested by Village staff, we would evaluate locating the screen upstream of the pumps. We would base this on a similar design completed for Germantown Hills, IL last year. In that case, the influent sewer was 20 feet deep, so modifications would be made to accommodate Freeburg (approximately 12 feet deep). Placing the screen ahead of the pumps will address the current pump plugging issues along with flushables that are becoming more problematic within the collection system.



Laboratory/Control Building: CMT has in-house architects that have designed numerous buildings at wastewater treatment plants incorporating laboratories, staff support, lunch/break rooms, locker rooms, restrooms, administrative offices, etc. We will work closely with your staff to identify the desired functions for the building and develop the appropriate floor plan to suit the Village's needs.



Secondary Biological Treatment: A2/O process: Anaerobic volume ~ 0.10 MG; Anoxic volume ~ 0.22 MG; Aerobic volume ~ 0.55 MG; 6 equally sized basins at 50' L x 20' W x 20' D. Two secondary clarifiers at 50' diameter yields a conservative 642 gpd/sf surface overflow rate at peak flow and would eliminate the need for tertiary filters.

Aerobic Digestion: Mean cell residence time (MCRT) of 60 days governs the digester sizing (60 days is suggested for winter operation in above-ground steel tanks with no cover); need 42,450 cf; per the Facility Plan the total volume in the existing package plants is 47,048 cf. We would convert the existing plant tankage to aerobic digesters and new construction of additional digester tanks would not be required.

Effluent Structure: We would incorporate effluent flow measurement and post aeration facilities to meet the effluent flow monitoring requirement and dissolved oxygen requirement in the NPDES permit. This could also be the source for a plant (non-potable) water system for water demands associated with the influent screen and washer-compactor, the screw press solids dewatering system, and general spray washing needs at the facility instead of using potable water.

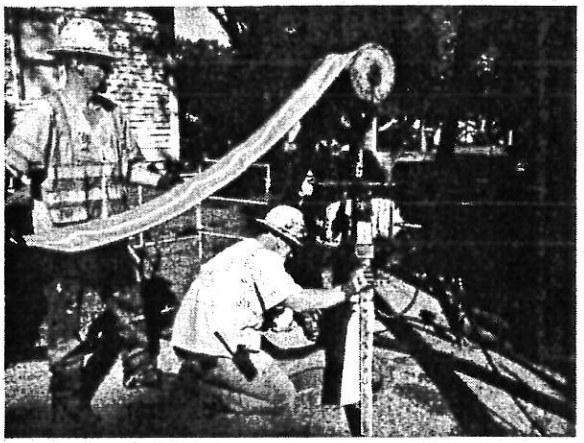
Biosolids Processing and Storage: We would implement the recommendation from the Facility Plan. Based on our experience with screw presses we would recommend them over centrifuges or rotary fan presses. For covered storage of dewatered solids, CMT suggests considering a Clearspan™ style cover for cost savings.

Deferred Items: CMT would suggest that the Village consider deferring the following items:

- Tertiary Filters: none of CMT's wastewater treatment plants over the past 25 years with traditional 10 mg/l BOD, 12 mg/l TSS effluent limits have required tertiary filters. We do not believe they are necessary with an activated sludge configuration that includes separate secondary clarifiers.
- UV Disinfection: because the Village has been able to keep their disinfection exemption and are a non-major (DAF < 1.0 MGD), we recommend that UV disinfection be deferred until the IEPA requires it in the NPDES permit. Further, with the proposed overhaul of the disinfection rules, it makes sense to wait until those changes are made to design the system, if possible.
- Chemical Feed System: if no numeric phosphorus limit is incorporated into the NPDES permit, then the chemical feed system could be deferred to reduce cost.
- Anaerobic Reactor: if no numeric phosphorus limit is incorporated into the permit, then the anaerobic tank could either be deferred to reduce cost or operated as an anoxic zone. If a phosphorus limit is added, this tank will significantly reduce the amount chemical feed required for P reduction.

Collection System Engineering

CMT has provided assistance with implementing CMOM requirements, including preparing CMOM reports for three communities in the past 5 years (Highland and Germantown Hills, IL and St. Charles, MO). We have also conducted system wide evaluation and rehabilitation projects involving smoke testing, CCTV inspection, flow monitoring, and physical inspections for three clients during the past 5 years (Highland, IL; Portageville, MO and the Northeast Public Sewer District in Fenton, MO). This work led to rehabilitation projects at Highland and NPSD that were highly successful in reducing infiltration and inflow, as well as extending the life of existing clay sewers and addressing deterioration before the point where excavation and replacement would be necessary at 5-10 times the cost.



Schedule & Facility Plan Revisions and Approval

The schedule will be driven by the SRF loan, and in particular the timing of the Facility Plan approval. If the Facility Plan is approved by January 31, 2019 the project will qualify for the Intended Use Plan (IUP) and have funds dedicated that would be available after July 1, 2019. If the Facility Plan is not approved by January 31, 2019 the project will not make the IUP and would have to rely on Bypass Monies that may not be available until early 2020. This could mean significant delays to the project since the bidding phase should not proceed until the SRF loan agreement is received. Because of the importance of the Facility Plan approval, CMT will engage the IEPA immediately concerning the review process. A meeting at IEPA in Springfield may be necessary including Village representatives in order to promote the Agency's review on a timeline that will facilitate the project's inclusion on the IUP.

Because of the critical nature of the Facility Plan approval, CMT will work with the Village to identify desired changes to the plan as originally submitted so that they may be incorporated into the plan during the review process that must be finished

by January 2019. We have done this on multiple projects, this is not a complicated process and, if revisions are submitted early in the process (e.g. October) should not cause any delays in the approval process. On past projects, this has involved a brief Supplement or Addendum to the originally submitted Facility Plan that focuses on the proposed changes, identifies any related regulations, and provides a clear explanation of how the proposed revisions meet the applicable regulations. The Village should not feel as if it is too late to change portions of the Facility Plan, as doing so should not jeopardize the project.

Preliminary Milestones and Estimated Completion Dates

Item	Est. Completion Date
Facility Plan Approval (1)	January 2019
Design Phase (2)	May 2019
IEPA Construction Permit	June 2019
Financing Secured	July 2019 (3)
Advertisement of Bids	July 2019
Notice to Proceed	September 2019
Substantial Completion (5)	December 2020
Final Completion[5]	March 2021

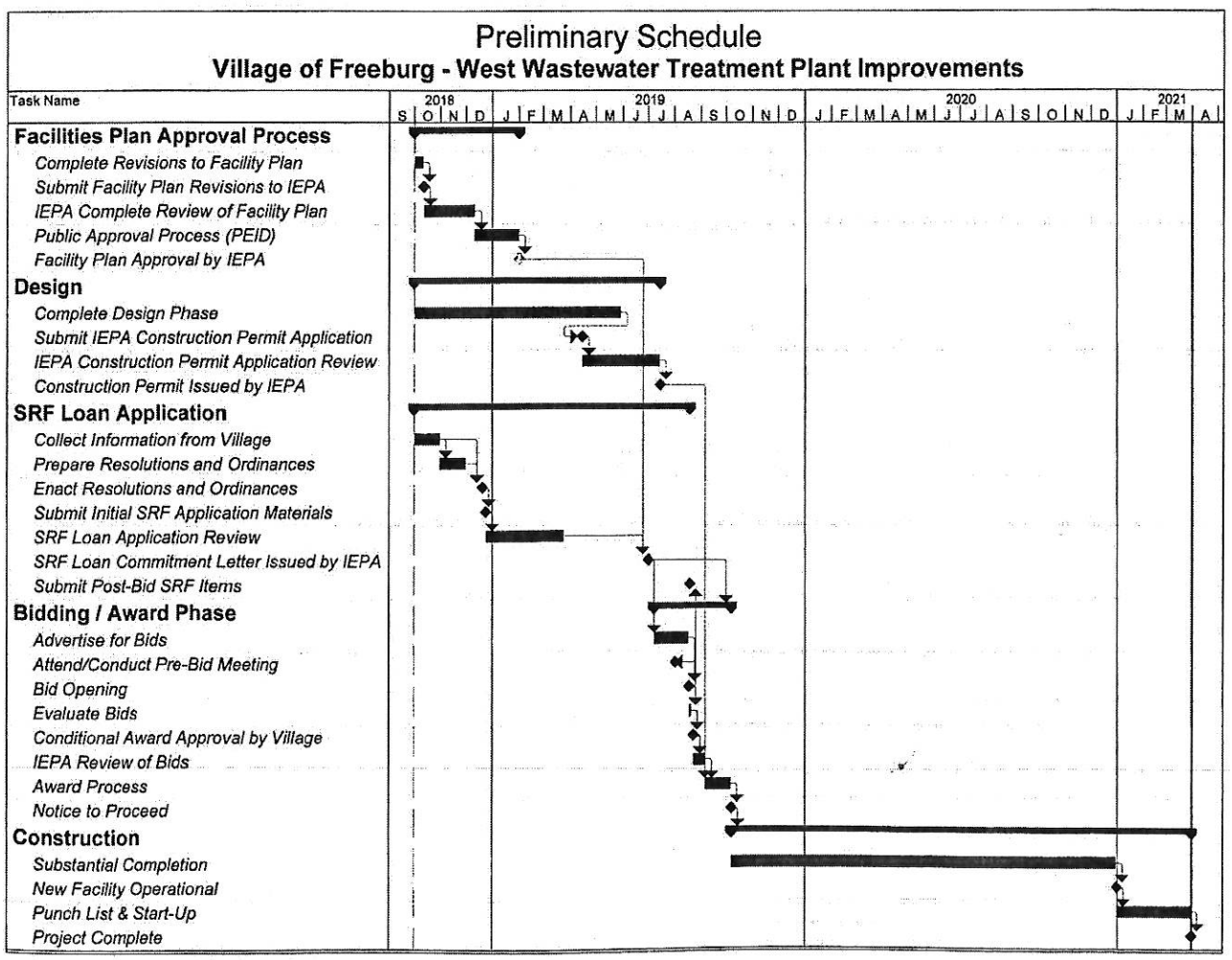
(1) Facility plan approval has been averaging 6 months, but must occur by January 31 (Intended Use Plan)

(2) Design phase is estimated as beginning no sooner than October 1, and requiring 8 months

(3) Facility plan approval must occur by January 31, 2019 in order to have funds available beginning in July 2019

(4) Facility plan approval after January 31, 2019 would rely on bypass funds available after February 2020

(5) Construction duration assumed as 15 months for substantial completion, 18 months for final completion



Project Approach

Communication

Our approach to producing the desired deliverables, keeping the project ahead of schedule and within budget will focus on thorough communication and close collaboration with the Village, and will include the following key items:

- Bi-weekly status discussions (meeting or phone conversation between Village and CMT project manager).
  - Discuss status of tasks, prioritize upcoming tasks.
  - Open agenda, comprehensive discussion.
- Project review meetings at 50%, 75% and 95% completion stages.
  - Meeting with Village.
  - Focus on 3D model of the entire project.
  - Review plan sheets and specifications as desired.
  - Review updated cost estimate.
  - Discuss remaining tasks and update schedule.
- Early coordination meetings with IEPA.
  - Identify contacts from IEPA for facility plan approval, construction and NPDES permitting and SRF coordination.
  - Discuss steps involved and milestones for permitting.
  - Develop consensus concerning timelines for IEPA items impacting overall schedule.
- Coordination with IEPA to ensure SRF requirements are met.
  - Identify submittal requirements for SRF eligibility.
  - Ensure competitive bidding and/or procurement of equipment and materials are conducted in a manner that meets SRF program requirements.
- Meetings with Village Staff to finalize project scope.
  - Develop scope of project identifying newly constructed items and upgrade/re-purposing of existing facilities.
- Meetings with Village Staff to develop project sequencing.
  - Critical in terms of maintaining the existing plant in service to meet effluent requirements during construction of improvements that may be integrated with the current plant.
- Meetings with Village Staff to finalize equipment selections.
  - Ensure that the preferred process equipment is provided for the project, with the desired options/configurations.
  - Workshops may include meetings with equipment representatives and discussion of pros & cons to arrive at decisions.
- Local permitting.
  - Coordinate local requirements including building permits, local codes, special inspections, etc. Integrate local requirements into the project.

Cost Estimating/Budgeting

Our intent is for the Village to be able to make decisions concerning the project scope based upon detailed and accurate cost estimates for the options being contemplated. Some highlights of CMT's approach to cost estimating and budgeting include:

- Based on a simple, easy to navigate but comprehensive spreadsheet.
  - Summary page showing broad breakdown by component or structure, plus fees, overhead and profit, etc.
  - Updated regularly, as a minimum for project status meetings.
- Breakdown of project costs by major structure/component.
- Copies of equipment proposals will be made available to the Village.
- Some highlights concerning our approach toward managing costs and ensuring compliance with the budget include:
- Identify base improvements and develop detailed cost estimate for these items.
- Hold initial meetings with the Village to determine the scope of various options for consideration.
- Develop detailed cost breakdowns for the various options in order to establish the cost implications, which will be one of the primary criteria involved with evaluating the options.
- Hold meetings with the Village to discuss the costs of options, weigh the non-monetary pros & cons, and as a team identify the scope of the project.

- As the project progresses, continue to update the project costs:
  - Reduce contingency as the design progresses.
  - Adjust equipment costs to reflect "purchase order" vs. "budgetary" values, and to incorporate all features desired by the City (e.g. controls, materials of construction, and other options).

BIM/3D Modeling

CMT uses 3D design to create all drawings (Revit and Civil 3D) because this process is more efficient, leading to shorter timelines for design completion, promotes clash detection between disciplines, and offers much-improved Owner reviews compared with traditional 2D plans.

From our recent work, our design using 3D modeling (Revit and Civil 3D) enhances our ability to generate accurate quantities for items such as earthwork, excavation, backfill, pavement, concrete, concrete reinforcing tonnage, pipe and fittings, electrical duct bank, masonry, etc. This lends to better cost estimating and more reliable pricing from vendors and suppliers at an earlier stage of the design.

Construction Sequencing

CMT will develop a detailed sequence of construction for the proposed improvements to ensure that the existing treatment components remain operational, such that effluent quality may be maintained. This is common with CMT, since most of our projects involve improvements to existing facilities and only 1 in 10 of our projects is a completely new, green-grass facility. Close coordination with plant personnel will be required in order to avoid unnecessary plant interruptions and minimize the impact of scheduled disruptions on plant performance. CMT will require the contractor to submit a staging plan for approval prior to proceeding with construction.

Protection of Existing Facilities

CMT will locate the new improvements in such a manner that minimizes the potential for encroaching on the existing facilities and include notes on the drawings that require the contractor to protect them. We will point out areas where the contractor must proceed with extreme caution while conducting the work in the vicinity of existing piping or structures that must remain in service. We will require the contractor to support and protect all existing piping to the extent required and maintain close coordination with Village staff in the case of temporary interruptions in service that may not be avoided.

SRF Financing

CMT has extensive experience assisting our clients with obtaining SRF loans. We are very familiar with the requirements of the loan program and have helped our clients receive over $150 million in SRF loan funds over the past 5 years. We understand that SRF funding can dictate the scope and budget, and drive the schedule for the project, and we will place the highest priority on coordination with the IEPA to ensure that all SRF requirements and deadlines are met.

Crawford, Murphy & Tilly - State Revolving Fund Loan Projects

Client	Project Name	Year Construction Completed	Loan Amount (millions)
Highland	WRF Improvements & Collection System Rehab	2018	$ 11.00
Springfield Metro Sanitary District	Sugar Creek WWTP Improvements	2018	$ 20.00
Belleville	B Street PS	2018	$ 1.10
Liberty, MO	Wastewater Conveyance and Treatment Facilities	2017	$ 80.00
Mattoon	Riley Creek CSO Satellite Treatment Facility	2017	$ 6.20
Belleville	East Creek Wet Weather Relief	2015	$ 3.00
Germantown Hills	WWTP No. 1 Improvements	2015	$ 1.50
Carlock	New Water Treatment Plant	2014	$ 1.50
Carbondale	Park Street Water Storage Facility	2014	$ 3.70
Springfield Metro Sanitary District	Spring Creek WWTP Improvements - Phase 4	2014	$ 20.00
Springfield Metro Sanitary District	Spring Creek WWTP Improvements - Phase 3	2012	$ 20.00
Litchfield	Membrane Filtration	2012	$ 2.60
Charleston	WWTP Improvements	2012	$ 7.30
Farmington Sanitary District	WWTP Improvements	2012	$ 0.63
NE Public Sanitary Dist., Fenton, MO	Saline Creek Interceptor Sewers	2012	$ 12.00
CWLP - Springfield	Water Treatment Plant Improvements	2012	$ 3.40
Ottawa	WWTP Improvements - Phase 2	2011	$ 7.70
Oregon	WWTP Improvements	2011	$ 3.70
Springfield Metro Sanitary District	Spring Creek WWTP Improvements - Phase 1	2011	$ 20.00
Peru, IN	Grissom Aeroplex WWTP Improvements	2011	$ 9.50
Princeton	WWTP Improvements	2010	$ 2.80
Litchfield	Water Treatment Plant	2009	$ 12.80
Mason City	New Water Treatment Plant	2009	$ 2.50
LaSalle	East Side Wastewater Treatment Facility - Phase 1 & 2	2009	$ 15.00
Ottawa	WWTP Improvements - Phase 1	2007	$ 0.90
West Chicago	New Water Treatment Plant	2005	$ 10.00
Carbondale	Southeast WWTP Improvements	2005	$ 10.00
CWLP - Springfield	Water Treatment Plant Improvements	2003	$ 2.20
Aurora	WTP Upgrade and New Clearwells	2002	$ 12.70
Effingham	Wastewater Treatment Plant Improvements	2001	$ 6.20
Mattoon	New Water Treatment Plant	2000	$ 8.40
Edwardsville	WWTP Improvements	1999	$ 9.30
Princeton	WWTP Improvements	1998	$ 6.10
Highland	WWTP Improvements	1998	$ 7.50

Organizational Chart

Village of Freeburg
John Tolan, Public Works Director

Collection System Engineering
Scott Knight, PE, ENV SP
Heather Gipp, EI, ENV SP
ADS Environmental

Project Manager
Scott Knight, PE, ENV SP

Architectural
Alex Bloc, AIA, LEED AP

Structural
Jason Shurtz, PE, ENV SP
Rick Huber, PE

Wastewater Process Design
Adrianne Eilers, PE, ENV SP

Electrical/SCADA
Justin Steinkuehler, PE, ENV SP

HVAC/Plumbing
Gerald Jones

Geotechnical
TSi

Cost Estimating
All Disciplines
Point of Contact | Matt Sainz, EI

IEPA Permitting & SRF Loan Coordination
Scott Knight, PE, ENV SP

Bidding & Construction Phase Services
All Disciplines
Point of Contact | Scott Knight, PE, ENV SP

Resident Engineering
Matt Sainz, EI

CMT is a full service firm and can use support staff, when needed. Including in-house surveying, architectural, mechanical (HVAC & plumbing, electrical/ SCADA and structural needs.

285 CMT employees

39 Water Resources engineers

18 Wastewater treatment engineers

6 Structural Engineers

5 SCADA/electrical engineers

CMT

Scott Knight, PE, ENV SP

Years Experience: 28

Education:
University of Illinois, BSCE, 1989

Registration:
Institute for Sustainable Infrastructure (ISI) Credentialed Envision Professional (ENV SP)

Professional Engineer - Missouri, Illinois

Scott is the St. Louis Water Resources Group manager and has 28 years of highly specialized experience in wastewater collection and treatment. Scott has served as a design engineer for over 26 wastewater treatment plant projects (including 6 BNR facilities) and has provided wastewater facility planning on 16 separate projects since 1991. Scott has also prepared 11 SRF loan applications and 12 rate studies. Scott's last four wastewater projects have received ACEC awards (Illinois, Indiana, and Missouri).

Liberty, MO; New WWTP
First Design/Build wastewater project to use SRF funding in Missouri. Project manager, permitting, SRF coordination, process equipment evaluation & coordination with City. New 5.0 MGD/20.0 MGD BNR facility featuring the Ovivo Carrousel activated sludge system. ASCE Grand Award (2017) and national recognition. DBIA Mid-America "Project of the Year" in 2017.

LaSalle, IL; East Creek WWTP
Project manager, lead design engineer, planning, permitting, funding, and conducted extensive public education program. Funded through SRF / ARRA program. New 1.0 MGD/10 MGD plant featuring a dual train Evoqua VLR activated sludge system with BNR capabilities and Evoqua Memcor membranes for re-use quality effluent. ASCE Honor Award (2012).

Grissom, IN; WWTP Upgrade and Expansion
Lead design engineer, planning, permitting and SRF funding. Major upgrade and expansion to 2.6 MGD/9 MGD, featuring conversion of existing SBR tanks into BNR-capable Evoqua VLR activated sludge system and conversion of existing abandoned aeration tanks into RAS deoxygenation basin for bio-P enhancement. ASCE Honor Award (2012).

Northeast Public Sewer District Saline Creek WWTP, Fenton, MO
Project manager, lead design engineer, planning, and permitting. New 4.0 MGD/10 MGD plant featuring Evoqua Orbal oxidation ditch with internal denitrification recycle. Obtained variance from MDNR concerning loading on activated sludge reactors, allowing a cost savings of over 10% to be realized with no loss in performance or function. ASCE Grand Award (2010), also received national recognition.

Ottawa, IL; WWTP Upgrade
Project manager, lead design engineer, planning, permitting and SRF/ARRA funding coordination. Major upgrade and expansion to 4.0 MGD/10.0 MGD, featuring conventional aeration system retrofit. Detailed sequencing plan developed to allow existing plant to remain in service while undergoing major improvements.

Sangamon County WRD, IL; Sugar Creek WWTP
Performed quality assurance/quality control reviews of new BNR activated sludge facilities featuring the Evoqua VLR process. At 32 MGD, this is one of the largest new BNR facilities in the Midwest. ASCE Special Achievement Award winner (2013), and APWA-Illinois Project of the Year (2013).

Stone County PSD, MO; Box Canyon WWTP
Performed quality assurance/quality control reviews of new 0.40 MGD BNR activated sludge facilities featuring the Aqua-Aerobics SBR process and AquaDisk tertiary filters to accommodate strict N and P limits associated with discharge to a recreational lake. Seasonal and highly variable flows. Also assisted with funding and rate adjustments.

Highland, IL; WRF Upgrade
Project manager for comprehensive collection system evaluation including flow monitoring, smoke testing, manhole inspections, CCTV inspection of sewer lines. Prepared CMOM report for the City. Worked closely with the City to prepare a 10-year capital improvement plan to prioritize needs in the collection system and at the wastewater treatment plant. The plan is in progress and is being

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Adrianne Eilers, PE, ENV SP

Years Experience: 12

Education:
University of Illinois, BSAgE, 2006

Registration:
Professional Engineer

Institute for Sustainable Infrastructure (ISI) Credentialed Envision Professional (ENV SP)

Adrianne has served as project manager, process lead designer and project engineer on various water resource projects. Over the past 12 years, her primary focus has been on the planning and design of all aspects of wastewater treatment plant projects, ranging in size from 0.50 MGD to 150 MGD, with an emphasis on biological nutrient removal. Her engineering work has included hydraulic design of wastewater treatment plants, pump stations and forcemains along with mechanical process design of headworks facilities (screening and grit removal), biological treatment systems (including biological nutrient removal, activated sludge systems and clarification), disinfection and biosolids treatment (including digestion and thickening/dewatering). She is recognized for her ability to assist clients in bring projects to a successful completion from the conceptual planning level to final design.

Highland, IL; WRF Upgrade
Project manager and lead process designer for the upgrade of the WWTP to a 2.0 MGD facility. Primary duties included design for the replacement of the influent pumps, influent screen, grit removal system, secondary clarifier equipment, sludge dewatering system and excess flow clarifier. Modifications were made to the oxidation ditch that included installation of mixers, a recycle pump and additional instrumentation to incorporate BNR. Additional plant upgrades included new construction of an aerobic digestion system, chemical phosphorus removal and post aeration. Work included the process design of all systems along with preparation of plans and specifications and cost estimating.

Sangamon County WRD, IL; Sugar Creek WWTP
Lead process designer for the replacement of the Sugar Creek WWTP with a new 15 MGD facility. Primary duties included the design along with development of plans and specifications of a non-proprietary activated sludge treatment process for BNR. The process utilizes a combination of mixers, fine bubble diffusers, recycle pumps, blowers and instrumentation to provide the proper environments to achieve biological nitrogen and phosphorus removal. Additional work included hydraulic profile computations and cost estimating along with design and construction document preparation for the influent screenings system, grit removal system, chemical phosphorus removal, post aeration and scum screening.

Portageville, MO; New WWTP
Lead process designer for the replacement of the existing WWTP with a new 0.561 MGD BNR facility. The work consisted of the development of plans and specifications for all treatment aspects of the new facility including hydraulic profile computations and design of the influent screening and pump station facilities, oxidation ditch activated sludge reactor, secondary clarifiers, RAS/WAS/Scum pumping facilities, UV disinfection and aerobic digestion facilities.

Liberty, MO; New WWTP
Lead process designer on the first design/build Missouri SRF funded wastewater project for a new 5.0 MGD BNR WWTP. Tasks performed included hydraulic profile computations and development of construction plans for all treatment process components including influent screening, grit removal, activated sludge treatment, secondary clarification, RAS/WAS/Scum pumping facilities, UV disinfection, cascade aeration, aerobic digestion, membrane thickening and dewatering.

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Justin Steinkuehler, PE, ENV SP

Years Experience: 8

Education:
Southern Illinois University
Edwardsville, BSEE, 2009

Registration:
Institute for Sustainable Infrastructure (ISI) Credentialed Envision Professional (ENV SP)

Professional Engineer - Illinois
Missouri, Kansas

Justin is a Water Resources senior engineer with 8 years of experience on electrical design projects ranging from simple to large and complex. Justin provides electrical system designs for interior and exterior lighting, power distribution, standby power, entrance and security fencing, pump and motor control, process instrumentation, SCADA systems layout and design and grounding and lightning protection. Duties have included preparation of plans, specifications and cost estimates, shop drawing review, construction observation and site inspections. Operations staff appreciate his responsiveness to design priorities such as electrical safety and facilitation of equipment maintenance.

Highland, IL; WRF Upgrade
- Lead electrical design engineer
- Provided exterior lighting, interior lighting, power distribution, instrumentation, and backup power generation designs for plant upgrades.
- Complex staging of electrical distribution and controls to incorporate proposed equipment within existing facility with limited outages.
- Unique site constraints and existing electrical limitations provided unique challenges for exterior power distribution.
- Designed building lighting systems for increased efficiencies to meet energy conservation requirements

Liberty, MO; New WWTP
- Member of a multi office electrical engineering team.
- Responsible for SCADA control design and implementation
- Provided hands on training for site staff for equipment control training.
- Use of intelligent motor control to enable increased supervision for equipment maintenance.
- Heavy coordination with equipment providers and installers in fast paced design build environment.

Germantown Hills, IL; Peak Flow Control Projects
- Lead electrical design engineer
- Designed SCADA system to integrate with multiple treatment plant site with numerous remote pump stations allowing second operator work station at secondary treatment plant.
- Incorporated Gas Detection system with building ventilation to provide safe, flexible, and dependable ventilation during occupancy.
- Heavy utility coordination to relocate existing electrical service which conflicted with improvements.

Portageville, MO; New WWTP
- Lead electrical design engineer
- Provided exterior lighting, interior lighting, power distribution, instrumentation, and backup power generation designs for plant upgrades.
- Use of multiple manufacturer packaged control systems for integrated plant control.
- Exterior Screening equipment provided challenges for heat tracing during operation in Midwest winter weather conditions.

Sangamon County WRD, IL; Sugar Creek WWTP
- Lead electrical design engineer
- Large Campus necessitated use of medium voltage distribution system. Critical areas were designed with dual and loop feed elements to provide redundancy and reliability.
- Fiber optic communications provide fast, reliable communications between process areas within the plant. A VPN protected connection with second plant provides communication for operator access and disaster recovery.
- Dual services from separate substations provide regulation required redundant electrical supplies without the use of generators simplifying electrical distribution design and reducing capital and maintenance costs.
- Provided control workshops with owners during design, construction and operation to ensure all users fully understood controls of the fully automated wastewater plant.

CMT

Jason Shurtz, PE, ENV SP

Years Experience: 9

Education:
Bradley University, BSCE, 2008

Registration:
Institute for Sustainable Infrastructure (ISI) Credentialed Envision Professional (ENV SP)

Professional Engineer – Illinois

Jason is a structural engineer with over 9 years experience on the design of a wide range of water resource projects. He provides structural analysis and design of new process structures, including pump stations, concrete process tanks and buildings. Primary duties include the preparation of construction drawings (utilizing Revit modeling software) and specifications along with construction cost estimating and shop drawing review.

Highland, IL; WRF Upgrade
- Performed structural analysis for an updated and expanded CMU grit equipment building, new CMU chemical feed building, new CMU blower building, and new metal framed covered sludge storage area.
- Utilized Revit for 3D modeling of all structures noted above for coordination with design team and preparation of plans.
- Coordinated with Geotechnical Engineer to determine best approach for dealing with poor soils in areas of some structures.
- Prepared cost estimates and specifications for the structural elements of these structures.

Liberty, MO; New WWTP
- Performed structural analysis for a new reinforced concrete and CMU headworks facility, including influent screens and integrated grit chamber, as well as a new CMU digester equipment building, CMU dewatering building, and metal framed dewatered sludge storage building.
- Utilized Revit for 3D modeling of all structures noted above for coordination with design team and preparation of plans.
- Coordinated with contractor throughout design-build process.

Germantown Hills, IL; Peak Flow Control Projects
- Performed structural analysis for a new reinforced concrete and CMU integrated headworks and influent pump station facility, including a deep screen with lower level access to equipment.
- Prepared cost estimates and specifications for the structural elements of these structures.
- Utilized Revit for 3D modeling of all structures noted above for coordination with design team and preparation of plans.

Sangamon County WRD, IL; New Spring Creek WWTP
- Performed structural analysis and prepared structural drawings for a new 12-cell reinforced concrete vertical loop reactor covering an area of 98,000 square feet which includes below-grade utility access corridors, an electrical building and a drum screen building.
- Performed structural analysis and prepared structural drawings for a composite reinforced concrete, precast concrete and structural steel influent pump station with a design capacity of 29,000 gallons per minute.
- Performed structural design and prepared structural drawings for a composite reinforced concrete, precast concrete and structural steel influent pump station with a design capacity of 150 MGD.
- Performed structural analysis and prepared structural drawings for a 2,700-squarefoot precast concrete boiler building and a reinforced concrete corridor connecting the building to an existing digester complex.
- Performed structural analysis and prepared structural drawings for modifications to an existing 1,900-square-foot mixing pump building to allow for the removal of all existing equipment and installation of two disc thickeners and a chemical feed system.
- Prepared cost estimates and specifications for the structural elements of these structures.

Rick Huber, PE

Rick has over 20 years experience in structural engineering design and construction observation. Rick has served as a structural engineer, construction inspector and resident engineer on numerous water resource projects. His structural design experience includes both new structures and modifications to existing structures. His construction experience has provided him with the ability to analyze and address potential constructability issues early in the design process.

Years Experience: 24

Education:
Southern Illinois University - Edwardsville, MSCE, 2004

Southern Illinois University - Edwardsville, BSCE, 2000

Registration:
Professional Engineer – Missouri, Illinois, Kansas, Indiana

Stone County PSD, MO; Box Canyon WWTP
- Structural engineer for a new sequencing batch reactor and an electrical/filter building.

Highland, IL; WRF Upgrade
- Design elements included modifying existing grit chamber, clarifier diversion structure and screen buildings, and design of new post aeration structure
- Entire plant was modeled in 3D using Revit

Liberty, MO; New WWTP
- Design-build project required rapid development and direct communication between engineers and contractor.
- Design included large, double train activated sludge tanks, secondary clarifiers, UV disinfection channel, cascade aerator, RAS/WAS pumping facilities and various diversion structures
- Design and plans were developed in 3D using Revit.

Marshfield, MO; WWTP Improvements
- Design elements include modifying screen structure to accommodate new, larger screen, enlarging existing pump station, modifying existing excess flow basin to accept new bypass piping, and adding a canopy cover to UV channels.

Matt Sainz, EI

Matthew serves as design engineer for water and wastewater projects. He is experienced in hydraulic design, including system curve development, process design, facility planning, and cost estimation. Matt has also served as resident engineer for multiple construction projects, ensuring that projects are constructed in accordance with plans and specifications

Years Experience: 2

Education:
Bradley University, BSCE, 2016

Registration:
Engineer Intern - Illinois

Quad City International Airport, Moline, Illinois
Assistant Resident Engineer providing construction inspection for the following projects:
- Taxiway K connector
- Rehabilitation of Taxiway H2, including airfield lighting

Alton, IL; WWTP Facility Plan
Assist the project manager on the submittal of a facility planning report for $22 million in upgrades to a 26 MGD wastewater treatment plant. Tasks performed include:
- Hydraulic profile computations and design
- Pump design and selection
- Evaluation of alternative treatment technologies
- Equipment selection
- Cost estimation

Marshfield, MO; WWTP Improvements
Design engineer in the preparation of plans and contract documents for a 9 MGD treatment facility. Additional duties include:
- Development of an entire hydraulic profile for the wastewater treatment plant.
- Development of alternatives to eliminate excess flow discharge events.
- Design of new excess flow treatment and pumping facilities, including system curve development.
- Cost estimation

Alex Block, AIA, LEED AP

Alex Block has 15 years experience as a project architect in a wide variety of project types. His experience includes both new and renovated projects in the areas of project production and staff management. In addition, his knowledge of building code requirements is beneficial for all projects. He provides coordination and administration of assigned project production staff on a daily basis and coordinates project, drawings and specifications with project managers and consultants. He obtains quality assurance reviews.

Years Experience: 16

Education:
University of Detroit Mercy, Detroit, Michigan

Master of Architecture, 2006

Bachelor of Architecture, 2001

Business Certificate, 2001

Registrations/Certification:
Licensed Architect – Illinois, Missouri, Ohio, Iowa and Texas

National Council of Architectural Registration Boards (NCARB) Certification

LEED AP Accreditation

ATC-20: Post Earthquake Safety Evaluations of Buildings

Sangamon County WRD, IL; Sugar Creek WWTP
- Lead project architect
- Provided design of four new buildings including headworks, AST utility building, dewatering and drying buildings.
- Provided renovation design of the existing utility building to include new electrical systems.

Liberty, MO; New WWTP
- Lead project architect
- Provided design of five new buildings including headworks, RAS pumping station, digester equipment, dewatering and dry sludge storage.
- As requested by City staff, the buildings were constructed of high efficiency multi-wythe masonry and included clerestory windows and skylights for natural daylighting of all spaces.

Highland, IL; WRF Upgrade
- Lead project architect
- Provided design of three new structures including grit removal, chemical feed and blower buildings.
- Provided renovation design of three existing buildings including the lab/ office, screen and sludge processing.

Germantown Hills, IL; Peak Flow Control Projects
- Lead project architect
- Provided design of the new influent screen building at Plant No. 2.

Gerald Jones

Gerald has 5 years experience in design/build and field observations and 9 years experience in HVAC engineering utilizing AutoCAD R12 - AutoCAD 2015, Revit MEP 2009, Revit 2014 – 2016, Vector Works, and TRACE 700. His primary duties include the design of and preparation of construction specification and plans for heating, ventilating and air condition (HVAC) systems, plumbing systems, fire protection systems and other mechanical systems.

Years Experience: 17

Education:
Alabama A&M University, B.S., Mechanical Drafting & Design, 2000

Liberty, MO; New WWTP
- Provided design for the HVAC system and plumbing components for five new buildings including headworks, RAS pumping station, digester equipment, dewatering and dry sludge storage.

Highland, IL; WRF Upgrade
- Provided design for the HVAC system and plumbing components for three new structures including grit removal, chemical feed and blower buildings.
- Provided HVAC renovation design of three existing buildings including the lab/office, screen and sludge processing.

Germantown Hills, IL; Peak Flow Control Projects
- Provided HVAC system design and plumbing design of the new influent screen building at Plant No. 2.
- Unique design component of the project was the ability to meet the HVAC requirements in the lower portion of the screen building

Years of Experience: 3

Education:
University of Illinois Urbana-Champaign, MS, Civil & Environmental Engineering, 2015

Certificate: Energy and Sustainability Engineering

BS, Agricultural & Biological Engineering, 2013

Registration:
Institute for Sustainable Infrastructure (ISI) Credentialed Envision Professional (ENV SP)

Engineer Intern - Illinois

Heather Gipp, EI, ENV SP

Heather is a water resources engineer with significant training in biological and environmental engineering and sustainability. Her work at CMT involves water and wastewater treatment, collection and distribution systems, sustainability and public outreach

Germantown Hills, IL; Peak Flow Control Projects
Project Engineer for plant upgrades to increase WWTP Capacity from 0.20 MGD (current) to 1.25 MGD (build-out). Design work included:

- New preliminary deep screen, influent pump station, and lagoon aerator replacement
- 5,436 LF of trunk sewer to divert flows from WWTP #1 to WWTP #2
- Cost estimating

Mason City, IL; Sanitary Sewer Improvement Program

- Reviewed and evaluated cleaning and televising videos and reports of 90,000 feet of sewer mains
- Identified problem areas and proposed solutions (lining, point repairs, full replacement)
- Developed Improvement Program to address all issues within five years

Mason City, IL; Year One Sanitary Sewer Improvements
Project Engineer for sanitary sewer improvements on high priority segments. Work included:

- 8,693 LF of CIPP Lining (sizes 8" to 18")
- 7 point repairs
- 5,733 LF of root treatment
- Other improvements such as cut intruding tap, service repair, and installing transition liners

Tremont, IL; Sanitary Sewer Improvement Program
Project Engineer for cleaning and televising of approximately 70,000 lineal feet of sanitary sewer and 291 manholes. Work included:

- Identifying correct sewer and manhole locations, recreating outdated sewer and manhole maps
- Contractor coordination
- Managing and reviewing project deliverables

Years Experience: 33

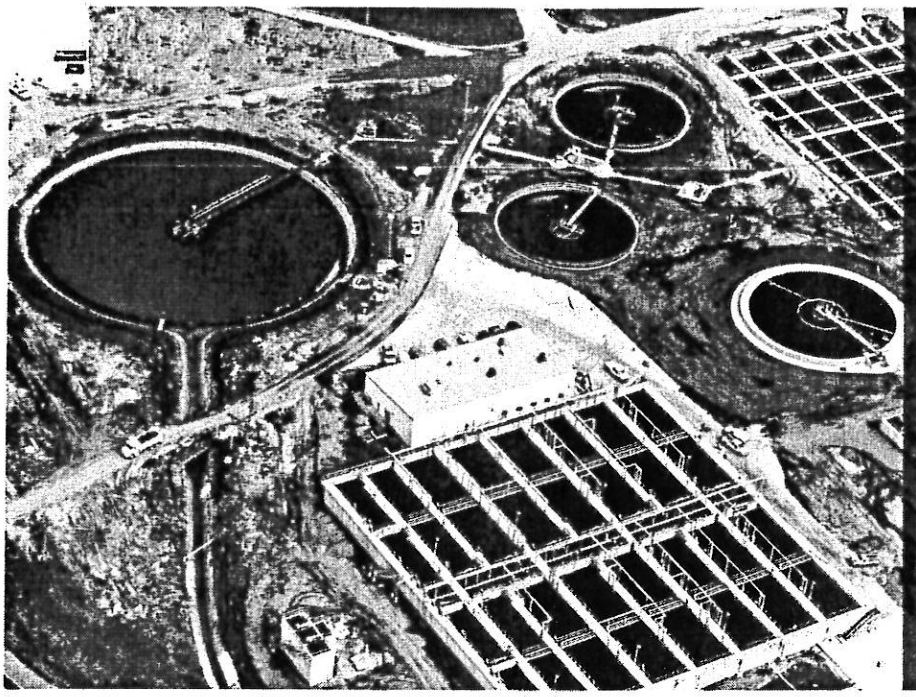
Education:
Has attended many seminars and was in the Navy for 3 years.

Registration:
Professional Land Surveyor – Illinois

Terry Landon, PLS

Terry has served as the lead technician on nearly all of CMT's wastewater treatment plant projects during the past 15 years. Conducted site design, including site geometry and overall layout, site piping and utilities, site grading and drainage, etc. Terry's expertise in Civil 3D and Revit 3D modeling is an asset on complex wastewater treatment plant projects. Terry is instrumental in developing comprehensive 3D models for client reviews. Recent projects include:

- Liberty, MO; New WWTP
- Highland, IL; WRF Upgrade
- Sangamon County WRD, IL; Sugar Creek WWTP
- Germantown Hills, IL; Peak Flow Control Projects
- Stone County PSD, MO; Box Canyon WWTP
- Portageville, MO; New WWTP
- Northeast Public Sewer District (Fenton, MO); Saline Creek Regional WWTP
- LaSalle, IL; East Creek WWTP
- Grissom, IN; WWTP Upgrade and Expansion



Project Status:
Design | 2011
Construction | 2017

Project Team:
Adrianne Eilers
Jason Shurtz
Rick Huber
Justin Steinkuehler
Alex Block
Scott Knight

Project Fee:
$3.6M

Reference:
Gregg Humphrey
Director/Engineer
3017 N. 8th St.
Springfield, IL 62702
217.528.0497

Sugar Creek Wastewater Plant Expansion

Sangamon County, Illinois, Water Reclamation District

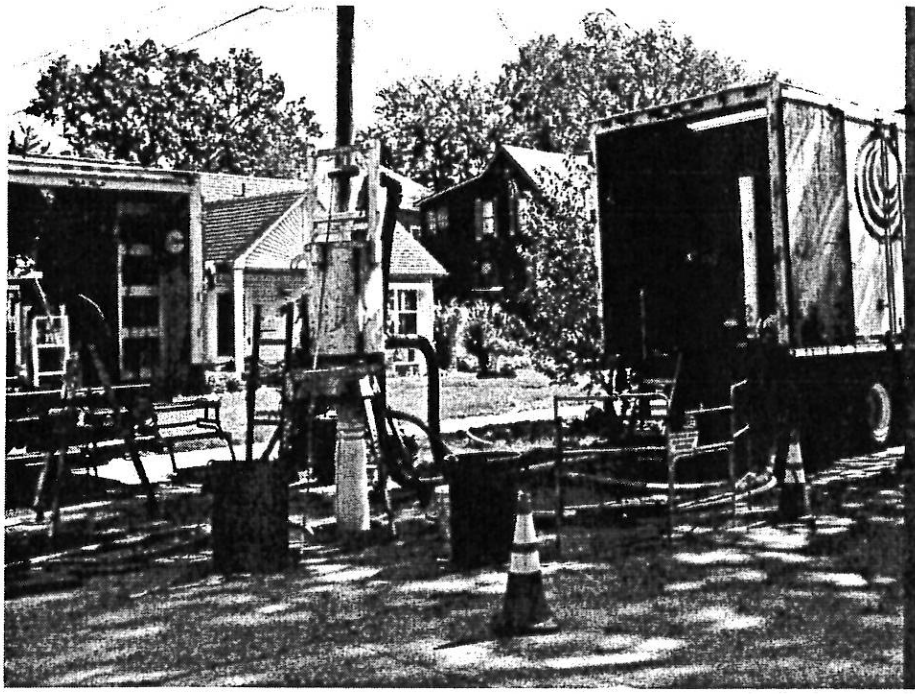
The Springfield Metro Sanitary District retained the services of CMT to upgrade a facility that had not had any major upgrades since it came online in the early 1970s. Due to growth in the community, loading to the plant was in excess of its rated capacity. CMT was retained to perform a detailed assessment of the plant capabilities, and worked with Illinois Environmental Protection Agency (IEPA) to obtain a re-rating of the plant's permitted capacity. This re-rating allowed for the continuation of growth in the Springfield Metro Area during the planning, design, and construction of plant improvements.

CMT was then retained to continue with the planning and design of the plant expansion. The Sugar Creek wastewater treatment plant was rated for an average flow of 10 MGD and a peak flow of 25 MGD. The improvements increased the average flow to 15 MGD and the peak flow to 37.5 MGD. These facilities feature state of the art non-proprietary biological phosphorus and total nitrogen removal. This facility is designed with a great deal of flexibility in the operation of the aeration tankage to accommodate the wide variation in flows seen at the site. CMT staff worked with SCWRD staff and utilized Biowin modeling to develop design criteria and to develop operating scenarios for the variable operation of swing zones within the aerobic and anoxic zones of the process.

The scope of the project included flow control and diversion to existing wet weather treatment facilities, mechanically-cleaned perforated plate fine screens, vortex grit removal system, submersible influent pump station, activated sludge tanks for biological nutrient removal, secondary clarification, post aeration, backup chemical phosphorus removal system and a biosolids handling system consisting of thickening, stabilization, dewatering, storage and sidestream equalization and treatment to control the phosphorus recycle through the plant.

The activated sludge treatment process utilizes non-proprietary mixers, fine bubble diffusers, blowers, pumps and instrumentation to achieve biological nutrient reduction to meet current and anticipated effluent phosphorus and total nitrogen limits. The non-proprietary system promotes operational flexiblity and optimum efficient for mixing and aeration along with energy efficient blowers and dislolloved oxygen-based controls.

Construction staging was also an important part of the design of the project as the existing plant needed to maintain full treatment capacity during the plant upgrades. With CMTs assistance, the District utilized the Illinois State Revolving Fund (SRF) loan program to fund the design and construction of the project.



Project Status:
Design | 2011
Construction | ongoing

Project Team:
Scott Knight
Terry Landon

Project Fee:
$150,000

Reference:
Joe Gilespie
Director of Public Works
1115 Broadway
Highland, IL 62249
618.654.6823

City of Highland, Illinois

CMOM Report Preparation/Comprehensive Sanitary Sewer Evaluation and Planning

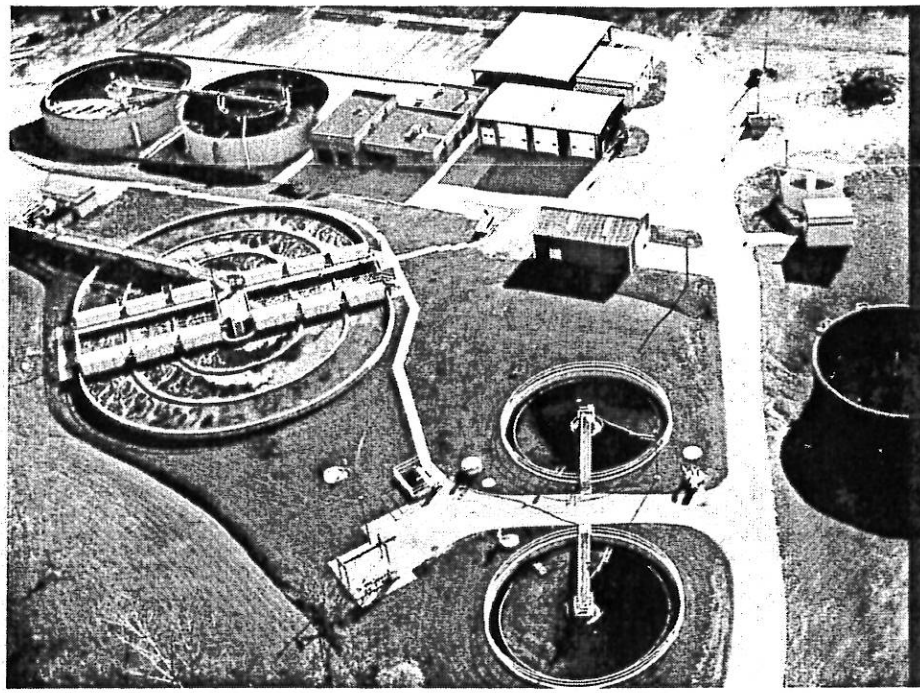
In 2013, CMT and ADS worked with the City of Highland to develop a capital improvement plan (CIP) for the City's wastewater system that would: 1) meet regulatory requirements and expectations (i.e. Capacity, Management, Operation & Maintenance, or "CMOM" related objectives); 2) address aging wastewater infrastructure; and 3) meet future capacity needs from ongoing community growth and development. The CIP would establish necessary adjustment to sewer rates to keep pace with inflation, fund the capital improvement plan & related projects, and provide revenue / financial stability.

The 10-year CIP identified ways to optimize spending while assessing the needs of the entire system (collection system and water reclamation facilities) through focusing on older and/or more problematic areas first and deferring major investments as much as practical. Working closely with the City, CMT developed a list of improvements and their estimated costs, grouped improvements into projects where logical, prioritized and scheduled improvements/projects, and developed financing strategies. In an iterative process, the resulting rate adjustments were evaluated against shifting of the implementation schedule of projects until the desired CIP was established.

CMT is currently assisting Highland with the implementation of the plan, with items 1-3 above now complete. This work has already produced positive results. Backups during both a very wet spring in 2015, as well as record rainfalls at the conclusion of 2015 were reported as three total, down significantly from a similar wet weather period in 2013 that resulted in 87 backups. Planning, design and SRF financing are currently under way for items 4-6.

The major components of the CIP include:

1. CMOM compliance / asset management
   - Inventory / condition
   - Enhance current televising and cleaning activities
   - Update equipment
2. System assessment by ADS Env.
   - Smoke testing
   - Flow monitoring
   - Physical inspections
3. Rehabilitation of high priority sewers
   - Older, problem areas
   - 23,000 feet, 73 MHs
4. Rehabilitate three major trunk sewers
   - 22,000 lineal feet of 18"
   - 50+ manholes
5. WWTP improvements
   - Replacement of major equipment (nearing end of service life)
   - Regulatory-driven
6. Future planning
   - Collection system capacity
   - WWTP capacity
   - Effluent requirements



Project Status:
Design | 2017
Construction | pending SRF financing

Project Team:
Scott Knight
Adrianne Eilers
Jason Shurtz
Rick Huber
Justin Steinkuehler
Gerald Jones
Alex Block
Terry Landon

Project Fee:
$1.16M

Reference:
Joe Gilespie
Director of Public Works
1115 Broadway
Highland, IL 62249
618.654.6823

City of Highland, Illinois (continued)

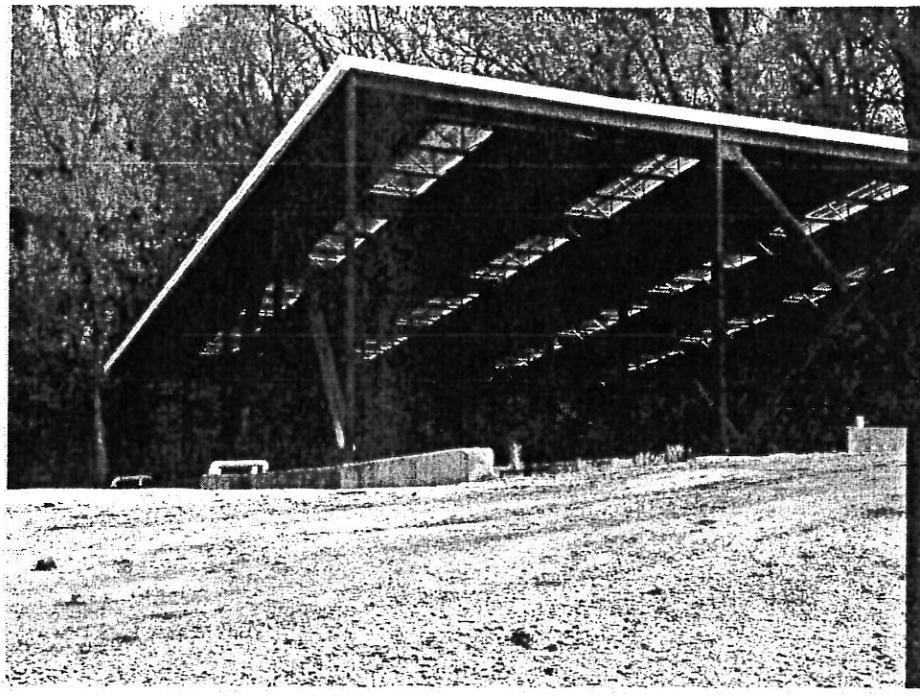
Upgraded Wastewater Treatment Plant

The City of Highland, IL engaged CMT to provide design services for the upgrade of their wastewater treatment plant. The WWTP is currently rated for a design average flow of 1.6 MGD and a peak flow of 4.0 MGD. Having designed the 1996 WWTP expansion and recently completing the City of Highland Wastewater System Comprehensive Facility Plan, CMT was in a unique position to assist with the current wastewater treatment plant upgrade, which is currently awaiting construction bidding pending SRF financing.

The scope of the project includes an upgrade of the plant's capacity to a design average flow of 2.0 MGD and a peak flow of 6.0 MGD. The upgrade includes replacement of aging equipment including the influent pumps, influent screen, influent grit removal system, oxidation ditch equipment, secondary clarifier equipment, biosolids dewatering equipment, ancillary pumps and excess flow clarifier. New processes including effluent flow measurement, post aeration, aerobic digestion facilities, backup chemical phosphorus removal and covered dewatered sludge storage facilities have been designed. Electrical, structural, HVAC and architectural upgrades have been proposed for the existing screen building, sludge processing building and office building. In addition, multi-disciplinary design has been completed on new process buildings including the grit removal building, blower building and chemical feed building.

Additional process modifications are proposed at the oxidation ditch to install mixers, recycle pump and instrumentation to include biological nutrient removal capabilities along with installation of launder covers and density current baffles at the secondary clarifiers to reduce algae growth and promote settling. Electrical and control upgrades are also included in the form of standby generator replacement, site lighting replacement and improved SCADA controls.

As with any treatment plant upgrade, staging is an important part of the design and construction process. Detailed construction staging notes have been developed to assist the contractor during construction of the project to maintain the full treatment capacity of the existing plant. In addition to design engineering services, CMT is also providing construction and operating permitting assistance along with financing assistance to obtain an Illinois State Revolving Fund (SRF) low-interest loan.



Project Status:
Design | 2012 - current
Construction | 2013 - current

Project Team:
Scott Knight
Heather Gipp

Project Fee:
$107,000

Reference:
Rich Brecklin
Public Works Supervisor
Village of Germantown Hills
216 Holland Road
Germantown Hills, IL 61548
309.383.4200

Village of Germantown Hills, Illinois

CMT has been serving as the Village Engineer for Germantown Hills since 2009. During this time, CMT has assisted the Village with completing a facility plan to secure funding for various wastewater treatment plant improvement projects and collection system projects along with development of a CMOM plan.

Capital Improvement Program

A Comprehensive Facility Plan for the wastewater collection and treatment system was prepared that included a detailed Capital Improvements Program aimed toward balancing the need for investment in their system with maintaining affordable sewer rates. CMT collaborated closely with the Village in developing the program, which consists of eight separate projects totaling over $16.0 million that would be implemented over the 15-year period from 2012 to 2027. The facility plan identified wastewater treatment plant improvements including plant-wide modifications to Plant No. 1 to address operational issues that had impacted plant performance during recent years. Plant No. 2 improvements consisted of aeration system modifications to address the declining performance of the existing aeration system. The recommended aeration improvements will drastically improve efficiency and significantly reduce energy costs. In addition to treatment plant improvements, several existing collection system improvements were identified, including improvements to the Plant No. 2 collection system to eliminate bottlenecks and known sources of inflow and infiltration (I/I) along with miscellaneous collection system improvements designed to provide better system reliability and level of service to ratepayers. In addition, a new Southwest Truck Sewer system was designed to divert wet weather flows and flows from future growth areas from the hydraulically overloaded Plant No. 1 to the underloaded lagoon at Plant No. 2. The future consolidation of all wastewater treatment operations at the existing Plant No. 2 site through the construction of a new, state-of-the-are mechanical treatment plant to replace the existing wastewater treatment lagoon and Plant No. 1 was also included in the project. With assistance from CMT, the Village is currently in the process of implementing the plan, with the first 5 projects either under way or recently completed. All projects to date have been financed using the Illinois State Revolving Fund (SRF) low-interest loan program.

Project Status:
Design | 2012 - current
Construction | 2013 - current

Project Team:
Scott Knight
Heather Gipp

Project Fee:
$25,000

Reference:
Rich Brecklin
Public Works Supervisor
Village of Germantown Hills
216 Holland Road
Germantown Hills, IL 61548
309.383.4200

Village of Germantown Hills, Illinois (continued)

CMOM Program

Condition 13 of the most recent NPDES Permit (IL0028916) for Wastewater Treatment Plant No. 1 required the Village prepare a capacity, management operation and maintenance (CMOM) plan for their sanitary sewer collection system. The Village called on CMT for assistance with this permit requirement. The village's sanitary sewer collection system infrastructure consists of gravity sewer (15 miles) and manholes (385), pump stations (10 each) and force mains (four miles), low pressure sewers (two miles) and individual residential grinder pump station (198).

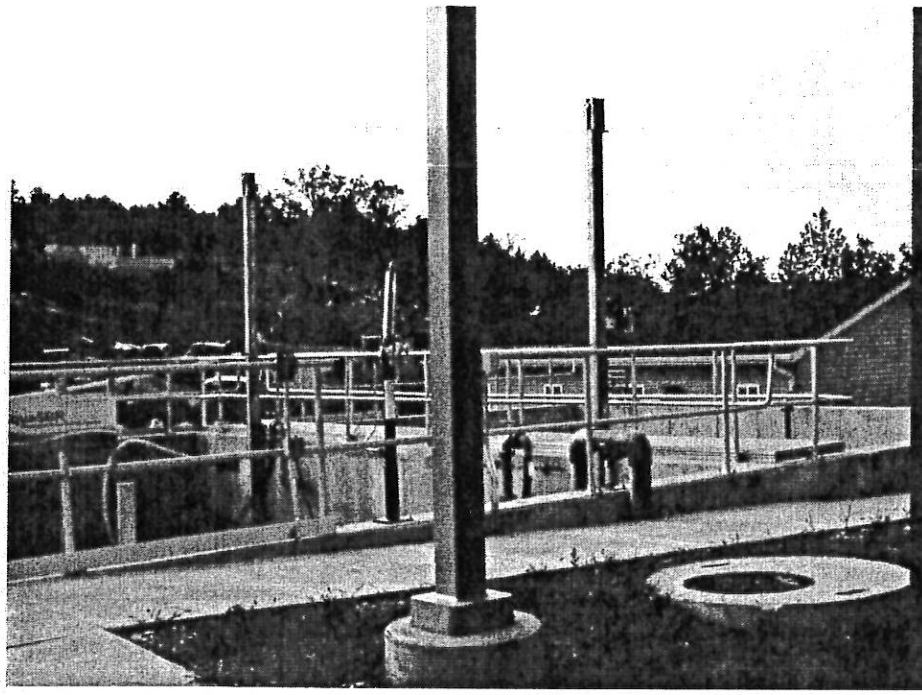
During the project, CMT meet with key village staff to review and document historical practices and procedures used to operate and maintain the sanitary sewer collection system and the methods for managing the information related to the system. The information and data gathered was reviewed and compared to standards and recommended guidance practices. Differences in practices were noted so that recommendations for improvement and implementation can be made, where applicable. CMT assisted the village with implementing the "Check Up Program for Small Systems" (CUPSS) asset management tool. CUPSS is a free asset management tool (software) developed by the USEPA. The software is primarily used by the village to issue, track and tie work orders directly to assets to better document their ongoing maintenance. The software also allows the village to better monitor assets and document past repairs/problems that can be used during the design or evaluation of an improvement to the asset.

CMT also reviewed the run time data for the 10 pump stations to determine potential sources of inflow and infiltration (I&I). This allowed the village to focus their resources on sewer sheds that will provide the greatest reduction in I&I.

The report ultimately identified the need for the Village to better document the maintenance and repair history so that they can track and maintain the performance of their collection system.

The plan report addressed the five elements of a CMOM program and evaluated implementation of a work order software:

- Collection System Management
- Collection System Operation
- Equipment and Collection System Maintenance
- Sewer System Capacity Evaluation – Testing and Inspection
- Sewer System Rehabilitation



Project Status:
Design | 2013
Construction | 2016

Project Team:
Scott Knight
Rick Huber
Terry Landon
Justin Steinkuehler

Project Fee:
$235,000

Reference:
Kathy Isaacs
118 Notch Lane
Branson West, MO 65737
417.338.5231

Box Canyon Wastewater Treatment Plant

Stone County Public Sewer District, Missouri

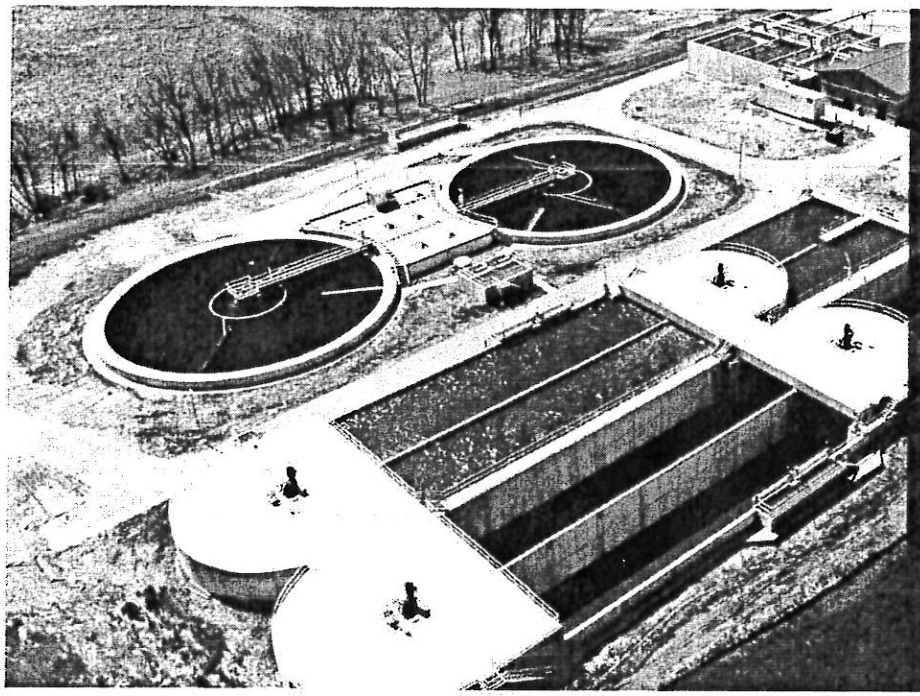
Stone County Public Sewer District hired CMT to assist them with the replacement of one of their failing wastewater plants, a recirculating gravel filter, which has been regularly out of compliance with their discharge permit. CMT was tasked with designing a new wastewater plant on a limited budget, with a limited footprint, and on a very small piece of existing property while not disrupting the operation of the old plant.

The new Box Canyon Wastewater Treatment Plant has a capacity of 0.15 MGD and has been designed as a Sequencing Batch Reactor (SBR) biological nutrient removal plant. This type of plant affords the owner all of the diversity it needs to remain in compliance with their strict discharge limits at all times of the year. Within the operational scheme of the SBR, both the aeration and mixing within each basin are independent of one another, allowing a transformation in operating conditions to occur from approaching anaerobic during the initial fill phase, to an alternating cycle of anoxic and aerobic. These cycles provide for biological phosphorus removal and for denitrification to occur.

To enhance the phosphorus removal, chemical feed has been included and its introduction into the basins has been integrated with the SBR controls. The enhanced biological phosphorus removal achieved through chemical feed serves to maintain compliance with the strict discharge permit. The final removal of phosphorus following its chemical precipitation is accomplished through the use of disk filters that are just ahead of ultraviolet disinfection.

The Box Canyon WWTP discharges into an arm of Table Rock Lake in southwestern Missouri which is recognized as an Outstanding Water Natural Resource. The new plant is capable of meeting discharge limits of 0.6 mg/l ammonia and 0.5 mg/l total phosphorus prior to its release to the lake.

Based on the early success of this project, and due to a resurgence in growth and building in the area, the owner has requested that CMT move forward with the design of Phase 2, an expansion envisioned and provided for in the design of the initial project. The project is currently under construction.



Project Status:
Design | 2015
Construction | 2017

Project Team:
Scott Knight
Adrianne Eilers
Jason Shurtz
Rick Huber
Justin Steinkuehler
Gerald Jones
Alex Block
Terry Landon

Project Fee:
$2.7M

Reference:
Brian Hess
Director of Utilities
101 E Kansas
Liberty, MO 64064
816.439.4500

Liberty Wastewater Treatment Plant

City of Liberty, Missouri

Liberty has implemented the Design-Build delivery approach for their new 5.0 MGD wastewater treatment plant and related conveyance system improvements.

The project includes a new WWTP featuring influent fine-screening and grit removal; BNR activated sludge treatment featuring the Ovivo Carrousel; secondary clarifiers; chamber-style UV disinfection; membrane-thickened aerobic digestion (Ovivo Mem-TAD™); solids dewatering centrifuges; and a new, state-of-the-art administration building and maintenance building. Conveyance system improvements include two large remote pump stations (11 MGD and 9 MGD), 12,000 lineal feet of new gravity sewer and 17,000 lineal feet of new force main.

Biological nutrient reduction is provided through Ovivo's proprietary 2-stage AlternatIR™ system. Two basins are added to the influent end of the standard aerobic Carrousel to serve as anoxic and anaerobic zones. One of the key features is the EliminatIR™ internal recycle gate that returns up to 10 times the design average flow from the aerobic zone to the anoxic zone to greatly enhance denitrification without pumping. The DivertIR™ gate on the influent and the EliminatIR™ gate work in tandem to create anaerobic cycles within the anoxic zone to achieve biological phosphorus reduction. Ovivo indicates the system will achieve BOD5<5 mg/l; NH3-N<0.5 mg/l; TN~5-8 mg/l; and TP~0.3-0.5 (with trim doses of metal salts).

At BNR facilities, it is very important to consider biosolids stabilization and the potential impacts from their sidestreams on BNR performance. At Liberty, all the work performed in the activated sludge reactors to promote P uptake is protected through solids stabilization featuring Ovivo's Mem-TAD™ aerobic digestion system. Unlike traditional aerobic digesters where aeration is temporarily interrupted to allow decanting and thickening – a step where stored P is often released by the biomass if anoxic conditions begin to develop – the Mem-TAD™ system utilizes membrane thickening, which is completely independent of aeration, to achieve up to 4% solids concentration in the digester. This system ensures the right environment in the digester to allow biomass to retain the P and reduce sidestream loads.

CMT conducted extensive Biowin modeling of the Liberty plant, and worked very closely with Ovivo in developing an accurate model of the AlternatIR™ Carrousel. CMT ran the model under numerous scenarios, including start-up conditions; initial rated capacity (5 MGD); design conditions (7 MGD); winter operation; summer operation; storm-flow conditions; etc. The model has been particularly useful for permitting and simulating start-up conditions, including seeding the reactors.

Wastewater Treatment Planning, Design & Construction Experience

	DAF MGD	DMF MGD	Pump Station	Screening	Screenings Press	Grit Removal	Grit Dewatering	Primary Settling	Trickling Filter	Aeration Activated Sludge	Nitrification/BNR	Oxidation Ditch	Secondary Settling	Tertiary Filtration	Membrane Bioreactor	Chlorination	Dechlorination	UV Disinfection	Gravity Belt Thickening	Aerobic Digestion	Anaerobic Digestion	Biosolids Destruction	Sludge Holding	Sludge Transport	Sludge Drying Beds	Belt Press Dewatering	Other Dewatering***	Office/Laboratory	Maintenance Shop	SCADA System	Lime/Sludge Stabilization	Excess Flow Treatment	Odor Control
Decatur, IL	41.0	125.0	•	•		•	•	•		•	•		•			•	•	•			•		•	•			•	•	•	•		•	•
SCWRD* - Spring Creek	32.0	80.0		•	•	•	•	•		•	•		•					•	•		•		•				•	•	•	•		•	•
Alton, IL	10.5	26.0	•			•	•	•		•			•			•				•	•			•	•	•		•	•				
SCWRD* - Sugar Creek	10.0	25.0	•	•	•	•	•			•			•			•				•			•		•			•	•		•	•	
Carbondale, IL	6.0	12.5	•	•	•						•	•	•			•				•			•	•					•	•		•	
Liberty, MO	5.0	20.0	•	•	•	•	•			•	•	•	•						•					•			•	•	•	•			•
Mount Vernon, IL	5.0	17.0	•	•		•	•				•	•	•			•							•	•				•			•	•	
Edwardsville, IL	4.3	9.3	•	•		•	•	•		•			•			•	•						•	•	•					•	•	•	
NPSD**, Fenton, MO	4.0	10.0	•	•		•					•	•	•				•		•		•								•		•		
Ottawa, IL	4.0	10.0		•	•	•	•			•			•			•	•						•	•			•	•	•	•		•	
Effingham, IL	3.8	9.0	•	•		•	•	•			•	•	•	•		•					•		•	•		•		•			•	•	
Canton, IL	3.5	8.34	•	•		•	•	•		•			•	•		•				•	•		•	•	•	•		•	•	•	•	•	
Charleston, IL	3.3	6.0	•					•		•	•		•										•		•					•			
Taylorville, IL	3.0	6.2	•	•		•	•	•		•	•		•	•		•				•	•		•	•	•	•		•	•	•		•	
Peru, IN - Grissom	2.6	8.7	•	•	•	•	•			•	•		•					•				•			•			•	•	•			
Salem, IL	2.5	7.02	•	•	•	•	•	•		•	•	•	•	•					•	•			•			•				•		•	
Princeton, IL	2.2	6.33	•	•	•	•	•	•			•	•	•	•		•						•		•		•		•		•	•	•	
Highland, IL	2.0	6.0	•	•	•	•	•				•	•	•			•							•	•		•		•			•	•	
LaSalle, IL	1.0	2.0		•	•	•	•			•	•				•			•				•						•	•	•			•
Portageville, MO	0.56	1.65	•	•		•						•	•					•		•		•					•						
Germantown Hills, IL	0.20	0.50	•	•	•					•		•	•						•					•			•						
Stone County PSD, MO	0.15	0.4	•	•						•				•					•				•										

* Sangamon County Water Reclamation District **Northeast Public Sewer District

***Includes centrifuge, rotary press, screw press