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Seth Speiser

**VILLAGE CLERK**  
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Mike Blaies  
Denise Albers  
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Michael Heap  
Lisa Meehling

**VILLAGE TREASURER**  
Bryan A. Vogel

# **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](http://www.freeburg.com)

**VILLAGE ADMINISTRATOR**  
Tony Funderburg

**PUBLIC WORKS DIRECTOR**  
John Tolan

**POLICE CHIEF**  
Michael J. Schutzenhofer

**ESDA COORDINATOR**  
Eugene Kramer

**ZONING ADMINISTRATOR**  
Matt Trout

**VILLAGE ATTORNEY**  
Weilmuenster & Keck, P.C.

September 20, 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 25, 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.: Farnsworth Group Statement of Qualifications for Wastewater System Improvements
2. 6:30 p.m.: Horner & Shifrin 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)



391 Frank Scott Pkwy East, Suite A  
Fairview Heights, IL 62208  
p 618.236.2000

[www.f-w.com](http://www.f-w.com) | [www.greennavigation.com](http://www.greennavigation.com)

July 27, 2018

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

**RE: Qualifications for Wastewater System Improvements**

Dear Mr. Funderburg

Farnsworth Group is pleased to submit our qualifications for improvements to the Village's wastewater collection and treatment system. Founded over a century ago, Farnsworth Group is a firm that focuses first on the broad needs of our clients, which has in turn made us leaders in every field of design. Our engineers are available to provide you personalized attention for your project challenges.

We are a full-service firm delivering proactive, reliable and efficient projects. For your wastewater system improvements project, we offer:

- **PEOPLE.** A reputable team and an experienced staff that the Village of Freeburg can count on to fulfill their engineering needs. We have recently provided professional design services for the upgrades to the Pekin, Mahomet, East Peoria, Pontiac, Fairbury and Bloomington and Normal Water Reclamation District (BNWRD) facilities. Each of these facilities are conventional, municipal wastewater treatment plants facing necessary infrastructure repair, upgrade or conversion for new nutrient standards.
- **PASSION.** A team that seeks innovative thinking, which introduces programming ideas and creative concepts that provide long-term solutions for your project's needs.
- **PERFORMANCE.** A team that you can trust and that understands the importance of communication, collaboration and partnership with the Village. You will always remain informed, updated and engaged.

Our team appreciates the opportunity to submit our engineering qualifications. We are available to meet and discuss your specific project needs and how we can address those needs in more detail. If you have any questions, please feel free to contact me at 309.663.8435 or [psheridan@f-w.com](mailto:psheridan@f-w.com)

Sincerely,

FARNSWORTH GROUP, INC.

A handwritten signature in black ink, appearing to read "Patrik J. Sheridan".

Patrik J. Sheridan, PE  
Senior Engineering Manager

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# Firm Overview

## CONTACT INFORMATION

Farnsworth Group, Inc.  
391 Frank Scott Pkwy East, Suite A  
Fairview Heights, IL 62208  
Phone: 618.236.2000  
www.f-w.com

Patrik J. Sheridan, PE  
Senior Engineering Manager  
psheridan@f-w.com  
309.663.8435

## PROFESSIONAL HISTORY

Farnsworth Group traces its origins back to the 1890s, when its predecessor firms provided land surveying and drainage services in central Illinois. Now, with offices in 22 cities throughout the country and nearly 480 employees, we have entered the 21st century as a multi-discipline leader in all facets of design and technical consulting.

Our talented and dedicated staff of engineers, architects, surveyors, scientists, technicians and support personnel provides the full range of services in civil, environmental, transportation, mechanical, electrical, structural and municipal engineering; architecture; landscape architecture; and surveying. Registrations are held throughout the continental United States.

### OUR PROFESSIONAL SERVICE CAPABILITIES INCLUDE, BUT ARE NOT LIMITED TO:

- Wastewater System Engineering
- Stormwater Management
- Water System Engineering
- Municipal Engineering
- Transportation Engineering
- Civil/Site Planning
- Architecture
- Landscape Architecture
- Interior Design
- Mechanical Engineering
- Electrical Engineering
- Plumbing Engineering
- Structural Engineering
- LEED® Consulting
- Land Surveying
- Pipeline Engineering
- Railroad Services
- Integrated Controls & Computer Systems
- Commissioning
- Professional Documentation Services
- Energy Services
- Land Development
- GIS/Mapping
- Referendum Services
- Grant Assistance
- Administrative Services



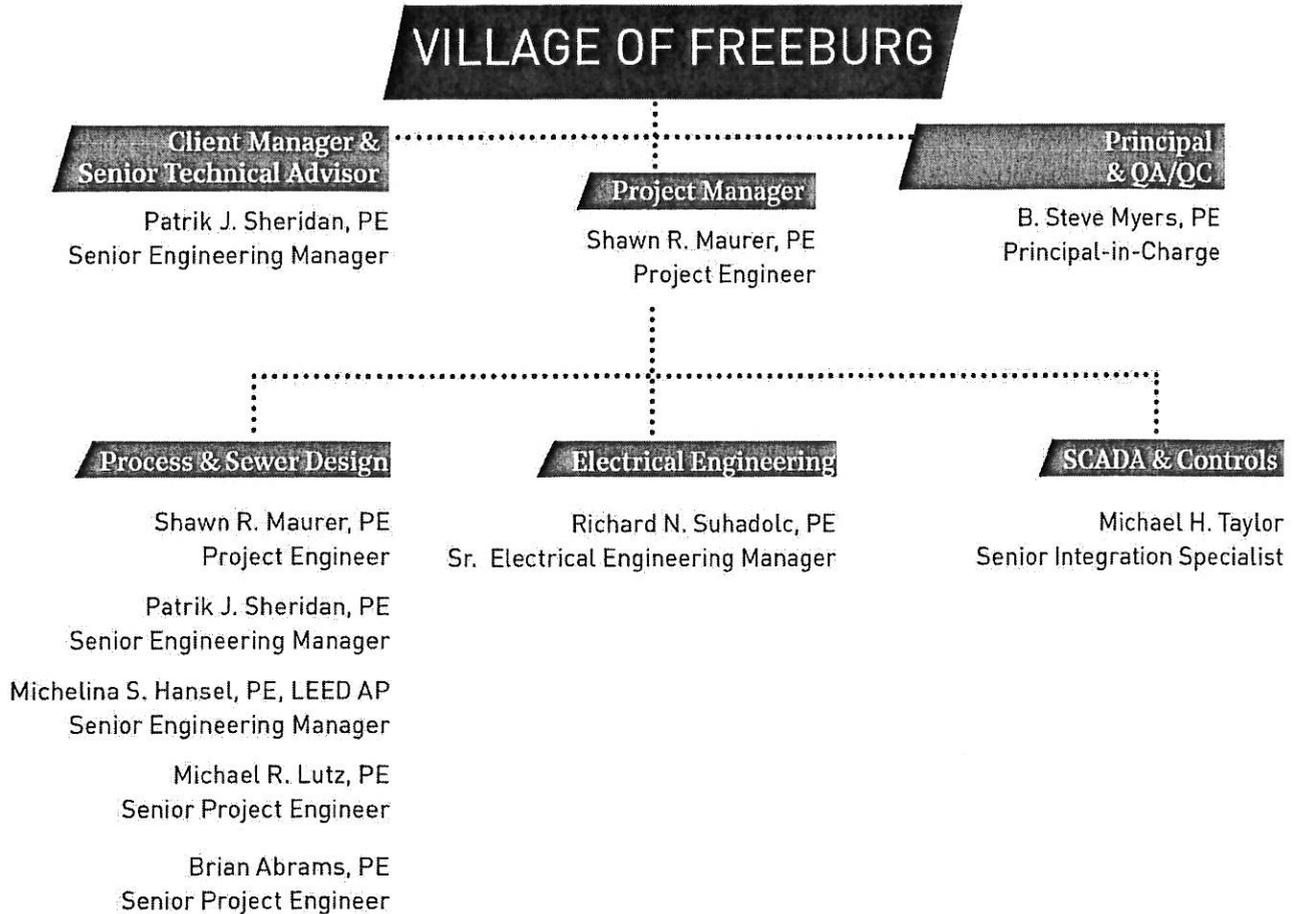
Ranked #200 in 2018 among the Top 500 Design Firms by Engineering News-Record

At the heart of what we do are our *people, passion, and performance.*



# Key Personnel

Our team understands the critical nature of the Village's project and the schedules that often accompany these types of projects. Our team includes the experience and depth that will allow flexibility in assignment of project tasks. The team has the availability required to devote to your project and will accomplish the project within the budget and schedule.

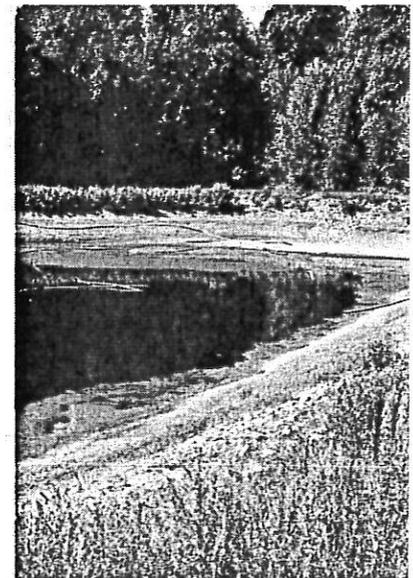


## SUBCONSULTANTS

Farnsworth Group is a full-service architectural and engineering firm and therefore we do not see any need at this time to contract out services for this first part of the project. Should a special situation arise, we would work with you and your staff to choose the appropriate consultant.

## DBE/MBE/WBE/SBE STATUS

Farnsworth Group is not able to claim a DBE/MBE/WBE/SBE status. However, we always search to form the best possible team for our clients. Where the client is best served and to fulfill contract requirements, we will partner with DBE/MBE/WBE/SBE consultants.





**Shawn R. Maurer, PE**  
**PROJECT ENGINEER**

Mr. Maurer is a licensed civil engineer with fourteen years of experience designing infrastructure improvements for municipalities and private clients. He has experience in all levels of project management from planning and design to construction observation services. He has served as a Resident Engineer on large-scale construction projects, and has acted as a liaison between municipalities, design engineers and general contractors to provide value engineering and efficient resolution of construction issues. His design experience includes water and wastewater treatment plants, water distribution systems, sewer collection systems, stormwater and drainage systems, motor fuel tax program planning and documentation, paving and grading plans, storm and sanitary sewer design, sidewalks and parking layouts.

**EDUCATION /**

M.S., Civil Engineering, Bradley University

B.S., Civil Engineering, Bradley University

**REGISTRATION AND CERTIFICATIONS /**

Professional Engineer: Illinois, Iowa

**INDUSTRY AFFILIATIONS /**

Illinois Society of Professional Engineers

National Society of Professional Engineers

American Public Works Association

**EXPERIENCE /**

**Wastewater Treatment Plant Improvements**

Minonk, Illinois / Project Manager

**Lake Bloomington Wastewater Collection & Treatment System Report**

Bloomington, Illinois / Study and Report

**Private Sewage Treatment System Designs**

Various Clients / Design Engineer

**CSO Lagoon Cleaning**

BNWRD / Project Manager

**Maple & Western Sanitary Sewer Replacement**

Farmer City, Illinois / Design Engineer

**51" Sewer Replacement**

BNWRD / Construction Observation

**Low Pressure Sewer Study**

Sangamon Valley Public Water District / Study

**Wastewater Treatment Plant**

Tulon, Illinois / Design Engineer

**Gilmore Street Pump Station Generator**

LeRoy, Illinois / Project Manager

**Tenney Street Replacement Sewer**

Kewanee, Illinois / Design Engineer

**New Sewer System**

Downs, Illinois / Design Engineer

**Drainage Studies**

Various Clients / Project Manager

**Storm Sewer Separation Project**

Minonk, Illinois / Design Engineer



**Patrik J. Sheridan, PE**  
**SENIOR ENGINEERING MANAGER**

Mr. Sheridan has over 32 years of experience in planning, civil/process design, design project management and construction project management and resident engineering on civil, environmental, water and wastewater processes, recreation and construction engineering projects for municipal, federal government and industrial clients. He currently serves as a Senior Engineering Manager in the Water and Wastewater Group and Section Leader for the Integrated Controls & Computer Systems Group.

**EDUCATION /**

B.S., Civil Engineering with Honors,  
University of Texas at Austin

B.S., German, University of Texas at  
Austin

M.S., Business Administration,  
Boston University, Boston,  
Massachusetts

M.S., Civil Engineering, University of  
Texas at Austin

**REGISTRATION  
AND CERTIFICATIONS /**

Professional Engineer: Illinois,  
Minnesota, Texas, Iowa, Wisconsin,  
Colorado

**INDUSTRY AFFILIATIONS /**

American Society of Civil Engineers

Illinois Society of Professional  
Engineers

American Water Works Association

Water Environment Federation

Illinois Association of Wastewater  
Agencies

**EXPERIENCE /**

**Southeast Wastewater Treatment  
Plant**

BNWRD / Project Manager

**Wastewater Treatment Plant**

Pekin, Illinois / Project Manager

**Long Term Control Plan CSO  
Improvements**

Pekin, Illinois / Project Manager

**Wastewater Facility Plan and CSO  
Improvements**

Fairbury, Illinois / Project Manager

**Nutrient Feasibility Study and  
Optimization Plan**

East Peoria, Illinois / Project  
Manager

**Nutrient Feasibility Study and  
Optimization Plan**

Pontiac, Illinois / Project Manager

**Sugar Creek CSO Improvements**

BNWRD / Project Manager

**Sludge Transfer System at West  
Plant**

BNWRD / Project Manager

**East Side Interceptor**

BNWRD / Project Manager

**GE Valley Pump Station**

BNWRD / Project Manager

**25-Year Capital Infrastructure  
Facilities Strategic Planning Study**

BNWRD / Project Manager

**Screen Replacements at West Plant**

BNWRD / Project Manager

**Filter Replacements at West Plant**

BNWRD / Project Manager

**Pump Station Study & Hydraulic  
Analysis, West Plant**

BNWRD / Project Manager

**Energy Management Study, West  
Plant**

BNWRD / Project Manager



**B. Steve Myers, PE, LEED AP**  
**PRINCIPAL**

Mr. Myers is Principal-in-Charge of Farnsworth Group's Water/Wastewater Section. He has an extensive background in water and wastewater systems project management, construction administration/observation and design. He has been responsible for construction management as Resident Engineer for a 20 million gallon per day water treatment plant in Bloomington and water treatment plants for the Villages of Metamora, Downs, Danvers and Stanford; the City of Farmer City; and Clear Water Service Corporation. Mr. Myers also has experience in water system evaluation and is certified in Risk Assessment Methodology for Water systems. Mr. Myers was Resident Engineer for \$26 million upgrade to the West Treatment Plant for the Bloomington and Normal Water Reclamation District.

**EDUCATION /**

B.S., Civil Engineering, Tennessee Technological University, Cookeville, Tennessee

**REGISTRATION AND CERTIFICATIONS /**

Professional Engineer: Illinois

RAM-W Certification, Risk Assessment Methodology, Water

Vulnerability Self Assessment Tool (V-SAT) Training Sponsored by Illinois Section AWWA

LEED Accredited Professional

**INDUSTRY AFFILIATIONS /**

Illinois Society of Professional Engineers

National Society of Professional Engineers

American Water Works Association

Illinois Section American Water Works Association

American Public Works Association

**EXPERIENCE /**

**Southeast Wastewater Treatment Plant**

BNWRD / Principal-in-Charge

**Wastewater Treatment Plant**

Pekin, Illinois / Principal-in-Charge

**Long Term Control Plan CSO Improvements**

Pekin, Illinois / Principal-in-Charge

**Wastewater Facility Plan and CSO Improvements**

Fairbury, Illinois / Principal-in-Charge

**Nutrient Feasibility Study and Optimization Plan**

East Peoria, Illinois / Principal-in-Charge

**Nutrient Feasibility Study and Optimization Plan**

Pontiac, Illinois / Principal-in-Charge

**BNWRD West Plant Phosphorous Feasibility Study**

BNWRD / Principal-in-Charge

**Low Pressure Sanitary Sewer Collection System**

Livingston County, Illinois / Principal-in-Charge

**Sewage Collection and Treatment System**

Lexington, Illinois / Principal-in-Charge

**Sewage Collection and Transmission System**

Downs, Illinois / Principal-in-Charge

**Wastewater Treatment Plant Expansion**

BNWRD / Resident Engineer



**Michelina Hansel, PE, LEED AP**  
**SENIOR ENGINEERING MANAGER**

Micki Hansel is a Senior Project Engineer at Farnsworth Group and has more than 15 years experience as a civil and environmental engineer. She has assisted clients in financing, permitting and design working in the areas of civil engineering, wastewater collection, stormwater management, water distribution, water supply, trails, floodplain studies and site development.

Micki has training and experience with various hydraulics modeling software including HYDRA, XP-SWMM, HEC-RAS, HEC-HMS, Pond Pack, WaterCAD, SewerCAD, StormCAD Civil 3D and Hydraflow.

**EDUCATION /**

B.S., Biological Engineering,  
University of Georgia

**REGISTRATION  
AND CERTIFICATIONS /**

Professional Engineer: Missouri  
LEED Accredited Professional

**INDUSTRY AFFILIATIONS /**

American Society of Civil Engineers  
National Society of Professional  
Engineers

**EXPERIENCE /**

**Wildwood Sewer Repairs**  
Decatur, Illinois / Sewer Design

**DeGiverville Combined Sewer  
Relocation**

Metropolitan St. Louis Sewer District  
/ Project Engineer

**Forestwood Sanitary Relief**

Metropolitan St. Louis Sewer District  
/ Project Engineer

**CSO- McKnight SE of Highway 40  
CSO interceptor (I-292)**

Metropolitan St. Louis Sewer District  
/ Project Engineer

**CC-11 and CC-20 Creve Coeur Creek  
Sanitary Relief**

Metropolitan St. Louis Sewer District  
/ Engineer

**CC-14 Creve Coeur Creek Sanitary  
Relief**

Metropolitan St. Louis Sewer District  
/ Engineer

**MC-01 & MC-02 Webster &  
Marlborough Trunk/Watson to  
Edgar Sanitary Relief Sewer**

Metropolitan St. Louis Sewer District  
/ Engineer

**Wastewater Treatment Plant**

Eatonton, Georgia / Engineer

**Curahee Club Sewerage System**

Eatonton, Georgia / Engineer

**Force Main and Pump Station**

Eatonton, Georgia / Engineer

**Fulton Area Drainage Study**

Decatur, Illinois / Project Engineer

**IAA Drainage Study and Detention  
Design**

Bloomington, Illinois / Project  
Engineer



**Michael R. Lutz, PE**  
**SENIOR PROJECT ENGINEER**

Mr. Lutz has worked on projects from the planning stages through design, construction and implementation.

**EDUCATION /**

B.S., Environmental Engineering,  
Michigan Technological University,  
Houghton, Michigan

M.S., Civil Engineering, Carnegie  
Mellon University, Pittsburgh,  
Pennsylvania

**REGISTRATION  
AND CERTIFICATIONS /**

Professional Engineer: Illinois,  
Michigan

**INDUSTRY AFFILIATIONS /**

National Society of Professional  
Engineers

Illinois Society of Professional  
Engineers

Water Environment Federation

Illinois Water Environment  
Association

American Water Works Association

Illinois Section of the American  
Water Works Association

**EXPERIENCE /**

**Southeast Wastewater Treatment  
Plant**

BNWRD / Process Study & Design

**Wastewater Treatment Plant**

Pekin, Illinois / Process Study &  
Design

**Long Term Control Plan CSO  
Improvements**

Pekin, Illinois / Study & Design

**Wastewater Facility Plan and CSO  
Improvements**

Fairbury, Illinois / Process Study &  
Design

**Nutrient Feasibility Study and  
Optimization Plan**

East Peoria, Illinois / Process Study  
& Design

**Nutrient Feasibility Study and  
Optimization Plan**

Pontiac, Illinois / Process Study &  
Design

**BNWRD West Plant Phosphorous  
Feasibility Study**

BNWRD / Process Study & Design

**LaSalle Long Term Control Plan**

LaSalle, Illinois / Process Study &  
Design

**Wastewater Treatment Plant**

Dwight, Illinois / Process Study &  
Design

**Wastewater Treatment Plant  
Improvements**

Forrest, Illinois / Process Study &  
Design

**North WWTP UV Disinfection  
Improvements**

Metamora, Illinois / Process Study &  
Design

**South Sewer Rehabilitation**

Metamora, Illinois / Sewer Design



**Brian Abrams, PE**  
**SENIOR PROJECT ENGINEER**

Mr. Abrams is serving in the Water and Wastewater Group and has 12 years of civil engineering experience. In his tenure with Farnsworth Group, Brian has been involved in several municipal wastewater process and projects and serves as the company expert in nutrient modeling projects. Prior to joining Farnsworth Group, Brian served in the public sector, as an engineer, for an agency of the State of Florida reviewing construction projects up to 500 acres in size and larger for issuance of environmental resource permits.

**EDUCATION /**

B.S., Civil Engineering, Purdue University, West Lafayette, Indiana  
M.S., Environmental Engineering Science, University of Florida, Gainesville, Florida

**REGISTRATION AND CERTIFICATIONS /**

Professional Engineer: Illinois, Colorado, Florida

**EXPERIENCE /**

**Southeast Wastewater Treatment Plant**

BNWRD / Process Study & Design

**Wastewater Treatment Plant**

Pekin, Illinois / Process Study & Design

**Long Term Control Plan CSO Improvements**

Pekin, Illinois / Study & Design

**Wastewater Facility Plan and CSO Improvements**

Fairbury, Illinois / Process Study & Design

**Nutrient Feasibility Study and Optimization Plan**

East Peoria, Illinois / Process Study & Design

**Nutrient Feasibility Study and Optimization Plan**

Pontiac, Illinois / Process Study & Design

**BNWRD West Plant Phosphorous Feasibility Study**

BNWRD / Process Study & Design

**Wastewater Treatment Facility Improvements**

La Junta, Colorado / Process Study & Design

**Wastewater Treatment Plant Upgrade**

Forrest, Illinois / Process Study & Design

**Harmony Ridge Lift Station**

Fort Collins, Colorado / Study & Design



**Richard N. Suhadolc, PE**  
**SENIOR ELECTRICAL ENGINEERING MANAGER**

**EDUCATION /**

B.S., Electrical Engineering University of Illinois, Urbana-Champaign, Illinois

**REGISTRATION AND CERTIFICATIONS /**

Professional Engineer: Illinois, Colorado, Indiana, Iowa, Michigan, Missouri, Texas, Wisconsin

Mr. Suhadolc has over 39 years of experience in the field of electrical engineering, 37 of those in consulting engineering. His projects have included power, lighting and communications systems. Furthermore, he has experience with large diesel generators, wind generators, power distribution and data transmission. His clients have included higher education, airports, medical facilities, municipal, drinking water utilities, reclamation water districts, the Department of Defense and industrial clients.

**EXPERIENCE /**

**Arc Flash Study Recommendations (WEST PLANT)**

BNWRD / Electrical Engineer

**New Sanitary Sewer System**

Lexington, Illinois / Electrical Engineer

**Wastewater Treatment Plant**

Pekin, Illinois / Electrical Engineer

**Sugar Creek CSO Improvements**

BNWRD / Electrical Engineer



**Michael H. Taylor**  
**SENIOR INTEGRATION MANAGER**

**EDUCATION /**

A.S., Electronics, Danville Area Community College

B.S., Electronics, Southern Illinois University

Mr. Taylor is a Senior Integration Manager providing system design, configuration, programming, training and documentation for water and wastewater facilities, power plants, food processing plants and other miscellaneous industrial applications.

**EXPERIENCE /**

**Danville Sanitary District**

Danville, Illinois / Control Systems Integrator

**West Wastewater Treatment Plant**

BNWRD / Control Systems Integrator

**Southeast Wastewater Treatment Plant**

BNWRD / Control Systems Integrator

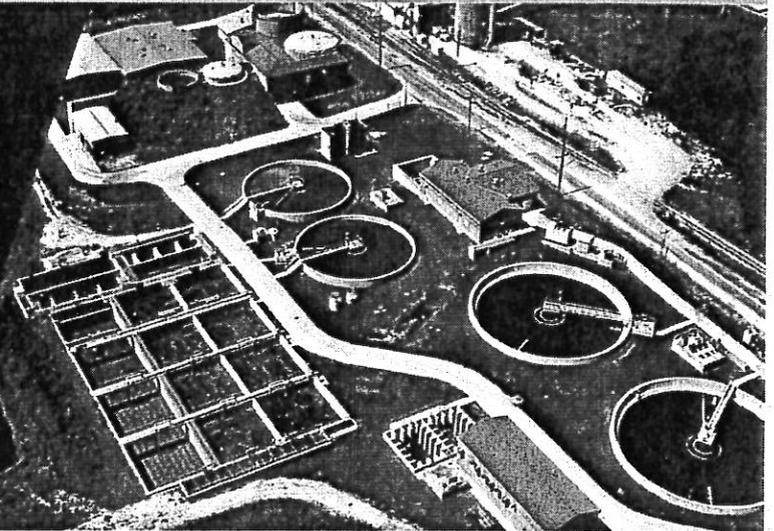
**Wastewater Treatment Plant**

Pekin, Illinois / Control Systems Integrator

# Related Experience

## Pekin Wastewater Treatment Plant & CSO Improvements

2017 APWA  
ILLINOIS  
CHAPTER  
PUBLIC  
WORKS  
PROJECT OF  
THE YEAR



Farnsworth Group staff have provided CSO and treatment plant engineering services to the City of Pekin since 1986. We recently worked with the City of Pekin to design improvements to their existing wastewater collection and treatment system. The scope of the project included: wastewater collection, pumping, storage and treatment systems evaluation; 20-year wastewater flow and loading projections; treatment systems improvement or replacement recommendation; treatment system alternative evaluation and recommendation; and development of construction cost estimates and schedule for the improvements. Also, funding assistance was initiated for the treatment system upgrade.

The City has two wastewater treatment plants, one (STP#1) which was used for wastewater treatment with a design average flow capacity of 4.5 million gallons per day (MGD) and a maximum flow capacity of 8.7 MGD. The second plant (STP#2) was used

for wastewater storage during periods of high wastewater flow.

The project included upgrading STP#1 to a design average flow of 6.84 MGD and maximum flow of 15.5 MGD. The project also included electrical distribution and controls upgrades and the addition of emergency power systems to supplement the existing systems.

### PHASE I

Phase I project improvements included: a new headworks facility elevated above the 100-year floodplain with influent Archimedes screw pumps and controls; automated fine screens with screening conveyance, compaction and washing; automated vortex grit traps with grit pumping, classification and washing; a new plant-wide non-potable water pumping station; a new effluent pump station, automated and VFD controlled for high river water level flood backflow protection; replacement of the digester gas management and

LOCATION /  
Pekin, IL

CLIENT /  
City of Pekin

COMPLETION /  
2016

COST /  
\$43M

STAFF /  
Patrik Sheridan

Steve Myers

Michael Lutz

Brian Abrams

Richard Suhadolc

Michael Taylor

SERVICES /  
Wastewater  
Treatment

Municipal

Electrical

Structural

Funding  
Assistance

Survey

Site Civil

Architecture

Mechanical

Plumbing  
Controls

Financial  
Planning

### CLIENT REFERENCE /

Mike Guerra  
111 S. Capitol Street  
Pekin, IL 61554  
309.478.5348

# Pekin Wastewater Treatment Plant & CSO Improvements

{continued}

safety system; replacement of the digester #2 gas mixing system with a mechanical mixing system and a new sludge boiler unit; site piping, site electrical distribution and emergency power; and controls. Construction was phased to maintain full process operation during construction and to adapt to the Phase II improvements.

## PHASE II

Phase II included new primary clarifiers and flow distribution; new activated sludge basins with ability for future biological phosphorous removal modifications; secondary clarifiers; RAS/WAS pumping and aeration blower facility; site civil improvements; site electrical improvements; and controls automation.

## NPDES PERMITTING

The future NPDES permit requirements for the City of Pekin STP#1 will include a limitation of the effluent concentration of phosphorus. As part of the design contract with the City of Pekin, Farnsworth Group completed a combined facility plan and biological nutrient reduction feasibility study. Our engineers developed a BioWin model for the wastewater treatment plant to assess the ability of the proposed treatment process to biologically remove phosphorus. The BioWin model uses twenty influent and one effluent parameters with the proposed STP#1 design to model biological nutrient removal. Some of the parameters were included in the plant's daily monitoring record. With the remaining parameters, we worked with plant operators to determine the best and most feasible location to take samples. We also

worked with laboratory personnel to determine the proper sampling methodology. The model used the proposed STP#1 layout, including primary and secondary clarifiers, secondary activated sludge basins and anaerobic and anoxic selectors. The main focus of the model was to strike a balance between the sizes of the secondary activated sludge basins and the anaerobic and anoxic selectors with recycle rates of returned active sludge and mixed liquor suspended solids to achieve a high level of phosphorus removal without degrading the plants ability to remove ammonia, biochemical oxygen demand and total suspended solids. The result of the model was a basis of design for biological phosphorus removal, which focused on the proper sizing of the secondary activated sludge basins and anaerobic and anoxic selectors, as well as determining a proper range for returned activated sludge and mixed liquor suspended solids rates. The model was also reassessed for potential future effluent nitrogen permit limitations. The basis of design built the foundation for reducing the size of the secondary activated sludge basin and reduced return activated sludge and mixed liquor suspended solids rates, saving the client money in construction costs and long term operating costs.

## CONTROLS

The plant processes were automated with controls, SCADA and operator interfaces to operate and maintain the plant with a minimal staff. Automation includes nine Allen-Bradley ControlLogix controllers, an Allen-Bradley Factory Talk ViewSE

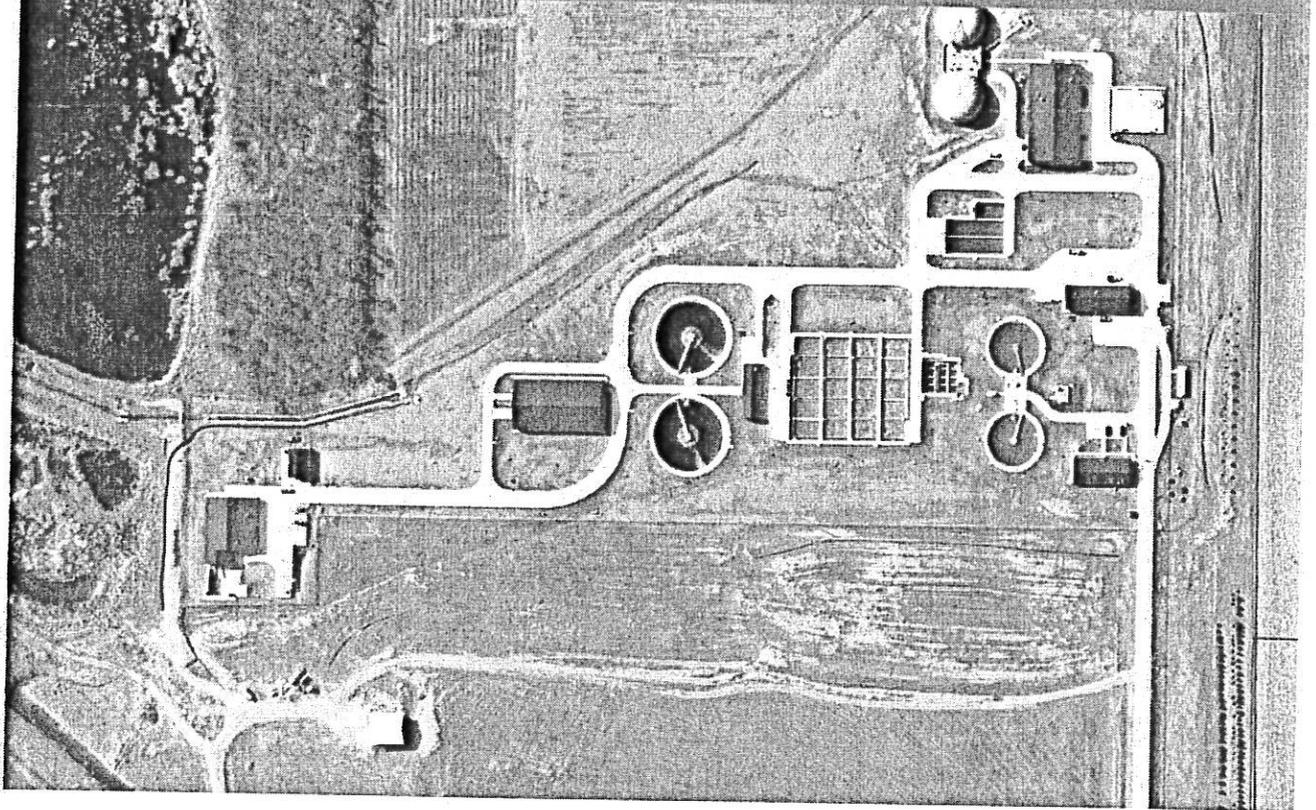
SCADA system, alarm notification with Specter Instruments WIN-911 software, eight Allen-Bradley PanelView 1000+ operator interfaces and Sytech XLReporter for logging and trending historical data and DMR reporting. The facility is connected with a high speed fiber Ethernet network. Telemetry to remote lift stations are by Ethernet radios.

## CSO IMPROVEMENTS

Farnsworth Group performed a comprehensive facility planning study and financial analysis for phased implementation of CSO improvements, including a CSO storage lagoon with a convertible excess flow overflow and disinfection detention; excess flow primary treatment and disinfection basins; CSO pump station; storage lagoon drain down pump station; excess flow drain down pump station; large diameter CSO interceptors; State Street CSO pump station and force main; interceptor junction structures at Caroline Street, Court Street, Fayette Avenue and STP #1; conversion of STP #2 to excess flow storage, including a storage lagoon; pump station and related site and site piping improvements.

A catenary bar and rake screen with screening conveyance and all associated controls was fitted ahead of the CSO propeller pump station for exterior location service with associated frost protective features. The screenings and pump station structure and dumpster load out facility required a very compact design and orientation to retrofit into the small available site area.

## BNWRD Southeast Wastewater Treatment Plant



Farnsworth Group provided complete engineering design for a new 8.5 MGD wastewater treatment plant. Portions of the residuals facilities were designed to serve an expansion of the plant to 17 MGD. The residuals facilities included sludge thickening, anaerobic digestion, sludge dewatering and dewatered sludge transport through a shaftless screw conveyor system to truck hauling facilities. The design also includes sludge pumping systems and polymer makeup and delivery systems.

The new facility is located approximately seven miles from BNWRD's main plant. During the design a study was conducted to determine the best alternative for ultimate residuals disposal. Two alternatives were analyzed,

including continuation of pad drying and mechanical indirect drying. An evaluation was also made to determine if the dewatered residuals should be dried at each plant or to combine the operation at one plant. The evaluation included many factors such as land available for disposal, market alternatives for sale of the dried residuals and capital costs of the equipment.

The District operates the new facility from the main plant, requiring minimal operational personnel at the new facility. In order to accomplish this the design included maximum automation of the facilities.

LOCATION /  
Bloomington, IL

CLIENT /  
Bloomington  
Normal Water  
Reclamation  
District

COMPLETION /  
Ongoing since  
2002

COST /  
\$40M

STAFF /  
Patrik Sheridan  
Steve Myers  
Michael Lutz  
Brian Abrams  
Richard Suhadolc  
Michael Taylor

SERVICES /  
Wastewater  
Treatment

Municipal  
Electrical  
Structural

Funding  
Assistance

Survey

Site Civil

Architecture

Mechanical

Plumbing

Controls

Financial  
Planning

# BNWRD Southeast Wastewater Treatment Plant

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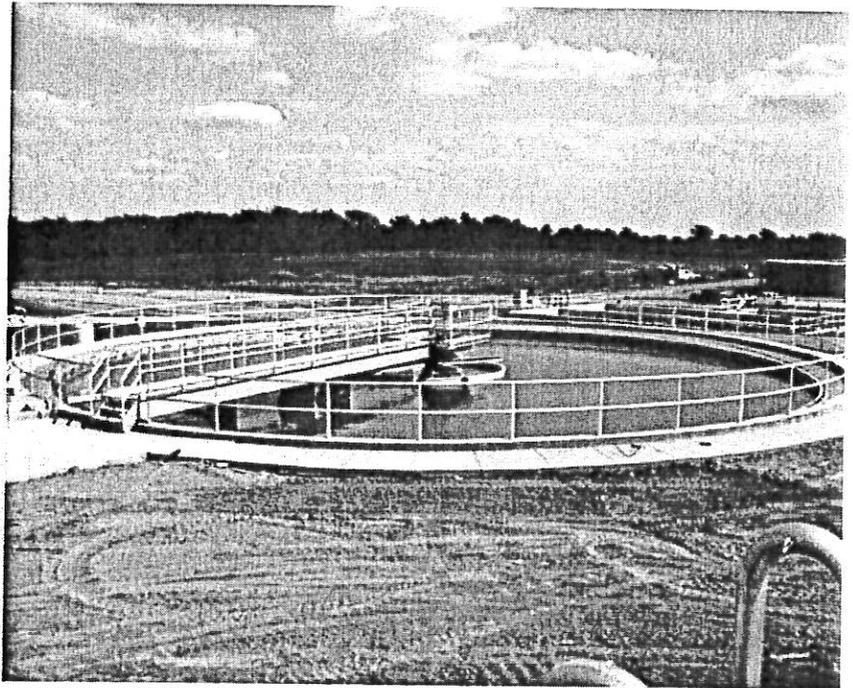
## NPDES PERMITTING

The BNWRD Southeast Wastewater Treatment Plant was designed with the capability of future nutrient removal processes; however, the design was contingent on unknown water quality standard/effluent limits at that time. Farnsworth Group is currently studying and performing a modeling analysis for the conversion to a Bio-P process limit of 1 mg/L with ability for future conversion to supplemental denitrification. The plant is already heavily automated and state-of-the-art, so the modeling is seeking minimal adjustments to adapt to the new effluent standards. The results will be presented in a combined facility plan and biological nutrient reduction feasibility study.

## INFLUENT HEADWORK UP-GRADES AND IMPROVEMENTS

Improvements included two, 16.875 MGD each, fine bar screens with automated conveyance and cleaning.

This project included new 10 mm perforated plated fine screens with dual speed motor screen transport; screen conveyance; screenings washing and dumpster load out; two 360 degree, vortex-style grit traps with a flooded suction grit pump station facility; screenings dewatering; and washing and dumpster load out. All associated controls and electrical were placed in a separate windowed room to avoid high-cost, Class 1/Div 1 electrical components in the main channel process area. The units were part of a new overall headworks structure, which also included pumps and metering.

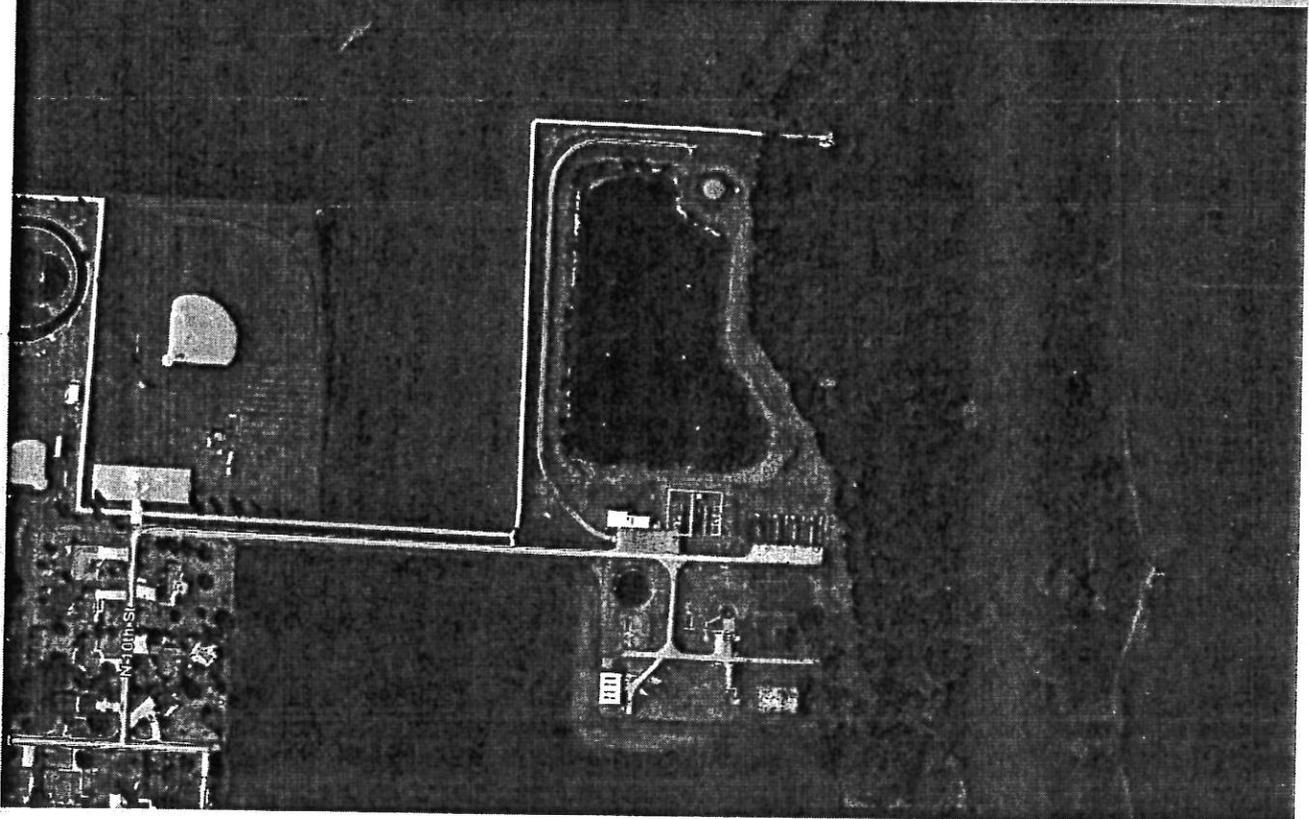


CLIENT REFERENCE /  
Randy Stein  
P. O. Box 3307  
Bloomington, IL 61702  
309.827.4396

“This repurposing or modification of some of BNWRD’s facilities has saved the Bloomington and Normal communities millions of taxpayer dollars.”

RANDY STEIN

## Fairbury Wastewater Facility Plan & CSO Improvements



Farnsworth Group was hired to complete a facility planning study and financial analysis for phased implementation of CSO improvements, including a CSO storage lagoon with an excess flow overflow and disinfection detention; excess flow primary treatment and disinfection; CSO pump station; storage lagoon drain down pump station; CSO interceptors, force mains and interceptor pump station; and related site civil improvements.

**CLIENT REFERENCE /**  
Brett Ashburn  
PO Box 228  
Fairbury, IL 61739  
815.692.2743

**LOCATION /**  
Fairbury, IL  
**CLIENT /**  
City of Fairbury

**COMPLETION /**  
Ongoing  
since 2014;  
Construction  
2018-2019

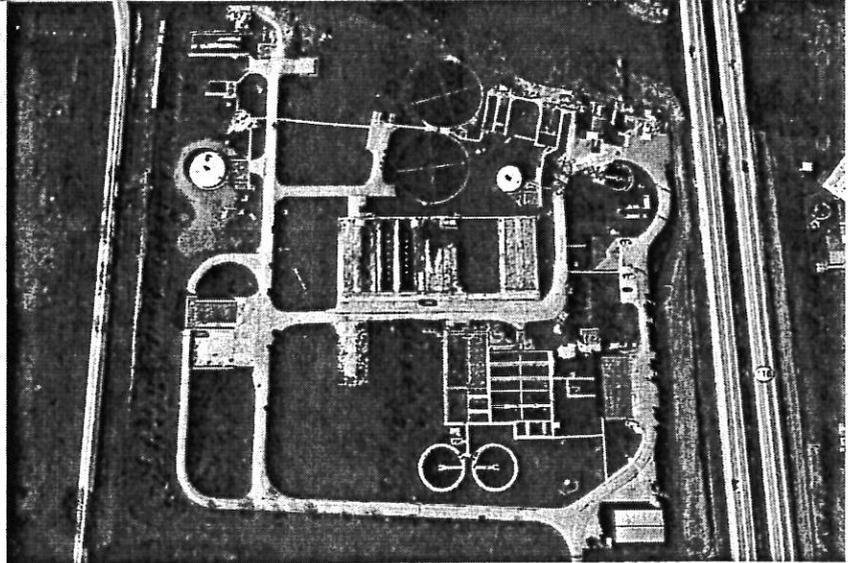
**COST /**  
\$202,000  
(Study Fee);  
Construction  
TBD

**STAFF /**  
Patrik Sheridan  
Steve Myers  
Michael Lutz  
Brian Abrams  
Richard Suhadolc  
Michael Taylor

**SERVICES /**  
Wastewater  
Treatment  
Planning  
Permitting  
Municipal  
Electrical  
Controls  
Financial  
Planning

## Pontiac Nutrient Feasibility Study and Optimization Plan

The City of Pontiac hired Farnsworth Group to create a Phosphorous Feasibility Study and Optimization Plan. The plan was undertaken to meet the requirements set forth in the Plant's NPDES permit. The City's wastewater treatment plant has not had a major upgrade since the 1980's and most of the equipment dates from that time period. Therefore, in conjunction with the improvements necessary for nutrient removal, additional plant upgrades were also incorporated. The existing plant has screening, aerated grit, primary clarification, trickling filters, activated sludge, secondary clarification, liquid chlorine disinfection and anaerobic sludge digestion.



The City collected influent samples for a variety of sample criteria. The sample results were used as inputs into a GPS-x process model. The model evaluated many alternatives to determine the best course of action for how to best achieve nutrient removal biologically. The improvements selected for plant design related to nutrients are: the elimination of the trickling filters, reconfiguration of the existing aeration basins, the addition of a secondary clarifier, the addition of tertiary filters to existing unused basins, repurposing of existing tanks for a two-stage fermenter and the addition of a small clarifier for chemical treatment of the dewatering underdrain flow.

There are also additional improvements to be made to the plant that are more "age of equipment related," than nutrient related, including: replacement of all of the sewage pumps and most

of the sludge pumps, replacement of a few of the aeration blowers with high efficiency units, digester improvements, conversion to vortex grit removal, bar screen replacement, CSO Storage improvements, a new storage building, the addition of mechanical thickening, replacement of the dewatering equipment and assorted electrical and SCADA improvements. Where at all possible, existing infrastructure was reused.

The aeration basin improvements include the reconfiguring of the basins with 4 anaerobic/anoxic selector zones, two full-size aeration basins and two half-size aeration basins. All of the basins will include supplemental mixing, in addition to aeration. The aeration system will be controlled via ammonia/nitrate probes for low DO operation.

### CLIENT REFERENCE /

Jacob Kinkade  
115 W. Howard Street  
Pontiac, IL 61764  
815.844.5574

LOCATION /  
Pontiac, IL

CLIENT /  
City of Pontiac

COMPLETION /  
Ongoing  
since 2016;  
Construction  
2019

COST /  
\$147,000  
(Study Fee);  
Construction  
TBD

STAFF /  
Patrik Sheridan

Steve Myers

Michael Lutz

Brian Abrams

Richard Suhadolc

Michael Taylor

SERVICES /  
Wastewater  
Treatment

Planning

Permitting

Municipal

Electrical

Controls

Financial  
Planning

## East Peoria Nutrient Feasibility Study and Optimization Plan



The City of East Peoria hired Farnsworth Group to create a Phosphorous Feasibility Study and Optimization Plan. The plan was undertaken to meet the requirements set forth in the City's NPDES permit for both WWTP #1 and WWTP #3. WWTP #1 has not had a major upgrade since the early 1990's and most of the equipment dates from that time period. WWTP #3 has not had a major upgrade since the plant was built in the 1970's and the equipment dates from then as well. Therefore, in conjunction with the improvements necessary for nutrient removal, additional plant upgrades were also incorporated.

The existing WWTP #1 has screening, vortex grit, primary clarification, activated sludge, secondary clarification, gas chlorine

disinfection and anaerobic sludge digestion. The existing WWTP #3 has screening, two activated sludge package plants with aerobic digestion and secondary clarifiers and gas chlorination disinfection.

The City collected influent samples for a variety of sample criteria at WWTP #1. The sample results were used as inputs into a GPS-x process model. The model evaluated many alternatives to determine the best course of action for how to best achieve nutrient removal biologically. The improvements selected for plant design related to nutrients are: elimination of 3 primary clarifiers, the reconfiguration of the existing aeration basins, the addition of a new aeration basin, the addition of two secondary clarifiers, the addition of a two-stage fermenter and the reconfiguration of an existing

LOCATION /  
East Peoria, IL

CLIENT /  
City of East  
Peoria

COMPLETION /  
Ongoing  
since 2011;  
Construction  
2019

COST /  
\$204,000  
(Study Fee);  
Construction  
TBD

STAFF /  
Patrik Sheridan

Steve Myers

Michael Lutz

Brian Abrams

Richard Suhadolc

Michael Taylor

SERVICES /  
Wastewater  
Treatment

Planning

Permitting

Municipal

Electrical

Controls

Financial

Planning

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## East Peoria Phosphorous Feasibility Study and Optimization Plan (continued)

secondary digester for chemical treatment of the dewatering underdrain flow.

There are also additional improvements to be made to the plant that are more "age of equipment related," than nutrient related, including: replacement of all of the sewage pumps and most of the sludge pumps, replacement of the aeration blowers with high efficiency units, digester improvements, vortex grit improvements, bar screen replacement, stormwater storage improvements, replacement of the dewatering equipment and assorted electrical and SCADA improvements. Where at all possible, existing infrastructure was reused. The existing WWTP #1 is confined to its existing land footprint.

WWTP #3 is a smaller facility, which is underutilized, but it is located where growth in the community is planned. Biological nutrient improvements are intended to occur when the plant is to be expanded for capacity reasons at a future phase. The more immediate concern is adding a pump station to correct the plant hydraulics, upgrading the screening, replacing the blowers, refurbishing the stormflow pond and adding sludge dewatering at the plant. Phosphorous removal will be via chemical means until the plant upgrade occurs.

The aeration basin improvements include the reconfiguring of the basins into 3 separate treatment trains with anaerobic/anoxic selector

zones and aeration zones. All of the basins will include supplemental mixing in addition to aeration. The aeration system will be controlled via ammonia/nitrate probes for low DO operation. Due to space constraints, primary clarification will be reduced to one existing clarifier with a high flow bypass. The existing clarifiers will be turned into aerobic digesters for the WAS. The primary sludge will be sent to the existing anaerobic digester. The sludge will not be combined and it will be pressed separately to eliminate a majority of the phosphorous from returning to the front end of the plant.

#### CLIENT REFERENCE /

Dennis Barron  
401 W. Washington St  
East Peoria, IL 61611  
309.698.4716

**"Our positive and long-standing relationship has led to the successful completion of numerous projects at each of our two active wastewater treatment plants"**

**JACKIE HARMANN**  
FORMER WASTEWATER  
DEPARTMENT SUPERVISOR

# OTHER SIMILAR PROJECTS

## VARIOUS SEWER PROJECTS, CRESTWOOD, ILLINOIS

**COST:** Varies by project

**CONTACT:** Bill Graffeo - 13840 S. Cicero Ave, Crestwood, Illinois, 60418 - 708.371.4800

### **Playfield Subdivision Sanitary Sewer and Water Main Planning Studies**

Farnsworth Group prepared a comprehensive planning study for the sanitary sewer and water main within the Playfield Subdivision, the oldest area of town, in accordance with the IEPA requirements for the Village to apply for state revolving loan financing for any improvements. This study evaluated the condition of the existing infrastructure and recommended options for rehabilitation and improvements. The study area included approximately 352 acres serving a current estimated population of approximately 2,184. For the sanitary sewer system, the evaluation included data gathered from the Inflow-Infiltration Study, smoke testing and manhole inspections. Recommended rehabilitations include point repairs for collapsed and sagging pipes, cured-in-place liner for cracked/leaking pipes and lining for manholes. For the water system, the evaluation included water loss accounting; break history; and material and age of the piping, hydrants and valves. In addition, a hydraulic water model was prepared of the Village's entire distribution system to assess weak spots in the system for capacity and pressure. The results of this model assisted in identifying and prioritizing improvement areas in the distribution system.

### **Village-Wide Inflow-Infiltration (I/I) Study**

Farnsworth Group is currently assisting the Village of Crestwood Public Works in performing a Comprehensive Assessment study (CAS) of high-priority areas in the Village in accordance with the MWRD I/I Control Program for all tributary municipalities. The goal of the program is to eliminate sanitary sewer overflows and basement backups through the Short- and Long-term programs. The CAS included smoke testing, manhole inspection, dye testing, flow monitoring, CCTV and cleaning of sewers in accordance with NASSCO standards.

### **East Playfield Sanitary Sewer Replacement**

Farnsworth Group is providing engineering services that include design, permitting, bidding and construction phase services for the replacement of an existing 15-inch sanitary sewer that was identified as part of the I/I study to be undersized and back sloped, which caused surcharging in the pipes and manholes upstream. Our design included performing hydraulic calculations to upsize the sewer pipe to a 24-inch with the existing slopes to provide sufficient capacity. Permitting and agency coordination included the IEPA and MWRD.

## WASTEWATER TREATMENT PLANT UPGRADE, LA JUNTA, COLORADO

**COST:** \$15.7M

**CONTACT:** Thomas Seaba - P.O. Box 489, La Junta, Colorado, 81050 - 719.384.7358

### **Existing WWTP Evaluation and Vulnerability Analysis**

The City of La Junta's wastewater treatment plant (WWTP) was oversized, aging and in need of significant upgrades. Several critical components of the WWTP were over 84 years old, and the newest was over 27 years old. Serious equipment and structural failures in recent years have emphasized the need to replace or upgrade the WWTP.

Farnsworth Group performed a comprehensive plant evaluation to determine areas needing improvement or replacement. Each process component was evaluated regarding its current condition, service life remaining, maintenance requirements, current code compliance and its suitability to meet proposed CDPHE Discharge Permit limits. The evaluation also included a vulnerability analysis to assess critical processes and plant components that posed a significant risk to human health or to the plant's ability to meet its permit limits in case an equipment or structure failure occurs. The evaluation concluded with recommendations for upgrades for replacement of the wastewater treatment plant components. A biosolids evaluation was prepared and incorporated into the plant upgrade.

### **Discharge Specific Variance**

Population decline and loss of a large industrial contributor have resulted in excess capacity at the plant. In addition, new effluent limits that the plant is not capable of meeting in its present configuration are slated to be implemented by the Colorado Department of Public Health and Environment (CDPHE) at the WWTP in the next discharge permit cycle. The City of La Junta experiences high levels of selenium in their ground water and wastewater due to geologic conditions. Our

team applied for a water quality Discharger Specific Variance for selenium on behalf of the City, which included a report and supporting the evaluation at the CDPHE Water Quality Control Commissioning hearing. After considering multiple factors, the Commission granted the variance. This was the fourth variance ever granted in the state of Colorado, and without it, the City of La Junta would not be able proceed with the design and construction of the upgrades.

### **Improvements Design**

Farnsworth Group provided engineering design for La Junta's new 0.85 MGD average and 4.13 MGD peak flow WWTP, and architectural building design services for four new buildings (Returned Activated Sludge (RAS) building, Grit Building, Headworks Building and UV Disinfection building).

The design included: influent headworks with mechanically cleaned bar screen, wet well equipped with three submersible sewage pumps with firm capacity of 4.13 MGD and flow metering; new forced-vortex-type grit removal structure new grit dewatering building; new three channel oxidation ditch aeration basin; two new final clarifiers; new UV-disinfection building; new RAS building with sludge transfer pumping and chemical feed equipment; new gravity thickener; and new aerobic sludge storage basin.

Additional work included the conversion of an existing aeration basin to aerated sludge storage and provision of a Supervisory Control and Data Acquisition (SCADA) system.

The project design and construction cost is estimated to be \$14,500,000 and is anticipated to be funded by a 20 year term low interest loan provided to the City through the Colorado State Revolving Fund program. Repayment of the loan is expected to be accomplished through sewer user charges and the City's existing reserve fund.

Our team also performed construction phase services including serving as the Owner's Representative for prequalification and selection assistance for contractors, construction contract administration and construction observation.

## **WASTEWATER TREATMENT PLANT EXPANSION, MAHOMET, ILLINOIS**

**COST:** \$12.5M

**CONTACT:** Sean Widener - P.O. Box 259, Mahomet, Illinois 61853 - 217.621.9094

Due to the Village's rapid growth over the past decade, the Village of Mahomet's wastewater treatment plant received influent flows in excess of its current design capacity. In order to continue to allow population growth and avoid the plant being placed on "restricted status" by the Illinois Environmental Protection Agency, the Village embarked on a major expansion project.

During the project's design phase, IEPA established "Total Maximum Daily Loads" (TMDL) for the Sangamon River stream segment downstream of the Mahomet treatment plant's discharge. The newly adopted TMDLs impose new discharge limits for phosphorus and nitrate-nitrogen on the expanded wastewater discharge, requiring the inclusion of nutrient removal technology, in addition to almost doubling the treatment capacity of the plant without increasing the footprint of the plant site.

The recommended and designed solution was the conversion of existing activated sludge tankage to a Biological Nutrient Removal (BNR) facility that utilizes Integrated Fixed Film Activated Sludge (IFAS) technology. In order to optimize treatment and achieve varying degree of TP and TN removals, the plant is provided with capability to operate in one of the following process configurations: A2O - Anaerobic, Anoxic and Oxidic Process; MLE - Modified Ludzack-Ettinger Process; VIP - Virginia Initiative Process; UCT - University of Cape Town Process; and MUCT - Modified University of Cape Town Process

By utilizing anaerobic, anoxic, aerobic with IFAS and conventional aerobic environments, the plant is capable of achieving all treatment goals, including nitrate-nitrogen and phosphorous TMDL limits for the foreseeable future, without constructing new tanks on an already constrained site. In fact, the IFAS technology allows this improvement without constructing new secondary treatment tanks.

These improvements enable the Village to meet IEPA requirements for the Sangamon River TMDL, improve the quality of the receiving stream and ensure that the Village can meet the planned wastewater treatment needs of the community for the next 20 years.

# Additional Information

## FARNSWORTH GROUP PROJECT APPROACH

- Fairbury WWTP LTCP and WWTP Improvements
- City of Pontiac WWTP Improvements and Nutrient Conversion
- City of East Peoria WWTP #3 Improvements, Future Expansion and Nutrient Conversion
- City of East Peoria WWTP #1 Improvements and Nutrient Conversion
- City of East Peoria Rte. 8 Pump Station and Improvements
- BNWRD SEWWTP Nutrient Conversion
- BNWRD Plant #3 Improvements and Nutrient Conversion
- BNWRD Plant #1 Improvements and Nutrient Conversion
- City of Pekin Plant #1 WWTP Improvements and Nutrient Conversion
- City of Pekin Plant #2 Conversion
- City of Pekin LTCP Improvements

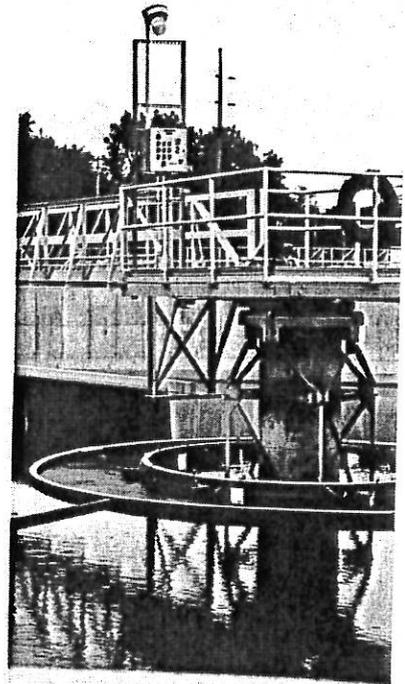
The above listed projects (at \$332M capitalization) reflect a sample of our recent regional wastewater improvements planning, design and construction work. Each is unique in size, community and site specific needs, and each is in a different stage of development. However, in retrospect we have found the general project approach for each to be essentially the same. We anticipate that approach to be efficient and suitable for the Village of Freeburg.

We do not use a "cookie cutter" or "off-the-shelf" approach for any project. We bring past experience and "lessons learned" features to each new design; however, each facility is unique and designed to site specific and operator defined needs and expectations. The facility first and foremost has to work consistently and effectively, meet operators' expectations, comply with IEPA criteria, serve the community for a long time and be as cost effective and viable within the design expectations and criteria.

We have substantial regional Illinois experience in partial and full wastewater treatment plant rehabilitation and/or upgrades and new reclamation facility construction. We are actively designing major repairs at facilities with local, experienced staff and proven design teams. We are on the leading edge on all regional trends and Biological Nutrient Removal design needs and facility adaptations.

We do wish to note our service profile (as illustrated in Section 3) and our objective with our clients focuses on a long-term relationship. We perform best when sharing the ideas at the beginning, through planning, funding, design, permitting, construction and thereafter. We are from Illinois, most of our experience is in Illinois and we are vested in our clients' success.

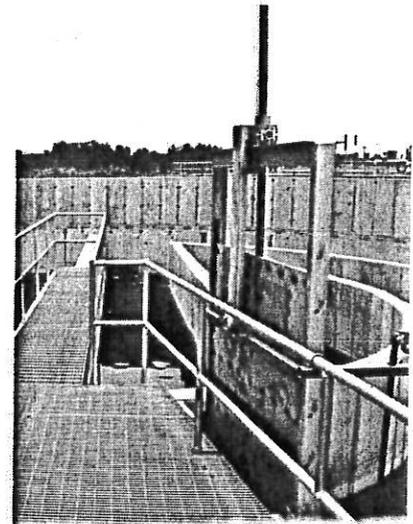
"Piece meal" projects are not as successful, as they can induce risk, conflict and ignore the "entire picture." By looking at the "entire picture," we integrate efficiencies and technical detail necessary for heavily interrelated wastewater



processes. We never suggest the "in one day-out the next" project approach and we firmly believe this offers huge advantages, efficiencies and long-term cost benefits that pass directly through to our clients. We, over time, adapt to your needs, and work for you.

The following basically outlines the fundamental approach "elements" used. There is much detail and background associated with each and we are available to discuss those, provide examples, wrestle the "why and what ifs" and trade options/ideas.

We look for heavy input by the client in each of these steps and we expect (and firmly request) direct input from operations staff. That input is vital for an effective infrastructure project.



## INITIAL ASSESSMENT

This stage takes the hard look at the existing facility infrastructure and the ability to meet the Village's needs today and into the future (i.e. determining the drivers).

- **Capacity**
- **Condition**
- **Nutrients** (the current knowns, the pending known unknowns and hedging for the future unknown unknowns)
- **Storm flow** (the peaks beyond DMF)

In each of our recent projects we are finding a combination of these factors in play to comprehensively address long-term needs. The primary driver is typically condition, with most facilities not having seen significant comprehensive improvements since the 70's or 80's. Although pending and real regulatory and NPDES permit changes are drawing attention to the need for facility improvements, they are concurrently surfacing more urgent imminent repair needs, despite good operational stewardship over the past 35 to 45 years or more. We do witness process infrastructure operated decades beyond initial planned design life.

Some communities are also seeing a reduced pace of growth and are able to take full advantage of reserve capacity within the existing infrastructure when coupled with some effective consideration to the storm peaking impacts, affording savings that can in part be redirected to other (regulatory driven) needs. Where applicable, nutrient design and operations requirements are allowing select reactor loadings above the current State conventional activated sludge criteria developed in the 70's, again creating opportunity for reserve capacity in existing secondary reactors.

# BASIS OF DESIGN

We prepare a comprehensive full-scale, process by process, calculated Basis of Design. No short cuts. Typically, this spreadsheet format includes both wastewater treatment and residuals processes.

This Basis of Design is the "real deal" and serves as the technical skeleton through design and final construction of the project. It is the identical document submitted to the IEPA for construction plan approval.

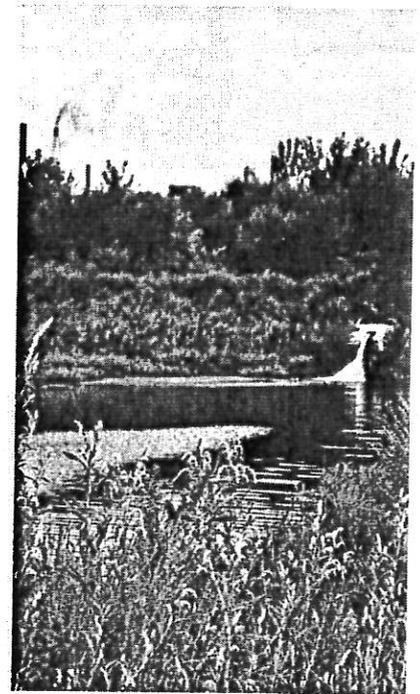
It is during this stage that we evaluate treatment process alternates, preferences, selections and what will work for the site and conditions. We start at the beginning and move through the end. Economics and cost are always a primary consideration, but we pay heavy attention to process effectiveness. Is it a reasonably operable and maintainable process? Is it out there and working? Is it proven to work? Will it be supported and maintainable into the future?

Using the combination of the client's operations staff, managers and our staff, this effort is, in essence, team driven with exceptional experience. The team focuses on best management practices and consensus for the course of action in the best long term interest of the Village.

The Basis of Design will provide for direct solutions and will be implementation driven. It will not be a summary and analysis of interim choices. A full review of options is included with respect to effective operations, simplification, current and projected standards and identified needs.

We have found, in all cases, clients preferring proven traditional processes. These processes are familiar and their operators are trained in these technologies. However, the processes are updated to current standards with improved modern equipment. Newer, proven innovations/adaptations to existing processes are also selectively considered to reduce operational hassles. We try to avoid flashy, attractive and newly marketed, but unproven, products.

We do maximize the re-use or re-purposing of existing tankage and infrastructure wherever possible and practicable. However, we avoid any workarounds or other complex adaptations to force a shoe to fit. If it works, the cost savings and operational familiarity/experience provide great benefits. However, forcing an old tank into the mix is rarely the best choice.



# NUTRIENTS

Nutrients in Illinois are an ever-changing flux of considerations. In general, for the larger wastewater treatment plants where future nutrient requirements are a 'pending' reality, we are designing for nutrient treatment. For smaller facilities where advancing nutrient standards remain less determinant, we are designing for the ability to adapt to those requirements in the future. However, we try to not utilize current infrastructure funding on an unknown target. The goal in every case is to be flexible and adaptable without being forced to tear down the entire process at some point in the foreseeable regulatory future.

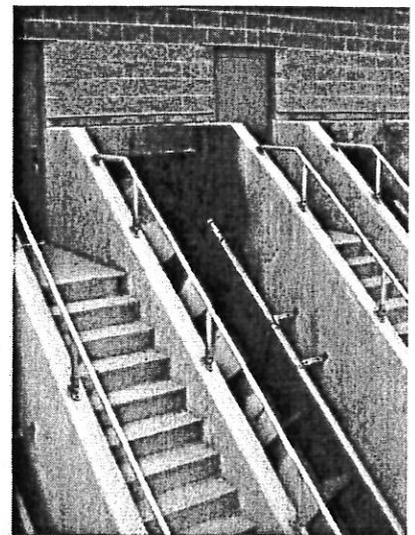
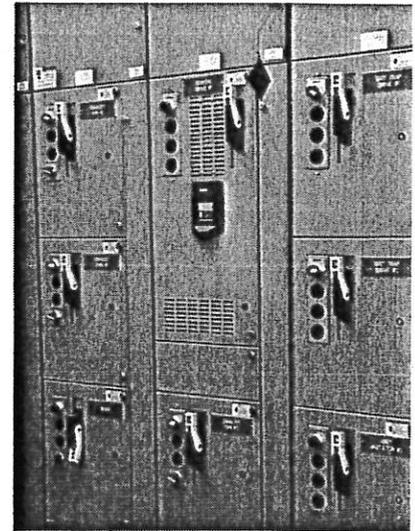
In terms of our nutrient design approach, we have designed the following:

- 10/12 mg/l BOD TSS achievable at the secondary clarifiers with tertiary processes acting as buffer
- TKN 10 mg/l
- Phosphorous 0.5 mg/l annual average

Furthermore, typical regional BNR process considerations include:

- Ability for modulated primary clarification and clarification bypass 25-75%
- Secondary Activated Sludge with process options for:
  - Anaerobic/Anoxic selectors
  - RAS fermentation/Anoxic selector
  - Low DO simultaneous nitrification/denitrification
- Increased aeration basin BOD loading (variance from IEPA design standard). Typically allows for reuse of existing basin tankage.
- Cascaded high efficiency aeration blowers with .5 to max 2.0 mg/l DO in basins (variation from IEPA Peaking standard). High energy savings are achievable.
- Ammonium, ORP and Nitrate basin modulation with DO monitoring only
- SCADA Process Control and Monitoring
- Room for future phosphorous co-precipitation with aluminates or as a current buffer

Computer modeling of the above is required. Our approach will look at a variety of projected potential operational impacts (seasonal temperature, high flow etc.) for the differing process options with a summary tabulated report for inclusion with the Basis of Design.



## STORM FLOW

We have sometimes incorporated storm flow mitigation into our wastewater improvement projects since 2006 with full support of the IEPA. For our recommended approach, chasing short duration high flow rate peaks with process equipment is (in our view) a non-option unless directed specifically by the client. Storm flows are far more cost effectively addressed (with substantial documentable water quality improvements) on a side stream storage (post storm treatment) volumetric basis.

We focus on the MG, which is manageable. The MGD is not. Where CSO infrastructure or permitted excess flow infrastructure exists, we are able to expand, amend and improve. Generally, based on site physical constraints we maximize possible storage with relief overflow above capacity.

Beyond that for long-term compliance requirements, we suggest monitoring and sampling actual relief overflow occurrences for concentration and volume and, where needed, for water quality impact determinations rather than frequency (4x per year) based determinations on random unpredictable storm events.

## OTHER CONSIDERATIONS

The core Basis of Design will address the treatment process' specific needs. There are other current "in vogue" process considerations stretching beyond the basic, which can include alternative energy recovery (solar, Co-gen, supplemental waste to Biogas generation, etc.), Phosphorous recovery and Class A Bio-solids, among others. We can include these in an adjunct to the Basis of Design (to not confuse with fundamental permit review items).

The final disposition of residuals sludges will also be addressed/formally defined in some fashion.

The result of this approach:

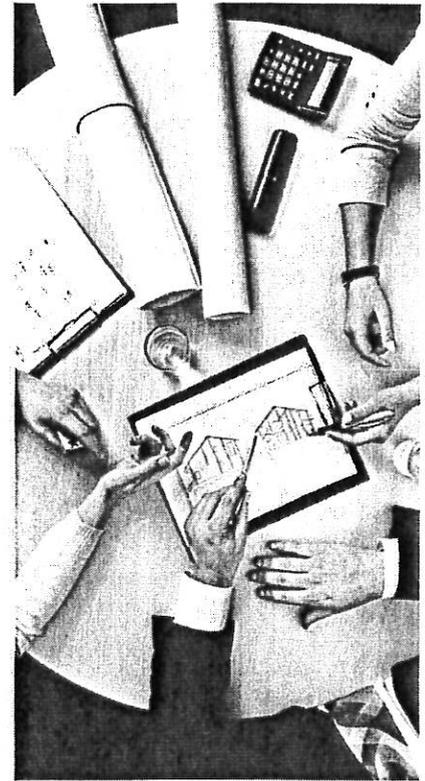
- Rather than submit a report with a range of complex process alternates subject to more discussion and choice with no defined formal design basis (varies with each alternative) - which then requires further work once decisions are made - we submit the determined formal design basis, evaluated and selected by you. This eliminates costly alternative iterations during preliminary design, locks in the planning strategy at the owner and agency level and allows for more accurate budget estimating without hedging for yet undetermined options or caveats.
- This approach is a more "up front" detailed comprehensive analysis and preliminary design requiring more time and effort than an options analysis. In our experience, the early resources spent on consensus driven decisions/solutions now are recovered when resolved long before full scale design, permitting and construction.

## PROJECT LAYOUT, HYDRAULIC PROFILE AND SCHEMATIC

A process schematic pictorially represents the Basis of Design determination and aids as a design and reference tool for the remainder of the project on into operations.

A preliminary hydraulic profile is necessary to confirm recommended processes will fit into the available hydraulic energy gradient. Where applicable (especially in older plants), flood protection may be required, including raising walls or tankage replacements as applicable/needed.

The project layout at this planning stage can be very basic, primarily depicting where the elements can/will exist on site and confirming there is available footprint.



# FINANCIAL PLAN AND IMPLEMENTATION SCHEDULE

We find this aspect of the approach the primary tool and most important for our managers, with operations staff heavily focused on the precursor technical details/needs determined previously.

Project Staging Factors considered:

- Construction of the improvements within the footprint of an existing active operating plant. Only select processes can be off-line and replacement processes must be constructed and in place before the next can be initiated.
- Owner priority needs (typically only severely deteriorated at-risk infrastructure).
- Bonding capacity of regional contractors and suppliers.
- IEPA Loan Funding Allocation limitations in any given year.
- User rate impacts.

This results in a necessary, phased multi-year, multi-project approach. Each construction block will carry a 1.5- to 2-year time frame, with some overlap as possible.

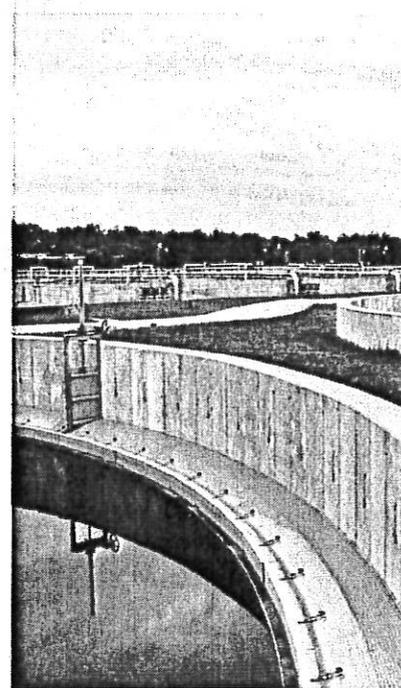
We often find that many years of client financial stewardship means little or no reserve capital retained, which would then require rate impacts. Therefore, phasing those necessary impacts over a reasonable time frame is a major owner consideration. The larger the community and user base, the rate impact can be less.

The referenced projects in Section 3 vary from a 3- to 10-year time frame, site and owner specific contingent.

Our approach provides a year by year financial cash flow model for the full term of the project financing. Project construction probable costs (by phase), contingencies, loans, operating expenses, etc. are assessed against existing rate based income and operations expenses. This is completed in a spreadsheet format. We will submit a 'clear form' for the client to enter/evaluate rate increases needed to retain a positive cash flow.

This financial model is mapped directly to the Basis of Design and IEPA financing criteria. It is the formal capitalization plan submitted to the IEPA with the planning report and remains the financial planning tool for the agency-funded project through completion. Our clients have used this same model for their needed rate structure revisions and as a financing capitalization tool after project completion for the term of the low interest loan.

Previous models we have utilized are exclusive to our clients. However, we can make an example available to present what one might look like. These have proven to be a very effective capitalization tool both for the Agency and clients on these projects.



# FINAL REPORT

The previous is bundled into a summary report with only necessary descriptive clarifications. This report, when Board/Trustees approved, becomes the IEPA Project Plan (Facility Plan) for IEPA Infrastructure Financial Planning (Loan Funding) submission. Depending on the client permit and project situation, the report serves as a combination of the following in a single document:

- Project Plan (IEPA Facility Plan)
- Nutrient Feasibility Study (NPDES Special Condition)
- Discharge Optimization Plan (NPDES Special Condition)
- Design Basis (IEPA Permitting)
- Financial Capitalization (IEPA Low Interest Loan)
- Scheduling
- Rate Structuring Guide

The bulk of our clients (those with an infrastructure condition driver), have submitted this report to the agency immediately at completion and approval; initiated rate structure revision at council level; and initiated full scale design (concurrent with the agency report review) in an effort to compress time lines and with consideration to exigent construction market conditions. That, of course, remains a client discretionary choice.

We do, irrespective of time lines or other, recommend a formal face to face meeting at the IEPA with the permitting and IFAS sections as soon as possible at the project report completion to partner with the agency on the pending work.

## SUMMARY RECOMMENDATION

For Freeburg, Illinois, we would recommend an update to the established facility plan as a "preliminary design," which will include the following:

1. Basis of Design update
2. Nutrient conversion to 0.5 mg/l Phosphorous with denitrification capability and future co-precipitation
3. Storm flow mitigation - possible side stream storm storage and load shifting among the two existing plants
4. Project layout, hydraulic profile and schematic
5. Financial plan and implementation schedule for rate analysis and Low Interest Loan requirements

With the preliminary design stage completed, first approved by the Village, and also then submitted to the agency's IFAS funding section for a planning amendment (along with necessary loan process pre-applications), full scale design would then be undertaken with Village approval.

All elements of the preliminary design would be included and used in the design contract documents and the loan financing process.



# HORNER SHIFRIN

THE POWERHOUSE AT UNION STATION • 401 S. 18TH ST., STE. 400 • SAINT LOUIS, MISSOURI 63103-2296  
314-531-4321 • FAX 844-339-2910 • www.HornerShifrin.com

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

July 27, 2018

Subject: Statement of Qualifications to Provide Professional Engineering Services – Wastewater System Improvements

Mr. Funderburg and Members of the Selection Committee:

Horner & Shifrin, Inc. is proud to submit our qualifications to the Village of Freeburg for engineering design of the new West WWTF with SBR technology and collection system engineering, including a hydraulic evaluation and asset management strategy for a CMOM Plan. This qualifications package will demonstrate our capabilities and expertise in providing engineering services for treatment plant design, as well as collection system evaluation and rehabilitation recommendations. Our team provides a staff of experts, with similar SBR treatment plant experience and extensive collection system expertise, strong relationships with IEPA permit and SRF project reviewers, and a unique understanding of the project having completed a previous Facility Plan for the Village. Our unique qualifications to provide these services include:

**PhD Process Engineer & Expert Staff**

The Horner & Shifrin team includes a PhD in chemical engineering and professional engineers with more than 20 years of experience. This expertise will allow for an independent evaluation of the manufacturer's design to verify their accuracy. Our team of experienced engineers also provides experts in collection system evaluation and rehabilitation. In addition to our staff, the team also includes ADS Environmental Services to complete CCTV, flow monitoring and other SSES inspections, as needed. Our team of experts will provide the Village with a holistic understanding of the collection system and wet weather operations.

**SBR Wastewater Treatment Plant and Collection System Design Experience**

Horner & Shifrin is currently working with the City of Mascoutah, Illinois on their SBR treatment plant design and has completed other similar designs for the City of Jerseyville, IL, Festus/Crystal City Sewage Commission, Rock Creek Sewer District, and Cape Girardeau County Reorganized Sewer District. In addition, we have worked with other nearby municipalities in Illinois to complete treatment plant and collection system designs and evaluations, including Columbia and Wood River.

**IEPA Permit and SRF Requirements**

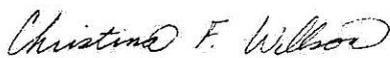
Horner & Shifrin fully understands the SRF and IEPA approval process and can assist the Village of Freeburg in meeting the deadlines associated with receiving funding for the improvements. We are currently working with the City of Mascoutah through the IEPA and SRF approval process and also worked through the process with the City of Jerseyville, Illinois for their wastewater treatment plant. We have assisted many other of our municipal clients through the SRF process and can successfully assist the Village of Freeburg with this effort.

**Freeburg Facility Plan**

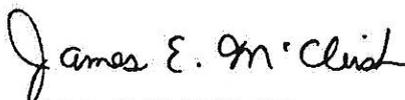
Horner & Shifrin completed the treatment plant evaluation for the 2009 Facility Plan for the Village of Freeburg, which provides a clear understanding of the existing conditions and will minimize start-up time for the design. Our team has visited the facility and comprehends the needed upgrades that will allow the Village to provide high quality services to its citizens well into the future.

We appreciate your consideration of our qualifications and welcome the opportunity to continue our successful relationship with the Village of Freeburg. Horner & Shifrin is confident that our team can continue our reputation of surpassing our clients' expectations. A review of our qualifications for this project will provide you with the confidence that our team can provide the expertise to meet the unique challenges of this project.

Sincerely,



Christina F. Willson, PE  
Project Manager, Water



James E. McCleish, PE  
Vice President, Water Practice Leader

1. FIRM INFO

**WHAT WE DO**

Education

Emergency

Government

Healthcare

Private

Utilities

**SERVICES**

**Building Structures**

Structural

Mechanical

Electrical

Plumbing

Fire Protection

HVAC

**Site Development**

Parks

Trails

**Transportation**

Bridge Design

Bridge Inspection

Roadway

Parking

Roundabouts

Streetscape

**Drinking Water**

Water Treatment

Conveyance

Pump Stations

**Wastewater**

Wastewater Treatment

Conveyance

Pump Stations

**Water Resources**

Flood Protection

Stormwater Management

**Geomatics**

Asset Management

GIS Mapping

LIDAR Scanning

Aerial Scanning & Mapping

**Land Survey**

Materials Testing

Construction Administration

Horner & Shifrin, Inc. is a multidisciplinary professional services firm with offices in St. Louis, O'Fallon and Poplar Bluff, Missouri, and Chicago and O'Fallon, Illinois, designated a small business by US SBA standards. With a staff of more than 100 engineers, technicians and support personnel, our firm has the experience and capability to serve a wide variety of clients in Missouri, Illinois and throughout the United States.

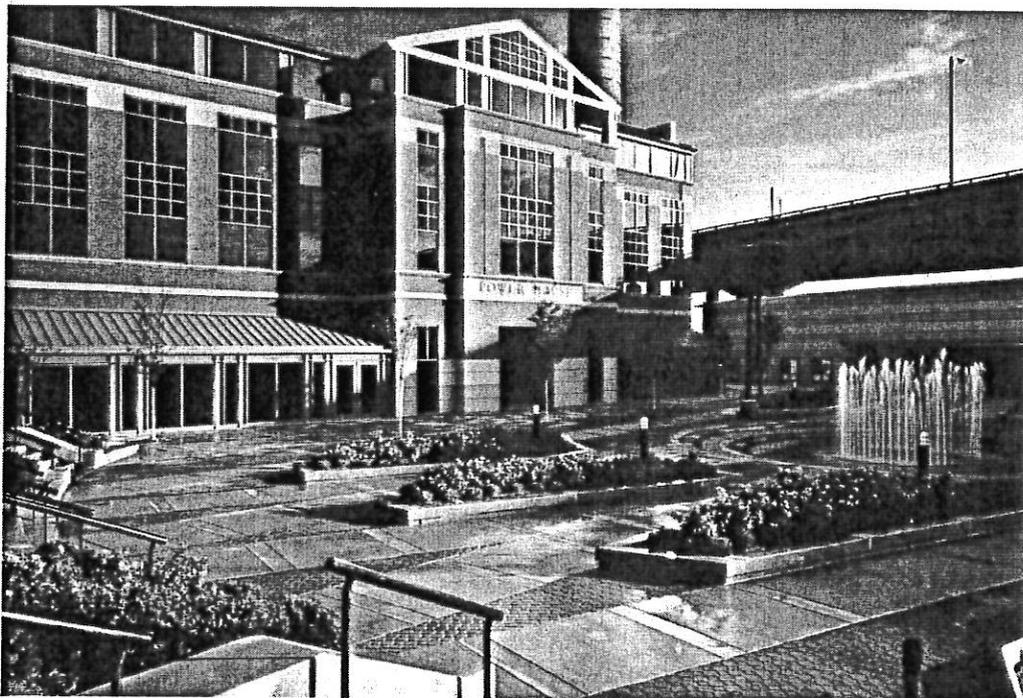
**Corporate Headquarters**

Horner & Shifrin, Inc.  
401 S. 18th Street, Ste. 400  
St. Louis, MO 63103  
(314) 531-4321

Founded in 1933 by W.W. Horner and H. Shifrin, the company has grown to be a multidisciplinary engineering firm with unusual versatility. We have expanded our services to meet our clients' continuously changing needs and to keep ahead of technological developments in the field of engineering.

We offer engineering services in all phases of a project, including design, feasibility, planning, development, GIS mapping services and construction administration. The firm has the in-house capability to execute projects of major scope. We are structured to ensure that our principals and senior personnel are directly involved with all projects, whether they are large or small. Many of our projects have demonstrated innovative techniques and designs, for which we have received numerous professional awards and repeat assignments from appreciative clients.

Horner & Shifrin is a 100-percent employee-owned corporation, managed by our officers and directors. We have no proprietary interest in any other corporation, firm, company or subsidiary or in any equipment or process. As employee-owners, we share a commitment to apply our expertise to the highest standards, exercising our knowledge and skills for the benefit of our community, clients and fellow employees.



**OUR CORPORATE VISION**

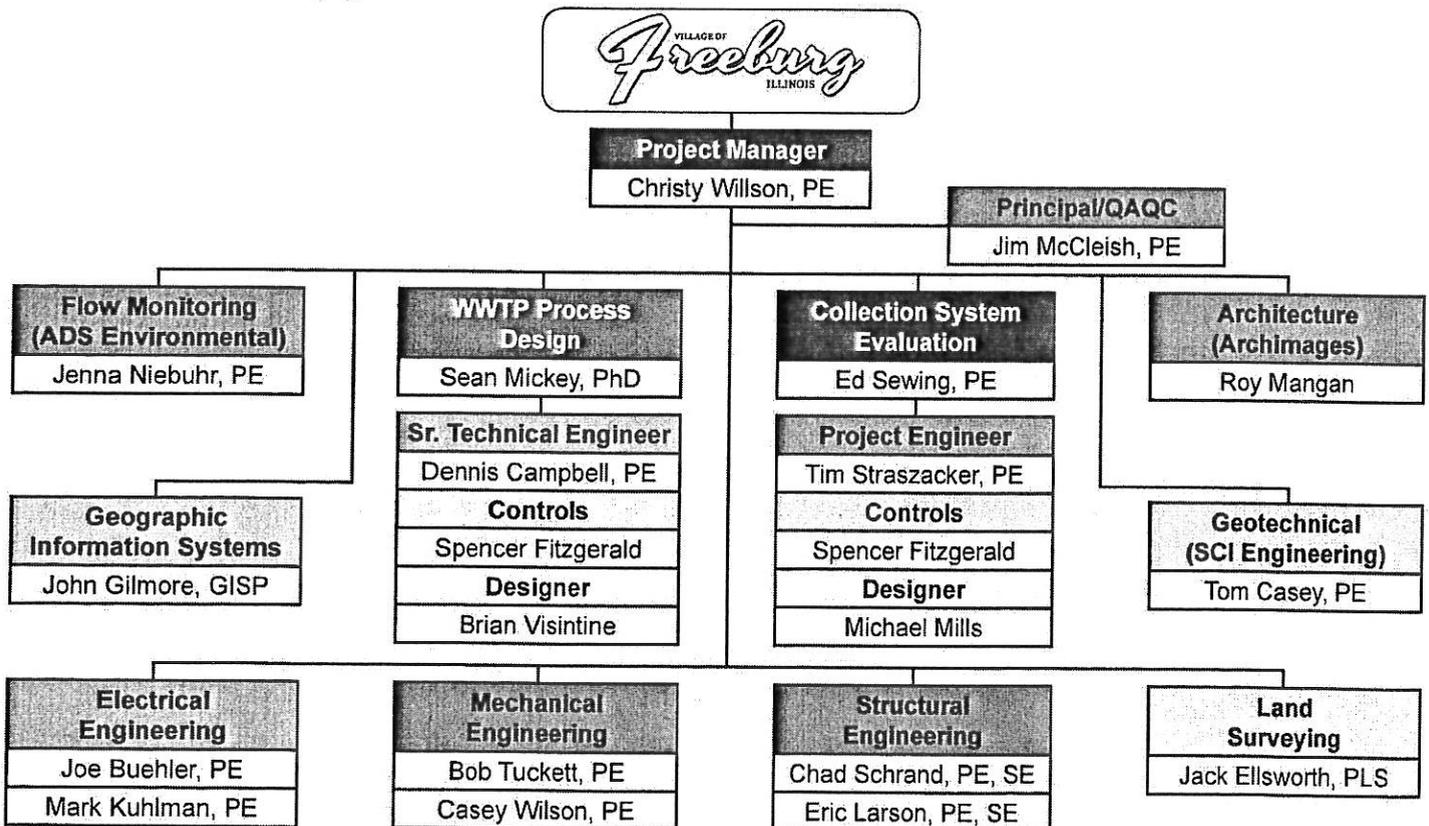
*To be the trusted provider of innovative solutions in the built environment by employing the best people and providing them with challenging projects and a work environment that fosters growth, innovation, and personal satisfaction.*

2. KEY PERSONNEL

The Horner & Shifrin team includes engineers that have completed multiple similar wastewater treatment plant designs, with experience of 20 years and more. Christy Willson will be the Project Manager for the improvements, a wastewater engineer who has experience with IEPA reviewers and is currently leading the design of the new wastewater plant for the City of Mascoutah. The wastewater treatment process design will be led by Sean Mickey, a PhD in chemical engineering. Sean's knowledge and expertise will allow him to complete an independent evaluation of the manufacturers' submittals to verify that all of the processes are accurately designed.

The collection system improvements will be led by Ed Sewing, a Project Manager with over 30 years of experience completing pump station and collection system improvements. Technical oversight and QA/QC will be provided by Jim McCleish, with over 28 years of experience in the design of treatment plants and pump station improvements.

Horner & Shifrin is a full service design firm that includes in-house surveying, electrical, structural and mechanical design staff. Having all of these disciplines with Horner & Shifrin's experience will improve coordination and result in efficient, cost-effective designs for the Village of Freeburg. In addition to our staff, the team will also include ADS Environmental Services to complete system inspections and obtain flow meter and rainfall data, as needed. SCI Engineering for geotechnical investigations, and ArchImages for architectural design. Horner & Shifrin has a long history of working with each firm. We understand that communication is a key factor in the success of any project and will draw on the relationships we have built with each firm to ensure the success of this project.



**CHRISTY WILLSON, PE****Project Manager, Water****Role: Project Manager**

*Christy Willson is a registered professional civil engineer with 20 years of experience in the water resources industry with a background in both the public and private sectors. Her knowledge includes hydraulic and hydrologic modeling, sanitary sewer design, storm sewer design, master plan development, and consent decree experience in wastewater, combined, and storm sewer collection systems.*

**EDUCATION**

BS, Civil Engineering,  
University of Missouri-  
Columbia, 1997

**REGISTRATIONS**

Professional Engineer,  
Missouri, Kentucky, Illinois

**PROFESSIONAL  
ACTIVITIES**

Water Environment Federation  
(WEF), Collection Systems  
Committee

Missouri Water Environment  
Association (MWEA)

**PUBLICATIONS**

Private Property Infiltration and  
Inflow Control – WEF Special  
Publication (reviewer)

**Wastewater Treatment Plant & Collection System Improvements | City of Mascoutah, IL**

Project Manager for design of new SBR wastewater treatment plant and collection system improvements. The new SBR treatment plant will include new screens, influent lift station, SBR treatment, tertiary filters, alum chemical feed for phosphorus removal, and a new control building. Improvements include replacement of three pump stations and North Terminal Lift Station odor control.

**Mascoutah Facility Plan Amendment | City of Mascoutah, IL**

Project Manager for the completion of a Facility Plan Amendment for the City of Mascoutah Illinois that included updates for a proposed new SBR treatment facility and improvements to 6 lift stations in the collection system and 3 lagoons. The amendment also included an analysis of additional secondary treatment options as well as process upgrades to meet potential future total phosphorus limits.

**Wastewater Facility Plan | City of Jackson, MO**

Senior Project Engineer for the development of the City of Jackson's Wastewater Facility Plan. The project included the comprehensive evaluation of the City's Collection system and treatment plant for existing, future, and wet weather flows.

**Cape Girardeau County Reorganized Common Sewer District**

Project Engineer in developing a centralized treatment facility and collection system to serve over 860 business and residential properties in Fruitland, Missouri. Duties included the design of 15 duplex pump stations, 7.8 miles of forcemain, approximately 20 miles of 8-12 inch diameter gravity sewer with multiple bored roadway crossings.

**JIM MCCLEISH, PE****Vice President | Practice Leader, Water****Role: Project Principal**

*Jim McCleish is an award winning project manager with 28 years of experience specializing in the study and design of municipal wastewater treatment plants, pump stations, collection systems improvements, and sludge management. He also has expertise in water treatment, distribution systems, storage tanks, and pumping facilities.*

**Wastewater Treatment Plant & Collection System Improvements | City of Mascoutah, IL**

Principal for design of new SBR wastewater treatment plant and collection system improvements. The new SBR treatment plant will include new screens, influent lift station, SBR treatment, tertiary filters, alum chemical feed for phosphorus removal, and a new control building. Improvements include replacement of three pump stations and North Terminal Lift Station odor control.

**Wastewater Treatment Plant Facilities Plan | Village of Freeburg, IL**

Project Principal for a facilities planning study for the City's wastewater treatment system involving two existing facilities. The project involves evaluating the two facilities and making recommendations for new wastewater treatment facilities for the 20-year planning period for the 14,000-acre Freeburg Facilities Planning Area.

**South Wastewater Treatment Plant Upgrade and Expansion | City of Jerseyville, IL**

Project Manager/Principal for facility plan, design and construction of improvements to South Wastewater Treatment Plant that included continuous-flow sequencing batch reactors (SBR), coarse and fine screens, tertiary filters, ultraviolet disinfection, chemical feed equipment, and conversion of an existing anaerobic digester to aerobic digester. This was the 1st project in Illinois to construct a deep bed sand filter for effluent polishing.

**EDUCATION**

MS, Environmental  
Engineering, Washington  
University, 1999

BS, Civil Engineering,  
University of Illinois,  
Champaign-Urbana, 1989

**REGISTRATIONS**

Professional Engineer,  
Missouri, Illinois

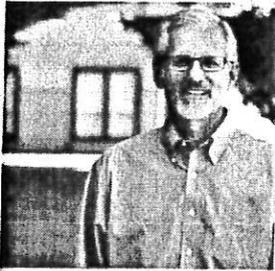
**PROFESSIONAL  
ACTIVITIES**

Member, American Council of  
Engineering Companies

Member, Water Environment  
Federation, IL & MO Sections

Past President, Missouri Water  
Environment Association

Member, American Water  
Works Association IL & MO  
Sections

**ED SEWING, PE****Senior Project Manager, Water****Role: Collection System Upgrades Lead**

*Ed Sewing is a project manager with over 30 years of experience in design and construction of sanitary sewer systems, pump stations, and I/I and SSES investigations for multiple municipal clients.*

**Wastewater Treatment Plant & Collection System Improvements | City of Mascoutah, IL**

Project Engineer for design of collection system improvements, which includes replacement the replacement of three pump stations and improvements to two additional pump stations. Three station with suction lift pumps will be replaced with submersible pumps. the wet well will be rehabilitated and reused and new controls and generators will be installed. Improvements to the two additional stations includes replacement of aging valves, a new generator, and odor control.

**GIS Mapping, Infiltration & Inflow Study and SSES | Rock Creek Public Sewer District**

Project Manager for comprehensive mapping and infiltration/inflow (I/I) investigation for the Rock Creek Public Sewer District sewer system consisting of approximately 4,000 manholes and 800,000 feet of sewers. Work included district-wide flow monitoring and evaluation program to prioritize areas for further field investigations, GPS location of existing structures and hosting of a web-based GIS system, manhole inspections, smoke testing, dye-water testing, and CCTV of sewers. This study analyzed infiltration and inflow into the system and evaluated recommended repairs or replacements to reduce both public and private I/I and restore the sewer system structural integrity.

**Wastewater Facility Plan | City of Jackson, MO**

Project Manager for the development of the City of Jackson's Wastewater Facility Plan. The project included the comprehensive evaluation of the City's Collection system and treatment plant for existing, future, and wet weather flows. The plan included an evaluation of inflow and infiltration in the the collection system along with a capacity evaluation. Improvements for capacity, operational, and maintenance issues were identified and prioritized into short-term and long-term schedules for implementation.

**EDUCATION**

BS, Civil Engineering,  
University of Missouri, Rolla,  
1984

**REGISTRATIONS**

Professional Engineer,  
Missouri, Illinois

**SEAN MICKEY, PhD****Senior Project Engineer, Water****Role: WWTP Process Design Lead**

*Sean Mickey has a PhD in Chemical Engineering and specializes in the areas of water and wastewater treatment system design. He also has experience with transmission and distribution, storage and pumping facilities and technology feasibility studies.*

**Wastewater Treatment Plant & Collection System Improvements | City of Mascoutah, IL**

Project Engineer for design of new SBR wastewater treatment plant and collection system improvements. The new SBR treatment plant will include new screens, influent lift station, SBR treatment, tertiary filters, alum chemical feed for phosphorus removal, and a new control building. Improvements include replacement of three pump stations and North Terminal Lift Station odor control.

**Mascoutah Facility Plan Amendment | City of Mascoutah, IL**

Project Engineer for the completion of a Facility Plan Amendment for the City of Mascoutah Illinois that included updates for a proposed new SBR treatment facility and improvements to 6 lift stations in the collection system and 3 lagoons. Provided a technical and economic analysis of additional secondary treatment options as well as process upgrades to meet potential future total phosphorus limits.

**Cape Girardeau County Reorganized Common Sewer District**

Project Engineer in the design of a new green field municipal WWTF for the start-up sewer district Cape Girardeau County Reorganized Common Sewer District to sewer the watershed of Hubble Creek north of Cape Girardeau and east of Jackson. The area has over 23 existing permitted sewer treatment facilities. Many of the facilities have problems due to required upgrades, aging infrastructure, and operational issues. In addition, the Fruitland area has many homes served by individual septic systems located on small lots with clay soils. Horner & Shifrin and Strickland Engineering provided a design for a two-phased approach to a new SBR treatment plant, including a terminal lift station, headworks screening, surface aerated digesters, and UV disinfection. Phase one included design up to an average flow of 450,000 gpd, and phase two included doubling flow up to 900,000 gpd.

**EDUCATION**

PhD, Chemical Engineering,  
Missouri University of Science  
and Technology, 2010

BS, Chemical Engineering,  
University of Kansas, 2005



**TIM STRASZACKER, PE**  
 Project Engineer, Water  
 Role: Collections Project Engineer

*Tim Straszacker's environmental engineering experience includes design and construction management work with stormwater, water mains, and sanitary sewers including sewer/manhole rehabilitation. Projects range from infiltration/inflow investigations to hydraulic model analysis of stormwater BMPs, sanitary sewer pumping systems, and water supply/distribution systems. Experience also includes extensive field work with stormwater investigations, hydrant testing, surveying, manhole inspections, smoke testing, and water main construction inspections.*

**EDUCATION**

BS, Civil Engineering,  
 University of Missouri,  
 Columbia, 2008

**REGISTRATIONS**

Professional Engineer:  
 Missouri, Illinois

**Relevant Projects:**

- Wastewater Treatment Plant & Collection Systems Improvements | City of Mascoutah, IL
- GIS Mapping, Infiltration & Inflow Study and SSES | Rock Creek Public Sewer District



**DENNIS CAMPBELL, PE**  
 Senior Project Manager, Water  
 Role: Sr. Technical Engineer

*Dennis Campbell has over 40 years of experience in the field of water and wastewater treatment, including process design, detailed design, sampling, industrial waste surveys, treatability, preparation of operation and maintenance manuals, treatment plant start-up, water conservation studies, land application of wastewater and cost estimates. He has been involved in the design and start-up of numerous municipal and industrial water and wastewater treatment facilities.*

**EDUCATION**

BS, Civil Engineering,  
 Missouri University  
 of Science and  
 Technology, Rolla,  
 1971

**REGISTRATIONS**

Professional Engineer:  
 Missouri, Illinois

**Relevant Projects:**

- Wastewater Treatment Plant Improvements | City of Jerseyville, IL
- Wastewater Treatment Facility | Columbia, IL
- New Regional Wastewater Facility | City of Sauget, IL



**SPENCER FITZGERALD**  
 Design Engineer, Water  
 Role: Controls

*Spencer Fitzgerald is an engineer with experience in wastewater aeration systems, chemical treatment process design, pumps, controls, on-site industrial pretreatment solutions, stormwater utility modeling, cost estimating, permitting, and performing project feasibility studies.*

**EDUCATION**

BS, Environmental  
 Engineering,  
 Marquette University

**Relevant Projects:**

- Screen and Blower Building | Northeast Public Sewer District
- Blower Upgrades | Mexico, MO
- Kerry Pretreatment | Kerry Foods
- Pump Stations | Cape Girardeau County Reorganized Common Sewer District



**JOE BUEHLER, PE, LEED GA**  
 Senior Project Manager, Building Services  
 Role: Electrical Engineer

*Joe Buehler is responsible for the preparation of cost estimates, system analysis, calculations, specifications, and design documents for studies, renovation, and new construction projects. His design experience includes electrical power and distribution, interior and exterior lighting, emergency power, fire alarm, security, public address, program bell, television systems, UPS systems, labs, computer rooms, power conditioning, and power studies.*

**EDUCATION**

BS, Electrical  
 Engineering, Missouri  
 University of Science  
 and Technology, Rolla,  
 1979

**REGISTRATIONS**

Professional Engineer:  
 Missouri, Illinois

**Relevant Projects:**

- Wastewater Treatment Plant & Collection Systems Improvements | City of Mascoutah, IL
- Cape Rock / Perryville Booster Pump Station | City of Cape Girardeau, MO
- LaSalle Booster Pump Station | City of Cape Girardeau, MO



**BOB TUCKETT, PE**  
Senior Project Engineer, Building Services  
Role: Mechanical Engineer

*Bob Tuckett has more than 40 years of experience specializing in HVAC, plumbing and fire protection systems planning and design. As a project manager, Bob coordinates with all engineering disciplines, ensuring that evolving designs meet project requirements, deadlines, budgets and quality standards. He is also often responsible for execution of quality control reviews of mechanical system designs for all Horner & Shifrin projects at appropriate intervals. He works directly with the Manager of Building Design Services to ensure that project costs and schedule adherence are considered during the design process.*

**EDUCATION**

BS, Mechanical Engineering,  
Washington University,  
1972

**REGISTRATIONS**

Professional Engineer:  
Missouri, Illinois,  
California

**Relevant Projects:**

- UV Disinfection System | City of Hannibal, MO
- Wastewater Treatment Plant Improvements | City of Jerseyville, IL



**CHAD SCHRAND, PE, SE**  
Practice Leader, Structural Building  
Role: Structural Engineer

*Chad Schrand has more than 14 years of experience in structural engineering with, a focus on investigations into building distress and structural failure, building envelope evaluations, evaluating compliance with building codes, and seismic analysis and design. Additionally, he has significant experience completing building condition assessments, evaluating construction defects, design for new buildings and renovation of existing structures, and completing risk assessments to determine probable loss from earthquakes or extreme weather events. He has experience with steel, concrete, wood, and masonry in commercial construction.*

**EDUCATION**

MS, Civil Engineering,  
University of Illinois  
Urbana-Champaign

**REGISTRATIONS**

Professional Engineer:  
Missouri, Arkansas  
Structural Engineer: IL

**Relevant Projects:**

- Wastewater Treatment Plant & Collection Systems Improvements | City of Mascoutah, IL
- Plant #1 Rehab & Improvements | Cape Girardeau, MO



**JACK ELLSWORTH, PLS**  
Professional Land Surveyor  
Role: Surveyor

*Jack Ellsworth has 43 years of surveying experience. He is licensed in Illinois and a member of the Illinois Professional Land Surveyor's Association. As a Professional Land Surveyor, Jack has provided surveying services for boundary, topographic, subdivisions, ALTA/ASCM land title surveys and construction layout for public and private site layouts. He is experienced with robotic total stations and GPS applications as well as CAD.*

**EDUCATION**

AAS, Drafting  
Technologies,  
Kaskaskia College,  
1974

**REGISTRATIONS**

Professional Land  
Surveyor: Illinois

**Relevant Projects:**

- Vogel Road Sewer Replacement | Rock Creek Public Sewer District
- Ghent Road Water Main Replacement | Columbia, IL
- Wastewater Treatment Plant & Collection Systems Improvements | City of Mascoutah, IL



**JOHN GILMORE, GISP**  
Senior GIS Professional  
Role: GIS Lead

*John Gilmore has 20 years of experience in GIS, CAD, and surveying for a wide variety of projects including building additions, bridges and tunnels, roadway improvements, water and wastewater treatment facilities, water mains, and storm and sanitary sewer systems. As Senior GIS/IT Professional, John is responsible for development of GIS Systems, maintaining the firm's CAD standards, geographic conversions between GIS/CAD/Surveying, software and hardware installation of computer systems, and IT support.*

**EDUCATION**

BS, Geography,  
Geographic  
Information  
Systems, Southern  
Illinois University  
Edwardsville, 2013

**Relevant Projects:**

- Mapping, I&I, and SSES | Rock Creek Public Sewer District
- Mapping, I&I, and SSES | City of Mexico, MO
- Mapping, Flow Monitoring and I&I Study | City of St. Genevieve, MO



**ROY MANGAN**  
 Project Manager  
 Project Role: Architect



*Roy Mangan has over 26 years of architectural experience with an emphasis on project management. Mr. Mangan's expertise lies in the areas of the construction, detailing, and technical aspects of construction, giving him a comprehensive understanding of the built environment. As Archimages Project Manager, Mr. Mangan will be responsible for production aspects of the project. He will assist H&S's Project Manager throughout the design, construction documentation, and administration process of the project.*

**EDUCATION**

Bachelor of Architecture:  
 University of Kansas

**REGISTRATION**

Registered Architect:  
 Missouri

**Relevant Projects:**

- Wastewater Treatment Plant & Collection Systems Improvements | City of Mascoutah, IL
- Wastewater Treatment Plant | Mexico, MO
- District Office Building | Rock Creek Public Sewer District
- New Pump House & Screening Building Renovations | Northeast Public Sewer District



**JENNA NIEBUHR, PE**  
 Project Manager  
 Role: Flow Monitoring Investigator



*Jenna Niebuhr is a quality driven professional with more than 15 years of experience providing technical, strategic and operational leadership. An expert in large scale temporary and permanent flow monitoring, including reconnaissance, installation, inspections, data analysis and finalization.*

**EDUCATION**

BS, Civil Engineering,  
 University of Missouri  
 - Rolla

**REGISTRATIONS**

Professional Engineer:  
 Missouri

LEED AP Accredited

*Her past experience includes Principal Engineer for St. Louis MSD, where she was responsible for all aspects of the \$2M annual flow monitoring program. This included defining and implementing processes to meet deliverable objectives of 200-400 meter sites annually. Ms. Niebuhr managed the workload and provided support and direction for 6 professional staff and 14 field staff. Ms. Niebuhr was a Project Manager for a private inflow and infiltration reduction (PIR) program with over 10,000 properties in 8 study areas for St. Louis MSD and was responsible for the coordination of multiple engineering firms with more than 30 team members.*



**JULIE MILLER, PE**  
 Senior Geotechnical Engineer  
 Role: Geotechnical Engineer



*Julie Miller has more than 17 years of geotechnical engineering experience. Julie's responsibilities include project management, engineering analyses, and preparation of reports and proposals for transportation, education, commercial and residential projects. Typically these projects include foundation deep and shallow foundation design, settlement analyses, seismic recommendations, liquefaction analyses, and pavement design. As a project manager, she reviews geotechnical reports and analyses, provides reviews of project plans and specifications, attends project meetings, and provides technical support.*

**EDUCATION**

MS, Geotechnical Engineering,  
 University of Missouri  
 Rolla, 2000

**REGISTRATIONS**

Professional Engineer:  
 Missouri, Illinois,  
 Louisiana

**Relevant Projects:**

- Wastewater Treatment Facility Improvements | City of Mascoutah, Illinois
- Wastewater Treatment Plant | City of Troy, Missouri

## SUBCONSULTANT INFO

### ADS Environmental Services | Flow Monitoring

ADS Environmental Services offers comprehensive, innovative flow information, from real-time flow data to temporary flow monitoring reports. ADS also offers level monitoring to provide early warning of preventable blockages - preventing overflows and optimizing sewer cleaning. They provide a full range of high quality SSES field investigations, including manhole inspections, CCTV, and smoke testing.



### *Horner & Shifrin's Experience with ADS Environmental Services*

- Wastewater Treatment Plant & Collection Systems Improvements | City of Mascoutah, IL – 2018
- CSO & Interceptor Outfall, Sewer Inspection | Metropolitan St. Louis Sewer District – 2017
- Dye Water Flooding & CCTV | City of Bonne Terre, MO – 2012
- CCTV | City of Mexico, MO – 2009
- Black Creek Sanitary Relief CCTV | Metropolitan St. Louis Sewer District – 2003
- Facility Plan, Flow Monitoring | City of Jackson, MO – 1998

### SCI Engineering | Geotechnical Investigation

SCI Engineering is a multi-disciplinary firm offering geotechnical and construction services. For more than 40 years, their staff have provided consulting services with quality, professionalism, and responsiveness to clients during the development, design, and construction phases of projects. The company's success is attributed to our team of highly skilled and experienced staff that includes geotechnical engineers, geologists, archaeologists, earth scientists, construction experts, and engineering technicians.



### *Horner & Shifrin's Experience with SCI Engineering*

- WWTP Improvements | City of Mascoutah, IL – 2018
- North KC Rail Yard Storm Sewer and Pump Station Design | Norfolk Southern – 2012
- PTB 173-31 Work Order 6 | IDOT – 2017
- PTB 173-31 Work Order 4 | IDOT – 2016

### Archimages | Architect

Since early 1988, Archimages has focused on providing design excellence utilizing a service oriented approach. Their family of dedicated architects and interior designers share a common passion for the natural and built environments and strive to consistently reach outcomes benefiting both. They have perfected the art of asking the right questions, listening, and then responding with expert guidance that allows our clientele to transform their vision into reality.



### *Horner & Shifrin's Experience with Archimages*

- Wastewater Treatment Plant & Collection Systems Improvements | City of Mascoutah, IL – 2018
- Industrial Wastewater Pretreatment System | Kerry Foods – 2018
- New Water Treatment Plant | City of Crystal City, MO – 2013
- Wastewater Treatment Plant Improvements | City of Mexico, MO – 2008
- New Administration Building | Rock Creek Public Sewer District – 2011
- Memorial Hospital Renovations | Belleville, IL – 2018
- Sullivan Armory Renovations | Illinois Capital Development Board – 2014
- New Fire Department Headquarters | City of O'Fallon, IL – 2014

3. RELATED PROJECT EXPERIENCE

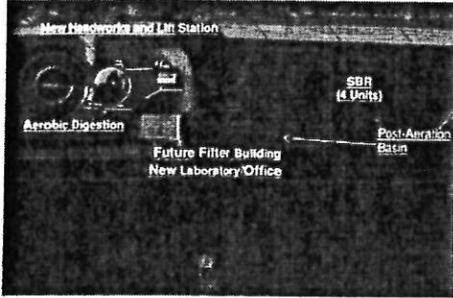
Horner & Shifrin has extensive experience working with municipalities in Illinois, including the cities of Columbia, Jerseyville, Wood River, Mascoutah and Freeburg. In addition, we have completed multiple successful wastewater treatment plant designs and pump station improvements for Jerseyville and Columbia in Illinois and Festus/Crystal City, Rock Creek, Cape County Reorganized Sewer District, and Jackson in Missouri. Our team also provides experience working with IEPA to achieve plan approval and construction permits for several projects. Horner and Shifrin also provides a wealth of experience utilizing a variety of technologies that is independent of any specific vendor. We will draw on our depth of experience to identify equipment options that will result in a cost-effective design that meets regulatory requirements while considering operational and maintenance demands on City staff for current and future flow conditions. Our experience on similar projects is summarized below and in detail on the following pages.

RELATED PROJECT EXPERIENCE

PROJECT COMPONENT MATRIX

Agency/Location	Facility/Project	SBR Technology	Pump Station / Collection System	Wet Weather Flow Treatment	Grit Removal	Screens	Biological Treatment	RAS/WAS Pumping System	Secondary Clarification	Tertiary Treatment	Sludge Handling Process	I/I Investigation	Sewer Inspection	Sewer Rehabilitation
<b>Horner &amp; Shifrin Projects</b>														
City of Jerseyville, IL	Wastewater Treatment Plant	●	●	●	●	●	●	●	●	●	●			
Rock Creek Public Sewer District	Sewer System Facility Plan & UV Disinfection	●	●	●	●	●	●	●	●	●	●			
Cape Girardeau County Sewer District	Wastewater Treatment Plant & Pump Stations	●	●	●		●			●	●	●			
City of Mascoutah, IL	Wastewater Treatment Plant & Collection System Improvements	●	●	●		●	●	●	●	●	●			
Village of Freeburg, IL	Wastewater Facility Planning Study		●	●	●	●	●		●		●			
City of Columbia, IL	Wastewater Treatment Plant Expansion		●	●			●							
Festus/Crystal City, MO	Wastewater Treatment Plant Replacement Design	●	●	●	●	●	●	●	●		●			
City of Wood River, IL	CSO Long Term Control Plan		●	●										
City of Jackson, MO	Wastewater Treatment Plant UV		●	●							●	●		
City of Hillsboro, MO	Wastewater Treatment Plant North Upgrade		●	●	●	●	●	●			●			
Menard Correction Center, Illinois CDB	Emergency Sewer Bar Screen Replacement					●								
City of Jackson, MO	Wastewater Treatment Plant Facility Plan		●	●	●	●	●	●	●	●	●	●		
City of Mexico, MO	Wastewater Treatment Plant Phase I Improvements		●	●	●	●	●	●	●	●	●			
City of Farmington, MO	East Wastewater Treatment Plant			●	●	●	●	●	●	●	●			
Northeast Public Sewer District	Influent Screen and Blower Building Study / Design					●	●							
Northeast Public Sewer District	Saline Creek Regional WWTF Upgrades			●		●	●	●	●	●	●			
City of O'Fallon, MO	West Lift Station		●											
Cloud 9 Ranch Club	Wastewater Treatment Facility Design		●											
Rock Creek Public Sewer District	Sewer System Evaluation Study											●	●	●
City of Ste. Genevieve, MO	Mapping, I/I, SSES and Sewer Rehabilitation											●	●	●
City of Mexico, MO	Sewer System Evaluation Survey, I/I & Mapping											●	●	●

WASTEWATER TREATMENT PLANT & COLLECTION SYSTEM IMPROVEMENTS



**PROJECT OWNER**

City of Mascoutah, Illinois

**COMPLETION DATE**

2020 (estimated)

**DESIGN COST**

\$1,898,000 (estimated)

**CONSTRUCTION COST**

\$13,500,000 (estimated)

**REFERENCE**

Tom Quirk  
City Engineer  
3 W. Main Street  
Mascoutah, IL 62258  
(618) 566-2964

**PROJECT STAFF**

Christy Willson  
Sean Mickey  
Jim McCleish  
Dennis Campbell  
Ed Sewing  
Tim Straszacker  
Brian Visintine  
Michael Mills

Horner & Shifrin is completing the design for the new SBR wastewater treatment plant and collection system improvements for the City of Mascoutah, Illinois. Our team previously completed a Facility Plan in 2016 and was submitted to IEPA for approval. The planning effort recommended the construction of a new SBR wastewater treatment plant with an average daily flow of 1.75 MGD and peak daily flow of 5.25 MGD. The existing mechanical aeration plant has been upgraded and expanded in the past and is nearing the useful life of its equipment. Growth in the past decade, the projected growth trend for the next 20 years, and an expectation of new effluent limits resulted in the recommendation that Mascoutah build a new plant. H&S evaluated sequencing batch reactor (SBR) technology and Aero-Mod technology for the new facility. The new plant will allow the City to meet its future treatment obligations.

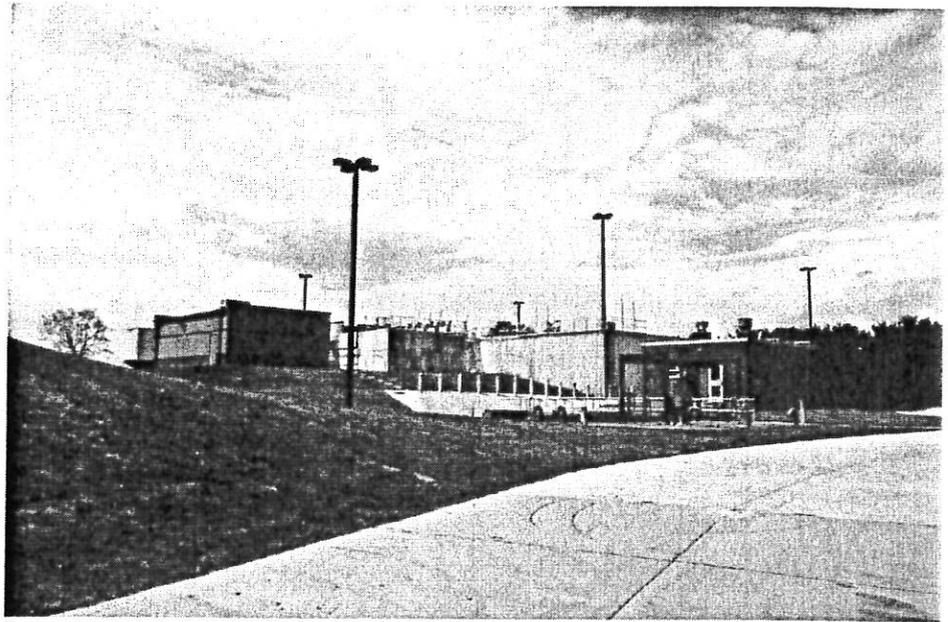
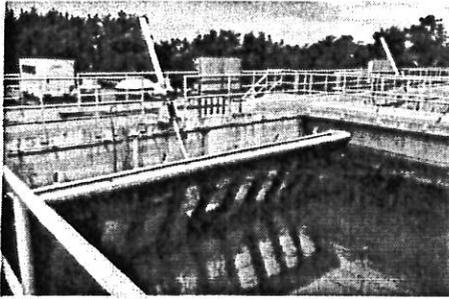
Three suction lift pump stations have reached the end of their useful life and are being upgraded to improve reliability and decrease maintenance costs. The three stations will be replaced with submersible pumps, rehabilitation to the existing wet wells, as required and replacement of existing generators. Horner & Shifrin is currently evaluating several pump stations for improvements to be added to the facility plan. The North Terminal Lift Station has an odor problem and odor control options are being evaluated. Replacement of existing suction pump with submersible pumps are being incorporated into the facility plan.

The new SBR treatment plant will include new screens, influent lift station, SBR treatment, tertiary filters, alum chemical feed for phosphorus removal, and a new control building. The existing clarifier will be rehabilitated and modified for aerobic digestion. Horner & Shifrin will also plan space for UV disinfection to be added in the future to meet changing regulatory requirements.

City stakeholders, including the City Engineer, Public Works Coordinator, and treatment plant Operator are involved the equipment selection. Workshops are being held with stakeholders and include vendor presentations to allow the City to select the equipment for the design that will meet their needs and result in easy maintenance for years into the future.

### 3. RELATED PROJECT EXPERIENCE

#### WASTEWATER TREATMENT PLANT



#### PROJECT OWNER

City of Jerseyville, Illinois

#### COMPLETION DATE

2014

#### DESIGN COST

\$868,800

#### CONSTRUCTION COST

\$18,300,000 (estimated)

#### REFERENCE

Jim Meszaros  
Wastewater Treatment Plant  
Superintendent  
21965 Maple Summit Road  
Jerseyville, IL 62052  
(618) 498-5228  
jmeszaros@jerseyville-il.us

#### PROJECT STAFF

Dennis Campbell  
Brian Visintine  
Tim Straszacker  
Jim McCleish  
Bob Tuckett

Horner & Shifrin provided engineering planning and design services for the Jerseyville South Wastewater Treatment Plant. The upgrade and/or expansion improvements will result in an increase in design capacity of 4.0 mgd, and will accommodate the projected population of the City of Jerseyville to the Year 2025.

During the basis of design phase, it was decided to upgrade and expand the existing South WWTP with continuous-flow SBRs. We designed the new SBR and other processes around several existing structures that could be upgraded or reused to help alleviate construction costs. The basis of design was written around a design flow rate of 6.0 mgd with a peak hourly flow rate of 14.3 mgd.

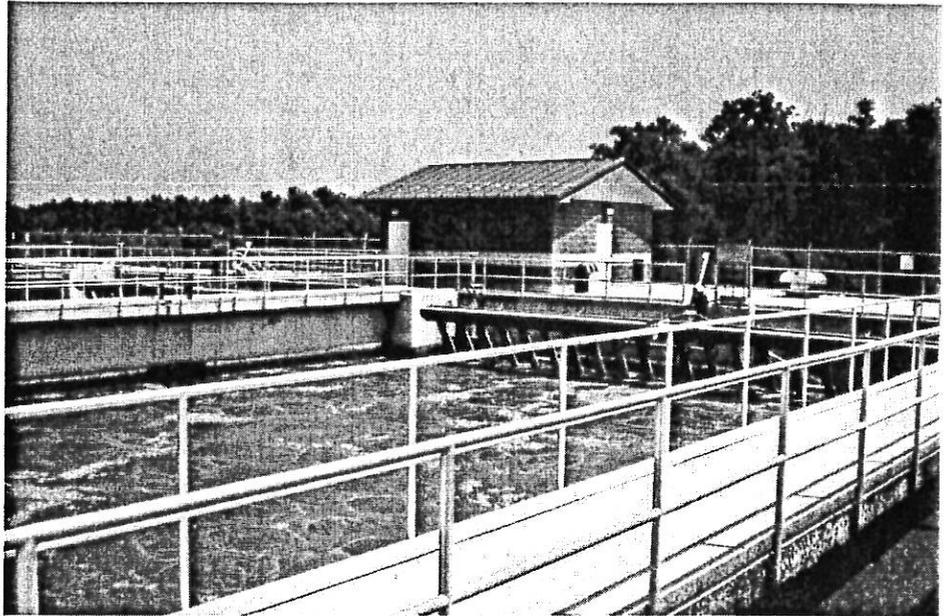
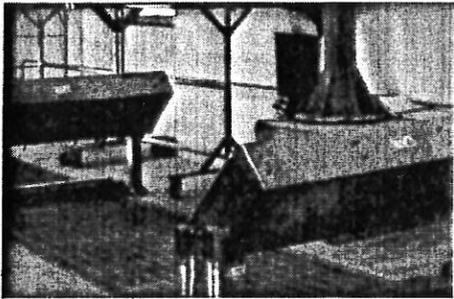
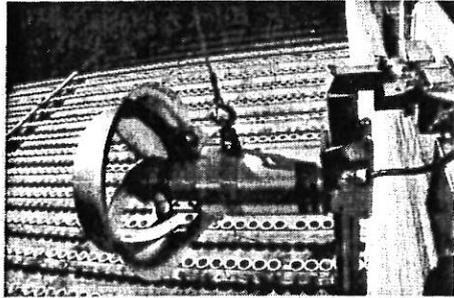
Concern over future nutrient limits at this facility led to the implementation of BNR for the SBRs. Also included in the design was a deep bed sand filter for denitrification polishing to further reduce total N. In addition, an alum feed system was designed for total P removal, beyond what is achievable through biological uptake.

Also included as part of this plant upgrade project was the rehabilitation of two existing pump stations and new facilities for the following processes: grit removal equipment, two fine screens, 75 HP turbo blowers, new tertiary filters, ultraviolet disinfection, reaeration, service water system improvements, chemical feed equipment, sludge dewatering unit, five new buildings to house the proposed equipment, complete new SCADA system and associated electrical and mechanical for the plant.

After cost evaluation of the project, long-term it was economically viable to thicken and dewater aerobically digested sludge. We evaluated the use of belt filter presses, screw presses, rotary fan presses and centrifuges. Rotary fan presses were deemed a very viable option for the City and yielded a system with simpler operation than a belt filter press. The City elected to pilot a rotary fan press. The technology proved viable and the plant was designed around the selected equipment. A covered concrete pad with push walls was designed to store sludge cake for application on agricultural land around the City.

Horner & Shifrin also provided engineering design services for the conversion of a 250,000-gallon anaerobic digester to a pre-thickened aerobic digester. The project included demolition of all old pumping and heat exchanger equipment, new positive displacement sludge pumps, new sludge flow meter, new turbo blowers and aeration equipment specifically designed for thickened sludge conditions. Project also was designed for second digester of the same size to be easily integrated in the future.

SEWER SYSTEM FACILITY PLAN & UV DISINFECTION



**PROJECT OWNER**

Rock Creek Public Sewer District

**COMPLETION DATE**

2012

**DESIGN COST**

\$197,550

**CONSTRUCTION COST**

\$1,600,000

**REFERENCE**

Don Daniel  
 District Administrator  
 PO Box 1060  
 Imperial, MO 63052  
 (636) 464-3305  
 dondaniel@rockcreekpsd.com

**PROJECT STAFF**

Jim McCleish  
 Ed Sewing  
 Tim Straszacker  
 Brian Visintine

Horner & Shifrin and the Rock Creek Public Sewer District (RCPSD) worked together to acquire grant and low interest loan funding from the State Revolving Loan - Stimulus Funding Program through the Missouri Department of Natural Resources (MDNR) for a list of needed improvements within the RCPSD wastewater treatment plant and collection system. To become eligible for the funding, the RCPSD recently engaged the services of Horner & Shifrin to amend the Facilities Plan for the wastewater treatment plant improvements.

RCPSD and Horner & Shifrin completed the facility planning effort in two phases – liquid treatment improvements and biosolids. The efforts included planning needed to upgrade the plant to meet more stringent wastewater effluent objectives (Phase I) and more stringent biosolids classification criteria (Phase II). Phase I of the study included the estimation of population, flow and loading requirements, the evaluation of alternatives to meet future nutrient removal capabilities and the development of recommendations for adding disinfection capabilities.

Alternatives considered for meeting current nutrient removal goals included the addition of mixers in the existing SBRs, as well as the programming required for the SBR to operate in nitrification/denitrification mode. Additional blower capacity is required before the District's plant reaches the ADF of 4.8 mgd in order to meet these goals at the District's design ADF.

Alternatives considered for meeting future nutrient removal requirements include the addition of fixed film media to the SBR tanks, the addition of SBR capacity in conjunction with deep bed sand filters, addition of an integrated fixed film activated sludge treatment system to treat a portion of the incoming raw influent in conjunction with deep bed sand filters, and optimization of nitrification within the SBRs with the addition of deep bed sand filters.

After thorough screening of these alternatives, we ultimately recommended the addition of additional SBR capacity in conjunction with deep bed sand filters. Additionally, both horizontal and vertical UV systems were evaluated for achieving effluent disinfection.

In this project, the Rock Creek Public Sewer District and Horner & Shifrin team have utilized knowledge gained in their 30-year working relationship to plan the improvements needed over the next 20 years.

MAPPING, I&I INVESTIGATION, SEWER SYSTEM EVALUATION SURVEY



**PROJECT OWNER**

Rock Creek Public Sewer District

**COMPLETION DATE**

2012

**DESIGN COST**

\$554,800

**REFERENCE**

Don Daniel  
District Administrator  
PO Box 1060  
Imperial, MO 63052  
(636) 464-3305  
dondaniel@rockcreekpsd.com

**PROJECT STAFF**

Ed Sewing  
John Gilmore  
Tim Straszacker  
Jim McCleish  
Brian Visintine

The Rock Creek Public Sewer District encompasses approximately 30 square miles with its wastewater treatment facility located on the Mississippi River at Kimmswick, Missouri. The District retained the services of Horner & Shifrin to provide a comprehensive mapping and infiltration and inflow (I&I) investigation and a district-wide flow monitoring and sewer system evaluation study to prioritize areas for further field investigations. The study analyzed I&I into the system and evaluated and recommended repairs or replacements to reduce infiltration and inflow and restore the sewer system structural integrity. The project consisted of the following phases.

**Flow and Rainfall Monitoring** – Four rain gauges and 14 flow meters were placed in the District boundaries and monitored for 60 days to quantify sanitary base and I&I flows from specific watersheds and total flows to the wastewater treatment plant.

**GIS/Access Database** – Developed a database of system attributes (location, sizes, physical condition, etc.) of the existing sewer system and defined shape files for import into the District's GIS database system, Pictometry.

**Mapping** – Conducted GPS survey of manholes and other sewer system structures. Downloaded survey data in GIS and created sewer mapping system in CAD. Developed shape files for linking sewer map to Pictometry.

**Manhole Inspections** – Conducted approximately 2,000 detailed manhole inspections identifying physical and structural conditions, and sources of possible I/I. All inspection notes, photographs, etc. are linked to the GIS database.

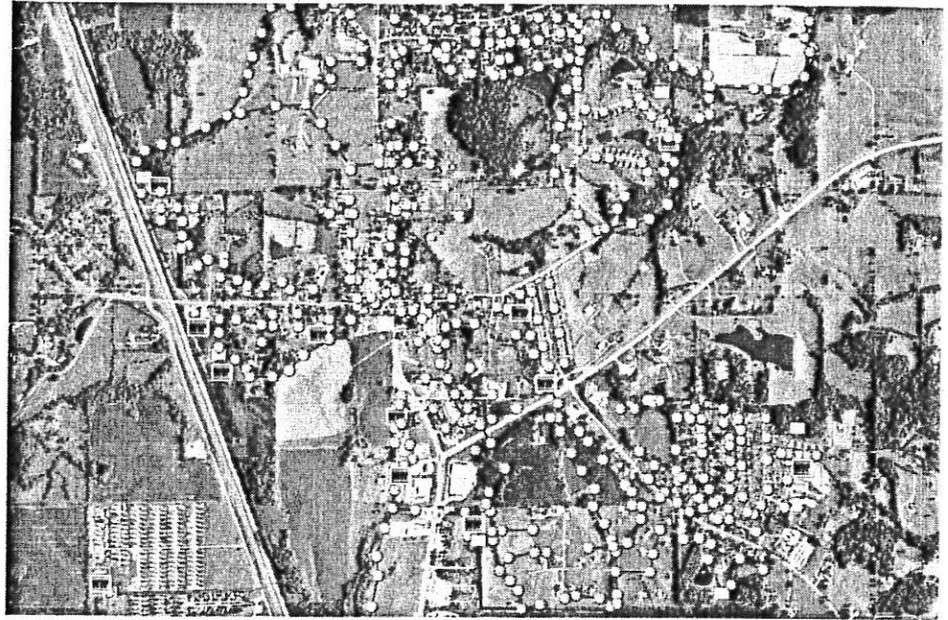
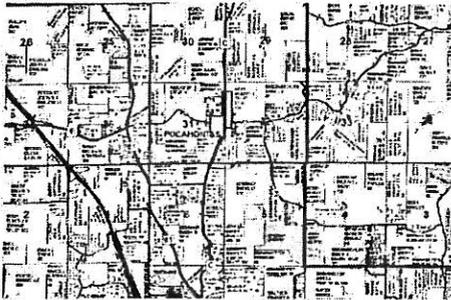
**Smoke Testing** – Conducted smoke testing on approximately 500,000 feet of sewers. Public and private defects and possible I/I locations were documented and entered into the GIS database system.

**Dye Water Testing** – Follow-up dye water testing of suspected I/I sources were performed to verify direct connection to the sanitary sewer system.

**CCTV Inspection** – Identified specific sewer reaches that were inspected by the District's CCTV crew based on data gathered from manhole/visual pipe inspections and smoke testing.

**Final I/I Report** – Performed water balance on defects; cost effective analysis for rehabilitation/replacement alternatives; and prioritized repair/replacement/rehabilitation schedules for implementation by the District.

WASTEWATER TREATMENT PLANT & PUMP STATIONS



**PROJECT OWNER**

Cape Girardeau County Public Sewer District

**COMPLETION DATE**

In Progress

**DESIGN COST**

\$3,960,000 (estimated)

**CONSTRUCTION COST**

\$10,458,000 (estimated)

**REFERENCE**

Brian Strickland  
 Owner/Principal, Strickland Engineering  
 113 W. Main  
 Jackson, MO 63755  
 (573) 243-4080  
 bstrickland@stricklandengineering.com

**PROJECT STAFF**

Christy Willson  
 Spencer Fitzgerald  
 Michael Mills  
 Sean Mickey  
 Jim McCleish  
 Dennis Campbell  
 Tim Straszacker  
 Jack Ellsworth  
 Ed Sewing

Horner & Shifrin assisted the newly developed Cape Girardeau County Reorganized Common Sewer District in developing a centralized treatment facility and collection system to serve over 860 business and residential properties in Fruitland, Missouri. The project includes the design of 15 duplex pump stations, 7.8 miles of forcemain, 19 miles of gravity sewers, and one wastewater treatment facility. The area has over 23 existing permitted sewer treatment facilities that required significant upgrades and individual septic systems located on small lots with clay soils that will all be abandoned as part of the construction.

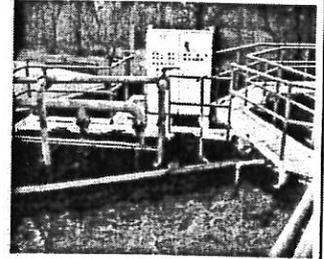
Horner & Shifrin was responsible for the antidegradation evaluation and facility plan development as well as process, structural, and civil/site design of the new Sequencing Batch Reactor treatment facility utilizing influent screening, aerobic digestion, and UV disinfection before discharging into a losing stream. The entire facility was designed for a phase II upgrade to increase plant Daily Average Flow from 425,000 gpd to 850,000 gpd. The influent screen, influent piping/valve gallery, blower house, and SBR tanks were designed into a common structure to deal with geologically challenging aspects of the site. The Terminal Lift Station, the only pumping system in the plant site, feeds raw wastewater to the headworks where the downstream processes were all designed to be hydraulically driven by gravity due to natural topography of the site. The aerobic digestion basins were designed with surface aerators and telescoping valves to stabilize, and manually decant to produce Class B biosolids for land application. The treatment facility was designed with a SCADA monitoring system to allow remote monitoring and data logging of all critical process parameters, and allow swift response to upset situations.

The 15 pumps stations have peak design flows that range from 70 to 750 gallons per minute and include 9 stations with self-priming pumps and 6 stations with grinder pumps. Peak flows included the potential for future development and contributions from neighboring towns. Each station was designed to provide at least 12 hours of storage. All stations were designed in compliance with the Missouri Department of Resources Clean Water Commission Design Guidelines. Two of the stations pumped to a common forcemain that increased in size from 8-inches to 10 inches. The varying pressures in the forcemain needed to be evaluated for the selection of the required pumps.

OTHER SIMILAR PROJECTS

**WASTEWATER FACILITY PLANNING STUDY**

<p><b>PROJECT OWNER</b> Village of Freeburg, Illinois</p> <p><b>CONSTRUCTION COST</b> N/A (Study)</p> <p><b>REFERENCE</b> John Tolan Public Works Director 14 Southgate Center Freeburg, IL 62243 (618) 539-3112 jtolan@freeburg.com</p>	<p>Horner &amp; Shifrin was retained to perform an evaluation of the Village's two existing wastewater treatment facilities (East Wastewater Treatment Facility and West Wastewater Treatment Facility) and make recommendations for new wastewater treatment facilities for the 20-year planning period for the 14,000-acre Freeburg Facilities Planning Area (FPA). The East Wastewater Treatment Facility consists of a two-cell aerated lagoon with the capability of tertiary filtration of the lagoon effluent. Final recommendations were to convert the existing first cell of the lagoon system for temporary wet weather excess flow storage with pumping of the wastewater from the lagoon site to a new central wastewater treatment facility adjacent to the existing West Wastewater Treatment Facility.</p> <p>Horner &amp; Shifrin made recommendations for interim improvements to the two package mechanical wastewater treatment plants at the West Wastewater Treatment Facility and a long-term recommendation to convert the two plants into aerobic sludge digesters for a new Central Wastewater Treatment Facility to be constructed on property adjacent to the West Wastewater Treatment Facility.</p> <p>The new 0.95 mgd capacity Central Wastewater Treatment Facility included a new headworks building with flow measurement and mechanically cleaned fine screen, aerated grit removal basin, secondary wastewater treatment using the sequencing batch reactor (SBR) process, tertiary filtration of the SBR effluent and ultraviolet disinfection of the plant effluent. Waste sludge from the new treatment facilities would be stabilized in the two aerobic sludge digesters and then dewatered by two belt filter presses in a new sludge processing building.</p>
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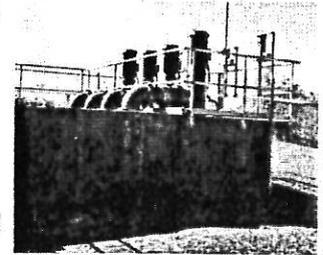


**CAPACITY MANAGEMENT, OPERATION AND MAINTENANCE (CMOM) PLAN**

<p><b>PROJECT OWNER</b> City of Hannibal, Missouri</p> <p><b>CONSTRUCTION COST</b> N/A (Planning)</p> <p><b>REFERENCE</b> Mathew Munzlinger Utility Planning &amp; Construction Engineer 3 Industrial Loop Drive Hannibal, MO 63401 (573) 221-8050 mmunzlinger@hannibalbpw.org</p>	<p>Many communities struggle to control inflow and infiltration (I/I) into their sewer systems. Capacity Management, Operation and Maintenance (CMOM) plans are a tool regulatory agencies often require communities develop as a means to control I/I. The Missouri Department of Natural Resources required Hannibal, Missouri to develop a CMOM plan.</p> <p>Hannibal had already implemented most of the elements of a CMOM plan as part of their sewer maintenance program. Their CMOM was therefore unique in that our primary job was to document how their existing procedures meet the criteria contained in the MDNR model CMOM.</p> <p>We worked closely with Hannibal Board of Public Works staff and obtained their sewer map, work orders, reporting forms, safety plan and documented their maintenance procedures. We placed these documents in the outline of the MDNR model plan. We met with MDNR representatives and shared the final draft CMOM with them to be sure we had met the intent of their requirements. They offered a few helpful suggestions; we made minor modifications and submitted the finished CMOM plan. Hannibal's CMOM will be a useful document to the Board of Public Works for many years because it is truly their plan. They will no doubt see the need to modify it through the years as they gain experience in their I&amp;I control efforts. Horner &amp; Shifrin designed their plan to be easily modified so the CMOM will remain useful for many years.</p>
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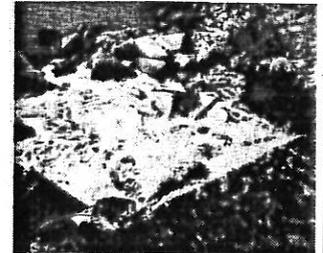
**WASTEWATER TREATMENT PLANT UV**

<p><b>PROJECT OWNER</b> City of Jackson, Missouri</p> <p><b>CONSTRUCTION COST</b> \$1,260,500</p> <p><b>REFERENCE</b> Kent Peetz Public Works Director 101 Court Street Jackson, MO 63755 (573) 243-4290 kpeetz@jacksonmo.org</p>	<p>Horner &amp; Shifrin was contracted by the City of Jackson, Missouri to add disinfection to their existing wastewater treatment plant utilizing UV technology. However, due it location between two creeks, a traditional open channel UV systems would flood leading to damage of the equipment and possible permit violations. Multiple UV technologies were evaluated to identify the best options for operation during submerged conditions at the flood prone site.</p> <p>USACE recently completed a flood study for the creek and it was known that the flood elevation at the plant outfall was approximately 3 feet higher than the when the plant was originally constructed, which resulted in the need for an effluent pump station to allow the plant to operate during wet weather flood events. A weir wall was constructed at the effluent of the UV channel to allow flow to overflow into a pump forebay. A check valve was installed on the plant effluent line to prevent the creek from backing up the line. The effluent pump station was designed to consist of 4 vertical turbine pumps, two at 5 mgd and two at 2.5 mgd, for a frim wet weather peak flow capacity of 10 mgd. Pumps are all installed in individual pump bays to optimize suction hydraulics. The equipment was installed with VFDs to maximize flow and discharge to a head box that is connected to the existing effluent line to create a significant head to overcome flood elevations.</p>
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**CSO LONG TERM CONTROL PLAN**

<p><b>PROJECT OWNER</b> City of Wood River, Illinois</p> <p><b>CONSTRUCTION COST</b> N/A (Planning)</p> <p><b>REFERENCE</b> Steve Palen Director of Public Services 501 W. Ferguson Wood River, IL 62095 (618) 251-3122</p>	<p>Horner &amp; Shifrin assisted the City of Wood River, IL in responding to a USEPA Administrative Order to prepare a Combined Sewer Overflow Long Term Control Plan. This project included creating corrective action plans regarding the operation and record keeping related to the combined sewer system, preparation of a public notification plan, and a pollution prevention plan.</p> <p>The CSO Long Term Control Plan included characterization of the tributary watershed, analysis of the frequency of CSO discharges, characterization of the receiving stream (Mississippi River), CSO discharge and receiving stream monitoring, screening of nineteen original control options, coordination of public participation meetings, detailed evaluations of feasible CSO control alternatives with cost estimates, analysis of the city's financial capabilities to implement the recommended control plan, and implementation scheduling.</p>
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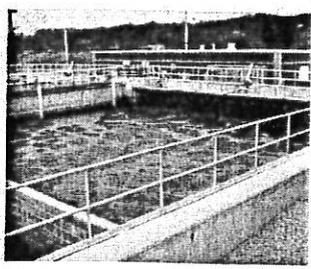


**WASTEWATER TREATMENT PLANT EXPANSION**

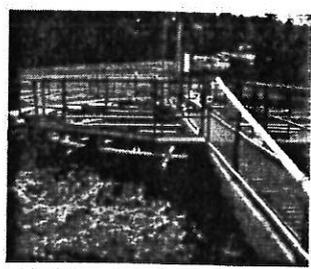
<p><b>PROJECT OWNER</b> City of Columbia, Illinois</p> <p><b>CONSTRUCTION COST</b> \$45,000</p> <p><b>REFERENCE</b> Jimmy Morani City Administrator 208 S. Rapp Avenue Columbia, IL 62236 (618) 281-7144 jmorani@columbiaillinois.com</p>	<p>Horner &amp; Shifrin engineers designed improvements to the municipal wastewater treatment facility for the City of Columbia, Illinois. The capacity of the existing 0.82 million gallons per day (mgd) facility has been expanded to 1.47 mgd. The phased expansion program follows the recommendations of an Engineering Report prepared by Horner &amp; Shifrin in September 1994 and approved by the Illinois Environmental Protection Agency in April 1995.</p> <p>On the basis of the Engineering Report, the existing treatment facility was re-rated to 1.10 mgd. The report used actual operational data for influent wastewater strength instead of empirical data to determine the treatment plant capacity. The increase in capacity from 0.82 mgd to 1.10 mgd was accomplished at zero capital cost to the City. The next phase of expansion included the use of the existing facilities plus the addition of two aerators and a baffle wall in Cell No. 3 of the treatment facility. These improvements, which cost the City approximately \$45,000, increase the capacity of the wastewater treatment facility to 1.47 mgd. City personnel constructed these improvements.</p>
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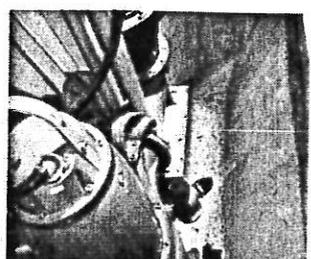
**WASTEWATER TREATMENT PLANT REPLACEMENT DESIGN**

<p><b>PROJECT OWNER</b> Festus/Crystal City Sewage Treatment Commission</p> <p><b>CONSTRUCTION COST</b> \$5,556,000</p> <p><b>REFERENCE</b> David Smith WWTP Superintendent 355 County Road Crystal City, MO 63019 (636) 937-7444</p>	<p>Horner &amp; Shifrin provided design, bidding and construction phase services for a new wastewater treatment plant that replaced a 25-year-old plant serving Festus and Crystal City. The new plant, located adjacent to the existing plant, brought the Festus/Crystal City Sewage Treatment Commission into compliance with new, stricter effluent quality requirements and increased the plant's hydraulic capacity. The new facility has a design capacity of 3 million gallons per (mgd) day, and accommodates the projected population of Festus and Crystal City to the year 2020.</p> <p>The new facility includes an influent pump station, headworks structure (with screening and grit removal equipment), and a Sequencing Batch Reactor (SBR) for secondary treatment and nitrogen removal. Waste biosolids will be aerobically digested, dewatered with belt filter presses and land disposed.</p> <p>A rate study was completed because the project was partially funded by the Missouri State Revolving Loan program.</p> <p>This project was coordinated with USACE's proposed flood protection levee in the area adjacent to the new treatment plant. In a unique "partnering" approach, the effluent will discharge to a stormwater pump station constructed by the Corps as part of the levee project.</p> 
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**NORTH WASTEWATER TREATMENT PLANT UPGRADES**

<p><b>PROJECT OWNER</b> City of Hillsboro, Missouri</p> <p><b>CONSTRUCTION COST</b> \$993,000</p> <p><b>REFERENCE</b> Jesse Wallis City Administrator 101 Main Street Hillsboro, MO 63050 (636) 797-3334 administrator@hillsboromo.org</p>	<p>Hillsboro retained Horner &amp; Shifrin to provide professional engineering services as a continuation of the City's Task Order Agreement with us to perform a Design Study to determine the most cost-effective and technically feasible method to upgrade the City's WWRP to consistently achieve the new NPDES Permit effluent limits. Subsequent to the completion of the Design Study, the City concurred with our recommendations and issued another Task Order to us for the design-phase and bidding-phase services for the WWRP Improvements project.</p> <p>The Hillsboro WWRP Improvements Project included improvements to the existing plant to meet new Permit requirements and other enhancements for the plant to improve the overall operation and maintenance of the plant plus the addition of portable standby pumping systems for four of the City's wastewater lift stations.</p> 
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**WASTEWATER TREATMENT PLANT PHASE I IMPROVEMENTS**

<p><b>PROJECT OWNER</b> City of Mexico, Missouri</p> <p><b>CONSTRUCTION COST</b> \$5,100,000</p> <p><b>REFERENCE</b> Kensley Russell Director of Public Works 300 North Coal Street Mexico, MO 65265 (573) 581-2100 krussell@mexicomissouri.org</p>	<p>Horner &amp; Shifrin designed improvements to the existing wastewater treatment plant (phase I) for City of Mexico, Missouri. The project consisted of improvements to the wastewater treatment plant processes and the addition of UV disinfection. Process improvements included primary clarifiers, RAS/WAS pumping, NPW, new aeration equipment, blower building improvements, UV disinfection, new effluent pump station, new post aeration system, upgrades to existing trickling filter (new media, distributor and structural improvements). Plant capacity is 3 mgd ADF, 6 mgd PDF and 10 mgd wet weather peak.</p> <p>Phase II of the project consisted of improvements to the wastewater treatment plant processes which included conversion of the existing dry pit 6 mgd headworks pump station into a 10 mgd submersible pump type station, new fine screen and grit removal facility, diffuse replacements in the activated sludge tanks, and rehabilitation of the existing anaerobic digester tank, including a new gas compression system for mixing and boiler and heat exchange improvements.</p> <p>Horner &amp; Shifrin provided construction management – including inspection and testing – for both phases.</p> 
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**SUBCONSULTANTS RELATED PROJECT EXPERIENCE****ADS Environmental Services | Flow Monitoring****Flow Monitoring & SSES Field Services | City of Highland, Illinois****Reference: Joe Gillespie, Director of Public Works, (618) 654-6823, jgillespie@highlandil.gov**

ADS began performing field services for the City of Highland, Illinois, in 2012. Initial work involved flow monitoring at eight (8) locations with one rain gauge for 90 days in the Spring of 2012. After the flow monitoring was completed, ADS smoke tested 20,000 l.f. based on the flow monitoring analysis. In 2013, ADS smoke tested the remainder of the collection system (~200,000 l.f.) in addition to 73 manhole inspections. In February of 2016 field investigations continued to include CCTV and heavy cleaning in 20,000 l.f. of sewer which comprised the three main trunk lines, two of which paralleled and crossed creeks. A 2nd round of flow monitoring (4 meters; 90 days) was completed in 2016 to further evaluate rain responses of the three trunk lines. Data from this last project are being evaluated by the City.

**Temporary Flow Monitoring with RDII report | Village of Godfrey, Illinois****Reference: Craig Noble, Facility Manager, (217) 828-2018, Craig.Noble@amwater.com**

ADS performed flow monitoring in Godfrey in 2015 and 2016, monitoring twenty (20) locations for 90 days. After the metering was completed ADS submitted an RDII (Rainfall Dependent Inflow & Infiltration) report using Slicer. This information was used to update the hydraulic model and was used for future projections and capital planning. In the Spring of 2017 ADS performed flow monitoring at an additional six (6) locations using area/velocity (A-V) meters and four (4) level only ECHO meters making this one of the first hybrid projects. When the flow monitoring is complete, a second RDII report will be published and the data will be used to further supplement and calibrate the hydraulic model.

**SCI Engineering | Geotechnical Investigation****Wastewater Treatment Facility Improvements | City of Mascoutah, Illinois****Reference: Christy Willson, Horner & Shifrin, (618) 726-0319**

SCI is providing geotechnical services for the improvements to the waste water treatment facilities in Mascoutah, Illinois. Planned improvements include the construction of a new four-unit sequencing batch reactor, new headworks and lift station and a new filter building/laboratory/office. The pump stations will be replaced and excavations of 5 to 10 feet will be required at each location. SCI conduct CPT soundings for the improvements as well as conduct more in-depth research on the undermining in the area surrounding the plant.

**Wastewater Treatment Plant | Lebanon, Illinois****Reference: Penny Pinkstaff, City of Lebanon, (618) 537-4976**

SCI conducted a geotechnical exploration for improvements to the existing Lebanon WWTP which included a new CMU, steel buildings and in-ground concrete tanks or basins for the various treatment processes.

**Wastewater Treatment Plant Improvements | Fayetteville, Illinois****Reference: Matt Joost, TWM, (618) 624-4488**

SCI provided a subsurface exploration and geotechnical recommendations for improvements at the existing facility which included: construction of a mechanical treatment tank, sludge storage tank, and a one-room building containing blowers, compressors, and electrical equipment.

**Archimages | Architect****City of Mascoutah, Illinois****Reference: Christy Willson, Horner & Shifrin, (618) 726-0319, cwillson@hornershifrin.com**

- Wastewater Treatment Facility

**Northeast Public Sewer District | Jefferson County, MO****Reference: Mr. Bob Hembrook, Executive Director, (636) 343-5090, BobH@northeastsewer.org**

- Headworks / Blower Facility

**Rock Creek Public Sewer District | Imperial, MO****Reference: Mr. Don Daniel, District Administrator, (636) 464-3305, dondaniel@rockcreekpsd.com**

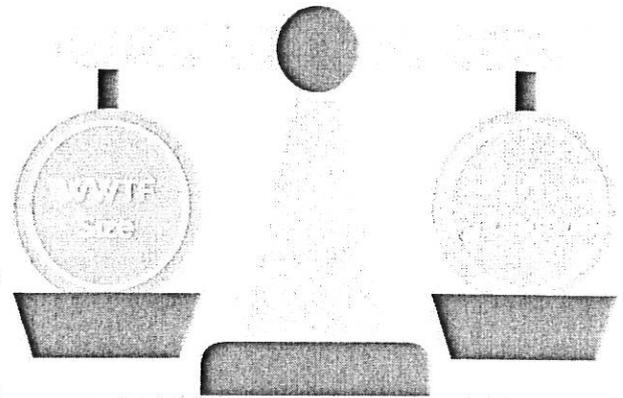
- New Administration / Storage Facility

4. ADDITIONAL INFORMATION

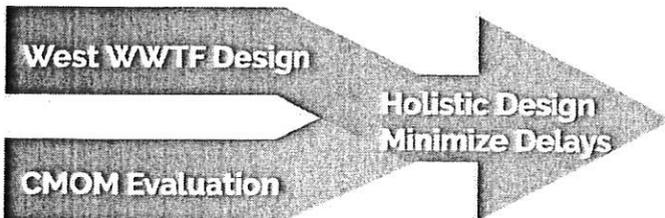
WASTEWATER TREATMENT PLANT DESIGN ENGINEERING

The Village of Freeburg has successfully operated and maintained its wastewater collection system and treatment plant for decades, which consists of two wastewater treatment facilities (WWTF), gravity sewers, force mains, and 10 pump stations. The age of the assets in the system range from 5 years to 45 years. The Village is growing and is looking to provide high quality services to residents well into the future. The addition of a new Sequencing Batch Reactor (SBR) at the West WWTF, combined with a comprehensive evaluation of the collection system to comply with CMOM requirements in the draft NPDES permit, will update the aging infrastructure and improve the ability of the Village to provide high quality treatment for the community and the environment. The plant will be designed to meet projected organic and hydraulic conditions with the capability to adapt to predicted regulatory requirements, future growth, and operate during wet weather conditions. Horner & Shifrin has extensive experience working with other municipalities in Illinois, including the cities of Columbia, Jerseyville, Wood River, and Mascoutah. In addition, we have completed multiple successful SBR wastewater treatment plant designs and collection system evaluations for Rock Creek Public Sewer District, Festus/Crystal City, Cape County Reorganized Sewer District, and Jackson in Missouri. We will incorporate this extensive expertise to provide the Village of Freeburg with high quality, cost effective designs that meet regulatory requirements, while considering operational and maintenance demands for Village staff. In addition, Horner & Shifrin has thorough knowledge of the conditions in Freeburg from our work on the 2009 Facility Plan, which will minimize startup time in the design process. Our approach will balance the size of the treatment facilities with upgrades in the collection system, focusing on inflow and infiltration reduction that results in an effective use of the Village's resources now and in the future.

Verification of the flows for the plant is a key step in the design process that will affect the organic loading for the process design, and ultimately the operation and effectiveness of the facility. Variations in peak and wet weather flows will affect the operation of the facility, however, *it is not cost effective to design a treatment process for excessive wet weather I/I flows.* Therefore, Horner & Shifrin proposes a parallel approach in the design of the treatment facility and collection system evaluation that will not delay the design of the new SBR treatment facility. The average daily flow (ADF) of 0.8 MGD, identified in the Facility Plan, includes the projected 2045 population of the entire Village and surrounding area, in addition to an amount of rainfall induced inflow and infiltration. Since only approximately two-thirds of the population in Freeburg is directed to the West WWTF and I/I is not typically included in the ADF calculation for design purposes, the design flow verification is necessary. However, these assumptions allow the Village the flexibility to process excess I/I until reduction measures can be implemented, use capacity for increased future growth, or the option to eliminate the East WWTF if regulatory requirements become cost prohibitive. This increased flexibility will allow the design process for the West facility to proceed with equipment selection while an evaluation of the I/I in the collection system is completed. Once the hydraulic capacity evaluation and I/I estimates are completed for a holistic understanding of wet weather flows in the system, the peak flow operations at the SBR WWTF will be reviewed. Horner & Shifrin proposes this parallel approach to minimize delays in the timeline for the design and construction of the West WWTF, while verifying that the improvements are "right-sized" to meet future growth needs for the Village of Freeburg.



Balance treatment plant size with collection system I/I reduction for optimal efficiency



The new WWTF would direct all influent flows to the West Facility through a new screening process to reduce debris throughout the plant. The design would allow the headworks to handle peak influent flows to the SBRs, and utilize the existing excess flow clarifier (EFC) for extreme wet weather events. Continuous flow SBRs have an excellent performance record in wet weather performance. This technology, which was the design basis in the 2009 Facility Plan, will allow the City to better deal with peak flow events while the collection system's I/I issues are investigated and eliminated. The existing

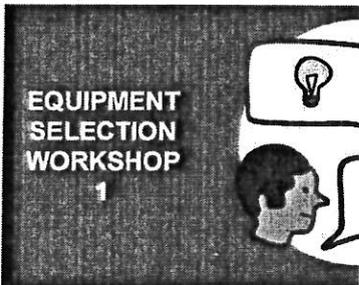
tanks will be inspected to determine if they can cost effectively be rehabilitated, painted, and used for aerobic digesters for the new treatment process. Long settling times for decanting can allow the tank to turn anaerobic, allowing the release of phosphates and ammonia to be sent back to the head of the plant. Overall process control systems, operator interfaces, and plant SCADA

systems will be developed to allow for the full degree of automation as required by the Village to operate under the new permit requirements. Full automation of the SBR system allows for online monitoring such as DO, ORP, pH, and water level in the tanks to confirm anaerobic and aerobic stages are fully utilized. The SBR can be designed to operate with anoxic stages, which can be optimized to produce lower operating costs due to a more energy efficient aeration process.

*Horner & Shifrin plans to work very closely with stakeholders to select specific equipment technologies that best fit with the operation and maintenance requirements for the Village of Freeburg.* Once final equipment technologies have been selected, and as requested by the Village, Horner & Shifrin can confirm process designs by providing BioWin modeling of the full process including all influent feed and recycle streams. Our process design engineer holds a PhD in Chemical Engineering and will work to develop the most efficient design for the Village and provide an independent review of vendor proposals. Horner & Shifrin will plan the treatment plant footprint to allow for possible future plant upgrades, such as disinfection and phosphorous removal, that may be needed to meet future regulatory requirements or for expanded capacity. The design will take a cost-effective approach that considers both capital cost expenditures and operating costs.

**APPROACH**

Horner & Shifrin's approach to the design process will incorporate the perspective of the multiple stakeholders for the Village of Freeburg, including the Public Works Director, Plant Operator, and Village Administrator. Our team will incorporate these individual perspectives by conducting multiple Process Technology Workshops to guide the staff through the manufacturer equipment selection and other design decisions to result in the best design for the Village that will last well into the future. These half-day workshops will be scheduled to reduce the impact on the operations of normal Village business, allowing staff to organize and complete tasks prior to the workshops, while giving time in the afternoon to coordinate events that occur throughout the day.

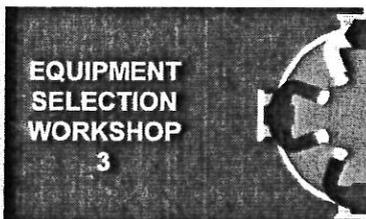


- Identify the Village of Freeburg's needs, preferences, and concerns
- Develop scoring matrix (cost, O&M, operation, reliability, performance, competitive bid vs. sole source, automation, etc.)
- Staff – input to develop weighting system to rank most important items
- Identify manufacturer options

- Vendor Presentations – 1 hour each vendor
- Allow Village to ask questions
- Identify pros and cons of each vendor
- Schedule site visits to view installed equipment



**EQUIPMENT  
SELECTION  
WORKSHOP  
2**



- Summarize Vendor Presentations
- Discussion of Village Staff perspective
- High-level installed cost comparison
- Complete scoring matrix

Once the workshops are complete, Horner & Shifrin will generate a Design Basis Memorandum (DBM) for the treatment plant, incorporating the results of the workshop discussions. Our expert team will work with Village staff to select the specific equipment that meets the regulatory and design requirements, while also factoring in ease of use and maintenance needs throughout the life of the system. Horner and Shifrin provides a wealth of experience utilizing a variety of technologies that is independent of any specific vendor. We will draw on our depth of experience to identify equipment options that will result in a successful design. Our goal is to provide the Village of Freeburg with a well-designed plant with the equipment you want, that can also be easily operated and maintained. The technical memorandum will summarize critical decision points for design and determine the design criteria on which the plans and project specifications will be based.

The DBM will include the following preliminary items:

- Site Layout
- Equipment Layout
- Building Layout
- Construction Materials
- Process Equipment and Tank Sizing
- Flow Diagrams

Horner & Shifrin will provide the Village of Freeburg with multiple opportunities to comment on the design to ensure that the new SBR plant meets the needs of community with a cost effective design, and can be easily operated and maintained by staff well into the future. The main steps in the design process include:

- Design Basis Memorandum (10% Design Complete)
- Process Design Submittal (30% Design Complete)
- Mechanical/Electrical/Structural Design Submittal (60% Design Complete)
- Draft Final Plans & Specifications (90% Design Complete)
- Final Plans & Specifications (100% Design Complete)

### COLLECTION SYSTEM ENGINEERING – CMOM

Horner & Shifrin will also assist the Village of Freeburg in developing a Capacity, Management, Operations, and Maintenance (CMOM) Plan to comply with the special condition in the draft NPDES permit. The CMOM Plan is designed to help the Village improve the functionality of the collection system by reducing sanitary sewer overflows that can result from blockages, asset failures, or insufficient hydraulic capacity.

This process will begin with a thorough review of the existing GIS data to identify data gaps that will be needed for the hydraulic evaluation and modeling, and provide a thorough asset inventory for the development of Asset Management Strategy. Our team will enhance the GIS data to confirm system connectivity, pipe size, and asset location, and incorporate any CCTV, smoke testing, or manhole inspection data needed for the condition assessment and asset management component of the CMOM Plan. Data collection will be incorporated into the Village's existing GIS for consolidated data management and ease of access to all staff. The Horner & Shifrin team includes Ed Sewing, an engineer with over 30 years of collection system evaluation and rehabilitation expertise, and Christy Willson, who worked for the Metropolitan St. Louis Sewer District for 15 years where she managed the modeling group, oversaw the District's flow metering program and development of their CMOM plan, and assisted in consent decree negotiations. Our team also includes ADS Environmental Services, an industry leader in manhole inspection, flow metering, and CCTV inspection that may be needed. The GIS data will be used to develop a hydraulic model for the evaluation of the collection system.

In order to obtain a thorough understanding of the collection system and its response to rainfall, flow meters should be installed at critical locations. The locations will be identified to break the treatment area into manageable basins to determine base sanitary flow, groundwater infiltration, and

rainfall dependent I/I. The data will be used to quantify the extent of I/I entering the system, along with prioritizing the areas for rehabilitation, and model calibration. ADS has a long successful history installing and maintaining rainfall and flow monitors for multiple communities in the surrounding area and across the globe, including Highland and Godfrey in Illinois, and a 15-year relationship with the Metropolitan St. Louis Sewer District. The flow monitoring data is the basis for the quantification of I/I and flow prediction throughout the collection system, and is the foundation for sewer improvements. It is critical that the equipment be installed and maintained by a knowledgeable firm to obtain accurate results.

Horner & Shifrin will select modeling software that best provides complexity needed to accurately evaluate the collection system

#### CMOM

- Map and system Inventory
- Capacity assessment
- Flow monitoring
- Excessive I/I areas
- Hydraulic evaluation
- Routine inspections
- Asset Management Strategy
  - Inventory
  - Condition assessment
  - Critical asset identification
  - Life cycle
- SSO reduction
- Documentation & Reporting
- Public Notification

and still allow for efficient results, as a more complex model will take longer to run, but may not provide better results. A hydraulic model will be generated based on the expanded GIS data and asset inventory. In order to gain an accurate representation of how the collection system functions, it is critical to include all major trunk sewers and structures, including the 10 pump stations within Freeburg's system. Typically, 10% to 15% of the physical system should be represented to gain a thorough understanding of the system functionality. It is important to also extend the model to any known SSOs or problem areas to assist in identifying causes of problems. Our staff will meet with Village operators to gain an understanding of known problem areas that need to be included in the hydraulic evaluation to help evaluate causes and ultimately identify improvements to reduce occurrences.

Model results will then be calibrated to both dry weather sanitary only conditions and wet weather events to refine the assumed input parameters. Dry weather conditions with sanitary flows and base groundwater infiltration need to be defined in order to obtain an accurate prediction of I/I that enters the system during wet weather events. Rainfall and flow monitoring data will be utilized to refine the assumed inputs, matching the peak flow and volume to model results. Additional data will be used to verify the calibration, resulting in real-world results specific to the Village of Freeburg collection system.

Design storms with different frequencies, including 1-year, 2-year, and 5-year return periods, can be run in the model to identify areas of insufficient capacity and determine the level of service provided by the system as required for the Asset Management Strategy in the CMOM Plan. The model will identify areas of excessive I/I and assist in the evaluation of I/I reduction efforts as required by the System Evaluation Plan for the CMOM requirements. The model can also evaluate if I/I reduction will solve capacity problems in the system, eliminating the need for costly and disruptive construction.

The Village of Freeburg will be operating and maintaining the WWTF and collection system for decades. Horner & Shifrin's goal is to help the Village select WWTF equipment and cost effective system improvements that will allow you to provide high quality services to the community that are sustainable well into the future.

### SRF FUNDING ASSISTANCE

Horner & Shifrin fully understands the SRF and IEPA approval process and can assist the Village of Freeburg in meeting the deadlines associated with receiving funding for the improvements. Deadlines for the funding application submittal are no later than January 31st of each year to make the Intended Use Plan, which also requires an approved Facility Plan by IEPA. If the Facility Plan is not approved by January 31st of the year of construction, the Village can get on the bypass list with a submittal deadline of June 30th. Horner & Shifrin is currently working with the City of Mascoutah through the IEPA and SRF approval process and has worked through the process with the City of Jerseyville, Illinois for their wastewater treatment plant. We have also assisted many other of our municipal clients through the SRF process. Once the Village of Freeburg receives approval for their Facility Plan, a new draft NPDES permit will be issued by IEPA. Since the intent is to keep the plant design flow below 1MGD, it will not achieve the "major" designation and will likely avoid restrictive effluent limits. We have a thorough understanding of the program requirements and the experience to assist the Village of Freeburg through the process.

### SRF REQUIREMENTS

- Facility Plan Submitted to IEPA/SRF
- Environmental Assessment
- Facility Plan Approval
- Construction Schedule
- User Rate Evaluation
- NPDES Draft Permit
- Facility Plan Public Hearing
- Loan Application
- Design Review and approval
- Construction Permit
- Bid submittal to IEPA
- Loan closing