Grand Ledge City Council Resolution #09 of 2021

A Resolution to Approve a Proposal from Fishbeck for Design Engineering Services for the Iron Removal Plant.

A resolution adopted by the Grand Ledge City Council, at a regular meeting held on Monday, 25 January 2021, in an online teleconference in compliance with the Open Meetings Act, as amended, and to follow recommendations by the Centers for Disease Control and other public health agencies concerning the COVID-19 pandemic.

Whereas, the City of Grand Ledge, Michigan ("City") is a municipal corporation organized under the provisions of the Home Rule City Act, Public Act 279 of 1909, as amended, and is governed by the provisions of the Grand Ledge City Charter adopted 07 August 2018, as amended ("Charter"); and

Whereas, Charter §13.1A provides:

"The power to make and to authorize the making of contracts on behalf of the City is vested in the City Council and shall be exercised in accordance with the provisions of law"; and

Whereas, Fishbeck presented a proposal for design engineering services for the Iron Removal Plant; and

Whereas, the City Council reviewed the proposal for design engineering services for the Iron Removal Plant to Fishbeck;

Now, Therefore, It Is Resolved:

1. The City approves an updated proposal from Fishbeck for design engineering services for the Iron Removal Plant, dated 22 January 2021, as attached.

2. The City directs the City Manager and Finance Director / Treasurer to appropriate the funds necessary to implement said proposal

3. The City Manager, or their duly authorized agent or representative, is authorized and directed to implement said proposal on behalf of the City of Grand Ledge; to do any other act(s) or thing(s) which shall be necessary to implement said proposal on behalf of the City of Grand Ledge; to preserve and protect the rights, duties and obligations of the City thereunder; and to do any act or thing required by statute, Charter, ordinance, rule, regulation or other provision of law in order to implement said proposal.

Motion by Gillespie

Second by Willems

Ayes: Gillespie, Jancek, Lantz, MacDowell, Mulder, Sowle, Willems

Nays: None

Absent: None

Approved:

Thomas J. Sowle, Jr. DIGITALLY SIGNED

Thomas J. Sowle, Jr., Mayor

I, Gregory L. Newman, Grand Ledge City Clerk, certify this is Resolution #09 of 2021, adopted by the Grand Ledge City Council at a regular meeting held on Monday, 25 January 2021; a meeting held in accordance with the Open Meetings Act, Public Act No. 267 of 1976, as amended.

Gregory L. Newman DIGITALLY SIGNED

Gregory L. Newman, City Clerk

fishbeck
Engineers | Architects | Scientists | Constructors

1515 Arboretum Drive, SE
Grand Rapids, Michigan 49546

616.575.3824 | fishbeck.com

January 22, 2021

Mr. Adam Smith
City Manager
City of Grand Ledge
310 Greenwood Street
Grand Ledge, MI 48837

Updated Proposal for Professional Services
Iron Removal Plant Engineering

Dear Adam:

Fishbeck appreciates the City's consideration of our fee proposal for design and bidding phase services dated January 8, 2021. In our recent conversation you explained the City's underlying concern with the overall project timing and costs to implement the needed improvements to the City's water treatment system. The existing iron removal plant continues to exhibit problems; the ability to continue treatment through design and construction of a new plant is a legitimate concern. Finances are also a major consideration for the City and Council wants to get best pricing without sacrificing value. We understand these concerns and have revisited our proposal per your request. This letter summarizes our findings.

As we commented in our original proposal, Fishbeck is committed to deliver the project for bid as soon as possible. The range of 9 to 12 months mentioned in our proposal reflects our experience with other recent water plant projects throughout the state. Our goal is to improve upon that timeframe; however, the timing of design will be affected by many factors that are out of the control of Fishbeck, including:

- Identification and City procurement of a vendor to conduct a pilot study.
- Vendor schedule for the pilot study, including availability of pilot equipment, and set up in the existing iron removal plant.
- Duration of the pilot study.
- Michigan Department of Environment, Great Lakes, and Energy (EGLE) input on corrosion control requirements.
- Review and response time by EGLE, United States Department of Agriculture (USDA) – Rural Development, and the City on the Preliminary Engineering Report (PER) and design review submittals.
- EGLE review time for the Part 399 Water System Construction Permit.

We hope you can understand how these constraints can impact the overall design process and timing. For example, the permit review time by EGLE for a recent project was over 4.5 months. In the past we have bid projects during the permitting review by EGLE to expedite the project. However, a project bid through USDA – Rural Development requires all permits to be in place prior to bidding.

We will commit to reduce the design time as much as we can, but are not able to guarantee a duration due to these factors not within our control. We have the project team assembled and ready to begin upon authorization. We will commit to taking on the geotechnical firm as a subconsultant to eliminate any City procurement time. We will include EGLE in each design review submittal and be available to meet with them to familiarize them and address any questions we can prior to the official permit review period. We can provide early recommendations on a pilot study vendor. Time can be saved if the City does not competitively bid the pilot study effort, although we would recommend confirming this approach with USDA – Rural Development. The treatment equipment would still be competitively bid.

Our original fee proposed for design was $667,000 with a commitment to achieve total project engineering within a range of 10% to 13% of the estimated construction cost of approximately $12 million. USDA – Rural Development recommends a range of 11% to 13% to communities as a fair market rate for professional services for a project of this magnitude. Generally, the cost for professional services increases as the project cost decreases and vice versa. This is because there are certain tasks and activities that need to be done regardless of the size of the project.

We understand the financial stress on the City and have evaluated our fees at your request. We offer a reduced design fee of $650,000 and will include in this fee the outside services for geotechnical engineering, which was not part of our original fee. This work is projected at $15,000. This results in reduction of approximately $32,000 to the City. The table below summarizes the original fee, and the reduced fee we are currently proposing.

Component	Labor	Reimbursable Expenses	Total
Design	$646,000*	$4,000	$650,000
Bidding	$13,400	$2,000	$15,400

*Including outside services for geotechnical engineering

We have also evaluated the anticipated construction phase services fee in more detail. One significant component of a construction project is onsite construction observation by a resident project representative (RPR). The RPR observes the work and serves as a liaison between the contractor and the engineer. The RPR does not make engineering decisions in the field but serves to observe and document the progress and quality of the work. The RPR is often called upon to assist in clarification of the contract documents, to answer contractor questions, identify work that does not conform to the contract documents, and to confer in real time with the engineers in the office to provide direction to the contractor. Some of our clients have designated staff that can take on some or all of the responsibilities for onsite observation. The MSU Iron Removal plant was one example of a project where the client had designated staff for this purpose. Duties for observation of the building construction were performed directly by MSU staff having building construction knowledge and experience. MSU relied upon Fishbeck for periodic site visits, primarily to observe the process work (piping and equipment) and control systems, so we had a limited RPR role on that project.

You requested that we commit to a total fee of 10% of the estimated construction cost. In order to achieve a fee approaching this level, we would need to reduce the scope from the typical level of services for a project of this magnitude and importance to half time or less. The level of construction observation can be varied depending on the Owner's preferences. A project of this magnitude generally includes full time observation through the project substantial completion date and then part time observation through final completion. We understand that the City desires full-time observation with an RPR. We feel we can provide full time observation and achieve a total fee of 12% of the estimated construction cost if the construction duration can be held to 18 months. If construction time is extended considerably beyond that, we would anticipate the total fee to approach 12.5% of the estimated cost presented in the study.

Our estimated fees do not include extensive start up and commissioning of the plant or work to demonstrate compliance with corrosion control guidelines that may be dictated by EGLE. We will work in good faith with the City to provide a fair fee for these services as may be requested. Other assumptions related to our design and bidding phase services and fees are as presented in our original January 8, 2021 proposal.

Fishbeck is a leader in water treatment design in the State of Michigan and has a better understanding of the City's system than other consultants can provide. We have recently conducted a tour of the MSU iron removal plant for City staff. This plant is one of the newest iron removal plants in the state and is similar in many ways to the City's project in that it includes provisions for radium removal, and it was designed to be able to be expanded with water softening in the future. Our experience with the MSU project will provide a direct benefit to the City, particularly in the area of approval of corrosion control methods and permitting through EGLE. We also have extensive experience with USDA – Rural Development funding with four projects currently in progress.

We appreciate the difficult decisions facing the City regarding the water system improvements. We feel we have been a good partner to the City in the recent efforts to improve the water system. We have credited the City approximately $19,000 for as needed services requested by the City related to the Well 9 legal effort. We also have incurred approximately $9,000 of costs on the water supply study fees which we have not asked the City to reimburse.

We hope you will find our updated proposal to be acceptable. Please contact me if you need any further information.

Sincerely,

John A. Willemin, PE

By email

PROPOSAL FOR:
THE CITY OF GRAND LEDGE

IRON REMOVAL TREATMENT PLANT

fishbeck

Engineers | Architects | Scientists | Constructors

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1515 Arboretum Drive, SE
Grand Rapids, Michigan 49546

616.575.3824 | fishbeck.com

January 8, 2021

Mr. Adam Smith
City Manager
City of Grand Ledge
310 Greenwood Street
Grand Ledge, MI 48837

Proposal for Professional Services
Iron Removal Plant Engineering

Dear Adam:

Fishbeck is pleased to provide the City of Grand Ledge (City) this proposal to provide detailed design and bidding phase engineering services associated with the construction of a new Iron Removal Plant for the City with provisions to accommodate water softening treatment in the future.

Statement of Understanding

The existing Iron Removal Plant was constructed in 1988 and uses an Aeralater Type II-Q by General Filter to remove iron from three groundwater supply wells (Wells 6, 7, and 8). The Aeralater is approaching the end of its useful life; it has begun to leak and has significant operational issues.

The City retained Fishbeck in 2019 to evaluate the option of repairing the existing Aeralater unit. The scope of required repairs could not be evaluated fully without completing costly demolition work to assess the damage. Based on Fishbeck's knowledge of the system and discussions with the manufacturer, repair of the Aeralater was determined to be difficult and expensive with no indication of how long the repairs would last, if successful. It was recommended that the City replace the equipment rather than repair the existing Aeralater.

In 2020, the City retained Fishbeck to complete three feasibility studies evaluating the replacement of the existing system. The first study examined options to replace the existing treatment system with a new iron removal treatment system. The second study examined options for a new water softening treatment plant. The third study examined the City purchasing water from the Lansing Board of Water and Light (LBWL). The City is considering moving forward with the construction of a new iron removal treatment plant based on the results of these studies.

The anticipated project improvements to be incorporated in the design are based on the descriptions and sizing from the *Iron Removal Treatment Plant Study* (Fishbeck, July 6, 2020). The project is expected to include the following major components:

- An iron removal plant utilizing pressure filtration with sand and anthracite media for the reduction of iron, manganese, and radium. The treatment processes and supporting spaces will be housed in a new treatment building with design provisions to incorporate an addition for water softening treatment in the future.
- The ultimate treatment capacity of the plant will be up to 4 million gallons per day (mgd). The capacity for the initial build will be determined during preliminary design.
- A cast-in-place concrete buried backwash storage tank with an approximate volume of 220,000 gallons.
- Buried utilities, paved access road, and associated site work to support the new facility.
- Process, controls, and electrical work will be completed at Wells 6, 7, and 8, the existing elevated tanks, and the Industrial Park Pump Station.

Anticipated Basis of Detailed Design

A detailed description of the components of the proposed Iron Removal Plant are presented by engineering discipline in the following paragraphs. These components are the basis of the proposal as presented and will be augmented by subsequent discussions with the City.

Water Process Engineering

Design of an iron removal system relies fundamentally on water process engineering. Our detailed design will provide for:

- Treatment capacity up to 4 mgd capacity, with the initial build to be determined during preliminary design.
- Horizonal pressure filters for removal of iron, manganese, and radium. The number of filters will be dependent on the capacity of the filters, redundancy requirements, building layout, provisions for capacity buildout, and the ability to retrofit the plant in the future to add softening.
- Chemical feed and storage, including:
    - Chlorine gas for chemical oxidation and finished water disinfection.
    - Hydrous manganese oxide (HMO) to adsorb radium in the water, allowing it to be filtered. Sodium permanganate and manganese sulfate systems would be used to produce HMO in batch tanks.
    - Phosphate for corrosion control.
    - Fluoride (hydrofluosilicic acid) for dental health.
- Associated piping, valves, and flow meters.
- A backwash system utilizing the filtrate of operational filters and blowers to provide air scour. Controls would be provided for semi-automatic function of the backwash process.
- Backwash waste will flow to a backwash equalization tank with discharge to the existing sanitary system being regulated using a control valve.
    - Modification of the existing well pumps to allow them to pump through the iron removal pressure filters directly to the existing distribution system without a repumping step.

Architectural/Structural Engineering

The iron removal system will be housed in an approximately 8,900-square foot building constructed on the south side of the existing Iron Removal Plant site. It is anticipated that the following features will be incorporated into the detailed design of the building:

- Wall construction will be determined in conjunction with the City during preliminary (30%) design phase. As a basis for the proposal, use of masonry wall construction is assumed. Typical exterior masonry walls include an interior load bearing concrete masonry unit (CMU) wythe and an exterior split face decorative block veneer. The decorative block would include integral color and water repellant admixtures for low maintenance. Rigid insulation would be installed in the cavity to meet energy code requirements. Other options for exterior walls could include an insulated metal panel system, or precast concrete. Interior masonry walls would be painted. The masonry walls would be reinforced with vertical bar reinforcing at a regular spacing, wire reinforcing in joints, and added reinforcing around openings.
- A sloped roof design is desired by the City and will be incorporated unless determined to not be economically viable during the preliminary design phase. Roofing will be prefinished standing seam metal roof panels applied over sheathing or purlins, and cold formed steel roof trusses. Gypsum board will be applied to the underside of the roof trusses. Batt insulation with sheet vapor retarder will be installed between the trusses to meet energy code requirements.

- Exterior doors and frames will be hollow-metal construction. The doors will be insulated, galvanized, and finish painted. Interior doors and frames will be painted, hollow-metal construction. Doors at chemical storage rooms will be fire rated fiber reinforced plastic (FRP) construction for chemical resistance with panic hardware. Door hardware will be keyed to match the Owner's existing system. Overhead doors will be insulated, sectional or coiling style, with metal cladding.
- Interior ceilings in process, chemical storage, and mechanical equipment spaces will be painted gypsum board. Suspended acoustical ceilings will be provided in administrative spaces, corridors, and restrooms.
- Floors will be sealed concrete in process, chemical storage, and mechanical equipment spaces. Vinyl composition tile will be provided in administrative spaces, corridors, and restrooms with a resilient base applied to the perimeter walls.
- Stainless steel toilet accessories, including grab bars at water closets, will be provided in restrooms to meet barrier free accessibility requirements.
- Where applicable, a small mezzanine may be constructed over certain rooms for storage and/or mechanical equipment. The mezzanine structure will be precast concrete plank with a cast-in-place concrete topping bearing on concrete masonry walls.
- Pending a geotechnical investigation, foundations are presumed to be shallow strip and spread footings constructed of reinforced concrete.
- Building slab on grade will be concrete on compacted granular soil, with welded wire reinforcing. A pipe trench will be constructed of reinforced concrete with reinforcing amounts and water stopped joints intended to minimize cracking and leakage. The grating over the trench is presumed to be heavy duty galvanized steel, capable of carrying a heavy wheel load. Supplementary steel members supporting the grating and other steel necessary in the building will be galvanized structural steel shapes. Slabs in chemical storage rooms will be constructed of reinforced concrete and designed to be fluid containing.
- The backwash equalization tank concept consists of a reinforced concrete bottom slab with trench/sump, walls, and top slab designed and reinforced to minimize cracking. Interior beams and columns will likely be required. At least two aluminum access hatches will be located at the ground surface for access into the tank and maintenance. Tank joints will be water stopped. The top slab will slope for drainage and be covered with sheet waterproofing wrapped onto the tank walls two feet down around the perimeter.

Site/Civil Engineering

Based on the conceptual design, the new Iron Removal Plant would be constructed on the south side of the existing water treatment plant site. It is anticipated that the following features will be incorporated into the site/civil design of the facility:

- Extension of the existing asphalt access road to the new treatment plant.
- Construction of 16-inch raw water main to connect the existing raw water line to the new plant.
- Construction of parallel 16-inch finished water main to connect the treatment plant to the distribution system.
- Construction of 16-inch backwash waste line that will connect to the reinforced concrete backwash equalization tank.
- Construction of 12-inch backwash drain line to the existing sanitary system connected to an electrically actuated modulating control valve and flow meter in a vault to control the flow of backwash to the sanitary system.
- Stormwater drainage modifications to accommodate the new treatment plant and access road.
- Construction of other utilities as necessary to support the new facility.

Mechanical (Heating, Ventilation, and Air Conditioning; and Plumbing) Engineering

Our mechanical engineers will develop a detailed design that provides ventilation and heating of the iron removal plant and other features.

Heat will be provided via a boiler with pumps that will provide hot water for air handling unit (AHU) heating coils and unit heaters in the chemical and electrical rooms.

Ventilation will be provided by the AHU and exhaust fans:

- One AHU will be located on a mezzanine level with supply air ductwork and registers at the ceiling level; a second AHU will be located in the mechanical room. The units will utilize 100% outdoor air.
- Exhaust fans in chemical rooms will be corrosion-resistant with ductwork and high and low intake grilles to promote better air flow and improved air quality in the breathing zone.
- A roof exhaust fan with a wall intake louver and a motorized damper will be provided to ventilate the electrical room.
- Corrosion-resistant air intake louvers with motorized dampers will be provided in the chemical rooms.

Other mechanical features of the detailed design will include:

- Emergency eyewash stations and showers in the chemical rooms, with a tepid water heating system.
- Non-potable water for general washdown hose bibs inside the addition.
- Wall hydrants on exterior walls for general non-potable water uses.
- Floor drains with trap seal primer or barrier-type trap seals connected to the existing sanitary system.
- Roof drains connected to the existing stormwater system.
- Natural gas piping system extension from the existing building.
- Wet pipe fire protection (sprinkling) system.

Electrical Engineering

The main electrical engineering considerations are to provide an electrical service for the new Iron Removal Plant as well as new power distribution, lighting, controls, and ancillary systems for the iron removal system equipment and iron removal plant building.

- Electrical Service
    - A new electrical service will be obtained from the local utility company for the new Iron Removal Plant. New service entrance equipment will be located in an electrical room inside the plant.
    - Voltage and metering requirements will be coordinated with the local utility company.
    - It is assumed that electrical services to existing facilities on the same site as the plant will remain and be reused.
- Power Distribution
    - Power will be distributed via a main service-entrance rated circuit breaker, automatic transfer switch, motor control centers, power distribution panelboards, 208Y/120-volt step-down transformers, and lighting panelboards.
    - Motor starters and variable frequency drives (VFDs) will be provided as required for controlling motor loads.
    - A diesel generator will be provided to supply standby power in case of a utility power outage. The generator will be sized so that the treatment plant can meet average day demands. Provisions (i.e., generator docking station) will be included for connecting a portable generator and load bank so the generator can be serviced and maintained with minimal interruptions in accordance with the

requirements of Article 700.3 of the National Electrical Code (NEC). The generator will be located outside in a weather-protected, sound-attenuated enclosure. A double-walled sub-base fuel storage tank, sized to allow the generator to operate at full load for a minimum of 24 hours, will be provided with the generator.

- A new diesel generator and automatic transfer switch will be provided at Well 6. The generator will be located outside in a weather-protected, sound-attenuated enclosure with a double-walled sub-base fuel storage tank sized to allow the generator to operate at full load for a minimum of 24 hours. A new (larger HP) motor and VFD will be provided at Well 6 along with appropriately sized motor controls.
- Existing pump, motor, and VFD will remain and be reused at Well 7. The existing 125KW generator and transfer switch will remain and be reused at Well 7.
- A new (larger HP) motor and VFD will be provided at Well 8.

- Controls
  - Treatment equipment, chemical feed systems, instrumentation, and controls will be monitored and controlled via a programmable logic controller (PLC) based control system.
  - Control panels with distributed PLCs and input/output (I/O) racks will be strategically located throughout the plant. Level, flow, pressure, temperature, and analytical instruments will be wired to local control panels. Each control panel will include an uninterruptible power supply (UPS) to allow equipment to ride through momentary power interruptions.
  - A network of computer servers and client workstations will interface with the PLCs and be programmed to provide operator interface visualization, alarming, reporting, trending, data collection, storage, and archiving features. Industrial workstations with touchscreen capabilities can be provided in certain control panels as necessary.
  - Control system equipment will be connected on an Ethernet network. Category 6 (copper) cabling will be used for network connections shorter than 300 feet. Multi-mode fiber optic cabling will be used for longer runs and between buildings.
  - Remote access to the control system can be provided via an internet connection and virtual private network (VPN). Managed Ethernet switches will be utilized to provide network security. Access via cell phones, tablets, and hand-held devices can also be incorporated.
  - PLCs and remote communications with well houses and other sites (e.g., elevated tanks, pump stations, etc.) will be reviewed during design. We understand that existing radios and antennas have been replaced with new 2.4 GHz spread spectrum equipment. It is assumed that the new radios communicate reliably and will be able to be reused with the new plant and remote communications system. If the new spread spectrum radios do not communicate reliably, cellular communications will be considered. PLC equipment will be evaluated for replacement. The existing PLCs have been discontinued by the manufacturer (Allen-Bradley) and may not be suitable for reuse. New CompactLogix or MicroLogix PLCs will be considered during design. An existing radio at the plant site will be reused or a new (compatible) radio provided. A new antenna will be provided near the new plant building. The antenna will be pole or building-mounted. Path testing will be specified to be performed during construction to confirm the antenna location and mounting height at the plant.
  - It is assumed that a new control panel with local PLC, I/O rack, and touchscreen operator interface will be provided at each remote site. Existing spread spectrum radios will be field installed in the new control panels, and existing antennas reused in their current locations. Cellular modems will be provided if spread spectrum radios cannot be utilized.
  - Existing instruments and motor controls will be reused at each well house, pump station, and tank.

- Lighting
  - LED lighting will be provided throughout the plant. Lighting controls will be provided to meet current energy conservation codes.
  - Emergency lighting will be powered via a centralized UPS system.
- Ancillary Systems
  - Exact fire alarm requirements will be determined and discussed with the City and local code officials during preliminary design. It is likely that a UL-listed and monitored system will be required in the plant due to the types and volumes of chemicals that will be used onsite. Pull stations, smoke detectors, heat detectors, sprinkler system tamper and flow switches, and audio/visual indicating appliances will be provided as required. Devices will be networked to a centrally located fire alarm control panel. The fire alarm system will be monitored via the plant control system.
  - We understand that the City will utilize an independent contractor to install security systems (access controls, cameras, etc.) at the plant. The design of the plant will be coordinated with the security system provider.

Scope of Services

Fishbeck has prepared an anticipated scope of services that includes the following elements and specific tasks:

Preliminary Design

During this phase, the various project elements will be sized, located, and refined. A preliminary basis of design will be established, process schematics will be developed, and building and process layouts will be prepared. This will be one of the most interactive phases between the City and Fishbeck, and we anticipate the City will have significant input on project preferences and building layout items. The primary design disciplines involved during this phase will include process, civil, electrical/controls, and geotechnical engineering, and architectural design. In addition, Fishbeck will assist the City in applying for funding through Rural Development. This will include preparation of a Preliminary Engineering Report and other necessary submittals to apply for funding.

Fishbeck will assist the City in obtaining a pilot testing vendor and will provide oversight on the progress of the pilot testing. A pilot testing study will be completed to determine the recommended filtration media and filtration rates for the new iron removal plant. In addition, the study will be used to predict the iron, manganese, and radium removal of the new iron removal plant and will provide recommendations on chemical application for optimum removals.

Fishbeck will assist the City in coordination with EGLE to define the requirements for a corrosion control study that will be necessary to achieve EGLE approval of a permit for construction, and to develop a plan and schedule to conduct the study. It is anticipated that a third-party corrosion consultant will be retained by the City to complete the corrosion study, which may need to be completed during plant start-up and commissioning. Fishbeck will assist the City in obtaining the services of a qualified corrosion consultant.

At the conclusion of the preliminary design phase, the design will be approximately 30% complete.

Specific tasks to be included are as follows:

1. Attend a project kickoff meeting with the City to identify key project goals and objectives, establish communication protocols, and review project approval procedures. If desired, Michigan Department of Environment, Great Lakes, and Energy (EGLE) can be included in this meeting.
2. Complete any additional topographic survey of the remote sites (wells, tanks, etc.) necessary to complete preliminary drawings.

3. Recommend a soils consultant for geotechnical services and coordinate with the soils consultant to obtain soil borings and complete a geotechnical report with recommendations for construction excavation, dewatering requirements, and footing/foundation design for new structural building elements.
4. Work with the City to identify a preferred vendor for pressure filter equipment and solicit pricing for the vendor to perform the pilot study. Coordinate with the preferred vendor and the City on set up of the pilot study in the existing plant. Work with the vendor to evaluate pilot study results confirming design parameters and sizing for the horizontal pressure filters, including filtration rates, media requirements, and chemical dosing. Compile the results of the pilot study into a report for submittal to EGLE for approval. Incorporate the results of the pilot study into the preliminary Basis of Design.
5. Coordinate with EGLE on requirements for corrosion analysis that will need to be included in the final design and update the City of any changes to the scope of services. A preliminary desktop analysis will be completed to understand the impact of the process changes on water corrosivity.
6. Conduct a building code review for building modifications to include structural, mechanical, and electrical code requirements. The code review will also verify local code requirements, such as may exist for zoning, setbacks, fire protection (sprinkling and alarm systems), etc.
7. Refine the preliminary floor plan developed in the study phase and prepare a building elevation drawing. Develop building renderings for City review to illustrate options related to roof design (flat versus sloped) and wall elements. Conduct a workshop with the City to confirm building material preferences, roof design, and overall floor plan.
8. Confirm site utility layout and rerouting requirements for existing utilities.
9. Confirm sizing for the backwash equalization tank and location on the project site.
10. Verify the sizing, layout, and piping requirements to incorporate the proposed improvements. Develop a Basis of Design for proposed improvements for use in the permitting process.
11. Determine electrical load requirements for the new equipment. Identify necessary electrical improvements to accommodate the new building and equipment. Determine how and where new equipment will be located connected. Identify new distribution equipment (e.g., motor control centers, panelboards, motor starters, VFDs, etc.).
12. Review the existing supervisory control and data acquisition (SCADA) system and develop a concept for incorporating new instrumentation and programming. Summarize new instrumentation and control equipment to incorporate controls and monitoring for new processes and equipment.
13. Review standby power requirements and provide capacity recommendations including generator size, type, and manufacturer recommendations. The City will be consulted to establish the desired generator capacity.
14. Determine requirements for improvements at remote sites for pumping, electrical, standby power, communications, and control.
15. Prepare preliminary drawings as follows:
    a. Site plan with utilities.
    b. Preliminary floor plan.
    c. Process schematic.
    d. Process instrumentation diagram.
    e. Preliminary piping plan.
    f. Electrical one-line diagram.
    g. Control system configuration (network architecture) diagram.

16. Assist the City in obtaining project funding through the United States Department of Agriculture – Rural Development Program (RD):
    a. Assist the City in completing Standard Form 424 – Application for Federal Assistance. It is assumed that the City will complete the form and Fishbeck will provide cost data and supporting information (reference for Items 4, and 6 through 10 on the Budget Information Sheet of Standard Form 242C).
    b. Assist the City in completing Existing Water System Summary worksheet provided by RD.
    c. Revise the studies completed previously to incorporate the provisions required by RD per Bulletin 1780-2 – Preliminary Engineering Reports (PERs). The revisions will include the addition of or revisions to the following sections, as applicable, included in the Bulletin 1780-2 outline for the PER:
        - Project Planning.
        - Supplemental information for Existing Facilities section.
        - Need for Project section.
        - Alternatives Considered/Alternatives Analysis section.
        - Selection of Alternative section.
        - Supplemental information for Proposed Project (Recommended Alternative) section.
    d. Assist the City with issuing comment solicitation letters to regional planning agencies, state and federal agency stakeholders such as endangered species and historical society, Tribal stakeholders, etc.
    e. Coordinate with the City's service provider for an Environmental Report.
17. Prepare an updated opinion of probable construction cost based on the preliminary design documents and include in the PER.
18. Submit the PER in electronic (PDF) format to the City, RD, and EGLE for review. Meet with the City to review comments on the draft PER. If desired, EGLE can be included in this meeting.
19. Incorporate applicable comments and issue final copies of the PER. We assume four hard copies will be provided in addition to an electronic (PDF) copy.

Final Design

During this phase, project concepts, layouts, and sizing will be developed from their preliminary state into detailed drawings and specifications for all design disciplines including Process, Civil, Architectural, Structural, Mechanical (HVAC and Plumbing), Electrical, and Instrumentation and Controls. Each discipline will prepare bid ready drawings and specifications. Throughout this phase, progress meetings will be held between the City and Fishbeck to relay design concepts and receive input on the design.

The specific tasks included in final design are as follows:

1. Prepare 60% and 90% design documents and submit for review by the project stakeholders including the City, RD, and EGLE, as applicable. Coordinate review comments and implement applicable comments into the bidding documents.
2. Coordinate contractual requirements with the City specifically relating to bonding, insurance, liquidated damages, and dispute resolution.
3. Prepare Divisions 00 and 01 front-end specifications to include the Standard General Conditions of the Construction Contract by the Engineers Joint Contract Documents Committee (EJCDC) as required for RD financing. These documents will identify contractual and administrative requirements.
4. Prepare technical specifications for bidding purposes. The specifications will follow the current Construction Specification Institute (CSI) numbering and formatting.

5. Prepare final drawings for bidding purposes, in major subdivisions to include Civil, Architectural, Structural, Process, Mechanical (HVAC and Plumbing), Electrical, and Instrumentation, as applicable to the project.
6. Update the Engineer's Opinion of Probable Construction Cost for the work reflecting 90% design documents.
7. Complete internal quality assurance/quality control (QA/QC) procedures, which will include City, RD, and EGLE review. Incorporate applicable review comments into the design documents.
8. Submit the bidding documents and permit application to EGLE and help the City to secure the Part 399 Water System Construction Permit issued by EGLE. The permit application will be submitted following completion of the design. Fishbeck will prepare the permit application, coordinate review with EGLE, and respond to EGLE comments. The time required to review and approve the permit is dependent on agency workload, although keeping the agency informed regarding the design progress can facilitate a faster review of the final design submittal.

Bidding

1. Assist the City with preparation of an advertisement for bids.
2. Coordinate distribution of drawings and specifications to potential bidders.
3. Attend and conduct a pre-bid meeting at the City's location.
4. Answer bidders' questions and issue addenda, as needed.
5. Attend and assist the City in the bid opening meeting at the City's location.
6. Assist the City in the evaluation of bids and identify qualified bids for City selection of a contractor for awarding construction of the project.
7. Assist the City in the award of the project and coordinate with RD to provide the necessary forms and documents.

Assumptions

The proposal and fee presented is based on the following assumptions:

1. Fees to complete the design phase services as described are presented herein. Fees for bidding and construction phase services will be provided at the conclusion of design.
2. There will be additional costs associated with the design for services to be provided by others as follows:
   a. A geotechnical investigation will be required for the project as described under preliminary design. We have included a budget to include the geotechnical investigation in our scope to be performed by a geotechnical firm as a subconsultant to Fishbeck. If desired, the City could contract directly with the geotechnical consultant.
   b. A pilot study will be required to finalize treatment equipment sizing and specifications. We have included our services related to the pilot study (vendor coordination, summary report, etc.) in our fee proposal. However, the vendor costs for the pilot study are not included. These costs will be determined from pricing quotations from the preferred vendor(s) selected by the City. The proposal assumes that the City will contract directly with the vendor for their services, and that the City will assist the vendor in setting up and operating the pilot equipment. Fishbeck can assist in this effort upon request.
   c. Funding through RD will require an Environmental Report. It is typical for this report to be completed by Rural Community Assistance Partnership (RCAP), a nonprofit organization that can complete the necessary report for considerably lower cost. It is assumed that the City will contract directly with RCAP for completion of the necessary Environmental Report, including any related State Historic Preservation Office (SHPO) reviews.

   d. Funding through RD will require that the City have attorney certification that all City utilities are located on City owned property, or on property for which the City has an easement. Fishbeck has not included any services or fees related to this effort in our proposal. We can provide support for this effort, i.e., required survey or writing of easement language, upon request.

3. A corrosion control analysis will be required by EGLE to achieve a Part 399 permit. It may be necessary to conduct this study during plant start-up and commissioning rather than during design. It is anticipated that a third-party corrosion consultant will conduct the corrosion study and that the City will contract directly with that service provider. Fishbeck will provide a description of scope and fees to assist the corrosion consultant with supporting data, reporting and review, and coordination with EGLE upon clarification from EGLE as to the study requirements. It is assumed that the corrosion consultant or the City will provide necessary field work. Fishbeck can assist in this effort upon request.
4. No meetings or special provisions for site plan approval are anticipated since this is a City project on City owned property.
5. No provisions for work or improvements at the existing iron removal plant are included.
6. Security system provisions, such as security cameras, card readers, fencing, etc., are not included in the design. It is assumed that these systems and their related designs will be provided by the City's security system provider. Fishbeck with coordinate with that provider as requested.
7. The City will pay applicable permit fees.
8. Local permit fees will be the responsibility of the construction contractors.
9. In general, project deliverables will be issued electronically (in PDF format) for review, except as required in hard copy for submittals to the reviewing agencies. It is assumed that four hard copies of the final PER and contract documents will be provided.
10. Bidders will be responsible to purchase the bidding documents. Fishbeck utilizes a commercial plan room to handle all bidder requests for hard copy documents. Bidding documents will be made available to a few of the common local plan rooms. A hard copy set of bidding documents will be provided to the City for public viewing, if desired.
11. This proposal covers design and bidding phase services. We recommend that construction phase engineering budgets be established when the project details are defined through preliminary design and a construction schedule can be further detailed.

Professional Services Fee

Fishbeck proposes to execute the Scope of Services described herein on an hourly, not-to-exceed basis. Our fees are summarized in the following table for the design and bidding phases. If the required scope of services is different from what is described in this proposal, we will notify the City immediately of any appropriate amendment to the scope and fee.

Component	Labor	Reimbursable Expenses	Total
Design	$663,000	$4,000	$667,000
Bidding	$13,400	$2,000	$15,400

Fishbeck will commit to complete the engineering services for the project within a range of 10% to 13% of the construction cost of the project, which is based on the current estimated capital cost of approximately $12 million. This range would cover typical construction administration and construction observations services but may not cover extensive startup and commissioning services as may be dictated by EGLE in the future. We assume the City would handle the majority of the startup operation and reporting labor for startup and commissioning. Fishbeck can assist in this effort upon request.

Fishbeck can carry the contract for the geotechnical investigation as an outside service. The budgeted fee for that effort, including the necessary soil borings would be $15,000, including all associated markup and insurance provisions. If the City would like to contract directly for geotechnical services, we will coordinate with the recommended geotechnical consultant to provide the City direct proposal pricing.

Invoices will be submitted every four weeks based on the time charged and expenses incurred.

Schedule

Design is expected to take 9 to 12 months. The actual time required for design will be dependent on the time needed to complete the pilot study, a corrosion study, and obtain the Part 399 permit from EGLE. All of these items will require feedback and approval from EGLE, and the time for the associated reviews is subject to EGLE's schedule and workload. Fishbeck recognizes the critical nature of this project and its importance to the City. We will work with the City, RD, and EGLE to improve on the design timeline as much as possible.

Authorization

Funding through RD will require use of that agency's approved engineering agreement. If you concur with our scope of services, please notify us of your intent to authorize an engineering agreement, and we will prepare the necessary agreement and return it to the City for review and approval.

We appreciate the opportunity to submit this proposal and look forward to working with the City on this critically important project. If you have any questions or require additional information, please contact me at 616.464.3801 or jwillemin@fishbeck.com.

Sincerely,

John A. Willemin, PE

Attachments
By email

FISHBECK SERVICES

Fishbeck is a professional civil engineering, environmental, architectural/engineering, and construction services consulting firm with over 490 people serving governmental, educational, healthcare, commercial, industrial, and private clients.

Established in 1956, Fishbeck is a 100-percent employee-owned firm with 14 offices throughout Michigan, Ohio, and Indiana. Our range of services and integrated project approach provides our clients with specifically suited, innovative designs. We are committed to delivering exceptional service, outstanding technical quality, and establishing long-term client relationships.

Our projects range from small feasibility, planning, and regulatory studies to very large design and construction projects. Our Water and Wastewater Department staff is dedicated full time to projects involving treatment, storage, and pumping solutions for water and wastewater systems. Our civil engineering division consists of experienced civil engineers, surveyors, stormwater/drainage experts, and landscape architects. The environmental division is a mix of environmental engineers, chemists, biologists, chemical engineers, air quality experts, compliance/regulatory specialists, geologists, hydrogeologists, certified safety professionals, and wetland experts.

Our architectural/engineering division has complete building design capabilities with architects and structural, mechanical, and electrical engineers. Our construction division offers construction management and design/build services.

INFRASTRUCTURE ENGINEERING

- Water Distribution
- Water Supply/Treatment
- Water Storage
- Watershed Management
- Wastewater Collection
- Wastewater Treatment
- GIS/Computer Mapping
- Asset Management
- Stormwater Management
- Site Development
- Transportation
- Surveying

ARCHITECTURE/ ENGINEERING

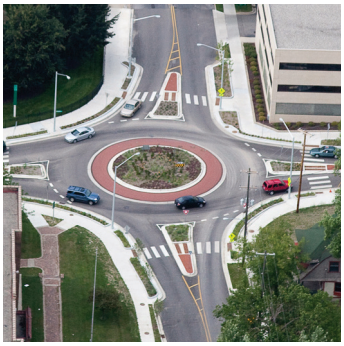
- Architecture
- Mechanical
- Electrical
- Structural
- Interior Design
- Systems Commissioning
- Indoor Air Quality
- Master Planning
- Facility Condition Assessment
- Energy Assessment

ENVIRONMENTAL

- Remediation
- State and Federal Environmental Program Assistance
- Air Quality
- Brownfield Redevelopment
- Water Resources
- Industrial Hygiene
- Asbestos/Lead Management
- Environmental Site Assessment
- Due Diligence

CONSTRUCTION

- Construction Management
- Design/Build
- Cost Estimating
- Scheduling
- Preconstruction
- Reconstruction and Cost Reduction Studies



100%
EMPLOYEE-OWNED

490+
EMPLOYEES

220+
SHAREHOLDERS

14
OFFICES

FISHBECK HISTORY + PHILOSOPHY

HISTORY

Fishbeck is a professional architectural/engineering, civil engineering, environmental, and construction services consulting firm. Our range of services and integrated approach to projects provides our clients with specifically suited, innovative designs while incorporating outstanding technical quality, and exceptional client service. We are committed to responding to our clients needs, whether down the street, across the country, or around the globe; and strive to establish long-term relationships.

Established in 1956, Fishbeck has grown to a firm of over 490 people who serve public and private clients. Our operations are guided by a defined set of core values and purpose – our Vision In Action. We have drawn together an extraordinary team of disciplined experts, creative thinkers, and caring professionals. We take personal responsibility for helping each other, clients, and colleagues succeed, as we fulfill our core purpose.

PHILOSOPHY

Fishbeck is a 100-percent employee-owned corporation that believes in the straightforward philosophy of providing outstanding service to our clients with our core values being:

- Enthusiasm & Intensity
- Honesty & Integrity
- Innovation & Excellence in Everything We Do
- A Concern & Respect for People and Their Personal & Professional Growth

These four values result in the **most important value: EXCEPTIONAL CLIENT SERVICE**.

At Fishbeck, **our core purpose** is to "help people realize their visions while benefiting society."

Fishbeck's **mission** is to meet our clients' needs and achieve our business goals in a manner that exemplifies our core values. Our mission basics include:

- Provide innovative and excellent designs within budget.
- Work in a supportive and synergistic way with other team members of all disciplines.
- Consider the client a project team member.
- Know the program requirements and meet them in the simplest, most constructible, cost-effective manner.
- Align expectations with clients' needs, budgets, and the scope of our services.
- Conduct preschematic multidiscipline brainstorming.
- Keep cost estimates updated, the client informed, and design to stay within approved estimates.
- Conduct QA/QC reviews at appropriate milestones to minimize redesign.
- Minimize addenda, bulletins, and change orders.

ORGANIZATIONAL CHART

CITY OF GRAND LEDGE – IRON REMOVAL TREATMENT PLANT PROJECT

CITY OF GRAND LEDGE

PROJECT MANAGER
David Baar, PE

TECHNICAL ADVISOR AND PRINCIPAL-IN-CHARGE
John Willemin, PE

WATER PROCESS

Colin McCorkle, PE
Water Engineer

Brian Phillips, PE, LEED AP
Sr. Water Engineer

CIVIL

Traci Osman, PE
Sr. Civil Engineer

STRUCTURAL

Rich Sageman, PE
Sr. Structural Engineer

MECHANICAL

Jerry Hirth, PE, LEED AP
Sr. Mechanical Engineer

Renee Zaccagni, PE, LEED GA
Mechanical Engineer

ELECTRICAL/INSTRUMENTATION

John Condie, PE
Principal/Sr. VP

Matt Stack, PE, LEED AP BD+C
Sr. Electrical Engineer

Tim Dwyer, PE
Sr. Electrical Engineer

ARCHITECTURE

Terry Bourassa, RA
Sr. Architect

YEARS OF EXPERIENCE
21 years — Fishbeck
23 years — total

EDUCATION
BS in Engineering, Civil Concentration, Calvin College

REGISTRATIONS/ CERTIFICATIONS
Professional Engineer – Michigan

MEMBERSHIPS
Member, American Society of Civil Engineers

Member, Water Environment Federation

Member, American Water Works Association, Young Professionals Committee

DAVID BAAR, PE

VICE PRESIDENT | SENIOR WATER & WASTEWATER ENGINEER

Dave has worked in the engineering and construction industry as a design engineer. His experience includes working with governmental, commercial, and industrial clients. He has provided civil and environmental engineering, construction assistance, construction inspection, and start-ups for various projects. His projects include water and wastewater treatment systems, pumping systems, and water distribution systems. His major focuses are municipal water treatment, pumping and storage, industrial wastewater treatment, and water distribution system modeling.

EXPERIENCE

WATER PROCESS

CITY OF ANN ARBOR, MICHIGAN

AMMONIA FEED SYSTEM MODIFICATIONS
Worked on evaluation of existing ammonia feed system, as well as detailed design, and construction phase of ammonia feed system improvements. Project included replacement of piping, feed equipment, controls and bulk to day tank transfer modifications.

FILTER PIPE GALLERY REHABILITATION STUDY
Implemented sampling plan and treatability study for municipal water supply. Performed feasibility study for a 5.8-MGD iron and manganese removal facility.

WATER SYSTEM RRA AND ERP UPDATE
Managed project designed to bring City into compliance with the America's Water Infrastructure Act of 2018.

WATER SYSTEM ASSET MANAGEMENT PROGRAM
Completed report to meet state requirements.

COLDWATER BPU, MICHIGAN

- WTP improvements included replacement of high-service pumps, pipe, and valves. The project also included a new generator, MCC equipment, VFDs for high-service pumps, and electrical improvements at the plant and adjacent well house.
- Completed a study for chlorination system replacement.

CITY OF PORTAGE, MICHIGAN

GARDEN LANE WELL FIELD
Completed feasibility study for arsenic, iron, and manganese from three existing wells and one proposed future well.

SHUMAN WELL FIELD
Implemented sampling plan and treatability study for municipal water supply. Performed feasibility study for a 5.8-MGD iron and manganese removal facility.

CITY OF MIDLAND, MICHIGAN

WTP chemical feed system, instrumentation, and control systems replacement including upgrade and additions to plant-wide SCADA system.

LAKE CHARTER TOWNSHIP, MICHIGAN

- Process design for 2-MGD membrane treatment system to increase existing WTP capacity.
- Process design for CIP, concrete finished water storage reservoir and process piping system.

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DAVID BAAR, PE

VICE PRESIDENT | SENIOR WATER & WASTEWATER ENGINEER

LANSING BOARD OF WATER & LIGHT, MICHIGAN

Design of facility rehabilitation improvements for a plant destroyed in a chemical release, which included replacement of plant-wide SCADA and control system with a new DCS system, and replacement of much of the process, mechanical, HVAC, and electrical systems in this 10-MGD facility.

CITY OF WYOMING, MICHIGAN

BACKWASH RECLAIM SYSTEM RENOVATION

Designed renovations to backwash reclaim system as part of the WTP expansion.

RRA AND ERP UPDATE

Managed project designed to bring City into compliance with the America's Water Infrastructure Act of 2018. Completed RRA and ERP update for this regional WTP serving over 100,000 customers in March 2020.

EAST LANSING-MERIDIAN WATER AND SEWER AUTHORITY, MICHIGAN

AMMONIA SYSTEM

Completed final design of an ammonia system for a 16-MGD WTP. The system included flow paced feed on anhydrous ammonia gas system and building modifications for a chemical feed and storage area.

SODIUM HYPOCHLORITE SYSTEM IMPROVEMENTS

Project manager for study and preliminary design for new bleach storage and feed equipment at the WTP. Final design is underway.

FLUORIDE FEED SYSTEM IMPROVEMENTS

Managed design project for new fluoride feed and storage equipment in a new building at the water plant.

WATER DISTRIBUTION

CITY OF GRAND LEDGE, MICHIGAN

Completed PNA of distribution system for reliability study update. Developed computer model and calibrated based on flow tests. Analyzed scenarios and developed recommendations for proposed system improvements. Also provided hydraulic design for a new 7,500-gpm booster station.

CITY OF HOLLAND, MICHIGAN

- Project manager for Transmission Main Route Study and WTP High Service Pump Evaluation.
- Project manager for the High Service pump replacement project, which included two, new 18-MGD pumps and electrical improvements.

CITY OF ANN ARBOR, MICHIGAN

WEST HIGH SERVICE DISTRICT STUDY

Updated water system model and evaluated elevated storage capacity and tank locations in this district.

WATER SYSTEM FIGURES

Completed water system modeling for entire system, for various operating scenarios. Developed figures with key operating parameters for water system operators to reference.

CITY OF GRAND RAPIDS, MICHIGAN

COMPREHENSIVE MASTER PLANS (2004, 2009, 2015)

Completed hydraulic modeling and demand projections for distribution system master plan for this major metropolitan area. The hydraulic model development involved importing GIS data, and reducing the model from over 80,000 pipes to 7,000. The distribution system includes 11 customer communities, 11 pressure districts, two 30-mile transmission mains, 21 storage tanks and reservoirs totaling 88 million gallons, and numerous pump stations and valve vaults. The model was calibrated and recommendations for system improvements were provided.

YEARS OF EXPERIENCE
23 years — Fishbeck
27 years — total

EDUCATION
MS in Civil/Environmental Engineering, Michigan Technological University

BS in Civil Engineering, Michigan Technological University

REGISTRATIONS/ CERTIFICATIONS
Professional Engineer – Michigan, Wisconsin

MEMBERSHIPS
American Water Works Association
- Michigan Section Chair (2016/2017)

Michigan State University Department of Civil and Environmental Engineering
- Professional Advisory Board (2012-2018)

Water Environment Federation

West Michigan Water Works Association

JOHN WILLEMIN, PE

SENIOR VICE PRESIDENT | PRINCIPAL

John is responsible for the technical leadership of the water and wastewater engineers assigned to projects. He has significant experience in report preparation, design, specifications and contract documents, and construction coordination. John specializes in project management and design of complex water and wastewater treatment systems. He has been involved in numerous treatment plant renovation and expansion projects, new treatment plants, and several groundwater remediation projects

EXPERIENCE

GENERAL WATER SUPPLY

LANSING BOARD OF WATER AND LIGHT, LANSING, MICHIGAN
- Water plant evaluation study for 40-MGD Dye and 10-MGD Wise Road softening plants.
- Raw water pipe chamber rehabilitation at Dye plant.

CITY OF LUDINGTON, MICHIGAN
Water system reliability study.

CITY OF SOUTH HAVEN, MICHIGAN
Water distribution system reliability study.

WATER PROCESS

CITY OF LUDINGTON, MICHIGAN
- Expansion of existing 3.2-MGD conventional plant to 8 MGD with high rate sedimentation.
- Two conventional gravity filters.
- Pumping system improvements.
- Intake evaluation.
- Treatment feasibility study.

GRATIOT AREA WATER AUTHORITY | ALMA, MICHIGAN
- Expansion of existing 4-MGD lime softening plant to 6 MGD
- 1-MG reservoir.
- Backwash storage and pumping facility.
- Pumping and chemical feed system improvements.

CITY OF SOUTH HAVEN, MICHIGAN
- 7-MGD conventional treatment plant with highrate settling.
- Raw water pumping station.
- Water plant reliability and capacity expansion study.
- Design for 15-MGD water supply intake.

CITY OF PORTAGE, MICHIGAN
Feasibility study for arsenic and iron removal treatment.

MARION, HOWELL, OCEOLA, GENOA (MHOG) WATER AUTHORITY | HOWELL, MICHIGAN
Study to evaluate blending softened water with hard water in the WTP distribution system.

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JOHN WILLEMIN, PE

SENIOR VICE PRESIDENT | PRINCIPAL

MICHIGAN STATE UNIVERSITY | EAST LANSING, MICHIGAN
KELLOGG BIOLOGICAL STATION

Arsenic treatment system for facility water supply.

CITY OF NILES, MICHIGAN
Design of a new 2.6-MGD iron removal treatment facility for the City's groundwater supply.

CITY OF OWOSSO, MICHIGAN
Upgrades to the 6-MGD water softening plant, including new treatment tanks, chemical feed systems, and existing building restoration.

SAGINAW CHIPPEWA INDIAN TRIBE | MT. PLEASANT, MICHIGAN
- 1.25-MGD water softening plant.
- Lime sludge decant handling evaluation.

WATER DISTRIBUTION

CITY OF ST. LOUIS, MICHIGAN
- Replacement of City water supply by connecting to the City of Alma and replacing municipal wells.
- Dual 3-MGD booster pumping stations.
- Three 0.9-MG wells/well houses.
- 5 miles of 16-inch transmission main.
- 0.2-MG elevated storage tank.

CITY OF KALAMAZOO, MICHIGAN
Well Station No. 11 pumping improvements to add service to an adjacent pressure district.

CITY OF ST. JOSEPH, MICHIGAN
1.5-MG elevated storage tank.

CITY OF ALMA, MICHIGAN
1.3-MGD well pump and well house.

CITY OF GRAND LEDGE, MICHIGAN
10.8-MGD pump station and 0.75-MG, prestressed concrete, ground level storage tank.

CITY OF HOLLAND, MICHIGAN
- Waverly and South Side booster pumping station improvements to increase pumping capacity.
- 1-MG elevated storage tank.

CITY OF IONIA, MICHIGAN
Rehabilitation of existing 1-MG ground level storage tank.

CITY OF WYOMING, MICHIGAN
5-MG prestressed concrete ground level storage tanks.

CITY OF MIDLAND, MICHIGAN
Design of a 9.5-MGD water booster pumping station to serve a new pressure district.

CITY OF ANN ARBOR, MICHIGAN
West high-service storage evaluation.

CITY OF NILES, MICHIGAN
1-MGD booster pumping station and 0.3-MG elevated storage tank.

YEARS OF EXPERIENCE
14 years — Fishbeck
17 years — total

EDUCATION
MS in Civil Engineering, South Dakota School of Mines and Technology

BS in Civil Engineering, Ohio Northern University

REGISTRATIONS/ CERTIFICATIONS
Professional Engineer – Michigan, Ohio

LEED Accredited Professional

AFFILIATIONS
American Water Works Association

BRIAN PHILLIPS, PE, LEED AP

SENIOR WATER & WASTEWATER ENGINEER

Brian has both engineering and construction experience. His engineering experiences include all phases of water projects including conceptual planning, process development, detail design, and construction. In addition, he has experience working on water and wastewater treatment systems, pumping systems, chemical feed systems, and water distribution systems.

EXPERIENCE

GENERAL WATER SUPPLY

CITY OF SYLVANIA, OHIO
Conducted multiple studies evaluating construction of a new municipal water supply, treatment facility, and transmission main system to serve the City and potential regional partners.

WATER PROCESS

CITY OF GRAND LEDGE, MICHIGAN
Design of a fluoride chemical feed system.

MICHIGAN STATE UNIVERSITY | EAST LANSING, MICHIGAN
MAIN CAMPUS WATER SYSTEM IMPROVEMENTS
Design and construction phase services for an 8-MGD iron removal treatment plant and 2-MG elevated storage tank. Following construction of the WTP, performed process commissioning activities to demonstrate plant performance to EGLE.

KELLOGG BIOLOGICAL STATION
Design and construction phase services of an arsenic treatment system for facility water supply.

CITY OF ANN ARBOR, MICHIGAN
Conducted an evaluation of filter valve actuators and instrumentation following a flooding event in the water treatment plant's pipe gallery.

CITY OF HARRISON, OHIO
Design of a reverse osmosis softening addition to an existing iron removal plant.

WRIGHT PATTERSON AIR FORCE BASE | OHIO
Completed evaluation of three ion exchange facilities which provide softened water for the residential and commercial portions of the Air Force Base. Following the evaluation, completed design services for rehabilitation of the softening facilities including replacement of all piping, instrumentation and controls and process equipment.

CITY OF LUDINGTON, MICHIGAN
Expansion of a 3.2-MGD conventional plant to an 8-MGD high rate sedimentation WTP.

GRATIOT AREA WATER AUTHORITY | ALMA AND ST. LOUIS, MICHIGAN
- Completed study evaluating potential alternatives for replacement of the City of St. Louis water system.
- Design and construction phase services for expansion of a 6-MGD lime softening plant.
- Design and construction phase services for construction of two 3-MGD booster stations.

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BRIAN PHILLIPS, PE, LEED AP

SENIOR WATER & WASTEWATER ENGINEER

- Design and construction phase services for numerous well houses.

LANSING BOARD OF WATER & LIGHT, MICHIGAN

DYE WATER PLANT

- Design and construction services to replace a dust collection system for lime and soda ash.
- Conducted a study to evaluate modification to lime and soda ash storage bins to alleviate plugging and bridging.
- Design and construction management services for the replacement of raw water piping, valves and actuators for a 40-MGD facility. Work included extensive jet grouting and a TERS.

WISE ROAD WATER PLANT

- Conducted an evaluation of various WTP components following a plant-wide chemical release.
- Design and construction phase services for replacement of process equipment, chemical feed systems, electrical and instrumentation equipment, and SCADA system for a 10-MGD facility.

CITY OF GRAND RAPIDS, MICHIGAN

LAKE MICHIGAN FILTRATION PLANT – 135-MGD RATED CAPACITY

- Design and construction phase services for a series of projects rehabilitating the flocculation/ sedimentation tanks; including new interior waterproof lining, traffic bearing coating on tank exterior and both interior and exterior expansion joint replacement.
- Design and construction phase services for a series of projects rehabilitating the filter cells; included new interior waterproof lining, new filter underdrain system, and installation of motorized valve actuators.
- Design and construction services for retrofitting existing up flow clarifiers into 64-MGD flocculation/ sedimentation basins with sludge collection. Project also included replacement of 86 MGD of existing horizontal flocculators.
- Conducted an evaluation of various Chemical Building components following a chemical release.
- 2015 and 2018 Comprehensive Master Plan Update: conducted assessment of unit processes, reviewed performance data, and future site plan development planning.
- Preliminary design for a residuals handling improvements project which included backwash clarification, sludge thickening, and mechanical dewatering.

CITY OF SOUTH HAVEN, MICHIGAN

- Completed WTP reliability study and water plant expansion alternatives analysis.
- Design and construction phase services for construction of a 7mgd replacement surface WTP. Project included a new Lake Michigan intake and raw water pumping station.

OTTAWA COUNTY ROAD COMMISSION | GRAND HAVEN, MICHIGAN

- Design and construction phase services for expansion of a 23.25-mgd high-rate monomedia direct filtration surface WTP.
- Served as full-time, onsite engineer and inspector for the WTP expansion project.
- Design of a replacement fluoride chemical feed system.
- Construction phase services for improvements to the raw water pumping system; including transmission mains, ground storage tank, and VFDs on existing raw water pumps.
- Completed WTP reliability study.

CITY OF PORT HURON, MICHIGAN

Design of a filter backwash holding tank; including a decant system.

YEARS OF EXPERIENCE

5 years — Fishbeck
6 years — total

EDUCATION

MS in Environmental Engineering, Michigan Technological University

BS in Civil Engineering, University of Michigan

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer – Michigan

MEMBERSHIPS

Member, American Water Works Association (Michigan Section)

COLIN MCCORKLE, PE

WATER & WASTEWATER ENGINEER

Colin has both engineering and construction experience. His engineering experiences include all phases of water, wastewater and structural projects including conceptual planning, process development, detail design, and construction. In addition, he has experience working on water and wastewater treatment plants, pumping systems, and water distribution systems.

EXPERIENCE

WATER PROCESS

MUNICIPAL

CITY OF SOUTH HAVEN, MICHIGAN

Design of a hypochlorite dilution feed.

CITY OF GRAND LEDGE, MICHIGAN

Design of an orthophosphate chemical feed system.

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY | MUSKEGON, MICHIGAN

Evaluation and coordination of repairs to the Ott Story WTP.

CITY OF MARQUETTE, MICHIGAN

- Coordination and design of repairs to the system's water intake.
- Design of upgrades to the high service and low service pumps.

CITY OF SAINT JOSEPH, MICHIGAN

- Development of a Drinking Water Revolving Fund project plan for the City including an evaluation of the WTP and the distribution system.

CONSTRUCTION

CITY OF IONIA, MICHIGAN

Site engineer at WWTP coordinating between contractors and the client.

CITY OF ST. LOUIS, MICHIGAN

Site engineer coordinating between contractors and the client for well house construction.

CITY OF COLDWATER, MICHIGAN

Site engineer coordinating between contractors and client for construction of booster station.

WATER DISTRIBUTION

CITY OF ANN ARBOR, MICHIGAN

- Hydraulic modeling analysis of the addition of an elevated water storage tank to the West High District.
- Completed water system modeling for entire system, for various operating scenarios. Developed figures with key operating parameters for water system operators to reference.

CITY OF SYLVANIA, OHIO

Conducted a study in conjunction with GLWA staff, evaluating transmission main system from the GLWA water system to serve City and potential regional partners.

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COLIN MCCORKLE, PE

WATER & WASTEWATER ENGINEER

GREAT LAKES WATER AUTHORITY, MICHIGAN

Hydraulic modeling of the distribution system to evaluate the hydraulics of the addition of a new flow control facility between the Water Works Park Treatment Plant and the Northeast Treatment Plant, including hydraulic transient analysis.

CITY OF COLDWATER, MICHIGAN

- Hydraulic modeling of the distribution system to evaluate the addition of a major industrial user. Water system improvements were sized and designed using the hydraulic model.
- Design and construction administration of a 3-MGD booster station.

CITY OF MOUNT PLEASANT, MICHIGAN

Analysis of potentially combining the City of Mount Pleasant's and Charter Township of Union's water system, including the hydraulics of combining the two systems, expansion of the City Treatment Plant, and evaluating water distribution system improvements needed.

CITY OF IONIA, MICHIGAN

- Distribution system modeling and field testing of distribution system to investigate system deficiencies.
- Water asset management plan development.

CITY OF GRAND LEDGE, MICHIGAN

Distribution system modeling and field testing of distribution system to investigate system deficiencies.

CITY OF SOUTH HAVEN, MICHIGAN

Distribution system modeling and development of unidirectional flushing program.

CITY OF LUDINGTON, MICHIGAN

- Distribution system modeling and evaluation of the system's pumping capabilities.
- Evaluation of needs and costs associated with refurbishment and replacement of system pumps.
- Water asset management plan development.

CITY OF ST. LOUIS, MICHIGAN

- Aided in the preliminary design of a new 0.5-MG elevated tank as part of the GAWA project.
- Modeled water system changes as part of the GAWA project.
- Distribution system modeling and field testing of distribution system to investigate system deficiencies.

CITY OF ALMA, MICHIGAN

- Distribution system modeling and field testing of distribution system to investigate system deficiencies.
- Design of two well houses to provide more capacity for the WTP.

CITY OF MACKINAC ISLAND, MICHIGAN

- Development of a hydraulic model for the water system. Distribution system modeling and field testing of distribution system to investigate system deficiencies.
- Condition assessment of the water treatment plant and water system facilities.
- Development of a capital improvements plan for the water system and treatment plant for a 20-year period.

YEARS OF EXPERIENCE
13 years — Fishbeck
23 years — total

EDUCATION
BS in Environmental Engineering, Michigan Technological University

REGISTRATIONS/ CERTIFICATIONS
Professional Engineer – Michigan

MEMBERSHIPS
West Michigan Soil Erosion Control Network

TRACI OSMAN, PE

SENIOR CIVIL ENGINEER

Traci is experienced in project management, design, and CAD drafting for various project types including subdivisions and commercial sites; private and public road design; drainage analyses; storm sewer, water main, and sanitary sewer design; residential and community septic systems; and pump station designs. She has worked with township, county, and state agencies to gain preliminary and final approvals that meet all zoning, construction, and building codes. Her responsibilities have included managing projects, design, preparing project bid packages (cost estimates and construction specifications), construction administration and maintaining client relations to consistently and successfully complete projects.

EXPERIENCE

WATER DISTRIBUTION

CITY OF COLDWATER, MICHIGAN

Design of water main piping system, access road, and site grading for a new 400,000-gallon elevated water storage tank and a booster station.

STORMWATER

EATON COUNTY DRAIN COMMISSIONER | DELTA AND ONEIDA TOWNSHIPS, MICHIGAN

SECTION 17 DRAIN

Designed 5,800 feet of closed county drain and three regional stormwater detention basins to service residents along the St. Joseph Highway corridor. Watershed master planning for the entire district.

EATON COUNTY DRAIN COMMISSIONER | DELTA TOWNSHIP, MICHIGAN

UPTON DRAIN

Designed 4,300 feet of closed county drain along portions of Upton and Broadbent Roads. Existing tile is failing and undersized for district lands.

GRAND VALLEY STATE UNIVERSITY | ALLENDALE, MICHIGAN

- Master planned diversion of portions of the campus storm sewer system to modify the drainage patterns to be near predevelopment conditions.
- Stormwater wetland complex grading design and MDNRE wetland permitting.

WASTEWATER COLLECTION

CITY OF GRAND LEDGE, MICHIGAN

WWTP upgrades including new sanitary sewer, new headworks building with associated site grading, storm sewer, and floodplain fill permitting through the MDNRE.

GRACE ADVENTURES | UPPER SILVER LAKE, MEARS, MICHIGAN

PUMP STATION AND SEPTIC DESIGN

Project included designing a pump station to receive flow from gravity sanitary lateral lines from cabins, showers, and the camp dining hall. Due to good site soils and lack of municipal sewer in the area, the pump station was designed to pump to a final septic disposal bed system.

fishbeck

TRACI OSMAN, PE

SENIOR CIVIL ENGINEER

SITE WORK

INGHAM COUNTY FAIRGROUNDS | MASON, MICHIGAN

Site improvements for a new 50,000-sf exposition center including 3,000-seat grandstand, restroom, concession, meeting facilities and two 3,000-sf retail spaces.

MICHIGAN STATE UNIVERSITY | EAST LANSING, MICHIGAN

BROAD COLLEGE OF BUSINESS

95,000-sf Graduate Pavilion with classrooms, teaching labs, program offices, career management offices, and interaction, event, and amenity spaces.

JENISON PARKING LOT

Site design of reconfigured surface parking lot including grading, storm sewer design, stormwater treatment units, MDEQ floodplain permitting, water main design, and irrigation main design.

TRANSPORTATION FACILITY

Site design for relocating the fueling station from the stadium to a new location. Design included new sanitary, water, and steam services to the new building, underground stormwater detention, site grading, and future phase master planning.

NORTH END ZONE ADDITION

Site design for all associated utilities for the building addition, stormwater management, and MDEQ floodplain permitting.

BIO ENGINEERING FACILITY

Site grading, underground stormwater management, and utility design for the new building.

ELI AND EDYTHE BROAD ART MUSEUM

Site design for stormwater management, relocation of East Circle Drive, and design of all utilities to the building including sanitary sewer, storm leads, chilled water, water and fire protection services, steam tunnel, and communication and electrical duct banks.

WELLS HALL ADDITION

Site design for all associated utilities for building addition and Red Cedar Road relocation.

CAMPUS FLOOD RESPONSE STUDY

Analyzed existing storm sewer; sanitary sewer; and steam, communication, and electrical utilities for different flood elevations of the Red Cedar River and its impact to the campus and buildings. Organized a flood procedure strategy for protecting the campus during such flood events.

UNIVERSITY VILLAGE APARTMENTS

Site design for removal and replacement of the University Village housing development including drainage and sidewalk design for green area.

SURPLUS STORE AND RECYCLING CENTER

LEED calculations and submittals.

MDTMB | EAST LANSING, MICHIGAN

GEAGLEY LABORATORY

Site layout and grading plan for laboratory addition. Relocation of enclosed county drain storm sewer system.

GRAND VALLEY STATE UNIVERSITY | ALLENDALE, MICHIGAN

LIVING CENTER 2010

Site layout, grading, utility, and stormwater management design.

CENTRAL MICHIGAN UNIVERSITY | MT. PLEASANT, MICHIGAN

Parking lot layout, grading, and drainage design.

FERRIS STATE UNIVERSITY | BIG RAPIDS, MICHIGAN

Pennock Hall parking lot.

YEARS OF EXPERIENCE
22 years — Fishbeck
36 years — total

EDUCATION
MS in Structural Engineering, Michigan Technological University

BS in Structural Engineering, Michigan Technological University

REGISTRATIONS/ CERTIFICATIONS
Professional Engineer – Kansas, Kentucky, Louisiana, Michigan, New Jersey, Tennessee, Wisconsin

MEMBERSHIPS
American Concrete Institute

American Institute of Steel Construction

American Society of Civil Engineers

fishbeck

RICH SAGEMAN, PE

SENIOR STRUCTURAL ENGINEER

Rich's work has been primarily in planning, project management, design, and construction administration for structural, architectural, water, and wastewater projects. Structural experience includes steel, concrete, and masonry buildings; water and wastewater treatment facilities; steel and concrete tank design; and foundation and retaining wall design. Architectural building experience includes primarily theatres, office buildings, libraries, and educational structures.

EXPERIENCE

WATER TREATMENT

GRATIOT AREA WATER AUTHORITY | CITY OF ALMA, GRATIOT COUNTY, MICHIGAN

Water Treatment Plant expansion.

CITY OF WYOMING, MICHIGAN

- 5-MG water storage tank
- Generator building
- Main office building

CITY OF SOUTH HAVEN, MICHIGAN

Lead structural design engineer for this new 9.3-MGD water filtration plant, housed within a 52,000-sf concrete and masonry building.

CITY OF ST. JOSEPH, MICHIGAN

Lead structural design engineer for this 3,670-sf shorewell pumping station, which draws raw water from Lake Michigan and has a wet well structure located 25 feet below groundwater.

WASTEWATER COLLECTION

VILLAGE OF SPRING LAKE, MICHIGAN

WEST SAVIDGE WATER AND WASTEWATER SYSTEM IMPROVEMENTS

Design engineer for construction of a 6-foot by 24-foot, 250-gpm sanitary sewer lift station; 100 feet of 8-inch water main with bore and jack under M-104; and 100 feet of 8-foot sanitary sewer with bore and jack.

CITY OF GRAND RAPIDS, MICHIGAN

MONROE AVENUE

Structural design of junction chambers for 96-inch- and 108 inch-diameter sanitary and storm sewers for a major road reconstruction. Also designed a 96 inch-diameter storm sewer outfall structure discharging to the Grand River.

WASTEWATER PROCESS

ST. CLAIR COUNTY | SMITHS CREEK, MICHIGAN

SMITHS CREEK LANDFILL

Lead structural engineer for design of a concrete and steel-framed, 5,900-sf landfill leachate pretreatment facility.

GRAND VALLEY REGIONAL BIOSOLIDS AUTHORITY | GRAND RAPIDS, MICHIGAN

RICH SAGEMAN, PE

ASSOCIATE | SENIOR STRUCTURAL ENGINEER

Lead structural engineer for design of a concrete and steel-framed, 22,800-sf dewatering facility.

CITY OF MUSKEGON HEIGHTS, MICHIGAN

Conventional WWTP expansion study, design, and construction.

CITY OF SALINE, MICHIGAN

POLLUTION CONTROL FACILITY ODOR ABATEMENT

Lead structural engineer for design of this WWTP odor control system, which included a 35-foot by 38 foot masonry building and several exterior duct supports.

WEST OLIVE ESTATES | WEST OLIVE, MICHIGAN

Structural design engineer for WWTP that included a 56-foot by 71-foot by 9-foot oval oxidation channel structure, 26 foot by 14-foot clarifier, and a 32 foot-diameter by 14-foot-deep sludge holding tank.

AMERICAN ELECTRIC POWER | BRIDGMAN, MICHIGAN

WASTEWATER TREATMENT FACILITY

Structural design for a 24-foot by 78-foot by 18-foot cast-in-place concrete, compartmented SBR. In addition to loads from the retained liquid, the structure supported a 14-foot-high masonry building with precast, prestressed concrete floor and roof decks.

DONNELLY CORPORATION | HOLLAND, MICHIGAN

128TH STREET PRETREATMENT FACILITY

Structural engineer for steel mezzanine and large steel tanks.

HILLSHIRE BRANDS | ZEELAND, MICHIGAN

WWTP

- Structural design for 84-foot by 16-foot cast-in-place concrete clarifier addition to an existing wastewater treatment facility.
- Structural design engineer for new WWTP construction. Design included a 225-foot by 245-foot by 11-foot oval oxidation channel structure, an 84-foot by 16-foot clarifier, and a 225 foot long (34-foot simple spans) precast, prestressed concrete pedestrian/equipment bridge.

OFFICES

CITY OF WYOMING, MICHIGAN

Donald K. Shine WTP office expansion.

GOVERNMENTAL

GERALD R. FORD PRESIDENTIAL MUSEUM | GRAND RAPIDS, MICHIGAN

Conceptual design for a 2-story, 8,000-sf student learning center addition and existing exhibits modernization.

OTTAWA COUNTY COURTHOUSE | GRAND HAVEN, MICHIGAN

Lead structural engineer for this 117,700-sf, 3-story, steel-framed building featuring composite concrete floor construction and braced frame lateral load resisting system.

INDUSTRIAL

AMWAY | ADA, MICHIGAN

NUTRITIONAL SUPPLEMENT MANUFACTURING PLANT

Renovated 60,000 sf of existing warehouse space into a new 2-story, modern, efficient manufacturing space.

GENERAL DYNAMICS LAND SYSTEMS | STERLING HEIGHTS, MICHIGAN

- Maneuver Collaboration Center.
- Vehicle Testing Center.

YEARS OF EXPERIENCE
5 years — Fishbeck
36 years — total

EDUCATION
BS Mechanical Engineering, University of Michigan

REGISTRATIONS/ CERTIFICATIONS
Professional Engineer – Michigan, New York, and Wisconsin

LEED Accredited Professional

TRAINING
Fire Protection Engineering Preparatory Course

Hazard Communication (HAZCOM)/Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

JERRY HIRTH, PE, LEED AP

SENIOR MECHANICAL ENGINEER

Jerry is a senior mechanical engineer with more than 30 years of experience planning and designing mechanical, marine, educational, transportation, industrial, pharmaceutical, food and beverage, and municipal projects. He manages the technical development of small, medium, and large multi-faceted mechanical projects; and is experienced in multi-discipline planning and technical supervision, overall project planning, project team organization, quality control, and budget and schedule control. Projects include fire protection, potable and process water systems, sanitary and storm sewer piping systems, natural gas distribution systems, industrial process and facility HVAC, compressed air, piping, and other mechanical work.

EXPERIENCE

MUNICIPAL

OAKLAND COUNTY WATER RESOURCES COMMISSIONER | OAKLAND COUNTY, MICHIGAN

CLINTON RIVER WATER RESOURCE RECOVERY FACILITY

Designed the complex phased renovation/addition of an administration building to accommodate for additional work spaces and meeting rooms, wet lab, shop areas, ADA and life safety improvements, general refresh of finishes, and site improvements.

PUBLIC WORKS BUILDING EXPANSION STUDY

Performed a space consolidation study and provided a review of the building systems and site to determine the feasibility of an expansion.

CITY OF WARREN, MICHIGAN

CITY WATER DIVISION BUILDING

Removed and replaced three rooftop HVAC units, new building controls, and ductwork and controls modifications for building co- tenant HVAC control.

WATER PROCESS

US ARMY CORPS OF ENGINEERS

DETROIT ARSENAL – EAST SIDE WATER MAIN FEED IMPROVEMENTS | WARREN, MICHIGAN

This $2.6-million ARRA project consisted of installing nearly 300 lf of new water main; constructing a backflow prevention building including 250 lf of gas, communications, and electrical service; and demolishing a water line and all apparatuses..

TULSA METROPOLITAN UTILITY AUTHORITY | TULSA, OKLAHOMA

OOLOGAH PUMP STATION REHABILITATION

Review of ventilation improvements to the raw water pump station with a capacity of 128 MGD.

MHOG SEWER & WATER AUTHORITY | MARION TOWNSHIP, MICHIGAN

WATER SYSTEM IMPROVEMENTS

Design of the Industrial Drive booster pump station's chemical feed building addition.

FORD MOTOR COMPANY AND AUTOMOTIVE COMPONENTS HOLDINGS, LLC, AUTO ALLIANCE, AND FCA

POTABLE WATER SAMPLING

Annual water sampling and analysis at locations of water quality concerns throughout the year on an as-needed basis. Summarized sampling findings in a report with

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JERRY HIRTH, PE, LEED AP

SENIOR MECHANICAL ENGINEER

recommendations to address any points in which analysis results were not within Bulletin 55 guideline limits.

POTABLE WATER CROSS CONNECTION SURVEYS

Surveyed and documented manufacturing plant potable water cross-connections and backflow prevention devices, assessed level of protection required, and identified required device locations.

FORD MOTOR COMPANY

LEGIONELLA ANALYSIS MONITORING PROGRAM

Performed Legionella analysis on water heaters and cooling towers. Obtained quarterly water samples from cooling towers and semi-annual samples from water heaters, submitted them for analysis, and reviewed findings and developed recommendations to address analysis results that were not within corporate limits.

PFIZER | KALAMAZOO, MICHIGAN

POTABLE WATER STANDARD COMPLIANCE

Developed study design concepts to comply with the EPA's arsenic potable water standard of 10 mg/l for a 15-MGD potable well water system.

AWREY BAKERIES | LIVONIA, MICHIGAN

POTABLE WATER SUPPLY IMPROVEMENTS STUDY

Managed and performed the project study, design, and installation oversight. Improvements included a new 8 inch plant potable water supply main line from the city water main, replacing the existing unreliable plant potable water supply.

YEARS OF EXPERIENCE

1 years — Fishbeck

8 years — total

EDUCATION

BS in Architectural Engineering, University of Detroit Mercy

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer – Michigan

LEED Green Associate

RENEE ZACCAGNI, PE, LEED GA

MECHANICAL ENGINEER

Renee has experience designing mechanical systems in several types of facilities including commercial, healthcare, industrial, and educational facilities. She has designed HVAC and plumbing systems. In addition to participating in systems design, Renee has provided design assistance during construction and completed construction punchlists.

EXPERIENCE

EDUCATIONAL

BOSTON UNIVERSITY | BOSTON, MASSACHUSETTS

HENRY M. GOLDMAN SCHOOL OF DENTAL MEDICINE

Designed HVAC and hydronic systems for a seven-story building addition and partial renovation. The dental school renovated their classrooms, patient facilities, offices, and added a new simulation lab, along with expanding their patient facilities.

MICHIGAN STATE UNIVERSITY | EAST LANSING, MICHIGAN

FACILITY FOR RARE ISOTOPE BEAMS

Designed HVAC and hydronic systems for office and lab research spaces. FRIB provides intense beams of rare isotopes that will give off a large amount of radiation, which made safety the biggest driver through design.

GRAND RAPIDS RESEARCH CENTER

Designed HVAC and hydronic systems for laboratories, classrooms, and offices.

UNIVERSITY OF MICHIGAN | ANN ARBOR, MICHIGAN

NUCLEAR ENGINEERING LAB RENOVATION

Designed HVAC and hydronic systems for laboratories, office, and conference rooms.

OAKLAND UNIVERSITY | ROCHESTER, MICHIGAN

ENGINEERING CENTER

Designed HVAC and hydronic systems for laboratories, classrooms, and offices.

ELLIOTT HALL BUSINESS SCHOOL

Studied new HVAC and hydronic systems for potential renovation. Spaces included classrooms, offices, and a large atrium space.

HEALTHCARE

Department of Veteran's Affairs

VA LOUISVILLE HOSPITAL

Designed HVAC and plumbing system for a new medical facility, approximately 910,000 sq. ft of space. This project was a multi-phase project that included surgery suites to office spaces.

INDUSTRIAL

DURR SYSTEMS INC. | SOUTHFIELD, MICHIGAN

DURR SYSTEMS INC.

Designed HVAC and plumbing systems for an office/ research facility. The office renovation contained 90,000 sq. ft of space, while the 100,000 sq. ft of research space was added onto the footprint of the original building.

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RENEE ZACCAGNI, PE, LEED GA

MECHANICAL ENGINEER

COMMERCIAL

GENERAL MOTORS | WARREN, MICHIGAN

VEC OFFICE RENOVATION

Designed HVAC and plumbing systems for office, restroom, and conference room renovations.

RED BASEMENT OFFICE RENOVATION

Designed HVAC and plumbing systems for office, restroom, and conference room renovations.

SMITH GROUP | DETROIT, MICHIGAN

OFFICE RENOVATION

Designed HVAC and plumbing systems for office, restroom, and conference room renovations.

DETROIT PUBLIC SAFETY HEADQUARTERS | DETROIT, MICHIGAN

PUBLIC SAFETY HEADQUARTERS

Designed HVAC and plumbing systems for the new headquarters that houses the Detroit Police Department, Detroit Fire Department, Detroit Emergency Medical services, as well as a forensic lab space.

AMBER APARTMENTS | ROYAL OAK, MICHIGAN

AMBER SQUARE TOWNHOMES

Designed HVAC and plumbing systems for a new 14-unit townhome development.

YEARS OF EXPERIENCE
25 years — Fishbeck
32 years — total

EDUCATION
BS in Electrical Engineering, Grove City College

REGISTRATIONS/ CERTIFICATIONS
Professional Engineer – Colorado, Connecticut, Georgia, Illinois, Iowa, Kansas, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New Mexico, New York, North Carolina, Oklahoma, Utah, and Wisconsin

MEMBERSHIPS
Michigan Society of Professional Engineers

National Society of Professional Engineers

JOHN CONDIE, PE

SENIOR VICE PRESIDENT | PRINCIPAL

John has been responsible for the design and coordination of electrical distribution, lighting, instrumentation, and control systems for municipal, commercial, industrial, educational, and healthcare clients. His experience includes medium- and low-voltage power distribution, standby generators, indoor and outdoor lighting, utility company coordination, power system analysis (e.g., short circuit, coordination, arc flash, voltage drop, load flow, etc.), digital and analog instrumentation, PLC-based control systems, Ethernet networks, telephone telemetry, and radio communication systems (licensed and unlicensed).

EXPERIENCE

WATER TREATMENT

GREAT LAKES WATER AUTHORITY | DETROIT, MICHIGAN
NE WTP FLOW CONTROL FACILITY
Supervised design of power distribution, lighting, instrumentation, controls, security, cameras, and fire alarm systems. Power distribution included 4160:480Y/277-volt pad-mounted transformers, double-ended 480-volt motor control centers, 480:208Y/120-volt dry-type transformers, and panelboards.

CITY OF ST. JOSEPH, MICHIGAN
- WTP electrical service evaluation.
- WTP filter renovations.
- High-service pump VFD additions.
- Electrical service entrance upgrade.
- Raw water intake and pump station.
- SCADA system improvements.

CITY OF WYOMING, MICHIGAN
- WTP evaluation, preliminary design, and plant expansion.
- Generator building.
- MCC replacements.
- Synchronous motor control replacements.
- Carbon building.

CITY OF PORT HURON, MICHIGAN
- Filter backwash treatment system.
- Low-service pump VFDs.

OTTAWA COUNTY ROAD COMMISSION, MICHIGAN
NORTHWEST OTTAWA WATER PLANT
- WTP expansion.
- Alum sludge dewatering system.
- Raw water pump VFDs.
- Water SCADA system.
- Backwash tank.

SAGINAW CHIPPEWA INDIAN TRIBE | MT. PLEASANT, MICHIGAN
- Water SCADA system.
- WTP.
- Utilities building.

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JOHN CONDIE, PE

SENIOR VICE PRESIDENT | PRINCIPAL

CITY OF MARQUETTE, MICHIGAN
Water filtration plant expansion.

CITY OF OWOSSO, MICHIGAN
WTP expansion.

EAST LANSING-MERIDIAN WATER AND SEWER AUTHORITY, MICHIGAN
Ammonia feed system.

HOLLAND BOARD OF PUBLIC WORKS, MICHIGAN
WTP feasibility study.

CITY OF KALAMAZOO, MICHIGAN
Water system master plan.

CITY OF GRAND RAPIDS, MICHIGAN
LAKE MICHIGAN FILTRATION PLANT

Process improvements and filter valve actuator replacements.

CITY OF MUSKEGON HEIGHTS, MICHIGAN
Water filtration plant expansion.

CITY OF MACKINAC ISLAND, MICHIGAN
Water filtration plant expansion and improvements.

CITY OF NEW BALTIMORE, MICHIGAN
WTP expansion.

CITY OF NILES, MICHIGAN
Water system improvements.

COLDWATER BOARD OF PUBLIC UTILITIES, MICHIGAN
High-service pump VFDs. WTP standby generator.

CITY OF MIDLAND, MICHIGAN
WTP chemical feed system improvements. WTP SCADA system upgrade.

CITY OF SOUTH HAVEN, MICHIGAN
WTP expansion. Switchgear building and emergency generator.

LAKE TOWNSHIP, MICHIGAN
WTP expansion.

MARINETTE WATER UTILITY | MARINETTE, WISCONSIN
WTP expansion and improvements.

CONTROLS/INSTRUMENTATION

MICHIGAN STATE UNIVERSITY | EAST LANSING, MICHIGAN
Booster pumping station control system evaluation.

CITY OF GRAND RAPIDS, MICHIGAN
Lake Michigan Filtration Plant automation upgrades.

OAKLAND COUNTY WATER RESOURCES COMMISSIONER | OAKLAND COUNTY, MICHIGAN
Walled Lake-Novi WWTP instrumentation and controls improvements.

CITY OF WYOMING, MICHIGAN
Water SCADA system.

YEARS OF EXPERIENCE

7 years — Fishbeck
9 years — total

EDUCATION

BS in Electrical Engineering, Western Michigan University

MS in Electrical Engineering, The Ohio State University

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer – Michigan

LEED Accredited Professional Building Design + Construction

MATT STACK, PE, LEED AP BD+C

SENIOR ELECTRICAL ENGINEER

Matt is a project engineer responsible for design and coordination of power, lighting, security, fire alarm, emergency power, and special systems for a variety of client types.

EXPERIENCE

WATER/WASTEWATER PROCESS

CITY OF HOLLAND, MICHIGAN

WTP

Design of new 480V switchboard and VFDs to feed new high-service pumps.

WAVERLY PUMP STATION

Design of new 480V service entrance equipment and VFDs to feed new pumps.

WWTP

Distribution, lighting, and SCADA changes to multiple existing buildings on campus to facilitate implementation of a new wastewater process.

CITY OF GRAND RAPIDS, MICHIGAN

LIVINGSTON PUMP STATION

Designed addition to the existing pump station that included lighting, distribution, and SCADA.

FRANKLIN STREET PUMP STATION

Existing facility requiring the replacement of existing 480V pump motor starters with VFDs, upgrades to existing lighting, and SCADA system.

LAKE MICHIGAN FILTRATION PLANT | GRAND HAVEN, MICHIGAN

- Replaced existing medium voltage switchgear and VFD for medium voltage pumping application.
- Replaced multiple 480V motor control centers to facilitate new water processes.
- Changes to existing SCADA system to incorporate multiple new processes.

CITY OF LUDINGTON, MICHIGAN

WTP

Distribution, lighting, and SCADA changes to facilitate implementation of a new water process.

WWTP

Distribution and lighting changes to facilitate implementation of a new wastewater process. Design of an entirely new SCADA system with Wonderware interface for plant control and monitoring.

LANSING BOARD OF WATER AND LIGHT | LANSING, MICHIGAN

DYE WATER PLANT

Distribution, lighting, and SCADA system changes to facilitate a new dust collection system.

VILLAGE OF INDIAN HILL, OHIO

WTP

Upgrades to existing facility power distribution to provide better reliability. Design included overhead distribution design.

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MATT STACK, PE, LEED AP BD+C

SENIOR ELECTRICAL ENGINEER

CITY OF LANSING, MICHIGAN
FRANCES PARK PUMP STATION

Distribution changes and VFD additions to facilitate replacement of existing pumps in this large sanitary lift station.

CITY OF FAIRBORN, OHIO
SOUTHEAST LIFT STATION IMPROVEMENTS

Complete facility redesign to incorporate new pumps. Designed new utility and standby power distribution, lighting, and SCADA changes.

OFFICES

LANSING BOARD OF WATER & LIGHT, MICHIGAN
REO TOWN HEADQUARTERS

40,000-sf interior fit-out consisting of lobby, office collaborative, meeting, and open office environments.

MANUFACTURING PROCESS

SARA LEE | ST. JOSEPH, MISSOURI

Addition to existing building and implementation of new manufacturing process.

ABBOTT LABS | COLUMBUS, OHIO AND ALTAVISTA, VIRGINIA

Distribution and lighting for new manufacturing process at existing facilities.

PARKING STRUCTURES

GERALD R. FORD INTERNATIONAL AIRPORT | GRAND RAPIDS, MICHIGAN

Lighting design for roof addition to existing parking deck.

INDUSTRIAL

MANE INC. | LEBANON, OHIO
CORPORATE HEADQUARTERS AND FLAVORS PLANT

New 135,000 sf, 2 story research and development building. The building included multiple labs and research and design areas, a pilot plant for small batch production, and office and conference areas.

TIM DWYER, PE

SENIOR ELECTRICAL ENGINEER

Tim has over 25 years of experience as an electrical engineer and project manager. His responsibilities have included designing and starting-up instrumentation and control systems for water, wastewater, and CSO control facilities. His designs include point-to-point loop diagrams, detailed wiring drawings, equipment and conduit location drawings, and P&ID drawings. He has also designed and debugged machine electrical, hydraulic and pneumatic control systems. He has several years of experience programming and debugging Allen Bradley PLCs including PLC/5, SLC/500, MicroLogix, CompactLogix and ControlLogix with ControlNet, DeviceNet, and Ethernet.

YEARS OF EXPERIENCE

5 years — Fishbeck
30 years — total

EDUCATION

MS in Business Administration, Wayne State University

BS in Electrical Engineering, Michigan Technological University

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer – Michigan, Florida, Indiana, Ohio, and the District of Columbia

MEMBERSHIPS

Michigan Society of Professional Engineers

National Society of Professional Engineers

EXPERIENCE

WATER/WASTEWATER PROCESS

LAKE MICHIGAN FILTRATION PLANT | GRAND HAVEN, MICHIGAN

Lead electrical for design and construction of two replacement septic pump stations including new controls, VFDs, PLC, and HMI integrated into existing SCADA system.

CITY OF GRAND RAPIDS, MICHIGAN

ALGER STREET PUMP STATION

Lead electrical for design and construction of a new booster pump station building including power distribution, lighting, controls and SCADA.

EAST LANSING MERIDIAN WATER AND SEWER AUTHORITY, MICHIGAN

Lead electrical for design and construction of a new Fluoride Building for the WTP including power distribution, lighting, controls and fire alarm system integrated into existing SCADA system.

LANSING BOARD OF WATER & LIGHT, MICHIGAN

SOUTH CREYTS SUBSTATION

Lead electrical for design and construction of a pump station for stormwater management and discharge including power distribution and controls.

CITY OF ST. LOUIS, MICHIGAN

WELL HOUSE NOS. 10 & 11

Lead electrical for two new Well Houses including new electrical service, power distribution, generator, lighting, controls and integration into existing SCADA system.

VILLAGE OF LAKE ODESSA, MICHIGAN

Lead electrical for the design and installation of a new water production well for the Village's WTP including VFD and controls.

DETROIT WATER AND SEWERAGE DEPARTMENT | DETROIT, MICHIGAN

NORTHEAST WTP FILTER REHABILITATION

Responsible for the instrumentation and controls section of the engineering study report and the final basis of design report. Developed the instrumentation and controls master drawing list and specification sections.

CITY OF COLDWATER, MICHIGAN

FISKE ROAD PUMP STATION

Lead electrical for design and construction of a new sanitary pump station including new electrical service, generator, controls, and SDADA system.

SEELEY BOOSTER STATION

Lead electrical for design and construction of a new booster pump station building including new electrical service, generator, lighting, controls, and SCADA system.

fishbeck

TIM DWYER, PE

SENIOR ELECTRICAL ENGINEER

CITY OF MACKINAC ISLAND, MICHIGAN
MISSION POINT PUMP STATION

Lead electrical for design and construction of pump station replacement, including new electrical service and controls.

VILLAGE OF SOUTH ROCKWOOD, MICHIGAN
PUMP STATION REPLACEMENTS

Lead electrical on the replacement of two sanitary pump stations with new electrical service, generator, VFDs and controls.

OAKLAND COUNTY WATER RESOURCES COMMISSIONER, MICHIGAN
WALLED LAKE-NOVI WWTP

Lead electrical for design and construction of WWTP headworks improvements project, including bar screen and grit classifier upgrades, FRP channel, temporary pumping, building modifications, and new entrance gate.

LAKEWOOD WASTEWATER AUTHORITY | LAKE ODESSA, MICHIGAN

Lead electrical for six pump station replacements with new electrical services and controls.

VILLAGE OF BALDWIN, MICHIGAN
WWTP EXPANSION

Lead electrical for design and construction of the WWTP expansion project. Project included upgrading power distribution system, expanding existing SRB and pipe gallery, new Headworks and Maintenance Buildings, expanding existing office space and a new SCADA and fire alarm system.

MDOT
PUMP STATION MONITORING SYSTEM DESIGN-BUILD

Lead electrical on the design-build project for installing a SCADA system that allows MDOT and other local agencies to remotely monitor and control 98 stormwater pumping stations in the Metro Detroit area. Performed field investigations to verify existing conditions. Coordinated design work with the client and installing contractor. Prepared design plans, diagrams, and details. Reviewed contractor submittals and questions during construction. Generated as-built record drawings.

YEARS OF EXPERIENCE
17 years — Fishbeck
41 years — total

EDUCATION
Master of Architecture,
University of Michigan

BS in Architecture,
University of Michigan

Bachelor of General Studies,
University of Michigan

REGISTRATIONS/ CERTIFICATIONS
Registered Architect – Michigan

National Council of Architectural Registration Boards (NCARB)

TERRY BOURASSA, RA

SENIOR ARCHITECT | CORPORATE QUALITY COORDINATOR

Terry's experience includes senior project architect, QA/QC manager, project management, and engineering department manager. Terry's role as quality manager begins at the outset of the project leading the development of QA/QC documentation, defining the QA/QC processes, and confirming compliance.

EXPERIENCE

GOVERNMENTAL

CITY OF FORT WAYNE, INDIANA
2 story WTP laboratory facility.

SOO LOCKS VISITOR CENTER | SAULT STE. MARIE, MICHIGAN
Addition and renovation to the existing facility.

MICHIGAN DEPARTMENT OF TECHNOLOGY, MANAGEMENT & BUDGET
CADILLAC PLACE INFRASTRUCTURE AND ENERGY ASSESSMENT | DETROIT, MICHIGAN
Infrastructure and energy audit report that documented the condition of many systems along with presenting many energy efficiency measures for consideration. The project scope included the assessment of exterior windows, mechanical systems, electrical systems, and conveying systems.

CITY OF MARQUETTE, MICHIGAN
Project manager for design of a new municipal service center to park and maintain vehicles with supporting office space.

PLAINFIELD CHARTER TOWNSHIP, MICHIGAN
Facility condition assessments of nine Township-owned facilities, a building envelope forensic analysis for Fire Station #3, and a space needs assessment/site study for the senior center.

CITY OF NOVI, MICHIGAN
PAVILION SHORE PARK SHELTER
Design of a new restroom/shelter building that complies with LEED Silver criteria.

GERALD R. FORD INTERNATIONAL AIRPORT | GRAND RAPIDS, MICHIGAN
PARKING DECK ROOF
Design and construction of a roof on the upper level of the existing 3- and 4-level parking deck.

CITY OF LANSING, MICHIGAN
WWTP reroofing projects.

INGHAM COUNTY HUMAN SERVICES | LANSING, MICHIGAN
New office building.

BYRON TOWNSHIP, MICHIGAN
New Township Hall offices and community center.

MUNICIPAL CIVIC CENTER | WALKER, MICHIGAN
New police and fire building, public library, and renovation of City Hall and court facilities.

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TERRY BOURASSA, RA

SENIOR ARCHITECT | CORPORATE QUALITY COORDINATOR

CITY OF LOWELL, MICHIGAN
Look Memorial Fire Station.

24TH DISTRICT COURT BUILDING | ALLEN PARK, MICHIGAN
New building including courtrooms, offices, and detention facilities.

NATIONAL GUARD ARMORY | BIG RAPIDS, MICHIGAN

US ARMY CORPS OF ENGINEERS | CORPUS CHRISTI, TEXAS
Replacement of aircraft hangar doors at two military hangars.

MICHIGAN AGRICULTURAL DEPARTMENT LABORATORIES | EAST LANSING, MICHIGAN
Detailed facility evaluation and cost estimate for renovation work.

CITY OF GRAND HAVEN, MICHIGAN
Detailed facility evaluations and cost estimates for renovation work on City Hall and the transportation building.

HEALTHCARE

ST. JOSEPH HOSPITAL | MISHAWAKA, INDIANA
Addition and interior renovation.

PSYCHIATRIC FACILITY | LAPEER, MICHIGAN
Renovation.

INDUSTRIAL

AMWAY | ADA, MICHIGAN
NUTRITIONAL SUPPLEMENT MANUFACTURING PLANT

Renovated 60,000 sf of existing warehouse space into a new 2-story, modern, efficient manufacturing space.

DIESEL TECHNOLOGIES | GRAND RAPIDS, MICHIGAN
Multimillion dollar facilities renovation.

GRAND HAVEN STAMPED PRODUCTS | GRAND HAVEN, MICHIGAN
New engineering and technical center.

PFIZER | KALAMAZOO, MICHIGAN
Industrial process facility renovation for Building 149.

PARKE DAVIS | HOLLAND, MICHIGAN
CHEMICAL DEVELOPMENT BUILDING

2 story analytical laboratory addition.

SLUDGE REMOVAL BUILDING

New facility and offices.

X RITE | GRAND RAPIDS, MICHIGAN
Manufacturing facility renovation.

OFFICES

LANSING BOARD OF WATER & LIGHT, LANSING
New 40,000 sf, 4 story REO Town plant administrative offices.

WATER SYSTEMS

FISHBECK PROVIDES OUR CLIENTS WITH A FULL SPECTRUM OF SERVICES RELATED TO THE WATER INDUSTRY INCLUDING STUDIES, PLANNING, COMPLIANCE CONSULTATION, TREATABILITY STUDIES, DESIGN, CONSTRUCTION ENGINEERING, AND START-UP/O&M TRAINING.

Fishbeck provides comprehensive design and consulting services covering virtually all aspects of water systems.

STUDIES AND PLANNING

- Master Planning
- Reliability Studies
- Rate Analyses
- VAs
- PNAs

WATER SUPPLY

- Well Systems
- Surface Water Intakes
- Wellhead Protection

WATER TREATMENT

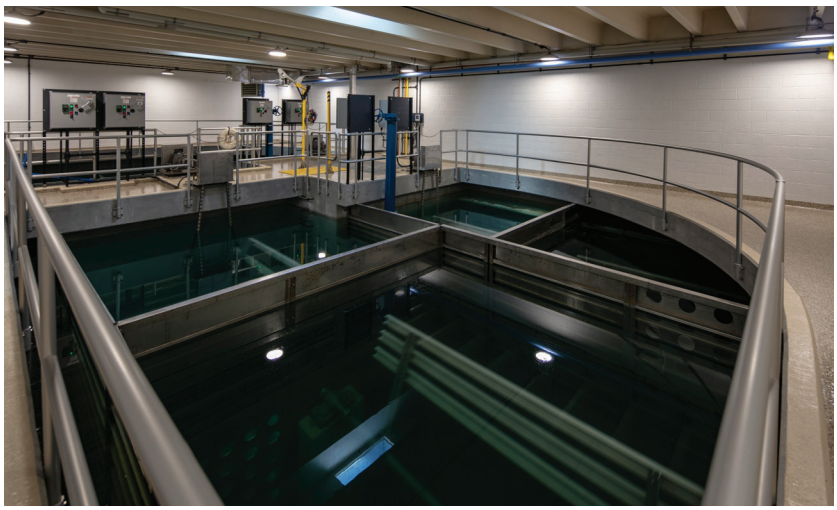
- Groundwater Treatment
- Surface Water Treatment
- Chemical Storage and FeedSystems
- Instrumentation and SCADA
- Solids Handling and Dewatering
- Pilot Treatment Studies

WATER STORAGE

- Elevated Storage Tanks
- Ground Storage Tanks
- Cast-in-Place Reservoirs

WATER DISTRIBUTION

- Transmission and Distribution Piping
- Booster Pumping Station



WATER SYSTEMS CLIENTS

For many years, Fishbeck has studied, planned, designed, and provided constructiuon engineering for a variety of water system clients. Project elements have included source development, wells, intakes, treatment, pumpage, elevated, ground level, and below grade storage, booster pump stations, transmission, and distribution mains.

MICHIGAN

City of Albion

City of Alma

City of Ann Arbor

City of Battle Creek

City of Benton Harbor

City of Big Rapids

City of Cadillac

City of Cedar Springs

City of Fremont

City of Grand Haven

City of Grand Ledge

City of Grand Rapids

City of Greenville

City of Ionia

City of Ithaca

City of Kalamazoo

City of Lowell

City of Ludington

City of Mackinac Island

City of Marquette

City of Marysville

City of Midland

City of Mt. Clemens

City of Mt. Pleasant

City of Muskegon Heights

City of Niles

City of Owosso

City of Plainwell

City of Portage

City of Roosevelt Park

City of Saginaw

City of Sault Ste. Marie

City of St. Claire

City of St. Joseph

City of St. Louis

City of South Haven

City of Sturgis

City of Wyoming

Village of Baldwin

Village of Blissfield

Village of Dansville

Village of Fowler

Village of Homer

Village of Ontonagon

Village of Port Austin

Village of Tekonsha

Barry Township

Cascade Charter Township

Delta Charter Township

DeWitt Township

Gratiot Area Water Authority

Great Lakes Water Authority

Kalamazoo Lake Sewer and Water

Lake Charter Township

Lansing Board of Light and Water

Lansing Township

Lincoln Township

Michigan State University

Negaunee-Ishpeming Water Authority

Plainfield Township

Waterford Township

Lake Bella Vista, Cannon

East Lansing-Meridian Water and Sewer Authority, Meridian Township

Saginaw-Chippewa Indian Reservation, Mt. Pleasant

Saginaw-Chippewa Saganing

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WATER TREATMENT PLANT IRON REMOVAL

MICHIGAN STATE UNIVERSITY | EAST LANSING, MI

PROJECT DATA

Completion Date: August 2020
Cost: $15 million

REFERENCE

Sherri Jett
517.355.3314

Tom Silsby
517.884.7109

Michigan State University (MSU) owns and operates a water system that serves their East Lansing campus. This system relies on 17 wells for water supply. The wells have undesirable concentrations of iron and manganese, and marginal concentrations of radium. In 2016 Fishbeck completed a planning study evaluating options for improving water quality on Campus, including construction of a new plant and purchase of water from adjacent communities.

In 2017 Fishbeck was retained to design an elevated storage tank and iron removal plant. A formal site selection process was first completed which identified five potential campus sites. A detailed matrix considered 15 parameters, including cost, future expansion, service access, supporting utility access, aesthetics, and master plan compatibility. Multiple stakeholder meetings were conducted to narrow the selection to two sites. The elevated storage tank and water treatment plant were then modeled in 3D, and fly-through videos were developed using Google Earth to aid stakeholders in site selection. The same process was later used to identify the design and placement of the elevated storage tank logos. This site selection process engaged stakeholders, allowed them to voice their concerns, and ultimately resulted in a consensus of how to move forward.

The elevated storage tank design considered tank location, storage volume, and operating levels. Hydraulic modeling determined the resulting system pressures at average and maximum day demand conditions, and the available fire flow. Costs were developed for the various size and types of tanks. Ultimately, a 2-MG composite elevated storage tank was selected and designed. The tank was constructed on an auger-cast pile sub-foundation, due to inadequate soil bearing capacity onsite.

Fishbeck coordinated a skid mounted pilot study as part of preliminary design activities which identified media selection and confirmed treatment performance. The iron filtration facility was designed and constructed with a treatment capacity of 7 MGD. Provisions were included to allow for expanding the facility to 8.8 MGD simply by adding one additional horizontal pressure filter. The facility also included a hydrous manganese oxide batching and feed system for radium removal. The 11,600-sf water treatment facility includes process areas, chemical storage rooms, a laboratory and control room, maintenance workshop, and administration spaces.

Construction activities were completed in the Fall of 2020, including an extensive startup and commissioning phase. Fishbeck performed onsite commissioning activities, including full-scale pilot testing of the filters, reporting, and EGLE involvement and approval. Corrosion coupon testing at the WTP and in the distribution system was also performed to optimize phosphate chemical type and dosage. In preparation for placing the facility online, Fishbeck developed a campus-wide Unidirectional Flushing Program for the distribution system.

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WATER SOFTENING IMPROVEMENTS DESIGN AND CONSTRUCTION

CITY OF HARRISON, OHIO

PROJECT DATA

Design Start: March 2019
Design Completion: August 2020
Design Engineering Fee: $700,000
Construction Start: October 2020
Construction Engineering Fee: $700,000
Construction Cost: $6.7 million

REFERENCE

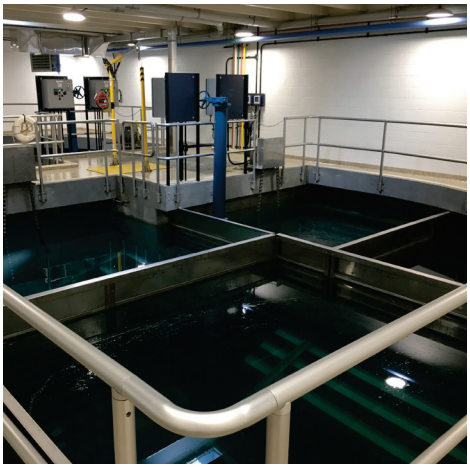
Jim Leslie
513.367.2111

The City of Harrison operates an iron removal plant originally constructed in 1985 with the capacity to treat 2.45 MGD of groundwater. Historically, finished water hardness is in the range 350 to 500 mg/L as calcium carbonate, which has damaged the City's distribution piping over time and burdens the City's customers with damaged fixtures and the need to operate and maintain individual water softeners. The City opted to add a water softening process at the WTP with the goal of achieving a target finished water hardness of 120 mg/L.

In 2017, Fishbeck developed a conceptual design for a reverse osmosis membrane softening system (RO system). In 2018, we helped the City obtain a revolving loan from Ohio EPA to design the system. In 2019, we helped the City obtain a revolving loan for construction. Construction startup was in October 2020 and is scheduled to be completed in 18 months (March/April 2022).

The primary design features include:

- A 5,000-sf building addition to house the RO system and include separate chemical storage and electrical rooms.
- Three RO membrane arrays with space for a fourth array.
- Chemical feed systems.
- A clean-in-place system consisting of a pump to deliver cleaning solution to the membrane units and an FRP cleaning tank with an electric heating element.
- New process piping from the existing pressure filters to the new RO system.
- A diesel generator to power the RO system.
- A concentrate discharge pipeline, which will extend from the building addition to the Whitewater River.
- Stormwater runoff collection and containment.
- SCADA improvements.
- Filter backwashing improvements.



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WATER TREATMENT PLANT IMPROVEMENTS

CITY OF LUDINGTON, MICHIGAN

PROJECT DATA

Start Date: September 2016
Completion Date: December 2018
Construction Cost: $8.7 million
Engineering Fee: $1.2 million

REFERENCE

Mitch Foster
231.845.6237

In 2016, the City of Ludington retained Fishbeck to complete extensive upgrades to its water treatment plant. We used an innovative design approach to increase the rated capacity of the facility from 3.2-MGD to 8.0-MGD without increasing the footprint of the building. A large degree of planning and sequencing, including multiple plant-wide shutdowns, were necessary to accomplish these improvements. Major components of the project included:

- Owner procurement of the pretreatment equipment including flocculation, sedimentation, and sludge collection equipment.
- Retrofitting one existing solids contact clarifier into two baffled flocculation and high-rate sedimentation basins.
- Retrofitting the other solids contact clarifier into two dual-media filters and new chemical storage and feed rooms.
- Upgrading two high-service pumps, including the addition of VFDs.
- Process Improvements: New chemical feed systems including fluoride, alum, and sodium hypochlorite.
- Electrical Improvements: new electrical switchgear, motor control centers, standby generator, and SCADA improvements.
- Building Improvements: replaced heating and ventilation equipment and upgraded the building façade, including a roof replacement.

Fishbeck has also assisted the City with distribution system planning, having completed their Reliability Study, General Plan, and Water Asset Management Plan. That work included hydraulic model development and calibration and capital improvements planning for the plant and distribution system. Current work includes the development of GIS mapping and water service inventory under a Pilot Drinking Water Community Water Supply Grant awarded to the City in 2018.

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NEW WATER TREATMENT PLANT

CITY OF SOUTH HAVEN, MICHIGAN

PROJECT DATA
Completion Date: May 2011
Construction Cost: $18.7 million

REFERENCE
Bill Hunter
269.637.0737

AWARDS
2013 Engineering Excellence Honorable Award – American Council of Engineering Companies/Michigan

2012 Project of the Year Award – American Public Works Association/ Michigan Chapter

2012 Project of the Year Award – American Public Works Association/ Southwest Michigan Chapter

Fishbeck updated the reliability study for the plant and developed an extensive master plan to evaluate short- and long-term solutions addressing a capacity shortfall. As a result, the City elected to construct new facilities adjacent to the existing plant consisting of high-rate (plate settler) sedimentation followed by conventional filtration. The City retained Fishbeck to design and construct the necessary facilities.

The new 7-MGD conventional surface WTP includes baffled flocculation, sedimentation with inclined plate settlers, and dual-media filters. The plant also includes a new raw water pumping station, an all new SCADA system, a new switchgear and generator building, and certified drinking water laboratory.

Fishbeck developed a BIM of the facility, which was used during the construction phase. The 3D computerized facility model was often used by our construction team to quickly gain an understanding of some of the more complex aspects of the construction.

The final project phase was the demolition of the previous plant. Fishbeck provided full-service design and construction management services.

INTEGRATED SERVICES
Fishbeck's integrated services approach afforded single-source delivery for the entire project. Fishbeck was responsible for:

- Comprehensive Master Planning
- Hydraulic Modeling
- Process Design
- Facilities Design
- Construction Management At-Risk
- Estimating
- Cost Management
- Scheduling
- Subcontractor Management
- Regulatory Compliance
- System Startup
- O&M Training

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REFERENCE
Wayne Jernberg, PE
616.456.4055

LAKE MICHIGAN FILTRATION PLANT PRETREATMENT SYSTEM IMPROVEMENTS

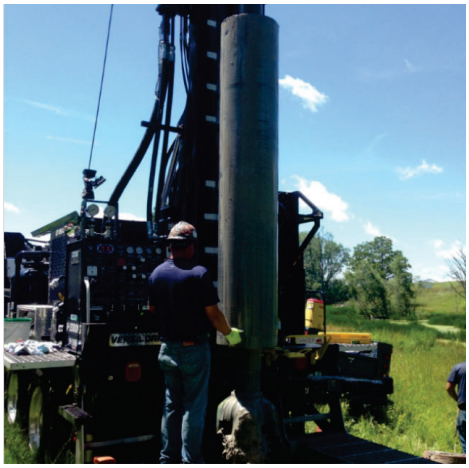
CITY OF GRAND RAPIDS, MICHIGAN

Fishbeck was selected to design the retrofit of two of the plant's four solids contact settling basins into flocculation/high-rate sedimentation basins. Each retrofitted basin was designed for a rated capacity of 32 MGD, for a total capacity of 64 MGD. The retrofitted pretreatment basins reused the existing rapid mixers and alum feed system.

Fishbeck evaluated the costs, advantages, and disadvantages of various types of flocculators, plate settlers, and sludge collectors as part of the preliminary design phase. We also evaluated the hydraulics to determine what effect the recommended equipment would have on the hydraulic profile. We created a comprehensive 3D model of the facility and developed a detailed cost estimate and construction schedule.

The final design included temporary roof supports to allow demolition of the existing equipment and installation of the new equipment. Building restoration was also necessary and included replacing the windows, performing concrete crack and spall repair, and repairing the brick façade. The project included mechanical, lighting, power, instrumentation, and control upgrades.

The project also included a comprehensive condition assessment of the existing 30 horizontal flocculators. Following the assessment, the City determined to replace the flocculation equipment, which included the shafts, paddles, bearings, and stuffing boxes. The existing ganged drive assemblies were also replaced with individual direct-drive gear boxes, powered by VFDs. The motor control center and control enclosures were also replaced. The treatment capacity for the replaced flocculators was 86 MGD.



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CAMPUS WATER SYSTEM IMPROVEMENTS

MICHIGAN STATE UNIVERSITY | EAST LANSING, MICHIGAN

PROJECT DATA
Completion Date: Spring 2020 (est.)
Bid Cost: $14.46 million (WTP & Tower)

MSU owns and operates its water supply system. Fishbeck was retained to identify future water supply well sites. The analysis was conducted using a groundwater flow model and GIS-based approach. Data was compiled into a single GIS spatial database map for evaluation. The evaluation identified the most favorable locations for future water supply well sites.

Two supply well sites were selected for installing and testing Type I water supply wells, the most recent in 2017/2018. Fishbeck conducted hydrogeological studies for the Type I water supply wells, which included test borings, aquifer testing, water quality evaluations, large quantity withdrawal evaluations, and permitting. Also, the groundwater flow and transport model was used to delineate wellhead protection areas for all MSU supply wells and evaluate well field drawdown.

Fishbeck also conducted a formal site selection process for a new elevated storage tank and water treatment plant that identified five potential campus sites. A detailed matrix considered 15 parameters, including cost, future expansion, service access, supporting utility access, aesthetics, and master plan compatibility. Multiple stakeholder meetings were conducted to narrow the selection to two sites. The elevated storage tank and water treatment plant were then modeled in 3D, and fly-through videos were developed using Google Earth to aid stakeholders in site selection. The same process was later used to identify the design and placement of the elevated storage tank logos. This site selection process engaged stakeholders, allowed them to voice their concerns, and ultimately resulted in a consensus decision of how to move forward.

The elevated storage tank evaluation considered tank location, storage volume, and operating levels. Hydraulic modeling determined the resulting system pressures at average and maximum day demand conditions, and the available fire flow. Costs were developed for the various size and types of tanks. Ultimately, a 2-MG composite elevated storage tank was selected and designed. The tank will be constructed on an auger-cast pile sub-foundation, due to inadequate soil bearing capacity onsite. An iron filtration facility was also designed as part of the project, which has a treatment capacity of 7 MGD. Provisions were included to allow for expanding the facility to 8.8 MGD simply by adding one additional horizontal pressure filter. The facility also includes a hydrous manganese oxide feed system for radium removal. The 11,600-sf water treatment facility includes process areas, chemical storage rooms, a laboratory and control room, maintenance workshop, and administration spaces.