

Engineers' News

November 2021

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www.FortWayneEngineersClub.org



Find us on 

November Tour

FORT WAYNE RAILROAD HISTORICAL SOCIETY INC.

When: Thursday, November 18th at 6:30 PM

Website: <https://fortwaynerailroad.org/>

Info: Founded in 1972. The organization has over 800 members and 100 volunteers. Their mission is to preserve, restore, and operate historic railroad equipment and artifacts significant to Northeast Indiana. In 1974, the Society was successful in removing historic Nickel Plate Road steam locomotive no. 765 from display in Lawton Park in Fort Wayne, Indiana. In 1979, the FWRHS became the first all-volunteer, non-profit organization to successfully restore and operate a steam locomotive, writing a significant chapter in the early days of the country's rail preservation movement. Since 1980, the Society has hosted and administered passenger train excursions, private charters, public exhibitions and education outreach activities with the 765 and a variety of other vintage railroad equipment throughout the Midwest. The Society holds regular work sessions and open houses at its restoration facility in New Haven, Indiana during the year and is poised to become a major player in downtown Fort Wayne as part of the Headwaters Junction attraction – all within a mile of the park where the 765 was initially preserved for display.

Address: 15808 Edgerton Rd, New Haven, IN 46774

Directions: From downtown, take Jefferson Blvd/Maumee Blvd east into New Haven.

In New Haven, Maumee Blvd turns into Dawkins Rd. Stay on that heading east, don't take 930 towards I-469. On Dawkins Road, east of I-469 turn left onto Ryan Road and then right onto Edgerton Road. The Historical Society will be on your right.

December Social

This year's event will be at the former International Harvester Engineering Center - 2911 Meyer Rd and is hosted by the Harvester Homecoming organization

When: Thursday, December 9th 6:00 PM to 9:00 PM

Website: <https://harvesterhomecoming.com/>

Info: Pizza, snacks, hot apple cider, bottled water, and soda pop will be provided at the club's expense. Please join us for a fun night of eating, socializing, and touring the old International Harvester building. Look for more information in the December newsletter.

October Tour Summary

by Rod Vargo



Date: October 21st, 2021

Aqua generously encouraged FWEC to invite Fort Wayne City Utilities and Fort Wayne's volunteer Utilities Advisory Group on this tour. Aqua has multiple facilities. This one is located at 9741 Woodland Ridge East, Fort Wayne. It is just west of I-69 on the northern edge of the glacial torrent valley occupied by the Little Wabash River (aka, Little River) and a major railroad right-of-way.

As with so many hosts of our tours, Aqua would welcome children and adolescents with potential career interests for initial introductions to what is involved

and possible mentoring. These professions are based largely on certifications instead of college degrees/debt. This relatively small facility is one of several Aqua locations in the region, yet employs a dozen certified wastewater operators, a lab for water analyses, and a specialist managing aquatic microbiology. Several of us have been aware for two decades that availability of certified wastewater personnel has been a limiting factor in commercial and municipal development. Our host, Aqua's Plant Supervisor Craig Williams, clearly loves his lifestyle and offered to be a contact. Additional career tracks include designing, expanding, and modernizing these facilities.

For more, click [here](#) to read the full summary

New job posting listed

The club accepts both job openings from around the area, as well as resumes from those seeking employment. Please submit these to the following email address:

Info@FortWayneEngineersClub.org

Volunteer Positions within the Club

This month's spotlight is on the position of

Board Member

Surprise, the club doesn't actually need any board members this year, we are all filled up. However, we generally need two new members each club year. This is a three-year term and involves as little or as much work as you would like to put in. Board members don't have any set jobs, though they are welcome to help out any way they would like with club activities and their vote is needed to make club votes official. If you're interested in helping the club in this capacity, please contact Ryan Stark at Info@FortWayneEngineersClub.org

Local Opportunities

Experimental Aircraft Association Chapter 2

The Experimental Aircraft Association's Chapter 2 is very active. Check the [EAA-2 website](#) for current information!

TekVenture

See Facebook or www.tekventure.org for updates.

General Info

Fort Wayne Engineers Club dues are \$0. Donations are welcome but strictly voluntary. In recent years, club funds have helped support Discover-E, the Regional Science and Engineering Fair, annual bridge building contests in schools, academic awards, networking events, mentoring, our website, and facilitating free tours. Please see FortWayneEngineersClub.org, LinkedIn, or Facebook for updates on current Club activities, other news, and/or prior newsletters.

Those participating in activities through FWEC and our hosts does so strictly at their own risk, including disease exposures. Participation in club events is voluntary, free, nonprofit, and solely for the benefit of participants and the community at large. Anyone with an interest may participate unless restrictions are specified for specific events, such as minimum age or minimum safety attire.

Interested in hosting a tour?

Contact us at Info@FortWayneEngineersClub.org

FWEC Board Meetings

The FWEC board meets eight times a year to plan and organize tours for our members. These meetings are open for anyone to attend. We are always looking for new members to join our team! If you are interested in being a board member please attend our next board meeting or contact us at info@fortwayneengineersclub.org.

Next Meeting

Date: Tuesday November 30th, 2021

Time: 7:00 pm

Location: Blackstone Laboratories 502 E Pettit Ave, Fort Wayne, IN 46806

FWEC roster for FY2021-2022

President: Nate Berndt

Vice President: Open

Secretary: Marna Renteria

Treasurer: Ryan Stark

Treasurer-Trainee: John Magsam
First-year Board Members: John Magsam, Mike Magsam
Second-year Board Member: Dave Gordon, Bert Spellman
Third-year Board Member: Craig Welch, John Renie
Editor of Engineer News: Open - interim: Ryan Stark
Membership and Contact Chair: Dave Schaller
Northeast Indiana DiscoverE Chair: Open

Advertise in the Engineers' News

The FWEC provides advertising space within the Engineers' News. Advertisements are \$10 per issue and limited to ½ page of content. For submissions please contact info@fortwayneengineersclub.org.

October Tour Summary Continued

This Aqua location began in the mid 1950's. It is now effectively two parallel systems, which developed relative to capacity needs and regulatory changes, plus effectively becoming landlocked by surrounding residential development. As with most water-related systems, the entire facility is laid out so one system or component could be inoperable for maintenance or due to a failure, while two or more alternatives remain available.

Inflows average 2.5 million gallons a day, with a maximum intake of 12 million gallons during rain events. Wastewater comes from dedicated septic and "sanitary" sewer lines, combined sewers, and traditional underground inflow/infiltration.

The system starts with a mechanical screen that excludes objects larger than roughly 3/8 of an inch. Then, the flow enters a well and lift (pump) station. Lift is roughly 35 feet, enough to allow mostly gravity flow through the rest of the facility. A not-so-simple splitter box divides that gravity flow between an older treatment system and a newer one. There are other potential pathways, as needed.

The older treatment system receives an infusion of alum, in this case sodium aluminum sulfate, to help precipitate phosphates. The flow continues into either of two very large rectangular tanks. These are very deep (12-15 feet?) and are not covered. Each tank operates as a batch process, which starts with sustained vigorously-roiling agitation driven by compressed air. Microbes inherent in the sewage, plus alum, eventually provide sufficient breakdown. Air is then turned off and the resulting still water allows solids and flocculants to settle to the bottom, where they are tapped off. Some materials float to the surface and are returned to the wastewater stream for reprocessing. The relatively clear water normally transfers by pipe through a

chlorinating station and onwards to a "polishing" tank.

The polishing tank looks like the conventional circular open-top units that people associate with sewage treatment plants, with a catwalk to the center and skimmers rotating across the top of the water. This provides time for the chlorine to work and relatively calm water for tiny suspended solids to separate out (still helped by the alum added much earlier). In due time, the clarified water is transferred by pipe and treated with sulfur dioxide to neutralize the chlorine before release into the McCulloch Ditch.

Most solids and flocculants are transferred in a considerable amount of partially treated wastewater to outdoor aerobic digesting tanks. Microbes from the sewage and from the digesting tanks can be managed to help break down the solids over time. Fluids can be transferred back into the wastewater treatment process. Persistent solids are mixed with a cationic flocculent gel, then transferred onto and drained by a fabric filter bed which then enters a roller mill to squeeze the solids into sheets of "cake". These are utilized by Republic's landfill as part of the required soil and microbial activity that is intermixed with the conventional trash. Time did not permit much discussion of the tradeoffs between landfilling versus discharging solids on cropland and gardens. (Ed.: Probably just as hotly debated now as literally 50 years ago.)

The newer treatment system receives wastewater directly from the splitter box and is a continuous flow process. The initial flow (without alum or chlorine) enters a large circular tank, which forms a moat around a second circular tank of the same height. Neither tank is covered. Wastewater is vigorously recirculated and infused with air in the moat, utilizing mostly biological activity for sewage digestion. A portion of the moat's contents are allowed to overflow into the center tank, which is calmer, where solids can float to the surface or settle out to the bottom. A conventional skimmer rotates around the surface of the center tank to push floating solids into an overflow trap, which are reprocessed. Bottom solids are tapped away to the aerobic digesters. (Presumably, the floor of the center tank slopes into a sump.) The relatively clear fluid of the center tank is metered off and chlorinated en route to a sand filter. The sand filter retains suspended solids and is a bottleneck in the system, despite being another long rectangular outdoor tank with a capacity of about a million gallons/day. Water flows downwards through a sandy bottom, and an automated skimmer squeegees the top of the sand layer to push solids into traps along the sides of the tank's bottom.

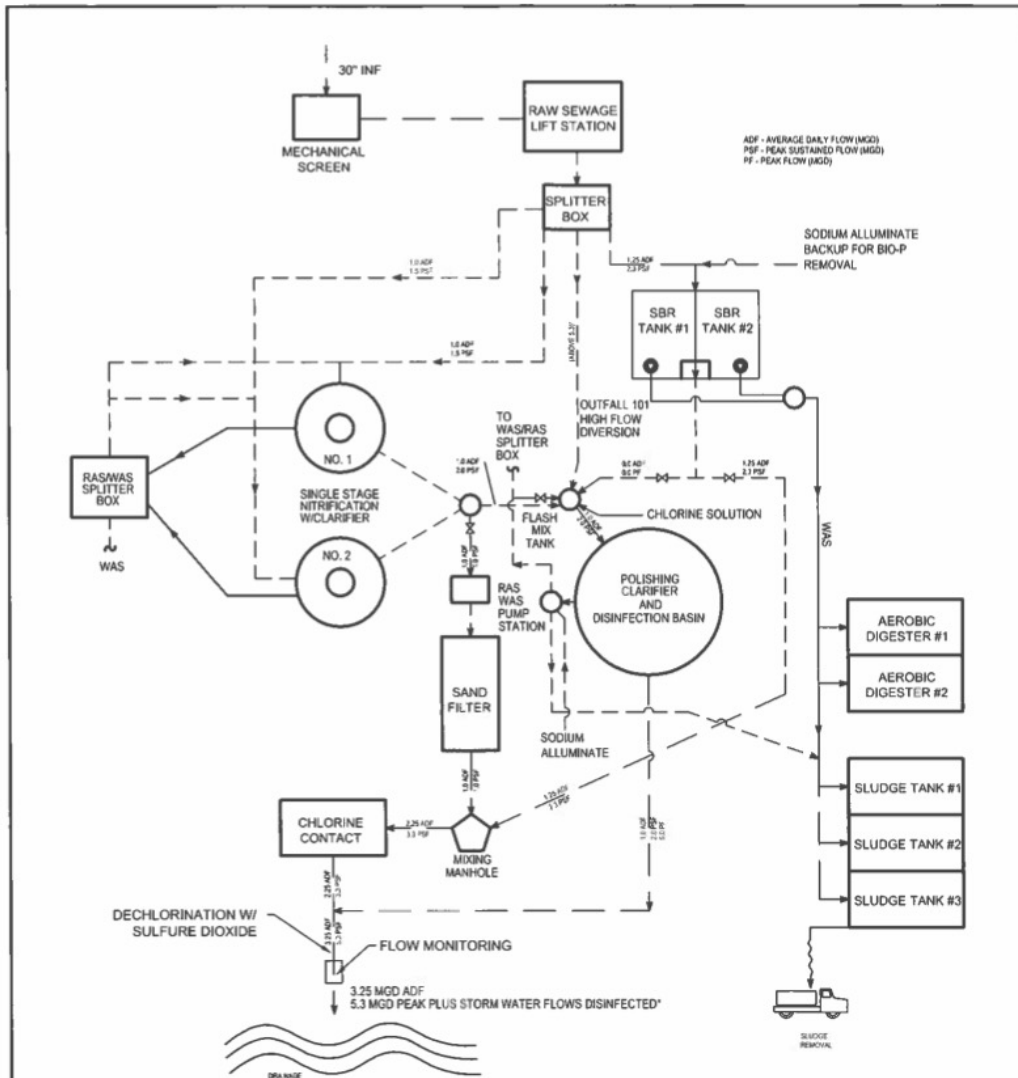
The specialized sand grains (granitic origin?) are about 1-1.5 mm in screen size and appear to be naturally rounded and polished by water flow. These sufficiently resist packing that flow through a bed can remain steady for as much as 7 years. Outflows from the sand filter are chlorinated again in a more complex system that can accommodate and monitor a wide range of water flows, including large storm events. In some storm events, the older treatment system can also bypass some flow into this chlorination system (Ed.: normal procedure, and subject to regulatory oversight). Sufficient time for the chlorine to work, regardless of flow rates, is provided by a classic open-air "lazy river" looping to and fro in a rectangular concrete tank (might also be termed a sluiceway) that may be readily observed and sampled throughout its course.

The chlorine is neutralized with sulfur dioxide before the flow is released into the McCulloch Ditch.



Electric costs for this facility range \$15,000-20,000/month. There are two utility feeds and multiple generator backups.

Freezing temperatures are rarely a problem. The compressed air entering the treatment systems is 140 degrees F due to the heat of compression. The water is often moving or underground, and contains salts, solids, and other components. Our host indicated that a limitation of operating at this site, surrounded on three sides by housing, is noise complaints, despite massive sound mitigation for the air blowers and operating them below capacity. That seemed quizzical, given our relatively quiet tour onsite and given a major high-speed railroad paralleling the length of the neighborhoods. Our host also indicated that odor complaints tend to actually originate as much or more from intensive agricultural operations also paralleling the housing - making the site's mandatory wind-direction sock very useful for him. Chemicals on site seemed to be low quantities, perhaps due to the proximity of the housing.

Sincere thanks to Aqua and Plant Supervisor Craig Williams for an informative and widely appreciated tour.



PROCESS FLOW SCHEMATIC

	 <p>COMMONWEALTH ENGINEERS, INC. <small>INCORPORATED IN INDIANA</small></p> <p>7794 Edwards Dr. Indianapolis, IN 46227 (317) 566-1177</p> <p>5824 Cambridge Rd. Suite 100 Fort Wayne, IN 46825 (317) 494-2223</p> <p>11410 West St. Green Plains, IN 46037 (773) 931-9077</p> <p>11110 N. Liberty Road Suite 100 Ellettsville, IN 47123 (317) 836-1177</p>	<p>AQUA INDIANA ALLEN COUNTY, INDIANA</p>	<p>FIGURE</p>
	<p>MAIN ABOITE WWTP - PROCESS FLOW DIAGRAM</p>		<p>2</p>



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