

Engineers' News

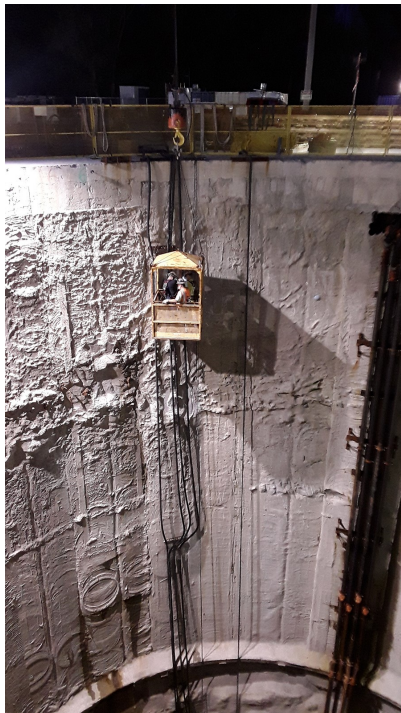
May 2023

Vol. 85 No. 8

www.FortWayneEngineersClub.org



May Tour



When: Thursday 5/25/2023 @ 6:00 p.m.

Address: Water Pollution Control Plant at 2601 Dwenger Ave., Fort Wayne IN 46803

Website: <https://www.cityoffortwayne.org/218-tunnel-project-website.html>

Info:

***THIS TOUR WILL NOT BE PHYSICALLY ACCESSING THE TUNNEL**

Three Rivers Protection & Overflow Reduction Tunnel (3RPORT) & the *Tunnel Works* Program

Fort Wayne City Utilities has hired a contractor to construct a large tunnel that will be located in the bedrock below the city. There will also be an associated network of pipes nearer to the surface of the ground. This system, known as *Tunnel Works*, will collect and transport sewage from locations where Fort Wayne's combined sewer system might overflow during wet weather to the sewage treatment plant. *Tunnel Works* is the capstone in the [Long-Term Control Plan](#) for reducing the amount of combined sewage (a mixture of sanitary sewage and stormwater) that is discharged into Fort Wayne's rivers every year.

The Tunnel

- The route generally runs parallel to the St. Marys and Maumee Rivers
- 3RPORT will be constructed in bedrock approximately 200–220 feet below ground using a tunnel boring machine (TBM)
- One working shaft to place the TBM underground, approximately 30 feet in diameter; one retrieval shaft to remove the TBM; and a shaft for a pump station that will remove wastewater from the tunnel
- 5 miles of tunnel lined with concrete, 16 feet finished diameter, to collect and transport combined sewage
- Seven drop shafts, 4–8 feet in diameter, to direct sewage from near-surface sewer pipes into the tunnel

Near-Surface Consolidation Sewers

- Construction of near surface “consolidation” sewers, each with a diameter of 48–84 inches, to direct sewage to drop shafts. Construction of consolidation sewers will use the traditional method of open-cutting a trench and installing pipe
- Two miles of additional sewer construction at the south end of the tunnel using the traditional trench construction method

Outcomes

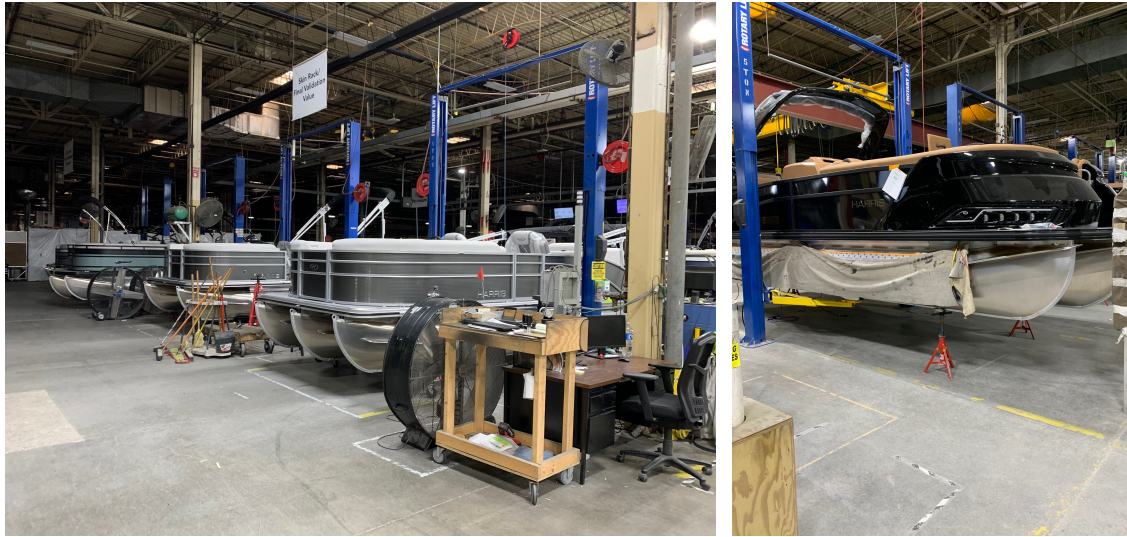
- Completion of 3RPORT and *Tunnel Works* program will reduce combined sewage overflows to St. Marys and Maumee Rivers by 90%, from about 71 times in a typical year to just four

Timetable & Cost

- 2014–2016: Design of overall system completed, including soil and rock drilling and testing, public outreach and finalizing the tunnel route. Bidding for construction occurred in February 2017
- 2017: Construction began.
- 2025: All parts of *Tunnel Works* system will be completed and operational.
- Approximate cost: \$188 million for the 3RPORT and drop shafts

April Tour Summary





Strong turnout on a fine spring evening made for a tour of many interests. This facility creates pontoon boats that range in retail price about \$25,000 without a motor to upward of \$400,000 with either one or 2 engines. The parent company, Brunswick Corporation, produces a substantial range of health, fitness, recreation, and sports brands.

Aluminum pontoon-type vessels continue to displace other traditional hulls because engineering increasingly allows pontoons to retain exceptional stability and passenger capacity while adding capabilities such as skiing or high speed cruising. Horsepower capacity can exceed two 450 hp V-10 outboards, and is slowly increasing. Our FWEC members discussed on-plane speeds in the 80 mph range but, realistically, larger boats are often heavily constructed for weathering distances across large bodies of water with wind and currents, as well as many passengers potentially mulling around while on board. Our hosts soberly emphasized the engineering has to withstand 10-year warranties

To read more, click [here](#)

Items of Note

FWEC member Rod Vargo is Chair of the 28 year-old and all-volunteer [Utility Advisory Group](#), which formally advises Fort Wayne City Utilities and often City Council. Your comments are welcome at rodvargo@comcast.net

Volunteer Positions within the Club

Membership and Contact Chair: Open
Northeast Indiana DiscoverE Chair: Open

Vice President:

Club Vice President needed! It's time once again to ask club members to fill this vital spot in the club's leadership roster next year. The Vice President is generally in charge of arranging club tours, though this has traditionally been a team effort so it's not really all that much work. You would be expected to attend the monthly officers meeting (from the end of August until the end of May) and at the end of your one-year term, you would automatically become club president. The typical monthly time involved would be roughly 2 hours (including attending the officers meeting). If you enjoy the club and would like to see it continue to function, please consider volunteering for this spot.

Let us know if you're interested!

Volunteer

General Club 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 past newsletters.

Those participating in activities or hosting tours through FWEC do 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 today!

Host a Tour

FWEC Roster for FY2022-2023

President: Nate Berndt

Vice President: Nathaniel Wisel

Secretary: Marna Renteria

Treasurer: John Magsam

First-year Board Members: Ryan Stark, Ed Woodward

Second-year Board Member: Mike Magsam, Rod Vargo

Third-year Board Member: Dave Gordon, Bert Spellman

Editor of Engineer News: Pending

Membership and Contact Chair: Open

Northeast Indiana DiscoverE Chair: Open

Vice President: Open for FY2023-2024

Job posting and resumes 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

Advertise in the Engineers' News

The FWEC provides advertising space within the Engineers' News. Advertisements are only \$10 per issue and limited to ½ page of content.

Advertise Your Business

April Tour Summary Continued

Boat models have steadily increased towards three pontoons instead of two, with price distinctions clearly reflecting capabilities and robustness of construction. At the same time, engineers have steadily worked towards shared underlying designs, but the various boat offerings vary for instance in gauges of metal used, number of braces, boat width,

and potential uses of bilge keels. Various techniques have modestly reduced the number of parts across all models.

The facility has invested heavily in reducing employee stress and fatigue. Lighting and ventilation have been completely upgraded. A dedicated classroom area on the work floor evolved for initial training. Classrooms provide for subsequent employment advancement. Much work is old-fashioned hand labor because it is highly adaptable. But, it can be hard on mind or body. A repeating aspect of our tour was processes to identify, prioritize, and address the downsides.

The fabrication of boats starts with aluminum sheets of various thicknesses. A FWEC tour in September, 2016, showcased extensive research and development of improved welding techniques. That seems to have been assimilated into the manufacturing process. Welding is all by hand using complex jigs, except for a limited-use structural member. Welding is taught in-house and treated as a pathway of career advancement.

Powder coating has replaced anodizing for railings and other metal parts. The coating can be done in-house with an overall delay of hours instead of weeks. Urgent replacement parts can be manufactured in a day instead of maintaining inventories. When chosen appropriately, either method should be equally durable but coating allows a greater range of color.

Cabinetry and upholstery is now completely outsourced due to years of stiff competition and consolidation in the RV industry. But, Harris installs details, especially electronics. These include speakers, helm consoles, and lighting. Drink cups are now lighted, the lighting colors often individually controllable. The ever increasing complexity has led to engineering investments in how to quickly troubleshoot glitches in fully assembled boats.

This tour contrasted sharply with our tour of September, 2016, which is NOT available online while the FWEC website is being modernized. There has been an understandable drift towards simpler manufacturing methods and less overall expense. Expensive oversight akin to lean manufacturing metrics appear to have shifted to tracking and responding to employee concerns as boats move through the facility. Overhead light cranes and/or floor hoists have proliferated. Documenting metal waste is deemed no longer economically worthwhile, but the facility qualifies as landfill free. It seemed inevitable in 2016 that electronic joysticks would mostly replace steering wheels by now. Electric-motor thrusters were to allow any skill level to dock sideways and enable GPS to replace anchors while fishing or doing most other activities. On board toilets and weather shelters seemed an obvious future trend.

But, from this writer's perspective, cost per unit and custom fashion details appear to

dominate both dealers and customers. Each boat is a custom order, essentially unique. This is still a relatively low volume industry, although producing somewhat more and often larger boats now-a-days. Fashionable features constantly change. Meanwhile, design quality and product durability appear to have steadily improved. Our hosts say quality and durability have been driven by the 10 year industry-standard warrantee. Based on chatting with a few people, potential savings or advantages of a larger/sturdier boat are preferable to the expense and complexity of a joystick or toilet.

A bit of trivia from the 2016 tour report: employee parking lost in 2016 to the Bass Road round-about cost \$3400/space to replace, given accessway, stone, asphalt, drainage, landscaping, and design services. Curbing and lighting expenses were minimal in that instance. That does not consider annual commercial property tax, stormwater (impervious surfaces) fees, insurance, or maintenance costs.

THANK YOU to Brunswick, Harris Boat, and our hosts John, Gary, and FWEC electrical engineer Sheri Stark!

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