



IMAGE COURTESY OF PROJECT CONSTRUCTION COMPANY, **Shook Construction**


Mazzei[®]
CASE STUDY

City of Sidney, Ohio Wastewater Treatment Plant

Post Treatment Aeration without Blowers (Venturi Injectors & BNM)

THE PROBLEM: The Sidney, Ohio, wastewater treatment plant (WWTP) plays a critical role in supporting the expansion of local industry and residential growth in the community, all while protecting the water quality of the Great Miami River.

Per capita, Sidney has the greatest number of manufacturing jobs in Ohio. As a result, its WWTP receives a significant portion of its flow and loading from local industrial facilities. To ensure the plant could continue to effectively meet its current and future treatment objectives, an improvement project was initiated to increase treatment capacity, bolster reliability and improve safety at the plant. The plan included upgrades to increase design capacity to 7.5 MGD and peak capacity to 14 MGD. In addition, a conversion from chlorine to UV for final disinfection would be implemented. After the completion of the plant's improvement project, the treatment process would consist of primary clarification, biological treatment, secondary clarification, UV disinfection, and post treatment aeration.

Prior to discharge into the Great Miami River, regulations require the plant to maintain a dissolved oxygen (DO) level of 6 mg/l or greater in the treated effluent. To meet this requirement, the plant had previously relied on cascade aeration for post treatment aeration, but after the installation of the UV disinfection system, there was insufficient pressure head available to accommodate this type of aeration system.

THE SOLUTION: While blowers and fine bubble diffusers are used in the biological treatment stage, a lower maintenance technology with a smaller footprint was desired for the post treatment aeration step. Fortunately, the design engineering firm, Hazen, was familiar with venturi aeration systems from Mazzei Injector Company. A Mazzei aeration system uses a pump to draw water from a small basin and recirculate it through a venturi injector. As the water passes through the injector, a vacuum is created and atmospheric air is aspirated into the recirculation loop. This air/water mixture is then discharged back into the basin through a basin nozzle manifold (BNM).

To provide the desired level of redundancy and turn-down capability, two (2) venturi aeration systems were installed in parallel at the Sidney WWTP. The injectors are mounted above the water level, and the BNMs are secured to the basin floor.

THE RESULT: Along with the other upgrades completed as part of the plant improvement project, the installation of the new post treatment aeration system has enabled the plant to continue meeting its permit requirements without adding to the daily responsibilities of plant personnel.

After almost five years of operation, the Sidney WWTP staff has discovered the many benefits of a Mazzei in-line aeration system, including:

- **Small Footprint:** All the equipment is contained within the length/width boundaries of the basin. Since venturis are used instead of blowers, there is no need to invest in additional infrastructure to house a blower.
- **Low Maintenance:** Since operation began at the Sidney plant, the only required maintenance has been hoisting the pump out of the basin once a year—on its guide rail—to replace its oil.
- **Zero Basin Entry:** With the Mazzei aeration equipment, routine maintenance does not require entrance into the basin. (When using blowers and fine bubble diffusers, it is a common requirement to periodically empty a basin to inspect, repair, and replace diffusers, which is labor intensive and time-consuming.)



Venturi 8" injectors



Basin nozzle manifold



Mixing in basin

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