



2021  
ASCE-NJ  
**PROJECT  
OF THE YEAR**  
< \$10M



## Innovative Wastewater Treatment Technology Delivers Critical Efficiency for Allentown Borough, NJ

**Customer:** Borough of Allentown, New Jersey  
**Project:** Wastewater Treatment Plant Upgrades  
**Engineer:** Roberts Engineering Group, LLC  
**Capacity:** 180,000GPD

### Challenge:

Located on a small tract among protected wetlands.  
Project required that the plant remain operational.  
Limited site area left no room for construction staging.

### Solution:

PSI Process envisioned a compact solution.  
IFAS treatment technology reduce space requirement.  
Temporary clarification enabled continued operation.

### Results:

Upgraded plant reduces cycle time by 50%.  
Solid waste carted from the site was greatly reduced.  
Measured output is now well within NJ DEP guidelines.

### Limited site footprint and operational continuity, delivered with confidence

The Borough of Allentown, New Jersey, is a quaint suburban community about midway between New York City and Philadelphia, in western Monmouth County. Well known for its shopping, restaurants, and historic sites, this community of about 1,900 residents called for proposals to upgrade its failing municipal WWTP facility.

Allentown sought a reliable solution and technology that could be deployed in just over 15 months. As a project requirement, the town asked that its existing wastewater treatment plant remained in service. And, most importantly, the project needed to fit the economic constraints of this small, independent municipality with fixed assistance from the New Jersey Clean Water State Revolving Fund.

## Challenge

Early 2019, the Borough of Allentown New Jersey sought to replace its outmoded wastewater treatment facility. The town's existing site was not keeping pace with town growth and threatened overflow into local protected wetlands. Initial rounds at engineering an improved facility went well beyond Allentown's available budget, even with state funding support. The site appeared to be too small to support project staging for a traditional activated sludge system and would not allow for continued operation during construction – a project requirement.

## Solution

In mid-2019, after reviewing the Allentown challenge, PSI Process proposed an integrated fixed film activated sludge (IFAS) solution. An IFAS upgrade would not only improve the site's performance. It would also reduce the site's operational footprint, allowing for both construction staging and interim processing tanks.

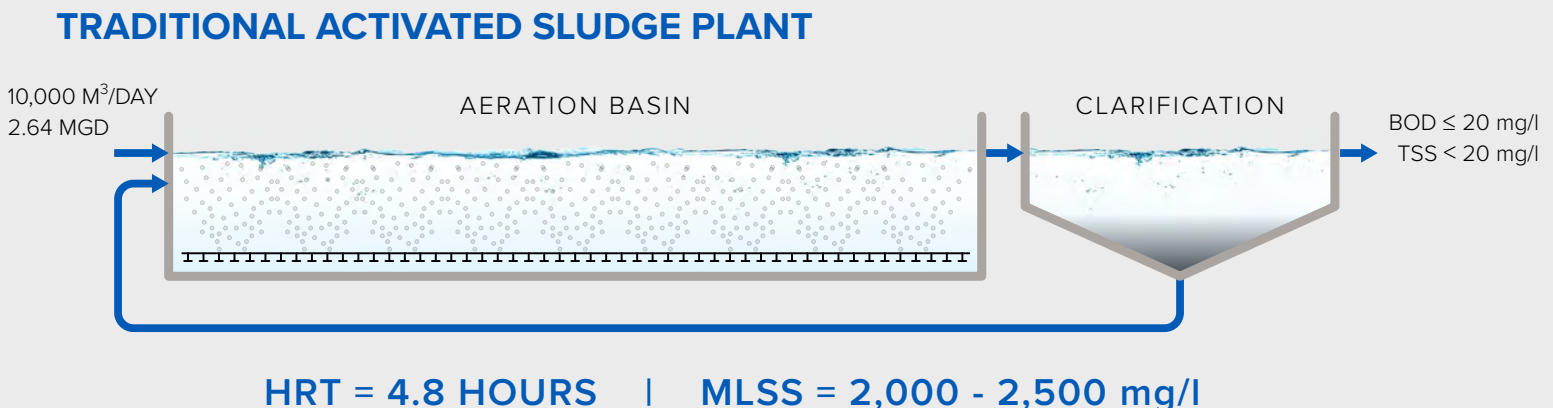
PSI Process design and integration teams provided the IFAS vision, and all the technology required for both the interim and completed solution. PSI worked with two collaborative partners to assure a reliable bid on the Allentown project. Roberts Engineering Group, LLC, established the build plan and budgeting. Pact Two, LLC, committed to delivering the construction portions with an overall contract value of just under \$4 million.

The partnership of Roberts Engineering, PSI Process, and Pact Two was the right combination, designing and delivering a reliable treatment solution that included:

- ▶ An innovative and efficient IFAS wastewater treatment upgrade within the existing site's footprint
- ▶ Interim equipment that allowed full and continuous site operation during construction
- ▶ Supervisory control and data acquisition (SCADA) that would allow constant monitoring and remote operation

### Why IFAS was the right solution for Allentown

Integrated fixed film activated sludge (IFAS) is an innovative wastewater treatment technology that was established in the early 2000s in response to the U.S. Clean Water Act of the early 1970s. IFAS systems add an attached growth media to an activated sludge tank which increases biomass growth to accelerate the treatment process.

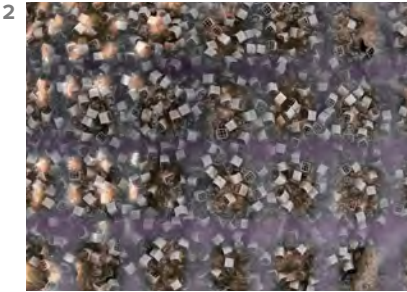






IFAS offers a range of advantages over traditional activated sludge technologies. But for the Borough of Allentown, it provided several critical strategic advantages:

- ▶ IFAS reduces the holding tank footprint by 50% and excavation requirement by 75% (Image 1).
- ▶ By introducing “biocarrier” media (Image 2) with high surface area, IFAS increases treatment efficiency, enabling this small-site application.

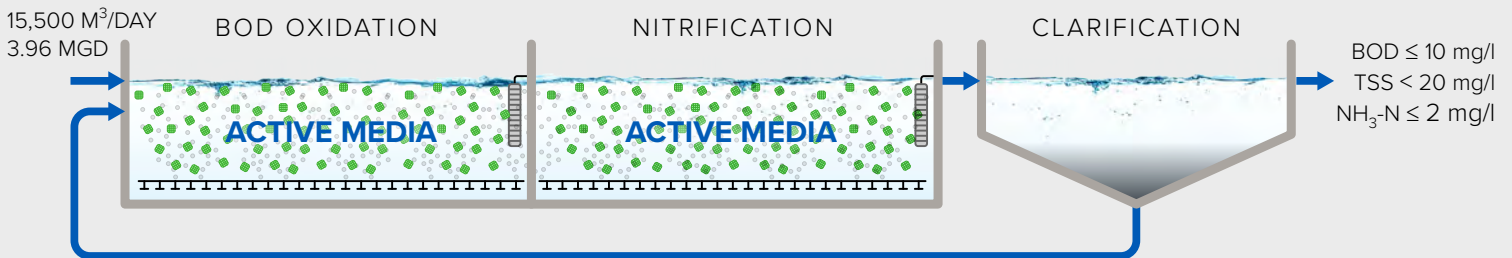


To support IFAS process efficiency, PSI integrated two, 20-horsepower positive displacement blowers (Image 3). The blowers elevate dissolved oxygen levels to maintain a high-quality effluent (Image 4) and meet state permit requirements.

PSI’s Systems Integration Team designed a control system for the plant (Image 5) to allow operators to monitor all critical process functions (Image 6), in addition to their own visual observations (Image 7).



## ACTIVATED SLUDGE PLANT CONVERTED TO IFAS



HRT = 3.2 HOURS | MLSS EQUIVALENT = 8,000 mg/l

Key features of the PSI upgraded solution included:

- ▶ A Flygt Concertor™ pump system for wastewater applications, designed to minimize energy usage, reduce pump station cleaning costs, and shrink pump inventories
- ▶ A control unit that includes an energy-minimizer function that monitors the pump and finds the operating point with the best energy efficiency
- ▶ An inlet works Franklin Miller SPIRALIFT® screens, washes, transports, and dewater solids entrained in the wastewater flow.
- ▶ A temporary clarifying system including three, 21,000-gallon weir tanks and a sludge holding tank
- ▶ An IFAS biological treatment system to encourage growth of biomass and enhance the treatment process, supplied by Headworks International
- ▶ A plant control system designed and programmed by PSI Process, integrating instrumentation, control, and SCADA for on-site and remote monitoring

## Results

The new treatment plant came online in May 2021 and the temporary facility was dismantled. The upgraded facility processes wastewater in about half the cycle time of the original plant. And, because the new system is more effective at thickening sludge, carting of residuals has been greatly reduced.

PSI Process and its project partners demonstrated an effective, collaborative working relationship which streamlined the design and innovation process. During the 400+ days of construction and calibration, the site remained online, at full capacity, supported by a temporary clarifying system and sludge holding tank that PSI constructed on-site.

PSI Process provided full commissioning and start up service, quickly addressed all punch-list issues, delivered complete operations and maintenance manuals, and provided final effluent evaluation and recommendations within the required project schedule. The PSI team continues to provide support well beyond the initial maintenance and troubleshooting period.

## About PSI Process

PSI Process is an authorized supplier and service facility for the world's leading manufacturers of water and wastewater transfer and treatment equipment. Celebrating more than 50 years in business, PSI is headquartered at its 45,000 square foot facility in Middlesex, New Jersey. The company is privately held and employee owned.

PSI Process has grown through acquisition while developing teams with expertise in water and wastewater equipment selection. This has helped the company excel on projects requiring engineering design knowledge and experience. Equipment implementation is supported with in-house project management, instrumentation and control design/program/build, start-up training, warranty, and aftermarket service contracts.

From the start, PSI Process has been a stocking distributor and service center for industry-leading submersible pumps, serving the municipal, construction, industrial, and commercial markets in New Jersey and New York.

IFAS TECHNOLOGY ENABLED

# 50%

SMALLER TANK FOOTPRINT AND

# 75%

LESS EXCAVATION

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“Together, PSI Process and Roberts Engineering provided a level of confidence that helped Allentown Borough move forward with the IFAS solution, a first-of-its-kind in the region.”

*Carmela Roberts, P.E.  
President, Roberts Engineering Group*

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PSI TEMPORARY SEDIMENTATION  
SYSTEMS ENABLED

# 100%

OPERATIONAL CAPACITY  
THROUGHOUT THE PROJECT

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[psiprocess.com](https://psiprocess.com)

Pumping Service, Inc.  
201 Lincoln Boulevard  
Middlesex, New Jersey 08846