

# CASE STUDY: Adairsville, Georgia Wastewater Treatment Plant



<b>Application:</b>	Aerobic Sludge Digestion
<b>Design Flow (ADF):</b>	2 MGD
<b>Mixing Efficiency:</b>	≈ 0.2 HP/1000 FT <sup>3</sup>
<b>Compressors:</b>	One (1) 10 HP Rotary Screw
<b>Blowers:</b>	Two (2) 75 HP Positive Displacement
<b>Design Engineer:</b>	Rindt McDuff Associates, Inc.

## BioCycle-D™ Aerobic Digestion Process Delivers Process Benefits and Energy Savings

The City of Adairsville is located approximately 60 miles northwest of Atlanta — halfway between Atlanta and Chattanooga, TN — and has a population of approximately 5,000 residents.

In 2017, the city began designing the upgraded North Wastewater Treatment Plant (WWTP). The purpose of the project was to increase plant capacity and meet lower effluent total phosphorus limits. Finished in 2021, the upgrade expanded capacity from 1 MGD to 2 MGD average flow with a peak capacity of 4 MGD and included major process equipment: headworks, oxidation ditch, effluent filters, UV disinfection, and aerobic digestion.

**EnviroMix’s BioCycle-D Optimized Aerobic Digestion Process was selected because of the significant energy savings it provides** and the reduction in nutrient recycle enabled by automated process control. BioCycle-D provides ideal conditions for aerobic sludge digestion and reduction of organic matter through endogenous respiration, maximizing volatile solids destruction. The process is based on automatically alternating aerobic and anoxic cycles, and it minimizes energy consumption by decoupling aeration from mixing.



*BioMix nozzle headers easily interlace with the coarse bubble aeration grid*



### ENERGY EFFICIENCY

**45% power savings** versus traditional diffused air mixing design approach



### STRAIGHTFORWARD OPERATION

Automatically adjusts the aerobic and anoxic cycles based on loading conditions  
  
Minimal, localized maintenance



### PROCESS OPTIMIZATION

Precise control maximizes nutrient removal and **minimizes N and P in return streams**



### UNPARALLELED FLEXIBILITY

Bottom-up, uniform BioMix Compressed Gas Mixing supplements aeration



Blowers, compressor and master control panel located tankside

“We land apply our sludge. It’s excellent Class B sludge.”

— Les McClure, Operator

Conventional aerobic digester designs utilize diffused aeration for both mixing and process oxygen demands. This design approach often results in over-aeration which leads to uncontrolled nitrification, depletion of alkalinity, and excessive energy consumption.

By contrast, **BioCycle-D delivers significant energy savings by decoupling aeration from mixing** — in other words, the function of mixing is no longer provided by the diffused aeration system, allowing for smaller blowers and significant turndown. In many cases, the volume of air required to mix the digester’s contents is far greater than the volume of air required to satisfy the oxygen demand. This condition is commonly referred to as “mixing limited.”

BioCycle-D’s decoupled approach eliminates mixing limited conditions because the system is designed so that:

- Aeration is designed for VS destruction only, not to mix the tank.
- Concurrent operation of aeration and mixing enables unmatched aeration turndown.
- Tank contents are consistently mixed, maximizing denitrification, alkalinity recovery, and VS destruction.
- Completely mixed, air-off time periods allow for further conditioning of the sludge for dewatering.

**By decoupling aeration from mixing, the Adairsville North WWTP’s BioCycle-D process provides more than 45% energy savings versus a conventional diffused air mixing system designed at the Ten State Standards.**



50’ diameter bolt steel tank aerobic digester



Zombie Valve Module located at top of tank



Contact [sales@enviro-mix.com](mailto:sales@enviro-mix.com) today to discuss the ways EnviroMix can optimize your mixing and process solutions.