

FLORIDA RURAL WATER ASSOCIATION

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Contact Name: Maria Accoo
Facility Name : Mantanzas Shores
Date: 6/14/2024

Mrs. Maria Accoo,

Recently you requested Florida Rural Water to evaluate plant operations at the Mantanzas Shores Wastewater Treatment Plant. On 6/12/2024, a plant inspection was conducted and the following are the findings:

Inspection Results:

Wastewater treatment plants (WWTPs) are critical infrastructure for managing and treating sewage and industrial wastewater before it is released into the environment. Three significant factors can increase the volume of wastewater that these plants must handle: Infiltration and Inflow (I&I), water utilization, and illegal dumping (See appendix for detailed definitions, mitigation strategies, and potential impacts of each). Each of these factors contributes to the overall flow to wastewater treatment plants, which can strain capacity, increase operational costs, and necessitate additional measures such as wastewater hauling. Based on recent trends and the permitted capacity of .322 mgd with an average flow of .083 to .084 mgd, there is no indication at this time that any of these factors are currently contributing to an increased hauling frequency.

Recommendations:

1. Increase digester capacity

Increased digester capacity allows for more sludge to be processed at any given time. This means that the plant can handle higher volumes of waste without compromising treatment efficiency. Larger digester capacity provides more thorough stabilization of sludge, reducing its volume and making it safer for disposal or reuse. Increased digester capacity can lead to more efficient sludge treatment, reducing the need for frequent sludge hauling and associated transportation costs. Larger digesters can handle fluctuations in sludge production, ensuring consistent and reliable plant operations even during peak load periods. Increased capacity provides greater flexibility in managing different types of sludge and adjusting to changes in wastewater composition. Increasing aerobic digester capacity at a wastewater treatment plant offers numerous advantages, including enhanced sludge treatment, operational efficiency, cost savings, environmental benefits, improved effluent quality, regulatory compliance, energy efficiency, and community and public health benefits. By investing in larger or more advanced aerobic digesters, WWTPs can ensure more sustainable, efficient, and reliable operations, ultimately contributing to better environmental and public health outcomes.

2. Increase decanting to thicken sludge

In wastewater treatment processes, sludge management is a critical component. One effective method to enhance sludge handling and disposal is through increased decanting to thicken sludge. Decanting involves removing the supernatant liquid from sludge, thereby increasing its solids concentration. Thickening sludge significantly reduces its volume, leading to substantial cost savings in transportation and disposal. By removing excess water, the amount of sludge that needs to be transported to treatment or disposal sites is minimized. This reduction in volume can lower the number of trips required for sludge transport.

3. Implement advanced wastewater treatment processes (Natura Solve)

Utilizing naturally occurring, enzyme and bacteria blend for enhanced breakdown of fats, grease, organics and toxins. Reduce Plant HRT times. Will accelerate the biological breakdown of organic waste. Natura Solve delivers advanced biotech solutions to significantly decrease plant treatment times, while simultaneously improving the quality of discharge. Odors are eliminated on contact and pathogens are destroyed without chlorination or UV treatment. Natura Solve offers alternatives to costly plant upgrades, and delivers the most powerful biotechnology to improve plant efficiencies and reduce operational expenses.

4. Replace existing ball valves with gate valves

Valves are essential components in various industrial and plumbing systems, regulating the flow of liquids and gases. Ball valves and gate valves are two common types used in these systems, each with unique features and applications. While ball valves are often praised for their quick operation and tight sealing capabilities, there are scenarios where replacing ball valves with gate valves can offer distinct advantages. Gate valves offer superior precision in flow control compared to ball valves. Their design allows for gradual opening and closing, making it easier to regulate the flow of fluids accurately. The gate valve's design provides a straight flow path with minimal resistance, reducing pressure drop across the valve. This is beneficial in systems where maintaining consistent pressure is critical. Gate valves generally experience less wear and tear compared to ball valves, especially in high-cycle applications. The gate's linear motion reduces the friction on sealing surfaces, enhancing the valve's longevity. Gate valves are better suited for handling thicker fluids, such as slurries or viscous liquids. The design of the valve allows it to cut through and seal against such materials more effectively than a ball valve.

If you have any questions please feel free to call me at 727-218-4602.
It has been a pleasure working with you.

Respectfully,

David Vice
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FRWA Wastewater Section

APPENDIX

Infiltration and Inflow (I&I)

Infiltration and Inflow (I&I) refer to the extraneous water that enters the sanitary sewer system from various sources:

1. Infiltration: Groundwater that enters sewer pipes through cracks, joints, or other defects. This is typically due to aging infrastructure or construction flaws.
2. Inflow: Surface water that enters the sewer system from improper connections such as storm water drains, roof drains, and sump pumps.

Impact on WWTPs

- Increased Volume: I&I can significantly increase the volume of water that a wastewater treatment plant needs to process, especially during wet weather events.
- Operational Strain: Excessive flows can overwhelm plant capacity, leading to potential overflows and reduced treatment efficiency.
- Infrastructure Stress: Constant high flows can wear out infrastructure faster, necessitating more frequent maintenance and upgrades.

Water Utilization

Water Utilization pertains to the amount of water used by households, businesses, and industries, which subsequently becomes wastewater.

Impact on WWTPs

- Higher Flows: Increased water usage directly translates to higher volumes of wastewater that need to be treated.
- Resource Demand: Higher flows require more energy and chemicals for treatment, increasing operational costs.
- Peak Load Management: WWTPs need to manage peak flows, which can vary based on daily, weekly, or seasonal water usage patterns.

Illegal Dumping

Illegal Dumping involves the disposal of waste materials into the sewer system, including hazardous chemicals, oils, and other pollutants.

Impact on WWTPs

- Contamination: Illegal dumping introduces harmful substances that can disrupt biological treatment processes and damage equipment.
- Increased Treatment Complexity: The presence of non-biodegradable or toxic substances requires additional treatment steps, increasing operational complexity and cost.
- Environmental Risks: Failure to adequately treat these substances can lead to environmental pollution and regulatory violations.

Increased Need for Hauling

The combined impact of I&I, increased water utilization, and illegal dumping can overwhelm a WWTP's capacity, necessitating additional measures such as hauling.

When Hauling is Necessary

- Capacity Exceedance: When inflow exceeds plant capacity, hauling is required to transport excess wastewater to other treatment facilities or storage locations.
- Emergency Situations: During extreme weather events or equipment failures, hauling provides a temporary solution to prevent overflows and environmental contamination.
- Maintenance and Upgrades: During periods of significant infrastructure work, hauling can manage flows that the WWTP cannot temporarily handle.

Challenges of Hauling

- Cost: Hauling wastewater is expensive due to transportation, labor, and disposal fees.
- Logistics: Coordinating hauling operations requires significant planning and resources, especially during peak periods.
- Environmental Impact: Hauling contributes to greenhouse gas emissions and can pose risks of spills and leaks during transport.

Mitigation Strategies

To mitigate the impact of these factors on wastewater treatment plants, several strategies can be employed:

1. Infrastructure Upgrades: Investing in modernizing and repairing sewer systems to reduce I&I.
2. Water Conservation: Promoting water-saving measures to reduce overall water usage and wastewater generation.
3. Regulation and Enforcement: Strengthening laws and enforcement against illegal dumping to protect sewer systems and treatment processes.
4. Public Awareness: Educating the public about the impact of I&I, water usage, and illegal dumping on wastewater treatment systems.

The combined effect of I&I, water utilization, and illegal dumping significantly increases the flow to wastewater treatment plants, necessitating measures such as wastewater hauling to manage the excess volume. Addressing these challenges requires a multifaceted approach, including infrastructure investment, regulatory enforcement, and public education, to ensure sustainable and efficient wastewater management.