



RECLAIMED WATER WHITE PAPER



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1. Introduction

Wastewater Effluent is a byproduct of the wastewater treatment process. Each day, Bonita Springs Utilities, Inc. (“BSU”) treats millions of gallons of sewage and must dispose of this treated wastewater in a sanitary and cost-effective manner.

In the past, it was common for utilities to pump effluent directly into rivers and oceans. As treatment methods and pollution regulations evolved, the practice of discharging to water bodies was replaced by the use of storage ponds where effluent evaporated into the air and seeped into the ground. Some utilities built deep wells to dispose of effluent.

Today, advanced methods of treatment have made effluent cleaner and safer. However, population growth, landscape irrigation and saltwater intrusion place increasing demands on our fresh water supply. Reclaiming effluent for outdoor irrigation makes sense and helps conserve potable (drinking) water.

2. Reclaimed Water: A State Environmental Objective

Using reclaimed water meets a State objective for conserving freshwater supplies, and preserves the water quality of rivers, streams, lakes, and aquifers (sections 403.064 and 373.250, Florida Statutes). The law further states that reuse systems, designed and operated according to FDEP guidelines, are environmentally friendly, and do not pose a threat to public health and safety.

Florida maintains the largest and most comprehensive inventory of permitted reuse systems in the country. In 2019, 476 domestic wastewater treatment facilities reported making reclaimed water available for reuse. Approximately 820 million gallons per day (“mgd”) was reused for beneficial purposes, which represents approximately 48 percent of the total domestic wastewater flow in the State. Reclaimed water from these systems was used to irrigate 455,510 residences, 529 golf courses, 1,126 parks, and 394 schools.

In Southwest Florida, in the Florida Department of Environmental Protection (FDEP) South District (Ft. Myers), wastewater treatment plants provided a total treatment capacity of 253 mgd. These facilities in turn had a reuse capacity of 204 MGD representing 81% of their treatment capacity. In Lee County, wastewater treatment plants provided a total treatment capacity of 95 MGD. These facilities in turn had a reuse capacity of 87 MGD representing 91% of their treatment capacity.

3. The BSU System

In 1991, BSU acquired a wastewater treatment facility and other infrastructure from Springs Environmental Systems, Inc. At the time, that system served only the Bonita Bay development. In the years that followed, BSU expanded wastewater capacity and extended service throughout the area. Today, BSU serves over 27,000 wastewater connections in a 60-square-mile franchise in the City of Bonita Springs, the southern portion of the Village of Estero, and surrounding areas of unincorporated Lee County.

As a condition of the acquisition of the Springs Environmental Systems wastewater facilities, BSU delivered effluent to Bonita Bay Properties, Inc., for irrigation within Bonita Bay. This reclaimed water disposal system was the most cost effective and environmentally beneficial method of effluent disposal then available. Other disposal alternatives would have required a substantial investment in land and construction of transmission, storage and disposal facilities, resulting in rate increases for wastewater customers.

Over the years, BSU's wastewater treatment capacity has increased substantially, and along with it the need for effluent disposal. In turn, Resource Conservation Systems, LLC ("RCS"), was incorporated as an irrigation company by Bonita Bay Properties. RCS extended reclaimed water irrigation systems throughout additional master planned communities including The Brooks, Cedar Creek, and Highland Woods.

BSU maintains a deep injection well as an effluent disposal backup for use when wet weather storage is not available. Approximately 99% of wastewater effluent is disposed of through the reclaimed water system. Excerpts from the Florida Administrative Code Rules that govern the operation of reclaimed water systems are set out in Exhibit "A."

4. The RCS System

RCS provides reclaimed water storage, pumping and distribution facilities and capacity. RCS provides millions of gallons of storage capacity for times when irrigation of golf courses and neighborhoods is not possible due to wet weather conditions.

RCS pays BSU for reclaimed water in 1,000-gallon increments. RCS pays a market rate; one based on the average rate for similar services charged by Lee County and Collier County utilities. It is worth noting that many Florida utilities have long-term contracts to provide effluent for little or no payment. When those contracts were signed, supply far exceeded demand.

Periodically, BSU receives requests to provide reclaimed water to other neighborhoods and properties. BSU requires these parties to pay the cost to bring reclaimed water to their properties, provide wet weather storage, and install the necessary irrigation systems. To date, no potential reclaimed water customer has made this commitment.

5. Permitting and Monitoring Requirements

The operation of reclaimed water facilities is permitted and monitored by the Florida

Department of Environmental Protection. Reports are submitted to the FDEP detailing the operation and quality of reclaimed water on a monthly, quarterly, and annual basis. These reports ensure that the facility is meeting all permitted requirements and that the reclaimed water meets all required standards for public access.

FDEP must issue a permit for sites where reclaimed water is applied. Groundwater in the area must be monitored to ensure that reclaimed water does not adversely affect the groundwater. This is accomplished by determining the direction of groundwater flow for an application site and placing monitoring wells in certain areas to monitor the effect of reclaimed water. The parameters required to be monitored include nutrients, Total Dissolved Solids, pH, turbidity, arsenic and several other parameters.

One monitoring well must be placed upstream of the application site to determine background constituents: what is already in the groundwater. Other intermediate wells are placed within the application site and monitored. Finally, the compliance well(s) is/are located near the boundary where the groundwater flow would leave the application site. Many things can affect groundwater in addition to the application of reclaimed water. Results from the compliance well are compared to results from the background well and the reclaimed water. This is to ensure that the application of reclaimed water is not impacting the local groundwater by increasing nutrients and other constituents beyond permitted levels.

6. Reclaimed Water Constituents

Reclaimed water contains nutrients, such as nitrogen, phosphorus and potassium. These nutrients are required by plants for normal growth and are typically applied using fertilizers. Taking advantage of the nutrients in reclaimed water helps reduce the amount of fertilizer used on landscapes. All reclaimed water also contains dissolved mineral salts.

The amount of nutrients contained in reclaimed water varies based on the wastewater treatment process. Nutrient content also can vary during the year. BSU nutrient test results are available in the FDEP public records.

Nutrient applications to the landscape should be accounted for by golf courses, homeowner associations and other reclaimed water customers. Reclaimed water customers should avoid irrigation of impervious surfaces such as roads, driveways, and sidewalks. Over-irrigation of reclaimed water should be avoided. It can cause nutrients to leach through soil, run off the landscape and contribute to fertilizer run off which may increase nutrient loads to retention ponds and streams.

7. Conclusion

BSU is committed to providing safe, reliable potable water and wastewater treatment, emphasizing responsible protection of our resources, at the most effective cost to all members. Effluent disposal is one of many aspects of providing such service.

Exhibit “A”
Excerpts from Rule 62-610 Florida Administrative Code
Slow Rate Land Application Systems

62-610.423 Hydraulic Loading Rates.

(1) Hydraulic loading rates shall be established after considering the ability of the soil-plant system to remove pollutants from the reclaimed water.

(2) Loading of nitrogen shall promote use by vegetation and nitrification-denitrification reactions in the soil. If supplemental fertilizers are used, the effect of such fertilizer use on nitrate concentrations in the ground water shall be assessed in the engineering report.

(3) Other factors which shall be considered in establishing loading rates are the infiltration capacity and hydraulic conductivity of the geologic materials underlying the site; the resulting pollutant load shall be within the assimilative capacity of the soil-plant system. The hydraulic loading rate shall not produce surface runoff or ponding of the applied reclaimed water. Additionally, the quality and use of underlying ground water may dictate the loading rates to be used.

(4) Since soil-plant relationships are complex, the initial design loading rate shall be conservative; a maximum annual average of two inches per week is recommended. The Department will consider a rate higher than the two inches per week average provided the rate is justified in the engineering report on the basis of the renovating and hydraulic capacity of the soil-plant system, the existing quality and use of surface or ground water in the area, and other hydrogeologic conditions.

62-610.450 Description of System.

(1) This type of reuse system involves the irrigation of areas that are intended to be accessible to the public, such as residential lawns, golf courses, cemeteries, parks, landscape areas, and highway medians. Public access areas may include private property that is not open to the public at large, but is intended for frequent use by many persons.

62-610.460 Waste Treatment and Disinfection.

(1) Preapplication waste treatment shall result in a reclaimed water that meets, at a minimum, secondary treatment and high-level disinfection. The reclaimed water shall not contain more than 5.0 milligrams per liter of suspended solids before the application of the disinfectant.

62-610.463 Monitoring and Operating Protocol.

(1) Reclaimed water limitations shall be met after disinfection and before discharge to holding ponds or reuse systems. The total suspended solids limitation shall be achieved before disinfection, regardless of the actual reclaimed water compliance monitoring location.

(2) The treatment facility shall include continuous on-line monitoring for turbidity before application of the disinfectant. Continuous on-line monitoring of total chlorine residual or for residual concentrations of other disinfectants, if used, shall be provided at the compliance monitoring point. Instruments for continuous on-line monitoring of turbidity and disinfectant residuals shall be equipped with an automated data logging or recording device. In accordance with rule 62-610.320, F.A.C., the permittee shall develop, and the Department shall approve, an operating protocol designed to ensure that the high-level disinfection criteria will be met before the reclaimed water is released to the system storage or to the reclaimed water reuse system. The operating protocol shall be reviewed and updated as required in rule 62-610.320, F.A.C.

(3) Ground water monitoring.

(a) Monitoring of ground water requirements shall be as contained in chapters 62-601 and 62-522, F.A.C.

(b) A ground water monitoring well shall be located adjacent to unlined storage ponds or lakes, unless the applicant provides an affirmative demonstration in the engineering report, based on local hydrogeological conditions or historic flow data for the pond, that reclaimed water stored in the pond will not percolate to ground water.

62-610.464 Storage Requirements.

(a) System storage ponds do not have to be lined.

(c) Existing or proposed lakes or ponds (such as golf course ponds) are appropriate for storage of reclaimed water and stormwater management if all Department rules are met and the use of lakes or ponds for reclaimed water storage will not impair the ability of the lakes or ponds to function as a stormwater management system.

62-610.471 Setback Distances.

(5) Setback distances are not required for surface waters or developed areas.

62-610.472 Supplemental Water Supplies.

(2) Other water supplies may be used by the permittee to supplement the supply of reclaimed water. Surface waters, ground waters, treated stormwater, and drinking water may be used to supplement the reclaimed water supply.

62-610.491 Additional Operation and Maintenance Requirements.

(1) In addition to the operation and maintenance requirements specified in rule 62-610.320, F.A.C., and the engineering report requirements specified in rule 62-610.310, F.A.C., the following requirements apply to reuse systems for irrigation in public access areas.

(a) The permittee shall develop and obtain Department approval of an operating protocol as discussed in rules 62-610.320 and 62-610.463, F.A.C.

(b) The permittee shall develop and obtain Department acceptance for a cross-connection prevention and inspection program as discussed in rule 62-610.469, F.A.C.

(c) As part of the permit application, the applicant shall submit documentation of controls on individual users of reclaimed water through detailed agreements (including copy of the agreement) or by local ordinance (include copy of appropriate ordinance).

(d) A pretreatment program shall be developed and implemented pursuant to rule 62-610.330, F.A.C.

(2) For new reuse systems, items required by paragraphs 62-610.491(1)(a) and (b), F.A.C., shall be approved or accepted and implemented prior to placing the initial part, portion, or phase of the reuse system into operation.