



FROM: Anna Fagan, Acting Executive Director, Delaware Center for the Inland Bays

TO: Lisa Vest, Public Hearing Officer, DNREC

RE: Inland Bays Regional Wastewater Treatment Facility Construction & Operations Permit Application

DATE: June 07, 2022

Dear Lisa,

Thank you for the opportunity to comment on the Operations Permit Renewal and Modification for the Inland Bays Regional Wastewater Treatment Facility (IBRWTF). The Delaware Center for the Inland Bays (Center) is a private non-profit organization dedicated to protecting and restoring Delaware's Inland Bays estuary including the Indian River and Rehoboth Bay watershed, which are affected by these applications. The Center is responsible for facilitating the implementation of the Inland Bays Comprehensive Conservation and Management Plan (CCMP) to which the Department and Sussex County is signatory. Central to this Plan is the achievement of the 1998 Total Maximum Daily Loads (TMDLs) of nutrients for the Inland Bays and the enforcement of the waters of Exceptional Recreational and Ecological Significance provisions of the State Water Quality Standards which require the least environmentally damaging disposal alternatives for wastewater.

It is important to note that the IBRWTF falls between two sub-watersheds (the Rehoboth Bay and Indian River), and two different TMDL regulations (the upper Indian River, and the Indian River/Rehoboth Bay/Indian River Bay). The upper Indian River TMDL is 425 lbs/day of nitrogen and 29 lbs/day of phosphorus from all nonpoint sources, while the Indian River/Rehoboth Bay/Indian River Bay TMDL is 968 lbs/day of nitrogen and 49 lbs/day of phosphorus from all nonpoint sources. With Delaware having the highest percentage of its rivers and streams classified as impaired (97%) in the U.S.<sup>1</sup>, having operating permits which set nutrient limits that work towards achieving the TMDLs is essential to improving water quality.

The following is the Center's evaluation and requests regarding the proposed permits and their contribution to the nutrient loading of the Indian River and Rehoboth Bay watersheds. These comments have been reviewed by the Chair of the Inland Bays Scientific and Technical Advisory Committee of the Center's Board of Directors.

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<sup>1</sup> Environmental Integrity Project. 2022. *The Clean Water Act at 50: Promises Half Kept at the Half-Century Mark*. <https://environmentalintegrity.org/wp-content/uploads/2022/03/Revised-CWA-report-3.29.22.pdf>

The Center is grateful for the work Sussex County continues to do on converting septic systems to centralized sewer throughout the Inland Bays watershed. This is important to reducing pollution entering the watershed, and Sussex County is an important stakeholder in implementing the CCMP. However, converting septic systems to centralized sewer means that more waste needs to be treated and disposed of through alternative methods such as spray irrigation. Because of this, it is critical that each permit application be reviewed scrupulously and in relation to nutrient loading to ensure that we still make progress towards achieving the 1998 TMDLs. As it is currently written, the draft operations permit does not provide enough information to make a well-educated assumption of how this facility, if permitted, will impact water quality. Therefore, the Center respectfully provides the following comments and asks that the draft permit be revised to include our recommendations.

**1. The draft Operations Permit Renewal and Modification for the IBRWTF should be revised to include a total annual nitrogen application limit for each spray field acre based on the TMDLs for the affected waterways.**

The current draft permit states that effluent discharged from the wastewater treatment facility shall not exceed 10 mg/L at any time which is the current drinking water standard for nitrogen. Research shows that aquatic life is negatively impacted at much lower levels, hence why 3 mg/L is used as a target concentration in the Department's TMDL development protocols.

In order to evaluate how this permit will impact achievement of TMDLs, the Center used the information provided within the draft operations permit with the understanding that the actual average flow might be less than the disposal capacity. However, information on the estimated average flow rate under Phase 2 is not provided so calculations were computed using the disposal capacity for each spray field. Under the draft operations permit for Phase 2, a total of 211,398 pounds (106 tons) of nitrogen can be applied by this facility each year from treated effluent. That equates to 579 lbs of nitrogen that can be applied in a single day, which is shown in Table 1.

The draft permit does not put a limit on the ***total nitrogen application*** for each spray field acre annually. This differs from the current operations permit (LTS 5004-90-12), which states that the total amount of nitrogen that may be applied to each spray field acre shall not exceed 250 lbs/year, including supplemental fertilizers, the nitrogen applied from the effluent, and any other source. This omission of a total nitrogen application limit in the draft permit will hinder or even reverse efforts to achieve TMDLs.

Furthermore, there is not sufficient information provided on nutrient attenuation and crop uptake to evaluate how much of this nitrogen applied through effluent will make its way to the already severely polluted waters of the Indian River and Rehoboth Bay watersheds.

**Table 1:** Nitrogen application rates allowed for each spray field with an effluent concentration of 10 mg/L.

Permitted Effluent Total Nitrogen Concentration (mg/L)	Field	Effluent Disposal Capacity (MGD)	Acres	Total Nitrogen in Effluent (lbs/year/acre)	Total Nitrogen (lbs/year)	Total Nitrogen (lbs/day)
10	North	0.73	103	216	22,236	61
10	South	0.73	103	216	22,236	61
10	NB	0.3	52	176	9,138	25
10	SB	0.18	41.9	131	5,483	15
10	NHL	0.18	47.5	115	5,483	15
10	SHL	0.24	30.48	240	7,311	20
10	EHL	0.13	34.46	115	3,960	11
10	WHL	0.16	20.16	242	4,874	13
10	A	1.45	149.8	295	44,168	121
10	B	0.13	13.1	302	3,960	11
10	C	0.87	90	294	26,501	73
10	D	1.84	190	295	56,048	154
				Total	211,398	579

This problem is exacerbated by the results of the nitrogen balance developed by Whitman, Requardt & Associates, LLP (WRA) in the 2020 Design Engineering Report (DER) for the Phase 2 expansion. The nitrogen balance was developed for all existing spray irrigation fields and the expansion fields A, B, C, and D. Though the nitrogen balance assumes that the existing and expansion fields will not be fertilized, there are still exceptions where the percolate content exceeds 10 mg/L. To address this, the nitrogen balance then assumes that those fields will not be sprayed during the month of June when planted in soybean. Though these assumptions are made in the nitrogen balance, the draft operations permit does not reinforce them. If adhering to these assumptions is necessary to ensure that the nitrogen content in the percolate does not exceed 10 mg/L, then the Department should revise the draft permit to explicitly state that adherence to these practices is required.

These spray field acres are in an area that has historically had high levels of nitrogen concentrations in the groundwater. According to the SWAR, the ambient total nitrogen concentration in groundwater for the existing spray fields is an average of 13 mg/L. In the same report, lysimeter data from 2012 to 2018 shows an average of 12 mg/L for the existing spray fields. Because there is already a high concentration of nitrogen in the groundwater, steps should be taken to remedy that through this draft permit. Neglecting to include a total nitrogen application limit is the opposite of a remedy. In fact, the EPA Land Treatment Manual (2006) states that the actual “nutrient uptake will be a function of the initial soil reserve and resulting nutrient stress.” The current application rate that is permitted could cause an excess of nitrogen that would then enter the groundwater and eventually the surface waters. This is an oversight that should be corrected before the final permit is approved.

**2. The draft permit should be revised to show a reduced application rate for the proposed fields A, B, C, and D.**

The draft permit allows for four new spray fields to be added to the IBRWTF operations which are currently forestland. The Surface Water Assessment Report provides a nitrogen uptake rate for trees of 250 lbs/ac/yr and cites the EPA Land Treatment Manual (2006). However, according to the same cited document, the rate provided is considered a “maximum estimate of nitrogen uptake including both the understory and overstory vegetation during the period of active tree growth.” It then goes on to state that “because nitrogen stored within the biomass of trees is not uniformly distributed among the tree components, the amount of nitrogen that can actually be removed with a forest crop system will be substantially less than the storage estimates given . . . unless 100 percent of the aboveground biomass is harvested (whole-tree harvesting).”

The cited document also explains at various points other factors that determine the rate of nitrogen uptake that should be considered. Currently, the County does not have a Forest Stewardship Plan (FSP) and there is no information on how the woods will be managed. The Design Engineering Report states that an FSP will be created similar to the one the County has for the Comfort Burton Tract. However, the land covered by this FSP is not in use for wastewater disposal. And because there isn’t an FSP for the proposed spray sites, the maximum uptake rate for nitrogen should not be used to determine the suitable disposal capacity of these fields until the land has been assessed by the Delaware Forest Service.

The EPA Manual states that “vegetative uptake and storage of nutrients depend on the species and forest stand density, structure, age, length of season, and temperature.” It also states that “following the initial growth stage, the rates of growth and nutrient uptake increase and remain relatively constant until maturity is approached and the rates decrease.” When this happens, “the stand should be harvested or the nutrient loading decreased.” Trees are considered mature when the stand is between 20 and 25 years old. Finally, the manual states that “the actual yield and nutrient uptake will be a function of the initial soil reserve and resulting nutrient stress. Soil and tissue analysis are used to determine proper nutrient deficiency and proper nutrient loading.” These factors, and more, were not considered by the reports that support this draft permit. Even though the County is not able to obtain a FSP until after the permit is approved, there are academic and private companies that can perform soil and tissue analyses.

Each of the proposed expansion fields drains entirely into the Indian River watershed, with the exception of spray field C which is split between the Indian River and Rehoboth Bay watershed. The Indian River watershed is arguably the most polluted watershed in the Inland Bays. The 1998 TMDL calls for an 85% reduction in nonpoint nitrogen to 425 lbs/day.

Table 2 below shows the amount of nitrogen that will be applied to the proposed expansion fields assuming that the effluent concentration is the maximum allowable of 10 mg/L. These calculations were made using the information provided in the draft permit. The Center understands that the actual average flow might be less than the effluent disposal capacity of the facility. However, information on the estimated average flow rate under the draft permit is not provided and so it could not be used.

Based on these calculations, the amount of nitrogen that can be applied through treated effluent exceeds 250 lbs/ac/yr for all of the expansion fields. And more importantly, the amount of nitrogen per day is 358 lbs - 61% of the entire operation. We do not know enough about the nutrient attenuation or the uptake rates of these forested fields. Therefore this could lead to severe nutrient runoff, significantly hindering efforts to improve the quality of the Indian River watershed.

Because of all of this information, one cannot assume an uptake rate of 250 lbs/acre. Information is not provided on density, age, structure, how often the stand will be harvested, or how much of the stand will be harvested. The Department cannot reasonably assume this high of an uptake rate, nor assume that these fields have this large of a disposal capacity without causing excess nutrient pollution.

**Table 2:** Total nitrogen application allowed through effluent on the proposed fields.

Permitted Effluent Concentration (mg/L)	Field	Effluent Disposal Capacity (MGD)	Acres	Nitrogen in Effluent (lbs/year/acre)	Total Nitrogen (lbs/year)	Total Nitrogen (lbs/day)
10	A	1.45	149.8	295	44,168	121
10	B	0.13	13.1	302	3,960	11
10	C	0.87	90	294	26,501	73
10	D	1.84	190	295	56,048	154
				Total	130,677	358