



STATE OF DELAWARE

**DEPARTMENT OF NATURAL RESOURCES AND
ENVIRONMENTAL CONTROL**

DIVISION OF WATER

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TECHNICAL RESPONSE MEMORANDUM

TO: Lisa Vest, Hearing Officer, Office of the Secretary

THROUGH: Steven M. Smailer, P.G., Director, Division of Water (DW) *MS*
Jennifer Roushey, Environmental Program Administrator, DW *JR* 8/21/23
John Rebar Jr., Environmental Program Manager II, Commercial
and Government Services Section (CGSS) *je* 08/21/23

FROM: Marlene Baust, Engineer IV, CGSS *MB* 08/21/23

RE: **Technical Response Memorandum - Response to Comments received during the Public Comment Period and the February 23, 2022 Public Hearing (Docket # 2022-P-W-0004) on the proposed draft Construction and draft Operations Permit Amendment for Artesian Wastewater Management, Inc.'s Sussex Regional Reclamation Facility (SRRF)**

DATE: August 21, 2023

Introduction

This Technical Response Memorandum (TRM) was prepared at the request of the presiding hearing officer to assist in the completion of the Hearing Officer's Report to the Secretary of the Delaware Department of Natural Resources and Environmental Control (the Department). This TRM also provides the information necessary to inform the final decision on the issuance of the proposed On-Site Wastewater Treatment and Disposal System (OWTDS) Construction Permit and the proposed OWTDS Operations Permit Amendment for Artesian Wastewater Management, Inc.'s (AWMI) planned Phase 2 project consisting of constructing and operating a new wastewater treatment system at the Sussex Regional Reclamation Facility.

The current Phase 1 project approval authorizes AWMI to receive treated poultry processing wastewater (treated effluent) from the Allen Harim Foods Harbeson Processing Facility's wastewater treatment system for storage in a 90 MG lagoon prior to discharge via spray irrigation for final disposal. This Phase 1 project is operating in accordance with AWMI's State of Delaware OWTDS Operations Permit No. 359288-02 for the Artesian Northern Sussex Regional Water Recharge Facility (ANSRWRF), which is now called the Sussex Regional Reclamation Facility (SRRF).

AWMI has applied for a State of Delaware OWTDS Construction Permit for a Phase 2 project consisting of the construction of a wastewater treatment system designed to treat up to 625,000 gallons per day (GPD) of municipal wastewater received from AWMI's wastewater service territories in Sussex County, DE. AWMI has also applied for an Amendment to their current Operations Permit (No. 359288-02) to authorize the operation of the systems and equipment installed during the proposed Phase 2 construction project.

The Phase 2 construction project's scope includes construction of a 3.0 million gallon (MG) combined equalization and off-spec water diversion lagoon, a headworks system consisting of screen and grit removal equipment, an influent lift station, a Hybrid Bardenpho process treatment system, two cloth media filters, an ultra-violet disinfection system, and an effluent lift station to pump treated wastewater to the existing 90 MG treated effluent storage lagoon. The construction project is to be located at the existing SRRF site on Sussex County Tax Map/Parcel Number 2-35 6.00 28.09, located on a 75-acre site south of Reynolds Pond Road, east of Route 30, north of Ingram Branch and Route 16, and west of Cedar Creek Road, Sussex County, Delaware.

The proposed draft Operations Permit Amendment will authorize the Phase 2 project's newly constructed wastewater treatment system to receive and treat wastewater from within Artesian's service territories in Sussex County. Treated effluent from the treatment system will be blended in the lagoon with the treated effluent from Allen Harim Foods Harbeson Processing Facility's wastewater treatment system and discharged via spray irrigation onto privately owned agricultural land, under a lease held in perpetuity by Artesian as the wastewater utility provider. The spray fields have been permanently placed in an Agricultural Preservation Easement by the Delaware Agricultural Lands Preservation Foundation.

The construction application was submitted in accordance with 7 Del. Admin. C. § 7101 *Regulations Governing the Design, Installation and Operation of On-Site Wastewater Treatment and Disposal Systems* (OWTDS Regulations) along with a request to amend the existing Operations Permit to allow the future operation of the Phase 2 wastewater treatment system. A virtual public hearing was held on the application and proposed draft permits on Wednesday, February 23, 2022, 6:00 PM. To allow the public ample time to review the application, draft permits, and provide comment, the Hearing Officer left the hearing record open until March 10, 2022. To adequately address all comments and questions the Division of Water requested additional information from AWMI in an email dated July 1, 2022 (Appendix I). AWMI provided the requested additional information in a response letter dated July 12, 2022 (Appendix II).

To prepare the responses to the public comments received, the Division of Water reviewed the transcript, written comments, monitoring data, and the additional information provided by AWMI on July 12th. Where public comments received were similar in nature, the Division combined similar comments together and paraphrased for brevity and clarity. The public comments and the Division's responses follow. Please note that permit condition citations are based on the finalized revised draft permits based on required permit changes discussed in this TRM and included as Appendix V.

Public Health

1. Potential Contamination to Water Supply Aquifer

Public comment expressed concern for the health of area residents that are on private wells, HOA wells, or the town's municipal well that could potentially be affected by the treated effluent [discharging to] their water supply aquifer.

Response: Wastewater is composed of a range of physical, chemical, and biological constituents. The goal of wastewater treatment is the removal of specific constituents of concern for the protection of public health and the environment. The primary constituents of concern in wastewater include total suspended solids (TSS), pathogens, biodegradable organics, nutrients (i.e., nitrogen and phosphorus) and other dissolved inorganics, heavy metals, and priority pollutants (i.e., carcinogenic organic and inorganic compounds). Wastewater treatment systems are designed to remove specific constituents depending on the source of the wastewater (i.e., municipal, industrial, agricultural, etc.) and point of discharge (surface water, groundwater, public or agricultural reuse, etc.).

The Division is required via permitting, compliance, and enforcement activities to ensure that permittees comply with §3.13 of the Regulations which requires all permitted on-site wastewater treatment and disposal systems to be “operated and maintained so as not to create a public health hazard or cause water pollution.” In addition, the Division is required by §3.20 of the Regulations to ensure that a permittee takes “all necessary actions to eliminate and correct any adverse impact on public health or the environment resulting from permit non-compliance.” To achieve these regulatory directives, the Division prepared a proposed draft On-Site Wastewater Treatment and Disposal System (OWTDS) Construction Permit for the Phase 2 construction of a wastewater treatment system by AWMi at SRRF and a proposed draft OWTDS Operations Permit Amendment authorizing the operation of the Phase 2 wastewater treatment system upon completion. The proposed draft permits include effluent limitations along with operational, monitoring, and reporting conditions designed to protect public health and the environment.

The State of Delaware is dependent on groundwater for the bulk of its potable water supply. Therefore, the Division issues discharge permits that are designed to protect groundwater quality to the maximum extent practicable by including requirements to control the amount of inorganic and organic compounds and nutrients (e.g., nitrates as nitrogen) discharged in treated wastewater (treated effluent). In addition, to further meet the Division’s mission to protect human health disinfection requirements are also incorporated in to permits. To address this public comment more thoroughly, the Division describes regulatory and permit conditions below established to protect groundwater including treatment criteria, offspec contingency plans, and groundwater monitoring requirements.

Treatment Criteria

Unlimited Public Access Criteria

The treated effluent from the SRRF wastewater treatment system will be required to meet the State’s highest wastewater quality criteria, required by the OWTDS Regulations for the spray irrigation of treated wastewater: unlimited public access. The treated wastewater utilized for unlimited public access sites must meet the following daily permissible average concentrations. These water quality limitations are listed in Part I.D.14 of the proposed revised draft Phase 2 Operations Permit Amendment and §6.3.2.3.3.2.4 of the Regulations.

Parameter	Daily Permissible Average Concentration
Five-day Biochemical Oxygen Demand (BOD ₅)	10 mg/L
Fecal Coliform	20 colonies/100 mL
Total Suspended Solids	10 mg/L
Turbidity	5 NTU

Effluent Nitrogen Concentration Limits

The treated effluent from the SRRF wastewater treatment system will also be required to meet a daily average Total Nitrogen concentration of 10 mg/L. The Phase 2 operation is designed to combine and blend the SRRF treated effluent with the previously permitted Phase 1 Allen Harim treated effluent within the storage lagoon. The combined effluent daily average Total Nitrogen concentration will be required to meet 22.5 mg/L. Part I.D.10 of the proposed revised draft Phase 2 Operations Permit Amendment delineates the effluent Total Nitrogen concentration requirements for Phase 1 and Phase 2 and combined/blended.

Drinking water standard for Nitrates

The federal Maximum Contaminant Level (MCL) for Nitrate as Nitrogen in drinking water is 10 mg/L. The SRRF application includes nitrogen balance calculations (prepared by a DE licensed Professional Engineer) verifying that SRRF incorporates sufficient land to spray the maximum amount of effluent each month at a total nitrogen concentration of 22.5 mg/L and not exceed a percolate of <10 mg/L beneath the spray irrigation fields. Thereby, meeting the MCL for nitrate-nitrogen and not causing an impact to groundwater resources and local drinking water wells. The nitrogen balance calculations were provided in the February 2021 Design Engineer Report Appendix C and updated on May 3, 2023. Part III.A.2 of the proposed revised draft Phase 2 Operations Permit Amendment requires that the “operation of SRRF shall not cause the quality of Delaware's groundwater resources to be in violation of applicable Federal or State Drinking Water Standards.” And further states that “if the Department determines that the discharge is impacting groundwater quality or downgradient receptors, corrective actions will be required.”

Nitrogen Loading Limitations

To protect groundwater resources, Part I.D.11 of the proposed revised draft Phase 2 Operations Permit Amendment incorporates nitrogen loading limits as calculated in the design nitrogen balance dated May 3, 2023. Part I.D.11 requires that the total amount of nitrogen authorized to be applied to each spray field acre not exceed the following loading limitations. The limits include supplemental fertilizers, the nitrogen supplied from the effluent, and any other source.

Phase 1 Nitrogen Loading Limits	
Crop Type	Nitrogen Loading Limit (lbs/acre-year)
Cover-Corn-Wheat	338.9
Wheat-Soybean-Cover	394.6
Woods (Loblolly Pines)	437.9

Phase 2 Nitrogen Loading Limits	
Crop Type	Nitrogen Loading Limit (lbs/acre-year)
Cover-Corn-Wheat	352.5
Wheat-Soybean-Cover	417.7
Woods (Loblolly Pines)	421.9

Diversion Capabilities and Contingency Plans

In addition to permit limitations aimed at protecting public health and groundwater resources, the OWTDS Regulations and the proposed revised draft Operations Permit Amendment also require diversion capabilities and contingency plans in the event effluent does not meet specified criteria.

Diversion Capabilities for Off-Spec Effluent

Section 6.3.2.3.2.4 of the Regulations stipulates diversion requirements for wastewater that fails to meet operating specifications:

§6.3.2.3.2.4 Automatic diversion of wastewater that fails to meet the operating criteria must be included in the system design.

And Section 6.3.2.3.12.3 stipulates storage requirements for off-spec wastewater:

§6.3.2.3.12.3 A separate off-line system for storage of reject wastewater must be provided at all unlimited access sites unless another permitted reuse system or

effluent disposal system is capable of receiving the reject wastewater. At a minimum, this capacity must be the volume equal to two days flow at the average daily design flow rate of the treatment facility. Provisions for re-circulating the reject wastewater back to the treatment facility for further treatment may be incorporated into the design of the facility.

To meet these requirements for Phase 1 operations, Allen Harim has an off-spec storage system for the 1.5 MGD average daily flow permitted in the event diversion of wastewater is required.

To meet these requirements for Phase 2, AWMI's proposed wastewater treatment system will include a 3.0 million gallon (MG) combined equalization and off-spec water diversion lagoon.

The average daily flow for the Phase 2 wastewater treatment system is 625,000 gallons per day. Therefore, the required storage volume will be 1.3 million gallons. The 3.0 MG diversion capabilities provided exceeds the regulatory requirement of two days of flow.

Additional specifics of the diversion operation are discussed below.

Contingency Plans

The proposed draft Phase 2 Operations Permit Amendment included contingency plans for Fecal Coliform Bacteria, Turbidity, and Total Nitrogen delineating requirements to ensure only high-quality treated effluent is used for irrigation. However, based on comments and to address compliance deficiencies documented by the Division during recent compliance evaluations, the Division has slightly revised the conditions to provide additional clarity regarding steps the Permittee is required to perform if the plans are initiated. The revised proposed permit conditions include:

8. *Phase 2 Total Nitrogen Contingency Plan*

- a) *Upon the operation of the SRRF wastewater treatment system, if the analytical results of a treated wastewater sample collected from the sampling port located immediately after filtration and disinfection documents the exceedance of the 10 mg/L Total Nitrogen concentration, the Permittee shall collect and analyze a second sample within 24 hours of becoming aware of the original exceedance. If the second sample results documents that the 10 mg/L Total Nitrogen concentration continues exceeded the Total Nitrogen limitation, the Permittee shall enact the following contingency plan.*
 - i. *The Permittee shall notify the Department within 24-hours after becoming aware of the second exceedance and submit a copy of the analytical results to the Department.*
 - ii. *If laboratory testing confirms that treated wastewater concentrations exceed 10 mg/L but the exceedance is less than 20 mg/L for either Nitrate as Nitrogen or Total Nitrogen than the Permittee shall notify the Department to determine if treated wastewater is required to be diverted for retreatment. If required, the treated wastewater shall be immediately diverted for storage and retreatment.*

- iii. *If laboratory testing confirms that treated wastewater concentrations exceed 20 mg/L for either Nitrate as Nitrogen or Total Nitrogen than the Permittee shall immediately divert the treated wastewater for storage and retreatment.*
 - iv. *The Permittee shall increase the frequency of Total Nitrogen effluent sampling at the SRRF wastewater treatment system to once daily and submit weekly results to the Department.*
 - v. *The Permittee shall examine the operation and maintenance log, required to be maintained by this Permit, for any possible improper operational procedures.*
 - vi. *The Permittee shall conduct a physical inspection of the treatment system to detect abnormalities. Any abnormalities discovered shall be corrected. A report detailing the corrections made shall be submitted to the Department within 30 days of correction.*
 - vii. *When daily analytical results from three consecutive days of wastewater sampling do not exceed the limitation, the Permittee is authorized to discharge to the storage lagoon and return to a bi-weekly monitoring frequency.*
- b) *If the Department approves the continued discharge of treated wastewater in accordance with 8.a.ii to the storage lagoon, the following additional requirements shall be required.*
- i. *The Permittee shall increase the frequency of Total Nitrogen effluent sampling at the SRRF wastewater treatment system and at the discharge side of SRRF's irrigation pumps to once daily and submit weekly results to the Department.*
 - ii. *The Permittee shall submit monthly TN balances documenting that the facility can continue spray irrigation at higher concentrations while not exceed 10 mg/L TN (monthly basis) in the percolate.*
 - iii. *When daily analytical results from three consecutive weeks of wastewater sampling do not exceed the limitation, the Permittee is authorized to return to a bi-weekly monitoring frequency.*
- c) *If the facility is required to enact this contingency plan more than three times in a 12-month period, the Permittee shall have the system evaluated to determine the cause of the elevated total nitrogen results and submit a revised Design Engineer Report with proposed corrective actions to achieve a maximum total nitrogen concentration of 10 mg/L that bears the seal and signature of a Class C licensed Delaware Professional Engineer to the Department. The report shall be submitted within one year of the third notification of the contingency plan being enacted. The Permittee shall initiate implementation of the plan within 90 days following approval by the Department.*

9. Phase 2 Fecal Coliform Bacteria and Turbidity Contingency Plan

- a) *Upon the operation of the SRRF wastewater treatment system, if the analytical results of a treated wastewater sample collected from the sampling port located immediately after filtration and disinfection documents an exceedance of the maximum limitations for fecal coliform bacteria and/or turbidity set by this Permit, the Permittee shall collect and analyze a second sample within 24 hours after becoming aware of the exceedance. If the second sample documents that any maximum limitation for fecal coliform bacteria and/or turbidity is continuing to be exceeded, the following corrective actions shall be enacted:*
- i. *Notify the Department of the non-compliance.*

- ii. *Submit copies of the recent analytical results documenting the exceedance to the Department.*
 - iii. *Immediately increase filtration through the cloth media filters. This shall be accomplished by either bringing online additional filtration capacity or decreasing the loading per square foot of filter media.*
 - iv. *Examine operation and maintenance logs for improper operational procedures.*
 - v. *Conduct a physical inspection of the treatment system to detect abnormalities. Any abnormalities discovered shall be corrected.*
- b) *Within 24 hours of enacting these corrective actions the Permittee shall collect and analyze a third sample for fecal coliform bacteria and/or turbidity from the treatment system discharge. If the analytical results no longer document an exceedance of any of the maximum limitations for fecal coliform bacteria and/or turbidity, the Permittee shall notify the Department and may resume normal operations.*
- c) *However, if the analytical results of the third sample again documents an exceedance of any of the maximum limitations for fecal coliform bacteria and/or turbidity set by this Permit, the following corrective actions shall be enacted:*
 - i. *Notify the Department of the continued non-compliance.*
 - ii. *Submit copies of the recent analytical results documenting an exceedance to the Department.*
 - iii. *Effluent from the treatment system shall be diverted away from the 90-million-gallon storage lagoon back to the influent equalization/diversion lagoon for further treatment.*
 - iv. *When additional analytical results from samples of treated wastewater effluent no longer document an exceedance of any of the maximum limitations for fecal coliform bacteria and/or turbidity, the Permittee shall notify the Department and upon written approval from the Department may resume transferring treated wastewater to the 90-million-gallon storage lagoon and resume normal operations.*
- d) *If the facility is required to divert poorly treated wastewater more than three times in a 12-month period, the Permittee shall have the wastewater treatment system evaluated to determine the cause of the elevated fecal coliform bacteria and/or turbidity results and submit a revised Design Engineer Report with proposed corrective actions to achieve a maximum fecal coliform bacteria count of 20 colonies/100 mL and/or turbidity concentration of 5 NTU that bears the seal and signature of a Class C licensed Delaware Professional Engineer to the Department. The report shall be submitted within one year of the third notification of the diversion of poorly treated wastewater being enacted. The Permittee shall initiate implementation of the plan within 90 days following approval by the Department.*

In addition, the Division is including a Phase 1 contingency plan for fecal coliform bacteria to address concerns raised in Public Comments and to address compliance deficiencies documented by the Division during recent compliance evaluations. This contingency plan requirement will be in effect during continued Phase 1 Operations at the facility until the new treatment plant is online at which point the above referenced Phase 2 contingency plans will be required. The proposed permit condition (Part I.I.7 as revised) follows:

7. *Phase 1 Fecal Coliform Bacteria Contingency Plan*

- a. *If the analytical results of an effluent sample from discharge side of the SRRF irrigation pumps documents an exceedance of the maximum limitations for fecal coliform bacteria set by this Permit, the Permittee shall collect and analyze a second sample within 24 hours after becoming aware of the exceedance. If the second sample documents that the maximum limitation for fecal coliform bacteria is continuing to be exceeded, the following corrective actions shall be enacted:*
 - i. *Notify the Department of the non-compliance.*
 - ii. *Immediately cease discharging effluent.*
 - iii. *Submit copies of the recent analytical results documenting the two exceedances to the Department.*
 - iv. *Examine operation and maintenance logs for improper operational procedures.*
 - v. *Conduct a physical inspection of the treatment system, lagoon, and effluent transfer line to detect abnormalities. Any abnormalities discovered shall be corrected.*
- b. *Within 24 hours of enacting these corrective actions, the Permittee shall collect and analyze a third sample for fecal coliform bacteria from discharge side of the SRRF irrigation pumps. If the analytical results no longer document an exceedance of the maximum limitations for fecal coliform bacteria, the Permittee shall notify the Department and may resume normal operations.*
- c. *However, if the analytical results of the third sample again documents an exceedance of the maximum limitations for fecal coliform bacteria set by this Permit, the Permittee shall install and operate a temporary disinfection system to further treat the effluent from the lagoon. Disinfection shall continue until fecal coliform bacteria results meet required limits and the Department authorizes the Permittee to cease disinfection.*

Groundwater Monitoring

Permit Monitoring Requirements

In addition to the incorporation of protective permit limitations for treatment criteria and requirements for diversion and detailed contingency plans in the event of effluent not meeting the design criteria, the proposed revised draft Phase 2 Operations Permit Amendment also includes extensive operational and monitoring requirements to ensure the protection of groundwater resources and public health.

To protect the State of Delaware groundwater potable water supply aquifer, an extensive groundwater monitoring well network is required to be maintained and monitored to ensure any wastewater-related contaminants are promptly detected and quantified. The monitoring well network serves as a sentinel for nearby supply wells and surface water bodies.

The existing Phase 1 Operations Permit consists of a groundwater monitoring well network of 18 wells to ensure that wastewater-related contaminants are detected, quantified, and analyzed regarding their impact to groundwater quality. The following parameters are required to be sampled in SRRF's 18 monitoring wells.

Parameter	Unit Measurement	Measurement Frequency	Sample Type
Ammonia as Nitrogen	mg/L	Quarterly	Grab
Chloride	mg/L	Quarterly	Grab
Depth to Water	hundredths of a	Monthly	Field Test
Dissolved Oxygen	mg/L	Quarterly	Field Test
Fecal Coliform	Col/100mL	Quarterly	Grab
Nitrate + Nitrite as	mg/L	Quarterly	Grab
pH	S.U.	Quarterly	Field Test
Sodium	mg/L	Quarterly	Grab
Specific Conductance	µS/cm	Quarterly	Field Test
Temperature	°C	Quarterly	Field Test
Total Dissolved Solids	mg/L	Quarterly	Grab
Total Nitrogen	mg/L	Quarterly	Grab
Total Phosphorus	mg/L	Quarterly	Grab

To further ensure groundwater protection and address public comments and concerns the Division has added the following groundwater monitoring parameters to the proposed revised draft Phase 2 Operations Permit Amendment.

Parameter	Unit	Measurement	Sample
Arsenic	mg/L	Once per 5 years	Grab
Cadmium	mg/L	Once per 5 years	Grab
Chromium	mg/L	Once per 5 years	Grab
Copper	mg/L	Once per 5 years	Grab
Hardness	mg/L	Once per 5 years	Grab
Iron	mg/L	Once per 5 years	Grab
Lead	mg/L	Once per 5 years	Grab
Manganese	mg/L	Once per 5 years	Grab
Mercury	mg/L	Once per 5 years	Grab
Nickel	mg/L	Once per 5 years	Grab
Selenium	mg/L	Once per 5 years	Grab
Sulfate	mg/L	Once per 5 years	Grab
Zinc	mg/L	Once per 5 years	Grab

The existing Phase 1 and proposed revised draft Phase 2 Operations Permits Amendment require that operation of the on-site wastewater treatment and disposal system not cause the quality of Delaware's groundwater resources to be in violation of applicable Federal or

State Drinking Water Standards and that “*the Permittee shall take all reasonable steps to eliminate or minimize any adverse impact to waters of the State resulting from this Permit, including such accelerated or additional monitoring as necessary to determine the source, nature, and extent of the impact from a noncomplying discharge. In addition, at the direction of the Department, the Permittee shall submit a corrective action plan which will include a description of the proposed actions to mitigate or eliminate the source of the impact and an associated completion schedule. The plan shall be enacted as approved by the Department.*”

[Part III.A.23 of the revised draft Phase 2 Operations Permit Amendment]

Background Groundwater Quality Analysis

In accordance with Section 6.6.3.16 of the Regulations, and to ascertain any increasing trends of wastewater constituents in groundwater after the initiation of operations, the Permittee was required to perform three separate rounds of groundwater and surface water sampling prior to the facility going into operation. Samples were required to be analyzed by a certified laboratory to establish background levels for nutrients, inorganic, and organic contaminants of concern.

Operational sampling is required by the facility through the following devices: lysimeters (in-field), monitoring wells (in-field, up-gradient, and down-gradient), and surface water grab samples (up-gradient and down-gradient). Using these three sets of data the Division will be able to assess any impact the spray irrigation activities may have on the spray fields, groundwater, and surface waters within and adjacent to the SRRF spray fields. In addition, annual soil sampling is also required; and, once every five years, heavy metals are required to be sampled. The background samples obtained and tested during the site investigation portion of the project will then be utilized to determine if any impacts are occurring because of spray irrigation activities.

Data Assessment and Compliance

The Division maintains a group of highly trained environmental professionals including inspectors, engineers, and hydrologists (Delaware-licensed professional geologists) qualified to analyze the effluent, groundwater, and surface water monitoring data. Data assessments and compliance evaluations are performed during the review and processing of monthly Discharge Monitoring Reports (DMRs) and routine inspections. Compliance concerns are addressed through enforcement measures including Notices of Violation, Corrective Actions, and Orders.

Compliance Monitoring Report

In addition to routine compliance analysis by the Department, Part IV.A.1 of the proposed revised draft Phase 2 Operations Permit Amendment requires the Permittee to prepare a Compliance Monitoring Report (CMR) every five years in accordance with Section 6.5.4.3 of the Regulations. The Permittee will be required to have a Delaware-licensed professional geologist (PG) prepare a hydrogeologic assessment that includes an evaluation and

comparison of temporal trends in both effluent and groundwater quality in comparison to background samples and/or previous sampling results. Furthermore, the PG must provide a conclusion of the operating status of the irrigation system based on the monitoring data and provide any recommendations for future monitoring, system upgrades or improvements if deviations from baseline groundwater conditions are detected.

Remedy

In the event trends of increasing concentrations and/or impacts are observed, the proposed revised draft Phase 2 Operations Permit Amendment will require the Permittee take all necessary actions to eliminate and correct any adverse impact on public health or the environment resulting from permit non-compliance in accordance with §3.20 of the Regulations.

Conclusion

In conclusion, the permitted constituent limitations outlined in the proposed revised draft Phase 2 Operations Permit Amendment for SRRF's OWTDS, coupled with the facility's diversion capabilities, mandated contingency plans, wastewater, groundwater, and surface water monitoring, and routine inspection and data assessments is protective of public health and the environment including the protection of the local drinking water supply aquifer.

- 2. Clean Delaware - Potential Impact on existing groundwater contamination**
Public comment expressed concern about the potential impact of SRRF's operation, specifically Field G, on existing groundwater contamination beneath the Clean Delaware facility. Additional comments requested a central water system be provided to the Collins, Russell, and Slim Street neighborhood downgradient from Clean Delaware.

Response: AWMI initiated the application process for the SRRF via a letter of intent in 2006. AWMI proceeded with a site evaluation including a 2007 Site Selection and Evaluation Report, a 2008 Soils Investigation Report, a Hydrogeologic Investigation Report and Groundwater Mounding Analysis. Based on the application and supplemental information, the Division issued a Construction Permit for SRRF (as ANSRWRF) in 2013. The permit included construction requirements and reporting elements designed to ensure that the facility is constructed in accordance with proposed design plans and in accordance with Regulatory requirements.

With regards to spray irrigation at SRRF's Field G, the treated effluent being applied to Spray Field G, up-gradient of Clean Delaware's Milton Farm, will undergo treatment and disinfection prior to application. The OWTDS Regulations seek to require the use of on-site wastewater treatment and disposal systems, including slow rate land treatment systems, that will function according to their performance criteria without causing the State's groundwater resources to violate U. S. Environmental Protection Agency Drinking Water Standards on an average annual basis. However, this system is designed so that spray

irrigation of the treated effluent will result in a percolate less than 10 mg/L Total Nitrogen beneath the spray fields “*on a monthly basis.*” A more stringent standard.

Groundwater movement through the unconfined aquifer is complex, and there are many factors that must be taken into consideration related to land application and the potential for impacts to groundwater quality. Typically, groundwater monitoring wells associated with land application sites such as Clean Delaware are shallow to allow for the detection of impacts from land application activities directly above the water table. Water deeper in the aquifer is comprised of water that has entered the groundwater system at various other locations in the up-gradient direction. The water sprayed on Spray Field G may ultimately flow beneath Clean Delaware, and although it may slightly increase the hydraulic gradient in the area because of the increased recharge, it is not expected to have any negative impact regarding any potential existing contamination. Part II.A.3 of the proposed revised draft Phase 2 Operations Permit Amendment for SRRF requires routine quarterly groundwater monitoring for nitrates from a monitoring well network consisting of nine wells beneath Spray Field G alone, eighteen across all fields. Monitoring will ensure that any potential nitrate impacts to groundwater do not go undetected. In addition, should an increasing trend be detected, the Permittee will be required to proactively implement corrective actions as required by the proposed revised draft permit.

It should also be noted, that beginning in 2013, the Division initiated monitoring well requirements at all biosolids land application sites to ensure nitrate impacts from land application activities are identified if they occur and additional best management practices can be implemented if necessary. In 2013, Clean Delaware installed a network of groundwater monitoring wells at its land application sites and elevated nitrates were detected. After receiving the monitoring results, and when the Division became aware of nitrate impacts to groundwater, the Division required corrective actions by Clean Delaware and the implementation of best management practices to minimize the impact of land application activities to groundwater. In addition, upon identifying private drinking water wells on Slim, Collins, and Russel Streets that were impacted above the drinking water standard for nitrate, Clean Delaware provided treatment at no cost to the owners/tenants. After several years of Clean Delaware’s operation with enhanced best management practices in place, groundwater conditions beneath the land application fields have shown significant improvement.

Therefore, the Division has concluded, based on the Division’s compliance efforts working with Clean Delaware to improve groundwater quality beneath their application sites, along with SRRF’s design to meet a percolate concentration that does not exceed 10 mg/L Total Nitrogen, with an extensive monitoring well network for routine monitoring of spray irrigation activities at SRRF, and in particular on Spray Field G, the proposed revised draft Phase 2 Operations Permit Amendment should not adversely impact groundwater beneath Clean Delaware’s Milton Farm or the quality of the drinking water wells located on Russell, Collins, and Slim Streets.

3. Avian Flu

Public comment questioned, since the avian flu has currently been detected in Delaware, how public health is protected from Avian flu getting into the groundwater and then migrating to nearby public wells.

Response: The existing SRRF Operations Permit allows for the disposal of treated poultry processing wastewater from the Allen Harim Harbeson Processing Facility via spray irrigation. In accordance with State Permit 597261-01, Allen Harim Foods, LLC treats and chlorinates wastewater generated by poultry processing for transfer and disposal at the SRRF. The permit requires Allen Harim Foods, LLC to provide sufficient chlorination of the treated wastewater to maintain a total chlorine residual of at least 1.0 mg/L.

The CDC has indicated that the avian influenza (H5N1) is readily inactivated by chlorination.¹ And, the EPA also recognizes research results confirming that free chlorine concentrations typically used in drinking water treatment would be sufficient to inactivate the virus.²

Therefore, the Division concludes, as per the EPA and the CDC guidance, that the chlorination process at the Allen Harim Harbeson Processing Facility's wastewater treatment process, in conjunction with the permit requirement to maintain a total chlorine residual of at least 1.0 mg/L, is protective of human health and the environment relative to the Avian Flu.

Monitoring

4. Groundwater Monitoring

MW-1L

Written comment inquired where the groundwater monitoring data from MW-1L is and if DNREC has had access to the data when deliberating over the additional wastewater volume from new service area sources (625,000 gallons)

Response: The Division's technical staff has reviewed both the background, as well as the current, monitoring well data for MW-1L, and did not have significant concerns regarding the data. The review did not preclude the permitting of additional flows. The following table of Nitrate data is provided as an example. A listing of additional data for MW-1L is also provided. If there is additional data the public would like access to that has not been specifically discussed or provided herein, a request for the data can be made through the Department's Delaware Freedom of Information Act (FOIA) website:
<https://dnrec.alpha.delaware.gov/foia/>.

¹ Chlorine Inactivation of Highly Pathogenic Avian Influenza Virus (H5N1) - Volume 13, Number 10—October 2007 - Emerging Infectious Diseases journal – CDC https://wwwnc.cdc.gov/eid/article/13/10/07-0323_article

² Chlorine inactivation of highly pathogenic avian influenza (H5N1) | Science Inventory | US EPA https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NHSRC&dirEntryId=199103&fed_org_id=1253

Site Investigative Background Data				
Monitoring Point	Permit Number	Sampling Date	Nitrite + Nitrate	Unit
MW-1L	254881	10/18/2017	4.77	mg/L
MW-1L	254881	3/19/2018	5.69	mg/L
MW-1L	254881	5/1/2018	5.25	mg/L

Background Data - Prior to Operations						
		2020			2021	
		May	Aug	Nov	May	
MW-1L						
Ammonia (NH ₄)	mg/L	0.08	0.05		0.05	0.05
Chloride (Cl)	mg/L	56.9	70.7		43.9	29.5
Depth To Water (DTW)	feet	8.6	17.18		14.21	13.73
Dissolved Oxygen (DO)	mg/L	7.98	5.61		6.37	7.46
Fecal Coliform (FC)	#/100 ml	2	2		2	2
Nitrite+Nitrate (NO ₂ +NO ₃)	mg/L	4.06	4.38		2.08	3.38
pH	SU	5.02	4.76		5.42	5.44
Phosphorus (P)	mg/L	0.16	0.08		0.06	0.05
Sodium (Na)	mg/L	27.8	21.4		15.9	17.5
Specific Conductivity	µS/cm	286	253		226	214.2
Temperature	Degrees C	15.3	17.3		17.5	13.9
Total Dissolved Solids	mg/L	176	194		162	142
Total Nitrogen	mg/L	4.33	4.78		2.23	3.5

Data Subsequent to Initiation of Operations on July 2021								
MW-1L		2021		2022				2023
		Jul	Dec	Mar	May	Aug	Nov	Feb
Ammonia (NH ₄)	mg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Chloride (Cl)	mg/L	38.3	61.4	98.1	90.9	74.9	71	45.8
Depth To Water(DTW)	feet	15.55	17	15.62	15.77	17.45	16.76	15.45
Dissolved Oxygen (DO)	mg/L	6.39	6.55	8.04	8.14	7.24	4.17	7.77
Fecal Coliform (FC)	#/100 ml	2	2	2	2	2	2	2
Nitrite+Nitrate (NO ₂ +NO ₃)	mg/L	3.73	4.09	2.66	2.31	2.62	3.05	3.24
pH	SU	5.18	5.21	5.34	5.33	5.1	4.99	5.26
Phosphorus (P)	mg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Sodium (Na)	mg/L	18.2	30.9	33.7	36.8	29.5	22.5	15.8
Specific Conductivity	µS/cm	152.9	187	198	183.9	684	270	177
Temperature	Degrees C	16.5	17	14	14.7	17.1	16.9	14.7
Total Dissolved Solids	mg/L	182	6.55	258	288	242	178	15.45
Total Nitrogen	mg/L	3.87	4.5	2.78	2.31	2.72	3.1	3.24

Fields F and G

Is Artesian reporting to DNREC groundwater monitoring around land application areas authorized by the Phase 1 Permit (Fields F and G)?

Response: The Division has required thirteen monitoring wells located around Fields F and G to monitor groundwater.

Section 6.8.1.3 of the Regulations requires “Spray irrigation systems require a minimum of six (6) monitor wells (MWs): one (1) upgradient, two (2) downgradient, one (1) within the wetted field, one (1) upgradient and one (1) downgradient of the treatment and storage pond(s).” And Section 6.8.1.5 of the Regulations allows the [Division] to require additional wells depending on site or project characteristics if deemed necessary.

Part II.A.3 of the proposed revised draft Phase 2 Operations Permit Amendment requires groundwater monitoring from four wells for Field F and nine wells for Field G. Page 3 of the proposed revised draft Phase 2 Operations Permit Amendment shows well locations.

DNREC Well ID	Local ID
258634	MW-1F
258632	MW-2F
258633	MW-3F
258635	MW-4F
258636	MW-5F
258620	MW-1G
258628	MW-2G
258630	MW-3G
258631	MW-4G
258625	MW-5G
258626	MW-6G
258627	MW-7G
258629	MW-8G
258624	MW-9G

In addition to background data provided in 2018, AWMI has been providing quarterly data since the initiation of operations of SRRF in July of 2021.

Storage Lagoons

How does the proposed DNREC permit provide tangible evidence to ensure that the wastewater does not leak/seep from the storage lagoons into shallow groundwater?

Response: Section 6.8.1.3 of the Regulations requires a minimum of two monitoring wells to monitor treatment storage ponds: one up gradient and one down gradient of the treatment and storage pond(s). And Section 6.8.1.5 of the Regulations allows the [Division] to require additional wells depending on site or project characteristics if deemed necessary.

Four wells have been located around the property that the existing storage lagoon and proposed lagoons are located on. The four wells are depicted on Page 3 of the proposed revised draft Phase 2 Operations Permit Amendment. The four wells are also depicted in Appendix A.2 and A.5 of the February 2021 DER (pdf pages 52 and 66). In addition, monitoring well 1-F (258634) is downgradient of the existing storage lagoon. Please note, SRRF began Phase 1 operation in July 2021.

DNREC Well ID	Local ID
254881	MW-1L
254882	MW-2L
254883	MW-3L
254884	MW-4L

Well data from Monitoring Wells Surrounding the Lagoon													
		Background Data - Prior to Operations					Data Subsequent to Initiation of Operations on July 2021						
		2020			2021				2022				2023
		May	Aug	Nov	Mar	May	Jul	Dec	Mar	May	Aug	Nov	Feb
MW-1F													
Chloride (Cl)	mg/L	21.6	38.5	31.7	34.4	33.6	37.6	41.1	44.6	40.2	38.8	34.2	33.4
Nitrite+Nitrate (NO2+NO3)	mg/L	11.1	16.1	10.6	10.4	9.72	10.3	8.42	9.07	8.07	7.89	7.68	8.73
Sodium (Na)	mg/L	10.7	3.54	7.5	7.2	7.39	7.69	10.4	10.8	14.2	12.5	12.5	11.3
Total Dissolved Solids (TDS)	mg/L	164	202	185	192	200	225	212	180	240	230	148	175
MW-1L													
Chloride (Cl)	mg/L	56.9	70.7	43.9		29.5	38.3	61.4	98.1	90.9	74.9	71	45.8
Nitrite+Nitrate (NO2+NO3)	mg/L	4.06	4.38	2.08		3.38	3.73	4.09	2.66	2.31	2.62	3.05	3.24
Sodium (Na)	mg/L	27.8	21.4	15.9		17.5	18.2	30.9	33.7	36.8	29.5	22.5	15.8
Total Dissolved Solids (TDS)	mg/L	176	194	162		142	182	6.55	258	288	242	178	15.45
MW-2L													
Chloride (Cl)	mg/L	17.8	17.8	14.4	13.2	11.4	11.7	15	9.86	9.44	8.49	6.18	9.97
Nitrite+Nitrate (NO2+NO3)	mg/L	12	12.4	10.4	9.6	8.01	7.22	5.31	6.71	6.15	5.83	4.28	9.75
Sodium (Na)	mg/L	14.8	4.63	4.24	4.43	3.94	3.68	4.38	4.15	5.36	3.96	4.63	4.95
Total Dissolved Solids (TDS)	mg/L	198	186	178	168	160	158	140	135	208	162	95	198
MW-3L													
Chloride (Cl)	mg/L	7.99	7.6	9.54	6.38	6.38	7.64	7.13	6.24	6.72	6.39	5.24	5.1
Nitrite+Nitrate (NO2+NO3)	mg/L	4.24	4.34	6.24	3.36	2.81	3.75	4.67	6.44	8.54	6.73	12.8	14
Sodium (Na)	mg/L	5.2	2.34	3.01	2.93	3.66	2.66	2.53	3.31	4.41	2.48	3.96	3.65
Total Dissolved Solids (TDS)	mg/L	132	126	182	140	135	140	140	118	182	212	112	165
MW-4L													
Chloride (Cl)	mg/L	4.2	8.98	4.18	5.32	6.44	9.2	7.91	5.85	6.08	6.39	4.82	9.82
Nitrite+Nitrate (NO2+NO3)	mg/L	4.7	3.69	2.61	3.45	3.78	4.72	3.47	5.04	6.04	6.73	9.59	9.01
Sodium (Na)	mg/L	13.2	1.56	2.23	2.19	2.22	1.63	2.36	2.36	3.37	2.48	3.65	3.03
Total Dissolved Solids (TDS)	mg/L	928	204	310	270	110	290	138	182	280	212	165	135

The Division has concluded that the monitoring well network is in line with the regulatory framework and will provide sufficient warning of a compromised lagoon liner. To date, all monitoring data received for these wells is consistent with prestart-up background concentrations.

5. Surface Water Monitoring

Public comment inquired if any monitoring was being done in the Ingram Branch to determine any impact from spray irrigation of the treated effluent. Written comment also expressed concern that when Artesian sprays into the trees, the minimal forest near SRRF, that Ingram creek exists in the same spot. It is connected by creeks and ponds to the Broadkill River and Delaware Bay.

Response: Section 6.3.2.3.13.12 of the Regulations requires that “surface water bodies adjacent to wastewater spray irrigation sites must be monitored by the wastewater treatment facility. The [Division] may deem necessary the monitoring of other surface water bodies in close proximity to the spray irrigation site. Monitoring must be performed upgradient and downgradient of the irrigation site.”

Part II.A.9 of the current Operations Permit 359288-02 requires quarterly surface water monitoring from six locations. The surface water sampling locations include Ingram Branch and Sowbridge Branch. Three of the monitoring locations are positioned to monitor Ingram Branch: upstream (SW-1), down-gradient of Field G (SW-2), and down-gradient of Field F (SW-3). And three monitoring locations are positioned to monitor Sowbridge Branch: upstream (SW-4), down-gradient of Field E (SW-5), and down-gradient of Field D (SW-6). Please note, the current Operations Permit, as well as the proposed revised draft Phase 2 Operations Permit Amendment, only authorizes the use of Field F and Field G. Fields D and E are not yet permitted for operations. The proposed revised draft Phase 2 Operations Permit Amendment will maintain surface water monitoring requirements. Division staff will review the quarterly data to assess any impact on surface water quality from the spray irrigation of the treated effluent. Since, operations began in July of 2021, SRRF does not appear to be negatively impacting Total Nitrogen in either branch (see following data table). However, only two monitoring events have occurred since the initiation of operations at SRRF. Once sufficient data is obtained, and prior to permit renewal, the Department’s Division of Watershed Stewardship along with the Division hydrologists will assess the data to determine there has been any environmental impact by the facility on the surface water bodies based on the observed data trends.

Surface Water Monitoring – Total Nitrogen (mg/L)											
	Background Data - Prior to Operations					Data Subsequent to Initiation of Operations on July 2021					
	2020		2021			2022					
	May	Aug	Dec	Mar	May	Sep	Dec	Mar	Jun	Sep	Dec
SW-1	Dry	Dry	10.2	0.062	0.37	Dry	Dry	Dry	Dry	Dry	Dry
SW-2	1.32	Dry	0.448	0.291	0.34	1.35	5.56	0.371	1.07	Dry	0.737
SW-3	8.34	4.18	4.95	2.91	2.75	3.83	3.85	6.5	6.11	Dry	10.9
SW-4	2.25	1.51	2.29	2.35	3.98	2	2.48	2.43	2.97	1.31	3.92
SW-5	4.13	2.74	4.96	5.84	3.51	3.6	5.72	5.06	8.21	2.09	6.87
SW-6	4.64	4.43	6.81	6.14	4.52	4.57	6.82	6.23	3	4.12	7.66

6. Monitoring Data Accessibility

Public comments requesting availability of the monitoring well data and the effluent monitoring at Allen Harim Harbeson. Comment also inquired about the availability of monitoring well data at the Clean Delaware site.

Response: Monitoring of the flow from Allen Harim Harbeson Processing Facility to SRRF in accordance with Part II.A.1 of the current Operations Permit DEN 359288-02 is summarized in the table below.

Influent to SRRF from Allen Harim Harbeson																				
		2021					2022												2023	
		Jul	Aug	Sep	Oct	Nov	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Average Quantity	gal/day	1.02	1.04	1.01	0.97	0.78	1.06	1.13	1.17	1.16	1.02	1.25	1.14	1.23	1.19	1.19	1.10	1.00	1.17	1.22
Maximum Quantity	gallons	1.35	1.44	1.57	1.55	1.37	1.82	1.65	2.29	1.90	1.64	1.81	1.55	1.65	1.81	1.66	1.65	1.77	1.74	1.69
Total Quantity	gallons	31.76	32.29	30.43	30.12	23.45	32.78	31.71	36.35	34.75	31.50	37.49	34.17	37.98	34.39	35.59	32.98	30.94	36.40	34.19
Ammonia	mg/L	0.12	0.26	0.1	0.07	3.4	1.27	0.12	0.12	0.12	0.14	0.11	0.09	0.9	0.12	0.16	0.1	0.17	0.66	0.1
Biological Oxygen Demand 5 day	mg/L	3	3.2	8.8	9.5	7.6	7.8	7.05	3.7	4.7	20.1	13	5.05	6.25	3.3	5.2	3.85	4	5.9	13
Chloride	mg/L			181		228	217		230				131	133			127		125	
Nitrite+Nitrate	mg/L	20.8	20.5	15.1	15.3	24.8	20.3	17.4	18.8	16.8	18.4	9.69	14.72	13.755	10.535	12.645	9.47	25	10.42	12.43
pH	SU	8.16	8.03	8.14	7.84	7.86	7.21		1.67	7.59	7.56	7.69		8.115	8.095			7.91		
Phosphorus	mg/L	0.16	0.13	0.16	0.1	0.07	0.06	0.08	0.065	0.1	0.14	0.1	0.17	0.3	0.44	0.12	0.009	0.13	0.09	0.11
Potassium	mg/L			48.1		57.7	52		53.6				51.3	56.4			53.7		53.3	
Sodium	mg/L			106		116	106		117				120	102			131		153	
Total Nitrogen	mg/L	21.8	21.7	16.2	16.7	30.2	22.7	18.55	19.85	18.2	18.4	11	15.49	15.15	11.605	13.835	10.61	27.2	13.35	14.25
Total Residual Chlorine	mg/L	1.61	2.05	2.31	2.17	2.3	2.22	2.08	1.92	2.55	2.67	2.86	2.59	2.53	2.61	2.87	3.1	2.06	2.28	1.89
Total Suspended Solids	mg/L	7.2	7.5	14	6	9.5	5.6	6	5.8	10.8	12	5.6	5.4	6.755	4.9	6.1	6.4	2	7.2	20.65
Turbidity	NTU	1.35	1.05	1.08	0.64	0.36	0.3	0.48	1.32	2.43	1.64	1.06	1.99	1.15	1.7	1.865	1.35	0.23	2.1	1.4

Clean Delaware does not discharge to SRRF and is not the subject of this Public Hearing; therefore, an in-depth discussion of Clean Delaware's data is not included herein. However, the public can access data regarding Clean Delaware by submitting a request through the Department's Delaware Freedom of Information Act (FOIA) website: <https://dnrec.alpha.delaware.gov/foia/>.

Treatment/Design

7. Treatment Efficiency

The influent/effluent table indicates the treatment efficiency is 97.5 percent, has DNREC compared that confidence of treatment to known treatment efficiencies of working Hybrid Bardenpho systems in Delaware? Other comments and concerns relative to the efficiency of the treatment proposed were also submitted.

Response: As per the Hybrid Bardenpho design specifications provided in Appendix B of the February 2021 Design Engineer Report (DER pdf page 74), *"The Hybrid Bardenpho is a plug-flow BNR process which is designed to remove phosphorus and nitrogen biologically. The Hybrid is an adaptation of the 5-stage Bardenpho process: both have, in series, an Anaerobic Zone, a First Anoxic Zone, an Oxidic Zone, a Second Anoxic Zone, and a Reaeration Zone. The Bardenpho process incorporates Return Activated Sludge (RAS) pumping from the Secondary Clarifier underflow to the First Anoxic Zone in the reactor. It also includes Nitrate Recycle pumping from the end of the Oxidic Zone to the First Anoxic Zone. The Hybrid adds a Mixed Liquor Recycle from the end of the First Anoxic Zone to the head of the Anaerobic Zone. This significantly enhances biological phosphorus removal. It also greatly improves sludge settleability and clarifier performance. The Hybrid Bardenpho is otherwise identical to the 5-Stage Bardenpho, including the high degree of flexibility to operate many other plug-flow BNR process configurations."*

The specifications further noted that the system would achieve monthly average effluent concentrations as follows (DER pdf page 76).

BOD5	< or =	10 mg/
TSS	< or =	10 mg/l
Nitrogen	< or =	10 mg/l
Phosphorus	< or =	8 mg/l

Division staff was unable to locate another Modified Bardenpho system in Delaware for comparison of treatment efficiency; however, staff did perform additional research and found a Fact Sheet published by the EPA that provided efficiency comparison with other biological nutrient removal technologies.

The EPA published a Fact Sheet titled *Biological Nutrient Removal Processes and Costs*³ to provide information on the types of biological nutrient removal technologies, nutrient removal efficiencies, and the associated costs for small and large municipal systems. In Exhibit 3 of the Fact Sheet, the Modified Bardenpho (similar to the design of the Hybrid) is rated as 'Excellent' for removing Nitrogen and 'Good' at removing phosphorus. Exhibit 4 of the Fact Sheet provides TN and TP effluent concentrations for various facilities using BNR processes. The Fact Sheet cites an example of a Bardenpho system at Cape Coral, FL

³ Biological Nutrient Removal Processes and Costs (epa.gov)
https://www.epa.gov/sites/default/files/documents/criteria_nutrient_bioremoval.pdf

that is treating a flow of 8.5 MGD and is achieving a reduction to effluent concentrations of 1.0 mg/L TN and 0.2 mg/L TP.

8. Equalization/Off Spec Diversion Lagoon

Public comments expressed during the hearing requested clarification and additional detail on how the emergency diversion is proposed to work? Additional written comments also inquired as to what the time lag between treatment and the determination of ‘off-spec’ diversion is? If the ‘off-spec’ water is automatically diverted (from response to probe) from the treatment plant to the 3 MG diversion pond to avoid discharge to Lagoon A what happens when the diversion pond is full? Is there an automatic probe in the diversion pond that reads freeboard available? Will this diverted inflow be raw domestic sewage and if so, what types of aeration will be provided in the diversion pond to keep the odors controlled and thus not a horrible nuisance to the neighborhood?

Response: In accordance with the of Design Engineer Report (DER pdf page 70) *“Should the treatment plant fail to produce acceptable effluent this volume would be directed back to the combined basin through a dedicated return line. This diversion would be automatic based on probes which monitor operational constituents within the treatment facility. Should such a diversion occur, concurrently, the combined basin would be valved off so that all incoming flow would be directed straight to the influent pump station. This would create a closed system where incoming raw waste would come directly to the plant for treatment allowing the plant to continue operating so that adjustments can be made to the process. All discharge would then flow back to the combined basin. Once normal operation is restored discharge to the effluent pump station for transport to the treated effluent storage lagoon would be renewed and the off-spec water in the combined basin would either be slowly mixed back in with the raw incoming flow if a suitable mixing ratio could be found that would not harm the treatment facility, or it would be pumped out and disposed of.”*

The Division sought additional information from AWTMI on July 1, 2022 to provide further clarification in response to the public’s question. In AWTMI’s July 12, 2022 response letter, AWTMI provided the following:

Public Comment: “Please provide clarification and additional detail regarding how the operation of the equalization and off-spec diversion lagoon will work during emergency diversion.”

AWTMI Response: There will be three modes of operation that will be available during an emergency diversion event. These modes are intended to respond to various types of off spec situations depending on their type and severity. All three of them are facilitated by different configurations of pumping and piping operations. The reason for multiple modes is that cutting off flow from a wastewater treatment plant can have devastating consequences for the microbes that perform treatment. Accordingly, in the event of all but the most catastrophic emergencies it is preferable to keep flow cycling through the plant until such time as the issue can be resolved. In light of this, the various

modes of operation are designed to prevent noncompliant effluent from reaching the spray lagoon while also keeping the plant functioning.

Mode 1: Terminate Spray Operations Only

In this mode of operation, the effluent pump station is re-routed to discharge all effluent from the WWTP back to the equalization/diversion lagoon. This creates a contained loop system in which treated wastewater is mixed with raw wastewater and brought back into the plant for treatment. This mode would be utilized if there was an issue within the WWTP process itself that was preventing full treatment from being reached. In this type of situation flow, either full or partial, would be maintained through the plant to keep all the microbes alive and functioning while the issue causing the problem was diagnosed and addressed. Instead of discharging to the spray lagoon, all discharge would be routed back to the equalization/diversion lagoon before being pumped back to the plant for further treatment. The treated wastewater would mix with the raw incoming flow in the equalization/diversion lagoon diluting the fresh wastewater so that the flow coming back to the plant would be diluted which would likely aid in the plant getting back online to its full capability.

Mode 2: Terminate Spray Operations & Disconnect Influent from Plant

Like in the first mode of operation, Mode 2 would begin with ceasing of discharge to the spray lagoon. However, instead of the effluent pump station being routed to discharge into the equalization/diversion lagoon, it would instead discharge directly back into the influent pump station. From there it would be pumped back through the plant in a loop to preserve the microbial population. The incoming raw wastewater from the system would be sent directly to the equalization/diversion lagoon where it would be held and not mixed with the flow cycling through the WWTP. This mode of operation would be used in the event that keeping the flow in the WWTP and equalization/diversion lagoon separate is beneficial. For example, if a problematic release of non-compliant flow was detected from Allen Harim or some other large customer this mode could be engaged to capture the problematic volume in the equalization/diversion lagoon before it reached the plant. The equalization/diversion lagoon could then be drained or the non-compliant volume held there until enough compliant wastewater flowed in that dilution could solve the problem. While all that was happening the volume in the WWTP at the time of the diversion could continue to cycle so that the microbial population was protected and preserved.

Mode 3: Terminate Spray and Shut Down WWTP

This mode would only be utilized if there was a catastrophic failure of the WWTP on the level of decimation from a hurricane or other natural disaster. The equalization/diversion lagoon would take in all incoming flow and hold it until trucks could be used to pump out the volume and remove it for treatment at another facility. In this mode the effluent pump station would be completely shut down and the influent pump station would cycle water from one side of the equalization/diversion lagoon to the other.

Public Comment: “What is the lag time between treatment and the determination of ‘off-spec’ diversion? If the ‘off-spec’ water is automatically diverted (from response to probe) from the treatment plant to the 3 MG diversion pond to avoid discharge to Lagoon A, what happens when the diversion pond is full?”

AWMI Response: There is no single lag time since multiple events can trigger a diversion. Additionally, the severity of any given event will also impact the response time. Where continuous probes are installed there will be continuous monitoring that will be used to initiate diversion. For parameters that rely on outside tests initiation of diversion will be implemented upon receipt of test results.

Should the diversion pond need to be partially drained the volume can be pumped out of the lagoon and into trucks for disposal at other WWTP facilities.

Public Comment: “Is there an automatic probe in the diversion pond that reads freeboard availability?”

AWMI Response: A level transducer will monitor the water level in the equalization/diversion lagoon.

Public Comment: “Will the diverted inflow be raw domestic sewage and if so, what types of aeration will be provided in the diversion pond to keep the odors controlled and thus not a horrible nuisance to the neighborhood?”

AWMI Response: Under normal SRRF operations the flow coming into the equalization/diversion lagoon will be raw wastewater. Such open basins are standard for wastewater treatment plants of this size throughout the world.

Public Comment: “Provide a process flow diagram depicting operations under diversion. The Process Flow Diagram provided in the application Drawings (pdf page 3) does not note a return line and appears unclear as to how the diversion process would be implemented.”

AWMI Response: Please see the diagrams contained in Appendix A [of application submission]. This depicts the three diversion modes described previously.

The Division has concluded that the proposed management of the emergency diversion would properly divert and manage flows in accordance with the intent of Section §6.3.2.3.2.4 of the Regulations which stipulates diversion requirements for wastewater that fails to meet operating specifications. In addition, the management of any diverted wastewater upon implementation of the contingency plan will minimize the potential for odor concerns because the wastewater will be recirculated back through plant for treatment as soon as possible.

9. Monitoring for pathogens

Written public comment inquired why there is no influent pathogen information for Phase 2 domestic wastewater provided in AWMI's Phase 2 Design Engineer Report? Written public comment further inquired if Artesian was claiming that there will be no pathogens, or do they not have data to report?

Response: The SRRF Phase 2 wastewater treatment facility is designed to treat domestic wastewater. The influent concentration tables provided in the Design Engineer Report (DER) do not list a specific value for Fecal Coliforms and instead lists N/A. However, Section 1.3.2 of the DER - Influent Characteristics notes: "...Where available, the design influent wastewater characteristics (§6.5.1.4.1.1.5) are based on actual concentrations from monitoring results for the AWMI Regional System for a three-year period. In general, the influent has been consistent with low flow rate/high strength domestic wastewater as described in Metcalf & Eddy..."

Table 3-15 of Metcalf & Eddy⁴ provides a typical Fecal Coliform concentration of $10^5 - 10^8$ FC/100mL for high strength influent domestic wastewater.

Section 6.3.1.9 of the Regulations requires: "All wastewater containing domestic wastes must undergo disinfection prior to being discharged to the disposal system with the exception of subsurface disposal methods. All disinfection must reduce fecal coliforms to ≤ 200 col/100 mL. Wastewater containing domestic wastes intended for spray irrigation onto unlimited public access sites must be disinfected prior to being discharged to the irrigation system to reduce fecal coliforms to ≤ 20 col/100mL...."

In accordance with Section 6.3.1.9 of the Regulations, and since the SRRF is designed for unlimited public access treatment criteria, the effluent from the SRRF will be required to reduce Fecal Coliforms to ≤ 20 col/100mL. Part I.D.14 of the proposed revised Phase 2 Operations Permit Amendment requires that SRRF meet this requirement.

DER Section 4.15 Disinfection, as required to be addressed by Section §6.5.1.4.1.7.4 of the Regulations, notes: "The disinfection point, consisting of an UV light system, is located after the wastewater has run through the primary treatment system and filters. Please refer to Appendix B4 for sizing information." Technical Specifications for the UV light system may also be found in the February 2021 Equipment Specifications - Section 009 UV Disinfection 01-02 (pdf page 157).

DER Appendix B.6 *UV Disinfection* provides the design overview for the UV disinfection system (DER pdf page 114). The Water Quality table provided in the overview notes influent counts up to 200,000 fecal coliform/100mL with disinfection proposed to achieve $<20/100$ mL ecoli. Note, *Escherichia coli* (*E. coli*) is part of the group of fecal coliforms.

⁴ Metcalf & Eddy (2003). *Wastewater Engineering: Treatment and Reuse*. 4th Edition, McGraw-Hill, New York. Table 3-15.

The Equipment Specifications iterates the following:

Plant Design

Your UV system has been designed on a set of parameters. These parameters are described below and are based on the entire plant operating properly. Ensure that pre-processes are providing good effluent that meets the design parameters. If you have concerns, please test the effluent's UV transmission (UVT%) and compare it to the design parameters.

- | | |
|--------------------------------|------------|
| 1. Peak instant: | 1.5 MGD |
| 2. Average flow: | TBD |
| 3. Minimum flow: | 0 |
| 4. UV Transmittance at 254 nm: | 65% |
| 5. Dosage: | 10 mJ |
| 6. Total Suspended Solids: | 10 mg/l |
| 7. Effluent temperature range: | 33 to 85 F |
- Effluent standard to be achieved < effluent limit of 20 fecal/100 ml based on a 30-day geometric mean of daily samples and sampling location immediately downstream of the UV reactor. Dosage > 90 mJ (90,000 uWs/cm²)

Section 6.8.2 of the Regulations does not require monitoring of Fecal Coliform bacteria in the Influent, however, does require monitoring in the Effluent.

Parameter	Unit Measurement	Monitoring Frequency	Sample Type	
			Influent	Effluent
Flow	Gallons Per Day	Continuous	Recorded	Recorded
BOD ₅	mg/L	2 x Month	Grab	Composite
TSS	mg/L	2 x Month	Grab	Composite
Total Dissolved Solids	mg/L	Quarterly	NA	Grab
Fecal Coliform	Col/100 ml	Quarterly	NA	Grab
Total Nitrogen	mg/L	2 x Month	Grab	Composite
Ammonia Nitrogen	mg/L	Monthly	Grab	Composite
Nitrate/Nitrite as Nitrogen	mg/L	Monthly	Grab	Composite
pH	S.U.	3 x per week	Grab	Composite
Total Phosphorus	mg/L	Monthly	Grab	Composite
Chloride	mg/L	Quarterly	Grab	Composite

Accordingly, Part II.A.1.b of the proposed revised draft Phase 2 Operations Permit Amendment does not require Fecal Coliform bacteria to be monitored in the wastewater influent. However, Part II.A.2 of the proposed revised draft Phase 2 Operations Permit

Amendment does require Fecal Coliform bacteria to be monitoring in the treated effluent at two locations:

Wastewater Treatment System: Samples taken in compliance with the sprayed effluent monitoring requirements for all parameters specified shall be taken from a sampling port and meters located immediately after filtration and disinfection.

Post-Storage Discharge of Blended Treated Effluent: Samples taken in compliance with the sprayed effluent monitoring requirements for all parameters specified shall be taken from a sampling port and meters located at the discharge side of the SRRF irrigation pumps.

As discussed previously in TRM Item 1 (pages 7-9) above, the Division has also included two Phase 1 and Phase 2 Fecal Coliform bacteria Contingency Plans in the proposed revised draft Phase 2 Operations Permit Amendment. The Plans require notification, potential diversion, additional monitoring, and potential remedy if a bacteria limitation is exceeded and continues to be exceeded.

The Division has concluded that although the influent concentration table provided in the DER does not list a specific value for Fecal Coliforms and instead lists N/A, the design does account for treatment of Fecal Coliform bacteria at concentrations consistent with high strength domestic wastewater and is designed to achieve the regulatory required concentration of ≤ 20 col/100mL. And, the Division imposes this disinfection requirement, as well as monitoring of the effluent to ensure compliance and contingency language to protect public health, in the proposed revised draft Phase 2 Operations Permit Amendment.

10. Tertiary Treatment Clarification

Public comment requested clarification on tertiary treatment relative to the proposed Bardenpho treatment process.

Response: As described by Metcalf & Eddy⁵, Tertiary Treatment is a level of wastewater treatment that provides for the removal of residual suspended solids (after secondary treatment), usually by granular medium filtration or microscreens. Disinfection is also typically a part of tertiary treatment. Nutrient removal is often included in this definition.

The SRRF application for the Phase 2 construction of the wastewater treatment system proposes a process that, according to the February 2021 *SRRF Phase 2 Design Engineer Report*, includes nutrient removal, filtration, and disinfection. In line with the above definition, the Bardenpho treatment process, followed by filtration and disinfection, would constitute tertiary treatment.

More specifically, the proposed treatment process includes the following:

⁵ Metcalf & Eddy (2003). *Wastewater Engineering: Treatment and Reuse*. 4th Edition, McGraw-Hill, New York.

The influent raw wastewater passes through a flow meter prior to the headworks, which will consist of a 6mm screen followed by grit removal of 95% at 140 mesh. Screenings are to be collected for landfill disposal. After separation, grit will be washed, dewatered, and then collected for landfill disposal. Excess water used for screen and grit cleaning will be returned to the equalization lagoon for treatment. After the headworks, the screened wastewater enters a combined equalization/off spec diversion lagoon, in order to stabilize the flow. The combined lagoon will have provisions for mixers to minimize stagnation and solids settling. The combined lagoon will have a storage capacity of 3 MG. In the event that off-spec water not suitable for disposal after treatment is encountered the non-compliant volume will be held in the combined lagoon for evaluation and disposal. Methodology for sizing and operation of the combined lagoon can be found in Appendix B.2. The wastewater will then be pumped from the EQ lagoon into the Hybrid Bardenpho process and will utilize a flow splitter box to evenly distribute flow amongst the two treatment trains. After the Hybrid Bardenpho process, cloth media filtration will be used for removal additional TSS not captured by the clarifier that exists in the Hybrid Bardenpho Process. From the cloth media filters, water will gravity flow through a UV system for disinfection and will drain into an effluent lift station. This lift station will be able to pump water into the existing 90 MG treated effluent storage lagoon, from which the treated effluent will be disposed of utilizing the existing spray irrigation system.

The design of the proposed Phase 2 wastewater treatment system is in line with appropriate recommended standards for achieving high quality wastewater effluent through tertiary treatment.

11. Phase 2 Wastewater Treatment Capacity

Public comment expressed concern about the capacity of the proposed Phase 2 treatment facility versus the recent commitments AWMi has made to accept wastewater (Town of Milton, Georgetown, and several other subdivisions and communities). “...It serves multiple communities and when it reached 70% capacity it constructed to double its WW treatment capacity.”

Response: The SRRF Phase 2 wastewater treatment system is proposed for 0.625 MGD (Peak Month Average Daily Inflow). Regardless of any commitments AWMi has made, the proposed revised draft Phase 2 Operations Permit Amendment limits AWMi to an influent of 0.625 MGD from all sources to the wastewater treatment plant. Any additional proposed flows would require AWMi to apply for Phase 3 upgrades to the wastewater treatment system.

For phased systems, the OWTDS Regulations require notification when flows reach 80% of the facility’s capacity. The regulations further require the permittee to design and apply for a construction permit for upgrades to the facility. The OWTDS Regulations prohibit flows to exceed the permitted capacity.

Section 6.3.1.15 of the Regulations requires the following:

6.3.1.15.1 Once an operation permit has been issued and the wastewater flow reaches 80% of the permitted treatment capacity for the constructed phase based on a period of seven (7) consecutive days, the permittee must submit written notification to the Department. The written notification must include a work plan for construction of the next permitted phase. The permittee must submit a construction permit application, plans and specifications and Design Engineer Report with applicable fees if the next phase has not yet been permitted or if there are changes to the previously permitted design.

6.3.1.15.2 Any flow above the permitted flow for a phase shall not be allowed to be discharged to the system until construction is completed on the following phase and an operating permit has been issued or amended by the Department for the next phase.

Part III.A.12 of the proposed revised draft Phase 2 Operations Permit Amendment reiterates the requirements of Section 6.3.1.15 of the Regulations requiring AWWMI to submit notification and an Application, Plans, Specifications, and a Design Engineer Report for the construction of the next phase when wastewater flow reaches 80% of the permitted treatment capacity.

The Division has therefore concluded that the proposed revised draft Phase 2 Operations Permit Amendment aligns with regulatory requirements, limits influent to 0.625 MGD for the proposed Phase 2 wastewater treatment system and requires AWWMI to apply for upgrades once flows reach 80% of the current permitted capacity.

12. Pre-Treatment

Pre-Treatment Standard requirement in proposed construction permit.

What are the names of the communities that will have sanitary waste treated at the Artesian Phase II SRRF and do they have industry/commercial waste that would trigger a federal pre-treatment permit?

What are the specific pretreatment standards that would apply to Artesian Phase I and II that are referred to in Part III A of the proposed construction permit? Which communities would have commercial and/or industrial wastewater inputs that would end up at the Artesian Phase II treatment plant? Where is the list of sources in the permit application materials?

Operations Permit Amendment

SRRF was established by Artesian as a regional wastewater facility and as such is tied into Artesian's regional wastewater system. Therefore, Artesian can route flow to SRRF from any part of the regional system based on system adjustment needs. In correspondence with the Department Artesian has stated that it requires pretreatment of flow from industrial users that discharge into their interconnected system (i.e., all potential flow, not just flow

that is sent to SRRF), and that only approximately 7% of flow discharged into Artesian's interconnected system is comprised of pre-treated industrial flow.

However, to address the public comment, the Division is adding a condition (Part II.B.12) to the revised draft Operations Permit Amendment requiring the Permittee to maintain and annually update an industrial listing that provides the names and addresses of all current Significant Industrial Users (SIUs) and Non-Significant Categorical Industrial Users (NSCIUs), as defined in 40 CFR 403.3, discharging to the SRRF Phase 2 wastewater treatment system.

The condition states:

12. Industrial Users

Within 30 days of the operation of the Phase 2 wastewater treatment system, the Permittee shall develop and maintain an industrial listing that provides the names and addresses of all current Significant Industrial Users (SIUs) and Non-Significant Categorical Industrial Users (NSCIUs), as defined in 40 CFR 403.3, discharging to the SRRF Phase 2 wastewater treatment system. The list shall be updated annually and submitted in the Annual Report required in Part II.B.5.

In addition, Operations Permit Amendment Part III.2 prohibits the operation of the wastewater treatment and spray system from impacting Delaware's water resources including the violation of applicable Federal or State Drinking Water Standards. If the Department determines that the discharge (including industrial pass-through or interference) is impacting groundwater quality or downgradient receptors, Part III.23 of the Operations Permit Amendment will require corrective actions designed to eliminate or minimize any adverse impact to waters of the State. To ensure that industrial inputs are not impacting water resources the Operations Permit Amendment requires extensive influent, effluent, surface water, groundwater, and soils monitoring of various industrial parameters including metals. The Department is confident that any significant industrial discharge to the SRRF Phase 2 wastewater treatment system will be detectable through the required monitoring.

Construction Permit

Part III.A of the proposed draft Phase 2 Construction Permit did include language regarding effluent limitations on pollutants attributable to industrial users. This condition was inadvertently carried over from a permit for a publicly owned treatment works regulated under federal Clean Water Act requirements in which by definition: "The term Publicly Owned Treatment Works or POTW means a treatment works as defined by section 212 of the Act, which is owned by a State or municipality (as defined by section 502(4) of the Act). This definition includes any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage or industrial wastes of a liquid nature. It also includes sewers, pipes, and other conveyances only if they convey wastewater to a POTW Treatment Plant. The term also means the municipality as defined in section 502(4)

of the Act, which has jurisdiction over the Indirect Discharges to and the discharges from such a treatment works.”

eCFR: 40 CFR Part 403 -- General Pretreatment Regulations for Existing and New Sources of Pollution

<https://www.ecfr.gov/current/title-40/chapter-I/subchapter-N/part-403>

The condition will be removed from proposed revised draft Construction Permit since this concern is addressed in the Operations Permit Amendment.

13. Soils Phosphorus

(a.)What caused the high phosphorus levels in the crop areas of Fields D, F, and G? Written comment noted: According to the Artesian Phase II Design Report (Table 2-1), there is already a problem with phosphorus loading at three of the land application sites (cropped acres of Fields D, F, and G).

Field D cropped acres = 45.3 ac

Field F cropped acres = 110.5 ac

Field G cropped acres = 291.9

Total acres that are phosphorus limited = 447.7 acres

Who is ultimately responsible for the decision to land apply on cropped acres that have high phosphorus levels?

Response: The Division does not have data or records regarding activities performed in the crop areas of Fields D, F, and G prior to the baseline site investigation for the SRRF; therefore, the cause of the high phosphorus levels in these areas is unknown. However, the levels may be legacy residual potentially related to historical or previous farming practices. The Division’s soil scientists have been involved in the Site Selection Process, including initial soils testing (borings, test pits and double ring infiltration testing) through permitting, provided reviews in 2009, noting:

“After reviewing the phosphorus sorption levels, in Appendix C there is a lot of sand in these soils so they will not have a lot of bonding sites for the Phosphorus compounds to bind to so they will tend to leach more than be tied up in the soil horizons. The average phosphorus life of the areas is approximately 150 years see Appendix 15 for specifics. The results of the hydraulic conductivity demonstrate rates >3 inches/hour which is in line with the soil textures encountered on the site.”

...and 2017, noting:

“After reviewing the phosphorus sorption levels, in Appendix C there is a lot of sand in these soils so they will not have a lot of bonding sites for the Phosphorus compounds to bind to so they will tend to leach more than be tied up in the soil horizons. The average phosphorus life of the areas is approximately 150 years see Appendix 15 for specifics. Upon further review of Section 4.8 Phosphorus Loadings, the plan discusses the high phosphorus levels present and provides two courses of action. The first is to restrict phosphorus loadings to crop uptake values or less over the first three years, and/or the second is to conduct a phosphorus site

index (PSI). After looking over the proposed steps forward I am in agreement with the plan. The results of the hydraulic conductivity demonstrate rates >3 inches/hour which is in line with the soil textures encountered on the site.”

And, in 2019, a Division soil scientist reviewed the relevant soils information pertaining to the Operations Permit Application submittal: Vegetative Management Plan (VMP) and Sections 2.2, 2.11.5, 3.3, 3.5.4, and 5.2.5 of the Operation and Maintenance (O&M) Plan received on March 21, 2019 and noted:

“Presence of high P soil was identified for fields D, F, and G according to Appendix C.3 of the O&M. Section 6.8.3.1 of the Regulations states that ‘Excessive levels of soil phosphorus are defined by the Delaware Nutrient Management Commission. Soil phosphorus levels must be tested in accordance with the University of Delaware soil testing methods (Gartley, 2002). If the soil phosphorus levels become excessive, the permittee must perform a Phosphorus Site Index (PSI) study. The results must be submitted to the GWDS within 30 days of study completion. Based on these, the GWDS may require the permittee to submit a plan detailing steps to reduce the phosphorus loading rates at the site.’ The proposed management approach to limit the application of phosphorus to the three-year crop removal rate is sufficient... PSI may still be required in the future depending on soil monitoring data.”

Permit Limits

As a result of the concerns of elevated phosphorus in the soils, Part I.D.2 of the proposed revised draft Phase 2 Operations Permit Amendment limits the application of phosphorus to not exceed annual crop uptake rates as follows.

The total amount of Phosphorus that may be applied to the crop areas in Fields D, F, and G shall not exceed crop uptake needs of 31.2 lbs/acre per year. This amount includes supplemental fertilizers, the phosphorus supplied from the effluent, and any other source. The wooded areas in Fields D and G, as well as all of Field E, do not have high phosphorus, and are thus exempt from these criteria. [February 2021 SRRF Phase II Design Engineer Report, Appendix C.2]

Adjustments and reductions are not to be factored into the annual reporting of Total Phosphorus Loading for demonstration of compliance with this limitation. If any crops are not removed from the spray irrigation fields, then the Total Phosphorus application rate for the field shall be reduced by the amount of phosphorus that would be removed by harvesting the crop.

Influent/Effluent Monitoring Requirements

In addition to the incorporation of a protective permit limit for the application of Phosphorus, the proposed revised draft Phase 2 Operations Permit Amendment also includes operational and monitoring requirements relative to Phosphorus.

Part II.A.1 of the proposed revised draft Phase 2 Operations Permit Amendment requires monitoring of the influent received from Allen Harim treatment system as well as the Phase 2 SRRF treatment system influent for Total Phosphorus on a monthly basis.

Part II.A.2 of the proposed revised draft Phase 2 Operations Permit Amendment requires monitoring of the effluent from two points of compliance: immediately post SRRF treatment system and post-storage of the combined blended treated effluent for Total Phosphorus on a quarterly basis.

In consideration of the public comments and concerns regarding elevated concentrations of Phosphorus in the soils and the need to limit the application of Phosphorus to crop uptake values as discussed above, Part II.A.2.b of the proposed revised draft Phase 2 Operations Permit Amendment, 'Requirements for Phase 2 effluent', has been modified to increase the monitoring of Total Phosphorus in the effluent at both points of compliance from 'Quarterly' to 'Monthly' (i.e., immediately post SRRF treatment system and post-storage of the combined blended treated effluent). This will allow for better monitoring and monthly calculation of Phosphorus loading to the site.

Groundwater/Soil Monitoring & Operations Requirements

Part II.A.3 of the proposed revised draft Phase 2 Operations Permit Amendment requires monitoring of the groundwater for Total Phosphorus on a Quarterly basis. Thereby allowing any increase in mobility of soils phosphorus to be detected.

Part II.A.7 of the proposed revised draft Phase 2 Operations Permit Amendment requires monitoring of the soil for Phosphorus annually. And, if soil phosphorus levels become excessive for plant growth, a Phosphorus Adsorption test is required (e.g. Mehlich 3). The Permit further notes: Excessive levels of soil phosphorus are defined by the Delaware Nutrient Management Commission. Soil phosphorus levels must be tested in accordance with the University of Delaware soil testing methods (Gartley, 2002). If the soil phosphorus levels become excessive, the Permittee shall perform a Phosphorus Site Index (PSI) study. The results shall be submitted to the Department within 30 days of completion. Based on these results, the Department may require the Permittee to submit a plan for detailing steps to reduce the phosphorus loading rates at the site.

Section 6.3.2.3.8.2.1.3 of the Regulations requires "*Once phosphorus has become the LLC [Land Limiting Constituent] the phosphorus application rate must be reduced to crop phosphorus uptake levels. Under such conditions, high phosphorus utilization vegetation may be grown to increase the phosphorus assimilative capacity.*"

Data Assessment and Compliance

The Division's technical staff (including a soil scientist) will analyze and evaluate the monitoring data. Data assessments and evaluations are performed during the review and

processing of Annual Reports and during various permitting activities (e.g., permit renewals and/or amendments).

Remedy

In the event phosphorus levels trend upward in the effluent or become excessive in the soils, the Permittee will be required to take all necessary actions to eliminate and correct any adverse impact on public health or the environment and to provide a corrective action plan detailing steps to reduce the phosphorus loading rates at the site (e.g. treatment system upgrades, or growing high phosphorus utilization vegetation to increase the phosphorus assimilative capacity).

Conclusion

In conclusion, the Division believes that the permitted limitations outlined in the proposed revised draft Phase 2 Operations Permit Amendment for Phosphorus application; coupled with groundwater and soils monitoring and routine data assessments is protective of public health and the environment. In addition, to further address concerns raised regarding elevated Phosphorus at the site, the Division has revised the effluent monitoring frequency in the draft Phase 2 Operations Permit Amendment from quarterly to monthly to allow for closer tracking of operational Phosphorus contributions to the fields.

(b.) How does DNREC enforce the Delaware Nutrient Management Commission's interim technical standards?

Response: By definition: "State Technical Standards" are the practices and conduct required of individuals or entities overseen by the Nutrient Management Commission that were developed by a group of environmental scientists, agronomists, engineers, planners, agricultural operators, and policy makers from the Nutrient Management Commission, Department of Agriculture, the Department of Natural Resources and Environmental Control, the University of Delaware, USDA-NRCS and the private sector.

The Department of Agriculture provides State Technical Standards on their website.⁶ The technical standards specifically note any practices that would require permitting oversight by the Department of Natural Resources. The technical standard also notes which DNREC regulations apply. In these instances, the technical standard mirrors Department regulatory requirements. For example, the 2016 technical standard for *Processed Wastewater Testing for Land Application*⁷ notes required permitting oversight by DNREC and cites many requirements listed in the DNREC 2014 OWTDS Regulations: 7 Del. Admin. C. § 7101 *Regulations Governing the Design, Installation and Operation of On-Site Wastewater Treatment and Disposal Systems*.

⁶ Publications and Resources - Delaware Department of Agriculture - State of Delaware
<https://agriculture.delaware.gov/nutrient-management/publications-resources/>

⁷ Processed-Wastewater.pdf (delaware.gov)
<https://agriculture.delaware.gov/wp-content/uploads/sites/108/2017/12/Processed-Wastewater.pdf>

(c.) Since the phosphorus removed from the wastewater by the Hybrid Bardenpho will be concentrated in the sludge from the clarifiers – where will the sludge be land applied with respect to phosphorus limited soils?

Response: Since application of Phosphorus at the site is limited to crop uptake values, the site will not be permitted for the application of biosolids. The Permittee will be required to utilize a licensed, contract hauler for proper disposal of biosolids. If disposed of in Delaware, the disposal application site is required to have a biosolids application permit from the Department. See Item 14 below for additional details.

14. Biosolids

Land application of biosolids. Questions: The proposed language in the permit seems to leave a very important aspect of the project up for interpretation – namely the proper disposal of biosolids and sludge from the domestic sewage treatment plant. Why is the permit so vague?

The proposed revised draft Phase 2 Construction Permit in Part II.C.3.j requires the Permittee upon the completion of construction to provide a Biosolids Management Plan.

Biosolids Management Plan. A copy of a biosolids management contract if a third party will be utilized to manage the biosolids. If the permittee is not contracting out sludge management, the permittee shall obtain any necessary permits for land application of biosolids from the Department and provide a copy to the [Division of Water].

However, the Division sought additional information from AWMI on July 1, 2022 relative to the management and disposal of biosolids from the proposed Phase 2 wastewater treatment system. In AWMI's July 12, 2022 response letter, AWMI noted the following.

“Management and disposal of biosolids produced at Artesian’s SRRF WWTP will be handled by pumping and transport to Sussex County’s Class A biosolids treatment facility at the Inland Bays complex. Artesian owns and operates two (2) 5,000-gallon pumper trucks operating under State of Delaware Non-Hazardous Liquid Waste Transporters Permit Number DE OH-300. These trucks will be used by Artesian to transport the sludge and biosolids. Artesian entered into a disposal agreement dated September 19, 2019 with Sussex County Council to dispose of up to 100 dry tons of biosolids per year at their IBRWF biosolids facility. A copy of the executed agreement with Sussex County can be found in Appendix D.”

After reviewing the additional information provided by AWMI, the Division has concluded that the proposed management and disposal of biosolids produced at the proposed Phase 2 wastewater treatment system will be in accordance with the Non-Hazardous Liquid Waste Transporters Permitting requirements of the On-Site Regulations, as well as the *Guidance and Regulations Governing the Land Treatment of Wastes* (7 DE Admin. Code 7103).

In addition, to address concerns regarding biosolids/sludge handling operations and to provide more clarity regarding biosolids/sludge management the Division is including the follow condition.

All sludge (biosolids) shall be handled in accordance with standard wastewater practices and shall be disposed of in a manner such as to prevent any pollutant from entering the surface water or groundwater and to comply with applicable federal or state laws and regulations.

Management and disposal of biosolids produced at the SRRF wastewater treatment system shall be handled by pumping and transport to Sussex County's Class A biosolids treatment facility at the Inland Bays Regional Wastewater Treatment Facility. The Permittee owns and operates two (2) 5,000-gallon pumper trucks operating under State of Delaware Non-Hazardous Liquid Waste Transporters Permit (No. DE OH-300). The Permittee shall use these trucks (or other permitted trucks) to transport biosolids. The Permittee shall handle sludge in accordance with the disposal agreement dated September 19, 2019 with Sussex County Council to dispose of up to 100 dry tons of biosolids per year at their IBRWTF biosolids facility. The Permittee shall maintain a current copy of the executed agreement with Sussex County on file with the Department.

In order to deviate from the above biosolids management and disposal plan, the Permittee shall submit an alternative plan for Department approval.

15. Construction above grade wastewater ponds – catastrophic failure.

What are the secondary containment provisions in case of a catastrophic failure of the above-grade Lagoon A berms that will protect Ingrams Branch? Written comments also inquired that in the event of a catastrophic failure of the above-grade Lagoon A berms, how will Artesian prevent the combined Allen-Harim poultry processing wastewater and the ‘treated’ domestic sewage from entering Ingrams Branch to the south of the property?

Response: The comment/question references the As-Built Drawings from the Phase I Construction that were provided in the Design Engineer Report as reference in Appendix A: “From page 54 of 134 Artesian Phase II Design Report”. Appendix A of the DER provides, in part, the As-Builts from the Phase 1 Construction (pdf 49-62) stamped in red as ‘Record Drawings’. Lagoon A in the As-Built Drawings references the 90 MG lagoon built during Phase 1 Construction.

The Phase 1 components including the 90 MG lagoon have already been permitted and constructed; therefore, the design of the Phase 1 system elements are relevant to this hearing matter. However, the Division will address the same safety concern relative to the Phase 2 proposed 3.0 MG Combined Equalization and Diversion Lagoon.

In effort to do so, the Division sought additional information from AWTMI on July 1, 2022 to address this question. In AWTMI's July 12, 2022 response letter, AWTMI provided the following:

Public Comment: “Please elaborate upon and demonstrate safety factors considered and incorporated into the design of the above grade wastewater ponds.”

AWMI Response: The proposed equalization/diversion lagoon was designed as a below grade installation. Due to the lack of above grade earthen berms erosion, the primary cause of problems for earthen berms, has been eliminated as a potential source of failure. The earthen berm being constructed within the equalization/diversion lagoon also remains below grade. Additionally, the entire interior of the proposed lagoon is going to be lined which will protect the soil underneath.

Public Comment: “In the event of a catastrophic failure of the above-grade berms, how would the combined Allen-Harim poultry processing wastewater and the ‘treated’ domestic sewage be prevented from entering Ingrams Branch to the south of the property? What are the secondary containment provisions, if any?”

AWMI Response: As noted above, the proposed equalization/diversion lagoon is a below grade installation. Accordingly, no secondary containment provisions have been incorporated.

After reviewing the additional information provided by AWMI, the Division has concluded that the proposed Phase 2 equalization/diversion lagoon was designed as a below grade installation, the potential for failure is unlikely, and the lagoon does not require a secondary containment unit.

16. Hydrologic Impact of Future Lagoon B

Written comment inquired what is the hydrologic impact of the future Lagoon B to the subsurface flow of Ingrams Branch?

Response: The comment/question references the As-Built Drawings from the Phase I Construction that were provided in the Design Engineer Report as reference in Appendix A: “From page 54 of 134 Artesian Phase II Design Report”. Appendix A of the DER provides a Treatment Site Plan (pdf page 48), as well as, the As-Built from the Phase 1 Construction (pdf 49-62) stamped in red as ‘Record Drawings’. Lagoon A in the As-Built Drawings references the 90 MG lagoon built during Phase 1 Construction. Lagoon B is a conceptually proposed storage lagoon that is not part of the Phase 2 construction; however, may be part of a future phase.

Section 6.3.2.3.5.8 of the Regulations requires “*The base of any pond, at its lowest point, must be at least two (2) feet above the seasonal high water table.*” In the April 3, 2017 Geotechnical Evaluation prepared by Duffield Associates for the ANSRWRF Lagoon site, Duffield recommended a seasonal high water table (SHWT) elevation of 24 feet be utilized for design.

Once an application is received for a future phase containing design specifications for the additional storage lagoon previously depicted as Lagoon B, the Division will review the specifications to ensure the base of the lagoon is at least two feet above the seasonal high

water table as recommended in the April 3, 2017 Geotechnical Evaluation prepared by Duffield Associates.

Though the comment was relative to a future lagoon that is not part of the Phase 2 application, the Division will address the same concern relative to the Phase 2 proposed 3.0 MG Combined Equalization and Diversion Lagoon. And, in effort to address this concern relative to the Phase 2 lagoon, the Division sought additional information from AWMI on July 1, 2022 requesting they provide a hydraulic profile for the 3.0 MG equalization and diversion lagoon demonstrating the lagoon complies with Section 6.3.2.3.5.8 of the Regulations. The request further noted that, unless a more recent technical report is available and had been provided to the Division, the seasonal high water table should be based on Duffield's findings in the 2017 Geotechnical Report.

In AWMI's July 12, 2022 response letter, AWMI noted the following.

According to the 2017 Geotechnical Report the seasonal high-water table to be used for design at the SRRF site is 24'. No additional geotechnical report related to groundwater levels has been completed since the 2017 Duffield report. Accordingly, its stipulated seasonal high-water level of 24' was used.

The lowest point in the proposed equalization/diversion lagoon is 26.5' which is 2.5' above the defined seasonal high-water level and therefore the design of the proposed SRRF WWTP complies with Section 6.3.2.3.5.8. The hydraulic profile can be found on sheet C-0.01 which has been included as Appendix B in this response.

After reviewing the additional information provided by AWMI, the Division has concluded that the Phase 2 design of the proposed 3.0 MG Combined Equalization and Diversion Lagoon meets the Regulatory requirement of Section 6.3.2.3.5.8 by being designed to maintain a separation distance of two feet above the seasonal high water table. All future phase applications will be reviewed to ensure this regulatory requirement is also met.

Agricultural Preservation

17. Agricultural Preservation

Public comment expressed concern the application of treated wastewater was not the intent of agricultural preservation.

Response: According to the State of Delaware Department of Agriculture's website, [Laws & Regulations - Delaware Department of Agriculture - State of Delaware](#), the following is the intent of the Agricultural Lands Preservation Act:

“The Agricultural Lands Preservation Act was enacted on July 8, 1991 to conserve, protect, and encourage the improvement of agricultural lands within Delaware for the production of food and other agricultural products. Preservation of the State's farmlands and forestlands is considered essential to maintaining agriculture as a viable industry and an important contributor to Delaware's economy. The Act also

provided for the creation of the Agricultural Lands Preservation Foundation. The Foundation has been charged with the authority and responsibility of establishing and administering an extensive statewide program to preserve Delaware's farmlands and forestlands."

Title 3 Agriculture, DE Admin. Code 700 Planning, Farmland Preservation does not preclude the irrigation of treated effluent onto lands preserved under the Agricultural Lands Preservation Act.

3 Del.C. 23 §2301 Delaware Code Online

§ 2301. Agricultural lands and use of treated wastewater effluent.
Notwithstanding any law or regulation to the contrary:

(1) Any agricultural lands which are actively being farmed shall have the right to receive and recycle to such land reclaimed water through irrigation systems.

(2) Any agricultural land receiving and applying reclaimed water pursuant to paragraph (1) of this section may also be leased to a private or public entity for irrigation systems to disperse said reclaimed water in accordance with the agronomic requirements of the agricultural land. Such leased irrigation systems shall only be subject to application and permitting of the irrigation systems by the Delaware Department of Natural Resources and Environmental Control.

(3) The receipt and application of reclaimed water for irrigation purposes on agricultural lands subject to agricultural lands preservation under Chapter 9 of this title shall be permitted subject to the provisions of § 909(a)(5)e. of this title.

§ 909(a)(5)e Delaware Code Online

e. Spray irrigation designed to replenish soil nutrients and improve the quality of the soil is allowed provided that the spray effluent is treated pursuant to the best available treatment technology, is disposed of on property utilized for the production of conventional cash crops, and all storage and treatment of the effluent disposed of on the District property takes place on property other than District property.

In 2005, the Department of Natural Resources and Environmental Control and the Department of Agriculture entered into a Memorandum of Understanding Relating to Agricultural Land Preservation and Spray Irrigation to clarify and expand on Section 1, Part 5(e) and to establish an appropriate application volume and appropriate levels of treatment. *"Irrigation rates on any given field shall be determined by crop utilization and uptake limits and not by treatment facility wastewater disposal needs."* Levels of treatment are to be based on the source and type of treated wastewater.

The Division has concluded that the proposed revised draft Phase 2 Operations Permit Amendment for SRRF's OWTDS establishes operational parameters that meet the intent of the Agricultural Land Preservation Act as interpreted and clarified under Title 3 and the DNREC/DDA 2005 Memorandum of Understanding. Spray irrigation limits are based on the nitrogen balance developed in consideration of crop type and crop uptake limits which sets a finite disposal capacity for the facility driven by agricultural needs and not the permittees wastewater disposal needs. Utilization of treated wastewater effluent for spray irrigation purposes not only supports crop development, but also preserves aquifer groundwater resources that would otherwise be used by the farmer to irrigate the crops.

Compliance

18. DNREC Compliance Inspectors Assigned to SRRF

Public comment expressed concern and inquired if the Department had assigned dedicated inspectors to inspect, review the monitoring reporting submittals, and ensure the facility is operating in compliance.

Response: The Division maintains inspectors, engineers, soil scientists, and hydrologists on staff to review monthly DMRs, Annual Reports, perform inspections and sampling, and assess whether the facility is operating in compliance with the Permit and Regulations.

Legal

19. Pending Appeal for Phase 1

Public comment questioned how the Department was able to hold this hearing when there is an appeal pending before the Environmental Appeal Board for the Phase 1 operating permit. And should this hearing have even been held until the Phase 1 appeal has been resolved. Why would DNREC issue construction permit for Phase II when the community is still appealing the construction permit for Phase I?

Response: The filing of the April 7, 2020 appeal for Phase 1 with the Environmental Appeals Board does not result in a stay on the Phase 1 Operations Permit. Therefore, the appeal would not preclude AWTMI from proceeding with operations, nor applying for a Construction Permit for Phase 2 Operations. In addition, on March 28, 2023 Keep Our Wells Clean withdrew their consolidated appeals concerning Phase 1 construction and operations permits.

General Comments

20. Groundwater Flow Direction

Written comments expressed that Artesian has said groundwater water flows North when it actually flows South and East to the River and Bay.

Response: According to the Division's October 28, 2009 Hydrogeological Evaluation Memorandum, "*Groundwater flow directions determined from the consultants Winflow Model are shown on figures 2A and 2B. In general groundwater flow for the 7 field areas*

is to the east and ranges from towards the northeast to towards the southeast depending on the specific field in question. Groundwater beneath fields A and B discharges to Slaughter Creek to the north and to North Prong to the south. Fields D and E's groundwater discharges to Sow Bridge Branch and Reynolds Pond. Groundwater beneath field C likely discharges to Sow Bridge Branch, Waples Pond, and Ingram Branch. Groundwater at field F discharges to Ingrams Branch which lies to the east and south. In the northern to middle portions of field G, groundwater at the site discharges to Ingram Branch. In the southern portion of field G, groundwater flows towards Brittingham Branch."

21. Controlling mosquitos in waste lagoons

Written public comment asked how Artesian will control mosquitos in all the wastewater ponds in accordance with Secretary's Order No. 2012-W-0052 issued March 12, 2013. Written comment further noted the Artesian SRRF Phase 2 Design Report did not specifically address mosquito control. The comment inquired as to what Artesian has done since constructing Lagoon A to mitigate mosquito breeding grounds and how has DNREC enforced this requirement of the Secretary's Order? The comment inquired if there is a document that was submitted to DNREC that includes a narrative description of how Artesian plans to control mosquitos?

Response:

A similar concern was raised during the 2017 and the 2019 public hearings for SRRF (ANSRWRF) and is addressed in Secretary's Order No. 2012-W-0052, issued March 12, 2013 which is attached as Appendix III for reference. Both the Allen Harim and the SRRF lagoons will be aerated to keep the waters agitated and moving. Mosquitos breed and proliferate in shallow, stagnant pools of water. The lagoons are deep (~ 25 feet) and with aeration/agitation do not provide a good breeding ground for mosquitos. Other similar facilities do not have mosquito issues.

Artesian also provided comments to the Department addressing their mitigation of potential mosquito concerns in a memorandum dated August 8, 2017. Their response follows.

"Conditions most favorable to mosquitoes breeding are areas of shallow, stagnant water with fairly flat side slopes and vegetation along the banks. To minimize the emergence of mosquitoes, the storage lagoon has designed as a deep pond with steep side slopes. Surface aeration will be used to keep the surface of the lagoon from becoming stagnant and allow wave action on the bank to prevent mosquitoes from hatching. The lagoon liner will discourage vegetation growth, and operators will maintain the liner and banks to minimize weeds."

"In a well-maintained pond system, mosquitoes usually are not a nuisance. According to studies by the U.S. Public Health Service, the density of the mosquito population is directly proportional to the extent of weed growth in a pond. Where weed growth in the ponds and along the water line of the dikes is negligible and where wind action on the pond is not unduly restricted, the likelihood of mosquitoes breeding is low." [U.S. EPA]

Both proposed draft construction and operations permits include requirements to operate and maintain treatment and storage lagoons in such a manner as to limit the opportunity for mosquitos to proliferate.

Additionally, the Division performed an inspection on June 3, 2022, at which time, compliance personnel verified the storage lagoon was being aerated with non-shallow conditions and no vegetative growth.

The Division has therefore concluded that AWMI has been implementing the management practices noted in their August 8, 2017 letter and in accordance with Secretary's Order No. 2012-W-0052 and that mosquito proliferation is adequately controlled at this time. Should conditions change or if control practices are not adequately maintained, the Division would require corrective measures.

22. Construction of proposed waste holding ponds prior to permit

Written public comment questioned why Artesian has constructed some of the proposed waste holding ponds north of Lagoon A prior to DNREC issuing the Phase II construction permit? Written comment included Google Earth images depicting disturbed areas, construction activity, proposed to be from 2019. The images are correlated with snapshots of Phase 2 engineering drawings depicting the location of two ponds proposed to be constructed north of Lagoon A.

Response: The Division performed an inspection on June 3, 2022, at which time, inspectors observed conditions of the location north of the existing storage lagoon. The inspectors verified that soil disturbance had occurred for use of the soils for Phase 1 lagoon berms that would need to be removed for Phase 2 construction; however, construction of the Phase 2 ponds have not yet been initiated.

The Division has therefore concluded that AWMI has not initiated construction of Phase 2 components prior to obtaining the Phase 2 Construction Permit.

Required Permit Changes to Address Comments and Compliance Issues

In accordance with Operations Permit (No. 359288-02), AWMI has operated SRRF since July 2021. The permit authorizes the storage and spray irrigation of treated effluent received from the Allen Harim Harbeson Processing Facility's wastewater treatment system. The permit includes effluent limitations, operational, monitoring, and reporting requirements. This includes the submission of monthly Discharge Monitoring Reports (DMRs) designed to verify that the facility is operating in a manner that is protective of human health and the environment.

During routine compliance evaluations of SRRF's monthly DMRs and the 2021 Annual Report and in conjunction with performing various reviews and data analyses designed to address public comments, Division staff identified many monitoring and reporting violations, deficiencies, and errors. These compliance issues were addressed in a *Manager's Deficiency Warning Letter* (dated August 12, 2022) which required several corrective actions including submission of missing data, revised monitoring and reporting methods, and the development and implementation of a

Quality Assurance/Quality Control (QA/QC) Plan to ensure the delivery of accurate and complete monthly DMRs and future Annual Reports. AWTMI completed the required corrective actions as required by the Division. However, subsequent data and compliance evaluations of SRRF's monthly DMRs continue to identify violations and compliance failures associated with SRRF monitoring and reporting program. The Division has determined that many of the violations and compliance failures are (in part) associated with the operational, monitoring, and reporting complexity required by AWTMI's proposal to use predictive monthly Nitrogen Balance worksheets in their current Operations Permit. Therefore, the Division has included revisions in the proposed draft operations permit to address compliance concerns. In addition, the required revisions will further address public comments and concerns by making the permit more stringent.

As referenced above, through the Division analysis of SRRF's DMRs and annual report it was determined that many of the violations and compliance failures are (in part) associated with AWTMI's use of predictive monthly Nitrogen Balance worksheets under the existing permit rather than a fixed Nitrogen limit established via the facility Nitrogen Design Balance. The worksheets were designed to demonstrate that the monthly quantity of effluent discharged did not exceed a volume that had been calculated each month by AWTMI to not cause groundwater to exceed the drinking water standard for Nitrate at the percolate. The predictive mathematical assumptions (i.e., crop nutrient uptake) would then be compared to actual laboratory analytical data and the appropriate adjustments would be made to spray irrigation operations. Operating in this fashion affords Artesian flexibility to increase spray irrigation volume when the Nitrate concentrations in the effluent received from Allen Harim were lower than concentrations used in the design of the facility. The monthly DMRs were required to include spreadsheets provided electronically, in Excel format with calculations maintained to the Division for evaluation and verification that the facility was maintaining 10 mg/L in the groundwater percolate.

The complexity of the proposed monitoring methodology resulted in numerous reporting errors, violations, and operational failures. It also created a situation in which AWTMI's partner farmer who receives the treated effluent for irrigation developed concerns regarding water quantity and nutrient requirements for crop viability. More significantly it hindered the Division's ability to effectively and efficiently perform evaluations to determine the facility's permit and regulatory compliance. Therefore, to address the public's concerns regarding the protection of public health and the environment and to resolve operational, monitoring, and reporting compliance concerns identified by the Division, the following revisions to the proposed Phase 2 Operations Permit Amendment and the proposed draft Construction Permit are required. Please note that the proposed revisions result in a more stringent permit and removes operational flexibility afforded to Artesian via the existing Operations Permit.

Required Revisions to the Proposed Draft Phase 2 Amended Operations Permit

1. Effluent Limitations

To address public comments regarding public health and groundwater protection (TRM Item 1) and to resolve SRRF's continued operational, monitoring, and reporting deficiencies identified by the Division, the operational flexibility originally proposed by AWTMI (i.e., the use of predictive methods in determining discharge volumes while meeting water quality limits in the

percolate) is being revised to include more stringent effluent discharge limitations based on the facility's design disposal capacity. This includes adding a Phase 1 Effluent Volume Limit Table and the Phase 2 Effluent Volume Limit Table. These tables limit the application rate (inches/acre-week) of the monthly and annual quantity of effluent discharged from SRRF to the spray fields or wooded areas (on any pivot or zone); thereby, eliminating Artesian's flexibility to vary spray volumes monthly based on their predictive calculations. The addition of these tables results in more operational, monitoring, and reporting clarity. See Condition Part I D.1 of the red-lined and finalized Phase 2 Operations Permit Amendment.

In addition, based on data provided by AWWMI on May 3, 2023, the Division is reducing the Phase 1 operations effluent Total Nitrogen concentration from 37.5 mg/L to the more stringent 34.6 mg/L and reducing the Phase 2 operations combined and blended effluent Total Nitrogen concentrations from 24.1 mg/L to the more stringent 22.5 mg/L. These reductions are based on actual monitoring data and protective of groundwater resources. See Condition Part I D.10 of the red-lined and finalized Phase 2 Operations Permit Amendment.

2. Fertilizer Application Requirements

To address agricultural operations and concerns regarding the need for sufficient volume of treated effluent for irrigation and nutrient loading for crop survival, the Division is requiring the addition of a fertilizer application condition to the Operations Permit (Part I.D.12 of the proposed revised draft Operations Permit Amendment). The application of additional fertilizer will only be authorized by the Division upon the Permittee developing and implementing an enhanced, higher resolution monitoring plan. The enhanced monitoring will ensure that groundwater is protected by providing accurate real-time data (via in-field instrumentation) thereby allowing the Division to determine (at a higher temporal resolution) if potential groundwater impacts are occurring because of additional nutrient loading from fertilizer use.

Upon installation of the enhanced monitoring well network, and the acquisition of required baseline data; the Permittee will be authorized to apply nitrogen commercial fertilizers on the spray irrigation fields. The condition will also allow the Division to revoke the authorization of additional fertilizer in the event the enhanced monitoring identifies impacts to groundwater, or the Permittee fails to submit complete and accurate monitoring data. While the application of fertilizer may exceed the mathematical/design limitations contained in the Permit, the enhanced, real-time, high temporal monitoring will allow the Division to make more accurate data-based decisions on fertilizer impacts that are not currently capture using just the predictive model. This new condition therefore addresses TRM Item 1 and 13 comments and concerns and ultimately makes the proposed revised operations permit more rigorously protective of groundwater quality. See Condition Part I.D.12 of the red-lined and finalized Phase 2 Operations Permit Amendment.

3. Enhanced Monitoring Plan

In conjunction with the fertilizer application condition discussed above, the Division is requiring the development and implementation of an Enhanced Monitoring Plan (Part I.F.1.a-c of the proposed revised draft Operations Permit Amendment). The Permittee will be required to develop a Plan for Fields F and G for Division review and approval. The Plan is required to include

at a minimum: 1) the installation of additional groundwater monitoring wells at deeper depths both in-field and down-gradient, 2) additional down-gradient wells to be located in between existing wells, 3) specific conductivity probes installed in the in-field and down-gradient monitoring wells for the collection of real-time data, 4) increased monitoring frequency to monthly from May through October, 5) additional monthly reporting of fertilizer quantity, timing of application, type of application, and constituents of fertilizer, and the collection of probe baseline data prior to application of additional fertilizer (~6 months of data).

In conjunction with the enhanced monitoring, the Division is requiring the development and implementation of an Enhanced Monitoring Contingency Plan. The Plan will, at a minimum, address a potential event of elevated Nitrates, or upward trend, being detected in the in-field or downgradient wells and will include multiple short- and long-term mitigation measures (e.g., field resting, crop rotation, or other source control measures and/or hydrogeologic investigation and corrective actions). This new condition therefore addresses TRM Item 1 and 13 comments and concerns and ultimately makes the proposed revised operations permit more rigorously protective of groundwater quality. See Condition Part I.F.1.a-c of the red-lined and finalized Phase 2 Operations Permit Amendment.

4. Enhanced Groundwater Monitoring

The Division also included a new condition to the revised draft operations permit which requires the Permittee to collect, analyze, and report results of enhanced groundwater monitoring. See Condition Part II.A.4 of the red-lined and finalized Phase 2 Operations Permit Amendment.

5. Sludge (Biosolids) Handling Requirements

To further address the public's sludge/biosolids comments and concerns discussed in TRM Item 13 and 14, the Division is including additional language to ensure the Permittee will perform all sludge/biosolids handling in accordance with all State and Federal Regulations. The condition also formally memorializes AWM's sludge/biosolids handling plan as described in their letter dated July 12, 2022. See Condition Part I.H of the red-lined and finalized Phase 2 Operations Permit Amendment.

6. Metals Sampling Requirements

To address public comments raised regarding public health and groundwater protection (TRM Item 1), the Division has added metals to the list of groundwater sampling parameters. Groundwater will be sampled for metals on an annual basis. The addition of metals sampling helps address comments and concerns outline in TRM Item 1 and ultimately makes the proposed revised operations permit more rigorously protective of groundwater quality. See Condition Part II.A.3-4 of the red-lined and finalized Phase 2 Operations Permit Amendment.

7. Annual Report Requirements

To address public comments raised regarding public health and groundwater protection (TRM Item 1) and to resolve SRRF's continued operational, monitoring, and reporting deficiencies identified by the Division, the "standard" annual report condition is being revised to provide additional clarity on the data and information required to be submitted to the Division on an annual basis.

The revised condition highlights selected data and information requirements that the Division has identified as missing in past reports. This includes: 1) a tabulated summary of the nutrient loading, crop removal and nutrient analysis, 2) lysimeter 12-month rolling average data for total nitrogen, 3) soils monitoring (with laboratory data sheets), 4) a tabulated summary of monthly fertilizer nitrogen applied (in lbs/acre per field/zone/pivot), fertilizer phosphorus applied (in lbs/acre per field/zone/pivot), and irrigation water used (in gallons per field/zone/pivot and in inches/acre per field/zone/pivot), and 5) a summary of monthly storage lagoon volumes tabulated in comparison to the permitted action level volume. See Condition Part II.B.5 of the red-lined and finalized Phase 2 Operations Permit Amendment.

8. General Clarifying Changes and Typographic Error Fixes

- a) Changed Groundwater Discharges Section (GWDS) to Commercial and Government Services Section (CGSS) in-line with recent Division of Water reorganization.
- b) Revised site map facility name from ANSRWRF to SRRF.
- c) Revised spray fields map facility name from ANSRWRF to SRRF.
- d) Added correspondence from July 2022 and May 2023 to documentation section.
- e) Changed Part I C.3 combined capacity from 2.123 MGD to 2.125 MGD to fix a typographic error.
- f) Added "samples required to be taken 'quarterly' shall be taken once every three months and no more than 100 days apart" to Part II.A Monitoring Requirements.

A red-lined revised proposed draft Phase 2 Amended Operations Permit is found in Appendix V and a clean copy of the finalized draft Phase 2 Amended Operations Permit is included in Appendix VI.

Required Revisions to the Proposed Draft Phase 2 Construction Permit

- a) A comment was submitted regarding the Condition Part III A.1 Effluent Limitations on Pollutants attributable to Industrial Users. As discussed in Item 12 above, the Division has determined that this condition is not applicable and therefore has removed the condition from the proposed draft permit.

A red-lined revised proposed draft Phase 2 Construction Permit is found in Appendix VII and a clean copy of the finalized draft Phase 2 Construction Permit is included in Appendix VIII.

Permit Issuance Recommendation

Artesian Wastewater Management, Inc.'s application submittal for the proposed draft On-Site Wastewater Treatment and Disposal System (OWTDS) Construction Permit and draft OWTDS Operations Permit Amendment authorizing the construction and operation of the proposed Phase 2 Sussex Regional Reclamation Facility (SRRF) project is complete and in accordance with the applicable regulatory requirements of 7 Del. Admin. C. § 7101 *Regulations Governing the Design, Installation and Operation of On-Site Wastewater Treatment and Disposal Systems*.

The Construction Permit includes a schedule of compliance, construction requirements, monitoring equipment installation requirements, and project completion requirements designed to assure proper system construction, reduce treatment system malfunctions, ensure the retention of construction documents, and ultimately result in a wastewater treatment system that is protective of water resources and the public's health, safety, and welfare.

The Operations Permit Amendment includes effluent limitations, operational, monitoring and reporting requirements designed to protect human health and the environment. In addition, the Division is requiring revisions to the proposed draft permit that includes more stringent effluent discharge limitations based on the facility's design disposal capacity and removes prior operational flexibility, includes enhanced monitoring for fertilizer application to resolve concerns associated with discharge volumes, nutrients, and crop viability, and includes robust contingency requirements if the treatment system is unable to achieve required water quality. These revised conditions along with the already extensive water quality monitoring using lysimeters (in-field), monitoring wells (in-field, up-gradient, and down-gradient), and surface water monitoring will allow Division to better assess the potential impacts the spray irrigation activities are having on the spray fields, groundwater, and surface waters within and adjacent to the spray fields. In the event trends of increasing concentrations and/or impacts are observed, the permittee will be required take all necessary actions to eliminate and correct any adverse impact on public health or the environment resulting from the spray disposal operation. The revisions required by the Division make the Operation Permit Amendment more rigorously protective of public health and the environment.

Given this, the Division has a high degree of confidence that the OWTDS Construction Permit and OWTDS Operations Permit Amendment proposed for Artesian Wastewater Management, Inc's Phase 2 Sussex Regional Recharge Facility project will be protective of public health and the environment. The Division has addressed the comments and concerns from the public raised during the public comment period and at the public hearing. As appropriate, the Division has included required revisions to the proposed draft permits to address public comment and compliance monitoring concerns under the existing Operations Permit. As such, the Division recommends the issuance of the OWTDS Phase 2 SRRF Construction Permit and Phase 2 SRRF Operations Permit Amendment with the revisions referenced herein.

Appendices

- I. Division's Request for Additional Information Email dated 01 July 2022
- II. AWM's Response to the Request for Additional information Letter dated 12 July 2022
- III. Secretary's Order No. 2012-W-0052
- IV. Manager's Deficiency Warning Letter dated August 12, 2022
- V. Red-lined revised proposed draft Phase 2 Amended Operations Permit
- VI. Finalized Draft Phase 2 Amended Operations Permit
- VII. Red-lined revised proposed draft Phase 2 Construction Permit
- VIII. Finalized Draft Phase 2 Construction Permit

Appendix I

Baust, Marlene M. (DNREC)

From: Rebar Jr., John J (DNREC)
Sent: Friday, July 01, 2022 5:18 PM
To: Daniel Konstanski
Cc: Roushey, Jennifer S. (DNREC); Baust, Marlene M. (DNREC)
Subject: Information needed to complete TRM

Importance: High

Daniel,

To address comments received during the public hearing on Artesian Wastewater Management Inc.'s (AWMI) application for permits to construct and operate the Sussex Regional Reclamation Facility (SRRF), the Department requires the submission of the following information.

Equalization/Off-Spec Diversion Lagoon

- Please provide clarification and additional detail regarding how the operation of the equalization and off-spec diversion lagoon will work during emergency diversion. Comments/questions include, but not limited to:
 - "What is the lag time between treatment and the determination of 'off-spec' diversion? If the 'off-spec' water is automatically diverted (from response to probe) from the treatment plant to the 3 MG diversion pond to avoid discharge to Lagoon A, what happens when the diversion pond is full?"
 - "Is there an automatic probe in the diversion pond that reads freeboard availability?"
 - "Will the diverted inflow be raw domestic sewage and if so, what types of aeration will be provided in the diversion pond to keep the odors controlled and thus not a horrible nuisance to the neighborhood?"
 - Provide a process flow diagram depicting operations under diversion. The Process Flow Diagram provided in the application Drawings (pdf page 3) does not note a return line and appears unclear as to how the diversion process would be implemented.

Construction of above grade wastewater ponds

- "Please elaborate upon and demonstrate safety factors considered and incorporated into the design of the above grade wastewater ponds. Specifically, in the event of a catastrophic failure of the above-grade berms, how would the combined Allen-Harim poultry processing wastewater and the 'treated' domestic sewage be prevented from entering Ingrams Branch to the south of the property? What are the secondary containment provisions, if any?"

Hydraulic Profile

- Please provide a hydraulic profile for the 3MG equalization/diversion lagoon demonstrating the lagoon complies with Section 6.3.2.3.5.8 of the Regulations: "The base of any pond, at its lowest point, must be at least two (2) feet above the seasonal highwater table."
 - Unless a more recent technical report is available and had been provided to the Department, the seasonal highwater table should be based on Duffield's findings in the 2017 Geotechnical Report (p7, Number 3).

Biosolids

- Please provide information relative to the management and disposal of biosolids and sludge from the proposed Phase 2 wastewater treatment facility.

As-Built Drawings

- Provide an electronic copy of As-Built Drawings for Field F. Include the identification of each pivot, corresponding wetted acreage, and all requirements in accordance with Part II.C.3.i of the Phase 1 Construction Permit 359288-01.

If you have questions regarding this request, please feel free to contact Marlene Baust, P.E., via e-mail or at (302) 739-9948.

John Rebar Jr.
Environmental Program Manager II
Commercial and Government Services Section
DNREC - Division of Water
(302) 739-9327

Appendix II



OVER 100 YEARS OF SUPERIOR SERVICE

Artesian Water Company ▲ Artesian Wastewater Management ▲ Artesian Utility Development ▲ Artesian Water Pennsylvania
▲ Artesian Water Maryland ▲ Artesian Wastewater Maryland

July 12th, 2022

Mr. John Rebar
Environmental Program Manager
Department of Natural Resources & Environmental Control
89 Kings Highway
Dover, DE 19901

Dear Mr. Rebar,

The purpose of this letter is to respond to your July 1st, 2022 email in which you requested that Artesian Wastewater Management Inc. (AWMI) provide information in response to comments received from the public concerning the AWMI application to construct and operate the Sussex Regional Reclamation Facility (SRRF). A total of five (5) comments were included in your email. AWMI's response to each is as follows.

Equalization/Off-Spec Diversion Lagoon

Comment Received:

- **Please provide clarification and additional detail regarding how the operation of the equalization and off-spec diversion lagoon will work during emergency diversion. Comments/questions include, but not limited to:**
 - **What is the lag time between treatment and the determination of 'off-spec' diversion? If the 'off-spec' water is automatically diverted (from response to probe) from the treatment plant to the 3 MG diversion pond to avoid discharge to Lagoon A, what happens when the diversion pond is full?**
 - **Is there an automatic probe in the diversion pond that reads freeboard availability?**
 - **Will the diverted inflow be raw domestic sewage and if so, what types of aeration will be provided in the diversion pond to keep the odors controlled and thus not a horrible nuisance to the neighborhood?**
 - **Provide a process flow diagram depicting operations under diversion. The Process Flow Diagram provided in the application Drawings (pdf page 3) does not note a return line and appears unclear as to how the diversion process would be implemented.**

AWMI Response:

"Please provide clarification and additional detail regarding how the operation of the equalization and off-spec diversion lagoon will work during emergency diversion"

There will be three modes of operation that will be available during an emergency diversion event. These modes are intended to respond to various types of off spec situations depending on their type and severity. All three of them are facilitated by different configurations of pumping and piping operations. The reason for multiple modes is that cutting off flow from a wastewater treatment plant can have devastating consequences for the microbes that perform treatment. Accordingly, in the event of all but the most catastrophic emergencies it is preferable to keep flow cycling through the plant until such time as the issue can be resolved. In light of this, the various modes of operation are designed to prevent non-compliant effluent from reaching the spray lagoon while also keeping the plant functioning.

Mode 1: Terminate Spray Operations Only

In this mode of operation, the effluent pump station is re-routed to discharge all effluent from the WWTP back to the equalization/diversion lagoon. This creates a contained loop system in which treated wastewater is mixed with raw wastewater and brought back into the plant for treatment. This mode would be utilized if there was an issue within the WWTP process itself that was preventing full treatment from being reached. In this type of situation flow, either full or partial, would be maintained through the plant to keep all the microbes alive and functioning while the issue causing the problem was diagnosed and addressed. Instead of discharging to the spray lagoon, all discharge would be routed back to the equalization/diversion lagoon before being pumped back to the plant for further treatment. The treated wastewater would mix with the raw incoming flow in the equalization/diversion lagoon diluting the fresh wastewater so that the flow coming back to the plant would be diluted which would likely aid in the plant getting back online to its full capability.

Mode 2: Terminate Spray Operations & Disconnect Influent from Plant

Like in the first mode of operation, Mode 2 would begin with ceasing of discharge to the spray lagoon. However, instead of the effluent pump station being routed to discharge into the equalization/diversion lagoon, it would instead discharge directly back into the influent pump station. From there it would be pumped back through the plant in a loop to preserve the microbial population. The incoming raw wastewater from the system would be sent directly to the equalization/diversion lagoon where it would be held and not mixed with the flow cycling through the WWTP. This mode of operation would be used in the event that keeping the flow in the WWTP and equalization/diversion lagoon separate is beneficial. For example, if a problematic release of non-compliant flow was detected from Allen Harim or some other large customer this mode could be engaged to capture the problematic volume in the equalization/diversion lagoon before it reached the plant. The equalization/diversion lagoon could then be drained or the non-compliant volume held there until enough compliant wastewater flowed in that dilution could solve the problem. While all that was happening the volume in the WWTP at the time of the diversion could continue to cycle so that the microbial population was protected and preserved.

Mode 3: Terminate Spray and Shut Down WWTP

This mode would only be utilized if there was a catastrophic failure of the WWTP on the level of decimation from a hurricane or other natural disaster. The equalization/diversion lagoon would take in all incoming flow and hold it until trucks could be used to pump out the volume and remove it for treatment at another facility. In this mode the effluent pump station would be completely shut down and the influent pump station would cycle water from one side of the equalization/diversion lagoon to the other.

“What is the lag time between treatment and the determination of ‘off-spec’ diversion? If the ‘off-spec’ water is automatically diverted (from response to probe) from the treatment plant to the 3 MG diversion pond to avoid discharge to Lagoon A, what happens when the diversion pond is full?”

There is no single lag time since multiple events can trigger a diversion. Additionally, the severity of any given event will also impact the response time. Where continuous probes are installed there will be continuous monitoring that will be used to initiate diversion. For parameters that rely on outside tests initiation of diversion will be implemented upon receipt of test results.

Should the diversion pond need to be partially drained the volume can be pumped out of the lagoon and into trucks for disposal at other WWTP facilities.

“Is there an automatic probe in the diversion pond that reads freeboard availability?”

A level transducer will monitor the water level in the equalization/diversion lagoon.

“Will the diverted inflow be raw domestic sewage and if so, what types of aeration will be provided in the diversion pond to keep the odors controlled and thus not a horrible nuisance to the neighborhood?”

Under normal SRRF operations the flow coming into the equalization/diversion lagoon will be raw wastewater. Such open basins are standard for wastewater treatment plants of this size throughout the world.

“Provide a process flow diagram depicting operations under diversion. The Process Flow Diagram provided in the application Drawings (pdf page 3) does not note a return line and appears unclear as to how the diversion process would be implemented.”

Please see the diagrams contained in Appendix A. This depicts the three diversion modes described previously.

Construction of above grade wastewater ponds

Comment Received:

- **Please elaborate upon and demonstrate safety factors considered and incorporated into the design of the above grade wastewater ponds. Specifically, in the event of a catastrophic failure of the above-grade berms, how would the combined Allen-Harim poultry processing wastewater and the ‘treated’ domestic sewage be prevented from entering Ingrams Branch to the south of the property? What are the secondary containment provisions, if any?**

AWMI Response:

“Please elaborate upon and demonstrate safety factors considered and incorporated into the design of the above grade wastewater ponds.”

The proposed equalization/diversion lagoon was designed as a below grade installation. Due to the lack of above grade earthen berms erosion, the primary cause of problems for earthen berms, has been eliminated as a potential source of failure. The earthen berm being constructed within the

equalization/diversion lagoon also remains below grade. Additionally, the entire interior of the proposed lagoon is going to be lined which will protect the soil underneath.

“In the event of a catastrophic failure of the above-grade berms, how would the combined Allen-Harim poultry processing wastewater and the ‘treated’ domestic sewage be prevented from entering Ingrams Branch to the south of the property? What are the secondary containment provisions, if any?”

As noted above, the proposed equalization/diversion lagoon is a below grade installation. Accordingly, no secondary containment provisions have been incorporated.

Hydraulic Profile

Comment Received:

- **Please provide a hydraulic profile for the 3MG equalization/diversion lagoon demonstrating the lagoon complies with Section 6.3.2.3.5.8 of the Regulations: “The base of any pond, at its lowest point, must be at least two (2) feet above the seasonal highwater table.”**
 - **Unless a more recent technical report is available and had been provided to the Department, the seasonal highwater table should be based on Duffield’s findings in the 2017 Geotechnical Report (p7, Number 3).**

AWMI Response:

“Please provide a hydraulic profile for the 3MG equalization/diversion lagoon demonstrating the lagoon complies with Section 6.3.2.3.5.8 of the Regulations. Unless a more recent technical report is available and had been provided to the Department, the seasonal highwater table should be based on Duffield’s findings in the 2017 Geotechnical Report”

According to the 2017 Geotechnical Report the seasonal high-water table to be used for design at the SRRF site is 24’. No additional geotechnical report related to groundwater levels has been completed since the 2017 Duffield report. Accordingly, its stipulated seasonal high-water level of 24’ was used.

The lowest point in the proposed equalization/diversion lagoon is 26.5’ which is 2.5’ above the defined seasonal high-water level and therefore the design of the proposed SRRF WWTP complies with Section 6.3.2.3.5.8. The hydraulic profile can be found on sheet C-0.01 which has been included as Appendix B in this response.

Biosolids

Comment Received:

- **Please provide information relative to the management and disposal of biosolids and sludge from the proposed Phase 2 wastewater treatment facility.**

AWMI Response:

“Provide information on management and disposal of biosolids and sludge:

Management and disposal of biosolids produced at Artesian’s SRRF WWTP will be handled by pumping and transport to Sussex County’s Class A biosolids treatment facility at the Inland Bays complex. Artesian owns and operates two (2) 5,000-gallon pumper trucks operating under State of Delaware Non-Hazardous

Liquid Waste Transporters Permit Number DE OH-300. These trucks will be used by Artesian to transport the sludge and biosolids. Artesian entered into a disposal agreement dated September 19, 2019 with Sussex County Council to dispose of up to 100 dry tons of biosolids per year at their IBRWF biosolids facility. A copy of the executed agreement with Sussex County can be found in Appendix D.

As-Built Drawings

Comment Received:

- **Provide an electronic copy of As-Built Drawings for Field F. Include the identification of each pivot, corresponding wetted acreage, and all requirements in accordance with Part II.C.3.i of the Phase 1 Construction Permit 359288-01.**

AWMI Response:

“Provide an electronic copy of As-Built Drawings for Field F.”

Please find the requested as-built drawing in Appendix C.

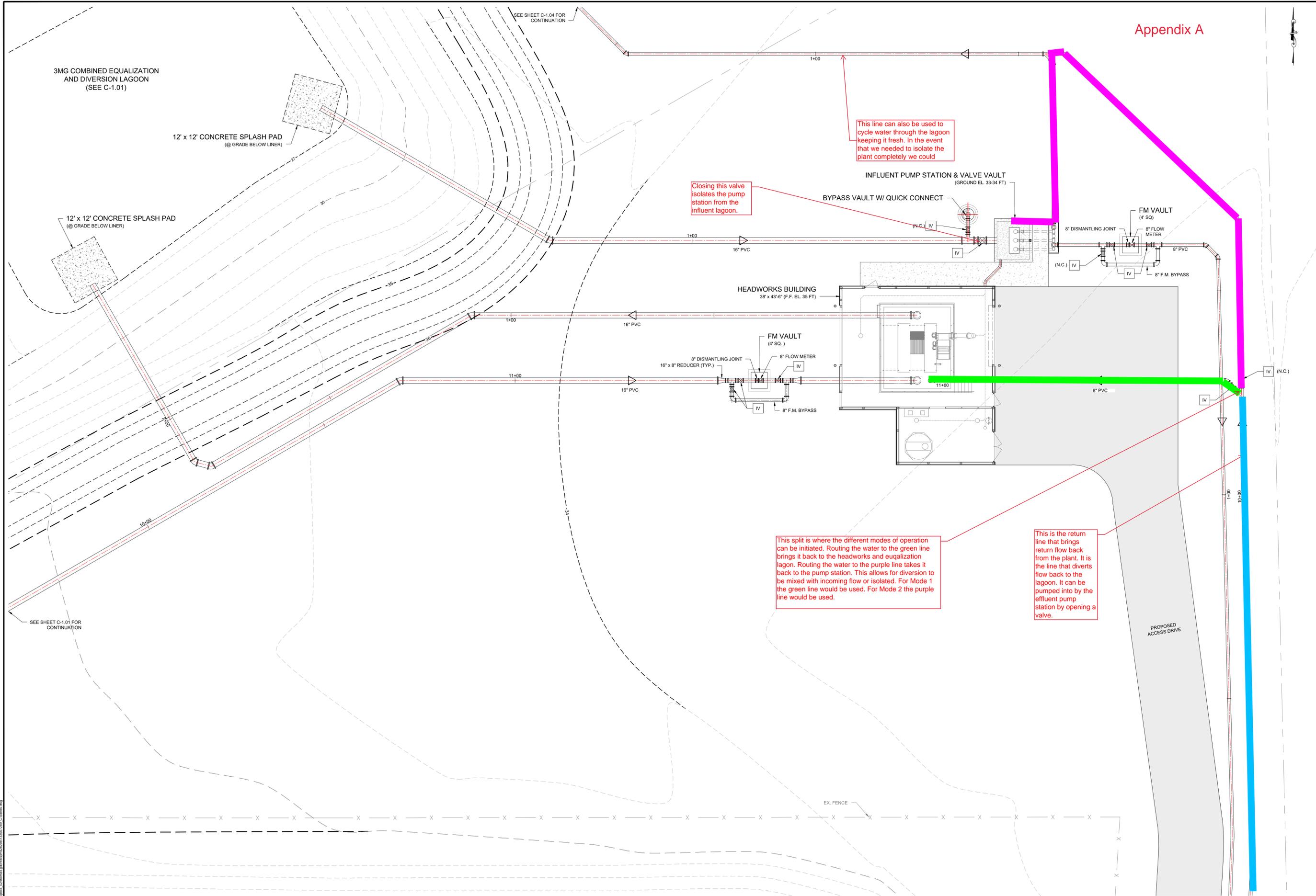
Thank you for your assistance on this project. Please contact me should you require additional information or clarification on this submittal.

Sincerely,



Daniel Konstanski, P.E., BCEE

Principal Engineer, AWMI



Closing this valve isolates the pump station from the influent lagoon.

This line can also be used to cycle water through the lagoon keeping it fresh. In the event that we needed to isolate the plant completely we could

This split is where the different modes of operation can be initiated. Routing the water to the green line brings it back to the headworks and equalization lagoon. Routing the water to the purple line takes it back to the pump station. This allows for diversion to be mixed with incoming flow or isolated. For Mode 1 the green line would be used. For Mode 2 the purple line would be used.

This is the return line that brings return flow back from the plant. It is the line that diverts flow back to the lagoon. It can be pumped into by the effluent pump station by opening a valve.

3MG COMBINED EQUALIZATION AND DIVERSION LAGOON (SEE C-1.01)

12' x 12' CONCRETE SPLASH PAD (@ GRADE BELOW LINER)

12' x 12' CONCRETE SPLASH PAD (@ GRADE BELOW LINER)

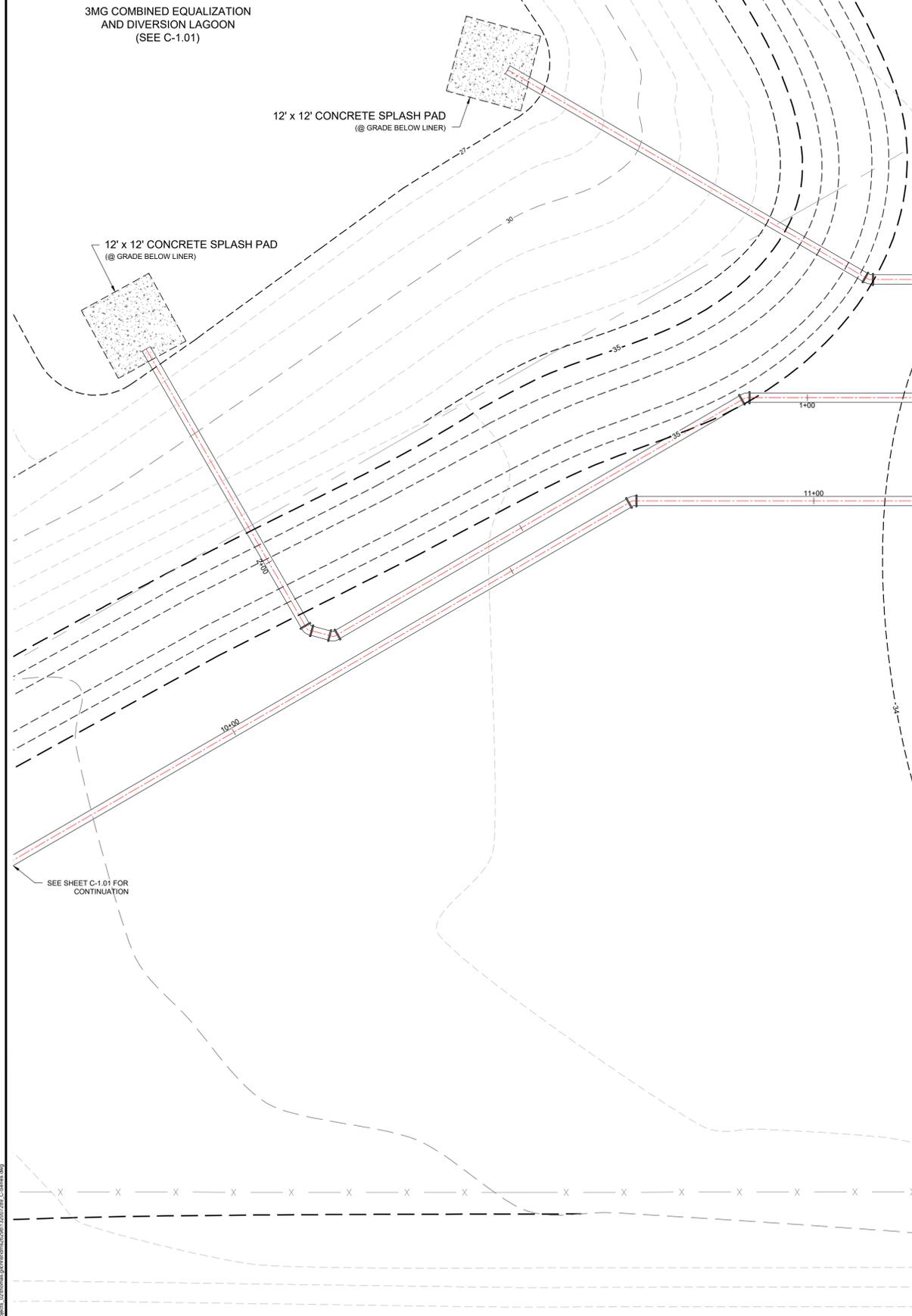
HEADWORKS BUILDING 38' x 43'-6" (F.F. EL. 35 FT)

INFLUENT PUMP STATION & VALVE VAULT (GROUND EL. 33-34 FT)

BYPASS VAULT W/ QUICK CONNECT

FM VAULT (4' SQ)

FM VAULT (4' SQ.)



SEE SHEET C-1.04 FOR CONTINUATION

SEE SHEET C-1.01 FOR CONTINUATION

OWNER/DEVELOPER: ARTESIAN WASTEWATER MANAGEMENT, INC. 1000 N. DUPONT HIGHWAY, SUITE 100 DOWERSVILLE, DE 19901 EMAIL: DOWERSVILLE@ARTESIANSANWATER.COM	DATE	REVISION
 KCI TECHNOLOGIES, INC. ENGINEERS - PLANNERS - SURVEYORS 614 N. DuPont Highway, Suite 100 Dowers DE 19901 PHONE: (302) 747-9599 FAX: (302) 773-7507 Website: www.kci.com		
HEADWORKS VICINITY SITE PLAN ARTESIAN SRRF WASTEWATER TREATMENT PLANT EXPANSION PROJECT SUSSEX COUNTY DELAWARE		
PROFESSIONAL CERTIFICATION I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF DELAWARE. LICENSE NO. 22929 EXPIRATION DATE 06-30-24		
SIGNATURE: Drafting: T.J.G. Check: KN Design: T.J.G. Check: DS		
SCALE: 1"=10' DATE: 06-07-22 KCI JOB #: 132007289 SHEET: C-1.02		

NORTH SITE PIPING PLAN
SCALE: 1" = 10'

CONSTRUCTION SET

P:\Projects\2022\132007289\132007289_C-1.02.dwg 07/07/2022 3:28 PM



LEGEND

	PROPERTY LINE
	ADJACENT PROPERTY LINE
	BENCHMARK
	CONCRETE MONUMENT FOUND
	CAPPED REBAR FOUND
	IRON PIPE FOUND
	BUILDING SETBACK LINE
	PAVEMENT SETBACK LINE
	EASEMENT LINE
	100 YEAR FLOODPLAIN
	FLOOD HAZARD AREA
	WETLANDS
	EDGE OF WATER
	CENTERLINE OF DITCH
	CONTOUR ELEVATION
	SPOT ELEVATION
	BUILDINGS
	FENCES
	SIGNS
	CABLE TELEVISION LINE
	FIBER OPTIC LINE
	TELEPHONE LINE
	NATURAL GAS LINE
	OVERHEAD ELECTRIC LINE
	ELECTRIC POLE
	UNDERGROUND ELECTRIC LINE
	SANITARY SEWER LINE
	SANITARY SEWER MANHOLE
	SANITARY SEWER FORCE MAIN
	WATER MAIN
	WATER VALVE
	FIRE HYDRANT
	WATER MANHOLE
	WATER WELL
	MONITORING WELL
	BORINGS OR TEST PITS
	PIEZOMETER
	LYSIMETER
	PR. BUILDING SETBACK LINE
	PR. CONTOUR ELEVATION
	PR. BUILDINGS
	PR. FENCES
	PR. SANITARY SEWER MANHOLE
	PR. SANITARY SEWER FORCE MAIN
	WETTED AREAS - FORESTED
	WETTED AREAS - AGRICULTURE
	DB DWELLING BUFFER LINE
	WWB WATER WELL BUFFER LINE
	WB WETLAND BUFFER LINE
	WCB WATER COURSE BUFFER

SPRAY IRRIGATION FIELD G

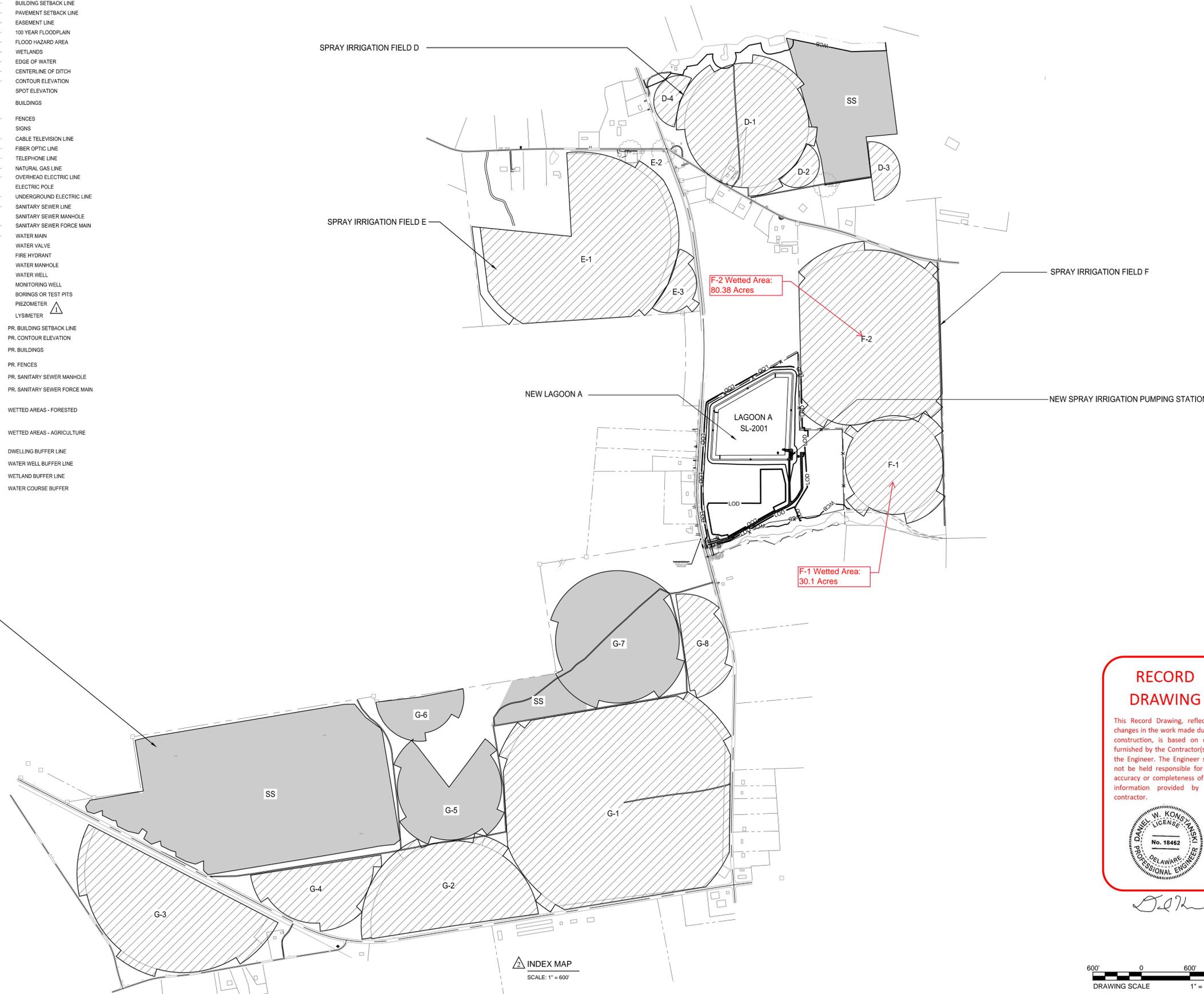
SPRAY IRRIGATION FIELD D

SPRAY IRRIGATION FIELD E

NEW LAGOON A

SPRAY IRRIGATION FIELD F

NEW SPRAY IRRIGATION PUMPING STATION



F-2 Wetted Area: 80.38 Acres

F-1 Wetted Area: 30.1 Acres

RECORD DRAWING

This Record Drawing, reflecting changes in the work made during construction, is based on data furnished by the Contractor(s) to the Engineer. The Engineer shall not be held responsible for the accuracy or completeness of the information provided by the contractor.



D.W. Konstanski

INDEX MAP
SCALE: 1" = 600'



DUFFIELD ASSOCIATES
Soil, Water & the Environment
5400 LIMESTONE ROAD
WILMINGTON, DE 19808-1232
TEL: 302.239.6634
FAX: 302.239.8485

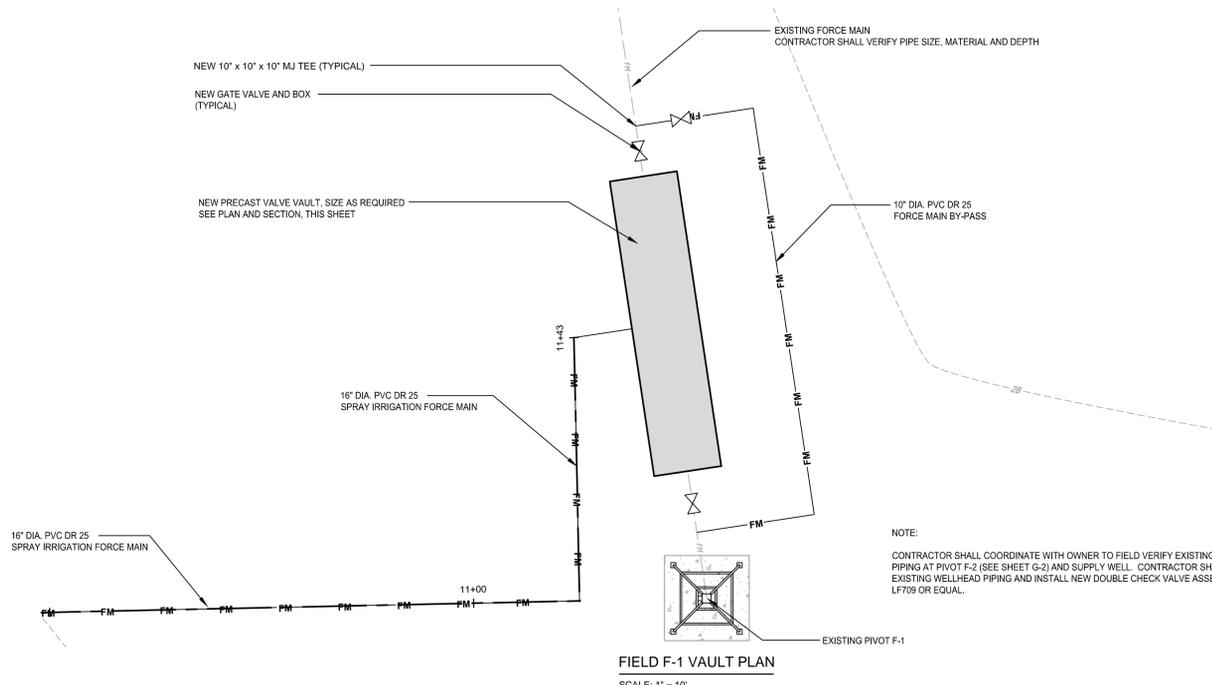
CHECKED BY: SCH
DESIGNED BY: SMC
DRAWN BY: GAF
FILE NAME: PRASE.LADON
STEVEN H. LEWANDOWSKI, P.E.
STATE OF DELAWARE
P.E. 11578

NO.	REVISION	DATE	BY	DESCRIPTION
1	ISSUED FOR DNRREC PERMITTING	4-20-2017	SMC	
2	ISSUED FOR CONTRACT A BID	6-12-2017	GAF	
3	DNRREC COMMENTS	8-12-2017	SMC	
4	ISSUED FOR CONTRACT B BID	10-25-2017	SMC	
5	ISSUED FOR CONSTRUCTION - CONTRACT A	12-2018	SMC	
6	REVISED FOR CONTRACT B REBID	2-18	SMC	

OWNER: ARTESIAN WASTE/WATER MANAGEMENT, INC.
644 CHURCHMAN ROAD, 302-453-8900
NEWARK, DELAWARE 19702

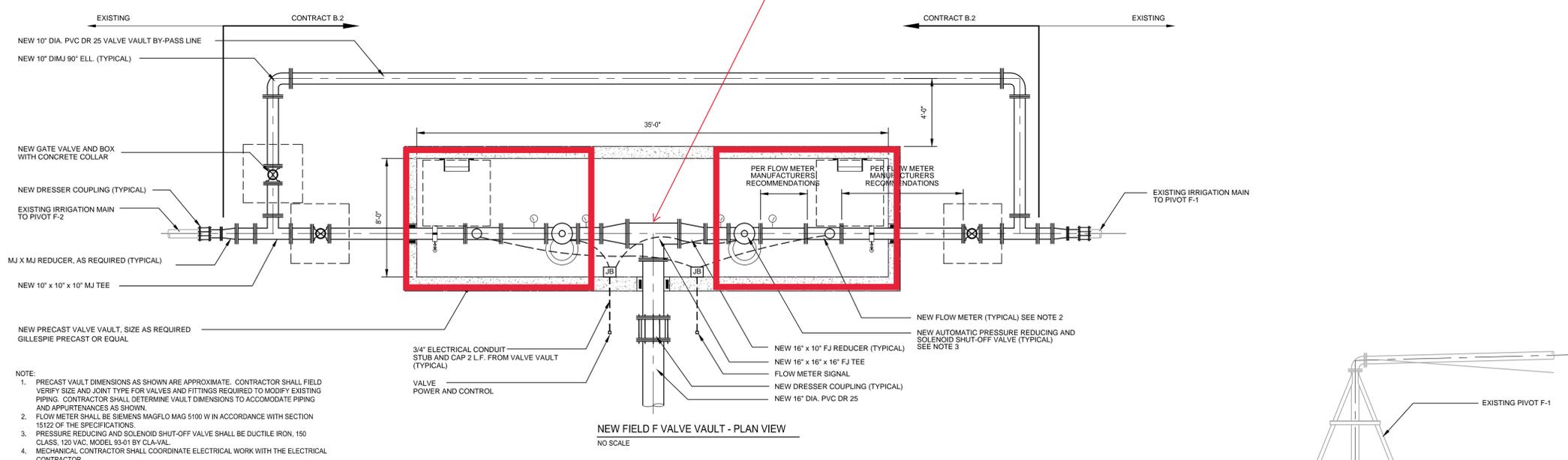
ARTESIAN NORTHERN SUSSEX REGIONAL
WATER RECHARGE FACILITY (ANSRWRF)
INDEX MAP
SUSSEX COUNTY - DELAWARE

DATE: 21 APRIL 2017
SCALE: AS SHOWN
PROJECT NO. 11278.BA
SHEET: G-2

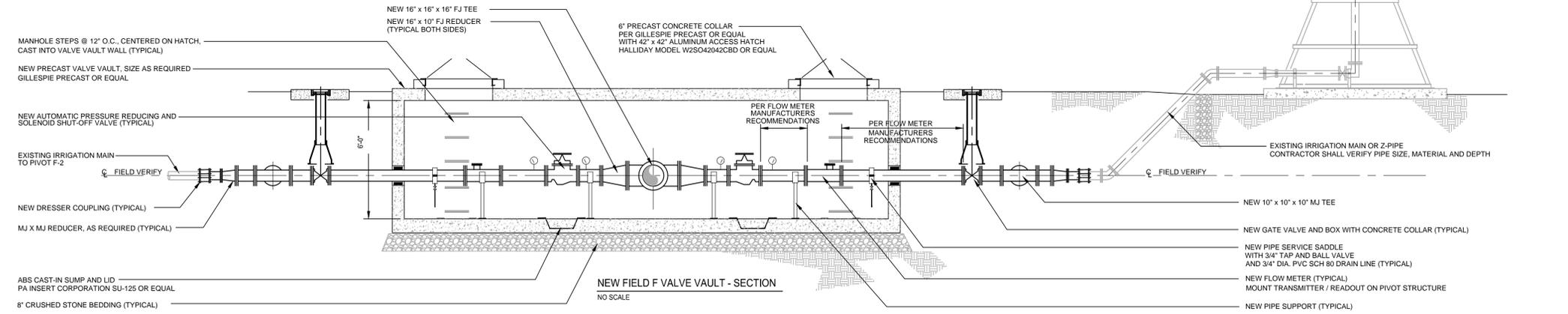


NOTE:
CONTRACTOR SHALL COORDINATE WITH OWNER TO FIELD VERIFY EXISTING UNDERGROUND PIPING AT PIVOT F-2 (SEE SHEET G-2) AND SUPPLY WELL. CONTRACTOR SHALL CUT-IN AT EXISTING WELLHEAD PIPING AND INSTALL NEW DOUBLE CHECK VALVE ASSEMBLY, WATTS MODEL LFT09 OR EQUAL.

Vault split into two separate vaults with T in between.



- NOTE:
1. PRECAST VAULT DIMENSIONS AS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY SIZE AND JOINT TYPE FOR VALVES AND FITTINGS REQUIRED TO MODIFY EXISTING PIPING. CONTRACTOR SHALL DETERMINE VAULT DIMENSIONS TO ACCOMMODATE PIPING AND APPURTENANCES AS SHOWN.
 2. FLOW METER SHALL BE SIEMENS MAGFLO MAG 5100 W IN ACCORDANCE WITH SECTION 15122 OF THE SPECIFICATIONS.
 3. PRESSURE REDUCING AND SOLENOID SHUT-OFF VALVE SHALL BE DUCTILE IRON, 150 CLASS, 120 VAC, MODEL 5341 BY CLA-VAL.
 4. MECHANICAL CONTRACTOR SHALL COORDINATE ELECTRICAL WORK WITH THE ELECTRICAL CONTRACTOR.



NOTE:
ALL WORK THIS SHEET IS IN CONTRACT B.2.

10' 0 10' 20'
DRAWING SCALE 1" = 10'

DUFFIELD ASSOCIATES
Soil, Water & the Environment
5400 Limestone Road
Wilmington, DE 19808-1232
TEL: 302.239.6634
FAX: 302.239.8485
OFFICES IN DELAWARE, MARYLAND, PENNSYLVANIA AND NEW JERSEY
WEB: HTTP://DUFFNET.COM
E-MAIL: DUFFIELD@DUFFNET.COM

CHECKED BY: SCH
DESIGNED BY: SMC
DRAWN BY: SMC
FILE NAME: PRASE LAGOON
STEVEN H. LEWANDOWSKI, P.E.
STATE DELAWARE
P.E. 11578

NO.	REVISION
1	REVISED FOR CONTRACT B REBID

OWNER: WASTEWATER MANAGEMENT, INC.
644 CHURCHMAN ROAD, 302-453-8909
NEWARK, DELAWARE 19702

ARTESIAN NORTHERN SUSSEX REGIONAL WATER RECHARGE FACILITY (ANSRWF)
SPRAY IRRIGATION SYSTEM PLANS AND DETAIL - FIELD F-1
SUSSEX COUNTY - DELAWARE

DATE: 5 DECEMBER 2017
SCALE: AS SHOWN
PROJECT NO. 11278.BA
SHEET: C-35

BIOSOLIDS HANDLING AGREEMENT BETWEEN SUSSEX COUNTY AND ARTESIAN WASTEWATER MANAGEMENT, INC.

THIS AGREEMENT (the "Agreement"), made this 19th day of September 2019 ("Effective Date"), by and between **SUSSEX COUNTY** (the "County") and **ARTESIAN WASTEWATER MANAGEMENT, INC.**, a Delaware corporation ("Artesian").

WITNESSETH:

WHEREAS, the County owns a wastewater treatment facility known as the Inland Bays Regional Wastewater Facility ("IBRWF"); and

WHEREAS, the County intends to construct a Class A biosolids treatment facility at the IBRWF ("Biosolids Facility"); and

WHEREAS, once the IBRWF Biosolids Facility is complete, Artesian wishes to send biosolids produced at various Artesian wastewater treatment facilities located throughout Sussex County, Delaware to the Biosolids Facility for treatment and disposal.

NOW, THEREFORE, in consideration of the mutual covenants and other consideration contained herein, the sufficiency of such consideration being hereby acknowledged, the parties hereto agree as follows:

1. Definitions. The parties agree to the following definitions for the purposes of this Agreement:

- a) Treatment and disposal: shall mean those processes necessary for the County to treat wastewater biosolids in a manner that results in Class A biosolids that can be land applied or otherwise beneficially used by the County in compliance with future Limited Distribution Permit(s) to be issued by the State of Delaware. Any Class B biosolids that the County produces will be disposed of at the landfill.
- b) Biosolids: shall mean the sludges generated by biological treatment of wastewater that is not recycled back to the biological facility. Class A biosolids are those wastewater sludges that meet the pathogen control requirements of 40 CFR 503.32(a). Class B biosolids are those

wastewater sludges that meet the pathogen control requirements of 40 CFR 503.32(b).

2. Term. The term of this Agreement shall commence on the date that the last party hereto executes this Agreement and shall remain in effect for twenty (20) years from the Effective Date, unless earlier terminated for default as provided herein. The County shall give Artesian prompt notice on the date that the County is ready and able to accept biosolids from Artesian, it being understood that the Biosolids Facility must be constructed and permitted before it can accept biosolids. The County estimates that it will be ready and able to start accepting biosolids at the IBRWF by January 1, 2020. Until the opening date of the IBRWF Biosolids Facility, the County has agreed to accept liquid biosolids from Artesian at the County's South Coastal Regional Wastewater Facility (SCRWF).

3. Transportation. Artesian agrees to transport the biosolids from its various Sussex County facilities to IBRWF via tanker trucks. In order to initiate transport acceptance at IBRWF, Artesian shall send electronic notice to the County's staff member(s) designated to receive orders at the Biosolids Facility, whose present contact information, which is subject to change from time to time hereafter, is:

Edwin Tennefoss
Director of Environmental Services
edwin.tennefoss@sussexcountyde.gov

Within one (1) business day after receipt of Artesian's transport notice, the County shall set and respond to Artesian with a date and time that falls within one (1) week of Artesian's request, when the County will accept the Artesian loads at the Biosolids Facility. No notice shall be necessary before Artesian transports biosolids to SCRWF.

4. Treatment. The County agrees to accept for further treatment up to one hundred (100) dry tons per year of biosolids with a solids content between a minimum of 1% and a maximum of 4%, provided, however, that the County reserves the right to refuse any truckloads of biosolids that exceed the concentrations of parameters set forth in Exhibit A hereto, which is incorporated herein by reference. The County also reserves the right to refuse truckloads that are not within the mandatory range of 1% to 4% solids content. In addition, operation and maintenance of facilities not owned by the County and before the point of acceptance by the County, will be responsibility of Artesian.

5. Payment. The County shall invoice Artesian on a quarterly basis for the biosolids pickup, treatment and disposal fees incurred in the previous quarter in accordance with the following terms:

- (a) The treatment and disposal fee will be three hundred dollars (\$300.00) per dry ton during the first calendar year, which shall begin on the date that Artesian begins sending biosolids to the IBRWF. At the end of the first calendar year, the County will calculate the previous year's maintenance and operation expenses of handling, treating and disposing of each dry ton in its Biosolids Facility and will submit a revised rate to Artesian that shall become applicable in the following calendar year. The annually revised rate will be set on this same day each year based upon the overall costs of maintenance and operations at the Biosolids Facility during the previous calendar year divided by the number of total of dry tons processed during the previous calendar year.
- (b) Artesian shall pay any invoice within forty-five (45) days of the mailing date. Late payments shall be assessed a one percent (1%) late fee, compounded monthly, and shall be considered a breach of this Agreement as long as the payments remain outstanding.

6. Biosolids Standards. Prior to commencement of transfers to the Biosolids Facility, Artesian shall ensure that all biosolids meet the requirements of the standards set forth in Exhibit A. If necessary, Artesian agrees to revise its industrial pretreatment permit(s) in order to meet said standards prior to releasing biosolids to the Biosolids Facility.

7. Calculation of Dry Tons. The solids content of each truckload of digested Class B biosolids received from Artesian shall be determined as follows: 1) the County will weigh the truckload received from Artesian at its Biosolids Facility on its calibrated IBRWF scales; and 2) the County will take a grab sample from each truck and test it in order to determine the solids content. The weight of the entire truckload will be deemed to have that same percentage as determined in the sample results. A receipt for each delivery noting the results of the weighing and sampling will be provided to Artesian within a reasonable timeframe after delivery of each load. Artesian may send a representative to observe any of these steps, in its discretion.

8. Termination.

- (a) Should Artesian breach or fail to comply with any of the provisions of the Agreement, the County may in writing demand that Artesian remedy such breach. Artesian shall cure said breach or failure to comply within thirty (30) days from receipt of notice from the County. In the event that the breach or failure to comply is not capable of correction within thirty (30) days, then Artesian must inform County of such fact and County will determine a reasonable time to cure. In the event that Artesian does not cure within thirty (30) days or the time designated by the County, whichever time period is applicable, this Agreement may be terminated immediately upon County's written notice of such termination. Any costs or expenses that the County incurs as the result of Artesian's breach of this Agreement shall be reimbursed to the County within thirty days of sending a detailed invoice, and this obligation survives termination of this Agreement. The remedies of this Agreement for default by the breaching party shall be cumulative and not limited to the provisions contained in this Agreement, but shall include all other remedies available to it at law or in equity.
- (b) Should the County breach or fail to comply with any of the provisions of the Agreement, Artesian may in writing demand that the County remedy such breach. The County shall cure said breach or failure to comply within thirty (30) days from receipt of notice from the Artesian. In the event that the breach or failure to comply is not capable of correction within thirty (30) days, then the County must inform Artesian of such fact and Artesian will determine a reasonable time to cure. In the event that the County does not cure within thirty (30) days or the time designated by Artesian, whichever time period is applicable, this Agreement may be terminated immediately upon Artesian's written notice of such termination. Any costs or expenses that Artesian incurs as the result of the County's breach of this Agreement shall be reimbursed to Artesian by the County within thirty days of sending a detailed invoice. The remedies of this Agreement for default by the breaching party shall be cumulative and not limited to the provisions contained in this Agreement, but shall include all other remedies available to it at law or in equity.

9. Inspection of Records. With at least three (3) business days' written notice, each party hereto, by a duly authorized representative, shall have the right at any time during regular business hours to inspect the books and records of the other party to the extent necessary to ascertain the accuracy of any information used in the calculations of the payments to be made under this Agreement, including but not limited to, the pickup and treatment fees.

10. Permit Compliance. The County will immediately notify Artesian if permit compliance issues are experienced at the IBRWF facility as a result of the biosolids sent to IBRWF by Artesian. The County shall provide notice of any compliance issues in writing to Artesian. Upon receipt of the notice, Artesian will take immediate steps to remedy the issues. If Artesian is unable to immediately correct such compliance issues, Artesian shall make verbal contact with the County and shall submit a written plan of correction to the County for approval within a reasonable timeframe, as determined by the County, from discovery of the compliance issue and/or receipt of the County's notice, whichever first occurred. Failure of Artesian to comply with a correction plan shall constitute a default of this Agreement and shall be a basis to terminate the Agreement in accordance with Section 8.

11. Compliance with Applicable Laws. The parties agree to comply with all applicable permits, statutes, ordinances, rules, orders, policies, regulations and requirements of the Federal, State, County and City Governments and any and all Courts, Departments and Bureaus that may apply to this Agreement. Further, Artesian agrees to comply with any reasonable instructions of the County with regard to the preparation of its biosolids to the County for transport.

12. Assignment. Artesian shall not assign or transfer any interest in this Agreement to any entity(s) or person(s) whatsoever without first receiving the County's written consent.

13. Notice. Any notice provided for herein, unless otherwise noted, shall be given by hand or registered or certified mail, postage prepaid and addressed to, if for the County: Sussex County Engineer, Sussex County Department of Engineering, 2 The Circle, P.O. Box 589, Georgetown, Delaware 19947 and if for Artesian: Executive Vice President, Artesian Wastewater Management, Inc., 664 Churchmans Road, Newark, Delaware 19702

The parties must provide advance written notice of any changes to the above-listed addresses. Notices sent to the addresses above or to an updated address properly

noticed in writing shall be deemed to be delivered on the third business day after sending to the other party via USPS.

14. Amendments/Modification. No amendments or modifications to this Agreement shall be binding unless in writing and signed by the County and Artesian.

15. Binding on Heirs. This Agreement shall be binding upon and for the benefit of the heirs, executors, administrators, and successors of the County and Artesian in like manner as upon the original parties, except as provided by mutual written agreement.

16. Integration. This document comprises the entire Agreement between the parties hereto relative to this matter and supersedes any prior agreements or representations, whether verbal or in writing.

17. Laws of Delaware. The Agreement shall be governed by and construed in accordance with the substantive laws of the State of Delaware without regard to principles of conflict of laws. Any action at law, suit in equity, or judicial proceeding for the enforcement of this Agreement or regarding any provision hereof shall be instituted and maintained only in a court of competent jurisdiction located in Sussex County, Delaware, or if under federal jurisdiction, in the District Court of the State of Delaware.

18. Signature Authority. Both the County and Artesian represent and warrant that they have the full and complete authority to execute this Agreement on behalf of their respective organizations.

19. Opportunity to Consult with Legal Counsel. The parties acknowledge that each has had the opportunity to consult with legal counsel of their own choosing concerning the provisions of this Agreement.

20. Time Calculations. Time is of the essence. The term "day" as used herein shall mean calendar day, unless specifically defined as a "business day."

21. Legal Construction. The parties acknowledge that each had the ability to negotiate terms and conditions, and this Agreement shall not be construed against the party who prepared and drafted the Agreement documents. If one or more of the provisions of the Agreement is held to be invalid, illegal or unenforceable in any respect for any reason, such invalidity, illegality, or unenforceability shall not affect

any other provision of the Agreement, and the Agreement shall be construed as if the invalid, illegal, or unenforceable provision had never been included.

22. Headings and Subheadings. The headings and subheadings herein are for convenience only and shall not be used to relieve either party of any obligation under this Agreement.

23. Non-Waiver of Rights. Any forbearance by either party in exercising its rights hereunder shall not be construed as a waiver thereof, unless expressly set forth in writing and signed by the parties. Any waiver by either party of any provision or condition of this Agreement shall not be construed or deemed to be a waiver of any other provision or condition of this Agreement, nor a waiver of a subsequent breach of the same provision or condition.

24. No Third-Party Beneficiaries. Neither the provisions of this Agreement nor the performance of the parties hereunder is intended to benefit, nor shall inure to the benefit, of any third party.

25. Execution in Counterparts. This Agreement may be executed in one or more counterparts, any or all of which shall constitute one and the same instrument.

[Signature pages follow]

ATTEST:

**ARTESIAN WASTEWATER
MANAGEMENT, INC.,**
a Delaware corporation

Joseph A. DiNunzio
Name: Joseph A. DiNunzio
Title: Secretary

By: *Dian C. Taylor* (SEAL)
Name: Dian C. Taylor
Title: President & Chief Executive Officer

STATE OF DELAWARE)
) ss.
SUSSEX COUNTY)

Be it remembered that on this 19th day of September, 2019, personally came before me, a notary public in and for the State and County aforesaid, Dian C. Taylor, known or satisfactorily proven to me to be the President of Artesian Wastewater Management, Inc., party to the foregoing Agreement, and acknowledged that, in her capacity as such, she executed this Agreement in her own hand for the above-named entity.

As given under my hand and seal of office this day and year aforesaid.



Lora A Fracek
Notary Public
Name: Lora A Fracek



SUSSEX COUNTY BIOSOLIDS AGREEMENTS

EXHIBIT A

May 8, 2017

Any sludges accepted at the Sussex County Inland Bays Regional Wastewater Facility shall not exceed the dry weight metal concentration limits of 40 CFR, Part 503 or the dry weight concentration limits set by the State of Delaware, as may be hereafter amended, whichever is lower.

	Concentration mg / kg (dry weight)	
	State of Delaware	40 CFR, Part 503
As	41	41
Cd	39	39
Cr	1200	1200
Cu	1500	1500
Pb	300	300
Hg	17	17
Mo	39	---
Ni	420	420
Se	36	100
Zn	2800	2800

Appendix III



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

OFFICE OF THE
SECRETARY

89 KINGS HIGHWAY
DOVER, DELAWARE 19901

PHONE: (302) 739-9000
FAX: (302) 739-6242

Secretary's Order No. 2012-W-0052

Re: Application of Artesian Wastewater Management, Inc. for a Groundwater Discharge Permit to construct the 'Artesian Northern Sussex Regional Water Recharge Facility' near Milton, Sussex County.

Date of Issuance: March 12, 2013

Effective Date: March 12, 2013

This Order considers the attached December 12, 2012 Report from the Department's presiding hearing officer, which recommends issuance to Artesian Wastewater Management, Inc. (Applicant or Artesian) a groundwater discharge permit¹ to construct a large community on-site wastewater treatment and disposal system (OWTDS). The Report is hereby adopted to the extent it is consistent with this Order.

BACKGROUND FINDINGS

Applicant seeks to construct the "Artesian Northern Sussex Regional Water Recharge Facility" (ANSRWRF or Facility) in an unincorporated area of Sussex County northwest of the Town of Milton. The Facility would have a 3 million gallon per day (MGD) wastewater treatment and disposal capacity, which would be capable of serving approximately 10,000 residences. Most of Applicant's proposed customers for the sewer

¹ Applicant submitted an application to the Division of Water, Groundwater Discharge Section (GDS) for the permit pursuant to the Department's *Regulations Governing the Design, Installation and Operation of On-Site Wastewater Treatment and Disposal Systems*, 7 DE Admin Code 7101 (OWTDS Regulation) and *Guidance and Regulations Governing the Land Treatment of Wastes*, 7 DE Admin. 7103 (Spray Irrigation Regulation).

Delaware's Good Nature depends on you!

service would be in 'The Village of Elizabethtown,' a planned community to be built north west of Milton. In addition, service would be provided to any other customer within Applicant's Public Service Commission approved and regulated public utility service territory. Applicant's proposes phasing the construction to add capacity when needed to meet the expected demand from its public utility sewer customers. The Facility also may serve existing houses that now use an individual OWTDS, particularly if an individual OWTDS fails and Applicant's system is nearby.

The Facility would have treatment buildings and storage pond capacity to hold sufficient volumes for spray irrigation usage as required by the Department's Spray Irrigation Regulation. The treatment part of the Facility would be built on 75 acres in three phases, with each phase capable of treating up to 1 million gallon per day.

The Facility's treatment process would have wastewater enter a headworks building for primary screening and grit removal. The process would then have treatment by Biolac aeration basin treatment with internal clarifiers. The treated wastewater then be would undergo coagulation, flocculation, filtration and finally ultraviolet disinfection. The treated wastewater would be subject to continuous water quality monitoring before any discharge to a storage pond. The treatment level would reduce phosphorous from 12 mg/L to 3 mg/l and reduce nitrogen from 60 mg/L to 10 mg/L, but the treatment process is adjustable to allow nitrogen up to 25 mg/L when needed for crop production on the spray fields. The crops will use nitrogen so that no more than 10 mg/L would be discharged into the groundwater and groundwater monitoring would ensure this limit is met.

The Facility would use 1,722 leased acres for the spray irrigation disposal of the treated wastewater. This land is wooded or used for agricultural crop production, and the farming use would continue largely unchanged if the Facility is built except more acres would eventually be irrigated as flows increased. The farm's fields would use the treated wastewater for its irrigation to essentially recycle the water and avoid the farmer from pumping groundwater from agricultural irrigation wells. The use of the Facility's treated wastewater also provides a benefit in that the agricultural use will further reduce nitrogen and phosphorous from entering the groundwater because crops will absorb these and allow the farmer to reduce the amount of nitrogen and phosphorous fertilizer that otherwise may be applied. Finally, the farmer will avoid the energy costs in pumping groundwater from wells that will be replaced by use of the Facility's treated wastewater. The farm land is subject to an agricultural preserve agreement that will allow farming usage to continue and preserve the farm land as open space.

ANSRWRF's treatment process would reduce considerably the amount of pollutants that would enter the groundwater compared to the pollutants discharged by an individual OWTDS, which would be the only alternative to serve a lot approved by Sussex County. For example, an individual OWTDS discharges approximately 50.0 mg/L of nitrogen and 18.0 mg/L of phosphorous. In contrast, the Facility would discharge either 10.0 or 25.0 mg/L of nitrogen depending on agricultural need and 3.0 mg./L of phosphorous. The treatment process also will meet the Department's highest level for discharge for use on land applications, which is the level required for a discharges on recreational lands, such as golf courses or parks. The treatment level is higher than the level required for the proposed land application on farm lands. Thus, the

Facility provides a much better environmental method for wastewater disposal to any lot approved by Sussex County using an individual OWTDS.

Sussex County's planning approval conditions required the treatment plant to be designed to look like an agricultural building and have landscaping to screen it from view from its neighbors.

The Department held a public hearing on June 6, 2012 before the Department's presiding hearing officer, who allowed public comments to be received until July 6, 2012. The public comments opposed the application except for one comment from the farmer who had leased the lands to Applicant.

The Department's Division of Water, Groundwater Discharge Section (GWDS) assisted the hearing officer with its expertise in an October 4, 2012 technical response memorandum (TRM) attached to the Report. GWDS' TRM recommends issuance of a construction permit, but subject to certain permit conditions that are designed to protect the environment and public health.

DISCUSSION AND REASONS

The Department finds that the application should be approved to allow the construction to occur based upon the permit to be prepared by GGWDSDS and issued to Applicant prior to when construction is to commence. GWDS' permit will impose reasonable permit conditions designed to protect the environment and public health.

The Report discusses benefits from the Facility's construction. One significant benefit is the high level of treatment of wastewater produced from the development of lots approved by Sussex County. While the Facility may allow development to occur in greater density than would occur if each approved lot had to install an individual

OWTDS, the record demonstrates that the advanced treatment provided by the Facility will reduce the amount of pollutants potentially entering the groundwater compared to the alternative of installing individual OWTDS on each approved lot. The Facility is the best environmental method to treat and dispose of wastewater produced by the development of the approved lots. Nevertheless, the Facility will not be built unless the demand is there for its wastewater treatment and disposal service. Thus, houses need to be built first to justify its construction, or the conversion of existing individual OWTDS users to become Applicant's public utility customers.

A second major benefit is that the Facility will use spray irrigation as its disposal method, which the Department considers the most protective method of disposal of treated wastewater. The treated wastewater will be applied to existing farm lands, which will reduce pollutants entering the groundwater and preserve farm land and open space from development.

The application was opposed by local residents, who voiced valid concerns about the proposed construction and operation of a wastewater treatment and disposal facility near their residences. The comments also noted that the Facility may result in the construction of the houses that may be served by the Facility, but again Sussex County already has determined that lots may be developed so houses may be constructed with or without the Facility if the lots are suitable for an OWTDS.

The Department's continuing regulation of the Facility that would be built will ensure that the Facility will operate properly. This means that it will produce treated wastewater that essentially meets Delaware's drinking water standards. The Department considers that the Facility, if operated properly, could be a good neighbor to the local

residences and could be a beneficial use because it will preserve open space from development. The Department and Sussex County's planning approval will ensure that there will be virtually no change in the farming operations as a result of the Facility, which will have its treatment facilities appear to be agricultural and have ponds and agricultural fields that will retain the rural and farming look of the existing farm operations.

The comments on the operation of the storage ponds will be addressed by permit condition that will prevent the ponds from becoming a breeding ground for mosquitos. Sussex County already has required buffers for the spray fields and a landscaping around the treatment building and the Department also will include Sussex County's conditions in its permit to provide even more regulatory protection that the Department can enforce independent of Sussex County.

All the public comments were addressed in the Report and GDS' TRM. The public comments' concerns will not be forgotten, but will be part of the Department's ongoing regulation of the Facility once constructed. The Facility will require an operating permit that will allow the Department the authority to monitor its operation to ensure compliance with the permit conditions designed to satisfy the concerns raised by the public comments. Moreover, the Department can impose additional permit conditions to address any problems that may arise that have not been identified by the public comments. The Department's continuing regulation under an operating permit will allow the Department to make changes to an operating permit when necessary and appropriate. Thus, to the extent the Facility does not operate as it was designed to operate, the

Department has the authority to correct any problems that may develop or take enforcement action to obtain compliance with the permit conditions.

The Department has weighed the position presented and relies on the advice of its experts, which consider that the Facility should be constructed as a protective method to provide wastewater treatment and disposal service to public utility customers within a public utility service area.

CONCLUSIONS

The Department finds and concludes that sound environmental reasons support approval of the construction of ANSWRF and the issuance of a groundwater discharge permit as drafted by GWDS. In sum, as more fully described in the above findings and reasons, in the Report, and GWDS' TRM, the Department directs the following as a final order:

1. The Department has jurisdiction under its statutory authority to make a determination in this proceeding;
2. The Department provided adequate public notice of Applicant's application and the public hearing;
3. The Department considered all timely and relevant public comments in the record and the advice of its experts making its determination;
4. The record supports approval of the application and issuance of a permit drafted by GWDS that imposes reasonable conditions to protect the environment and public health; and that

5. The Department shall provide notice of this Order to the persons affected by this Order, as determined by the Department, including those who participated in the public hearing process.

A handwritten signature in black ink, appearing to read 'Collin P. O'Mara', written over a horizontal line.

Collin P. O'Mara
Secretary

HEARING OFFICER'S REPORT

TO: The Honorable Collin P. O'Mara
Secretary, Department of Natural Resources and Environmental Control

FROM: Robert P. Haynes, Esquire
Hearing Officer, Office of the Secretary
Department of Natural Resources and Environmental Control

RE: Application of Artesian Wastewater Management, Inc. for a Large Community On-site Wastewater Treatment and Disposal Permit to Construct the Northern Sussex Regional Water Recharge Facility near Milton, Sussex County.

DATE: December 12, 2012

I. PROCEDURAL HISTORY

In a December 8, 2006 letter, Artesian Wastewater Management, Inc. (Applicant) notified the Department of Natural Resources and Environmental Control's Division of Water, Ground Water Discharge Section (GWDS or Department) of its intent to begin a soils investigation on 1,739.8 acres near Milton, Sussex County. The investigation was to determine whether the soils were suitable for future use as the site for a regional On-site Wastewater Treatment and Disposal System (OWTDS) capable of treating between 3 to 6 million gallons per day (MGD). DNREC Ex. 4.

In a January 8, 2007 cover letter, Applicant submitted to GWDS a "Site Selection and Evaluation Report (SSER) for the Proposed The Villages of Elizabethtown Regional Spray Irrigation Project." DNREC Ex. 5.

In a January 7, 2007 letter, GWDS accepted Applicant's SSER as complying with the Department's current criteria for land disposal of treated wastewater, and notified Applicant that it could proceed with the next step in the permit process by preparing a Design Development Report (DDR) as per Department guidelines. DNREC Ex. 6.

In a June 19, 2009 letter, Applicant submitted its DDR for the "Artesian Northern Sussex Regional Water Recharge Facility" (ANSRWRF), which identified seven areas where the soils

would be suitable for the proposed spray irrigation disposal of treated wastewater. DNREC Ex. 8.

In an August 11, 2009 memorandum, GWDS' Jack Hayes reviewed Applicant's DDR and provided comments. DNREC Ex. 9.

In an October 28, 2009 memorandum, the Department's expert in the Division of Water's Groundwater Protection Branch, Blair Venables, P.G., commented on the DDR and requested that Applicant provide additional information. DNREC Ex. 10.

In a March 3, 2010 submission, Applicant provided the information requested by Mr. Venables. DNREC Ex. 11.

In a November 12, 2009 report, Applicant provided an updated DDR based upon a meeting with Department staff on October 1, 2009. DNREC Ex. 12

In a January 27, 2010 letter, GWDS' Marlene M. Baust, P.E., requested information required by the Department's regulations and guidance documents. DNREC Ex.13.

In March 2, 2010 and March 8, 2010 letters, Applicant provided the information Ms. Baust requested. DNREC Ex. 14.

In a March 25, 2010 memorandum, Mr. Venables provided additional comments and conditionally approved the DDR subject to Applicant fulfilling certain requirements. DNREC Ex. 15.

In April 22, 2010 and April 26, 2010 letters, Applicant provided further responses and agreed to the conditions in Mr. Venables' comments. DNREC Ex. 16.

In an April 29, 2010 letter, GWDS' Marlene Baust, P. E., approved the DDR, which allowed Applicant to prepare ANSRWRF's detailed plans and specifications. DNREC Ex. 17.

On October 18, 2011, Applicant submitted the detailed Plans and Specifications for ANSRWRF (DNREC Ex. 18) and a map of the area. DNREC Ex. 20.

On January 30, 2012, Applicant submitted to GWDS the Department's two page form application for ANSRWRF and paid the filing fee, and on April 27, 2012 submitted a revised application that contained more description of the requested permit. DNREC Ex. 19.

On February 12, 2012, the Department had published public notice of the spray irrigation permit application to construct ANSRWRF. DNREC Ex. 1.

In a March 14, 2012 letter, Maggie Fryer, President of Sylvan Acres Homeowners Association, requested a public hearing on the application. DNREC Ex. 2.

On May 13, 2012, the Department had published public notice of a public hearing to be held on June 6, 2012 on the ANSRWRF application.

On June 6, 2012, this hearing officer presided over a public hearing on the ANSRWRF application.

In a memorandum dated October 4, 2012, this hearing officer requested GWDS to prepare a technical response memorandum (TRM), which was submitted October 4, 2012 and attached hereto.

I requested additional information from the Applicant on the proposed service area, and Applicant provided its response on

I consider the record, as reviewed below, complete and sufficient to support this Report's recommendations that the permit drafted by GWDS be issued by an Order of the Secretary.

II. SUMMARY OF THE RECORD¹

The record that supports this Report includes: 1) the verbatim transcript of the public hearing, 2) documents submitted as exhibits, and 3) this Report, including the attached TRM and other documents referenced herein.

¹ This summary reviews a record of public comments but does not determine any factual accuracy.

At the public hearing, Ron Graeber, Manager of GWDS' Large Systems Branch, provided for the record² selected relevant documents from the Department's files, some of which are summarized in the above procedural history. Mr. Graeber summarized the application as seeking a permit to build a wastewater treatment facility capable of eventually treating and disposing of up to 3 MGD. The disposal would use land application by spray irrigation on three separate parcels totaling 740 acres. He indicated that ANSRWRF would use a high level treatment process with screening, grit removal, biological treatment with a bio-lock process, seven clarifiers, coagulation, filtration, flocculation and ultra violet disinfection. The spray irrigation would support existing agricultural operations, which would reduce the farming's use of pumping groundwater and applying fertilizer.

The Applicant's representative at the hearing was Brian Carbaugh, Applicant's Director of Engineering and Design, who was available for answering public questions.

The public comments at the public hearing began with comments from Tom DiOrio, who asked a question on his concern with groundwater contamination of the wells located in the vicinity of the proposed ANSRWRF. Mr. Graeber answered it by explaining the groundwater monitoring that would be required and that the treated effluent would meet federal drinking water standards. Mr. DiOrio also asked about prescription drugs entering the wastewater flow as a possible source of contamination. Mr. Graeber explained how advanced treatment and land application by spray irrigation would reduce this risk of contamination more than continued use of standard septic systems. Mr. DiOrio also asked about spray irrigation causing wet conditions. Mr. Graeber replied explaining that the spray regulation controls how much may be sprayed and during weather conditions in order to prevent causing any undue level of wet conditions. Mr.

² The Department's role at the hearing is that it takes no position on the merits of the application until after a public hearing. Instead, the Department develops the hearing record with certain information solely to assist the public in providing comments.

DiOreo also asked upon the holding pond for the treated effluent and how mosquitoes would be controlled. Mr. Graeber responded by indicating that the water levels would be constantly changing.

Joe Montani asked about the size of the holding pond, and Mr. Graeber told him it would hold 60,000,000 gallons. He spoke against the application because of his concern with the devaluation of his property's value from being near ANSRWRF and its odor. Mr. Graeber replied that similar facilities in Sussex County do not produce odors absent some significant failure of the equipment.

Virginia Weeks asked about the plant's sludge or bio-solids. Mr. Carbaugh replied that bio-solids would be dried on the site using a natural process of reed drying beds, which is based upon plants that grow in wetlands. The dried bio-solids would be removed for reuse on agricultural lands. Mr. Graeber also indicated that the Department regulates the use of bio-solids under the federal bio-solids program.

III. DISCUSSION OF FINDINGS AND REASONS

A. Legal Authority

The Department regulates this permit application pursuant to the authority provided in 7 *Del C. §6003(a)(4)*, which allows the Department to regulate by permit "any activity... [i]n a way which may cause or contribute to discharge of a pollutant into any surface or ground water...." Applicant's proposed facility would, if approved, discharge the pollutants nitrogen and phosphorus into the groundwater.

This discharge will occur despite the proposed wastewater treatment that meets or exceeds the Department's current regulatory standards, as established by the: 1) *Regulations Governing the Control of Water Pollution*, (Water Regulations); 7 *DE. Admin. Code 7200*, 2) *Regulations Governing the Design, Installation and Operation of On-Site Wastewater Treatment*

and Disposal Systems (OWTDS Regulations); 7 DE Admin Code 7101, 3) TMDLs for (TMDLs); 7 DE Admin. Code 7407, 4) Surface Water Quality Standards, 7 DE Admin. Code 7401; and 5) Guidance and Regulations Governing the Land Treatment of Wastes (Spray Regulations)³, 7 DE Admin. Code 7103.

The OWTDS Regulations provide that the Department may deny a permit “when it determines that a denial “best implement the purposes of 7 Del. C. Ch. 60 and these Regulations.” 7 DE Admin 7101 section 5.5.1.

B. Applicant’s Proposed Construction.

Applicant seeks to construct a 3 MGD capacity large community OWTDS under the OWTDS Regulations and the Spray Regulations. The specific timing of the construction will occur in three phases, with the phases dependent on the demand for sewer service within Applicant’s PSC regulated service territory. Each phase would add 1 MGD capacity.

I find the proposed phasing is reasonable in concept because it will allow a gradual and extended construction of the facility that will coincide with the phased increases in demand for sewer service. The proposed phasing of construction allows the Department the opportunity to phase its review of the construction, including requiring changes when the Department determines a permit modification is appropriate. The Department also will have further regulatory review possible for the operating permit and its amendments, as may be required periodically as treatment capacity is added.

I also find that Applicant’s phases are appropriate in that they will follow the increased demand for sewer service. This demand may be from new residential and commercial development, and the abandonment of existing OWTDS users. The abandonment of existing OWTDS users may occur voluntarily or be required by the Department’s OWTDS Regulations.

³ These apply to any land application of treated wastewater and the biosolids (sludge) from treatment.

The potential demand from existing OWTDSs is harder to predict as it may arise from: 1) the failure of an individual OWTDS or a large community OWTDS; 2) the higher cost of advanced treatment individual OWTDS that will be required by the PCS for any new or replacement OWTDS; or 3) mandated by Department regulations based upon the proximity of central sewer facilities. I find the connection of existing OWTDS an important environmental reason for constructing the facility. Any prediction of future demand for central sewer service is difficult given the many variables involved. Nevertheless, the Department's environmental purposes are served by encouraging the use of central sewer service over construction of many individual OWTDS.

Applicant, as a public utility, has a public service obligation to serve its service territory under the terms, conditions and rates approved by the Public Service Commission. Applicant has determined, in its exercise of managerial discretion, the need to construct ANSRWRF as a regional treatment and disposal facility. The Department's role is to protect the environmental impact from undue harm.

I find that the phased approval is consistent with the Department's administration of Chapter 60 authority's statutory purposes, as set forth below:

The State, in the exercise of its sovereign power, acting through the Department should control the development and use of the land, water, underwater and air resources of the State so as to effectuate full utilization, conservation and protection of the water and air resources of the State.

(c) Purpose. -- It is the purpose of this chapter to effectuate state policy by providing for:

(1) A program for the management of the land, water, underwater and air resources of the State so directed as to make the maximum contribution to the interests of the people of this State;

(2) A program for the control of pollution of the land, water, underwater and air resources of the State to protect the public health, safety and welfare;

(3) A program for the protection and conservation of the land, water, underwater and air resources of the State, for public recreational purposes, and for the conservation of wildlife and aquatic life;

(4) A program for conducting and fostering research and development in order to encourage maximum utilization of the land, water, underwater and air resources of the State;

(5) A program for cooperating with federal, interstate, state, local governmental agencies and utilities in the development and utilization of land, water, underwater and air resources.

7 Del. C. §6001.

The above statutory language allows the permit process to be crafted to meet the particular circumstances. The Department readily could require the Applicant to submit a new application for each construction phase, but I do not recommend this procedure when the phasing is appropriate so long as the Department may effectively regulate the phases as recommended herein.

V. RECOMMENDED FINDINGS AND CONCLUSIONS

Based upon the discussion findings and reasons, I find and conclude that the record supports the issuance of a permit to allow Applicant to construct a 3 MGD treatment facility in 3 phases in order to serve Applicant's public utility service territory. This recommendation is made based upon the conditions in the draft permit prepared by GWDS, and the discussion of the phased review and approval process discussed in connection with spray irrigation plans and the need to assess the spray disposal performance periodically. I recommend the Secretary adopt the attached draft Order.


Robert P. Hayes, Esquire
Hearing Officer

MEMORANDUM

TO: Robert Haynes, Hearing Officer

FROM: Ronald Graeber, Program Manager I 

RE: Application submitted by Artesian Wastewater Management Inc.,(AWMI) to construct the Artesian Northern Sussex Regional Water Recharge Facility (ANSRWRF)

DATE: October 4, 2012

On Wednesday July 6, 2012 the Groundwater Discharges Section (GDS), Division of Water, Department of Natural Resources and Environmental Control (Department) conducted a Public Hearing to receive comments regarding the application submitted by AWMI to construct and operate a 3.0 Million Gallon per Day Regional Wastewater Treatment and Spray Irrigation Facility (Facility) near Milton, Delaware. Approximately 50 people attended the hearing and many provided comment on the application, most in opposition to the application. Given the amount of feedback the Department received during the public hearing, the Hearing Officer decided to leave the hearing record open for a period of 30 days to provide the attendees additional time to submit documentation for the record.

Response to Public Comments

In general, most of the people attending the Public Hearing were opposed to the proposed facility for the following reasons:

Issue 1 – Concern over potential ground water contamination from spray irrigation of treated wastewater onto agricultural fields

Response 1 – The wastewater will receive advanced treatment before it is discharged to the storage lagoon for spray irrigation. The treated effluent will meet most drinking water standards, including the standard for nitrogen, prior to discharge. Additionally, a detailed ground water

monitoring program will be implemented on the site in order to gauge compliance with drinking water standards.

Issue 2 – Concerns that emerging contaminants like pharmaceuticals will be in this treated wastewater and adversely impact ground water quality.

Response 2 – It has been established that emerging contaminants such as pharmaceuticals have been found in low concentrations in wastewater. These contaminants are found in such low concentrations that their adverse impact on humans has not been documented. However, the high level of treatment being proposed will remove the majority of these contaminants. Additionally, spray irrigation of the treated effluent provides additional mechanisms to trap or breakdown these contaminants, such as volatilization, soil bacteria breakdown, and soil storage.

Issue 3 – Concerns that spraying treated wastewater during wet weather periods would cause flooding and runoff from the farms to local residents.

Response 3 – Spray irrigation will be prohibited during periods of rain that could lead to runoff, or when the soils are saturated, or when the water table rises to within 24 inches of the surface. The facility will include a 60 day storage lagoon that will store the water during wet weather periods. Consequently, wastewater runoff should not occur; however, if wastewater does run off the fields, this would be a violation and the permittee would be required to reduce the wastewater loading rate to eliminate runoff.

Issue 4 – Concern that the storage pond would act as a breeding ground for mosquitos and other vectors.

Response 4 – The storage lagoons are dynamic ponds that receive and discharge treated water on a daily basis. Lagoon levels fluctuate on a regular basis; these are not static lagoons. There are currently 23 spray irrigation storage lagoons in use in Delaware, and none have experienced problems associated with excessive breeding of mosquitos or any other insects.

Issue 5 – Concerns that the facility, including the proposed sludge drying beds, would generate unacceptable odors, similar to odors generated by the Blessing Composting facility located approximately 2 miles from the proposed ANSRWRF facility.

Response 5 – The proposed ANSRWRF facility is a state-of-the-art Membrane Biological Reactor (MBR), which will include a 60 day capacity storage lagoon for treated wastewater. Biosolids generated at the facility will be treated by an aerobic digester, then discharged to a series of Reed phragmites beds for final treatment. These types of systems are in operation in Delaware and across the country, and generate little odor. In comparison, the Blessing Facility receives industrial processing biosolids, food waste and municipal wastes which is then composted on site, in the open, generating significant odors when anaerobic pockets are disturbed.

Issue 6 – Concerns that treated wastewater will egress the farm via aerosols or runoff.

Response 6 – The wastewater will be treated to levels deemed safe for human contact; consequently, a minimum of 25 foot buffer is normally required however, it must be acknowledged that nuisance aerosols may egress the site on windy days. The proposed spray irrigation fields are not near any residential developments, except one. The north-west corner of the Sylvan Acres Development is near the south-east corner of one of the spray irrigation fields. In order to allay residents' concerns, the GWDS recommends requiring a 100 foot buffer from the wetted field area to the Sylvan Acres Development.

Issue 7 – Questions were asked about how ground water monitoring would track ground water quality over time.

Response 7 – Ground water monitoring wells will be installed upgradient of each irrigation fields, within each irrigation field, and down gradient of each irrigation field. A minimum of 3 ground water samples will be collected from each well and analyzed for a variety of parameters to determine background ground water quality. Thereafter, ground water monitoring wells continue on a quarterly basis once irrigation activities commence. This will allow the GWDS staff to determine any potential impact to the ground water from spray irrigation.

Issue 8 – Concerns were raised over what would happen to the storage lagoons and spray irrigations fields in the event of a huge flood.

Response 8 – The storage lagoon is equipped with two feet of freeboard. Consequently, even if the area experienced a twelve (12) inch rain event, the storage lagoon would be capable of receiving the precipitation, and still have over twelve inches of freeboard. Furthermore, spray irrigation is prohibited during precipitation events. Consequently, any runoff egressing the farm will be simple storm water.

Issue 9 – Several attendees raised objection to the facility due to its proximity to residential areas.

Response 9 – There is only one residential development within any proximity to the proposed facility: Sylvan Acres. Owing to the hodge-podge manner in which residential developments are approved in Sussex County, it is impossible to locate a facility of the nature in an area devoid of development. However, the area is zoned Agricultural/Residential, and spray irrigation is a normal agricultural activity.

Issue 10 – Several attendees stated they were opposed to the facility because it would allow for significant growth in the area, noting that the facility could serve up to 10,000 homes. Sussex County Councilwoman, Joan Devers, also voiced this concern.

Response 10 – The ANSRWF facility is being constructed to serve future developments. It must be noted that Sussex County Counsel has the final say in approving new developments. Sussex County Counsel Woman Joan Devers, who attended the Hearing, will have the opportunity to address future developments through Sussex County's land use approval process.

Issue 11 – An attendee asked if a large (~100') heavily vegetated buffer could be constructed along the perimeter of the spray irrigation fields if the facility, were permitted. Most attendees agreed with the request.

Response 11 – The GWDS opposes requiring a 100' vegetated buffer around the perimeter of the spray fields. This would significantly reduce the area available for irrigation, while providing no increase in public health protection. The GWDS does, however, support a minimum 100' buffer be provided from the proposed irrigation field and the Sylvan Acres Development.

Conclusions and Recommendations

The majority of the questions raised either dealt with the treatment technology proposed (MBR with a storage lagoon, spray irrigation of the treated wastewater, and reed drying beds for biosolid treatment) or a concern over potential ground water contamination. The wastewater treatment system is a state-of-the-arts MBR system which is capable of providing a very high level of treatment. There are many of these types of systems in operation throughout the country, and two in Delaware (Millsboro and Lewes); they generate minimal odors and are very reliable. The storage lagoon will only hold treated wastewater. There are 23 wastewater storage lagoons operating in Delaware. None generate odors, nor do they act as breeding areas for nuisance vectors. Spray irrigation of treated wastewater is one of the most environmentally sound methods of managing wastewater, as the nutrients found in the wastewater are taken up by the crops.

The potential for ground water contamination to occur at a land treatment facility is significantly less than at a conventional agricultural site where nutrient loadings occur only once or twice per year. This, coupled with an extensive ground water monitoring network, will satisfactorily protect public health. Consequently, staff recommends the issuance of the ANSRWF permit to construct a regional wastewater spray irrigation facility at the Milton-area site.

Appendix IV



STATE OF DELAWARE
**DEPARTMENT OF NATURAL RESOURCES AND
ENVIRONMENTAL CONTROL**
DIVISION OF WATER
RICHARDSON & ROBBINS BUILDING
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

Commercial & Government Services

Telephone: (302) 739-9948

August 12, 2022

Rodney Wyatt
Director of Operational Compliance &
Wastewater Operations
Artesian Wastewater Management, Inc.
664 Churchmans Road
Newark, DE 19702

**RE: Manager's Deficiency Warning Letter, Artesian Wastewater Management, Inc.'s
Sussex Regional Recharge Facility, State of Delaware Spray Irrigation Permit No.
359288-02**

Dear Mr. Wyatt:

On March 18, 2020, the Delaware Department of Natural Resources and Environmental Control's Division of Water (the Department) issued a large On-Site Wastewater Treatment and Disposal System (OWTDS) Spray Irrigation Permit (No. 359288-02) to Artesian Wastewater Management, Inc. (Permittee) for the operation of the Sussex Regional Recharge Facility (SRRF), formerly known as the Artesian Northern Sussex Regional Water Recharge Facility (ANSRWRF). The Permit authorizes SRRF to receive treated poultry processing wastewater (treated effluent) from the Allen Harim Foods Harbeson Processing Facility's wastewater treatment system. Treated effluent is stored (at SRRF) in a synthetically lined lagoon prior to being discharged via spray irrigation to approximately 1,714 acres of agricultural fields located in Sussex County, Delaware. The Permit includes effluent limitations, monitoring, reporting, and operational requirements. Part III A.1 of Permit No. 359288-02 requires the Permittee to comply with the terms and conditions of the Permit.

Part II.B.2 of Permit No. 359288-02, requires the Permittee to submit monitoring data and other information to the Department in monthly discharge monitoring reports (DMRs). The DMRs include influent, effluent, groundwater, surface water analytical sampling data and operational and maintenance information. The Department recently completed a file and data review of this facility to determine compliance with permit and regulatory requirements. The Department's review included an evaluation of DMRs submitted between July and December 2021. The review identified significant errors and omissions and the Department required the Permittee to revise and re-submit the DMRs. The revised DMRs were submitted on March 1, 2022. The revised DMRs along with the January 2022 DMR, and the facility's 2021 Annual Report were then evaluated.

The following are violations and items of concern identified by the Department.

VIOLATIONS

1. Fecal Coliform Bacteria Limit
 - a. Part I.D.13.a of the Permit requires the effluent not to exceed 20 col/100mL Fecal Coliform.
 - i. The July DMR Effluent Monitoring reported a Fecal Coliform value of 81 col/100mL.
 - ii. The August DMR Effluent Monitoring reported a Fecal Coliform value of 30 col/100mL.
2. Total Suspended Solids (TSS) Limit
 - a. Part I.D.13.c of the Permit requires the influent TSS not to exceed 10 mg/L.
 - i. The September DMR Influent Monitoring reported a TSS value of 14 mg/L.
3. Failure to Report/Submit Required Information
 - a. Non-Compliance Notification Submissions
 - i. Part IV.A.4 of the Permit, requires the Permittee to submit to the Department notification (orally within 24 hours and in writing within five days) after becoming aware of any noncompliance with this Permit, Regulations, or any other situation that may endanger the public health or the environment.
 - ii. The Department has no record of receiving a 24-hour oral nor a 5-day written Non-compliance Notification for the following water quality exceedances:
 - July 2021 Effluent Fecal Coliform Exceedance of Fecal Coliform at 81 col/100mL.
 - August 2021 Effluent Fecal Coliform Exceedance of Fecal Coliform at 30 col/100mL.
 - September 2021 Influent Monitoring Exceedance of TSS at 14 mg/L.
 - b. Predictive monthly Nitrogen Balance (NB) worksheets
 - i. Part I.D.1 of the Permit requires, in part: "The monthly quantity of effluent discharged from the wastewater facility to the spray fields shall not exceed a volume that has been calculated each month by the Permittee to not cause the groundwater to exceed the drinking water standard for Nitrate at the percolate. The monthly quantity is to be calculated by utilizing the average of the lab verified effluent Total Nitrogen concentrations from the previous month and the calculations and assumptions provided in the design Nitrogen Balance excel spreadsheet. Once actual data is acquired for the mathematical assumptions, it shall be utilized in lieu of the assumed data (i.e., crop nutrient uptake). All changes to the spreadsheet calculations and assumptions shall be approved by the Groundwater Discharges Section prior to implementation. Each monthly spreadsheet shall be provided

(electronically, in Excel format with calculations maintained) to the Groundwater Discharges Section to be considered with the monthly Discharge Monitoring Report.”

1. Predictive monthly Nitrogen Balance (NB) worksheets were not submitted with the monthly DMRs for July, August, September, October, and November 2021 as required by the Permit.
- c. Effluent monthly Nitrogen Balance (NB) worksheets
- i. Part II.A.2 of the Permit requires Monthly and Cumulative Loading and Percolate calculations (Nitrogen Balance) for each Field/Pivot. The Permit also requires, via Footnote 5, “The Permittee shall submit to the GWDS monthly in Excel spreadsheet format.”
 1. Effluent Monthly and Cumulative Loading and Percolate calculations Nitrogen Balance (NB) worksheets were not submitted with the monthly DMRs for July, August, September, October, and November 2021 as required by the Permit.
- d. Operations Monitoring
- i. Part II.A.8.a&b of the Permit requires monitoring of additional spray field applications of supplemental irrigation, supplemental fertilizer, and lagoon levels. The periodic reporting is required upon initiation of irrigation activities in accordance with Part II.B.2 of the Permit.
 1. Operations Monitoring data was not submitted with the monthly DMRs for July, August, September, October, November, and December 2021.
- e. Phosphorus Loading Calculations
- i. Part II.A.2 of the Permit's Effluent Monitoring section requires Phosphorus Loading Rate to each Field/Zone/Pivot to be calculated and reported monthly.
 1. Phosphorus loading calculations were not provided with the July 2021 DMR. The DMR ‘Spray Irrigation Monthly Worksheet and Calculations’ noted a ‘#REF!’ error.
4. Weekly Application Rate exceeded permit limitation of 1.65 inches per acre
- a. Part I.D.3 of the Permit prohibits the average weekly quantity of effluent discharged to any portion of the spray irrigation field from exceeding 1.65 inches per acre averaged over a 7-day rolling period.
 - i. The July DMR Weekly Spray Record (pdf pages 25-26) notes that the application rate the week of July 8, 2021, on Zone G-101 exceeded 1.65 inches reporting that 1.73 inches were applied, and the application rate the week of July 15, 2021, on Zone G-111 exceeded 1.65 inches reporting that 1.76 inches were applied.
 - ii. The Department also received a Non-Compliance Notification (dated April 7, 2022) that also reported “due to a programming overlook on April 5, 2022, I [operator] over sprayed on field Zone G-2 by .14 in.”

5. Failure to maintain and report a rolling 12-month average of TN percolate concentrations for lysimeters in accordance with Part II.A.5 of the Permit.
6. Storage Volume Design Maximum Exceedance
 - a. Part I.4 of the Permit states "Phase I [operations] is designed to require only 65.2 MG of the storage lagoon's 90 MG capacity. If storage volume exceeds 65.2 MG, the Permittee must notify the Groundwater Discharges Section in writing. The additional 23 MG storage capacity may not be utilized during Phase I unless under the written authorization of the GWDS or in response to emergencies outside the Permittee's control (Force Majeure)."
 - i. On April 7, 2022, the Department received a Non-Compliance Notification stating an exceedance of the design storage volume: "As of April 7, 2022, the lagoon level at SRRF is above our 65.2 MG limit by approximately 1 million gallons." The April 2022 DMR noted a storage volume of 71,499,225 gallons for the week of April 20, 2022.
7. Duty to Comply
 - a. Part III.A.1 of the Permit requires the Permittee to comply with all the terms and conditions of Permit No. 359288-02
 - i. The Permittee failed to comply with the Permit's monitoring and reporting requirements.

GENERAL COMPLIANCE DEFICIENCIES, INCONSISTENCIES, ERRORS, AND DISCREPANCIES

The following sections outline compliance concerns the Department identified during the file/data review. The purpose of documenting these compliance issues in this letter is to provide technical assistance to the Permittee to ensure that future reports are more accurate, complete, and in compliance with all permit and regulatory requirements. The observations are based on both the initial DMR submittal and revised DMR submittal. This is not intended to be an exhaustive list.

Discharge Monitoring Reports

1. Please note the Lysimeter Rolling Average (submitted with revised DMRs) appears that it will exceed the 12-month average of 10 mg/L TN percolate concentrations.
2. Effluent reported in thousand gallons on DMR and zone loading sheet. Permit requires reporting in gallons.
3. Incorrect volumes reported on the DMR per field loading calc sheets. For example, July 2021 Field 8 reported 0.112 on the DMR instead of 1.112 affecting loadings and total volume. Also see Aug 2021 Field F-2.
4. Volumes reported are inconsistent with total effluent, the summation of loading to each pivot zone on the DMR sheet and the summation of the loading reported on the NB spreadsheet.

5. Failure to accurately calculate the monthly nitrogen loading rate to each spray field/zone. Nitrogen loading calcs reported utilized incorrect TN concentration.
6. It was unclear and not noted the monitoring location of the Chlorine and Turbidity values on the Daily flow sheet. It appears they are for the influent.
7. Certification Sheet check boxes did not always accurately reflect monitoring results provided.
8. DMR Sheets have reporting inconsistent accuracy relative to the reporting period, sample dates and date of submittal (e.g., December 2021 DMR incorrectly noted Reported Period as Nov-21 with Sample dates in December 2021).
9. Depth to Water (DTW) is required by the permit to be taken and reported to the 100th of a foot in both Monitoring Wells (MWs) and Piezometers (Pz). Reporting was inconsistent across DMRs for MWs and Pzs.
10. Field logs were not provided for DTW for Pzs or MWs.
11. Significant figures routinely dropped during transfer from lab sheets to DMRs. Unclear if this was due to rounding by Operator when entering or rounding by the Excel Spreadsheet and the DMR sheet needs modifying to maintain the appropriate number of significant figures.
12. Improper monitoring well quarterly sampling methodology. Monitoring data indicates that sampling was performed during the first month of a quarter, followed by the last month of the next quarter. The result leaves nearly a half year gap in monitoring well data and does not constitute proper quarterly sampling (i.e., July & Dec).
13. Electronic copies of the lab sheets were illegible due to scan quality. Some data was difficult to verify due to poor quality scanned lab sheets.
14. Inconsistent field nomenclature between DMR Spray Monthly Calculation sheets, Weekly Spray Record sheets and Weekly Loading per Zone sheets (i.e., G100-G118 vs 1-19).
15. Field nomenclature for Field G-5 is referenced in '20190717 ANSRWRF O&M Plan.pdf' as G-8.
16. Acreage of Field F-2 is noted in '20190717 ANSRWRF O&M Plan.pdf' as 80.36 acres reported in DMRs as 80.38 acres.
17. Unable to locate an As-built drawing for Field F with monitoring locations and acreage delineated.

18. The Predictive Nitrogen Balance (NB) is utilized as an operational tool in ensuring that treated wastewater applications do not cause groundwater quality to exceed the drinking water standard for Nitrate at the percolate. However, the NB assumed crop uptake for the cover crop that was subsequently plowed under.
19. Please note, the percolate calculated with the crop uptake for Field G2 Crop December was 9.9 mg/L. Removing the crop uptake value may potentially cause the calculated percolate to exceed 9.9 mg/L.
20. Pdf page 8 Section 8.2 Vegetative Management Practices notes that "During 2021, AWMI chose not to take any credit for cover crop uptake (N) due to the farmer's practice of plowing under short cover crops that are followed by corn crop plantings which is the plan for 2022. This was reflected in the Active Spreadsheets which covered the months that the cover crop was out on the fields. The only nitrogen assumed to be removed was the small amount from evapotranspiration and volatilization. Application rates were limited so that the percolate concentration making it to the groundwater complied despite there being no uptake by the crops accounted for."
21. Effluent Nitrogen Balances – see review comments under the Annual Report review section below.

2021 Annual Report

1. In accordance with Section 6.8.2.4.1 of the Regulations, the Permittee is required to show the validity of all effluent monitoring and groundwater monitoring data by requiring its laboratory to adhere to standard quality assurance practice including utilizing duplicate and spiked samples as described in Section 6.8.2.4.1.1 and 6.8.2.4.1.2 of the Regulations. The data (including percent recovery, number of duplicate and spiked samples run, date and laboratory log number of samples run, and name of analyst) is required to be summarized and submitted in the Permittee's Annual Report.
 - a. Laboratory quality assurance data was not summarized and submitted in the 2021 Annual Report in accordance with Section 6.8.2.4.1.3 of the Regulations.
2. In accordance with Section 6.9.1.10 of the Regulations, the Permittee is required to provide daily rainfall, temperature, wind speed and direction information in the Permittee's Annual Report.
 - a. Daily wind direction was not provided in the Annual Report in accordance with Section 6.9.1.10 of the Regulations.
3. In accordance with Section 6.9.14.1 of the Regulations, the Permittee shall submit in the Annual Report the annual volume of wastewater spray irrigated on each field with the total nitrogen and phosphorus loading applied from all sources to each field in pounds per acre per field as well as total pounds of nitrogen and phosphorus removed through crop uptake.
 - a. Annual Report Appendix A delineates the volume of effluent spray irrigated on each pivot/zone per month in gallons.

- b. Annual Report Appendix A does not provide Annual Total Nitrogen or Total Phosphorus loading in pounds per acre per year for comparison to permit limit and demonstration of compliance.
 - i. Appendix A summarizes the total nitrogen and phosphorus loading applied to each field in pounds; however, the total nitrogen and phosphorus loading applied to each field was not provided in pounds per acre per field as required by the Regulation.
 - ii. Appendix A did not provide an annual summation.
 - c. Appendix A does not provide total pounds of nitrogen and phosphorus removed through crop uptake.
 - d. Appendix F provides harvest information consistent with Section 6.9.14.5 of the Regulations, however, it does not provide the total pounds of nitrogen and phosphorus removed through crop uptake as required in Section 6.9.14.1.
4. Section 6.9.14.2 of the Regulations requires the Annual Report to include a Nitrogen balance calculation spreadsheet using actual effluent, nitrogen monitoring data and any additional applied nitrogen. The 2021 Annual Report included effluent Nitrogen Balances in Appendix D - 'Revised Active Spreadsheets/Nitrogen Balance Calculations'
- a. A review of the Nitrogen Balance Excel spreadsheet files submitted in the Annual Report for each pivot/zone noted discrepancies in monthly total volumes applied, crop uptake values, etc. In one instance, it appeared a greater calculated percolate value should have resulted (Field G2 Crop December) potentially exceeding 9.9 mg/L.
 - b. An example of effluent volume data discrepancies for Field F1 Crop, comparing the Nitrogen Balance and Appendix A follows:

Source	Effluent	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21
Annual Report Appendix A F1 Crop (pdf page17)	Total Flow (MG)	0.61	0.52	1.55	0.86	0	1.15
Annual Report Nitrogen Balance F1 Crop Line 13 (pdf page 38)	Total Flow (MG)	1.4	0.9	1.6	1.4	0	0.9

5. Percolate Calculations Discrepancies – Crop Uptake Value

- a. An example of percolate calculation discrepancies includes the following:
 - i. Pdf page 8 Section 8.2 Vegetative Management Practices notes that "During 2021, AWM I chose not to take any credit for cover crop uptake (N) due to the farmer's practice of plowing under short cover crops that are followed by corn crop plantings which is the plan for 2022. This was reflected in the Active Spreadsheets which covered the months that the cover crop was out on the fields. The only nitrogen assumed to be removed was the small amount from evapotranspiration and volatilization. Application rates were

- limited so that the percolate concentration making it to the groundwater complied despite there being no uptake by the crops accounted for."
- ii. However, pdf page 37, Appendix D - Revised Active Spreadsheets/Nitrogen Balance Calculations includes values in line 30 from 'Crop Nitrogen Removal' for Fields F1, F2, G1, G2, G3, G4, G5.
 - iii. The percolate calculated with the crop uptake for Field G2 Crop December was 9.9 mg/L. Removing the crop uptake value may potentially cause the calculated percolate to exceed 9.9 mg/L.
6. Section 6.9.14.3 of the Regulations requires the Annual Report to include a chemical analysis of soils from each field for the soil monitoring constituents identified in the permit.
 - a. While the tabulated soils data was provided, the lab data sheets were not included.
 7. Part II.A.6 of the Permit requires plotting soil sample locations on a scaled drawing and labeled consistent with the sample nomenclature. Each field is also required to be identified so that sample results may be tracked and properly assessed for field life limiting factors.
 - a. A Map as required by Part II.A.6 of the Permit was not provided in the Annual Report.
 8. Inconsistencies with the effluent flows were noted as follows:
 - a. August Total Effluent Flow:
 - i. Pdf page 5 Table 2 Effluent Flow summary August 24,410,000
 - ii. Pdf page 192 August DMR has 28,792,000.
 - iii. Average and peak values also do not match.
 - b. Annual Total Effluent Flow:
 - i. Summation of all DMRs annual total effluent is 148,494,000.
 - ii. The 2021 Annual Report pdf page 5 Table 2 notes an annual total effluent of 144,112,000.
 9. Data discrepancies were also noted in the review. Examples:
 - a. August TN loading from page 7 compared to Appendix A August total TN loading does not match 3705 lbs vs 3186 lbs respectively.
 - i. Effluent Flow: Nov Field 7
 - Appendix A 0.437 MG
 - DMR 0.435 MG
 - b. Effluent Total Phosphorus
 - i. Pdf page 8 - Table 5.4 is missing November data
 - c. Total Phosphorus, Total Nitrogen and Total Effluent Flow comparison across document:

Source	Effluent	Jul-21	Aug-21	Sep-21	Dec-21
Monthly DMRs	Total Phosphorus (mg/L)	0.16	0.05	0.16	0.05
Annual Report - Appendix A	Total Phosphorus (mg/L)	0.16	0.05	0.16	0.13

Monthly DMRs	Total Nitrogen (mg/L)	14.46	18.2	15.3	24.85
Annual Report - Appendix A	Total Nitrogen (mg/L)	14.45	15.5	15.5	24.85
Annual Report - NB F1 Crop (pdf page 38)	Total Nitrogen (mg/L)	14.5	18.2	15.3	24.9
Monthly DMRs	Total Flow (MG)	28.79	28.79	25.29	31.79
Annual Report - Appendix A	Total Flow (MG)	28.79	24.41	25.29	31.79
Annual Report - Table 1 (pdf page 5)	Total Flow (MG)	28.79	24.41	25.29	31.79

CORRECTIVE ACTIONS REQUIRED

The Department has identified numerous monitoring and reporting violations, omissions, and errors. Taken together, these deficiencies record a significant failure of the Permittee to comply with the terms and conditions of Permit No. 359288-02. To correct the deficiencies documented in this letter, the Permittee must perform the following corrective actions.

1. Within 45 days of the date of this letter, the Permittee must submit a Quality Assurance/Quality Control (QA/QC) Plan designed to identify and implement monitoring and reporting procedures and activities to ensure the delivery of accurate and complete monthly discharge monitoring reports and annual reports in accordance with Permit No. 359288-02. The QA/QC Plan must include (at a minimum) the following information.
 - a. The identification of a QA/QC Manager responsible for ensuring monitoring data and reports submitted to the Department are accurate and in accordance with the requirements of Permit No. 359288-02.
 - b. A description of sampling schedules, process, and methods
 - c. A description of sample handing, custody, and methods
 - d. A description of data management, review, and verification methods
 - e. A description of data evaluation and reporting methods

2. Within 45 days of the date of this letter, the Permittee must revise its monitoring and reporting methods to ensure the following information is provided to the Department in the monthly discharge monitoring reports (DMRs).
 - a. Submit a process flow diagram with meter locations and sampling locations identified
 - b. Submit a Nitrogen Balance spreadsheet that utilizes gallons instead of inches for a more accurate calculation and streamline/combine spreadsheets into one excel workbook
 - c. Revise Field F-2 acreage to 80.36 acres in accordance with 20190717 ANSRWRF O&M Plan.pdf and 20190717 Lagoon Pump (pdf page 11) and Disposal Record Drawings.pdf (pdf page 15-19)
 - d. Continue providing 'Weekly Volume Loading Rates per Zone' sheet; however, provide in gallons. This will assist in reconciling discrepancies, for example July

2021 Field 8 reported 0.112 on the DMR instead of 1.112 causing a miscalculation of loadings and total volume. Another example includes Aug 2021 Field F-2.

- e. Submit monitoring field sheets with MW and Pz depth-to-water measurements
- f. Modify the DMR coversheet to include permit limits and result values for comparison. See example.

Monitoring Requirement	Permit Limit	Data
Influent Flow	1.5 MGD AVG daily flow	
Influent Flow	2.0 MGD Max daily flow	
pH	5.5 < pH < 9.0	
TRC	1.0 < TRC < 4.0	
BOD	< 10.0 mg/L	
TSS	< 10 mg/L	
Turbidity	< 5.0 NTU	
Effluent Flow	TN < 30	
Fecal Coliform	< 20	
MWs & Pz	DTW > 3.0 ft	
Weekly Spray Application (Weekly Spray Sheet)	1.65 inches/acre-week	
Operations Monitoring	Storage < 65.2 MG	
Lysimeter 12 Month Rolling Average	< 10 in each lysimeter	

- 3. Within 45 days of the date of this letter, the Permittee shall re-submit the 2021 Annual Report that includes the following information.
 - a. The Permittee must provide a tabulated summary of the nutrient loading, crop removal and nutrient analysis.
 - i. The Permittee will tabulate total Nitrogen and total Phosphorus monthly Average Concentrations, monthly volumes of wastewater irrigated per field/zone/pivot, and monthly mass loadings pounds per acre per field/zone/pivot with annual volumes and loadings totaled for each field/zone/pivot.
 - ii. The Permittee will tabulate annual loadings per field for total Nitrogen and total Phosphorus in comparison to the crop type planted for the year and the permit limit for that specific crop type.

- iii. Utilizing the vegetative monitoring lab data analysis required by Part II.A.7 of the Permit, the Permittee will calculate and tabulate the Nitrogen and Phosphorus removed by the crops in pounds per acre per field/zone/pivot. The tabulated summary shall note the crop type planted for the pivot, the amount of crop harvested, and the amount of nutrients removed (pounds per acre per pivot).
 - iv. The Permittee shall provide a comparison of the lab analyzed crop uptake values with the values utilized in the Nitrogen Balance, Vegetative Management Plan and Phosphorus loading limitation calculation.
 - v. The Permittee will provide an assessment of Phosphorus utilization relative to the permit limit of 31.2 lbs/acre total Phosphorus. The Permittee will discuss any discrepancies and proposed operational adjustments.
 - vi. The Permittee will provide the laboratory data sheets from each crop analysis.
- b. The Permittee will submit soil data laboratory sheets.
 - c. The Permittee will submit Lysimeter 12-month rolling average data for total Nitrogen in accordance with Part II.A.5 of the Permit.
 - i. If the rolling 12-month average exceeds the total nitrogen percolate concentration of 10 mg/L, the Permittee will discuss steps taken to examine the facility's operation and maintenance log for improper operational procedures, conduct a physical inspection of the disposal system to detect abnormalities, and review monitoring data and other records to determine the cause/source of the total nitrogen exceedance.
 - ii. The Permittee will report on all findings along with any proposed modifications to operational procedures or other corrective actions.
 - d. The Permittee will submit a tabulated summary of the following information in accordance with Part II.A.8.
 - i. Irrigation water in gallons per field/zone/pivot and in inches/acre per field/zone/pivot
 - ii. Fertilizer Nitrogen in lbs/acre per field/zone/pivot
 - iii. Fertilizer Phosphorus in lbs/acre per field/zone/pivot
 - e. The Permittee will submit a summary of monthly storage lagoon volumes tabulated in comparison to the permitted action level volume.
 - i. If storage lagoon volumes exceeded the permitted action level volume, discuss steps taken to assess system functionality and any proposed modifications to operational procedures or other corrective actions.

All corrective actions must be completed in the timelines indicated above. Failure to complete corrective actions in the required timeframes may result in enforcement escalation.

Should you have any questions regarding this letter, please feel free to contact me at (302) 739-9327 or email at john.rebar@delaware.gov or Marlene Baust, P.E. at (302) 739-9948 or email at marlene.baust@delaware.gov.

Artesian Wastewater Management, Inc.
Manager's Deficiency Warning Letter
August 12, 2022

Sincerely,

A handwritten signature in blue ink that reads "John Rebar Jr." with a stylized flourish at the end.

John Rebar Jr.
Environmental Program Manager II
DNREC - Division of Water

CC: Steve Smailer, PG, DNREC
Jennifer Roushey, DNREC
Marlene Baust, DNREC
Nathan Jackson, DNREC
Cody Letsinger, DNREC

Appendix V

Draft Permit Name: Sussex Regional Recharge Facility
State Permit No. 359288-02
Effective Date: March 18, 2020
Amendment Date: **TBD**
Expiration Date: March 17, 2025
Page 1 of 67



**AUTHORIZATION TO OPERATE AND DISCHARGE
UNDER THE LAWS OF THE
STATE OF DELAWARE**

PERMITTEE: Artesian Wastewater Management, Inc. (AWMI)
664 Churchmans Road
Newark, DE 19702

FACILITY: Sussex Regional Recharge Facility (SRRF) *formerly known as the Artesian Northern Sussex Regional Water Recharge Facility (ANSRWRWF)*

1. The Delaware Department of Natural Resources and Environmental Control (the Department or DNREC) issues this Operations Permit Amendment (Permit No. 359288-02) to Artesian Wastewater Management, Inc. (the Permittee or AWMI) pursuant to the provisions of 7 Del. C. §6003 and 7 Del. Admin. C. §7101 *Regulations Governing the Design, Installation, and Operation of On-Site Wastewater Treatment and Disposal Systems* (the Regulations).
2. The Department's purpose in issuing this Operations Permit Amendment, and in imposing the conditions and requirements specified herein, is to ensure that all systems and discharges at the Sussex Regional Recharge Facility (SRRF) are operated and maintained so as not to create a public health hazard or cause water pollution. It is the responsibility of the Permittee to comply with the terms and conditions of this Permit. Effluent limitations, monitoring requirements, and other conditions are set forth herein.
3. The Sussex Regional Recharge Facility is located on Sussex County Tax Map/Parcel Number: 2-35 6.00 28.09 along Route 30 approximately 4,000-ft north of the intersection of Route 16 and Route 30. The Sussex County Tax Map/Parcel Numbers for authorized discharged sites are listed in **Part I.A.** of this Permit.

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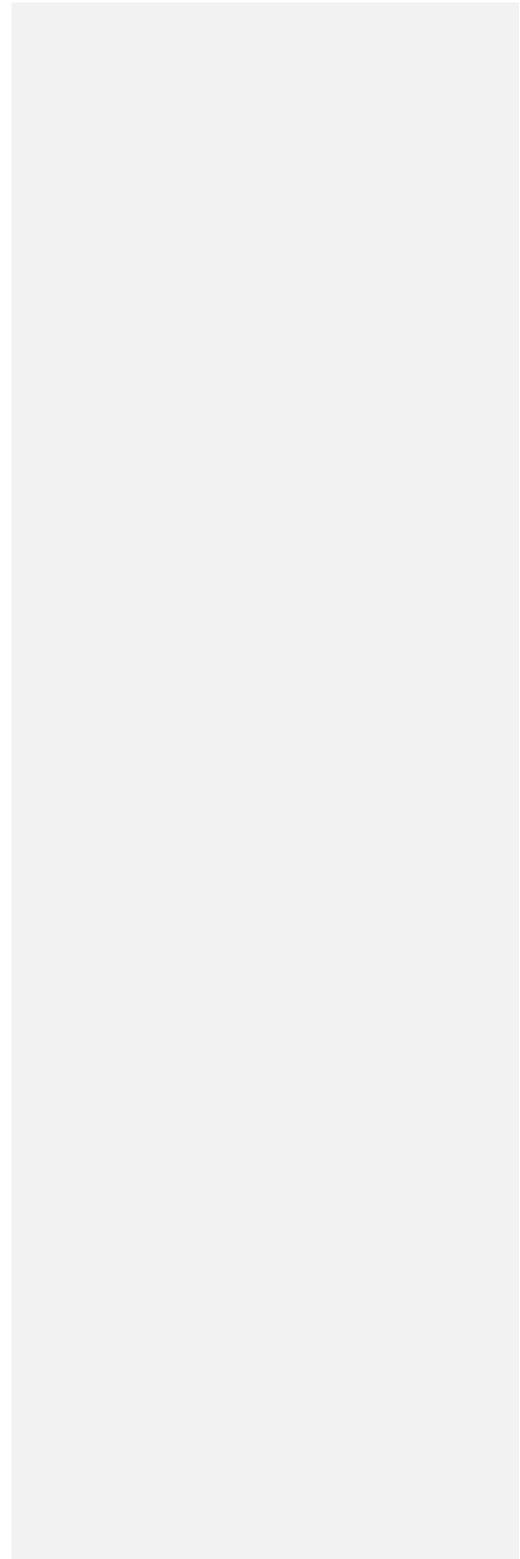
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John J. Rebar, Jr.
Environmental Program Manager **HI**
~~Groundwater Discharges Section~~
Delaware Department of Natural Resources
and Environmental Control

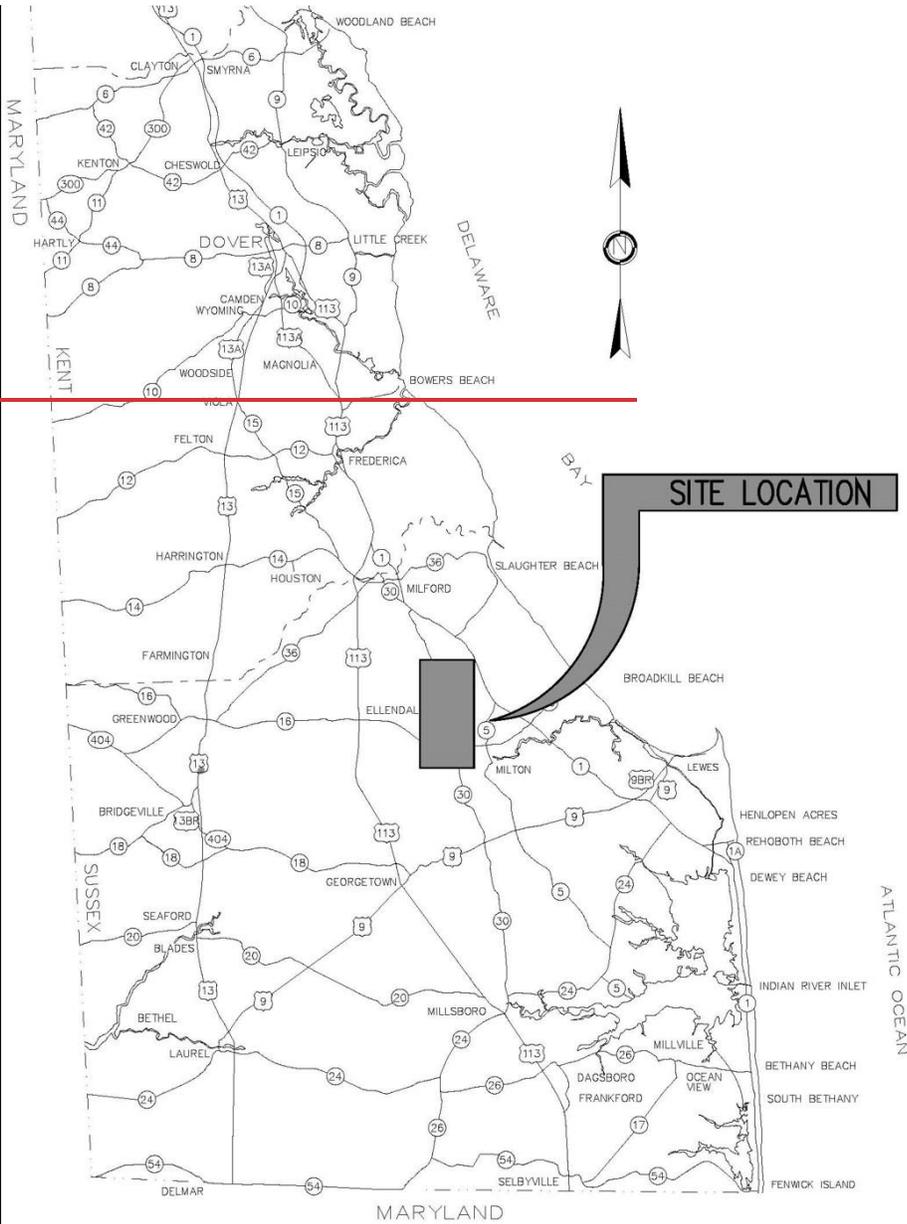
Date Signed

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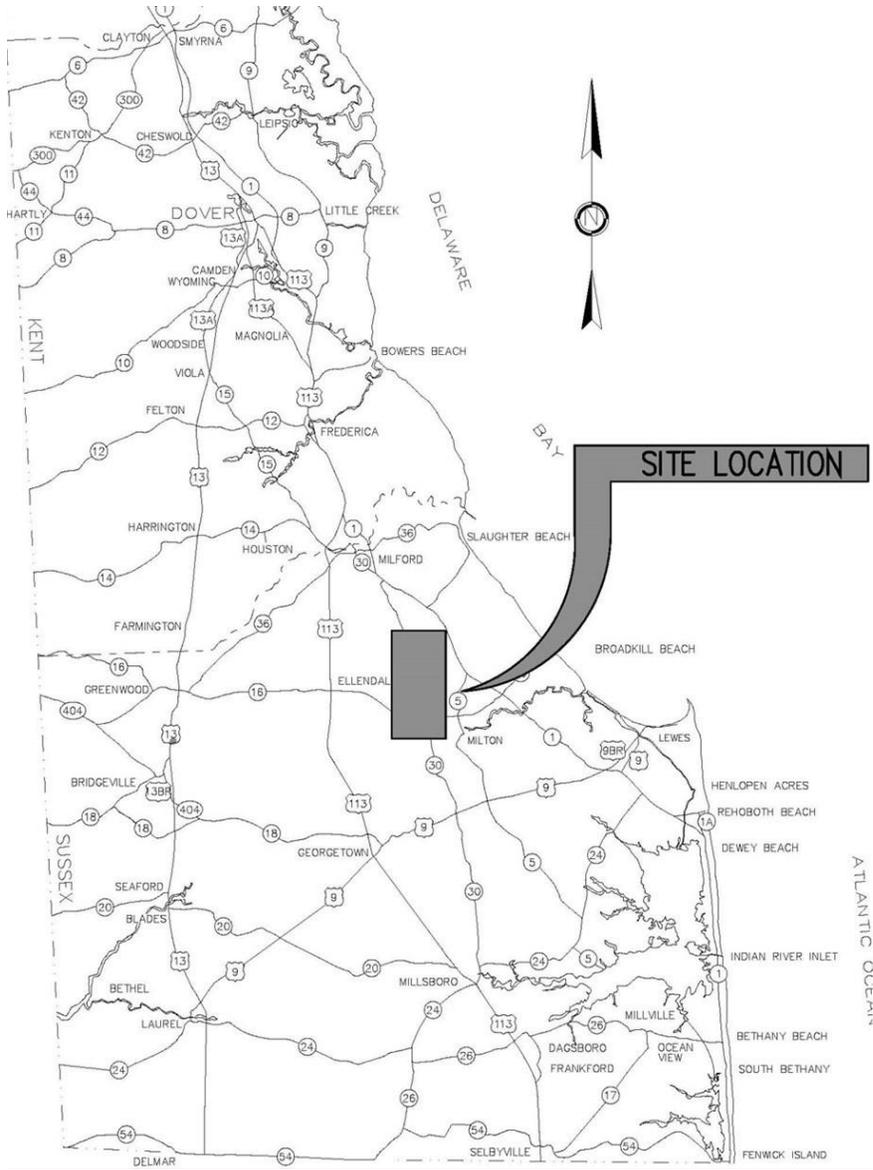
LOCATION MAP



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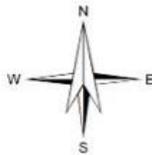
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SITE MAP



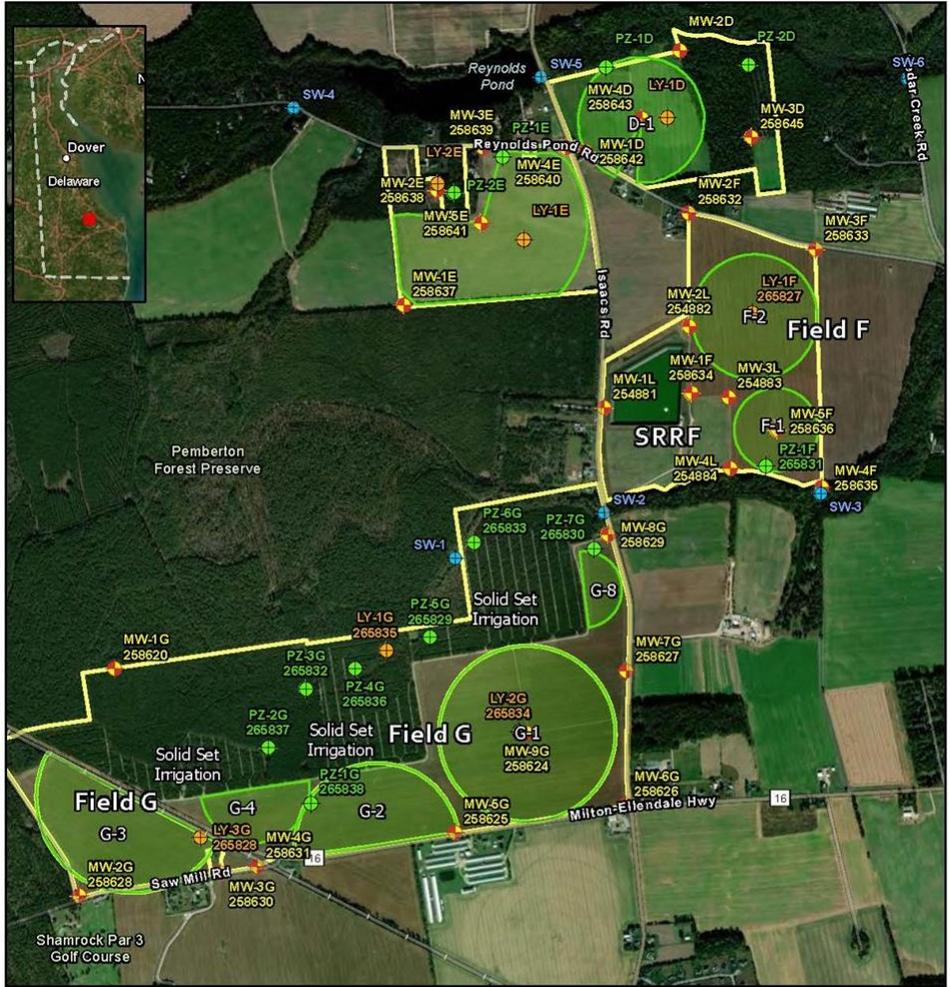
Legend

-  Monitoring Wells
-  Piezometers
-  Lysimeters
-  Surface Water Monitoring Locations



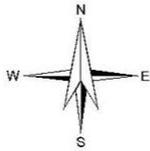
Stuck Corp. 2017

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Legend

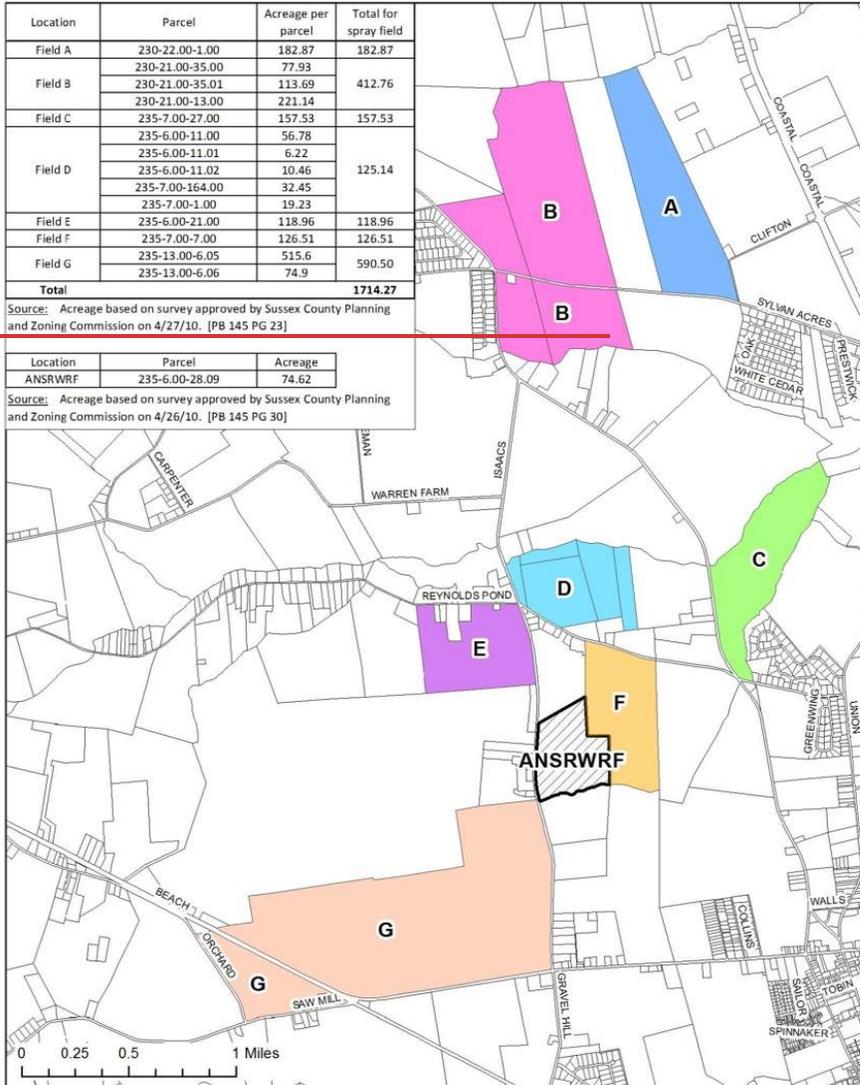
- Groundwater Monitoring Wells
- Lysimeters
- Piezometers
- Surface Water Monitoring
- Irrigation Pivots at SRRF



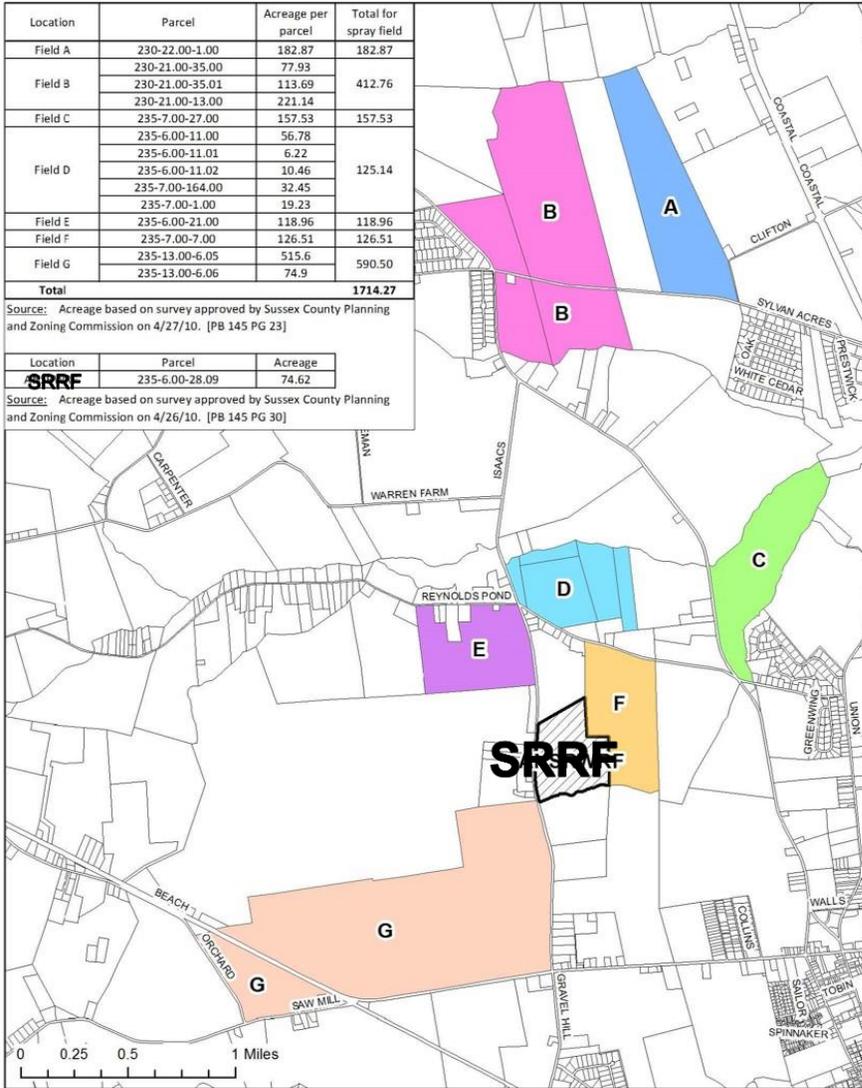
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SPRAY FIELDS

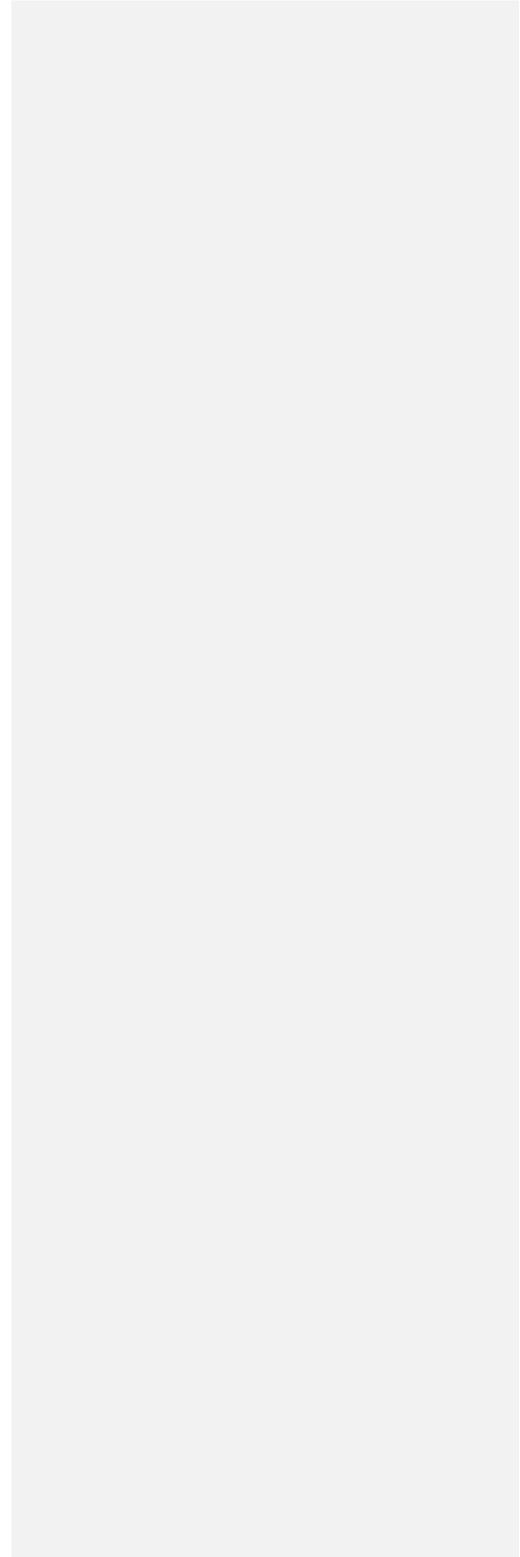


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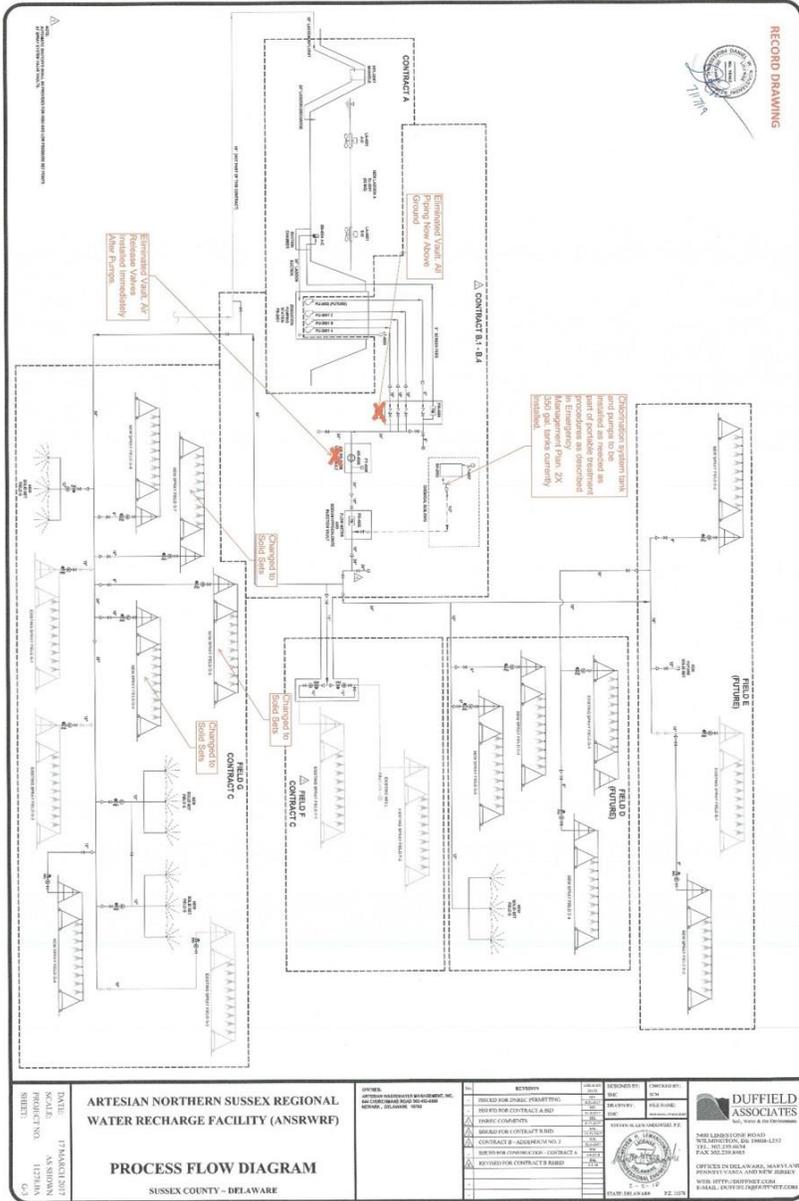


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PROCESS FLOW DIAGRAM PHASE 1 [taken from 2019.07.17 Drawings G-3 and G-4]



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LAGOON VOLUMES [taken from 2019.07.17 Drawings G-3 and G-4]

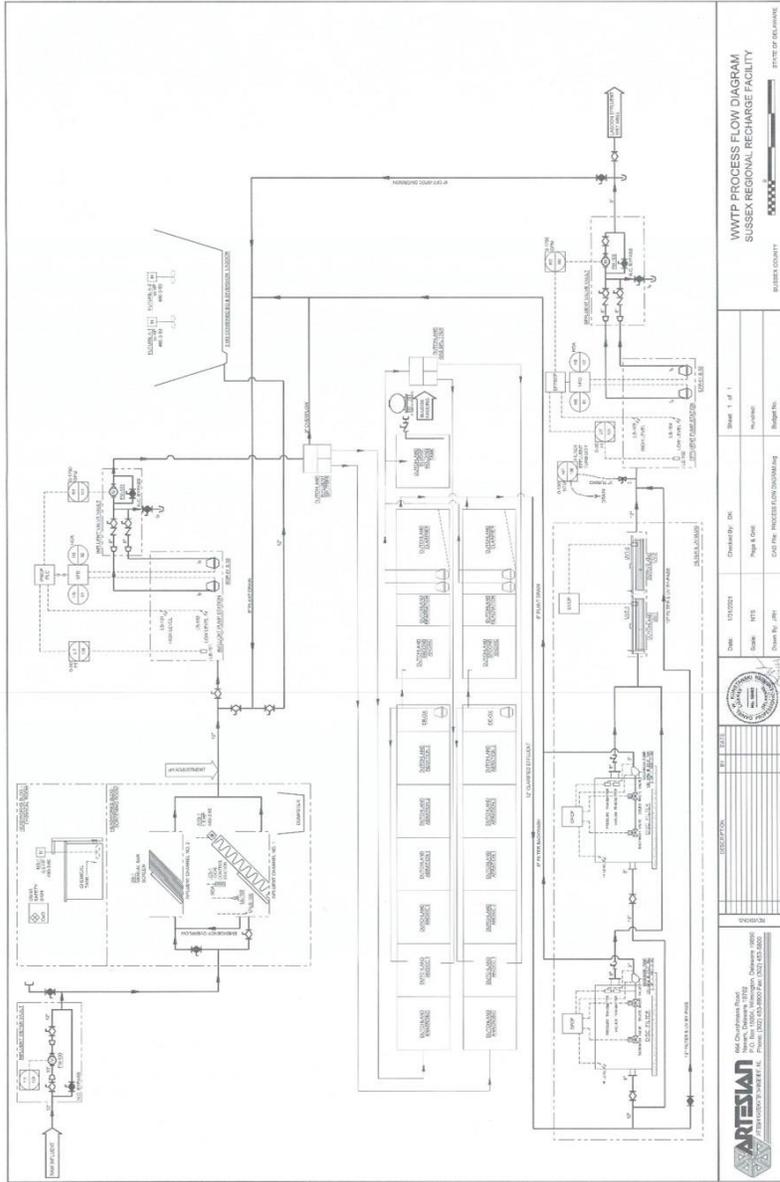
Contour Elevation	Contour Area (sq.ft.)	Avg. End Area Cumulative Volume (cu. Ft.)	Gallons (MG)
26	69,330	0	0.0
26.5	474,857	136,047	1.0
27	678,297	424,335	3.2
28	686,689	1,106,829	8.3
29	695,129	1,797,738	13.4
30	703,618	2,497,112	18.7
31	712,155	3,204,998	24.0
32	720,741	3,921,446	29.3
33	729,374	4,646,504	34.8
34	738,057	5,380,219	40.2
35	746,787	6,122,641	45.8
36	755,566	6,873,818	51.4
37	764,386	7,633,793	57.1
38	773,245	8,402,609	62.9
39	782,142	9,180,303	68.7
40	791,078	9,966,913	74.6
41	800,051	10,762,477	80.5
42	809,063	11,567,034	86.5
43	818,115	12,380,623	92.6
44	827,206	13,203,284	98.8
45	836,337	14,035,055	105.0
46	845,508	14,875,978	111.3

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Contour Elevation	Contour Area (sq.ft.)	Avg. End Area Cumulative Volume (cu. Ft.)	Gallons (MG)
26	69,330	0	0.0
26.5	474,857	136,047	1.0
27	678,297	424,335	3.2
28	686,689	1,106,829	8.3
29	695,129	1,797,738	13.4
30	703,618	2,497,112	18.7
31	712,155	3,204,998	24.0
32	720,741	3,921,446	29.3
33	729,374	4,646,504	34.8
34	738,057	5,380,219	40.2
35	746,787	6,122,641	45.8
36	755,566	6,873,818	51.4
37	764,386	7,633,793	57.1
38	773,245	8,402,609	62.9
39	782,142	9,180,303	68.7
40	791,078	9,966,913	74.6
41	800,051	10,762,477	80.5
42	809,063	11,567,034	86.5
43	818,115	12,380,623	92.6
44	827,206	13,203,284	98.8
45	836,337	14,035,055	105.0
46	845,508	14,875,978	111.3

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PROCESS FLOW DIAGRAM PHASE 2 [SRRF Wastewater Treatment System]



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PART I

A. DESCRIPTION OF OPERATIONS AND DISCHARGES

Pursuant to the provisions of 7 Del. C. §6003 and 7 Del. Admin. C. §7101 *Regulations Governing the Design, Installation, and Operation of On-Site Wastewater Treatment and Disposal Systems* (the Regulations), Artesian Wastewater Management, Inc. (the Permittee or AWMI) is authorized to operate and maintain the Sussex Regional Recharge Facility (SRRF), formerly known as the Artesian Northern Sussex Regional Water Recharge Facility (ANSRWRF), to serve as a regional on-site wastewater treatment and disposal system (OWTDS) meeting the existing and future wastewater treatment and disposal needs of AWMI's service territories in Sussex County, Delaware. Operations are divided into multiple Phases.

Phase ~~H1~~

SRRF is currently authorized to receive treated poultry processing wastewater (treated effluent) from the Allen Harim Foods Harbeson Processing Facility's wastewater treatment system. The poultry processing facility's wastewater treatment system is owned by Allen Harim Foods, LLC and operated in accordance with State Permit No. 597261-01-~~(and as amended)~~. The average daily flow of treated effluent received at SRRF is 1.5 million gallons per day (MGD) with a peak flow of 2.0 MGD. Treated effluent is stored (at SRRF) in a synthetically lined lagoon prior to being discharged via spray irrigation to approximately 1,714 acres of agricultural fields located in Sussex County, Delaware (see AWMI's Phase ~~H1~~ process flow diagram on [Page 5](#)).

Treated effluent is authorized to be discharged (via spray irrigation) to Fields D, E, F, and G; however, as of the date of this Permit ~~Amendment~~, only Fields F and G have been constructed and only Fields F and G are permitted for use. Fields D and E will be permitted for use upon completion of the Schedule of Compliance requirements iterated in [Part I.F.1](#) of this Permit and upon written approval from DNREC.

Phase ~~H2~~

Upon completion of a proposed advanced wastewater treatment system (see AWMI's Phase 2 process flow diagram on [Page 7](#)) authorized by Construction Permit No. 359288-03, and upon receiving written approval from the Department, SRRF will be authorized to receive and treat wastewater from within AWMI's service territories in Sussex County, Delaware. The wastewater treatment system will include a 3.0 million gallon (MG) combined equalization and off-spec water diversion lagoon, a headworks system consisting of screening and grit removal, an influent lift station, a Hybrid Bardenpho treatment process, two cloth media filters, a UV system for disinfection, and an effluent lift station to pump treated effluent to the existing 90 MG storage lagoon constructed as part of Phase ~~H1~~. Treated wastewater from the SRRF treatment system will be mixed with the treated effluent from Allen Harim's treatment system within the existing 90 MG storage lagoon and discharged (via spray irrigation) to the agricultural fields previously permitted under Phase ~~H1~~ (see Spray Fields on [Page 4](#)).

SRRF is located on Sussex County Parcel Number: 2-35 6.00 28.09; on a 75-acre site south of Reynolds Pond Road, east of Route 30, north of Ingram Branch and Route 16, and west of Cedar Creek Road, Sussex County, Delaware.

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Treated effluent is discharged via spray irrigation of privately owned agricultural land, under a lease held in perpetuity by AWMI as the wastewater utility provider. The spray fields have been permanently placed in an Agricultural Preservation Easement by the Delaware Agricultural Lands Preservation Foundation.

Spray Fields are listed below.

Phase 1 & H1 and 2 Spray Fields include Fields F and G [taken from 2019.07.17 Drawing 29]

Field	Tax Map ID	Gross Area (acres)	Crop Spray Area (acres)	Woods Spray Area (acres)	Total Spray Area (acres)
A ¹	230-22.00-1.00	182.9	116.3	34.1	150.4
B ¹	230-21.00-13.00 230-21.00-35.00 230-21.00-35.01	412.8	214.1	86.3	300.4
C ¹	235-7.00-27.00	157.5	37.0	38.2	75.2
D ^{2,3}	235-6.00-11.00 235-6.00-11.01 235-6.00-11.02 235-7.00-1.00 235-7.00-164.00	125.1	58.0	32.7	90.7
E ^{2,4}	235-6.00-21.00	119.0	90.5	0	90.5
F	235-7.00-7.00	126.5	110.5	0	110.5
G	235-13.00-6.05 235-13.00-6.06	590.5	276.1	200.5	476.5
Total		1,714.27	902.5	391.8	1294.19

- 1) Spray areas based on preliminary design for Design Development Report dated June 19, 2009. These will be designed and permitted during a future phase.
- 2) Fields D and E have not yet been constructed.
- 3) One parcel from Field D (2-35-6-11.01) is not included in the current Conditional Use Ordinance 1923, adopted July 31, 2017. Spray will not commence on this parcel until it has been added to an approved Conditional Use.
- 4) There is a wooded region in Field E of approximately 10 acres which is not included in the existing design, but may be utilized in future phases.

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B. DOCUMENTATION

The application consists of the materials submitted by the Permittee and materials contained in the administrative record prior to the issuance of this Permit. This includes documents associated with ~~the~~ both Phase 1 and Phase 2 construction and operation of SRRF (previously known as ANSRWRF).

Phase 1

1. March 12, 2013, Secretary's Order No. 2012-W-0052
2. May 5, 2017, Application Package for an amended Construction Permit for the Artesian Northern Sussex Regional Water Recharge Facility (ANSRWRF) Phase 1 submitted by AWMI

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- ~~iii.3.~~ Application Package includes: Application Form, Amended Design Development Report (DDR), Drawings and Specifications-
- ~~iv.4.~~ August 18, 2017, Amended DDR Addendum 1 submitted by AWMI providing requested additional information
- ~~v.5.~~ June 12, 2018, Amended DDR Addendum 2 submitted by AWMI providing a revised drawing of surface water monitoring locations
- ~~vi.6.~~ November 2, 2017, Secretary's Order No. 2017-W-0029
- ~~vii.7.~~ August 17, 2018, Application for a Construction Permit Extension
- ~~viii.8.~~ July 17, 2019, Spray Irrigation Permit Application
- ~~ix.9.~~ July 17, 2019, Operation and Maintenance Plan
- ~~x.10.~~ December 9, 2021, AWMI Comment Letter

~~Documentation associated with the Phase 2 construction of SRRF.~~

Phase 2

- ~~xi.1.~~ February 8, 2021, Application
- ~~xii.2.~~ February 4, 2021, (inadvertently dated 2020) AWMI letter providing resubmittal and addressing comments outlined in DNREC-GWDS's November 30, 2020 letter
- ~~xiii.3.~~ February 4, 2021, Application Form for an Amended Operations Permit
- ~~xiv.4.~~ February 3, 2021, Application Form for a Construction Permit
- ~~xv.5.~~ February 4, 2021, (inadvertently dated 2020) Artesian letter providing Applications
- ~~xvi.6.~~ February 2021, Design Engineer Report - Sussex Regional Recharge Facility (SRRF) - Phase 2 prepared by Artesian Resources Corp. for Artesian Wastewater Management, Inc.
- ~~7.~~ May 3, 2023, revised Nitrogen Balances for Sussex Regional Recharge Facility (SRRF) Phase 1 and Phase 2

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C. INFLUENT LIMITATIONS

1. Phase ~~H1~~: The ~~average daily~~ influent ~~discharged directly to the SRRF storage lagoon~~ received by SRRF from Allen Harim Foods, LLC (Allen Harim) shall not exceed an average daily flow of 1.5 MGD ~~in any calendar month or~~ nor a peak daily flow of 2.0 MGD in any calendar month.

Design Capacity to be received from Allen Harim: 1.5 MGD average daily flow,
— [calculated as Total Monthly Volume divided by number of days in month]

Peak daily flow from Allen Harim not to exceed: 2.0 MGD.

2. Phase ~~H2~~: The ~~average daily~~ influent received by ~~the~~ SRRF wastewater treatment system shall not exceed an average daily flow of 0.625 MGD ~~nor a peak daily flow of 1.25 MGD in any calendar month.~~

Design Treatment Capacity: 0.625 MGD,
[calculated as Total Monthly Volume divided by number of days in month]

Peak Daily Treatment Capacity: 1.25 MGD.

3. Combined capacity upon completion of Phase ~~H2~~: The Phase 2 combined influent received by SRRF shall not exceed 2.125 an average daily flow of 2.125 MGD in any calendar month or nor a peak daily flow of 3.25 MGD in any calendar month.

Combined Phase ~~H1~~ and Phase ~~H2~~ Capacity Average Daily Flow: 2.125 MGD.

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[calculated as Total Monthly Volume divided by number of days in month]

Combined Phase H1 and Phase H2 Peak Daily Flow: 3.25 MGD.

D. SPRAYED EFFLUENT LIMITATIONS

During the period beginning on the effective date and lasting through the expiration date of this Permit, the Permittee is authorized to discharge to the spray irrigation Fields F and G as identified on Page 9, in Part I.A, and depicted on Pages 3 and 4 of this Permit in the quantity and quality of treated effluent specified below and in accordance with the design documents listed in Part I.B of this Permit.

1. The monthly quantity of effluent discharged from SRRF to the spray fields or wooded areas shall not exceed ~~a volume that has been the monthly, nor the annual, application rates and total volumes~~ calculated ~~each month~~ by the Permittee to not cause the groundwater to exceed the drinking water standard for Nitrate (as Nitrogen) within the percolate. ~~The monthly quantity is to be calculated by utilizing the average of the lab verified effluent Total Nitrogen concentrations from the previous month and the calculations and assumptions provided in the design Nitrogen Balance excel spreadsheet. Once actual data is acquired for the mathematical assumptions, it shall be utilized in lieu of the assumed data (i.e., crop nutrient uptake). All changes to the spreadsheet calculations and assumptions shall be approved by the Groundwater Discharges Section prior to implementation. Each monthly spreadsheet shall be provided as both a hard copy format and electronically in Excel format with calculations maintained to the Groundwater Discharges Section for evaluation with the monthly Discharge Monitoring Report as provided in the revised Nitrogen Balances for Sussex Regional Recharge Facility (SRRF) Phase 1 and Phase 2 dated May 3, 2023.~~

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Phase 1: Effluent Discharge Limitations and Design Disposal Capacity

Fields F and G

Design Disposal Capacity: 2.49 MGD

[Calculated as the average of the two annual design disposal capacities for the two-year crop rotation cycle]

Fields D, E, F, and G

Design Disposal Capacity: 3.18 MGD

[Calculated as the average of the two annual design disposal capacities for the two-year crop rotation cycle]

The monthly and annual quantity of effluent discharged from SRRF to the spray fields or wooded areas shall not exceed the following application rate limitations (inches/acre-week) on any pivot or zone; and shall not exceed the following application rate limitations (MG/month and MG/year) on the combined pivot/zones within the specified field.

Effluent Volume Limit - Phase 1														
Crop Rotation (Cover-Corn-Wheat)														
<u>Field</u>	<u>Units</u>	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>SUM</u>
<u>Field G - Crop</u>	<u>MG/month</u>	<u>16.6</u>	<u>16.1</u>	<u>17.5</u>	<u>14.4</u>	<u>54.8</u>	<u>53.0</u>	<u>54.8</u>	<u>54.8</u>	<u>6.7</u>	<u>11.0</u>	<u>16.8</u>	<u>19.2</u>	<u>335.65</u>
<u>-</u>	<u>in/week</u>	<u>0.50</u>	<u>0.54</u>	<u>0.53</u>	<u>0.45</u>	<u>1.65</u>	<u>1.65</u>	<u>1.65</u>	<u>1.65</u>	<u>0.21</u>	<u>0.33</u>	<u>0.52</u>	<u>0.58</u>	<u>-</u>
<u>Field F - Crop</u>	<u>MG/month</u>	<u>6.6</u>	<u>6.5</u>	<u>7.0</u>	<u>5.8</u>	<u>21.9</u>	<u>21.2</u>	<u>21.9</u>	<u>21.9</u>	<u>2.6</u>	<u>4.4</u>	<u>6.7</u>	<u>7.7</u>	<u>134.28</u>
<u>-</u>	<u>in/week</u>	<u>0.50</u>	<u>0.54</u>	<u>0.53</u>	<u>0.45</u>	<u>1.65</u>	<u>1.65</u>	<u>1.65</u>	<u>1.65</u>	<u>0.20</u>	<u>0.33</u>	<u>0.52</u>	<u>0.58</u>	<u>-</u>
<u>Field D - Crop</u>	<u>MG/month</u>	<u>3.2</u>	<u>3.2</u>	<u>3.4</u>	<u>2.8</u>	<u>10.7</u>	<u>10.4</u>	<u>10.7</u>	<u>10.7</u>	<u>1.3</u>	<u>2.1</u>	<u>3.3</u>	<u>3.8</u>	<u>65.66</u>
<u>-</u>	<u>in/week</u>	<u>0.50</u>	<u>0.54</u>	<u>0.53</u>	<u>0.45</u>	<u>1.65</u>	<u>1.65</u>	<u>1.65</u>	<u>1.65</u>	<u>0.20</u>	<u>0.33</u>	<u>0.52</u>	<u>0.58</u>	<u>-</u>
<u>Field E -Crop</u>	<u>MG/month</u>	<u>4.8</u>	<u>4.6</u>	<u>5.0</u>	<u>4.1</u>	<u>16.1</u>	<u>17.4</u>	<u>18.0</u>	<u>18.0</u>	<u>1.9</u>	<u>3.2</u>	<u>4.8</u>	<u>5.5</u>	<u>103.28</u>
<u>-</u>	<u>in/week</u>	<u>0.44</u>	<u>0.47</u>	<u>0.46</u>	<u>0.39</u>	<u>1.48</u>	<u>1.65</u>	<u>1.65</u>	<u>1.65</u>	<u>0.18</u>	<u>0.29</u>	<u>0.46</u>	<u>0.51</u>	<u>-</u>

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Crop Rotation (Wheat-Soybean-Cover)														
Field	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	SUM
Field G -Crop	MG/month	17.4	20.8	42.7	53.0	54.8	3.9	50.9	54.8	53.0	38.1	11.2	17.6	418.28
-	in/week	0.52	0.69	1.29	1.65	1.65	0.12	1.53	1.65	1.65	1.15	0.35	0.53	-
Field F -Crop	MG/month	6.9	8.4	17.1	21.2	21.9	3.6	20.3	21.9	21.2	15.1	4.5	7.0	169.28
-	in/week	0.52	0.70	1.29	1.65	1.65	0.28	1.53	1.65	1.65	1.14	0.35	0.53	-
Field D - Crop	MG/month	3.4	4.1	8.4	10.3	10.7	1.8	9.9	10.7	10.4	7.4	2.2	3.4	82.77
-	in/week	0.52	0.70	1.29	1.65	1.65	0.28	1.53	1.65	1.65	1.14	0.35	0.53	-
Field E -Crop	MG/month	5.0	6.0	12.3	17.3	15.7	1.2	14.6	18.0	17.4	10.9	3.2	5.1	126.56
-	in/week	0.46	0.61	1.13	1.65	1.45	0.11	1.34	1.65	1.65	1.00	0.31	0.46	-
Field G Woods														
Field	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	SUM
Field G -Woods	MG/month	24.9	18.9	24.0	24.5	26.5	37.8	39.8	39.8	38.5	39.8	33.9	31.3	379.74
-	in/week	1.03	0.87	1.00	1.05	1.10	1.62	1.65	1.65	1.65	1.65	1.45	1.30	-
Field D Woods														
Field	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	SUM
Field D -Woods	MG/month	4.0	3.1	3.9	4.0	4.3	6.2	6.5	6.5	6.3	6.5	5.5	5.1	61.91
-	in/week	1.03	0.87	1.00	1.05	1.10	1.62	1.65	1.65	1.65	1.65	1.45	1.30	-

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Phase 2: Effluent Discharge Limitations and Design Disposal Capacity

Fields F and G

Design Disposal Capacity: 2.92 MGD

[Calculated as the average of the two annual design disposal capacities for the two-year crop rotation cycle]

Fields D, E, F, and G

Design Disposal Capacity: 3.75 MGD

[Calculated as the average of the two annual design disposal capacities for the two-year crop rotation cycle]

The monthly and annual quantity of effluent discharged from SRRF to the spray fields or wooded areas shall not exceed the following application rate limitations (inches/acre-week) on any pivot or zone; and shall not exceed the following application rate limitations (MG/month and MG/year) on the combined pivot/zones within the specified field.

Effluent Volume Limit - Phase 2														
Crop Rotation (Cover-Corn-Wheat)														
Field	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	SUM
Field G - Crop	MG/month	24.59	23.83	25.93	21.27	54.78	53.01	54.78	54.78	9.86	16.32	24.78	28.43	392.33
-	in/week	0.74	0.79	0.78	0.66	1.65	1.65	1.65	1.65	0.31	0.49	0.77	0.86	-
Field F - Crop	MG/month	9.8	9.6	10.4	8.5	21.9	21.2	21.9	21.9	3.9	6.5	9.9	11.3	156.82
-	in/week	0.74	0.80	0.78	0.66	1.65	1.65	1.65	1.65	0.30	0.49	0.77	0.85	-
Field D - Crop	MG/month	4.8	4.7	5.1	4.1	10.7	10.4	10.7	10.7	1.9	3.2	4.8	5.5	76.68
-	in/week	0.74	0.80	0.78	0.66	1.65	1.65	1.65	1.65	0.30	0.49	0.77	0.85	-
Field E -Crop	MG/month	8.1	7.9	8.5	6.9	18.0	17.4	18.0	18.0	3.2	5.3	8.1	9.2	128.43
-	in/week	0.74	0.80	0.78	0.66	1.65	1.65	1.65	1.65	0.30	0.49	0.77	0.85	-

- The total amount of Phosphorus that may be applied to the crop areas in Fields D, F, and G shall not exceed crop uptake needs of 31.2 lbs/acre per year. This amount includes supplemental fertilizers, (when approved by the Department), the phosphorus supplied from the effluent, and any other source. The wooded areas in Fields D and G, as well as all of Field E, do not have high phosphorus, and are thus exempt from these criteria. [February 2021 SRRF Phase ~~42~~ Design Engineer Report, Appendix C.2]

Adjustments and reductions are not to be factored into the annual reporting of Total Phosphorus Loading for demonstration of compliance with this limitation.

If any crops are not removed from the spray irrigation fields, then the Total Phosphorus application rate for the field shall be reduced by the amount of phosphorus that would be removed by harvesting the crop.

- The monthly quantity of effluent discharged may not exceed hydraulic loading assimilative capabilities of the fields.
- The ~~average~~ weekly quantity of effluent discharged to any portion of the spray irrigation field shall not exceed 1.65 inches per acre ~~averaged over~~ during any 7-day rolling period.

~~If operations at SRRF encounter emergency or extenuating circumstances that would require the weekly quantity of effluent discharged to exceed 1.65 inches per acre per 7-day period or 0.25, and the fields would be able to assimilate the additional Nitrogen Loading without exceeding the limitations set forth in Part I.D.11 below, please contact the Groundwater Discharges Section for written authorization in accordance with Section 6.3.2.3.13.8.1 of the Regulations.~~

If the Permittee wishes to pursue an increase in the application rate, the Permittee shall provide appropriate supporting design analysis in consultation with Department technical staff for consideration and written approval. A request for an increased application rate may require an Application for an Operations Permit Amendment, applicable Department fees and public advertisement.

- The quantity of effluent discharged to any portion of the spray irrigation field shall not exceed 0.25 inch/acre/hour.
- There shall be sufficient rest periods between applications to prevent field saturation and runoff from occurring in any part of the field.
- If the system has a partial circle center pivot, there shall be a minimum one-hour rest period when the center pivot reaches any in-field end stops if the instantaneous application rate exceeds a rate of 0.125 inch/acre in any one hour.
- The pH of the effluent shall not be less than 5.5 standard units nor greater than 9.0 standard units at any time. The point of compliance shall be ~~at Allen Harim's effluent pump station~~ in accordance with Part II.A.2 of this Permit.
- The Total Residual Chlorine (TRC) concentration shall not be less than 1.0 mg/L nor more than 4.0 mg/L at any time. The point of compliance shall be ~~at Allen Harim's effluent pump station~~ in accordance with Part II.A.2 of this Permit.

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10. Design Effluent Nitrogen Concentration

Allen Harim waste stream:

SRRF is designed to receive an effluent Total Nitrogen concentration of 3027.7 mg/L from Allen Harim's wastewater treatment system. [May 5, 2017, Amended Design Development Report ANSRWRF Phase 1].

During Phase 1 operations, if the effluent Total Nitrogen concentration exceeds 37.534.6 mg/L [Design Value + 25%] in any calendar month, the Permittee shall resample the wastewater and submit the additional analyses to the ~~Groundwater Discharges Section, Department~~. If the effluent Total Nitrogen concentration exceeds 37.534.6 mg/L for over a three-month period, the Permittee shall have the system evaluated to determine the cause and submit a revised Design Engineer Report to the ~~Groundwater Discharges Section, Department~~. If the effluent exceeds 45.041.5 mg/L [Design Value +50%], the Department may invoke the provisions of Part V.A.1 of this Permit. Also reference Part II.B.1.

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Phase 2 SRRF wastewater treatment system:

~~The Treated effluent discharged from the~~ Phase 2 SRRF wastewater treatment system ~~is designed to treat wastewater effluent to shall not exceed~~ a daily average Total Nitrogen concentration of 10 mg/L. The daily average concentration shall be determined by the summation of all the measured daily concentrations obtained from composite samples divided by the number of days during the calendar month when the measurements were made. [February 2021, Design Engineer Report SRRF Phase 2].

Phase 2 combined blended effluent:

The Phase 2 operation is designed to combine and blend the SRRF treated wastewater with the Allen Harim treated wastewater within the storage lagoon. ~~The Phase 2 is designed for a 2~~ combined effluent ~~shall not exceed a~~ daily average Total Nitrogen concentration of 24.422.5 mg/L. The daily average concentration Total Nitrogen shall be determined by the summation of all the measured daily concentrations obtained from composite samples divided by the number of days during the calendar month when the measurements were made.

During Phase 2 operations, if the effluent Total Nitrogen concentration from the SRRF treatment system, the Allen Harim waste stream, or the combined blended effluent exceeds 125% of the design value [Design Value + 25%] in any calendar month, the Permittee shall resample the wastewater and submit the additional analyses to the ~~Groundwater Discharges Section, Department~~. If any of the Total Nitrogen concentrations exceeds 125% of the design value over a three-month period, the Permittee shall have the system evaluated to determine the cause and submit a revised Design Engineer Report to the ~~Groundwater Discharges Section, Department~~. If the effluent exceeds 150% of the design value [Design Value +50%], the Department may invoke the provisions of Part V.A.1 of this Permit. Also reference Part II.B.1.

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11. The total amount of nitrogen that may be applied to each spray field acre shall not exceed the following limitations. This amount includes supplemental fertilizers, (when authorized by the Department), the nitrogen supplied from the effluent, and any other source. [Taken from February 2021, Design Engineer Report Appendix C May 3, 2023 revised Nitrogen Balances] for Sussex Regional Recharge Facility (SRRF) Phase 1 and Phase 2.] Additional Nitrogen via fertilizer in excess of the below limits may only be applied if approval is received from the Department in accordance with Part I.F.1.a of this Permit.

Phase 1 Nitrogen Loading Limits	
Crop Type	Nitrogen Loading Limit (lbs/acre-year)
Cover-Corn-Wheat	346.7338.9
Wheat-Soybean-Cover	411.1394.6
Woods (Loblolly Pines)	429.6437.9

Phase 2 Nitrogen Loading Limits	
Crop Type	Nitrogen Loading Limit (lbs/acre-year)
Cover-Corn-Wheat	352.5
Wheat-Soybean-Cover	417.7
Woods (Loblolly Pines)	421.9

Adjustments and reductions for denitrification, ammonia volatilization, evapotranspiration, and plant uptake are *not* to be factored into the annual reporting of Total Nitrogen Loading for demonstration of compliance with this limitation.

If any crops are not removed from the spray irrigation fields, then the Total Nitrogen application rate for the field shall be reduced by the amount of nitrogen that would be removed by harvesting the crop as detailed in SRRF's Design Engineer Report and/or Design Nitrogen Balance.

12. Application of Fertilizer

The application of additional fertilizer is only authorized with Department approval upon the Permittee completing the enhanced, higher resolution monitoring required in the Schedule of Compliance in Part I.F.1.a through Part I.F.1.c of this Permit. The enhanced monitoring is required prior to application to ensure groundwater protection by providing accurate actual data to determine via field data if potential groundwater impacts occur due to additional nutrient loading.

Upon installation of the enhanced monitoring well network, and the acquisition of required baseline data; the Permittee is authorized to apply nitrogen commercial fertilizers on the spray irrigation fields in a manner that may exceed the limitations contained in the Permit with Department approval.

Permittee shall notify the Department within 48 hours of application and submit application data including enhanced monitoring data in the monthly DMR.

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The Department reserves the right to revoke the authorization of additional fertilizer in the event the enhanced monitoring identifies impacts to groundwater, or the Permittee fails to submit complete and accurate monitoring data.

~~12-13.~~ The discharge to the spray irrigation fields shall be free from material such as floating solids, sludge deposits, debris, scum, oil, and grease.

~~13-14.~~ The facility is designed for Unlimited Public Access criteria.

Unlimited Public Access

Treated effluent utilized for unlimited public access sites shall meet the following daily permissible average concentrations. The daily average concentration shall be determined by the summation of all the measured daily concentrations obtained from composite or grab samples divided by the number of days during the calendar month when the measurements were made. The point of compliance shall be at the discharge side of SRRF's irrigation pumps for fecal coliform bacteria and at wastewater treatment system sampling port located immediately after filtration and disinfection for BOD₅, TSS, and Turbidity.

- a. The fecal coliform bacteria concentration of disinfected treated wastewater discharged to the spray fields shall not exceed 20 col/100 mL.
- b. The 5-day Biochemical Oxygen Demand (BOD₅) concentration of treated wastewater discharged to the spray fields shall not exceed 10 mg/L.
- c. The Total Suspended Solids (TSS) concentration of treated wastewater discharged to the spray fields shall not exceed 10 mg/L.
- d. The turbidity of the treated wastewater shall not exceed 5 NTU.

Parameter	Daily Permissible Average Concentration
BOD ₅	10.0 mg/L
Fecal Coliform	20 colonies/100 mL
TSS	10.0 mg/L
Turbidity	5 NTU

15. Lysimeter Percolate Limitation

The rolling 12-month average percolate Total Nitrogen concentrations in each lysimeter shall not exceed 10 mg/L. If the rolling 12-month average exceeds the total nitrogen percolate concentration of 10 mg/L, the Permittee shall examine the facility's operation and maintenance log for improper operational procedures, conduct a physical inspection of the disposal system to detect abnormalities, and review monitoring data and other records to determine the cause/source of the total nitrogen exceedance. The Permittee shall report the finding to the Department with any proposed modifications to operational procedures or other corrective actions. The Permittee shall implement proposed actions upon approval by the Department.

Upon the Permittee completing the enhanced, higher resolution monitoring required in the Schedule of Compliance in this Permit, the lysimeter data will be utilized in conjunction with the groundwater monitoring data to determine environmental impact.

E. FACILITY CLASSIFICATION

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A classification was performed on SRRF in accordance with the *Regulations Licensing Operators of Wastewater Facilities*. The wastewater treatment system is designated as a Class IV Facility. SRRF shall be under the direction of a Class IV Licensed Operator in Direct Responsible Charge who is available to direct operations. A licensed operator, operating under the direction of the licensed operator in Direct Responsible Charge for the facility, shall be available when the spray irrigation system is in operation.

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F. SCHEDULE OF COMPLIANCE

1. The Permittee shall submit the information necessary and/or complete the following requirements.

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a. Enhanced Monitoring Plan

i. Prior to applying nitrogen fertilizers (as discussed in Part.I.D.12), the Permittee shall provide to the Department for review and approval an Enhanced Monitoring Plan for Fields F and G developed by a licensed PG.

ii. The Enhanced Monitoring Plan shall include, but not be limited to, the following:

- 1) The installation of additional groundwater monitoring wells at deeper depths both in-field and down-gradient.
- 2) Additional down-gradient wells to be located in between existing wells.
- 3) Specific conductivity probes installed in the in-field and down-gradient monitoring wells.
- 4) May through October increase monitoring frequency to monthly at a minimum.
- 5) Additional Reporting regarding fertilizer, timing of application, type of application, constituents of fertilizer, etc.
- 6) Obtain probe baseline data prior to application of additional fertilizer (~6 months of data)

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b. Enhanced Monitoring Well Network Requirements

i. Within 15 days of installation of the monitoring well network, the Permittee shall provide an updated Monitoring Well As-built Drawing for the entire site bearing the seal and signature of a licensed Professional Engineer registered in the State of Delaware. The Monitoring Well As-built Drawing shall contain:

- 1) Table summary of groundwater monitoring well information.
- 2) GPS information detailing the northings and eastings; the local well ID number; and the DNREC Well ID/Well Permit Number. The GPS information must be in either Delaware State Plane, North American Datum 1983 meters; or Latitude and Longitude decimal degrees.
- 3) TOC elevations survey results, using NAVD88, for all monitoring wells to be utilized for groundwater monitoring. Provide the length of the well stickup and the well survey information to the closest 0.01 feet. Provide a permanent mark, etch, or fixture to be used to specify the survey point where the TOC elevations were read.

c. Enhanced Monitoring Contingency Plan

i. Within 15 days of installation of the monitoring well network, the Permittee shall provide an Enhanced Monitoring Contingency Plan that shall, at a minimum, address a potential event of elevated Nitrates, or upward trend, being detected in the in-field or downgradient wells. The plan shall include multiple short- and long-term mitigation measures (e.g., field resting, crop rotation, or other source control measures and/or hydrogeologic investigation and corrective actions).

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Phase I

a-d Prior to utilizing Fields D and E, the Permittee shall complete the following:

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- i. The Permittee shall notify the ~~Department's Groundwater Discharges Section~~ Department in writing of the intent to initiate construction activities for Fields D and E at least fifteen days prior to the commencement of construction. The written notification shall include a draft construction schedule. The Permittee shall provide updated construction schedules if the schedule changes as construction progresses.
- ii. Complete all construction relative to Fields D and E in accordance with State Permit DEN Number: 359288-01.
- iii. The Permittee shall notify the ~~Department's Groundwater Discharges Section~~ Department in writing upon completion of construction and request a Construction Completion Inspection to be performed by the ~~Department's Groundwater Discharges Section~~ Department staff. If an inspection is required, the Design Engineer, Class E.4 system contractor, licensed operator, and the Permittee may be required to be present during the inspection. During the inspection, all mechanical parts are to be tested.
- iv. Upon completion of construction, the Permittee shall submit to the ~~Department's Groundwater Discharges Section~~ Department the following applicable items. The items shall be combined in one package and shall include an electronic copy of all items where possible. Failure to submit all required information constitutes grounds for denial of the authorization to utilize Fields D and E for disposal.

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~~1~~) Design Engineer Inspection Report(s) certifying the project has been constructed in accordance with approved plans and specifications.

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~~2~~) Copies of any other applicable State/County inspection reports.

~~3~~) Contractor's Certificate of Completion.

~~4~~) A set of "as-built" drawings of the project bearing the seal and signature of a licensed Professional Engineer registered in the State of Delaware.

~~a~~) The "as-built" drawings shall include:

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~~b~~) Site map showing the location of all structures, piping and appurtenances, disposal areas and buffers.

~~c~~) A full equipment list and technical specifications for all equipment used, if different than submitted in the permit application.

~~d~~) The new topography elevations of the system.

~~e~~) Monitoring/Observation well elevations at the top of the casing (TOC) and at the ground surface, GPS coordinates (State Plane), and local topography tied to a common benchmark.

~~f~~) The location and screen depth, length of stick up, and well IDs shall be provided for each monitor well.

~~v~~) Any necessary updates to the Operation and Maintenance (O&M) Plan in accordance with Section 6.7 of the Regulations.

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~~vi~~) Spreadsheet summary of groundwater monitoring well, lysimeter, and piezometer information.

- h)vii. GPS information detailing the northings and eastings; the local well ID number; and the DNREC Well ID/Well Permit Number. The GPS information shall be in either Delaware State Plane, North American Datum 1983 meters, or Latitude and Longitude decimal degrees.
- h)viii. TOC elevations survey results for all monitoring wells to be utilized for groundwater monitoring. Provide the length of the well stickup and the well survey information to the closest 0.01 feet. Provide a permanent mark, etch, or fixture to be used to specify the survey point where the TOC elevations were read.
- j)ix. A summary report detailing the analyses of the background groundwater quality sampling program that was conducted consisting of at least three (3) samples one (1) month apart and analyzed within six months prior to the initiation of disposal activities (see Section 6.6.3.16 of the Regulations). Lab data sheets must be provided in addition to an Excel summary worksheet.
- k)x. An approved Conditional Use for Field D parcel (2-35-6-11.01).
 - xi. A summary report detailing the analyses of background soils sampling that was conducted in accordance with Part I.A.6 "Soil Monitoring Requirements" of this permit and performed within six months prior to the initiation of disposal activities. Lab data sheets must be provided in addition to an Excel summary worksheet.

~~h)e.~~ Obtain written approval from the ~~Groundwater Discharges Section~~Department authorizing disposal on Fields D and E.

Phase H2

~~b.f.~~ Prior to operation of the SRRF wastewater treatment system constructed in accordance with DNREC Construction Permit DEN Number 359288-03, Permittee shall obtain written approval from the ~~Groundwater Discharges Section~~Department.

2. The Permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance by specified date. In the event of noncompliance, the notice shall include the cause of noncompliance, any remedial action taken, and the probability of meeting the next scheduled requirement.

G. BUFFER REQUIREMENTS

Buffer zones shall be maintained in accordance with Section 6.3.2.3.10 of the Regulations unless otherwise specified below. Also see buffer requirement set forth in Part I.I.c.

1. Buffer zones of at least 150-feet shall be maintained around all public and private domestic wells.
2. A buffer zone of 150-feet shall be maintained from all downgradient domestic wells occurring on parcels 235-14.00-63.00, 235-14.00-66.00, and 235-13.00-6.00 [Per DNREC Hydrogeologic review dated March 25, 2010 and the August 18, 2017 DDR Addendum].

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3. In accordance with Secretary's Order No. 2012-W-0052 Issued and Effective March 12, 2013, Permittee shall:
 - a. Maintain all required buffers for the spray fields as set by both the Department and Sussex County.
 - i. Maintain a 100-foot buffer from the wetted field area to the north-west corner of the Sylvan Acres Development.

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H. SLUDGE HANDLING REQUIREMENTS

~~N/A~~

All sludge (biosolids) shall be handled in accordance with standard wastewater practices and shall be disposed of in a manner such as to prevent any pollutant from entering the surface water or groundwater and to comply with applicable federal or state laws and regulations.

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Management and disposal of biosolids produced at the SRRF wastewater treatment system shall be handled by pumping and transport to Sussex County's Class A biosolids treatment facility at the Inland Bays Regional Wastewater Treatment Facility. The Permittee owns and operates two (2) 5,000-gallon pumper trucks operating under State of Delaware Non-Hazardous Liquid Waste Transporters Permit (No. DE OH-300). The Permittee shall use these trucks (or other permitted trucks) to transport biosolids. The Permittee shall handle sludge in accordance with the disposal agreement dated September 19, 2019 with Sussex County Council to dispose of up to 100 dry tons of biosolids per year at their IBRWTF biosolids facility. The Permittee shall maintain a current copy of the executed agreement with Sussex County on file with the Department. In order to deviate from the above biosolids management and disposal plan, the Permittee shall submit an alternative plan for Department approval.

I. FACILITY SPECIFIC CONDITIONS

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1. The Permittee is authorized to transfer flows to other Permittee-owned and Sussex County-owned wastewater treatment facilities for additional treatment and/or disposal as approved by Department-issued Permits.
2. In accordance with Secretary's Order No. 2012-W-0052 Issued and Effective March 12, 2013, the Permittee shall:
 - a. Design the treatment plant to look like an agricultural building and have landscaping to screen it from view from its neighbors.
 - b. Ensure that the storage ponds do not become a breeding ground for mosquitos.
 - c. Maintain all required buffers for the spray fields as set by both the Department and Sussex County.
 - i. Maintain a 100-foot buffer from the wetted field area to the north-west corner of the Sylvan Acres Development.
3. The Permittee shall comply with all applicable Sussex County ordinances and conditional use requirements placed on this facility.
4. The Permittee shall maintain an updated copy of the spray irrigation land area Lease Agreement on file with the ~~Groundwater Discharges Section~~Department.
5. Phase 2 is designed to require only 37.2 MG of the storage lagoon's 90 MG capacity. If storage volume exceeds 37.2 MG, the Permittee shall notify the ~~Groundwater Discharges Section~~Department in writing. See lagoon volumes table on **Page 6** of this Permit.

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6. Wastewater spray irrigation will not be permitted on Field D parcel (2-35-6-11.01) until it is added to an approved Conditional Use. Parcel 2-35-6-11.01 is not included in the current Conditional Use Ordinance 1923, adopted July 31, 2007. Once this parcel has been added to an approved Conditional Use, the Permittee shall provide a copy of the approved Conditional Use to the ~~Groundwater Discharges Section~~Department for approval.

7. ~~Total Nitrogen Wastewater Treatment System~~Phase 1 Fecal Coliform Bacteria Contingency Plan

- a. ~~If the analytical results of an effluent sample from discharge side of the SRRF irrigation pumps documents an exceedance of the maximum limitations for fecal coliform bacteria set by this Permit, the Permittee shall collect and analyze a second sample within 24 hours after becoming aware of the exceedance. If the second sample documents that the maximum limitation for fecal coliform bacteria is continuing to be exceeded, the following corrective actions shall be enacted:~~
- ~~i. Notify the Department of the non-compliance.~~
 - ~~ii. Immediately cease discharging effluent.~~
 - ~~iii. Submit copies of the recent analytical results documenting the two exceedances to the Department.~~
 - ~~iv. Examine operation and maintenance logs for improper operational procedures.~~
 - ~~v. Conduct a physical inspection of the treatment system, lagoon, and effluent transfer line to detect abnormalities. Any abnormalities discovered shall be corrected.~~
- b. ~~Within 24 hours of enacting these corrective actions, the Permittee shall collect and analyze a third sample for fecal coliform bacteria from discharge side of the SRRF irrigation pumps. If the analytical results no longer document an exceedance of the maximum limitations for fecal coliform bacteria, the Permittee shall notify the Department and may resume normal operations.~~
- c. ~~However, if the analytical results of the third sample again documents an exceedance of the maximum limitations for fecal coliform bacteria set by this Permit, the Permittee shall install and operate a temporary disinfection system to further treat the effluent from the lagoon. Disinfection shall continue until fecal coliform bacteria results meet required limits and the Department authorizes the Permittee to cease disinfection.~~

8. Phase 2 Total Nitrogen Contingency Plan

- a) Upon the operation of the SRRF wastewater treatment system, if the analytical results of a treated wastewater sample collected from the sampling port located immediately after filtration and disinfection documents the exceedance of ~~at the~~ 10 mg/L Total Nitrogen concentration, the Permittee shall collect and analyze a second sample within 24 hours of becoming aware of the original exceedance. If the second sample results documents that the 10 mg/L Total Nitrogen concentration ~~is continuing to be~~continues exceeded, ~~the Total Nitrogen limitation, the Permittee shall enact~~ the following contingency plan ~~shall be enacted~~.
- ~~i. The Permittee shall notify the Groundwater Discharges Section~~Department within 24-hours after becoming aware of the second exceedance and submit a copy of the analytical results ~~documenting to the exceedances~~Department.
 - ~~ii. Upon evaluation of~~If laboratory testing confirms that treated wastewater concentrations exceed 10 mg/L but the ~~data~~exceedance is less than 20 mg/L for either Nitrate as Nitrogen or Total Nitrogen than the Permittee shall notify the Department ~~shall to~~ determine if treated wastewater is required to be diverted ~~for retreatment~~. If required, the ~~Permittee treated wastewater shall be immediately cease discharging to~~diverted for storage ~~lagoon and retreatment~~.

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- iii. If laboratory testing confirms that treated wastewater concentrations exceed 20 mg/L for either Nitrate as Nitrogen or Total Nitrogen than the Permittee shall immediately divert the treated wastewater to the off-spec lagoon for temporary storage and additional treatment.
- iv. The Permittee shall increase the frequency of Total Nitrogen treated wastewater effluent sampling at the SRRF wastewater treatment system to once daily and submit weekly results to the Groundwater Discharge Section Department.
- v. The Permittee shall examine the operation and maintenance log, required to be maintained by this Permit, for any possible improper operational procedures.
- vi. The Permittee shall conduct a physical inspection of the treatment system to detect abnormalities. Any abnormalities discovered shall be corrected. A report detailing the corrections made shall be submitted to the Groundwater Discharge Section Department within 30 days of correction.
- vii. When daily analytical results from three consecutive days of wastewater sampling do not exceed the limitation, the Permittee is authorized to discharge to the storage lagoon and return to a bi-weekly monitoring frequency.

- b) If the Department approves the continued discharge of treated wastewater in accordance with 8.a.ii to the storage lagoon, the following additional requirements shall be required.
- i. The Permittee shall increase the frequency of Total Nitrogen treated wastewater effluent sampling at the SRRF wastewater treatment system and at the discharge side of SRRF's irrigation pumps to once daily and submit weekly results to the Groundwater Discharge Section Department.
 - ii. The Permittee shall submit monthly TN balances documenting that the facility can continue spray irrigation at higher concentrations while not exceed 10 mg/L TN (monthly basis) in the percolate.

- iii. When daily analytical results from three consecutive weeks of wastewater sampling do not exceed the limitation, the Permittee is authorized to return to a bi-weekly monitoring frequency.

- c) If the facility is required to enact this contingency plan more than three times in a 12-month period, the Permittee shall have the system evaluated to determine the cause of the elevated total nitrogen results and submit a revised Design Engineer Report with proposed corrective actions to achieve a maximum total nitrogen concentration of 10 mg/L that bears the seal and signature of a Class C licensed Delaware Professional Engineer to the Groundwater Discharges Section Department. The report shall be submitted within one year of the third notification of the contingency plan being enacted. The Permittee shall initiate implementation of the plan within 90 days following approval by the Groundwater Discharges Section Department.

8.9. Wastewater Treatment System Phase 2 Fecal Coliform Bacteria and Turbidity Contingency Plan

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- a) Upon the operation of the SRRF wastewater treatment system, if the analytical results of a treated wastewater sample collected from the sampling port located immediately after filtration and disinfection documents an exceedance of the maximum limitations for fecal coliform bacteria and/or turbidity set by this Permit, the Permittee shall collect and analyze a second sample within 24 hours after becoming aware of the exceedance. If the second sample documents that any maximum limitation for fecal coliform bacteria and/or turbidity is continuing to be exceeded, the following corrective actions shall be enacted:
- ~~1-i.~~ Notify the Department of the non-compliance ~~and initiate that the following~~ corrective actions.
 - ~~2-ii.~~ Submit copies of the recent analytical results documenting ~~an~~the exceedance to the Department.
 - ~~3-iii.~~ Immediately increase filtration through the cloth media filters. This shall be accomplished by either bringing online additional filtration capacity or decreasing the loading per square foot of filter media.
 - ~~4-iv.~~ Examine operation and maintenance logs for improper operational procedures.
 - ~~5-v.~~ Conduct a physical inspection of the treatment system to detect abnormalities. Any abnormalities discovered shall be corrected.
- b) Within 24 hours of enacting these corrective actions the Permittee shall collect and analyze a third sample for fecal coliform bacteria and/or turbidity from the treatment ~~plan~~system discharge. If the analytical results no longer document an exceedance of any of the maximum limitations for fecal coliform bacteria and/or turbidity, the Permittee shall notify the Department and may resume normal operations.
- c) However, if the analytical results of the third sample again documents an exceedance of any of the maximum limitations for fecal coliform bacteria and/or turbidity set by this Permit, the following corrective actions shall be enacted:
- ~~1-i.~~ Notify the Department of the continued non-compliance ~~and initiate the following~~ corrective actions.
 - ~~2-ii.~~ Submit copies of the recent analytical results documenting an exceedance to the Department.
 - ~~3-iii.~~ Effluent from the treatment system shall be diverted away from the 90- million-gallon storage lagoon back to the influent equalization/diversion lagoon for further treatment.
 - ~~4-iv.~~ When ~~the~~ additional analytical results from samples of treated wastewater effluent no longer document an exceedance of any of the maximum limitations for fecal coliform bacteria and/or turbidity, the Permittee shall notify the Department and upon written approval from the Department may resume transferring treated wastewater to the 90- million-gallon storage lagoon and resume normal operations.
- d) If the facility is required to divert poorly treated wastewater more than three times in a 12-month period, the Permittee shall have the wastewater treatment system evaluated to determine the cause of the elevated fecal coliform bacteria and/or turbidity results and submit a revised Design Engineer Report with proposed corrective actions to achieve a maximum fecal coliform bacteria count of 20 colonies/100 mL and/or turbidity concentration of 5 NTU that bears the seal and signature of a Class C licensed Delaware Professional Engineer to the ~~Groundwater Discharges Section~~Department. The report shall be submitted within one year of the third notification of the diversion of poorly treated wastewater being enacted. The Permittee shall

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Draft Permit Name: Sussex Regional Recharge Facility
State Permit No. 359288-02
Effective Date: March 18, 2020
Amendment Date: **TBD**
Expiration Date: March 17, 2025
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initiate implementation of the plan within 90 days following approval by the ~~Groundwater Discharges Section~~ Department.

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PART II

A. MONITORING REQUIREMENTS

Draft Permit Name: Sussex Regional Recharge Facility
State Permit No. 359288-02
Effective Date: March 18, 2020
Amendment Date: **TBD**
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During the period beginning on the effective date and lasting through the expiration date of this Permit, the Permittee is authorized to discharge to spray irrigation **Fields F and G** as identified on **Page 9, in Part I.A**, and depicted on **Page 3 and 4 of this Permit**. Such discharge shall be monitored by the Permittee as specified herein.

Fields D and E will be authorized for use upon completion of the Schedule of Compliance requirements iterated in **Part I.F.1** of this Permit and upon written approval from DNREC.

For samples required to be taken 'monthly' and/or 'twice per ~~month~~, month,' the samples for each monitoring location (i.e., influent, effluent, well, lysimeter, etc.) shall be taken a minimum of 14 days apart. ~~Samples required to be taken 'quarterly' shall be taken once every three months and no more than 100 days apart.~~

Requests for monitoring modifications shall be submitted to the ~~Department's Groundwater Discharges Section~~ **Department** in writing. Such requests shall clearly state the reason for and nature of the proposed modification and, where applicable, shall contain supporting scientific information, analysis, and justification. Requests will be addressed by the Department on a case-by-case basis.

The Permittee shall initiate periodic reporting required under **Part II.B.2** upon initiation of irrigation activities for all monitoring requirements.

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1. INFLUENT MONITORING REQUIREMENTS

a. Phase ~~1~~ and Phase 2 Allen Harim treated effluent entering SRRF's storage lagoon

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Samples taken in compliance with the sprayed influent monitoring requirements for all parameters specified may either be taken from a sampling port and meter located prior to storage at SRRF or reported as sampled in accordance with Allen Harim LLC's Permit No. 597261-01 at their effluent pump station.

Parameter	Unit of Measurement	Monitoring Frequency	Sample Type
Flow - Total Influent Flow for Month to SRRF	Gallons	Continuous	Recorded
Flow - Max Daily Influent Flow to SRRF	Gallons	Continuous	Recorded
Flow - Average Daily Influent Flow to SRRF	Gallons/Day	Continuous	Calculation (Total Influent Flow for Month / Number of Days in Month)
BOD ₅	mg/L	Monthly	Composite
TSS	mg/L	Monthly	Composite
Total Nitrogen	mg/L	Monthly	Composite
Ammonia Nitrogen	mg/L	Monthly	Composite
Nitrate + Nitrite as Nitrogen	mg/L	Monthly	Composite
pH	S.U.	Monthly	Composite
Total Phosphorus	mg/L	Monthly	Composite
Chloride	mg/L	Quarterly	Composite
Turbidity	NTU	Continuous	Recorded
Total Residual	mg/L	Continuous	Recorded
Potassium	mg/L	Quarterly	Composite
Sodium	mg/L	Quarterly	Composite

b. Phase ~~4~~ SRRF treatment system influent

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Parameter	Unit of Measurement	Monitoring Frequency	Sample Type
Flow - Total Influent Flow for Month to SRRF	Gallons	Continuous	Recorded
Flow - Max Daily Influent Flow to SRRF	Gallons	Continuous	Recorded
Flow - Average Daily Influent Flow to SRRF	Gallons/Day	Continuous	Calculation (Total Influent Flow for Month / Number of Days in Month)
BOD ₅	mg/L	Monthly	Grab
TSS	mg/L	Monthly	Grab
Total Nitrogen	mg/L	Monthly	Grab
Ammonia Nitrogen	mg/L	Monthly	Grab
Nitrate + Nitrite as Nitrogen	mg/L	Monthly	Grab
pH	S.U.	Monthly	Grab
Total Phosphorus	mg/L	Monthly	Grab
Chloride	mg/L	Quarterly	Grab
Copper	Mg/L	Annually	Grab

2. SPRAYED EFFLUENT MONITORING REQUIREMENTS

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a. Requirements for Phase 4¹ Allen Harim treated effluent discharged from SRRF's storage lagoon

Samples taken in compliance with the sprayed effluent monitoring requirements for all parameters specified shall be taken from ~~a sampling port and meters located at~~ the discharge side of the SRRF irrigation pumps.

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Parameter	Unit Measurement	Monitoring Frequency	Sample Type
Ammonia Nitrogen	mg/L	Monthly	Composite
Cadmium	mg/L	Annually	Composite
Copper	mg/L	Annually	Composite
Effluent Flow	Gal/day per Field /Zone/Pivot ¹	Continuous	Recorded
Fecal Coliform	Col/100 ml	Twice per month	Grab
Lead	mg/L	Annually	Composite
Nickel	mg/L	Annually	Composite
Nitrate + Nitrite Nitrogen	mg/L	Monthly	Composite
Organic Nitrogen	mg/L	Monthly	Calculation
Total Nitrogen	mg/L	Twice per Month	Composite
Total Phosphorus	mg/L	Monthly	Composite
Total Residual Chlorine ²	mg/L	Monthly	Composite
Zinc	mg/L	Annually	Composite

¹ Data shall be provided for each zone (wooded areas) and each pivot (agricultural fields). Providing only an overall summary for each field will constitute a violation of this Permit.

² Total Residual Chlorine shall only be sampled ~~in the event of a~~when disinfection ~~event is required~~ at SRRF.

Additionally, the Permittee shall provide the following information.

Parameter	Unit Measurement	Monitoring Frequency	Sample Type
Total Effluent Flow to all Fields/Zones/Pivots combined	Gallons	Monthly	Data
Max Daily Effluent Flow to all Fields/Zones/Pivots combined	Gallons	Monthly	Data
Average Daily Effluent to all Fields/Zones/Pivots combined	MGD or GPD	Monthly	Calculation (Total Monthly Effluent Flow / Number of Days in Month)
Number of Days Sprayed during the Month to all Fields/Zones/Pivots combined	Days	Monthly	Data
Total Effluent Flow to each Field/Zone/Pivot	Gallons	Monthly	Data
Number of Days Sprayed During the Month to each Field/Zone/Pivots	Gallons	Monthly	Data
Nitrogen Loading Rate to each Field/Zone/Pivot	lbs/acre per Field/Zone/Pivot ³	Monthly	Calculation
Phosphorus Loading Rate to each Field/Zone/Pivot	lbs/acre per Field/Zone/Pivot ³	Monthly	Calculation
Monthly and Cumulative Loading and Percolate Calculations (Nitrogen Balance) for each Field/Pivot ⁴	lbs/acre mg/L	Monthly	Calculation

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³Data shall be provided for each zone (wooded areas) and each pivot (agricultural fields). Providing only an overall summary for each field will constitute a violation of this Permit.

⁴The Permittee shall submit to the GWDS monthly in Excel spreadsheet format both electronically and in hard copy format

b. Requirements for Phase #2 effluent (two points of compliance)

Wastewater Treatment System

Samples taken in compliance with the sprayed effluent monitoring requirements for all parameters specified shall be taken from a sampling port and meters located immediately after filtration and disinfection.

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Parameter	Unit Measurement	Monitoring Frequency	Sample Type
Ammonia Nitrogen	mg/L	Monthly	Composite
BOD ₅	mg/L	Twice per month	Composite
Cadmium	mg/L	Annually	Composite
Chloride	mg/L	Quarterly	Composite
Copper	mg/L	Annually	Composite
Effluent Flow	Gal/day per Field/Zone/Pivot	Continuous	Recorded
Fecal Coliform	Col/100 ml	Twice per month	Grab
Lead	mg/L	Annually	Composite
Nickel	mg/L	Annually	Composite
Nitrate + Nitrite Nitrogen	mg/L	Monthly	Composite
Organic Nitrogen	mg/L	Monthly	Calculation
pH	S.U.	Daily	In-situ
Potassium	mg/L	Quarterly	Composite
Sodium	mg/L	Quarterly	Composite
Total Nitrogen	mg/L	Twice per Month	Composite
Total Phosphorus	mg/L	Monthly Quarterly	Composite
TSS	mg/L	Twice per month	Composite
TDS	mg/L	Quarterly	Composite
Turbidity	NTU	Continuous	Recorded
Total Residual Chlorine ⁵	mg/L	Daily	Composite
Zinc	mg/L	Annually	Composite

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⁵ Total Residual Chlorine shall only be sampled ~~in the event of a~~if disinfection event(using Chlorine) is required at SRRF.

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 + 5" + 5.5" + 6" + 6.5" + 7" + 7.5" + 8" + 8.5" + 9"

Post-Storage Discharge of Blended Treated Effluent

Samples taken in compliance with the sprayed effluent monitoring requirements for all parameters specified shall be taken from a sampling port and meters located at the discharge side of the SRRF irrigation pumps.

Parameter	Unit Measurement	Monitoring Frequency	Sample Type
Ammonia Nitrogen	mg/L	Monthly	Composite
BOD ₅	mg/L	Twice per month	Composite
Cadmium	mg/L	Annually	Composite
Chloride	mg/L	Quarterly	Composite
Copper	mg/L	Annually	Composite
Effluent Flow	Gal/day per Field/Zone/Pivot	Continuous	Recorded
Fecal Coliform	Col/100 ml	Twice per month	Grab
Lead	mg/L	Annually	Composite
Nickel	mg/L	Annually	Composite
Nitrate + Nitrite Nitrogen	mg/L	Monthly	Composite
Organic Nitrogen	mg/L	Monthly	Calculation
pH	S.U.	Daily	In-situ
Potassium	mg/L	Quarterly	Composite
Sodium	mg/L	Quarterly	Composite
Total Nitrogen	mg/L	Twice per Month	Composite
Total Phosphorus	mg/L	Quarterly Monthly	Composite
TSS	mg/L	Twice per month	Composite
TDS	mg/L	Quarterly	Composite
Turbidity	NTU	Continuous	Recorded
Total Residual Chlorine ⁶	mg/L	Daily	Composite
Zinc	mg/L	Annually	Composite

⁶ Total Residual Chlorine shall only be sampled ~~in the event of a~~if disinfection event(using Chlorine) is required at SRRF.

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Additionally, the Permittee shall provide the following information.

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<u>Parameter</u>	<u>Unit Measurement</u>	<u>Monitoring Frequency</u>	<u>Sample Type</u>
<u>Total Effluent Flow to all Fields/Zones/Pivots combined</u>	<u>Gallons</u>	<u>Monthly</u>	<u>Data</u>
<u>Max Daily Effluent Flow to all Fields/Zones/Pivots combined</u>	<u>Gallons</u>	<u>Monthly</u>	<u>Data</u>
<u>Average Daily Effluent to all Fields/Zones/Pivots combined</u>	<u>MGD or GPD</u>	<u>Monthly</u>	<u>Calculation</u> <u>(Total Monthly Effluent Flow /</u> <u>Number of Days in Month)</u>
<u>Number of Days Sprayed during the Month to all Fields/Zones/Pivots combined</u>	<u>Days</u>	<u>Monthly</u>	<u>Data</u>
<u>Total Effluent Flow to each Field/Zone/Pivot</u>	<u>Gallons</u>	<u>Monthly</u>	<u>Data</u>
<u>Number of Days Sprayed During the Month to each Field/Zone/Pivots</u>	<u>Gallons</u>	<u>Monthly</u>	<u>Data</u>
<u>Nitrogen Loading Rate to each Field/Zone/Pivot</u>	<u>lbs/acre per Field/Zone/Pivot</u>	<u>Monthly</u>	<u>Calculation</u>
<u>Phosphorus Loading Rate to each Field/Zone/Pivot</u>	<u>lbs/acre per Field/Zone/Pivot</u>	<u>Monthly</u>	<u>Calculation</u>

3. GROUNDWATER MONITORING REQUIREMENTS

Groundwater samples shall be taken from each monitoring well at SRRF. Groundwater monitoring well locations are depicted on the Site Map found on Page 3 of this Permit.

Samples taken in compliance with the monitoring requirements specified shall be taken at each monitoring well in accordance with procedures approved by the Department and listed in the *State of Delaware, Field Manual for Groundwater Sampling* (Custer, 1988) or alternative methodology approved by the Department.

Groundwater monitoring results for each monitoring well shall be reported using the State of Delaware Well Identification Tag Number that is required on all wells in accordance with the *Delaware Regulations Governing the Construction and Use of Wells*, Section 11.1.

All field sampling logs and laboratory results for samples obtained from a well shall be identified by the DNREC ID affixed to the well.

Groundwater samples shall be tested from the following wells for the following parameters [well info taken from 2019.07.17 O&M p.32].

DNREC Well ID	Local ID	Northings (meters)	Eastings (meters)	Ground Elevations (ft)	Top of Outer Casing (ft)	Length of Stick Up (ft)	Casing Depth (ft)
254881	MW-1L	88993.83	206492.46	34.11	36.67	2.56	20
254882	MW-2L	89332.77	206846.20	33.21	35.67	2.46	20
254883	MW-3L	89038.74	207010.94	28.50	30.69	2.19	20
254884	MW-4L	88740.91	207018.88	34.11	36.67	2.56	20
258634	MW-1F	89056.08	206855.40	31.57	33.98	2.41	20
258632	MW-2F	89805.84	206844.26	31.53	33.93	2.4	20
258633	MW-3F	89653.61	207373.30	23.43	29.03	5.6	20
258635	MW-4F	88664.02	207398.01	18.48	20.98	2.5	20
258636	MW-5F	88901.57	207213.08	27.06	29.55	2.49	20
258620	MW-1G	87908.08	204453.82	39.08	41.88	2.8	20
258628	MW-2G	86961.64	204305.92	42.18	44.70	2.52	20
258630	MW-3G	87059.37	204894.01	38.48	40.82	2.34	20
258631	MW-4G	87083.99	205047.96	39.13	41.72	2.59	20
258625	MW-5G	87224.43	205871.48	35.28	38.11	2.83	20

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- 1) Coordinates are in NAD 1983 Delaware State Plane 0700 Meters.
- 2) Monitoring Wells have been screened from a depth of 20-ft to 30-ft.

Parameter	Unit Measurement	Measurement Frequency	Sample Type
Ammonia as Nitrogen	mg/L	Quarterly	Grab

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<u>Chloride</u>	<u>mg/L</u>	<u>Quarterly</u>	<u>Grab</u>
<u>Depth to Water</u>	<u>hundredths of a foot</u>	<u>Monthly</u>	<u>Field Test</u>
<u>Dissolved Oxygen</u>	<u>mg/L</u>	<u>Quarterly</u>	<u>Field Test</u>
<u>Fecal Coliform</u>	<u>Col/100mL</u>	<u>Quarterly</u>	<u>Grab</u>
<u>Nitrate + Nitrite as Nitrogen</u>	<u>mg/L</u>	<u>Quarterly</u>	<u>Grab</u>
<u>pH</u>	<u>S.U.</u>	<u>Quarterly</u>	<u>Field Test</u>
<u>Sodium</u>	<u>mg/L</u>	<u>Quarterly</u>	<u>Grab</u>
<u>Specific Conductance</u>	<u>µS/cm</u>	<u>Quarterly</u>	<u>Field Test</u>
<u>Temperature</u>	<u>°C</u>	<u>Quarterly</u>	<u>Field Test</u>
<u>Total Dissolved Solids</u>	<u>mg/L</u>	<u>Quarterly</u>	<u>Grab</u>
<u>Total Nitrogen</u>	<u>mg/L</u>	<u>Quarterly</u>	<u>Grab</u>
<u>Total Phosphorus</u>	<u>mg/L</u>	<u>Quarterly</u>	<u>Grab</u>
<u>Arsenic</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Cadmium</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Chromium</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Copper</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Hardness</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Iron</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Lead</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Manganese</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Mercury</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Nickel</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Selenium</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Sulfate</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Zinc</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>

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4. ENHANCED GROUNDWATER MONITORING NETWORK

Groundwater samples from the Enhanced Monitoring Network wells, once installed in accordance with **Part I.F.1.a** of this Permit; in addition to the following wells, shall be monitored for the following parameters:

<u>DNREC Well ID</u>	<u>Local ID</u>	<u>Northings (meters)</u>	<u>Easting s (meters)</u>	<u>Ground Elevations (ft)</u>	<u>Top of Outer Casing (ft)</u>	<u>Length of Stick Up (ft)</u>	<u>Casing Depth (ft)</u>
<u>258633</u>	<u>MW-3F</u>	<u>89653.61</u>	<u>207373.30</u>	<u>23.43</u>	<u>29.03</u>	<u>5.6</u>	<u>20</u>
<u>258635</u>	<u>MW-4F</u>	<u>88664.02</u>	<u>207398.01</u>	<u>18.48</u>	<u>20.98</u>	<u>2.5</u>	<u>20</u>
<u>258636</u>	<u>MW-5F</u>	<u>88901.57</u>	<u>207213.08</u>	<u>27.06</u>	<u>29.55</u>	<u>2.49</u>	<u>20</u>
<u>258626</u>	<u>MW-6G</u>	<u>87338.98</u>	<u>206580.77</u>	<u>32.14</u>	<u>34.70</u>	<u>2.56</u>	<u>20</u>
<u>258627</u>	<u>MW-7G</u>	<u>87898.99</u>	<u>206585.64</u>	<u>33.23</u>	<u>35.64</u>	<u>2.41</u>	<u>20</u>
<u>258629</u>	<u>MW-8G</u>	<u>88466.82</u>	<u>206507.64</u>	<u>28.26</u>	<u>30.94</u>	<u>2.68</u>	<u>20</u>
<u>258624</u>	<u>MW-9G</u>	<u>87639.24</u>	<u>206170.14</u>	<u>33.67</u>	<u>36.15</u>	<u>2.48</u>	<u>20</u>

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- Coordinates are in NAD 1983 Delaware State Plane 0700 Meters.
- Monitoring Wells have been screened from a depth of 20-ft to 30-ft.

Parameter	Unit Measurement	Measurement Frequency	Sample Type
Ammonia as Nitrogen	mg/L	<u>Quarterly</u> <u>Monthly</u>	Grab
Chloride	mg/L	<u>Quarterly</u> <u>Monthly</u>	Grab
Depth to Water	hundredths of a foot	Monthly	Field Test
Dissolved Oxygen	mg/L	<u>Quarterly</u> <u>Monthly</u>	Field Test
Fecal Coliform	Col/100mL	<u>Quarterly</u> <u>Monthly</u>	Grab
Nitrate + Nitrite as Nitrogen	mg/L	<u>Quarterly</u> <u>Monthly</u>	Grab
pH	S.U.	<u>Quarterly</u> <u>Monthly</u>	Field Test
Sodium	mg/L	<u>Quarterly</u> <u>Monthly</u>	Grab
Specific Conductance	µS/cm	<u>Quarterly</u> <u>Continuously</u>	Field Test
Temperature	<u>°C</u>	<u>Quarterly</u> <u>Monthly</u>	Field Test
Total Dissolved Solids	mg/L	<u>Quarterly</u> <u>Monthly</u>	Grab

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Total Nitrogen	mg/L	Quarterly Monthly	Grab
Total Phosphorus	mg/L	Quarterly Monthly	Grab
<u>Arsenic</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Cadmium</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Chromium</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Copper</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Hardness</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Iron</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Lead</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Manganese</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Mercury</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Nickel</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Selenium</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Sulfate</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>
<u>Zinc</u>	<u>mg/L</u>	<u>Annually</u>	<u>Grab</u>

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4-5 GROUNDWATER TABLE ELEVATION MONITORING REQUIREMENTS

Monthly water level measurements shall be taken at each piezometer and observation well listed below and depicted on **Page 3** from December through April [well info taken from 2019.07.17 O&M p.33].

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DNREC Well ID	Local ID	Northings (meters)	Eastings (meters)	Ground Elevations (ft)	Top of Outer Casing (ft)	Length of Stick Up (ft)
265831	PZ-1F	88751.53	207166.42	22.53	25.53	25.41
265838	PZ-1G	87347.73	205271.49	35.45	38.86	37.92
265837	PZ-2G	87578.95	205093.80	37.31	41.29	40.00
265832	PZ-3G	87823.90	205250.09	32.78	43.00	41.81
265836	PZ-4G	87908.92	205455.69	32.64	36.24	32.23
265829	PZ-5G	88039.85	205768.25	32.67	35.97	35.23
265833	PZ-6G	88434.07	205949.66	31.58	34.63	33.21
265830	PZ-7G	88408.29	206450.31	25.91	29.58	29.92

Coordinates are in NAD 1983 Delaware State Plane 0700 Meters.

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While performing the monitoring as required by **Part II.A.3** and **Part II.A.4** of this Permit, if the 'Depth to Water' in any one of the monitoring wells has reached within 3-feet of the ground surface, the Permittee shall be required to collect additional weekly depth to water measurements from the monitoring wells within 3-feet of the ground surface. The additional monitoring is necessary to ensure that spray irrigation ceases on any areas of the spray fields where the groundwater may reach within 2-feet of the ground surface in accordance with **Part III.A.5** of this Permit. The Permittee may discontinue the additional weekly sampling for depth to water in a well when the groundwater table elevation readings in the well exceeds a 3-foot separation between groundwater and ground surface. The

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additional groundwater table elevation measurements must be recorded in the operator's log and reported to the ~~Groundwater Discharges Section~~ Department in accordance with **Part II.B.2** of this Permit.

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5.6. LYSIMETER MONITORING REQUIREMENTS

Samples shall be taken monthly from each lysimeter for SRRF. Lysimeter locations are depicted on the Site Map found on **Page 3** of this Permit.

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All field sampling logs and laboratory results for samples obtained from a well shall be identified by the DNREC ID affixed to the well.

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Samples shall be tested from the following wells for the following parameters. The constituents are listed below in highest priority first. If sufficient sample volume is not be obtained to test for all parameters listed, the sample shall be tested for as many constituents possible in the following parameter order [well info taken from 2019.07.17 O&M p.35].

DNREC Well ID	Local ID	Northings (meters)	Eastings (meters)	Ground Elevation (ft)	Outer Casing (ft)	Inner Casing (ft)
265827	LY-1F	89388.92	207110.93	33.13	35.73	35.23
265835	LY-1G	87984.44	205584.58	34.27	36.22	35.38
265834	LY-2G	87646.77	206139.14	33.80	36.10	35.82
265828	LY-3G	87205.37	204810.20	40.62	43.25	42.82

Coordinates are in NAD 1983 Delaware State Plane 0700 Meters.

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Parameter	Unit Measurement	Measurement Frequency	Sample Type
Total Nitrogen	mg/L	Monthly	Grab
Total Phosphorus	mg/L	Monthly	Grab
Nitrate + Nitrite as Nitrogen	mg/L	Monthly	Grab
Ammonia as Nitrogen	mg/L	Monthly	Grab
Chloride	mg/L	Monthly	Grab
Sodium	mg/L	Monthly	Grab

Total Dissolved Solids	mg/L	Monthly	Grab
pH	S.U.	Monthly	Field Test
Specific Conductance	µS/cm	Monthly	Field Test
Temperature	°C	Monthly	Field Test

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Lysimeter Rolling 12-Month Average

The Permittee shall maintain a rolling 12-month average of total nitrogen percolate concentrations in each lysimeter. The rolling 12-month average shall be calculated by adding the current month's total nitrogen concentration to the previous eleven (11) month's total nitrogen concentrations and dividing the sum by the number of samples obtained (i.e., 12 unless sample data was unattainable for any given month). The rolling 12-month average shall be reported to the Department monthly.

~~If the rolling 12-month average exceeds the total nitrogen percolate concentration of 10 mg/L, the Permittee shall examine the facility's operation and maintenance log for improper operational procedures, conduct a physical inspection of the disposal system to detect abnormalities, and review monitoring data and other records to determine the cause/source of the total nitrogen exceedance. The Permittee shall report the finding to the Department with any proposed modifications to operational procedures or other corrective actions. The Permittee shall implement proposed actions upon approval by the Department.~~

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6.7. SOIL MONITORING REQUIREMENTS

The Permittee shall submit a Soil Sampling Plan for GWDS Department approval within 120 days from the effective date of this Permit.

Composite soil samples representing each soil series within the wetted spray field shall be taken separately from both soil depths of 0–12 inches and 12–24 inches. A minimum of three composite sample for each mapped soil mapping unit are needed for each depth (0-12 inches and 12-24 inches) in accordance with the Regulations and the GWDS-approved Soil Sampling Plan. The composite soil sampling shall represent the average conditions in the sampled body of material. The discrete samples that are to be composited shall be collected from the same soil horizon and depth interval.

Soil sample locations shall be plotted on a scaled drawing and labeled consistent with the sample nomenclature. Each field shall also be identified so that sample results may be tracked and properly assessed for field life limiting factors.

Soil chemical testing should be in accordance with Methods of Soil Analysis published by the American Society of Agronomy, Madison, Wisconsin.

~~Testing for Cadmium, Nickel, Lead, Zinc and Copper shall be performed approximately one year prior to permit renewal so results may be utilized by the Permittee in the CMR and/or by Groundwater Discharges Section staff during renewal review. Reference Part IV.A.2 of the Permit and Section 6.5.4 of the Regulations regarding CMR requirements.~~

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Parameter	Unit Measurement	Measurement Frequency	Sample Type
pH	S.U.	Annually	Soil Composite
Organic Matter	%	Annually	Soil Composite
Phosphorus (as P ₂ O ₅)	mg/kg	Annually	Soil Composite
Potassium	mg/kg	Annually	Soil Composite
Sodium Adsorption Ratio	meq/100g	Annually	Soil Composite
Cadmium	mg/kg	Annually	Soil Composite
Nickel	mg/kg	Annually	Soil Composite
Lead	mg/kg	Annually	Soil Composite
Zinc	mg/kg	Annually	Soil Composite
Copper	mg/kg	Annually	Soil Composite
Cation Exchange Capacity	meq/100g	*Only if soil pH changes significantly	Soil Composite
Phosphorus Adsorption (Mehlich 3 acceptable)	meq/100g	**Only if soil phosphorus levels become excessive for plant growth	Soil Composite
Percent Base Saturation	%	*Only if soil pH changes significantly	Soil Composite

*A significant change in soil pH is defined as a change of one or more standard units from the original value established in the Design Development Report.

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** Excessive levels of soil phosphorus are defined by the Delaware Nutrient Management Commission. Soil phosphorus levels must be tested in accordance with the University of Delaware soil testing methods (Gartley, 2002). If the soil phosphorus levels become excessive, the Permittee shall perform a Phosphorus Site Index (PSI) study. The results shall be submitted to the ~~Groundwater Discharges Section~~Department within 30 days of completion. Based on these, the ~~Groundwater Discharges Section~~Department may require the Permittee to submit a plan for detailing steps to reduce the phosphorus loading rates at the site.

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7.8. VEGETATION MONITORING

~~Each year~~Upon each harvest, a minimum of one composite sample for each field pivot is required ~~upon each harvest. If a crop rotation is utilized either in alternate years or in the same year, the aforementioned requirement shall be duplicated~~ for each crop type. Results must be utilized for analysis and provided to the Department in the Annual Report in accordance with Part II.B.5.a.

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Parameter	Unit Measurement	Measurement Frequency	Sample Type
Yield	Bushels/acre and lbs/acre	Per harvest	Vegetation Composite
Nitrogen	% and lbs/acre	Per harvest	Vegetation Composite
Phosphorus	% and lbs/acre	Per harvest	Vegetation Composite
% Moisture	%	Per harvest	Vegetation Composite

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8.9. OPERATIONS MONITORING REQUIREMENTS

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a. Spray Field Applications

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Parameter	Unit Measurement	Monitoring Frequency	Sample Type
Additional/Supplemental Irrigation Water (i.e., groundwater)	Total Gallons per field /zone/pivot	Monthly	Recorded/Calculated
Additional/Supplemental Irrigation Water (i.e., groundwater)	Inches/acre per field /zone/pivot	Monthly	Recorded/Calculated
Fertilizer Nitrogen	lbs/acre per field /zone/pivot	Monthly	Reported
Fertilizer Phosphorus	lbs/acre per field /zone/pivot	Monthly	Reported

b. Lagoons

Parameter	Sample Location	Unit Measurement	Monitoring Frequency	Sample Type
Lagoon Levels	Lagoons	Feet and Gallons	Weekly	Field Test

9.10. SURFACE WATER MONITORING REQUIREMENTS

Surface Water samples shall be obtained from the six locations as approximately depicted on the Site Map found on Page 3 of this Permit. The surface water sampling locations include Ingram Branch and Sowbridge Branch (East of Reynolds Pond).

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The geographic coordinates of the surface water sampling locations are as follows [location info taken from 2019.07.17 O&M p.34].

Local ID	Northings	Eastings
SW-1	88368.84	205871.47
SW-2	88557.43	206493.46
SW-3	88638.01	207393.63
SW-4	90245.11	205198.77
SW-5	90372.08	206230.09
SW-6	90363.90	207758.40

Coordinates are in NAD 1983 Delaware, State, Plane, 0700 Meters.

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Surface Water Monitoring results for each monitoring point shall be reported using the established geographic coordinates.

A downgradient sample for a surface water body should be taken first, immediately followed by the upgradient location for the same surface water body and followed by the downgradient sample for the next surface water body being taken third, immediately followed by sampling of the upgradient location for this same surface water body. All samples shall be taken on the same day.

Surface Water sampling shall not occur within three (3) days of a measurable rainfall event to ensure that the streams have returned to base flow, groundwater dominant, conditions.

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Parameter	Unit Measurement	Measurement Frequency	Sample Type
Ammonia as Nitrogen	mg/L	Quarterly	Grab
BOD5	mg/L	Quarterly	Grab
Chloride	mg/L	Quarterly	Grab
Dissolved Oxygen	mg/L	Quarterly	Field Test
Enterococcus	Col/100mL	Quarterly	Grab
Fecal Coliform	Col/100 ml	Quarterly	Grab
Nitrate + Nitrite as Nitrogen	mg/L	Quarterly	Grab

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pH	S.U.	Quarterly	Field Test
Sodium	mg/L	Quarterly	Grab
Specific Conductance	µS/cm	Quarterly	Field Test
Temperature	°C	Quarterly	Field Test
Total Dissolved Solids	mg/L	Quarterly	Grab
Total Nitrogen	mg/L	Quarterly	Grab
Total Phosphorus	mg/L	Quarterly	Grab
Total Suspended Solids	mg/L	Quarterly	Grab

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B. MONITORING SPECIFICATIONS AND REPORTING REQUIREMENTS

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1. Representative Sampling

Samples and measurements taken as required in the operation permit shall be representative of the volume and nature of the monitored discharge. If there has been significant increase (> 25%) in the characterization of any one parameter of the effluent wastewater as established in the Design Engineer Report, the Permittee shall resample the wastewater and submit the additional analyses to the Department. The Permittee shall re-characterize the wastewater to determine if a change in treatment is required and/or if the land limiting constituent has changed. If a change in treatment is required and/or if the land limiting constituent has changed, a revised Design Engineer Report shall be submitted to the Department. After a review of these results, the Department may invoke the provisions of **Part V.A.1** of this Permit.

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2. Reporting

Monitoring results obtained during the previous one month/quarter shall be summarized and reported on an approved monitoring report form(s) postmarked no later than the 28th day of the month following the completed reporting period. Laboratory analytical results and sampling logs shall be submitted with the corresponding month's monitoring report. Signed reports/forms, laboratory analytical results, laboratory sampling logs and field data sheets shall be submitted in one complete package to the Department at the following address:

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~~Groundwater Discharges~~ **Resource Protection Section - Compliance and Enforcement**
 Division of Water
 Department of Natural Resources and Environmental Control
 89 Kings Hwy
 Dover, DE 19901
 Office: (302) 739-9948/9945

The Department may provide written requirements for the Permittee to submit monitoring data electronically. Upon notification from the Department, the Permittee shall transition (as directed) to the Department's electronic database system. The submission may need to be electronically signed.

3. Monitoring results reported as less than the detectible limit shall be reported with the less than symbol \lt before the detection limit. The full detection limit value shall be utilized in any necessary calculations. The less than symbol shall be carried through the calculation. The resulting value shall include any appropriate less than or greater than symbol resulting from the calculation.

4. Additional Monitoring by Permittee

If the Permittee monitors any parameter at the location(s) designated herein more frequently than required, using approved analytical methods, the results shall be reported to the Department on an approved monitoring report form. Such increased frequency shall also be indicated.

5. Annual Report

The Permittee shall submit to the ~~Department's Groundwater Discharges~~Department an Annual Report summarizing the operations, management, administration, and maintenance of the facility for the calendar year. The Annual Report shall be submitted to the ~~Department's Groundwater Discharges~~Department on or before February 28th of each year. The Annual Report shall include all applicable items found in Section 6.8.2.4.1.3 and Section 6.9 of the Regulations.

Additionally, the Permittee shall report the following:

a. Nutrient Loading, Removal and Analysis:

Permittee shall provide a tabulated summary of the nutrient loading, crop removal and nutrient analysis.

Loading: In accordance with the intent of the reporting requirements of Section 6.9.1.7, 6.9.1.8 & 6.9.14.1 of the Regulations, the permittee shall tabulate Total Nitrogen and Total Phosphorus monthly Average Concentrations, monthly volumes of wastewater irrigated per field/zone/pivot, and monthly mass loadings pounds per acre per field/zone/pivot. Annual volumes and loadings shall be calculated for each field/zone/pivot. If fertilizer was applied, monthly Total Nitrogen and Total Phosphorus loading applications via fertilizer shall also be tabulated and incorporated into the annual totals. If additional/supplemental water (i.e., groundwater) was irrigated, monthly and annual loading applications shall also be tabulated as both 'Total Gallons per field/zone/pivot' and 'Inches/acre per field/zone/pivot.'

Permittee shall tabulate annual loadings per field for Total Nitrogen and Total Phosphorus in comparison to the crop type planted for the year and the permit limit for that specific crop type.

Removal: Utilizing the vegetative monitoring lab data analysis required by Part II.A.8 of the Permit, and in accordance with the intent of the reporting requirements of Section 6.9.14.1 and 6.9.14.5 of the Regulations, the permittee shall calculate and tabulate the Nitrogen and Phosphorus removed by the crops in pounds per acre per field/zone/pivot. The tabulated summary shall note the crop type planted for the pivot, the amount of crop harvested, and the amount of nutrients removed (pounds per acre per

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pivot). Permittee shall provide a comparison of the lab analyzed crop uptake values with the values utilized in the Nitrogen Balance, Vegetative Management Plan and Phosphorus loading limitation calculation. Permittee shall provide an assessment of Phosphorus utilization relative to the permit limit of 31.2 lbs/acre Total Phosphorus. Permittee shall discuss any discrepancies and proposed operational adjustments. Permittee shall provide the lab data sheets from each crop analysis.

Analysis: When providing the Nitrogen Balance calculations in accordance with Section 6.9.14.2 of the Regulations, the permittee shall provide a Nitrogen Balance worksheet for each Field/Zone/Pivot electronically in Excel spreadsheet format.

b. Soils Monitoring

6.9.14.3 Provide soils data lab sheets.

c. Lysimeter Monitoring - Part II.A.5

Lysimeter Monitoring - Provide Lysimeter 12 month rolling average data for Total Nitrogen.

If the rolling 12-month average exceeds the total nitrogen percolate concentration of 10 mg/L, discuss steps taken to examine the facility's operation and maintenance log for improper operational procedures, conduct a physical inspection of the disposal system to detect abnormalities, and review monitoring data and other records to determine the cause/source of the total nitrogen exceedance. Report all findings along with any proposed modifications to operational procedures or other corrective actions.

d. Operations Monitoring - Part II.A.8

Spray Field Applications - Report a tabulated summary of monthly additional/supplemental:

- Irrigation water in gallons per field/zone/pivot and in inches/acre per field/zone/pivot.
- Fertilizer Nitrogen in lbs/acre per field/zone/pivot
- Fertilizer Phosphorus in lbs/acre per field/zone/pivot

Storage Lagoon Volume - Report a summary of monthly storage lagoon volumes tabulated in comparison to the permitted action level volume. If storage lagoon volumes exceeded the permitted action level volume, discuss steps taken to assess system functionality and any proposed modifications to operational procedures or other corrective actions.

6. Test Procedures

Test procedures for analysis of pollutants shall conform to the applicable test procedures identified in 40 CFR, Part 136 or the most recently adopted copy of Standard Methods unless otherwise specified in this Permit.

7. Recording of Results

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For each measurement or sample taken pursuant to the requirements of this Permit, the Permittee shall record the following information:

- a. The exact place, date and time of sampling and/or measurement;
- b. The person(s) who performed the sampling and/or measurement;
- c. The date(s) the analyses were performed and the time the analyses were begun;
- d. The person(s) who performed the analyses; and
- e. The results of each analysis.

8. Records Retention

All records and information resulting from the monitoring activities required by this Permit or the Regulations including all records of performed analyses, calibration and maintenance of instrumentation and recording from continuous monitoring instrumentation shall be retained for five years. This period of retention shall be extended automatically during any unresolved litigation regarding the regulated activity or regarding control standards applicable to the Permittee or as requested by the Department.

9. Availability of Reports

All reports prepared in accordance with the terms of this Permit shall be available for public inspection at the offices of the Department of Natural Resources and Environmental Control. Monitoring data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in 7 Del. C., §6013.

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10. Operator Log

An operator log shall always be kept onsite. Each spray system section shall be numbered and referred to by number in the operator log. All records and reports shall also always be kept in a bound logbook onsite and shall be made available upon request for review by the Department. This log shall, at a minimum, include the applicable items listed in Section 6.7.3 of the Regulations.

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11. Quality Assurance Practices

The Permittee is required to show the validity of all monitoring data by requiring its laboratory to adhere to quality assurance practices in accordance with Section 6.8.2.4 of the Regulations.

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12. Industrial Users

Within 30 days of the operation of the Phase 2 wastewater treatment system, the Permittee shall develop and maintain an industrial listing providing the names and addresses of all current Significant Industrial Users (SIUs) and Non-Significant Categorical Industrial Users (NSCIUs), as defined in 40 CFR 403.3, discharging to the SRRF Phase 2 wastewater treatment system. The list shall be updated annually and submitted in the Annual Report Part II.B.5.

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PART III

A. OPERATIONAL REQUIREMENTS

13. Duty to Comply

The Permittee shall comply with all the terms and conditions of this Permit.

The discharge of any pollutant more frequently than, or at a level in excess of that identified and authorized herein, shall constitute a violation of the terms and conditions of this Permit. The violation of any influent/effluent limitation or of any other condition specified in this Permit is a violation of 7 Del. C. Chapter 60 and is grounds for enforcement as provided in 7 Del. C., Chapter 60 "Enforcement; civil and administrative penalties; and expenses.", "Criminal Penalties." and "Cease and desist order." for Permit termination or loss of authorization to discharge pursuant to this Permit, for Permit revocation and reissuance, or Permit modification, or denial of a Permit renewal application. The Department may seek voluntary compliance by way of warning, notice or other educational means, pursuant to 7 Del. C., Chapter 60 "Voluntary compliance." or any other means authorized by Law. However, the Law does not require that such voluntary means be used before proceeding by way of compulsory enforcement.

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14. Groundwater Requirements

Operation of ~~SRRF~~ the wastewater treatment facility and spray irrigation system shall not cause the quality of Delaware's groundwater resources to be in violation of applicable Federal or State Drinking Water Standards. If the Department determines that the discharge is impacting groundwater quality or downgradient receptors, corrective actions will be required.

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15. Facilities Operation

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The Permittee shall properly maintain and operate all structures, pipelines, systems, and equipment for collection, treatment control and monitoring which are used by the Permittee to achieve compliance with the terms and conditions of the Permit. Proper operation and maintenance may include but is not limited to, effective performance based on designed facility removals, adequate funding, effective management, adequate operator staffing and training, and adequate laboratory and process controls including appropriate quality assurance procedures.

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4.16. The spray irrigation fields shall be managed to assure at a minimum that:

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- a. Spray irrigation of wastewater shall only occur on fields being prepared for planting or already planted with a crop and shall not occur on fields with crops not actively growing or on voluntary vegetation.
- b. The spray fields shall be maintained in such a manner as to prevent wastewater pooling and/or discharge of wastewater to any surface waters. Should pooled areas become evident, spraying on those areas shall be prohibited until saturated conditions no longer exist.
- c. Aerosols or nuisance odors shall not extend beyond the boundary of the spray irrigation site when treated wastewater is being applied. If odors are produced and become considered a public nuisance, the Permittee shall take the necessary steps to eliminate such odors. All action taken shall be reported to the Department in accordance with Part IV.A.4 of this Permit.

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- d. Erosion controls shall be employed to prevent wastewater runoff from the spray irrigation fields. The Permittee shall notify the Department immediately if any wastewater runoff occurs.
- e. The spray irrigation field's crops shall be maintained in optimal condition, including any necessary weed management, reseeding, or other vegetative management practices.
- f. Effective vegetative management shall be provided such that crops harvested on the spray irrigation sites are removed from the sites.
- g. Forage crops shall be harvested and removed from the irrigation field(s) at least twice a year. Crops harvested shall be removed from the irrigation site within six (6) months of harvest.
- h. The wastewater shall be applied in a manner such that the application is even and uniform over the irrigation area.

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5-17. Spray irrigation is prohibited when saturated or frozen soil conditions exist.

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6-18. The groundwater mound created by the added infiltration shall at no time reach within two feet of the ground surface in any section of the spray irrigation fields. Should the groundwater mound exceed this limit, the Permittee shall cease all irrigation of wastewater to the affected fields until the groundwater mound recedes to acceptable levels.

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7-19. Connections or additions to the spray irrigation system other than those indicated on the approved plans are prohibited without prior approval from the Department's Groundwater Discharges Section/Department.

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~~8-20.~~ The Permittee shall take appropriate measures to protect the spray irrigation system from damage due to sub-freezing conditions.

~~9-21.~~ Any leaks shall be reported to the Department and repaired immediately.

~~10-22.~~ Signs

Unlimited Public Access: Unlimited public access sites must have advisory signs posted at all entry points that indicate the site is spray irrigated with treated wastewater. Verbiage shall include the following wording: "RECYCLED WASTEWATER – DO NOT DRINK". Alternate verbiage may be used if approved in writing by the Department.

~~11-23.~~ Potable, ground, or surface water may be used for distribution system testing and irrigation to establish vegetation when sufficient treated effluent is not available.

~~12-24.~~ Phased Systems

- a. Once an Operations Permit is issued and the wastewater flow reaches 80% of the permitted treatment capacity for the constructed phase based on a period of seven (7) consecutive days, the Permittee shall submit written notification to the Department. The written notification shall include a work plan for construction of the next permitted phase. The Permittee shall submit a construction permit application, plans and specifications and Design Engineer Report with applicable fees if the next phase has not yet been permitted or if there are changes to the previously permitted design.
- b. Any flow above the permitted flow for a phase shall not be allowed to be discharged to the system until construction is completed on the following phase and an operating permit has been issued or amended by the Department for the next phase.
- c. Required documents for connecting subdivisions may be found in Section 6.5.10.3.1 of the Regulations.

~~13-25.~~ If the permittee installs new monitoring wells or replaces any existing monitoring wells, the Permittee shall submit to the ~~Department's Groundwater Discharges Section~~ Department new elevation details relative to the common benchmark previously established. Additionally, the Permittee shall conduct a groundwater quality sampling program prior to initiation of wastewater disposal activities on the area incorporating the well. The sampling program shall be sufficient to establish representative groundwater quality at each well prior to initiation of the wastewater disposal activities. A minimum of three samples shall be collected at least one month apart and analyzed. A summary report detailing all analyses shall be submitted to the ~~Department's Groundwater Discharges Section~~ Department prior to initiation of wastewater disposal activities. Analyses shall include the parameters iterated in Section 6.8.1 of the Regulations.

~~14-26.~~ The Permittee shall calibrate all flow meters in accordance with the Manufacturer's recommendations. Calibration shall include, but not be limited to influent, effluent, continuous online turbidity, and chlorine residual monitors. The calibration documentation shall be submitted with the Annual Report in accordance with **Part II.B.5.**

~~15-27.~~ The Permittee shall operate and maintain SRRF in accordance with the facility's design and the approved Operation and Maintenance Plan (O&M). A copy of the O&M shall always be kept onsite. The Permittee shall maintain the O&M's accuracy and applicability in accordance with both the Permit and the

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Regulations. In the event of a discrepancy between the O&M and the Permit or Regulations, the requirements of the Permit and the Regulations would govern.

16.28. At least three feet of freeboard, measured vertically from the lowest point of the berm, is required for all ponds/lagoons. The lowest point of the berm shall be determined and marked.

17.29. The Permittee shall notify the ~~Department's Groundwater Discharges Section~~ Department in writing prior to utilizing the freeboard in any lagoon or immediately upon unexpected encroachment into freeboard. In the event of encroachment into freeboard, Permittee shall contact the ~~Groundwater Discharges Section~~ Department to coordinate relief measures. In the event of an emergency, Permittee may contact the Department at the telephone numbers cited in Part II.B.2 of this Permit; however, written notification shall subsequently be provided within 5 days of encroachment.

18.30. If the facility does not treat sewage and has a storage tank that requires cleanout, and if the Permittee intends to land apply material collected from the cleanout onto the spray irrigation field, the Permittee shall analyze the material for nutrients and any other applicable parameters of concern as determined by the ~~Groundwater Discharges Section~~ Department. Prior to tank cleanout being performed. The Permittee shall submit to the ~~Groundwater Discharges Section~~ Department a report including the results, the frequency and estimated volume of material to be applied, and how and where it will be applied. The report shall include a mathematical analysis determining any nitrogen loading from the tank cleaning combined with nitrogen loading from wastewater application will not exceed the allowable nitrogen load.

19.31. Fencing is required at treatment facilities, pump stations and storage/treatment ponds. Fencing of spray fields is not required.

20.32. The collection and channelization of irrigated wastewater for purposes other than retreatment is prohibited.

21.33. Direct application of treated wastewater to drainage ditches, any water bodies, and wetlands is prohibited.

22.34. Emergency Repairs

Emergency repairs or the replacement of critical "like kind" components of the wastewater treatment facility necessary for the continued operation of the facility may be performed without first obtaining a construction permit from the Department.

A report shall be submitted to the Department within five (5) days of completion of the emergency repairs. The report shall summarize the nature of the emergency and the repairs performed. All violations shall also be reported in accordance with Section 6.5.9 of the Regulations.

23.35. Adverse Impact

The Permittee shall take all reasonable steps to eliminate or minimize any adverse impact to waters of the State resulting from this Permit, including such accelerated or additional monitoring as necessary to determine the source, nature, and extent of the impact from a noncomplying discharge. In addition, at the direction of the Department, the Permittee shall submit a corrective action plan which will include a

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description of the proposed actions to mitigate or eliminate the source of the impact and an associated completion schedule. The plan shall be enacted as approved by the Department.

24-36. Bypassing

The diversion of flow from any portion of the treatment facility's process flow (including, but not limited to, pretreatment, storage, distribution, and land application) necessary to maintain compliance with the terms and conditions of this Permit is prohibited unless:

- a. The bypass is unavoidable to prevent personal injury, loss of life, severe property damage, or materially adversely affect public health and/or the environment; or
- b. There are no alternatives readily available.

The ~~Groundwater Discharges Section~~ Permittee shall ~~be orally notified~~ notify the Department within 24 hours after such bypass; and shall submit a written submission regarding the bypass ~~shall be submitted~~ within five days of the Permittee's becoming aware of the bypass. Where the need for a bypass is known (or should have been known) in advance, this notification shall be submitted to the ~~Groundwater Discharges Section~~ Department for approval at least ten days prior, or as soon as possible, before the date of bypass.

The treatment facility shall be repaired and restored to the permitted design operations process flow.

25-37. Removed Substances

Solids, sludges, filter backwash or other pollutants removed in the collection, conveyance, or treatment of wastewater shall be disposed of in a manner such as to prevent any pollutant from entering the surface water or groundwater and to comply with applicable federal or state laws and regulations.

26-38. Power Failures

An alternative power source, which is sufficient to operate the wastewater treatment and disposal facilities, shall be available. If such alternative power source is not available, the Permittee shall halt, reduce, or otherwise control production and/or all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater facilities.

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Draft Permit Name: Sussex Regional Recharge Facility
State Permit No. 359288-02
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Amendment Date: **TBD**
Expiration Date: March 17, 2025
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PART IV

A. MANAGEMENT REQUIREMENTS AND RESPONSIBILITIES

~~1. Initiation of Facility Operations Notification~~

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~~If this Permit is for initial operations following construction, the Permittee shall notify the Department in writing within 24 hours of the initiation of operations.~~

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2.1. Operation Permit Re-Issuance

At least 180 days before the expiration date of this Permit, the Permittee shall submit an application for renewal or notify the Department of the intent to cease discharging by the expiration date. The application package for systems with a design flow $\geq 100,000$ GPD, shall include a five (5) year Compliance Monitoring Report (CMR). The CMR shall be prepared in accordance with Section 6.5.4.3 of Regulations. If a timely and complete application has been submitted as determined by the Department, and the Department is unable, through no fault of the Permittee, to issue a new Permit before the expiration date of this Permit, the terms and conditions of this Permit are automatically continued and remain fully effective and enforceable until a decision is made on the new application.

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3.2. Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this Permit. The discharge of any pollutant identified in this Permit more frequently than or at a level that exceeds that authorized shall constitute a violation of the Permit.

Any anticipated facility/system expansions, production increases, or process modifications that will result in new, different, or increased discharges of pollutants shall be reported in writing to the ~~Department's Groundwater Discharges Section~~ Department for approval. A new Permit may be required.

Any other activity which would constitute cause for modification or revocation and reissuance of this Permit as described in ~~Part V.A.1~~ of this Permit shall be reported to the ~~Groundwater Discharges Section~~ Department. Following such notice, the Permit may be modified to specify and limit any pollutants not previously limited.

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4.3. Non-compliance Notification

The Permittee shall report to the ~~Groundwater Discharges Section~~ Department orally within 24 hours from the time the Permittee became aware of any noncompliance with this Permit, Regulations, or any other situation that may endanger the public health or the environment by contacting the ~~Groundwater Discharges Section~~ Department at the telephone numbers cited in ~~Part II.B.2~~ of this Permit.

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If for any reason the Permittee does not comply with, or will be unable to comply with, any effluent limitations or other conditions specified in this Permit, the Permittee shall provide the Department with the following information in writing within five days of becoming aware of any actual or potential noncompliance:

- a. A description and cause of the non-compliance with any limitation or condition;
- b. The period of non-compliance including exact dates and times; or, if not yet corrected, the anticipated time the non-compliance is expected to continue; and
- c. The steps being taken or planned to reduce, eliminate and/or prevent recurrence of the non-compliant condition.

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5.4. Spill Reporting

In the event of any environmental release of pollutants (i.e., spill), the Permittee shall call the Department's 24-hour Emergency Release Reporting Hotline at (800) 662-8802.

The Permittee shall also notify the [GWDS Resource Protection Section \(RPS\)](#) regarding any environmental release of pollutants (i.e., spill) into surface water or groundwater or on land, within 24-hours from the time the Permittee becomes aware of the release and activate their emergency site plan. In addition, the following information shall be reported to the [GWDSRPS](#) in writing within five days.

- a. The facility name and location of release;
- b. The chemical name or identity of any substance involved in the release;
- c. An indication of whether the substance is an extremely hazardous substance;
- d. An estimate of the quantity of any such substance that was released into the environment;
- e. The time and duration of the release;
- f. The medium or media into which the release occurred;
- g. Any known or anticipated acute or chronic health risks associated with the emergency and, where appropriate, advice regarding medical attention necessary for exposed individuals;
- h. Proper precautions to take as a result of the release, including evacuation;
- i. The names and telephone number of the person or persons to be contacted for further information; and
- j. Such other information as the [GWDSRPS](#) may require.

6.5. Facility and Construction Changes

The Permittee shall submit a written report to the Department for review and approval, of any changes to the facility or construction of the system within the following time periods:

- a. Thirty days before any planned activity, physical alteration to the permitted facility or addition to the permitted facility if that activity, alteration or addition would result in a change in information that was previously submitted to the Department;
- b. Thirty days before any anticipated change which would result in noncompliance with any permit condition or the regulations; or
- b. Immediately after the Permittee becomes aware of relevant facts omitted from, or incorrect information submitted in, a permit application or report to the Department.

7.6. Right of Entry

The Permittee shall allow the Department entry and access, consistent with 7 Del.C. Ch. 60, to:

- a. Enter the permitted facility.
- b. Inspect any records that must be kept under the conditions of the Permit.
- c. Inspect any facility/system, equipment, practice, or operation permitted or required by the Permit.
- d. Sample or monitor for the purpose of [assessing effluent quality](#) or assuring Permit compliance of any substance or any parameter at the facility.

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8.7. Permit Transferability

~~Permits~~The Permit may be transferred to a new owner or operator. The Permittee shall notify the Department by requesting a change of ownership of the Permit before the date of transfer. The transfer shall be consistent with any notarized legal documents and/or CPCN required by the Regulations. The legal documentation shall be provided with the application. The application shall be received by the Department 30 days before the transfer.

- a. No person shall transfer a permit from one (1) person to another unless 30 days written notice is given to the Department, indicating the transfer is agreeable to both persons, and approval of such transfer is obtained in writing from the Department, and any conditions of the approval of such transfer is obtained in writing from the Department, and any conditions of the transfer approved by the Department are complied with by the transferor and the transferee.
- b. The notice to the Department shall contain a written agreement between the transferor and the transferee, indicating the specific date of proposed transfer of Permit coverage and acknowledging responsibilities of current and new permittees for compliance with and liability for the terms and conditions of this Permit. The notice shall be signed by both the transferor and the transferee.

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Draft Permit Name: Sussex Regional Recharge Facility
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Amendment Date: **TBD**
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PART V

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A. PROVISIONS

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1. Permit Revocation

The Department may revoke a Permit if, among other things, the Permittee violates any Permit condition, these regulations, fails to pay applicable Departmental fees, misrepresents facts or data to obtain the Permit, or fails to fully disclose all relevant facts.

Except in cases of emergency, the Department shall issue a written notice of intent to revoke to the Permittee prior to final revocation. Revocation shall become final within 20 days of receipt of the notice by the Permittee, unless within that time the Permittee requests an administrative hearing in writing.

The Department shall notify the Permittee in writing of any revocation hearing at least 20 days prior to the date set for such hearing.

If the Department finds ~~that~~ public health, safety, or welfare requires emergency action, the Department shall incorporate findings in support of such action in a written notice of emergency revocation issued to the Permittee. Emergency revocation shall be effective upon receipt by the Permittee. Thereafter, if requested by the Permittee in writing, the Department shall provide the permittee a revocation hearing.

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2. Permit Modifications/Amendments

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In consultation with the Permittee, the Department may modify or amend an existing permit provided that the modifications would not result in an increased impact or risk to the environment or to public health.

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3. State Laws

This Permit shall not be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation.

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4. Property Rights

The issuance of this Permit does not convey any property rights of either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

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5. Severability

The provisions of this Permit are severable. If any provision of this Permit, or the application of any provision of this Permit, to any circumstances is held invalid; the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

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6. This Permit does not relieve the Permittee of complying with any applicable federal, state, or local regulations.

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7. Additional Information

The Permittee shall furnish to the Department within a specified period, any information including copies of records, which may be requested by the Department to determine whether cause exists for modifying, revoking, reissuing, or terminating the Permit, or to determine compliance with the Permit and the Regulations.

8. Wastewater Treatment Facility Closure/Abandonment

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If the wastewater treatment facility, or a component of the facility, is proposed to be abandoned, the Permittee shall submit a proposed closure and abandonment work plan with procedures on how the facility will be abandoned for review and approval by the Department. The work plan shall address remediation if monitoring data indicates impacts to the environment. Upon review and approval of the work plan and completion of all closure and abandonment actions the Permittee shall contact the Department for a final inspection of the site.

Draft Permit Name: Sussex Regional Recharge Facility
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Effective Date: March 18, 2020
Amendment Date: **TBD**
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9. If the *Regulations Governing the Design, Installation and Operation of On-Site Wastewater Treatment and Disposal Systems* or applicable federal regulations are revised, this Permit may be opened and modified accordingly after notice and opportunity for a public hearing.
10. This Permit supersedes all previous spray irrigation operations permits issued to the Permittee for this facility.

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Appendix VI



**AUTHORIZATION TO OPERATE AND DISCHARGE
UNDER THE LAWS OF THE
STATE OF DELAWARE**

PERMITTEE: Artesian Wastewater Management, Inc. (AWMI)
664 Churchmans Road
Newark, DE 19702

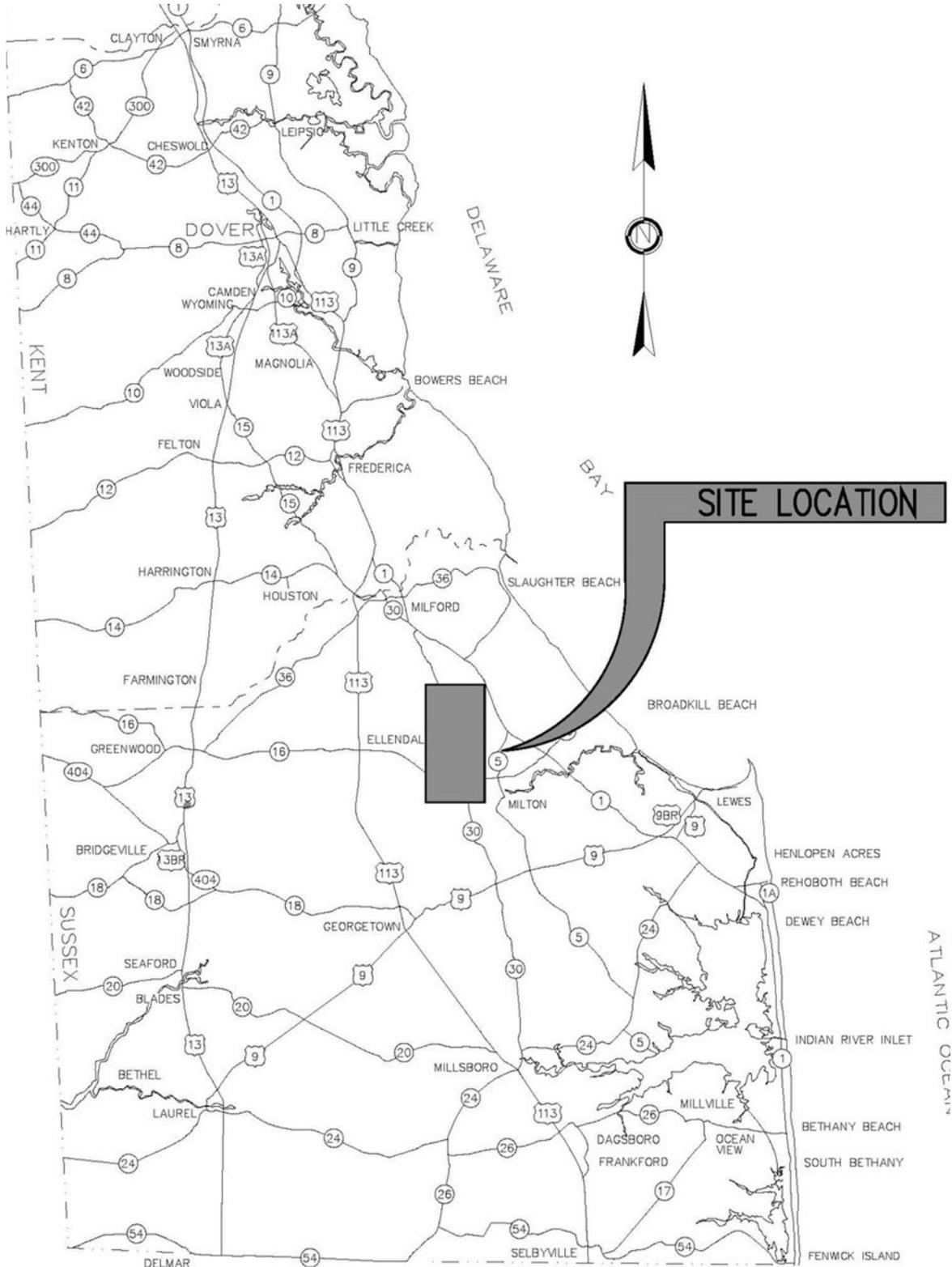
FACILITY: Sussex Regional Recharge Facility (SRRF) *formerly known as the Artesian Northern Sussex Regional Water Recharge Facility (ANSRWRF)*

1. The Delaware Department of Natural Resources and Environmental Control (the Department or DNREC) issues this Operations Permit Amendment (Permit No. 359288-02) to Artesian Wastewater Management, Inc. (the Permittee or AWMI) pursuant to the provisions of 7 Del. C. §6003 and 7 Del. Admin. C. §7101 *Regulations Governing the Design, Installation, and Operation of On-Site Wastewater Treatment and Disposal Systems* (the Regulations).
2. The Department's purpose in issuing this Operations Permit Amendment, and in imposing the conditions and requirements specified herein, is to ensure that all systems and discharges at the Sussex Regional Recharge Facility (SRRF) are operated and maintained so as not to create a public health hazard or cause water pollution. It is the responsibility of the Permittee to comply with the terms and conditions of this Permit. Effluent limitations, monitoring requirements, and other conditions are set forth herein.
3. The Sussex Regional Recharge Facility is located on Sussex County Tax Map/Parcel Number: 2-35 6.00 28.09 along Route 30 approximately 4,000-ft north of the intersection of Route 16 and Route 30. The Sussex County Tax Map/Parcel Numbers for authorized discharged sites are listed in **Part I.A.** of this Permit.

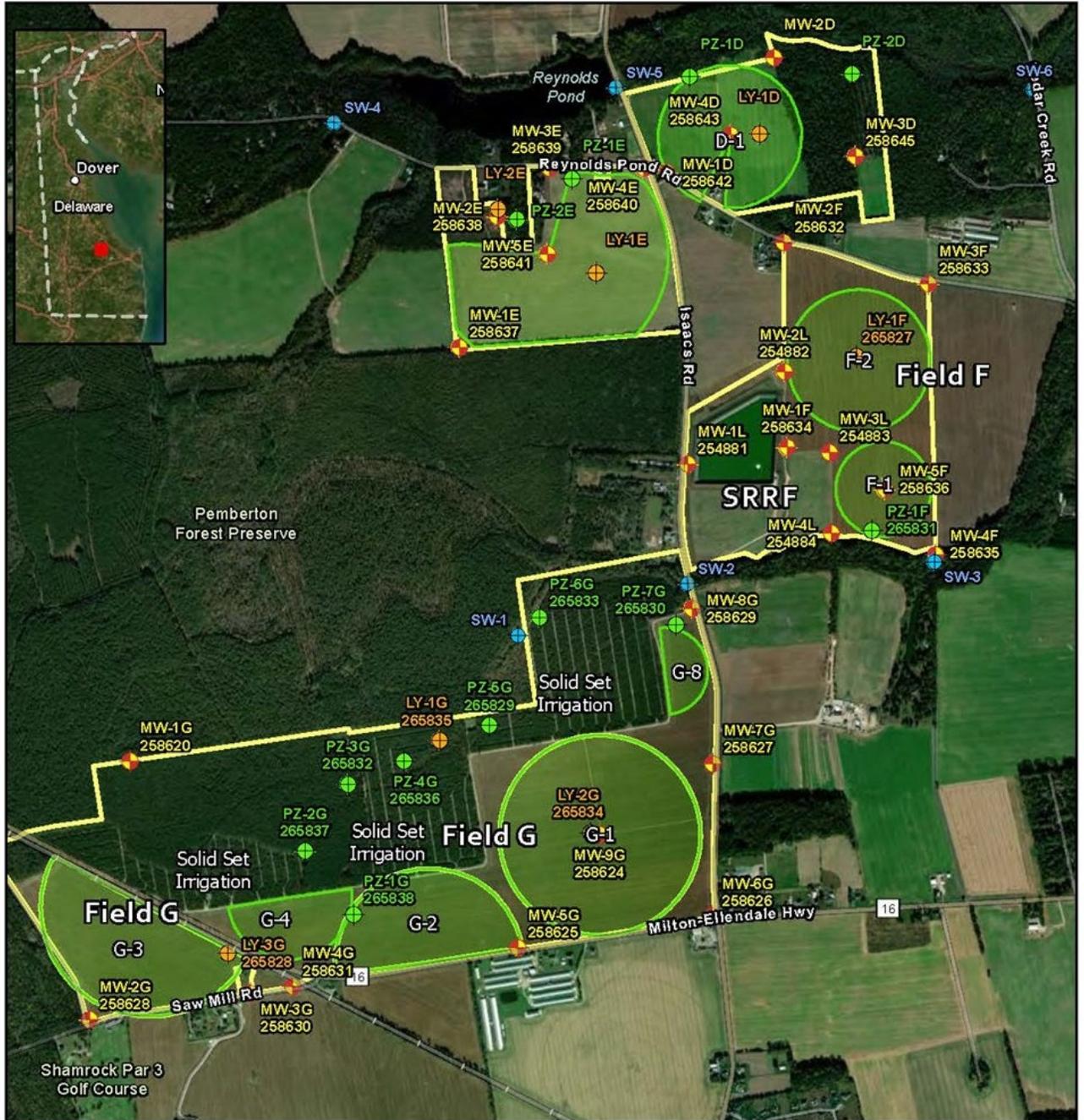
John J. Rebar, Jr.
Environmental Program Manager II
Delaware Department of Natural Resources
and Environmental Control

Date Signed

LOCATION MAP

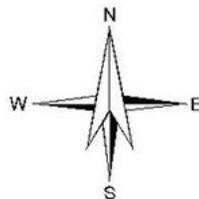


SITE MAP

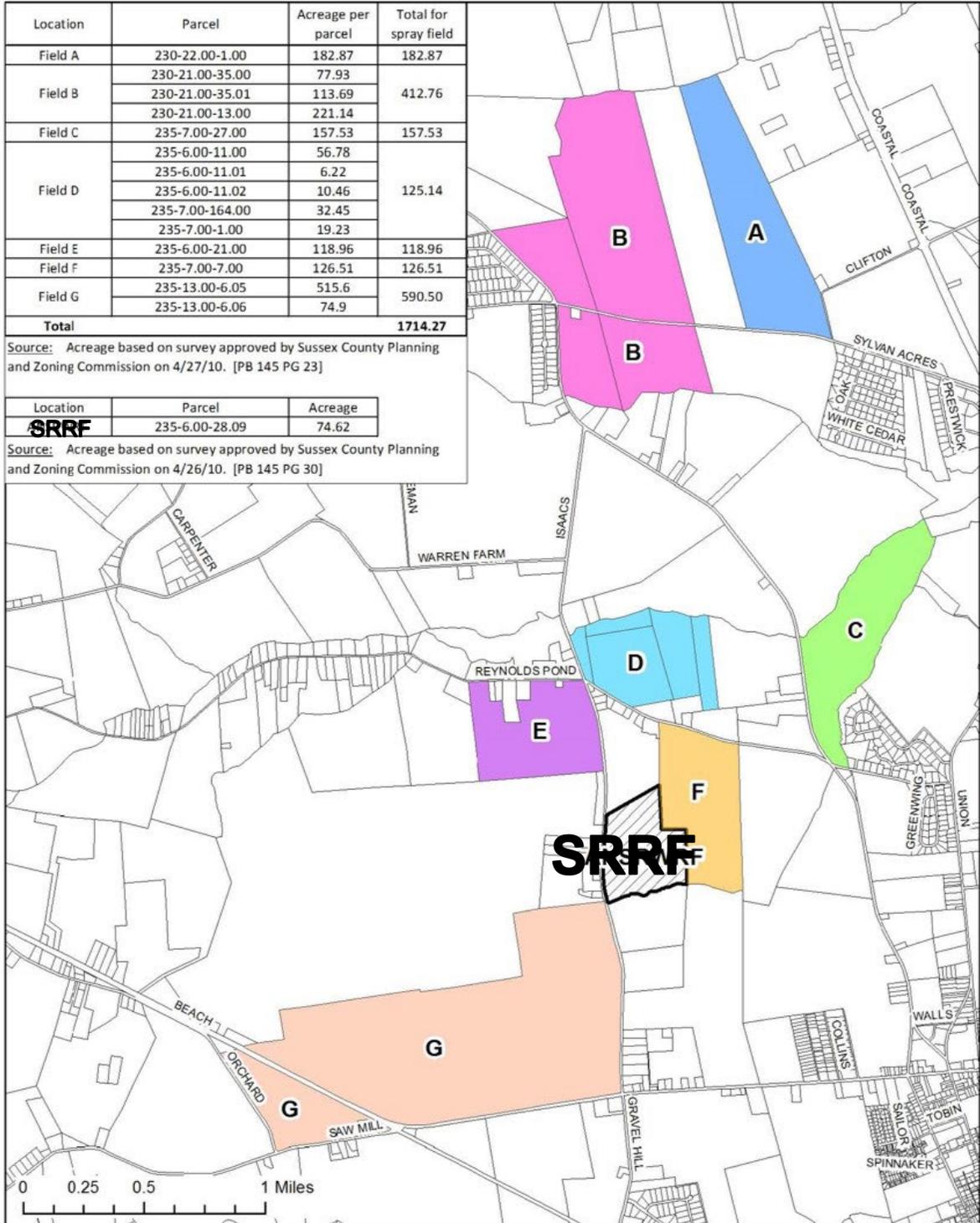


Legend

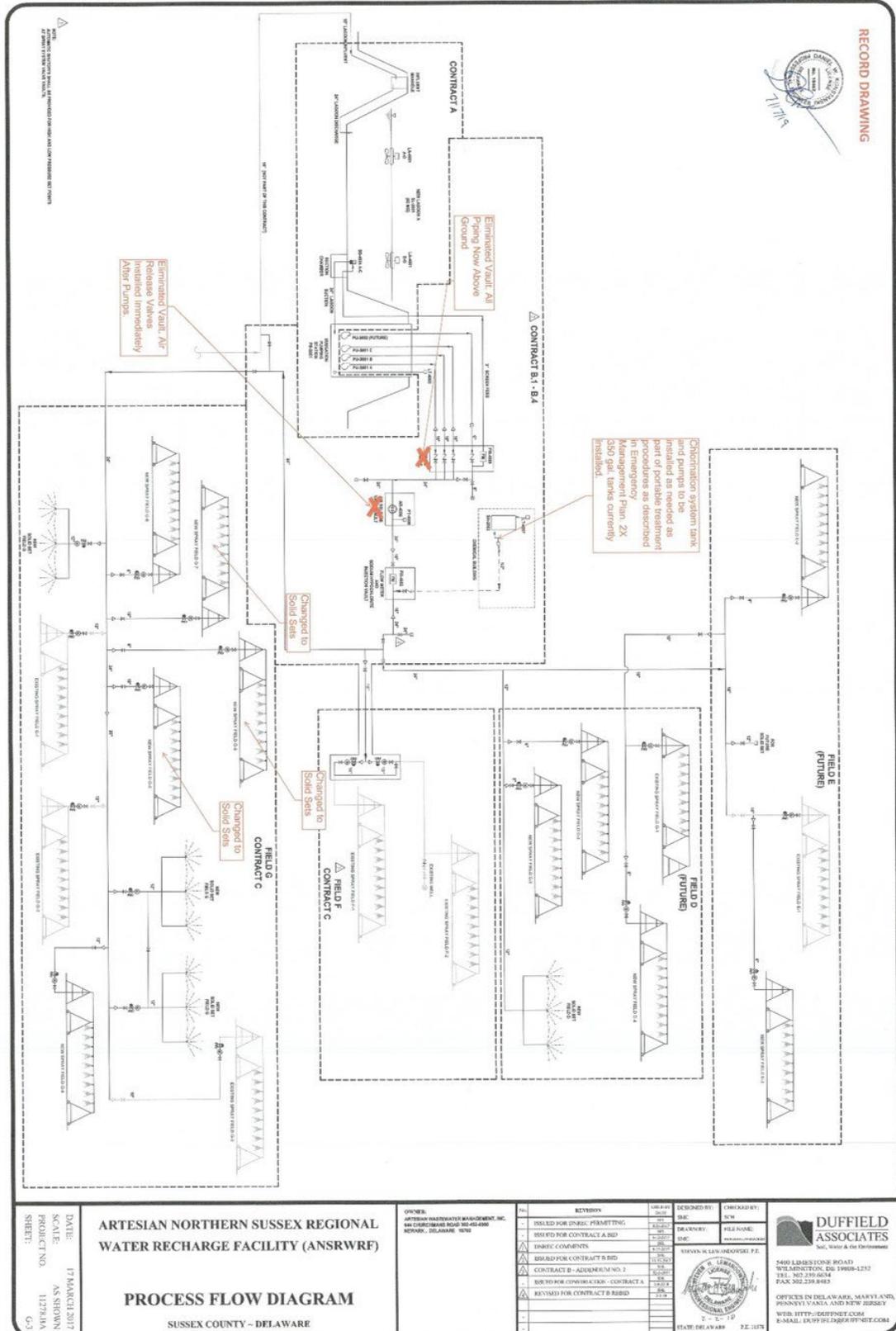
- Groundwater Monitoring Wells
- Lysimeters
- Piezometers
- Surface Water Monitoring
- Irrigation Pivots at SRRF



SPRAY FIELDS



PROCESS FLOW DIAGRAM PHASE 1 [taken from 2019.07.17 Drawings G-3 and G-4]



DATE: 17 MARCH 2017
 SCALE: AS SHOWN
 PROJECT NO. 112781A
 SHEET: G-3

ARTESIAN NORTHERN SUSSEX REGIONAL WATER RECHARGE FACILITY (ANSRWF)

PROCESS FLOW DIAGRAM

SUSSEX COUNTY - DELAWARE

OWNER: ARTESIAN NORTHERN SUSSEX REGIONAL WATER RECHARGE FACILITY, SUSSEX COUNTY, DELAWARE

DESIGNED BY: [Redacted]

CHECKED BY: [Redacted]

NO.	REVISION	DATE
1	ISSUED FOR ENGINEERING PERMITTING	11/15/16
2	ISSUED FOR CONTRACT A BID	12/15/16
3	ENGINEER COMMENTS	2/2/17
4	REBID FOR CONTRACT B BID	11/15/17
5	CONTRACT B - ADDITIONAL NO. 2	11/15/17
6	NO TO BE CONSTRUCTION - CONTRACT A	11/15/17
7	REVISION FOR CONTRACT B REBID	11/15/17

DESIGNED BY: [Redacted]

CHECKED BY: [Redacted]

DATE: 11/15/16

SCALE: AS SHOWN

PROJECT NO. 112781A

SHEET: G-3

DUFFIELD ASSOCIATES
 Soil, Water & Air Scientists

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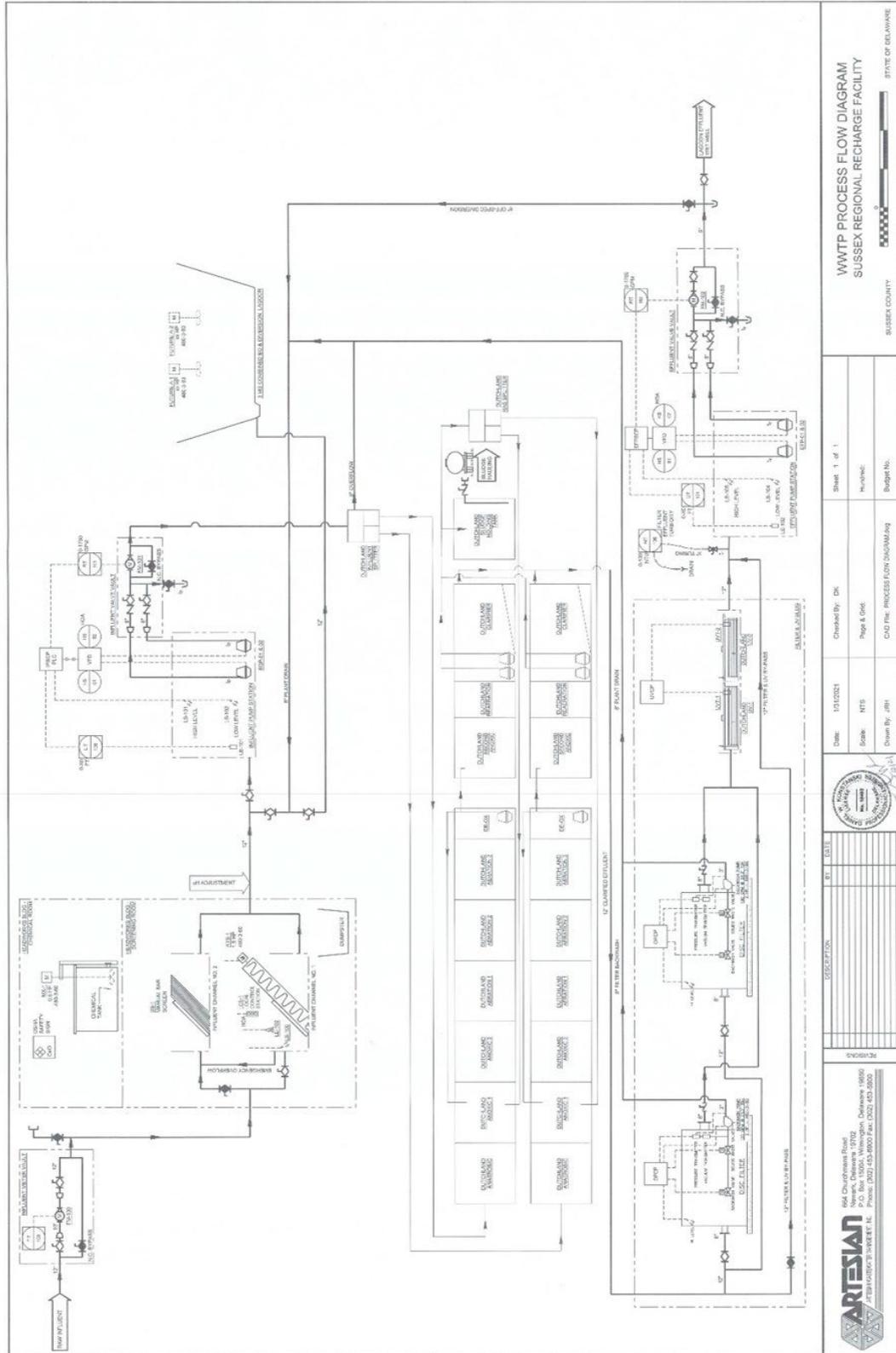
OFFICES IN DELAWARE, MARYLAND, PENNSYLVANIA, AND NEW JERSEY

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 E-MAIL: info@duffield.com

LAGOON VOLUMES [taken from 2019.07.17 Drawings G-3 and G-4]

Contour Elevation	Contour Area (sq.ft.)	Avg. End Area Cumulative Volume (cu. Ft.)	Gallons (MG)
26	69,330	0	0.0
26.5	474,857	136,047	1.0
27	678,297	424,335	3.2
28	686,689	1,106,829	8.3
29	695,129	1,797,738	13.4
30	703,618	2,497,112	18.7
31	712,155	3,204,998	24.0
32	720,741	3,921,446	29.3
33	729,374	4,646,504	34.8
34	738,057	5,380,219	40.2
35	746,787	6,122,641	45.8
36	755,566	6,873,818	51.4
37	764,386	7,633,793	57.1
38	773,245	8,402,609	62.9
39	782,142	9,180,303	68.7
40	791,078	9,966,913	74.6
41	800,051	10,762,477	80.5
42	809,063	11,567,034	86.5
43	818,115	12,380,623	92.6
44	827,206	13,203,284	98.8
45	836,337	14,035,055	105.0
46	845,508	14,875,978	111.3

PROCESS FLOW DIAGRAM PHASE 2 [SRRF Wastewater Treatment System]



<p>444 Chatham Road Newark, Delaware 19702 302.406.1000 Fax: 302.406.1001</p>		<p>Sheet 1 of 1</p>	
<p>DESCRIPTION</p>		<p>WWT PROCESS FLOW DIAGRAM SUSSEX REGIONAL RECHARGE FACILITY</p>	
<p>DATE: 12/13/2018</p>		<p>DESIGNED BY: JPH</p>	
<p>DATE: 12/13/2018</p>		<p>CHECKED BY: DK</p>	
<p>DATE: 12/13/2018</p>		<p>PROJECT NO.: 18-00000000000000000000</p>	
<p>DATE: 12/13/2018</p>		<p>SCALE: NTS</p>	
<p>DATE: 12/13/2018</p>		<p>PROJECT: PROCESS FLOW DIAGRAM</p>	
<p>DATE: 12/13/2018</p>		<p>PROJECT: SUSSEX REGIONAL RECHARGE FACILITY</p>	
<p>DATE: 12/13/2018</p>		<p>PROJECT: SUSSEX COUNTY</p>	
<p>DATE: 12/13/2018</p>		<p>PROJECT: STATE OF DELAWARE</p>	

PART I

A. DESCRIPTION OF OPERATIONS AND DISCHARGES

Pursuant to the provisions of 7 Del. C. §6003 and 7 Del. Admin. C. §7101 *Regulations Governing the Design, Installation, and Operation of On-Site Wastewater Treatment and Disposal Systems* (the Regulations), Artesian Wastewater Management, Inc. (the Permittee or AWMI) is authorized to operate and maintain the Sussex Regional Recharge Facility (SRRF), formerly known as the Artesian Northern Sussex Regional Water Recharge Facility (ANSRWRF), to serve as a regional on-site wastewater treatment and disposal system (OWTDS) meeting the existing and future wastewater treatment and disposal needs of AWMI's service territories in Sussex County, Delaware. Operations are divided into multiple Phases.

Phase 1

SRRF is currently authorized to receive treated poultry processing wastewater (treated effluent) from the Allen Harim Foods Harbeson Processing Facility's wastewater treatment system. The poultry processing facility's wastewater treatment system is owned by Allen Harim Foods, LLC and operated in accordance with State Permit No. 597261-01 (and as amended). The average daily flow of treated effluent received at SRRF is 1.5 million gallons per day (MGD) with a peak flow of 2.0 MGD. Treated effluent is stored (at SRRF) in a synthetically lined lagoon prior to being discharged via spray irrigation to approximately 1,714 acres of agricultural fields located in Sussex County, Delaware (see AWMI's Phase 1 process flow diagram on **Page 5**).

Treated effluent is authorized to be discharged (via spray irrigation) to Fields D, E, F, and G; however, as of the date of this Permit, only Fields F and G have been constructed and only Fields F and G are permitted for use. Fields D and E will be permitted for use upon completion of the Schedule of Compliance requirements iterated in **Part I.F.1** of this Permit and upon written approval from DNREC.

Phase 2

Upon completion of a proposed advanced wastewater treatment system (see AWMI's Phase 2 process flow diagram on **Page 7**) authorized by Construction Permit No. 359288-03, and upon receiving written approval from the Department, SRRF will be authorized to receive and treat wastewater from within AWMI's service territories in Sussex County, Delaware. The wastewater treatment system will include a 3.0 million gallon (MG) combined equalization and off-spec water diversion lagoon, a headworks system consisting of screening and grit removal, an influent lift station, a Hybrid Bardenpho treatment process, two cloth media filters, a UV system for disinfection, and an effluent lift station to pump treated effluent to the existing 90 MG storage lagoon constructed as part of Phase 1. Treated wastewater from the SRRF treatment system will be mixed with the treated effluent from Allen Harim's treatment system within the existing 90 MG storage lagoon and discharged (via spray irrigation) to the agricultural fields previously permitted under Phase 1 (see Spray Fields on **Page 4**).

SRRF is located on Sussex County Parcel Number: 2-35 6.00 28.09; on a 75-acre site south of Reynolds Pond Road, east of Route 30, north of Ingram Branch and Route 16, and west of Cedar Creek Road, Sussex County, Delaware.

Treated effluent is discharged via spray irrigation of privately owned agricultural land, under a lease held in perpetuity by AWMI as the wastewater utility provider. The spray fields have been permanently placed in an Agricultural Preservation Easement by the Delaware Agricultural Lands Preservation Foundation. Spray Fields are listed below.

Phase 1 and 2 Spray Fields include Fields F and G [taken from 2019.07.17 Drawing 29]

Field	Tax Map ID	Gross Area (acres)	Crop Spray Area (acres)	Woods Spray Area (acres)	Total Spray Area (acres)
A ¹	230-22.00-1.00	182.9	116.3	34.1	150.4
B ¹	230-21.00-13.00 230-21.00-35.00 230-21.00-35.01	412.8	214.1	86.3	300.4
C ¹	235-7.00-27.00	157.5	37.0	38.2	75.2
D ^{2,3}	235-6.00-11.00 235-6.00-11.01 235-6.00-11.02 235-7.00-1.00 235-7.00-164.00	125.1	58.0	32.7	90.7
E ^{2,4}	235-6.00-21.00	119.0	90.5	0	90.5
F	235-7.00-7.00	126.5	110.5	0	110.5
G	235-13.00-6.05 235-13.00-6.06	590.5	276.1	200.5	476.5
Total		1,714.27	902.5	391.8	1294.19

- 1) Spray areas based on preliminary design for Design Development Report dated June 19, 2009. These will be designed and permitted during a future phase.
- 2) Fields D and E have not yet been constructed.
- 3) One parcel from Field D (2-35-6-11.01) is not included in the current Conditional Use Ordinance 1923, adopted July 31, 2017. Spray will not commence on this parcel until it has been added to an approved Conditional Use.
- 4) There is a wooded region in Field E of approximately 10 acres which is not included in the existing design, but may be utilized in future phases.

B. DOCUMENTATION

The application consists of the materials submitted by the Permittee and materials contained in the administrative record prior to the issuance of this Permit. This includes documents associated with both Phase 1 and Phase 2 construction and operation of SRRF (previously known as ANSRWRF).

Phase 1

1. March 12, 2013, Secretary's Order No. 2012-W-0052
2. May 5, 2017, Application Package for an amended Construction Permit for the Artesian Northern Sussex Regional Water Recharge Facility (ANSRWRF) Phase 1 submitted by AWMI
3. Application Package includes Application Form, Amended Design Development Report (DDR), Drawings and Specifications
4. August 18, 2017, Amended DDR Addendum 1 submitted by AWMI providing requested additional information
5. June 12, 2018, Amended DDR Addendum 2 submitted by AWMI providing a revised drawing of surface water monitoring locations
6. November 2, 2017, Secretary's Order No. 2017-W-0029
7. August 17, 2018, Application for a Construction Permit Extension

8. July 17, 2019, Spray Irrigation Permit Application
9. July 17, 2019, Operation and Maintenance Plan
10. December 9, 2021, AWTI Comment Letter

Phase 2

1. February 8, 2021, Application
2. February 4, 2021, (inadvertently dated 2020) AWTI letter providing resubmittal and addressing comments outlined in DNREC-GWDS's November 30, 2020 letter
3. February 4, 2021, Application Form for an Amended Operations Permit
4. February 3, 2021, Application Form for a Construction Permit
5. February 4, 2021, (inadvertently dated 2020) Artesian letter providing Applications
6. February 2021, Design Engineer Report - Sussex Regional Recharge Facility (SRRF) - Phase 2 prepared by Artesian Resources Corp. for Artesian Wastewater Management, Inc.
7. May 3, 2023, revised Nitrogen Balances for Sussex Regional Recharge Facility (SRRF) Phase 1 and Phase 2

C. INFLUENT LIMITATIONS

1. Phase 1: The influent received by SRRF from Allen Harim Foods, LLC (Allen Harim) shall not exceed an average daily flow of 1.5 MGD nor a peak daily flow of 2.0 MGD in any calendar month.

Design Capacity to be received from Allen Harim: 1.5 MGD average daily flow.
[calculated as Total Monthly Volume divided by number of days in month]

Peak daily flow from Allen Harim not to exceed: 2.0 MGD.

2. Phase 2: The influent received by SRRF wastewater treatment system shall not exceed an average daily flow of 0.625 MGD nor a peak daily flow of 1.25 MGD in any calendar month.

Design Treatment Capacity: 0.625 MGD.
[calculated as Total Monthly Volume divided by number of days in month]

Peak Daily Treatment Capacity: 1.25 MGD.

3. Combined capacity upon completion of Phase 2: The Phase 2 combined influent received by SRRF shall not exceed an average daily flow of 2.125 MGD nor a peak daily flow of 3.25 MGD in any calendar month.

Combined Phase 1 and Phase 2 Capacity Average Daily Flow: 2.125 MGD.
[calculated as Total Monthly Volume divided by number of days in month]

Combined Phase 1 and Phase 2 Peak Daily Flow: 3.25 MGD.

D. SPRAYED EFFLUENT LIMITATIONS

During the period beginning on the effective date and lasting through the expiration date of this Permit, the Permittee is authorized to discharge to the spray irrigation Fields F and G as identified on **Page 9**, in Part **I.A**, and depicted on **Pages 3** and **4** of this Permit in the quantity and quality of treated effluent specified below and in accordance with the design documents listed in **Part I.B** of this Permit.

1. The monthly quantity of effluent discharged from SRRF to the spray fields or wooded areas shall not exceed the monthly, nor the annual, application rates and total volumes calculated by the Permittee to not cause the groundwater to exceed the drinking water standard for Nitrate (as Nitrogen) within the percolate as provided in the revised Nitrogen Balances for Sussex Regional Recharge Facility (SRRF) Phase 1 and Phase 2 dated May 3, 2023.

Phase 1: Effluent Discharge Limitations and Design Disposal Capacity

Fields F and G

Design Disposal Capacity: 2.49 MGD

[Calculated as the average of the two annual design disposal capacities for the two-year crop rotation cycle]

Fields D, E, F, and G

Design Disposal Capacity: 3.18 MGD

[Calculated as the average of the two annual design disposal capacities for the two-year crop rotation cycle]

The monthly and annual quantity of effluent discharged from SRRF to the spray fields or wooded areas shall not exceed the following application rate limitations (inches/acre-week) on any pivot or zone; and shall not exceed the following application rate limitations (MG/month and MG/year) on the combined pivot/zones within the specified field.

Effluent Volume Limit - Phase 1														
Crop Rotation (Cover-Corn-Wheat)														
Field	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	SUM
Field G - Crop	MG/month	16.6	16.1	17.5	14.4	54.8	53.0	54.8	54.8	6.7	11.0	16.8	19.2	335.65
	in/week	0.50	0.54	0.53	0.45	1.65	1.65	1.65	1.65	0.21	0.33	0.52	0.58	-
Field F - Crop	MG/month	6.6	6.5	7.0	5.8	21.9	21.2	21.9	21.9	2.6	4.4	6.7	7.7	134.28
	in/week	0.50	0.54	0.53	0.45	1.65	1.65	1.65	1.65	0.20	0.33	0.52	0.58	-
Field D - Crop	MG/month	3.2	3.2	3.4	2.8	10.7	10.4	10.7	10.7	1.3	2.1	3.3	3.8	65.66
	in/week	0.50	0.54	0.53	0.45	1.65	1.65	1.65	1.65	0.20	0.33	0.52	0.58	-
Field E -Crop	MG/month	4.8	4.6	5.0	4.1	16.1	17.4	18.0	18.0	1.9	3.2	4.8	5.5	103.28
	in/week	0.44	0.47	0.46	0.39	1.48	1.65	1.65	1.65	0.18	0.29	0.46	0.51	-

Crop Rotation (Wheat-Soybean-Cover)														
Field	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	SUM
Field G -Crop	MG/month	17.4	20.8	42.7	53.0	54.8	3.9	50.9	54.8	53.0	38.1	11.2	17.6	418.28
	in/week	0.52	0.69	1.29	1.65	1.65	0.12	1.53	1.65	1.65	1.15	0.35	0.53	-
Field F -Crop	MG/month	6.9	8.4	17.1	21.2	21.9	3.6	20.3	21.9	21.2	15.1	4.5	7.0	169.28
	in/week	0.52	0.70	1.29	1.65	1.65	0.28	1.53	1.65	1.65	1.14	0.35	0.53	-
Field D - Crop	MG/month	3.4	4.1	8.4	10.3	10.7	1.8	9.9	10.7	10.4	7.4	2.2	3.4	82.77
	in/week	0.52	0.70	1.29	1.65	1.65	0.28	1.53	1.65	1.65	1.14	0.35	0.53	-
Field E -Crop	MG/month	5.0	6.0	12.3	17.3	15.7	1.2	14.6	18.0	17.4	10.9	3.2	5.1	126.56
	in/week	0.46	0.61	1.13	1.65	1.45	0.11	1.34	1.65	1.65	1.00	0.31	0.46	-
Field G Woods														
Field	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	SUM
Field G -Woods	MG/month	24.9	18.9	24.0	24.5	26.5	37.8	39.8	39.8	38.5	39.8	33.9	31.3	379.74
	in/week	1.03	0.87	1.00	1.05	1.10	1.62	1.65	1.65	1.65	1.65	1.45	1.30	-
Field D Woods														
Field	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	SUM
Field D -Woods	MG/month	4.0	3.1	3.9	4.0	4.3	6.2	6.5	6.5	6.3	6.5	5.5	5.1	61.91
	in/week	1.03	0.87	1.00	1.05	1.10	1.62	1.65	1.65	1.65	1.65	1.45	1.30	-

Phase 2: Effluent Discharge Limitations and Design Disposal Capacity

Fields F and G

Design Disposal Capacity: 2.92 MGD

[Calculated as the average of the two annual design disposal capacities for the two-year crop rotation cycle]

Fields D, E, F, and G

Design Disposal Capacity: 3.75 MGD

[Calculated as the average of the two annual design disposal capacities for the two-year crop rotation cycle]

The monthly and annual quantity of effluent discharged from SRRF to the spray fields or wooded areas shall not exceed the following application rate limitations (inches/acre-week) on any pivot or zone; and shall not exceed the following application rate limitations (MG/month and MG/year) on the combined pivot/zones within the specified field.

Effluent Volume Limit - Phase 2														
Crop Rotation (Cover-Corn-Wheat)														
Field	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	SUM
Field G - Crop	MG/month	24.59	23.83	25.93	21.27	54.78	53.01	54.78	54.78	9.86	16.32	24.78	28.43	392.33
	in/week	0.74	0.79	0.78	0.66	1.65	1.65	1.65	1.65	0.31	0.49	0.77	0.86	-
Field F - Crop	MG/month	9.8	9.6	10.4	8.5	21.9	21.2	21.9	21.9	3.9	6.5	9.9	11.3	156.82
	in/week	0.74	0.80	0.78	0.66	1.65	1.65	1.65	1.65	0.30	0.49	0.77	0.85	-
Field D - Crop	MG/month	4.8	4.7	5.1	4.1	10.7	10.4	10.7	10.7	1.9	3.2	4.8	5.5	76.68
	in/week	0.74	0.80	0.78	0.66	1.65	1.65	1.65	1.65	0.30	0.49	0.77	0.85	-
Field E -Crop	MG/month	8.1	7.9	8.5	6.9	18.0	17.4	18.0	18.0	3.2	5.3	8.1	9.2	128.43
	in/week	0.74	0.80	0.78	0.66	1.65	1.65	1.65	1.65	0.30	0.49	0.77	0.85	-

2. The total amount of Phosphorus that may be applied to the crop areas in Fields D, F, and G shall not exceed crop uptake needs of 31.2 lbs/acre per year. This amount includes supplemental fertilizers (when approved by the Department), the phosphorus supplied from the effluent, and any other source. The wooded areas in Fields D and G, as well as all of Field E, do not have high phosphorus, and are thus exempt from these criteria. [February 2021 SRRF Phase 2 Design Engineer Report, Appendix C.2]

Adjustments and reductions are not to be factored into the annual reporting of Total Phosphorus Loading for demonstration of compliance with this limitation.

If any crops are not removed from the spray irrigation fields, then the Total Phosphorus application rate for the field shall be reduced by the amount of phosphorus that would be removed by harvesting the crop.

3. The monthly quantity of effluent discharged may not exceed hydraulic loading assimilative capabilities of the fields.
4. The weekly quantity of effluent discharged to any portion of the spray irrigation field shall not exceed 1.65 inches per acre during any 7-day rolling period.

If the Permittee wishes to pursue an increase in the application rate, the Permittee shall provide appropriate supporting design analysis in consultation with Department technical staff for consideration and written approval. A request for an increased application rate may require an Application for an Operations Permit Amendment, applicable Department fees and public advertisement.

5. The quantity of effluent discharged to any portion of the spray irrigation field shall not exceed 0.25 inch/acre/hour.
6. There shall be sufficient rest periods between applications to prevent field saturation and runoff from occurring in any part of the field.
7. If the system has a partial circle center pivot, there shall be a minimum one-hour rest period when the center pivot reaches any in-field end stops if the instantaneous application rate exceeds a rate of 0.125 inch/acre in any one hour.
8. The pH of the effluent shall not be less than 5.5 standard units nor greater than 9.0 standard units at any time. The point of compliance shall be in accordance with **Part II.A.2** of this Permit.
9. The Total Residual Chlorine (TRC) concentration shall not be less than 1.0 mg/L nor more than 4.0 mg/L at any time. The point of compliance shall be in accordance with **Part II.A.2** of this Permit.

10. Design Effluent Nitrogen Concentration

Allen Harim waste stream

SRRF is designed to receive an effluent Total Nitrogen concentration of 27.7 mg/L from Allen Harim's wastewater treatment system. [May 5, 2017, Amended Design Development Report ANSRWRF Phase 1].

During Phase 1 operations, if the effluent Total Nitrogen concentration exceeds 34.6 mg/L [Design Value + 25%] in any calendar month, the Permittee shall resample the wastewater and submit the additional analyses to the Department. If the effluent Total Nitrogen concentration exceeds 34.6 mg/L for over a three-month period, the Permittee shall have the system evaluated to determine the cause and submit a revised Design Engineer Report to the Department. If the effluent exceeds 41.5 mg/L [Design Value +50%], the Department may invoke the provisions of **Part V.A.1** of this Permit. Also reference **Part II.B.1**.

Phase 2 SRRF wastewater treatment system

Treated effluent discharged from the Phase 2 SRRF wastewater treatment system shall not exceed a daily average Total Nitrogen concentration of 10 mg/L. The daily average concentration shall be determined by the summation of all the measured daily concentrations obtained from composite samples divided by **the number of days during the calendar month when the measurements were made**. [February 2021, Design Engineer Report SRRF Phase 2].

Phase 2 combined blended effluent

The Phase 2 operation is designed to combine and blend the SRRF treated wastewater with the Allen Harim treated wastewater within the storage lagoon. The Phase 2 combined effluent shall not exceed a daily average Total Nitrogen concentration of 22.5 mg/L. The daily average concentration Total Nitrogen shall be determined by the summation of all the measured daily concentrations obtained from composite samples divided by **the number of days during the calendar month when the measurements were made**.

During Phase 2 operations, if the effluent Total Nitrogen concentration from the SRRF treatment system, the Allen Harim waste stream, or the combined blended effluent exceeds 125% of the design value [Design Value + 25%] in any calendar month, the Permittee shall resample the wastewater and submit the additional analyses to the Department. If any of the Total Nitrogen concentrations exceeds 125% of the design value over a three-month period, the Permittee shall have the system evaluated to determine the cause and submit a revised Design Engineer Report to the Department. If the effluent exceeds 150% of the design value [Design Value +50%], the Department may invoke the provisions of **Part V.A.1** of this Permit. Also reference **Part II.B.1**.

11. The total amount of nitrogen that may be applied to each spray field acre shall not exceed the following limitations. This amount includes supplemental fertilizers (when authorized by the Department), the nitrogen supplied from the effluent, and any other source. [Taken from May 3, 2023 revised Nitrogen Balances for Sussex Regional Recharge Facility (SRRF) Phase 1 and Phase 2.] Additional Nitrogen via fertilizer in excess of the below limits may only be applied if approval is received from the Department in accordance with **Part I.F.1.a** of this Permit.

Phase 1 Nitrogen Loading Limits	
Crop Type	Nitrogen Loading Limit (lbs/acre-year)
Cover-Corn-Wheat	338.9
Wheat-Soybean-Cover	394.6
Woods (Loblolly Pines)	437.9

Phase 2 Nitrogen Loading Limits	
Crop Type	Nitrogen Loading Limit (lbs/acre-year)
Cover-Corn-Wheat	352.5
Wheat-Soybean-Cover	417.7
Woods (Loblolly Pines)	421.9

Adjustments and reductions for denitrification, ammonia volatilization, evapotranspiration, and plant uptake are *not* to be factored into the annual reporting of Total Nitrogen Loading for demonstration of compliance with this limitation.

If any crops are not removed from the spray irrigation fields, then the Total Nitrogen application rate for the field shall be reduced by the amount of nitrogen that would be removed by harvesting the crop as detailed in SRRF’s Design Engineer Report and/or Design Nitrogen Balance.

12. Application of Fertilizer

The application of additional fertilizer is only authorized with Department approval upon the Permittee completing the enhanced, higher resolution monitoring required in the Schedule of Compliance in **Part I.F.1.a** through **Part I.F.1.c** of this Permit. The enhanced monitoring is required prior to application to ensure groundwater protection by providing accurate actual data to determine via field data if potential groundwater impacts occur due to additional nutrient loading.

Upon installation of the enhanced monitoring well network, and the acquisition of required baseline data; the Permittee is authorized to apply nitrogen commercial fertilizers on the spray irrigation fields in a manner that may exceed the limitations contained in the Permit with Department approval.

Permittee shall notify the Department within 48 hours of application and submit application data including enhanced monitoring data in the monthly DMR.

The Department reserves the right to revoke the authorization of additional fertilizer in the event the enhanced monitoring identifies impacts to groundwater, or the Permittee fails to submit complete and accurate monitoring data.

13. The discharge to the spray irrigation fields shall be free from material such as floating solids, sludge deposits, debris, scum, oil, and grease.

14. The facility is designed for Unlimited Public Access criteria.

Unlimited Public Access

Treated effluent utilized for unlimited public access sites shall meet the following daily permissible average concentrations. The daily average concentration shall be determined by the summation of all the measured daily concentrations obtained from composite or grab samples divided by the number of days during the calendar month when the measurements were made. The point of compliance shall be at the discharge side of SRRF’s irrigation pumps for fecal coliform bacteria and at wastewater treatment

system sampling port located immediately after filtration and disinfection for BOD₅, TSS, and Turbidity.

- a. The fecal coliform bacteria concentration of disinfected treated wastewater discharged to the spray fields shall not exceed 20 col/100 mL.
- b. The 5-day Biochemical Oxygen Demand (BOD₅) concentration of treated wastewater discharged to the spray fields shall not exceed 10 mg/L.
- c. The Total Suspended Solids (TSS) concentration of treated wastewater discharged to the spray fields shall not exceed 10 mg/L.
- d. The turbidity of the treated wastewater shall not exceed 5 NTU.

Parameter	Daily Permissible Average Concentration
BOD ₅	10.0 mg/L
Fecal Coliform	20 colonies/100 mL
TSS	10.0 mg/L
Turbidity	5 NTU

15. Lysimeter Percolate Limitation

The rolling 12-month average percolate Total Nitrogen concentrations in each lysimeter shall not exceed 10 mg/L. If the rolling 12-month average exceeds the total nitrogen percolate concentration of 10 mg/L, the Permittee shall examine the facility’s operation and maintenance log for improper operational procedures, conduct a physical inspection of the disposal system to detect abnormalities, and review monitoring data and other records to determine the cause/source of the total nitrogen exceedance. The Permittee shall report the finding to the Department with any proposed modifications to operational procedures or other corrective actions. The Permittee shall implement proposed actions upon approval by the Department.

Upon the Permittee completing the enhanced, higher resolution monitoring required in the Schedule of Compliance in this Permit, the lysimeter data will be utilized in conjunction with the groundwater monitoring data to determine environmental impact.

E. FACILITY CLASSIFICATION

A classification was performed on SRRF in accordance with the *Regulations Licensing Operators of Wastewater Facilities*. The wastewater treatment system is designated as a Class IV Facility. SRRF shall be under the direction of a Class IV Licensed Operator in Direct Responsible Charge who is available to direct operations. A licensed operator, operating under the direction of the licensed operator in Direct Responsible Charge for the facility, shall be available when the spray irrigation system is in operation.

F. SCHEDULE OF COMPLIANCE

- 1. The Permittee shall submit the information necessary and/or complete the following requirements.

- a. Enhanced Monitoring Plan

- i. Prior to applying nitrogen fertilizers (as discussed in Part.I.D.12), the Permittee shall provide to the Department for review and approval an Enhanced Monitoring Plan for Fields F and G developed by a licensed PG.
- ii. The Enhanced Monitoring Plan shall include, but not be limited to, the following:

- 1) The installation of additional groundwater monitoring wells at deeper depths both in-field and down-gradient.
 - 2) Additional down-gradient wells to be located in between existing wells.
 - 3) Specific conductivity probes installed in the in-field and down-gradient monitoring wells.
 - 4) May through October increase monitoring frequency to monthly at a minimum.
 - 5) Additional Reporting regarding fertilizer, timing of application, type of application, constituents of fertilizer, etc.
 - 6) Obtain probe baseline data prior to application of additional fertilizer (~6 months of data)
- b. Enhanced Monitoring Well Network Requirements
- i. Within 15 days of installation of the monitoring well network, the Permittee shall provide an updated Monitoring Well As-built Drawing for the entire site bearing the seal and signature of a licensed Professional Engineer registered in the State of Delaware. The Monitoring Well As-built Drawing shall contain:
 - 1) Table summary of groundwater monitoring well information.
 - 2) GPS information detailing the northings and eastings; the local well ID number; and the DNREC Well ID/Well Permit Number. The GPS information must be in either Delaware State Plane, North American Datum 1983 meters; or Latitude and Longitude decimal degrees.
 - 3) TOC elevations survey results, using NAVD88, for all monitoring wells to be utilized for groundwater monitoring. Provide the length of the well stickup and the well survey information to the closest 0.01 feet. Provide a permanent mark, etch, or fixture to be used to specify the survey point where the TOC elevations were read.
- c. Enhanced Monitoring Contingency Plan
- i. Within 15 days of installation of the monitoring well network, the Permittee shall provide an Enhanced Monitoring Contingency Plan that shall, at a minimum, address a potential event of elevated Nitrates, or upward trend, being detected in the in-field or downgradient wells. The plan shall include multiple short- and long-term mitigation measures (e.g., field resting, crop rotation, or other source control measures and/or hydrogeologic investigation and corrective actions).

Phase 1

- d. Prior to utilizing Fields D and E, the Permittee shall complete the following:
 - i. The Permittee shall notify the Department in writing of the intent to initiate construction activities for Fields D and E at least fifteen days prior to the commencement of construction. The written notification shall include a draft construction schedule. The Permittee shall provide updated construction schedules if the schedule changes as construction progresses.
 - ii. Complete all construction relative to Fields D and E in accordance with State Permit DEN Number: 359288-01.
 - iii. The Permittee shall notify the Department in writing upon completion of construction and request a Construction Completion Inspection to be performed by the Department staff. If an inspection is required, the Design Engineer, Class E.4 system contractor, licensed operator, and the Permittee may be required to be present during the inspection. During the inspection, all mechanical parts are to be tested.

- iv. Upon completion of construction, the Permittee shall submit to the Department the following applicable items. The items shall be combined in one package and shall include an electronic copy of all items where possible. Failure to submit all required information constitutes grounds for denial of the authorization to utilize Fields D and E for disposal.
 - 1) Design Engineer Inspection Report(s) certifying the project has been constructed in accordance with approved plans and specifications.
 - 2) Copies of any other applicable State/County inspection reports.
 - 3) Contractor's Certificate of Completion.
 - 4) A set of "as-built" drawings of the project bearing the seal and signature of a licensed Professional Engineer registered in the State of Delaware.
 - a) The "as-built" drawings shall include:
 - b) Site map showing the location of all structures, piping and appurtenances, disposal areas and buffers.
 - c) A full equipment list and technical specifications for all equipment used, if different than submitted in the permit application.
 - d) The new topography elevations of the system.
 - e) Monitoring/Observation well elevations at the top of the casing (TOC) and at the ground surface, GPS coordinates (State Plane), and local topography tied to a common benchmark.
 - f) The location and screen depth, length of stick up, and well IDs shall be provided for each monitor well.
 - v. Any necessary updates to the Operation and Maintenance (O&M) Plan in accordance with Section 6.7 of the Regulations.
 - vi. Spreadsheet summary of groundwater monitoring well, lysimeter, and piezometer information.
 - vii. GPS information detailing the northings and eastings; the local well ID number; and the DNREC Well ID/Well Permit Number. The GPS information shall be in either Delaware State Plane, North American Datum 1983 meters, or Latitude and Longitude decimal degrees.
 - viii. TOC elevations survey results for all monitoring wells to be utilized for groundwater monitoring. Provide the length of the well stickup and the well survey information to the closest 0.01 feet. Provide a permanent mark, etch, or fixture to be used to specify the survey point where the TOC elevations were read.
 - ix. A summary report detailing the analyses of the background groundwater quality sampling program that was conducted consisting of at least three (3) samples one (1) month apart and analyzed within six months prior to the initiation of disposal activities (see Section 6.6.3.16 of the Regulations). Lab data sheets must be provided in addition to an Excel summary worksheet.
 - x. An approved Conditional Use for Field D parcel (2-35-6-11.01).
 - xi. A summary report detailing the analyses of background soils sampling that was conducted in accordance with Part II.A.6 "Soil Monitoring Requirements" of this permit and performed within six months prior to the initiation of disposal activities. Lab data sheets must be provided in addition to an Excel summary worksheet.
- e. Obtain written approval from the Department authorizing disposal on Fields D and E.

Phase 2

f. Prior to operation of the SRRF wastewater treatment system constructed in accordance with DNREC Construction Permit DEN Number 359288-03, Permittee shall obtain written approval from the Department.

2. The Permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance by specified date. In the event of noncompliance, the notice shall include the cause of noncompliance, any remedial action taken, and the probability of meeting the next scheduled requirement.

G. BUFFER REQUIREMENTS

Buffer zones shall be maintained in accordance with Section 6.3.2.3.10 of the Regulations unless otherwise specified below. Also see buffer requirement set forth in **Part I.1.c.**

1. Buffer zones of at least 150-feet shall be maintained around all public and private domestic wells.
2. A buffer zone of 150-feet shall be maintained from all downgradient domestic wells occurring on parcels 235-14.00-63.00, 235-14.00-66.00, and 235-13.00-6.00 [Per DNREC Hydrogeologic review dated March 25, 2010 and the August 18, 2017 DDR Addendum].
3. In accordance with Secretary's Order No. 2012-W-0052 Issued and Effective March 12, 2013, Permittee shall:
 - a. Maintain all required buffers for the spray fields as set by both the Department and Sussex County.
 - i. Maintain a 100-foot buffer from the wetted field area to the north-west corner of the Sylvan Acres Development.

H. SLUDGE HANDLING REQUIREMENTS

All sludge (biosolids) shall be handled in accordance with standard wastewater practices and shall be disposed of in a manner such as to prevent any pollutant from entering the surface water or groundwater and to comply with applicable federal or state laws and regulations.

Management and disposal of biosolids produced at the SRRF wastewater treatment system shall be handled by pumping and transport to Sussex County's Class A biosolids treatment facility at the Inland Bays Regional Wastewater Treatment Facility. The Permittee owns and operates two (2) 5,000-gallon pumper trucks operating under State of Delaware Non-Hazardous Liquid Waste Transporters Permit (No. DE OH-300). The Permittee shall use these trucks (or other permitted trucks) to transport biosolids. The Permittee shall handle sludge in accordance with the disposal agreement dated September 19, 2019 with Sussex County Council to dispose of up to 100 dry tons of biosolids per year at their IBRWTF biosolids facility. The Permittee shall maintain a current copy of the executed agreement with Sussex County on file with the Department. In order to deviate from the above biosolids management and disposal plan, the Permittee shall submit an alternative plan for Department approval.

I. FACILITY SPECIFIC CONDITIONS

1. The Permittee is authorized to transfer flows to other Permittee-owned and Sussex County-owned wastewater treatment facilities for additional treatment and/or disposal as approved by Department-issued Permits.

2. In accordance with Secretary's Order No. 2012-W-0052 Issued and Effective March 12, 2013, the Permittee shall:
 - a. Design the treatment plant to look like an agricultural building and have landscaping to screen it from view from its neighbors.
 - b. Ensure that the storage ponds do not become a breeding ground for mosquitos.
 - c. Maintain all required buffers for the spray fields as set by both the Department and Sussex County.
 - i. Maintain a 100-foot buffer from the wetted field area to the north-west corner of the Sylvan Acres Development.
3. The Permittee shall comply with all applicable Sussex County ordinances and conditional use requirements placed on this facility.
4. The Permittee shall maintain an updated copy of the spray irrigation land area Lease Agreement on file with the Department.
5. Phase 2 is designed to require only 37.2 MG of the storage lagoon's 90 MG capacity. If storage volume exceeds 37.2 MG, the Permittee shall notify the Department in writing. See lagoon volumes table on **Page 6** of this Permit.
6. Wastewater spray irrigation will not be permitted on Field D parcel (2-35-6-11.01) until it is added to an approved Conditional Use. Parcel 2-35-6-11.01 is not included in the current Conditional Use Ordinance 1923, adopted July 31, 2007. Once this parcel has been added to an approved Conditional Use, the Permittee shall provide a copy of the approved Conditional Use to the Department for approval.
7. Phase 1 Fecal Coliform Bacteria Contingency Plan
 - a. If the analytical results of an effluent sample from discharge side of the SRRF irrigation pumps documents an exceedance of the maximum limitations for fecal coliform bacteria set by this Permit, the Permittee shall collect and analyze a second sample within 24 hours after becoming aware of the exceedance. If the second sample documents that the maximum limitation for fecal coliform bacteria is continuing to be exceeded, the following corrective actions shall be enacted:
 - i. Notify the Department of the non-compliance.
 - ii. Immediately cease discharging effluent.
 - iii. Submit copies of the recent analytical results documenting the two exceedances to the Department.
 - iv. Examine operation and maintenance logs for improper operational procedures.
 - v. Conduct a physical inspection of the treatment system, lagoon, and effluent transfer line to detect abnormalities. Any abnormalities discovered shall be corrected.
 - b. Within 24 hours of enacting these corrective actions, the Permittee shall collect and analyze a third sample for fecal coliform bacteria from discharge side of the SRRF irrigation pumps. If the analytical results no longer document an exceedance of the maximum limitations for fecal coliform bacteria, the Permittee shall notify the Department and may resume normal operations.
 - c. However, if the analytical results of the third sample again documents an exceedance of the maximum limitations for fecal coliform bacteria set by this Permit, the Permittee shall install and operate a temporary disinfection system to further treat the effluent from the lagoon. Disinfection shall continue until fecal coliform bacteria results meet required limits and the Department authorizes the Permittee to cease disinfection.

8. Phase 2 Total Nitrogen Contingency Plan

- a) Upon the operation of the SRRF wastewater treatment system, if the analytical results of a treated wastewater sample collected from the sampling port located immediately after filtration and disinfection documents the exceedance of the 10 mg/L Total Nitrogen concentration, the Permittee shall collect and analyze a second sample within 24 hours of becoming aware of the original exceedance. If the second sample results documents that the 10 mg/L Total Nitrogen concentration continues exceeded the Total Nitrogen limitation, the Permittee shall enact the following contingency plan.
 - i. The Permittee shall notify the Department within 24-hours after becoming aware of the second exceedance and submit a copy of the analytical results to the Department.
 - ii. If laboratory testing confirms that treated wastewater concentrations exceed 10 mg/L but the exceedance is less than 20 mg/L for either Nitrate as Nitrogen or Total Nitrogen than the Permittee shall notify the Department to determine if treated wastewater is required to be diverted for retreatment. If required, the treated wastewater shall be immediately diverted for storage and retreatment.
 - iii. If laboratory testing confirms that treated wastewater concentrations exceed 20 mg/L for either Nitrate as Nitrogen or Total Nitrogen than the Permittee shall immediately divert the treated wastewater for storage and retreatment.
 - iv. The Permittee shall increase the frequency of Total Nitrogen effluent sampling at the SRRF wastewater treatment system to once daily and submit weekly results to the Department.
 - v. The Permittee shall examine the operation and maintenance log, required to be maintained by this Permit, for any possible improper operational procedures.
 - vi. The Permittee shall conduct a physical inspection of the treatment system to detect abnormalities. Any abnormalities discovered shall be corrected. A report detailing the corrections made shall be submitted to the Department within 30 days of correction.
 - vii. When daily analytical results from three consecutive days of wastewater sampling do not exceed the limitation, the Permittee is authorized to discharge to the storage lagoon and return to a bi-weekly monitoring frequency.

- b) If the Department approves the continued discharge of treated wastewater in accordance with 8.a).ii to the storage lagoon, the following additional requirements shall be required.
 - i. The Permittee shall increase the frequency of Total Nitrogen effluent sampling at the SRRF wastewater treatment system and at the discharge side of SRRF's irrigation pumps to once daily and submit weekly results to the Department.
 - ii. The Permittee shall submit monthly TN balances documenting that the facility can continue spray irrigation at higher concentrations while not exceed 10 mg/L TN (monthly basis) in the percolate.
 - iii. When daily analytical results from three consecutive weeks of wastewater sampling do not exceed the limitation, the Permittee is authorized to return to a bi-weekly monitoring frequency.

- c) If the facility is required to enact this contingency plan more than three times in a 12-month period, the Permittee shall have the system evaluated to determine the cause of the elevated total nitrogen results and submit a revised Design Engineer Report with proposed corrective actions to achieve a maximum total nitrogen concentration of 10 mg/L that bears the seal and signature of a Class C licensed Delaware Professional Engineer to the Department. The report shall be submitted within one year of the third notification of the contingency plan being enacted. The Permittee shall initiate implementation of the plan within 90 days following approval by the Department.

9. Phase 2 Fecal Coliform Bacteria and Turbidity Contingency Plan

- a) Upon the operation of the SRRF wastewater treatment system, if the analytical results of a treated wastewater sample collected from the sampling port located immediately after filtration and disinfection documents an exceedance of the maximum limitations for fecal coliform bacteria and/or turbidity set by this Permit, the Permittee shall collect and analyze a second sample within 24 hours after becoming aware of the exceedance. If the second sample documents that any maximum limitation for fecal coliform bacteria and/or turbidity is continuing to be exceeded, the following corrective actions shall be enacted:
 - i. Notify the Department of the non-compliance.
 - ii. Submit copies of the recent analytical results documenting the exceedance to the Department.
 - iii. Immediately increase filtration through the cloth media filters. This shall be accomplished by either bringing online additional filtration capacity or decreasing the loading per square foot of filter media.
 - iv. Examine operation and maintenance logs for improper operational procedures.
 - v. Conduct a physical inspection of the treatment system to detect abnormalities. Any abnormalities discovered shall be corrected.
- b) Within 24 hours of enacting these corrective actions the Permittee shall collect and analyze a third sample for fecal coliform bacteria and/or turbidity from the treatment system discharge. If the analytical results no longer document an exceedance of any of the maximum limitations for fecal coliform bacteria and/or turbidity, the Permittee shall notify the Department and may resume normal operations.
- c) However, if the analytical results of the third sample again documents an exceedance of any of the maximum limitations for fecal coliform bacteria and/or turbidity set by this Permit, the following corrective actions shall be enacted:
 - i. Notify the Department of the continued non-compliance.
 - ii. Submit copies of the recent analytical results documenting an exceedance to the Department.
 - iii. Effluent from the treatment system shall be diverted away from the 90 million-gallon storage lagoon back to the influent equalization/diversion lagoon for further treatment.
 - iv. When additional analytical results from samples of treated wastewater effluent no longer document an exceedance of any of the maximum limitations for fecal coliform bacteria and/or turbidity, the Permittee shall notify the Department and upon written approval from the Department may resume transferring treated wastewater to the 90 million-gallon storage lagoon and resume normal operations.

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Amendment Date: **TBD**

Expiration Date: March 17, 2025

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- d) If the facility is required to divert poorly treated wastewater more than three times in a 12-month period, the Permittee shall have the wastewater treatment system evaluated to determine the cause of the elevated fecal coliform bacteria and/or turbidity results and submit a revised Design Engineer Report with proposed corrective actions to achieve a maximum fecal coliform bacteria count of 20 colonies/100 mL and/or turbidity concentration of 5 NTU that bears the seal and signature of a Class C licensed Delaware Professional Engineer to the Department. The report shall be submitted within one year of the third notification of the diversion of poorly treated wastewater being enacted. The Permittee shall initiate implementation of the plan within 90 days following approval by the Department.

PART II

A. MONITORING REQUIREMENTS

During the period beginning on the effective date and lasting through the expiration date of this Permit, the Permittee is authorized to discharge to spray irrigation **Fields F and G** as identified on [Page 9, in Part I.A](#), and depicted on [Page 3 and 4 of this Permit](#). Such discharge shall be monitored by the Permittee as specified herein.

Fields D and E will be authorized for use upon completion of the Schedule of Compliance requirements iterated in [Part I.F.1](#) of this Permit and upon written approval from DNREC.

For samples required to be taken ‘monthly’ and/or ‘twice per month,’ the samples for each monitoring location (i.e., influent, effluent, well, lysimeter, etc.) shall be taken a minimum of 14 days apart. Samples required to be taken ‘quarterly’ shall be taken once every three months and no more than 100 days apart.

Requests for monitoring modifications shall be submitted to the Department in writing. Such requests shall clearly state the reason for and nature of the proposed modification and, where applicable, shall contain supporting scientific information, analysis, and justification. Requests will be addressed by the Department on a case-by-case basis.

The Permittee shall initiate periodic reporting required under [Part II.B.2](#) upon initiation of irrigation activities for all monitoring requirements.

1. INFLUENT MONITORING REQUIREMENTS

a. Phase 1 and Phase 2 Allen Harim treated effluent entering SRRF's storage lagoon

Samples taken in compliance with the sprayed influent monitoring requirements for all parameters specified may either be taken from a sampling port and meter located prior to storage at SRRF or reported as sampled in accordance with Allen Harim LLC's Permit No. 597261-01 at their effluent pump station.

Parameter	Unit of Measurement	Monitoring Frequency	Sample Type
Flow - Total Influent Flow for Month to SRRF	Gallons	Continuous	Recorded
Flow - Max Daily Influent Flow to SRRF	Gallons	Continuous	Recorded
Flow - Average Daily Influent Flow to SRRF	Gallons/Day	Continuous	Calculation (Total Influent Flow for Month / Number of Days in Month)
BOD ₅	mg/L	Monthly	Composite
TSS	mg/L	Monthly	Composite
Total Nitrogen	mg/L	Monthly	Composite
Ammonia Nitrogen	mg/L	Monthly	Composite
Nitrate + Nitrite as Nitrogen	mg/L	Monthly	Composite
pH	S.U.	Monthly	Composite
Total Phosphorus	mg/L	Monthly	Composite
Chloride	mg/L	Quarterly	Composite
Turbidity	NTU	Continuous	Recorded
Total Residual	mg/L	Continuous	Recorded
Potassium	mg/L	Quarterly	Composite
Sodium	mg/L	Quarterly	Composite

b. Phase 2 SRRF treatment system influent

Parameter	Unit of Measurement	Monitoring Frequency	Sample Type
Flow - Total Influent Flow for Month to SRRF	Gallons	Continuous	Recorded
Flow - Max Daily Influent Flow to SRRF	Gallons	Continuous	Recorded
Flow - Average Daily Influent Flow to SRRF	Gallons/Day	Continuous	Calculation (Total Influent Flow for Month / Number of Days in Month)
BOD ₅	mg/L	Monthly	Grab
TSS	mg/L	Monthly	Grab
Total Nitrogen	mg/L	Monthly	Grab
Ammonia Nitrogen	mg/L	Monthly	Grab
Nitrate + Nitrite as Nitrogen	mg/L	Monthly	Grab
pH	S.U.	Monthly	Grab
Total Phosphorus	mg/L	Monthly	Grab
Chloride	mg/L	Quarterly	Grab
Copper	Mg/L	Annually	Grab

2. SPRAYED EFFLUENT MONITORING REQUIREMENTS

a. Requirements for Phase 1 Allen Harim treated effluent discharged from SRRF's storage lagoon

Samples taken in compliance with the sprayed effluent monitoring requirements for all parameters specified shall be taken from the discharge side of the SRRF irrigation pumps.

Parameter	Unit Measurement	Monitoring Frequency	Sample Type
Ammonia Nitrogen	mg/L	Monthly	Composite
Cadmium	mg/L	Annually	Composite
Copper	mg/L	Annually	Composite
Effluent Flow	Gal/day per Zone/Pivot ¹	Continuous	Recorded
Fecal Coliform	Col/100 ml	Twice per month	Grab
Lead	mg/L	Annually	Composite
Nickel	mg/L	Annually	Composite
Nitrate + Nitrite Nitrogen	mg/L	Monthly	Composite
Organic Nitrogen	mg/L	Monthly	Calculation
Total Nitrogen	mg/L	Twice per Month	Composite
Total Phosphorus	mg/L	Monthly	Composite
Total Residual Chlorine ²	mg/L	Monthly	Composite
Zinc	mg/L	Annually	Composite

¹ Data shall be provided for each zone (wooded areas) and each pivot (agricultural fields). Providing only an overall summary for each field will constitute a violation of this Permit.

² Total Residual Chlorine shall only be sampled when disinfection is required at SRRF.

Additionally, the Permittee shall provide the following information.

Parameter	Unit Measurement	Monitoring Frequency	Sample Type
Total Effluent Flow to all Fields/Zones/Pivots combined	Gallons	Monthly	Data
Max Daily Effluent Flow to all Fields/Zones/Pivots combined	Gallons	Monthly	Data
Average Daily Effluent to all Fields/Zones/Pivots combined	MGD or GPD	Monthly	Calculation (Total Monthly Effluent Flow / Number of Days in Month)
Number of Days Sprayed during the Month to all Fields/Zones/Pivots combined	Days	Monthly	Data
Total Effluent Flow to each Field/Zone/Pivot	Gallons	Monthly	Data
Number of Days Sprayed During the Month to each Field/Zone/Pivots	Gallons	Monthly	Data
Nitrogen Loading Rate to each Zone/Pivot	lbs/acre per Zone/Pivot ³	Monthly	Calculation
Phosphorus Loading Rate to each Zone/Pivot	lbs/acre per Zone/Pivot ³	Monthly	Calculation

³ Data shall be provided for each zone (wooded areas) and each pivot (agricultural fields). Providing only an overall summary for each field will constitute a violation of this Permit.

b. Requirements for Phase 2 effluent (two points of compliance)

Wastewater Treatment System

Samples taken in compliance with the sprayed effluent monitoring requirements for all parameters specified shall be taken from a sampling port and meters located immediately after filtration and disinfection.

Parameter	Unit Measurement	Monitoring Frequency	Sample Type
Ammonia Nitrogen	mg/L	Monthly	Composite
BOD ₅	mg/L	Twice per month	Composite
Cadmium	mg/L	Annually	Composite
Chloride	mg/L	Quarterly	Composite
Copper	mg/L	Annually	Composite
Effluent Flow	Gal/day per Field/Zone/Pivot	Continuous	Recorded
Fecal Coliform	Col/100 ml	Twice per month	Grab
Lead	mg/L	Annually	Composite
Nickel	mg/L	Annually	Composite
Nitrate + Nitrite Nitrogen	mg/L	Monthly	Composite
Organic Nitrogen	mg/L	Monthly	Calculation
pH	S.U.	Daily	In-situ
Potassium	mg/L	Quarterly	Composite
Sodium	mg/L	Quarterly	Composite
Total Nitrogen	mg/L	Twice per Month	Composite
Total Phosphorus	mg/L	Monthly	Composite
TSS	mg/L	Twice per month	Composite
TDS	mg/L	Quarterly	Composite
Turbidity	NTU	Continuous	Recorded
Total Residual Chlorine ⁴	mg/L	Daily	Composite
Zinc	mg/L	Annually	Composite

⁴ Total Residual Chlorine shall only be sampled if disinfection (using Chlorine) is required at SRRF.

Post-Storage Discharge of Blended Treated Effluent

Samples taken in compliance with the sprayed effluent monitoring requirements for all parameters specified shall be taken from a sampling port and meters located at the discharge side of the SRRF irrigation pumps.

Parameter	Unit Measurement	Monitoring Frequency	Sample Type
Ammonia Nitrogen	mg/L	Monthly	Composite
BOD ₅	mg/L	Twice per month	Composite
Cadmium	mg/L	Annually	Composite
Chloride	mg/L	Quarterly	Composite
Copper	mg/L	Annually	Composite
Effluent Flow	Gal/day per Field/Zone/Pivot	Continuous	Recorded
Fecal Coliform	Col/100 ml	Twice per month	Grab
Lead	mg/L	Annually	Composite
Nickel	mg/L	Annually	Composite
Nitrate + Nitrite Nitrogen	mg/L	Monthly	Composite
Organic Nitrogen	mg/L	Monthly	Calculation
pH	S.U.	Daily	In-situ
Potassium	mg/L	Quarterly	Composite
Sodium	mg/L	Quarterly	Composite
Total Nitrogen	mg/L	Twice per Month	Composite
Total Phosphorus	mg/L	Monthly	Composite
TSS	mg/L	Twice per month	Composite
TDS	mg/L	Quarterly	Composite
Turbidity	NTU	Continuous	Recorded
Total Residual Chlorine ⁵	mg/L	Daily	Composite
Zinc	mg/L	Annually	Composite

⁵ Total Residual Chlorine shall only be sampled if disinfection (using Chlorine) is required at SRRF.

Additionally, the Permittee shall provide the following information.

Parameter	Unit Measurement	Monitoring Frequency	Sample Type
Total Effluent Flow to all Fields/Zones/Pivots combined	Gallons	Monthly	Data
Max Daily Effluent Flow to all Fields/Zones/Pivots combined	Gallons	Monthly	Data
Average Daily Effluent to all Fields/Zones/Pivots combined	MGD or GPD	Monthly	Calculation (Total Monthly Effluent Flow / Number of Days in Month)
Number of Days Sprayed during the Month to all Fields/Zones/Pivots combined	Days	Monthly	Data
Total Effluent Flow to each Field/Zone/Pivot	Gallons	Monthly	Data
Number of Days Sprayed During the Month to each Field/Zone/Pivots	Gallons	Monthly	Data
Nitrogen Loading Rate to each Field/Zone/Pivot	lbs/acre per Field/Zone/Pivot	Monthly	Calculation
Phosphorus Loading Rate to each Field/Zone/Pivot	lbs/acre per Field/Zone/Pivot	Monthly	Calculation

3. GROUNDWATER MONITORING REQUIREMENTS

Groundwater samples shall be taken from each monitoring well at SRRF. Groundwater monitoring well locations are depicted on the Site Map found on **Page 3** of this Permit.

Samples taken in compliance with the monitoring requirements specified shall be taken at each monitoring well in accordance with procedures approved by the Department and listed in the *State of Delaware, Field Manual for Groundwater Sampling* (Custer, 1988) or alternative methodology approved by the Department.

Groundwater monitoring results for each monitoring well shall be reported using the State of Delaware Well Identification Tag Number that is required on all wells in accordance with the *Delaware Regulations Governing the Construction and Use of Wells*, Section 11.1.

All field sampling logs and laboratory results for samples obtained from a well shall be identified by the DNREC ID affixed to the well.

Groundwater samples shall be tested from the following wells for the following parameters [well info taken from 2019.07.17 O&M p.32].

DNREC Well ID	Local ID	Northings (meters)	Eastings (meters)	Ground Elevations (ft)	Top of Outer Casing (ft)	Length of Stick Up (ft)	Casing Depth (ft)
254881	MW-1L	88993.83	206492.46	34.11	36.67	2.56	20
254882	MW-2L	89332.77	206846.20	33.21	35.67	2.46	20
254883	MW-3L	89038.74	207010.94	28.50	30.69	2.19	20
254884	MW-4L	88740.91	207018.88	34.11	36.67	2.56	20
258634	MW-1F	89056.08	206855.40	31.57	33.98	2.41	20
258632	MW-2F	89805.84	206844.26	31.53	33.93	2.4	20
258620	MW-1G	87908.08	204453.82	39.08	41.88	2.8	20
258628	MW-2G	86961.64	204305.92	42.18	44.70	2.52	20
258630	MW-3G	87059.37	204894.01	38.48	40.82	2.34	20
258631	MW-4G	87083.99	205047.96	39.13	41.72	2.59	20
258625	MW-5G	87224.43	205871.48	35.28	38.11	2.83	20

- 1) Coordinates are in NAD 1983 Delaware State Plane 0700 Meters.
- 2) Monitoring Wells have been screened from a depth of 20-ft to 30-ft.

Parameter	Unit Measurement	Measurement Frequency	Sample Type
Ammonia as Nitrogen	mg/L	Quarterly	Grab
Chloride	mg/L	Quarterly	Grab
Depth to Water	hundredths of a foot	Monthly	Field Test
Dissolved Oxygen	mg/L	Quarterly	Field Test
Fecal Coliform	Col/100mL	Quarterly	Grab
Nitrate + Nitrite as Nitrogen	mg/L	Quarterly	Grab

pH	S.U.	Quarterly	Field Test
Sodium	mg/L	Quarterly	Grab
Specific Conductance	µS/cm	Quarterly	Field Test
Temperature	□C	Quarterly	Field Test
Total Dissolved Solids	mg/L	Quarterly	Grab
Total Nitrogen	mg/L	Quarterly	Grab
Total Phosphorus	mg/L	Quarterly	Grab
Arsenic	mg/L	Annually	Grab
Cadmium	mg/L	Annually	Grab
Chromium	mg/L	Annually	Grab
Copper	mg/L	Annually	Grab
Hardness	mg/L	Annually	Grab
Iron	mg/L	Annually	Grab
Lead	mg/L	Annually	Grab
Manganese	mg/L	Annually	Grab
Mercury	mg/L	Annually	Grab
Nickel	mg/L	Annually	Grab
Selenium	mg/L	Annually	Grab
Sulfate	mg/L	Annually	Grab
Zinc	mg/L	Annually	Grab

4. ENHANCED GROUNDWATER MONITORING NETWORK

Groundwater samples from the Enhanced Monitoring Network wells, once installed in accordance with **Part I.F.1.a** of this Permit; in addition to the following wells, shall be monitored for the following parameters:

DNREC Well ID	Local ID	Northings (meters)	Eastings (meters)	Ground Elevations (ft)	Top of Outer Casing (ft)	Length of Stick Up (ft)	Casing Depth (ft)
258633	MW-3F	89653.61	207373.30	23.43	29.03	5.6	20
258635	MW-4F	88664.02	207398.01	18.48	20.98	2.5	20
258636	MW-5F	88901.57	207213.08	27.06	29.55	2.49	20
258626	MW-6G	87338.98	206580.77	32.14	34.70	2.56	20
258627	MW-7G	87898.99	206585.64	33.23	35.64	2.41	20
258629	MW-8G	88466.82	206507.64	28.26	30.94	2.68	20
258624	MW-9G	87639.24	206170.14	33.67	36.15	2.48	20

- 1) Coordinates are in NAD 1983 Delaware State Plane 0700 Meters.
- 2) Monitoring Wells have been screened from a depth of 20-ft to 30-ft.

Parameter	Unit Measurement	Measurement Frequency	Sample Type
Ammonia as Nitrogen	mg/L	Monthly	Grab
Chloride	mg/L	Monthly	Grab
Depth to Water	hundredths of a foot	Monthly	Field Test
Dissolved Oxygen	mg/L	Monthly	Field Test
Fecal Coliform	Col/100mL	Monthly	Grab
Nitrate + Nitrite as Nitrogen	mg/L	Monthly	Grab
pH	S.U.	Monthly	Field Test
Sodium	mg/L	Monthly	Grab
Specific Conductance	µS/cm	Continuously	Field Test
Temperature	°C	Monthly	Field Test
Total Dissolved Solids	mg/L	Monthly	Grab
Total Nitrogen	mg/L	Monthly	Grab
Total Phosphorus	mg/L	Monthly	Grab
Arsenic	mg/L	Annually	Grab
Cadmium	mg/L	Annually	Grab
Chromium	mg/L	Annually	Grab
Copper	mg/L	Annually	Grab
Hardness	mg/L	Annually	Grab
Iron	mg/L	Annually	Grab
Lead	mg/L	Annually	Grab

Manganese	mg/L	Annually	Grab
Mercury	mg/L	Annually	Grab
Nickel	mg/L	Annually	Grab
Selenium	mg/L	Annually	Grab
Sulfate	mg/L	Annually	Grab
Zinc	mg/L	Annually	Grab

5. GROUNDWATER TABLE ELEVATION MONITORING REQUIREMENTS

Monthly water level measurements shall be taken at each piezometer and observation well listed below and depicted on **Page 3** from December through April [well info taken from 2019.07.17 O&M p.33].

DNREC Well ID	Local ID	Northings (meters)	Eastings (meters)	Ground Elevations (ft)	Top of Outer Casing (ft)	Length of Stick Up (ft)
265831	PZ-1F	88751.53	207166.42	22.53	25.53	25.41
265838	PZ-1G	87347.73	205271.49	35.45	38.86	37.92
265837	PZ-2G	87578.95	205093.80	37.31	41.29	40.00
265832	PZ-3G	87823.90	205250.09	32.78	43.00	41.81
265836	PZ-4G	87908.92	205455.69	32.64	36.24	32.23
265829	PZ-5G	88039.85	205768.25	32.67	35.97	35.23
265833	PZ-6G	88434.07	205949.66	31.58	34.63	33.21
265830	PZ-7G	88408.29	206450.31	25.91	29.58	29.92

Coordinates are in NAD 1983 Delaware State Plane 0700 Meters.

While performing the monitoring as required by **Part II.A.3** and **Part II.A.4** of this Permit, if the ‘Depth to Water’ in any one of the monitoring wells has reached within 3-feet of the ground surface, the Permittee shall be required to collect additional weekly depth to water measurements from the monitoring wells within 3-feet of the ground surface. The additional monitoring is necessary to ensure that spray irrigation ceases on any areas of the spray fields where the groundwater may reach within 2-feet of the ground surface in accordance with **Part III.A.5** of this Permit. The Permittee may discontinue the additional weekly sampling for depth to water in a well when the groundwater table elevation readings in the well exceeds a 3-foot separation between groundwater and ground surface. The additional groundwater table elevation measurements must be recorded in the operator’s log and reported to the Department in accordance with **Part II.B.2** of this Permit.

6. LYSIMETER MONITORING REQUIREMENTS

Samples shall be taken monthly from each lysimeter for SRRF. Lysimeter locations are depicted on the Site Map found on **Page 3** of this Permit.

All field sampling logs and laboratory results for samples obtained from a well shall be identified by the DNREC ID affixed to the well.

Samples shall be tested from the following wells for the following parameters. The constituents are listed below in highest priority first. If sufficient sample volume is not be obtained to test for all parameters listed, the sample shall be tested for as many constituents possible in the following parameter order [well info taken from 2019.07.17 O&M p.35].

DNREC Well ID	Local ID	Northings (meters)	Eastings (meters)	Ground Elevation (ft)	Outer Casing (ft)	Inner Casing (ft)
265827	LY-1F	89388.92	207110.93	33.13	35.73	35.23
265835	LY-1G	87984.44	205584.58	34.27	36.22	35.38
265834	LY-2G	87646.77	206139.14	33.80	36.10	35.82
265828	LY-3G	87205.37	204810.20	40.62	43.25	42.82

Coordinates are in NAD 1983 Delaware State Plane 0700 Meters.

Parameter	Unit Measurement	Measurement Frequency	Sample Type
Total Nitrogen	mg/L	Monthly	Grab
Total Phosphorus	mg/L	Monthly	Grab
Nitrate + Nitrite as Nitrogen	mg/L	Monthly	Grab
Ammonia as Nitrogen	mg/L	Monthly	Grab
Chloride	mg/L	Monthly	Grab
Sodium	mg/L	Monthly	Grab
Total Dissolved Solids	mg/L	Monthly	Grab
pH	S.U.	Monthly	Field Test
Specific Conductance	µS/cm	Monthly	Field Test
Temperature	°C	Monthly	Field Test

Lysimeter Rolling 12-Month Average

The Permittee shall maintain a rolling 12-month average of total nitrogen percolate concentrations in each lysimeter. The rolling 12-month average shall be calculated by adding the current month's total nitrogen concentration to the previous eleven (11) month's total nitrogen concentrations and dividing the sum by the number of samples obtained (i.e., 12 unless sample data was unattainable for any given month). The rolling 12-month average shall be reported to the Department monthly.

7. SOIL MONITORING REQUIREMENTS

The Permittee shall submit a Soil Sampling Plan for Department approval within 120 days from the effective date of this Permit.

Composite soil samples representing each soil series within the wetted spray field shall be taken separately from both soil depths of 0–12 inches and 12–24 inches. A minimum of three composite sample for each mapped soil mapping unit are needed for each depth (0-12 inches and 12-24 inches) in accordance with the Regulations and the GWDS-approved Soil Sampling Plan. The composite soil sampling shall represent the average conditions in the sampled body of material. The discrete samples that are to be composited shall be collected from the same soil horizon and depth interval.

Soil sample locations shall be plotted on a scaled drawing and labeled consistent with the sample nomenclature. Each field shall also be identified so that sample results may be tracked and properly assessed for field life limiting factors.

Soil chemical testing should be in accordance with Methods of Soil Analysis published by the American Society of Agronomy, Madison, Wisconsin.

Parameter	Unit Measurement	Measurement Frequency	Sample Type
pH	S.U.	Annually	Soil Composite
Organic Matter	%	Annually	Soil Composite
Phosphorus (as P ₂ O ₅)	mg/kg	Annually	Soil Composite
Potassium	mg/kg	Annually	Soil Composite
Sodium Adsorption Ratio	meq/100g	Annually	Soil Composite
Cadmium	mg/kg	Annually	Soil Composite
Nickel	mg/kg	Annually	Soil Composite
Lead	mg/kg	Annually	Soil Composite
Zinc	mg/kg	Annually	Soil Composite
Copper	mg/kg	Annually	Soil Composite
Cation Exchange Capacity	meq/100g	*Only if soil pH changes significantly	Soil Composite
Phosphorus Adsorption (Mehlich 3 acceptable)	meq/100g	**Only if soil phosphorus levels become excessive for plant growth	Soil Composite
Percent Base Saturation	%	*Only if soil pH changes significantly	Soil Composite

*A significant change in soil pH is defined as a change of one or more standard units from the original value established in the Design Development Report.

** Excessive levels of soil phosphorus are defined by the Delaware Nutrient Management Commission. Soil phosphorus levels must be tested in accordance with the University of Delaware soil testing methods (Gartley, 2002). If the soil phosphorus levels become excessive, the Permittee shall perform a Phosphorus Site Index (PSI) study. The results shall be submitted to the Department within 30 days of completion. Based on these, the Department may require the Permittee to submit a plan for detailing steps to reduce the phosphorus loading rates at the site.

8. VEGETATION MONITORING

Upon each harvest, a minimum of one composite sample for each pivot is required for each crop type. Results must be utilized for analysis and provided to the Department in the Annual Report in accordance with **Part II.B.5.a.**

Parameter	Unit Measurement	Measurement Frequency	Sample Type
Yield	Bushels/acre and lbs/acre	Per harvest	Vegetation Composite
Nitrogen	% and lbs/acre	Per harvest	Vegetation Composite
Phosphorus	% and lbs/acre	Per harvest	Vegetation Composite
% Moisture	%	Per harvest	Vegetation Composite

9. OPERATIONS MONITORING REQUIREMENTS

a. Spray Field Applications

Parameter	Unit Measurement	Monitoring Frequency	Sample Type
Additional/Supplemental Irrigation Water (i.e., groundwater)	Total Gallons per zone/pivot	Monthly	Recorded/Calculated
Additional/Supplemental Irrigation Water (i.e., groundwater)	Inches/acre per zone/pivot	Monthly	Recorded/Calculated
Fertilizer Nitrogen	lbs/acre per zone/pivot	Monthly	Reported
Fertilizer Phosphorus	lbs/acre per zone/pivot	Monthly	Reported

b. Lagoons

Parameter	Sample Location	Unit Measurement	Monitoring Frequency	Sample Type
Lagoon Levels	Lagoons	Feet and Gallons	Weekly	Field Test

10. SURFACE WATER MONITORING REQUIREMENTS

Surface Water samples shall be obtained from the six locations as approximately depicted on the Site Map found on **Page 3** of this Permit. The surface water sampling locations include Ingram Branch and Sowbridge Branch (East of Reynolds Pond).

The geographic coordinates of the surface water sampling locations are as follows [location info taken from 2019.07.17 O&M p.34].

Local ID	Northings	Eastings
SW-1	88368.84	205871.47
SW-2	88557.43	206493.46
SW-3	88638.01	207393.63
SW-4	90245.11	205198.77
SW-5	90372.08	206230.09
SW-6	90363.90	207758.40

Coordinates are in NAD 1983 Delaware State Plane 0700 Meters.

Surface Water Monitoring results for each monitoring point shall be reported using the established geographic coordinates.

A downgradient sample for a surface water body should be taken first, immediately followed by the upgradient location for the same surface water body and followed by the downgradient sample for the next surface water body being taken third, immediately followed by sampling of the upgradient location for this same surface water body. All samples shall be taken on the same day.

Surface Water sampling shall not occur within three (3) days of a measurable rainfall event to ensure that the streams have returned to base flow, groundwater dominant, conditions.

Parameter	Unit Measurement	Measurement Frequency	Sample Type
Ammonia as Nitrogen	mg/L	Quarterly	Grab
BOD5	mg/L	Quarterly	Grab
Chloride	mg/L	Quarterly	Grab
Dissolved Oxygen	mg/L	Quarterly	Field Test
Enterococcus	Col/100mL	Quarterly	Grab
Fecal Coliform	Col/100 ml	Quarterly	Grab
Nitrate + Nitrite as Nitrogen	mg/L	Quarterly	Grab
pH	S.U.	Quarterly	Field Test
Sodium	mg/L	Quarterly	Grab
Specific Conductance	µS/cm	Quarterly	Field Test
Temperature	□C	Quarterly	Field Test
Total Dissolved Solids	mg/L	Quarterly	Grab
Total Nitrogen	mg/L	Quarterly	Grab
Total Phosphorus	mg/L	Quarterly	Grab
Total Suspended Solids	mg/L	Quarterly	Grab

B. MONITORING SPECIFICATIONS AND REPORTING REQUIREMENTS

1. Representative Sampling

Samples and measurements taken as required in the operation permit shall be representative of the volume and nature of the monitored discharge. If there has been significant increase (> 25%) in the characterization of any one parameter of the effluent wastewater as established in the Design Engineer Report, the Permittee shall resample the wastewater and submit the additional analyses to the Department. The Permittee shall re-characterize the wastewater to determine if a change in treatment is required and/or if the land limiting constituent has changed. If a change in treatment is required and/or if the land limiting constituent has changed, a revised Design Engineer Report shall be submitted to the Department. After a review of these results, the Department may invoke the provisions of **Part V.A.1** of this Permit.

2. Reporting

Monitoring results obtained during the previous one month/quarter shall be summarized and reported on an approved monitoring report form(s) postmarked no later than the 28th day of the month following the completed reporting period. Laboratory analytical results and sampling logs shall be submitted with the corresponding month's monitoring report. Signed reports/forms, laboratory analytical results, laboratory sampling logs and field data sheets shall be submitted in one complete package to the Department at the following address:

Resource Protection Section - Compliance and Enforcement
Division of Water
Department of Natural Resources and Environmental Control
89 Kings Hwy
Dover, DE 19901
Office: (302) 739-9945

The Department may provide written requirements for the Permittee to submit monitoring data electronically. Upon notification from the Department, the Permittee shall transition (as directed) to the Department's electronic database system. The submission may need to be electronically signed.

3. Monitoring results reported as less than the detectible limit shall be reported with the less than symbol (“<”) before the detection limit. The full detection limit value shall be utilized in any necessary calculations. The less than symbol shall be carried through the calculation. The resulting value shall include any appropriate less than or greater than symbol resulting from the calculation.

4. Additional Monitoring by Permittee

If the Permittee monitors any parameter at the location(s) designated herein more frequently than required, using approved analytical methods, the results shall be reported to the Department on an approved monitoring report form. Such increased frequency shall also be indicated.

5. Annual Report

The Permittee shall submit to the Department an Annual Report summarizing the operations, management, administration, and maintenance of the facility for the calendar year. The Annual Report shall be submitted to the Department on or before February 28th of each year. The Annual Report shall include all applicable items found in Section 6.8.2.4.1.3 and Section 6.9 of the Regulations.

Additionally, the Permittee shall report the following:

a. Nutrient Loading, Removal and Analysis:

Permittee shall provide a tabulated summary of the nutrient loading, crop removal and nutrient analysis.

Loading: In accordance with the intent of the reporting requirements of Section 6.9.1.7, 6.9.1.8 & 6.9.14.1 of the Regulations, the permittee shall tabulate Total Nitrogen and Total Phosphorus monthly Average Concentrations, monthly volumes of wastewater irrigated per field/zone/pivot, and monthly mass loadings pounds per acre per field/zone/pivot. Annual volumes and loadings shall be calculated for each field/zone/pivot. If fertilizer was applied, monthly Total Nitrogen and Total Phosphorus loading applications via fertilizer shall also be tabulated and incorporated into the annual totals. If additional/supplemental water (i.e., groundwater) was irrigated, monthly and annual loading applications shall also be tabulated as both 'Total Gallons per field/zone/pivot' and 'Inches/acre per field/zone/pivot.'

Permittee shall tabulate annual loadings per field for Total Nitrogen and Total Phosphorus in comparison to the crop type planted for the year and the permit limit for that specific crop type.

Removal: Utilizing the vegetative monitoring lab data analysis required by Part II.A.8 of the Permit, and in accordance with the intent of the reporting requirements of Section 6.9.14.1 and 6.9.14.5 of the Regulations, the permittee shall calculate and tabulate the Nitrogen and Phosphorus removed by the crops in pounds per acre per field/zone/pivot. The tabulated summary shall note the crop type planted for the pivot, the amount of crop harvested, and the amount of nutrients removed (pounds per acre per pivot). Permittee shall provide a comparison of the lab analyzed crop uptake values with the values utilized in the Nitrogen Balance, Vegetative Management Plan and Phosphorus loading limitation calculation. Permittee shall provide an assessment of Phosphorus utilization relative to the permit limit of 31.2 lbs/acre Total Phosphorus. Permittee shall discuss any discrepancies and proposed operational adjustments. Permittee shall provide the lab data sheets from each crop analysis.

Analysis: When providing the Nitrogen Balance calculations in accordance with Section 6.9.14.2 of the Regulations, the permittee shall provide a Nitrogen Balance worksheet for each Field/Zone/Pivot electronically in Excel spreadsheet format.

b. Soils Monitoring

6.9.14.3 Provide soils data lab sheets.

c. Lysimeter Monitoring - **Part II.A.5**

Lysimeter Monitoring - Provide Lysimeter 12 month rolling average data for Total Nitrogen.

If the rolling 12-month average exceeds the total nitrogen percolate concentration of 10 mg/L, discuss steps taken to examine the facility's operation and maintenance log for improper operational procedures, conduct a physical inspection of the disposal system to detect abnormalities, and review monitoring data and other records to determine the cause/source of the total nitrogen exceedance. Report all findings along with any proposed modifications to operational procedures or other corrective actions.

d. Operations Monitoring - **Part II.A.8**

Spray Field Applications - Report a tabulated summary of monthly additional/supplemental:

- Irrigation water in gallons per field/zone/pivot and in inches/acre per field/zone/pivot.
- Fertilizer Nitrogen in lbs/acre per field/zone/pivot
- Fertilizer Phosphorus in lbs/acre per field/zone/pivot

Storage Lagoon Volume - Report a summary of monthly storage lagoon volumes tabulated in comparison to the permitted action level volume. If storage lagoon volumes exceeded the permitted action level volume, discuss steps taken to assess system functionality and any proposed modifications to operational procedures or other corrective actions.

6. Test Procedures

Test procedures for analysis of pollutants shall conform to the applicable test procedures identified in 40 CFR, Part 136 or the most recently adopted copy of Standard Methods unless otherwise specified in this Permit.

7. Recording of Results

For each measurement or sample taken pursuant to the requirements of this Permit, the Permittee shall record the following information:

- a. The exact place, date and time of sampling and/or measurement;
- b. The person(s) who performed the sampling and/or measurement;
- c. The date(s) the analyses were performed and the time the analyses were begun;
- d. The person(s) who performed the analyses; and
- e. The results of each analysis.

8. Records Retention

All records and information resulting from the monitoring activities required by this Permit or the Regulations including all records of performed analyses, calibration and maintenance of instrumentation and recording from continuous monitoring instrumentation shall be retained for five years. This period of retention shall be extended automatically during any unresolved litigation regarding the regulated activity or regarding control standards applicable to the Permittee or as requested by the Department.

9. Availability of Reports

All reports prepared in accordance with the terms of this Permit shall be available for public inspection at the offices of the Department of Natural Resources and Environmental Control. Monitoring data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in 7 Del. C., §6013.

10. Operator Log

An operator log shall always be kept onsite. Each spray system section shall be numbered and referred to by number in the operator log. All records and reports shall also always be kept in a bound logbook onsite and shall be made available upon request for review by the Department. This log shall, at a minimum, include the applicable items listed in Section 6.7.3 of the Regulations.

11. Quality Assurance Practices

The Permittee is required to show the validity of all monitoring data by requiring its laboratory to adhere to quality assurance practices in accordance with Section 6.8.2.4 of the Regulations.

12. Industrial Users

Within 30 days of the operation of the Phase 2 wastewater treatment system, the Permittee shall develop and maintain an industrial listing that provides the names and addresses of all current Significant Industrial Users (SIUs) and Non-Significant Categorical Industrial Users (NSCIUs), as defined in 40 CFR 403.3, discharging to the SRRF Phase 2 wastewater treatment system. The list shall be updated annually and submitted in the Annual Report required in Part II.B.5.

PART III

A. OPERATIONAL REQUIREMENTS

1. Duty to Comply

The Permittee shall comply with all the terms and conditions of this Permit.

The discharge of any pollutant more frequently than, or at a level in excess of that identified and authorized herein, shall constitute a violation of the terms and conditions of this Permit. The violation of any influent/effluent limitation or of any other condition specified in this Permit is a violation of 7 Del. C. Chapter 60 and is grounds for enforcement as provided in 7 Del. C., Chapter 60 “Enforcement; civil and administrative penalties; and expenses.”, “Criminal Penalties.” and “Cease and desist order.” for Permit termination or loss of authorization to discharge pursuant to this Permit, for Permit revocation and reissuance, or Permit modification, or denial of a Permit renewal application. The Department may seek voluntary compliance by way of warning, notice or other educational means, pursuant to 7 Del. C., Chapter 60 “Voluntary compliance.” or any other means authorized by Law. However, the Law does not require that such voluntary means be used before proceeding by way of compulsory enforcement.

2. Groundwater Requirements

Operation of the wastewater treatment facility and spray irrigation system shall not cause the quality of Delaware's groundwater resources to be in violation of applicable Federal or State Drinking Water Standards. If the Department determines that the discharge is impacting groundwater quality or downgradient receptors, corrective actions will be required.

3. Facilities Operation

The Permittee shall properly maintain and operate all structures, pipelines, systems, and equipment for collection, treatment control and monitoring which are used by the Permittee to achieve compliance with the terms and conditions of the Permit. Proper operation and maintenance may include but is not limited to, effective performance based on designed facility removals, adequate funding, effective management, adequate operator staffing and training, and adequate laboratory and process controls including appropriate quality assurance procedures.

4. The spray irrigation fields shall be managed to assure at a minimum that:

- a. Spray irrigation of wastewater shall only occur on fields being prepared for planting or already planted with a crop and shall not occur on fields with crops not actively growing or on voluntary vegetation.
- b. The spray fields shall be maintained in such a manner as to prevent wastewater pooling and/or discharge of wastewater to any surface waters. Should pooled areas become evident, spraying on those areas shall be prohibited until saturated conditions no longer exist.
- c. Aerosols or nuisance odors shall not extend beyond the boundary of the spray irrigation site when treated wastewater is being applied. If odors are produced and become considered a public nuisance, the Permittee shall take the necessary steps to eliminate such odors. All action taken shall be reported to the Department in accordance with **Part IV.A.4** of this Permit.

- d. Erosion controls shall be employed to prevent wastewater runoff from the spray irrigation fields. The Permittee shall notify the Department immediately if any wastewater runoff occurs.
 - e. The spray irrigation field's crops shall be maintained in optimal condition, including any necessary weed management, reseeding, or other vegetative management practices.
 - f. Effective vegetative management shall be provided such that crops harvested on the spray irrigation sites are removed from the sites.
 - g. Forage crops shall be harvested and removed from the irrigation field(s) at least twice a year. Crops harvested shall be removed from the irrigation site within six (6) months of harvest.
 - h. The wastewater shall be applied in a manner such that the application is even and uniform over the irrigation area.
5. Spray irrigation is prohibited when saturated or frozen soil conditions exist.
 6. The groundwater mound created by the added infiltration shall at no time reach within two feet of the ground surface in any section of the spray irrigation fields. Should the groundwater mound exceed this limit, the Permittee shall cease all irrigation of wastewater to the affected fields until the groundwater mound recedes to acceptable levels.
 7. Connections or additions to the spray irrigation system other than those indicated on the approved plans are prohibited without prior approval from the Department.
 8. The Permittee shall take appropriate measures to protect the spray irrigation system from damage due to sub-freezing conditions.
 9. Any leaks shall be reported to the Department and repaired immediately.

10. Signs

Unlimited Public Access: Unlimited public access sites must have advisory signs posted at all entry points that indicate the site is spray irrigated with treated wastewater. Verbiage shall include the following wording: "RECYCLED WASTEWATER – DO NOT DRINK". Alternate verbiage may be used if approved in writing by the Department.

11. Potable, ground, or surface water may be used for distribution system testing and irrigation to establish vegetation when sufficient treated effluent is not available.

12. Phased Systems

- a. Once an Operations Permit is issued and the wastewater flow reaches 80% of the permitted treatment capacity for the constructed phase based on a period of seven (7) consecutive days, the Permittee shall submit written notification to the Department. The written notification shall include a work plan for construction of the next permitted phase. The Permittee shall submit a construction permit application, plans and specifications and Design Engineer Report with applicable fees if the next phase has not yet been permitted or if there are changes to the previously permitted design.

- b. Any flow above the permitted flow for a phase shall not be allowed to be discharged to the system until construction is completed on the following phase and an operating permit has been issued or amended by the Department for the next phase.
 - c. Required documents for connecting subdivisions may be found in Section 6.5.10.3.1 of the Regulations.
13. If the permittee installs new monitoring wells or replaces any existing monitoring wells, the Permittee shall submit to the Department new elevation details relative to the common benchmark previously established. Additionally, the Permittee shall conduct a groundwater quality sampling program prior to initiation of wastewater disposal activities on the area incorporating the well. The sampling program shall be sufficient to establish representative groundwater quality at each well prior to initiation of the wastewater disposal activities. A minimum of three samples shall be collected at least one month apart and analyzed. A summary report detailing all analyses shall be submitted to the Department prior to initiation of wastewater disposal activities. Analyses shall include the parameters iterated in Section 6.8.1 of the Regulations.
14. The Permittee shall calibrate all flow meters in accordance with the Manufacturer's recommendations. Calibration shall include, but not be limited to influent, effluent, continuous online turbidity, and chlorine residual monitors. The calibration documentation shall be submitted with the Annual Report in accordance with **Part II.B.5**.
15. The Permittee shall operate and maintain SRRF in accordance with the facility's design and the approved Operation and Maintenance Plan (O&M). A copy of the O&M shall always be kept onsite. The Permittee shall maintain the O&M's accuracy and applicability in accordance with both the Permit and the Regulations. In the event of a discrepancy between the O&M and the Permit or Regulations, the requirements of the Permit and the Regulations would govern.
16. At least three feet of freeboard, measured vertically from the lowest point of the berm, is required for all ponds/lagoons. The lowest point of the berm shall be determined and marked.
17. The Permittee shall notify the Department in writing prior to utilizing the freeboard in any lagoon or immediately upon unexpected encroachment into freeboard. In the event of encroachment into freeboard, Permittee shall contact the Department to coordinate relief measures. In the event of an emergency, Permittee may contact the Department at the telephone numbers cited in **Part II.B.2** of this Permit; however, written notification shall subsequently be provided within 5 days of encroachment.
18. If the facility does not treat sewage and has a storage tank that requires cleanout, and if the Permittee intends to land apply material collected from the cleanout onto the spray irrigation field, the Permittee shall analyze the material for nutrients and any other applicable parameters of concern as determined by the Department. Prior to tank cleanout being performed. The Permittee shall submit to the Department a report including the results, the frequency and estimated volume of material to be applied, and how and where it will be applied. The report shall include a mathematical analysis determining any nitrogen loading from the tank cleaning combined with nitrogen loading from wastewater application will not exceed the allowable nitrogen load.
19. Fencing is required at treatment facilities, pump stations and storage/treatment ponds. Fencing of spray fields is not required.
20. The collection and channelization of irrigated wastewater for purposes other than retreatment is prohibited.
21. Direct application of treated wastewater to drainage ditches, any water bodies, and wetlands is prohibited.

22. Emergency Repairs

Emergency repairs or the replacement of critical “like kind” components of the wastewater treatment facility necessary for the continued operation of the facility may be performed without first obtaining a construction permit from the Department.

A report shall be submitted to the Department within five (5) days of completion of the emergency repairs. The report shall summarize the nature of the emergency and the repairs performed. All violations shall also be reported in accordance with Section 6.5.9 of the Regulations.

23. Adverse Impact

The Permittee shall take all reasonable steps to eliminate or minimize any adverse impact to waters of the State resulting from this Permit, including such accelerated or additional monitoring as necessary to determine the source, nature, and extent of the impact from a noncomplying discharge. In addition, at the direction of the Department, the Permittee shall submit a corrective action plan which will include a description of the proposed actions to mitigate or eliminate the source of the impact and an associated completion schedule. The plan shall be enacted as approved by the Department.

24. Bypassing

The diversion of flow from any portion of the treatment facility’s process flow (including, but not limited to, pretreatment, storage, distribution, and land application) necessary to maintain compliance with the terms and conditions of this Permit is prohibited unless:

- a. The bypass is unavoidable to prevent personal injury, loss of life, severe property damage, or materially adversely affect public health and/or the environment; or
- b. There are no alternatives readily available.

The Permittee shall orally notify the Department within 24 hours after such bypass; and shall submit a written submission regarding the bypass within five days of the Permittee's becoming aware of the bypass. Where the need for a bypass is known (or should have been known) in advance, this notification shall be submitted to the Department for approval at least ten days prior, or as soon as possible, before the date of bypass.

The treatment facility shall be repaired and restored to the permitted design operations process flow.

25. Removed Substances

Solids, sludges, filter backwash or other pollutants removed in the collection, conveyance, or treatment of wastewater shall be disposed of in a manner such as to prevent any pollutant from entering the surface water or groundwater and to comply with applicable federal or state laws and regulations.

26. Power Failures

An alternative power source, which is sufficient to operate the wastewater treatment and disposal facilities, shall be available. If such alternative power source is not available, the Permittee shall halt, reduce, or otherwise control production and/or all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater facilities.

PART IV

A. MANAGEMENT REQUIREMENTS AND RESPONSIBILITIES

1. Operation Permit Re-Issuance

At least 180 days before the expiration date of this Permit, the Permittee shall submit an application for renewal or notify the Department of the intent to cease discharging by the expiration date. The application package for systems with a design flow $\geq 100,000$ GPD, shall include a five (5) year Compliance Monitoring Report (CMR). The CMR shall be prepared in accordance with Section 6.5.4.3 of Regulations. If a timely and complete application has been submitted as determined by the Department, and the Department is unable, through no fault of the Permittee, to issue a new Permit before the expiration date of this Permit, the terms and conditions of this Permit are automatically continued and remain fully effective and enforceable until a decision is made on the new application.

2. Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this Permit. The discharge of any pollutant identified in this Permit more frequently than or at a level that exceeds that authorized shall constitute a violation of the Permit.

Any anticipated facility/system expansions, production increases, or process modifications that will result in new, different, or increased discharges of pollutants shall be reported in writing to the Department for approval. A new Permit may be required.

Any other activity which would constitute cause for modification or revocation and reissuance of this Permit as described in **Part V.A.1** of this Permit shall be reported to the Department. Following such notice, the Permit may be modified to specify and limit any pollutants not previously limited.

3. Non-compliance Notification

The Permittee shall report to the Department orally within 24 hours from the time the Permittee became aware of any noncompliance with this Permit, Regulations, or any other situation that may endanger the public health or the environment by contacting the Department at the telephone numbers cited in **Part II.B.2** of this Permit.

If for any reason the Permittee does not comply with, or will be unable to comply with, any effluent limitations or other conditions specified in this Permit, the Permittee shall provide the Department with the following information in writing within five days of becoming aware of any actual or potential noncompliance:

- a. A description and cause of the non-compliance with any limitation or condition;
- b. The period of non-compliance including exact dates and times; or, if not yet corrected, the anticipated time the non-compliance is expected to continue; and
- c. The steps being taken or planned to reduce, eliminate and/or prevent recurrence of the non-compliant condition.

4. Spill Reporting

In the event of any environmental release of pollutants (i.e., spill), the Permittee shall call the Department's 24-hour Emergency Release Reporting Hotline at (800) 662-8802.

The Permittee shall also notify the Resource Protection Section (RPS) regarding any environmental release of pollutants (i.e., spill) into surface water or groundwater or on land, within 24-hours from the time the Permittee becomes aware of the release and activate their emergency site plan. In addition, the following information shall be reported to the RPS in writing within five days.

- a. The facility name and location of release;
- b. The chemical name or identity of any substance involved in the release;
- c. An indication of whether the substance is an extremely hazardous substance;
- d. An estimate of the quantity of any such substance that was released into the environment;
- e. The time and duration of the release;
- f. The medium or media into which the release occurred;
- g. Any known or anticipated acute or chronic health risks associated with the emergency and, where appropriate, advice regarding medical attention necessary for exposed individuals;
- h. Proper precautions to take as a result of the release, including evacuation;
- i. The names and telephone number of the person or persons to be contacted for further information; and
- j. Such other information as the RPS may require.

5. Facility and Construction Changes

The Permittee shall submit a written report to the Department for review and approval, of any changes to the facility or construction of the system within the following time periods:

- a. Thirty days before any planned activity, physical alteration to the permitted facility or addition to the permitted facility if that activity, alteration or addition would result in a change in information that was previously submitted to the Department;
- b. Thirty days before any anticipated change which would result in noncompliance with any permit condition or the regulations; or
- b. Immediately after the Permittee becomes aware of relevant facts omitted from, or incorrect information submitted in, a permit application or report to the Department.

6. Right of Entry

The Permittee shall allow the Department entry and access, consistent with 7 Del.C. Ch. 60, to:

- a. Enter the permitted facility.
- b. Inspect any records that must be kept under the conditions of the Permit.
- c. Inspect any facility/system, equipment, practice, or operation permitted or required by the Permit.
- d. Sample or monitor for the purpose of assessing effluent quality or assuring Permit compliance of any substance or any parameter at the facility.

7. Permit Transferability

The Permit may be transferred to a new owner or operator. The Permittee shall notify the Department by requesting a change of ownership of the Permit before the date of transfer. The transfer shall be consistent with any notarized legal documents and/or CPCN required by the Regulations. The legal documentation shall be provided with the application. The application shall be received by the Department 30 days before the transfer.

- a. No person shall transfer a permit from one (1) person to another unless 30 days written notice is given to the Department, indicating the transfer is agreeable to both persons, and approval of such transfer is obtained in writing from the Department, and any conditions of the approval of such transfer is obtained in writing from the Department, and any conditions of the transfer approved by the Department are complied with by the transferor and the transferee.
- b. The notice to the Department shall contain a written agreement between the transferor and the transferee, indicating the specific date of proposed transfer of Permit coverage and acknowledging responsibilities of current and new permittees for compliance with and liability for the terms and conditions of this Permit. The notice shall be signed by both the transferor and the transferee.

PART V

A. PROVISIONS

1. Permit Revocation

The Department may revoke a Permit if, among other things, the Permittee violates any Permit condition, these regulations, fails to pay applicable Departmental fees, misrepresents facts or data to obtain the Permit, or fails to fully disclose all relevant facts.

Except in cases of emergency, the Department shall issue a written notice of intent to revoke to the Permittee prior to final revocation. Revocation shall become final within 20 days of receipt of the notice by the Permittee, unless within that time the Permittee requests an administrative hearing in writing.

The Department shall notify the Permittee in writing of any revocation hearing at least 20 days prior to the date set for such hearing.

If the Department finds that public health, safety, or welfare requires emergency action, the Department shall incorporate findings in support of such action in a written notice of emergency revocation issued to the Permittee. Emergency revocation shall be effective upon receipt by the Permittee. Thereafter, if requested by the Permittee in writing, the Department shall provide the permittee a revocation hearing.

2. Permit Modifications/Amendments

In consultation with the Permittee, the Department may modify or amend an existing permit provided that the modifications would not result in an increased impact or risk to the environment or to public health.

3. State Laws

This Permit shall not be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation.

4. Property Rights

The issuance of this Permit does not convey any property rights of either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

5. Severability

The provisions of this Permit are severable. If any provision of this Permit, or the application of any provision of this Permit, to any circumstances is held invalid; the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

6. This Permit does not relieve the Permittee of complying with any applicable federal, state, or local regulations.

7. Additional Information

The Permittee shall furnish to the Department within a specified period, any information including copies of records, which may be requested by the Department to determine whether cause exists for modifying, revoking, reissuing, or terminating the Permit, or to determine compliance with the Permit and the Regulations.

8. Wastewater Treatment Facility Closure/Abandonment

If the wastewater treatment facility, or a component of the facility, is proposed to be abandoned, the Permittee shall submit a proposed closure and abandonment work plan with procedures on how the facility will be abandoned for review and approval by the Department. The work plan shall address remediation if monitoring data indicates impacts to the environment. Upon review and approval of the work plan and completion of all closure and abandonment actions the Permittee shall contact the Department for a final inspection of the site.

9. If the *Regulations Governing the Design, Installation and Operation of On-Site Wastewater Treatment and Disposal Systems* or applicable federal regulations are revised, this Permit may be opened and modified accordingly after notice and opportunity for a public hearing.

10. This Permit supersedes all previous spray irrigation operations permits issued to the Permittee for this facility.

Appendix VII



**AUTHORIZATION TO CONSTRUCT
UNDER THE LAWS OF THE
STATE OF DELAWARE**

PERMITTEE: Artesian Wastewater Management, Inc.
664 Churchmans Road
Newark, DE 19702

FACILITY: Sussex Regional Recharge Facility (SRRF)
fka Artesian Northern Sussex Regional Water Recharge
Facility (ANSRWRF)

1. Pursuant to the provisions of 7 Del. C., 6003, **Artesian Wastewater Management, Inc.** is herein authorized to construct Phase 2 of the large on-site wastewater treatment and disposal system project called **SRRF**.

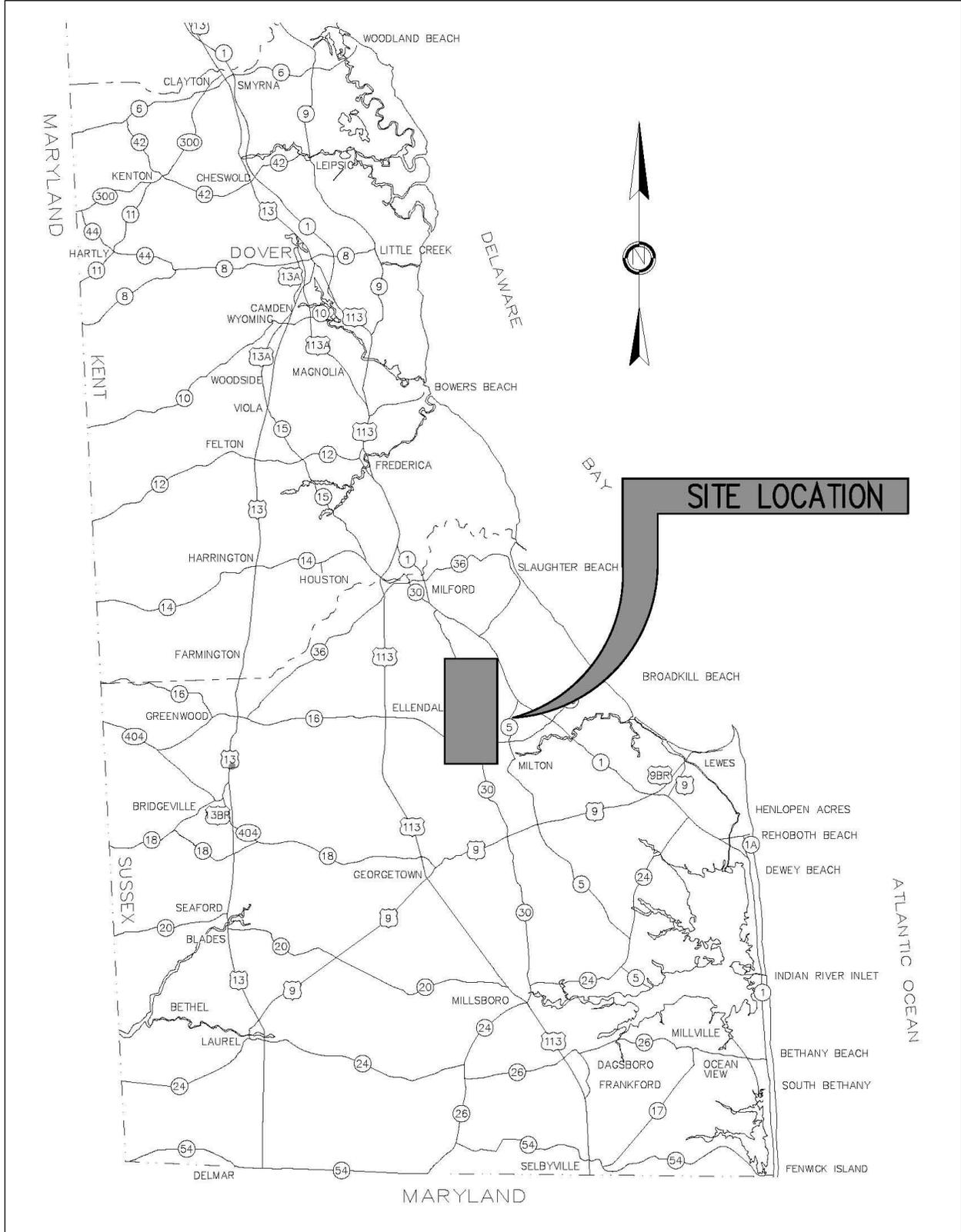
SRRF Construction Site: The Phase 2 treatment plant components are to be constructed on Sussex County Tax Map/Parcel Number: 2-35 6.00 28.09 along Route 30 approximately 4,000-ft north of the intersection of Route 16 and Route 30.

2. The Delaware Department of Natural Resources and Environmental Control's (the Department's or DNREC's) purpose in issuing this Permit, and in imposing the requirements and conditions specified herein, is for the protection of public health and the environment as required by 7 Del. Admin. C. §7101 *Regulations Governing the Design, Installation and Operation of On-Site Wastewater Treatment and Disposal Systems* (the Regulations). The construction requirements and other permit terms and conditions are set forth herein.

John J. Rebar, Jr.
Environmental Program Manager I
Groundwater Discharges Section
Division of Water
Delaware Department of Natural Resources
and Environmental Control

Dated Signed

LOCATION MAP



Part I

A. GENERAL DESCRIPTION

The Sussex Regional Recharge Facility (SRRF), formerly known as the Artesian Northern Sussex Regional Water Recharge Facility (ANSRWRF), will serve as a regional facility meeting existing and future wastewater needs within Artesian's wastewater service territories in Sussex County, Delaware.

The SRRF project is to be constructed on Sussex County Tax Map/Parcel Number: 2-35 6.00 28.09; located on a 75 acre site south of Reynolds Pond Road, east of Route 30, north of Ingram Branch and Route 16, and west of Cedar Creek Road, Sussex County, Delaware.

The SRRF project will be built in three phases. Phase 1 was permitted for Construction under DEN 359288-01. Phase 1 of the project was to construct a storage lagoon and disposal spray fields, and to accept treated wastewater from Allen Harim Foods, LLC (Allen Harim). The design average daily flow was 1.5 million gallons per day (MGD) with a peak daily flow of 2.0 MGD. The customers for Phase 1 consisted of a single food processing source, Allen Harim.

This Permit authorizes Phase 2. Phase 2 of the project is to construct an onsite wastewater treatment system designed to treat 625,000 gallons per day (GPD) of wastewater received from Artesian's wastewater service territories in Sussex County. The Phase 2 treatment system will be constructed on the 75 acre SRRF site where the existing storage lagoon is located. The project scope includes construction of a 3.0 million gallon (MG) combined equalization and off-spec water diversion lagoon, a headworks system consisting of screen and grit removal equipment, an influent lift station, a Hybrid Bardenpho treatment process system, two cloth media filters, an UV disinfection system, and an effluent lift station to pump treated wastewater to the 90 MG treated effluent storage lagoon. The treated wastewater from the SRRF treatment plant will be mixed in the lagoon with the treated effluent from Allen Harim and discharged via spray irrigation for final disposal.

The treated wastewater (effluent) is discharged via spray irrigation on privately owned agricultural land, under a lease held in perpetuity by Artesian. Spray irrigation sites are listed below.

Current and Future Spray Irrigation Sites

Field	Sussex County Tax Map ID	Gros Area (Acres)	Existing Crop Spray Area (Acres)	Proposed Crop Spray Area (Acres)	Proposed Woods Spray Area (Acres)	Total Spray Area (Acres)	Percent Spray (%)
D	235-6.00-11.00 235-6.00-11.01 235-6.00-11.02 235-7.00-1.00 235-7.00-164.00	125.1	45.3	12.7	32.7	90.7	72.5%
E	235-6.00-21.00	119.0	83.2	7.3	0	90.5	76.0%
F	235-7.00-7.00	126.5	110.5	0	0	110.5	87.3%
G	235-13.00-6.05 235-13.00-6.06	590.5	241.9	34.2	195.0	471.0	79.8%
Total		961.1	480.9	54.2	227.7	762.7	

B. DOCUMENTATION

Construction shall be in accordance with the following documents and as required by this Permit.

1. The State of Delaware *Regulations Governing the Design, Installation and Operation of On-Site Wastewater Treatment and Disposal Systems* (the Regulations).
2. February 8, 2021 Application submittal:
 - a. February 4, 2021 (inadvertently dated 2020) Artesian letter providing resubmittal and addressing comments outlined in DNREC-GWDS's November 30, 2020 letter.
 - b. Application Form for an Amended Operation Permit dated February 4, 2021.
 - c. Application Form for a Construction Permit dated February 3, 2021.
 - d. February 4, 2021 (inadvertently dated 2020) Artesian letter providing Applications.
 - e. February 2021 'Design Engineer Report - Sussex Regional Recharge Facility (SRRF) - Phase 2' prepared by Artesian Resources Corp. for Artesian Wastewater Management, Inc.

C. FACILITY SPECIFIC CONDITIONS

1. In accordance with Secretary's Order No. 2012-W-0052 Issued and Effective March 12, 2013, the Permittee shall:
 - a. Design the treatment plant to look like an agricultural building and have landscaping to screen it from view from its neighbors.
 - b. Ensure that the storage ponds shall not become a breeding ground for mosquitos.
 - c. Maintain all required buffers for the spray fields as set by both the Department

and Sussex County.

- i. Maintain a 100-foot buffer from the wetted field area to the north-west corner of the Sylvan Acres Development.
2. The permittee shall comply with all applicable Sussex county ordinances and conditional use requirements placed on this facility.
3. Wastewater spray irrigation will not be permitted on Field D parcel (2-35-6-11.01) until it is added to an approved Conditional Use. Parcel 2-35-6-11.01 is not included in the current Conditional Use Ordinance 1923, adopted July 31, 2007. Once this parcel has been added to an approved Conditional Use, Permittee must provide a copy of the approved Conditional Use to the Groundwater Discharges Section for approval. Written approval from the Groundwater Discharges Section must be acquired by the permittee prior to wastewater spray irrigation on this parcel.
4. In accordance with Part I.F Schedule of Compliance Item 1a delineated in State Permit DEN Number 359288-04, the Permittee shall obtain written approval from the Department's Groundwater Discharges Section authorizing disposal on Fields D and E prior to implementing spray irrigation.
5. The Department reserves the right to increase required separation/buffer and/or isolation distances at any time for reasons including the following:
 - a. objection by an adjacent property owner due to aerosol migration onto their property;
 - b. change in ownership of adjacent property; or
 - c. change in land use of adjacent property.
6. Phase 2 is designed to require only 37.2 MG of the storage lagoon's 90 MG capacity. If storage volume exceeds 37.2 MG, the Permittee shall notify the Groundwater Discharges Section in writing within five days of discovery.
7. The facility shall be constructed to operate in accordance with the following design criteria (Table 2-1) provided in the DER, dated February 2021, and the Regulations.

Table 2-1: General Information (Continued)

<i>Flow Characteristics</i>					
Parameter ¹	Units	Phase 1 Design Influent ⁴ (to lagoon)	Phase 2 Design Influent (to treatment)	Phase 2 Design Effluent (to lagoon)	Phase 1 + 2 Blend (in lagoon)
Peak Month Avg. Flow	MGD	1.5	0.625	0.625	2.125
Peak Day Daily Flow	MGD	2.0	1.25	1.25	3.25
Peak Instantaneous Flow	gpm	1,400	2,572	N/A	N/A
BOD ₅	mg/L	10	400	10	10
TSS	mg/L	10	450	10	10
TN	mg/L	30	70	10	24.1
Ammonia (as N)	mg/L	0	50	1	0.29
Nitrate + Nitrite (as N)	mg/L	28	5	8	22.1
Total Phosphorous	mg/L	1.0	9	8	3.1
pH	S.U.	6.0 – 9.0	6.5 – 8.5	6.0 – 9.0	6.0 – 9.0
Chlorine Residual	mg/L	0.5 – 4	N/A	N/A	N/A
Fecal Coliform	col/100 mL	20	N/A	20	20
Turbidity	NTU	5	N/A	5	5
Cadmium	mg/L	0.0005	0.002	0.002	0.00094
Copper	mg/L	0.0072	0.07	0.07	0.026
Lead	mg/L	0.001	0.06	0.06	0.018
Nickel	mg/L	0.0074	0.025	0.025	0.011
Zinc	mg/L	0.039	0.2	0.2	0.086
<i>Storage Volume</i>					
Minimum Required Storage (storage calcs)				37.2	MG
Total Available Storage (w/o freeboard) ³				92.6	MG
Surface Area (top of lagoon)				19.4	acres
Surface Area (high water level)				18.8	acres
Surface Area (low water level)				1.6	acres
Freeboard				3.0	ft
Top Elevation				46.0	ft
High Water Elevation				43.0	ft
Low Water Elevation				26.0	ft
Sidewall Slope				2.5:1	

1. All values are based on monthly averages, unless specified otherwise.
2. Permit requirements.
3. See discussion in Section 5.8.
4. The point of compliance for all Phase 1 influent flow to the lagoon shall be the Allen Harim Metering and Monitoring building at their Harbeson facility.

Table 2-1: General Information (Continued)

<i>Spray Area</i>		
Total Available Spray Area (gross acreage)	1,714	acres
Phase 2 Wetted Area (initial construction) ¹	581	acres
Phase 2 Wetted Area (total permitted) ¹	763	acres
Treatment Site Buffer Distance (property line)	30	ft
Treatment Site Buffer Distance (dwelling)	100	ft
Spray Buffer Distance (watercourse)	100	ft
Spray Buffer Distance (upgradient well)	100	ft
Spray Buffer Distance (downgradient well)	150	ft
<i>Spray Irrigation Nitrogen Balance</i>		
Design Percolate Total N	10	mg/L
Available Crop Area (initial construction) ¹	387	acres
Available Woods Area (initial construction) ¹	195	acres
Available Crop Area (total permitted) ¹	535	acres
Available Woods Area (total permitted) ¹	228	acres
Crop Plan	Corn-Wheat-Soybean-Cover	
Crop Plan (alternate option)	Corn-Barley-Soybean-Cover	
Corn Annual N Removal	155	lbs/acre/year
Wheat Annual N Removal	89	lbs/acre/year
Barley Annual N Removal	65	lbs/acre/year
Soybean Annual N Removal	189	lbs/acre/year
Cover Annual N Removal	0	lbs/acre/year
Loblolly Pine Annual N Removal	200	lbs/acre/year
Soybean Fixation	40%	% Annual Removal
Precipitation Deposition of N	5	lbs/acre/year
Ammonia Volatilization	5%	% Ammonia
Denitrification	15%	% Total Nitrogen
Max Hydraulic Loading	1.65	in/week

1. See discussion in Section 5.8.

Table 2-1: General Information (Continued)

<i>Phosphorus Loading</i>		
Phosphorus Limited	Crop Areas of Fields D, F, and G	
Design Percolate Total Phosphorus	8.0	mg/L
Maximum Phosphorous Loading (3-Year Average) ¹	31.2	lbs/acre-year
Maximum Application Rate (3-Year Average) ²	1.2	MG/acre-year
Anticipated Application Rate (3-Year Average) ³	0.93	MG/acre-year
<i>Heavy Metals Loading</i>		
Soil Cation Exchange	0 - 5	meq/100g
Soil Density	1.55	g/cc
Existing Lead in Soil	92.0	mg/kg
Existing Zinc in Soil	34.0	mg/kg
Existing Copper in Soil	13.0	mg/kg
Existing Nickel in Soil	13.0	mg/kg
Existing Cadmium in Soil	0.121	mg/kg
Land Limiting Constituent (LLC)	Zinc	
Approximate Site Life based on LLC	42	years

1. Maximum Phosphorus Loading only applies to the fields which have been identified as having high soil phosphorus. These include the crop areas in Fields D, F, and G. The woods areas in Fields D and G, as well as all of Field E, do not have high phosphorus, and are thus exempt from these criteria. For Phosphorus Limited Sites, the maximum phosphorus loading is based on the three-year average crop removal rate.
2. Maximum Application Rate in MG/acre-year is guideline based on expected concentrations, and not a limit in and of itself. Application limitations will be based on sampled phosphorus concentrations.
3. Anticipated Application Rate is an estimate, and will vary based on operational decisions

Part II

A. CONSTRUCTION REQUIREMENTS

1. The permittee shall notify the Department's Groundwater Discharges Section in writing of the intent to initiate construction activities at least fifteen days prior to the commencement of construction. The written notification shall include a proposed construction schedule.

The permittee shall provide updated construction schedules if the schedule changes as construction progresses.

2. Prior to initiating construction of a large on-site wastewater treatment and disposal system, the Department may require a pre-construction meeting be held on-site and attended by the following individuals: DNREC Soil Scientist, DNREC Environmental Engineer, DNREC Hydrologist, Class D.3 Soil Scientist, Professional Geologist, Project Design Engineer, General Site Contractor, Class E.4 System Contractor and other necessary parties.
3. The permittee shall notify the Department's Groundwater Discharges Section of scheduled construction progress report meetings. The Department's Groundwater Discharges Section staff may attend these meetings.
4. All systems shall be constructed/installed by a DNREC licensed Class E.4 system contractor. Proper construction/installation of the components of the treatment and disposal system shall be certified in writing by the design engineer and the manufacturer's representative prior to startup of the wastewater treatment and disposal system.
5. The Class E.4 system contractor shall have a copy of all valid, required and approved permits on site during construction.
6. The design engineer or designee shall periodically review the construction of the disposal system to ensure compliance with design specifications.
7. All system components shall be surveyed to a common datum point.
8. Soil disturbance to the disposal areas shall be limited to the minimum required for construction. The soils may be rendered unsuitable should unnecessary soil disturbance occur near or within the disposal area. Particular care should be taken when clearing wooded lots so as not to remove the surface soil material (see *Lot Clearing Guidelines*, Attachment 2 of the Regulations).
9. If well pointing is required during construction, the wells shall be installed by a licensed well driller, and a permit to construct such wells shall be obtained from the Department.

10. All construction activities shall be approved by the Department's Groundwater Discharges Section and shall comply with all other applicable local utility construction specifications and standards; and shall be in accordance with the Ten States Standards.
11. Connections and/or additions to the wastewater treatment and disposal system, other than those indicated on the approved plans and specifications, will not be allowed without prior written approval from the Department's Groundwater Discharges Section.
12. Any anticipated facility expansions, production increases, or process modifications that will result in new, different, or increased discharges of pollutants shall be reported in writing to the Department's Groundwater Discharges Section for approval. A new permit may be required.
13. Facility and Construction Changes
The permittee shall submit a written report to the Department's Groundwater Discharges Section for review and approval of any changes to the facility or construction of the system within the following time periods.
 - a. Thirty days before any planned activity, physical alteration to the permitted facility or addition to the permitted facility if that activity, alteration or addition would result in a change in information that was previously submitted to the Department's Groundwater Discharges Section; or
 - b. Thirty days before any anticipated change which would result in noncompliance with any permit condition or the Regulations; or
 - c. Immediately after the permittee becomes aware of relevant facts omitted from, or incorrect information submitted in, a permit application or report to the Department's Groundwater Discharges Section.
14. The permittee shall supply the Department's Groundwater Discharges Section with testing procedures and results conducted on the force main/collection/distribution system (including any lift stations).
15. A construction permit issued by the Department does not relieve the permittee from complying with any local, municipal, county, or state requirement.
16. The Class E.4 system contractor shall contact the design Engineer, licensed operator and the Department's Groundwater Discharges Section to schedule an inspection prior to completion of construction.
17. Upon completion of construction, the permittee shall provide the Department's Groundwater Discharges Section with an approved engineer inspection report(s) demonstrating that the system has been constructed in accordance with the approved Design Engineer Report, Plans and Technical Specifications.
18. The permittee is responsible for supplying the Department's Groundwater Discharges Section with a certificate or letter of completion/approval from the wastewater treatment

plant manufacturer upon construction completion of the wastewater treatment plant, if applicable.

19. Construction activities within spray fields shall be minimized. Excessive compaction of surface soils by construction equipment shall be avoided. Re-grading of pipeline trenches shall match original contours. Settlement of trench backfill shall be repaired.
20. In forested systems, it is necessary to only grub the pipe centerline. Excessive clearing and grubbing shall be avoided. Clearing for above-ground piping systems shall involve only vegetation that will interfere with operation of the system.
21. All areas disturbed by construction shall be re-vegetated prior to initiation of irrigation activities.
22. Sloped areas require protection from erosion.
23. Pressure testing of the irrigation force mains and laterals shall be conducted during installation to avoid damage to spray fields from re-excavation and repair. Flushing is necessary to clear distribution system pipes of construction debris which will clog sprinkler nozzles. Care should be exercised to prevent erosion or flooding of the spray fields during pipeline flushing. Every effort should be made to keep trash and debris out of the distribution systems. Sprinklers and drain valves shall be checked for proper operation prior to installation.
24. Wastewater irrigation on bare soil is not allowed beyond what is necessary for germination to establish a vegetative cover. Wastewater application, at the design rate, may begin only after a uniform vegetative cover has been established.
25. Spray fields should be constructed early in the project so a vegetative cover can be re-established on disturbed areas before wastewater irrigation begins.
26. Potable, ground or surface water shall be used for distribution system testing unless authorized in writing by the Department's ~~Groundwater Discharges Section~~.
27. One growing season may be necessary before new spray fields will accept the design wastewater loading. This start-up period shall be considered in the design and operation of these systems.
28. If testing of the system is required prior to construction completion that will require the operation of the system or the discharge of treated wastewater, the permittee shall request approval in writing from the Department's Groundwater Discharges Section and shall notify the Groundwater Discharges Section of the scheduled testing so that Groundwater Discharges Section staff may be present during the testing of the system. Testing shall not commence until written approval is received by the Groundwater Discharges Section.

29. The permittee shall take all reasonable steps to minimize any adverse impact to waters of the state resulting from construction under this permit. Such steps shall include, but not be limited to, accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge or reasonable mitigation of such impacts.
30. The permittee must obtain appropriate state permits for the collection and distribution system if applicable.

B. MONITORING REQUIREMENTS

1. Monitoring wells, piezometers and lysimeters are required in accordance with the Phase 1 Construction Permit DEN Number: 359288-01.
2. Information for each monitoring well and piezometer shall be reported using the State of Delaware Well Identification Tag Number that is required on all wells in accordance with the State of Delaware's *Regulations Governing the Construction and Use of Wells*, Section 11.
3. Sampling parameters and frequencies are outlined in the Operations Permit DEN Number: 359288-02 and will be superseded by the proposed Amended Operation Permit DEN Number 359288-04.

C. REQUIREMENTS PRIOR TO PLACING SYSTEM INTO OPERATION

1. The permittee shall notify the Department's Groundwater Discharges Section in writing prior to the completion of construction and request a Construction Completion Inspection to be performed by the Department's Groundwater Discharges Section staff. The Design Engineer, Class E.4 system contractor, licensed operator and the permittee shall be present during the inspection. During the inspection, all mechanical parts are to be tested.
2. A classification shall be performed on the facility in accordance with the State of Delaware's *Regulations Licensing Operators of Wastewater Facilities*. The class of operator required for the facility will be determined by the Board of Certification for Licensed Wastewater Operators in accordance with the *Regulations Licensing Operators of Wastewater Facilities*. All large systems shall be under the direction of a licensed operator. The licensed operator shall be available at all times. The licensed operator shall be on-site at the time the system is put into operation and is to receive all training as necessary to properly operate the system.
3. Upon completion of construction, the permittee shall submit to the Department's Groundwater Discharges Section the following applicable items. The items shall be combined in one package and submitted electronically.
 - a. Design Engineer Inspection Report(s) certifying the facility has been constructed in accordance with approved plans and specifications.
 - b. Copies of any other applicable State/County inspection reports.

- c. Contractor's Certificate of Completion.
- d. A certificate or letter of completion/approval from the wastewater treatment plant manufacturer.
- e. A set of "as-built" drawings of the facility bearing the seal and signature of a licensed Professional Engineer registered in the State of Delaware.
The "as-built" drawings shall include the following information.
 - i. Site map showing the location of all structures, piping and appurtenances, disposal areas and buffers.
 - ii. A full equipment list and technical specifications for all equipment used, if different than submitted in the permit application.
 - iii. The new topography elevations of the system.
 - iv. Monitoring/Observation well elevations at the top of the casing (TOC) and at the ground surface, GPS coordinates (State Plane), and local topography tied to a common benchmark.
 - v. The location and screen depth, length of stick up, and well ID's shall be provided for each monitor well.
 - vi. Surface water monitoring points.
- f. A copy of all Collection System Permit(s).
- g. Inspection Reports demonstrating collection system has been installed and inspected by Design Engineer.
- h. If the collection system does not require county approval, the permittee must supply the Department's Groundwater Discharges Section with all testing procedures conducted on the collection system, force main(s) and lift station(s).
- i. An amended Operation and Maintenance (O&M) Plan outlined in accordance with Section 6.7 of the Regulations.
- j. Biosolids Management Plan. A copy of a biosolids management contract if a third party will be utilized to manage the biosolids. If the permittee is not contracting out sludge management, the permittee shall obtain any necessary permits for land application of biosolids from the Department and provide a copy to the Groundwater Discharges Section.
- k. Legal documents (see Section 6.4 of the Regulations).
- l. Material Safety Data Sheets for all chemicals to be used by the facility staff/operator.

Part III

A. MANAGEMENT REQUIREMENTS AND RESPONSIBILITIES

~~1. Effluent Limitations on Pollutants Attributable to Industrial Users~~

~~The use of the constructed facility is conditioned on meeting all applicable pretreatment standards under 40 CFR, Part 403, or toxic pollutant discharge limitation under Section 307(a) of the Clean Water Act of 1977, PL 95-217.~~

~~2.1. Right of Entry~~

The permittee shall allow the Department entry and access, consistent with 7 Del.C. Ch. 60, to:

- a) enter the permitted facility;
- b) inspect any records that must be kept under the conditions of the permit or Regulations;
- c) inspect any facility, equipment, practice, or operation permitted or required by the permit or Regulations; and
- d) sample or monitor for the purpose of assuring permit compliance of any substance or any analytical or operational parameter at the facility.

~~3.2. Permit Transferability~~

Permits may be transferred to a new owner or operator. The permittee shall notify the Department's Groundwater Discharges Section by requesting a change of ownership of the permit before the date of transfer. The transfer shall be consistent with any notarized legal documents and/or CPCN required by the Regulations. The legal documentation shall be provided with the application. The application shall be received 30 days before the transfer.

- a) No person shall transfer a permit from one person to another unless 30 days written notice is given to the Department's Groundwater Discharges Section, indicating the transfer is agreeable to both persons, and approval of such transfer is obtained in writing from the Department's Groundwater Discharges Section, and any conditions of the approval of such transfer is obtained in writing from the Department's Groundwater Discharges Section, and any conditions of the transfer approved by the Department's Groundwater Discharges Section are complied with by the transferor and the transferee.
- b) The notice to the Department's Groundwater Discharges Section shall contain a written agreement between the transferor and the transferee, indicating the specific date of proposed transfer of permit coverage and acknowledging responsibilities of current and new permittees for compliance with and liability for the terms and conditions of this permit. The notice shall be signed by both the transferor and the transferee.

4.3.Availability of Reports

All reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department of Natural Resources and Environmental Control. Monitoring data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in 7 Del. C., §6013.

5.4.Non-compliance Notification

The Permittee shall report to the Department's Enforcement Section at (800) 662-8802 any unpermitted release or discharge of any contaminant into the air, or a pollutant, including petroleum substances, into surface waters, groundwater, or onto land as soon as the Permittee has knowledge of, or should have had knowledge of, the release or discharge.

The Permittee shall also report to the Department's Groundwater Discharges Section orally within 24 hours from the time the Permittee became aware of any unpermitted release or discharge of any contaminant into the air, or a pollutant, including petroleum substances, into surface waters, groundwater, or onto land as soon as the Permittee has knowledge of, or should have had knowledge of, the release or discharge or any other action or event that may endanger the public health or the environment by contacting the Department at the telephone numbers cited below. Spill reporting shall follow the requirements of 7 Del. C., 6028.

If for any reason the Permittee does not comply with, or will be unable to comply with, any effluent limitations or other conditions specified in this Permit, the Permittee shall provide the Department's Groundwater Discharges Section with the following information in writing within five days of becoming aware of any actual or potential non-compliance:

- a) a description and cause of the non-compliance with any limitation or condition;
- b) the period of non-compliance including exact dates and times; or, if not yet corrected, the anticipated time the non-compliance is expected to continue; and
- c) the steps being taken or planned to reduce eliminate and/or prevent recurrence of the non-compliant condition.

The notification shall be submitted to the Department at the following address:

Groundwater Discharges Section
Division of Water
Department of Natural Resources and Environmental Control
89 Kings Hwy
Dover, DE 19901
Office Telephone: (302) 739-9948

6.5.Construction Permit Expiration

- a) If construction has not been initiated prior to the expiration of the construction permit, and there are proposed changes to the approved design, the applicant shall submit a new or updated Design Engineer Report and construction plans as outlined in Sections 6.2.3, 6.5.1.4 and 6.5.1.5 for project re-evaluation. This will require public notification.
- b) If construction has been initiated prior to the expiration of the construction permit, and construction has not been completed prior to the expiration of the permit, the permittee may apply for a one year extension of the construction permit.
- c) If construction has not been initiated or construction has not been completed prior to the expiration of the one year extension, provided, the SIR is valid, and there are no changes to the approved design prior to the expiration of the construction permit, the applicant must submit a construction permit application along with applicable fees, and a construction schedule.

7.6.Construction Permit Extension

The application for extension shall include the following:

- a) A Department extension form.
- b) Applicable Departmental fees.
- c) Construction schedule.

PART IV

A. PROVISIONS

1. Permit Revocation

The Department may revoke a permit if, among other things, the Permittee violates any permit condition, these regulations, fails to pay applicable Departmental fees, obtains the permit by misrepresentation or fails to fully disclose all relevant facts.

Except in cases of emergency, the Department shall issue a written notice of intent to revoke to the permittee prior to final revocation. Revocation shall become final within 20 days of receipt of the notice by the Permittee, unless within that time the Permittee requests an administrative hearing in writing.

The Department shall notify the Permittee in writing of any revocation hearing at least 20 days prior to the date set for such hearing.

If the Department finds the public health, safety or welfare requires emergency action, the Department shall incorporate findings in support of such action in a written notice of emergency revocation issued to the Permittee. Emergency revocation shall be effective upon receipt by the Permittee. Thereafter, if requested by the Permittee in writing, the Department shall provide the Permittee a revocation hearing.

2. Permit Modifications/Amendments

In consultation with the permittee, the Department may modify or amend an existing permit provided that the modifications would not result in an increased impact or risk to the environment or to public health.

3. State Laws

This permit shall not be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation.

4. Property Rights

The issuance of this permit does not convey any property rights of either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

5. Severability

The provisions of this permit are severable. If any provision of this permit, or the application of any provision of this permit, to any circumstances is held invalid; the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

6. This permit does not relieve the Permittee of complying with any other applicable Federal, State or local regulations.

7. In the event that the *Regulations Governing the Design, Installation and Operation of On-Site Wastewater Treatment and Disposal Systems* or applicable federal regulations are revised, this permit may be opened and modified accordingly after notice and opportunity for a public hearing.

Appendix VIII



**AUTHORIZATION TO CONSTRUCT
UNDER THE LAWS OF THE
STATE OF DELAWARE**

PERMITTEE: Artesian Wastewater Management, Inc.
664 Churchmans Road
Newark, DE 19702

FACILITY: Sussex Regional Recharge Facility (SRRF)
fka Artesian Northern Sussex Regional Water Recharge
Facility (ANSRWRF)

1. Pursuant to the provisions of 7 Del. C., 6003, **Artesian Wastewater Management, Inc.** is herein authorized to construct Phase 2 of the large on-site wastewater treatment and disposal system project called **SRRF**.

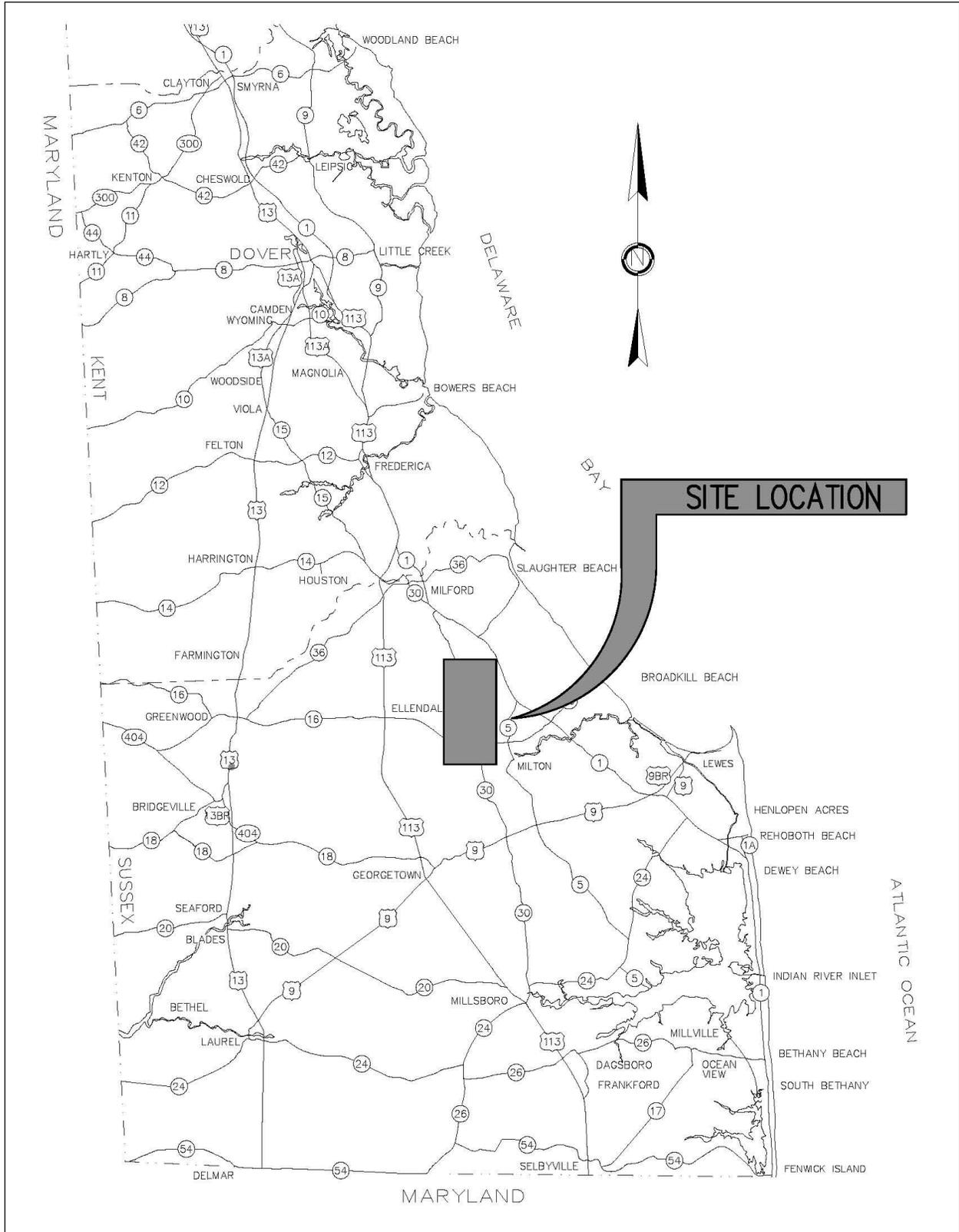
SRRF Construction Site: The Phase 2 treatment plant components are to be constructed on Sussex County Tax Map/Parcel Number: 2-35 6.00 28.09 along Route 30 approximately 4,000-ft north of the intersection of Route 16 and Route 30.

2. The Delaware Department of Natural Resources and Environmental Control's (the Department's or DNREC's) purpose in issuing this Permit, and in imposing the requirements and conditions specified herein, is for the protection of public health and the environment as required by 7 Del. Admin. C. §7101 *Regulations Governing the Design, Installation and Operation of On-Site Wastewater Treatment and Disposal Systems* (the Regulations). The construction requirements and other permit terms and conditions are set forth herein.

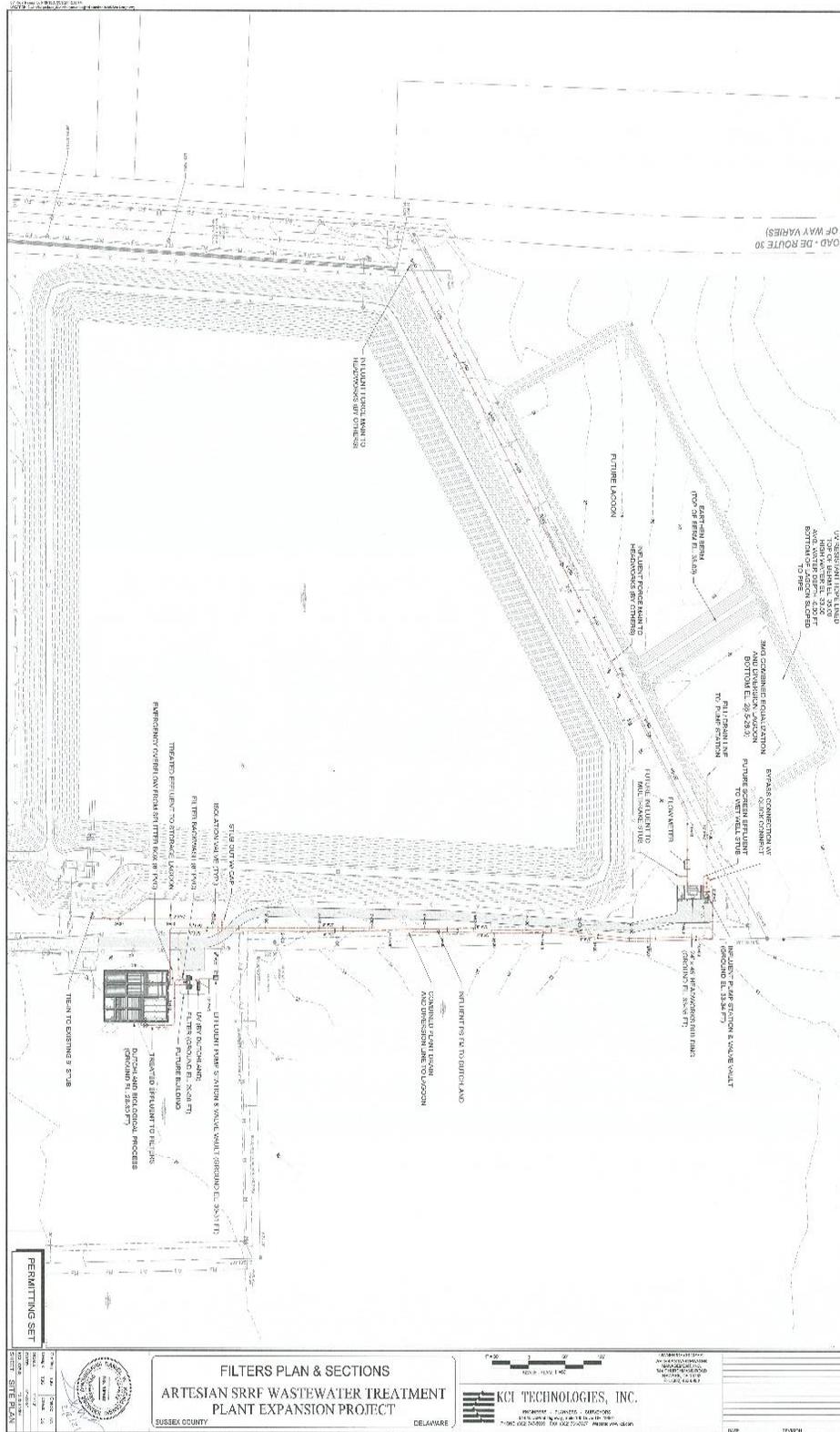
John J. Rebar, Jr.
Environmental Program Manager I
Groundwater Discharges Section
Division of Water
Delaware Department of Natural Resources
and Environmental Control

Dated Signed

LOCATION MAP



SITE LAYOUT



Part I

A. GENERAL DESCRIPTION

The Sussex Regional Recharge Facility (SRRF), formerly known as the Artesian Northern Sussex Regional Water Recharge Facility (ANSRWRF), will serve as a regional facility meeting existing and future wastewater needs within Artesian's wastewater service territories in Sussex County, Delaware.

The SRRF project is to be constructed on Sussex County Tax Map/Parcel Number: 2-35 6.00 28.09; located on a 75 acre site south of Reynolds Pond Road, east of Route 30, north of Ingram Branch and Route 16, and west of Cedar Creek Road, Sussex County, Delaware.

The SRRF project will be built in three phases. Phase 1 was permitted for Construction under DEN 359288-01. Phase 1 of the project was to construct a storage lagoon and disposal spray fields, and to accept treated wastewater from Allen Harim Foods, LLC (Allen Harim). The design average daily flow was 1.5 million gallons per day (MGD) with a peak daily flow of 2.0 MGD. The customers for Phase 1 consisted of a single food processing source, Allen Harim.

This Permit authorizes Phase 2. Phase 2 of the project is to construct an onsite wastewater treatment system designed to treat 625,000 gallons per day (GPD) of wastewater received from Artesian's wastewater service territories in Sussex County. The Phase 2 treatment system will be constructed on the 75 acre SRRF site where the existing storage lagoon is located. The project scope includes construction of a 3.0 million gallon (MG) combined equalization and off-spec water diversion lagoon, a headworks system consisting of screen and grit removal equipment, an influent lift station, a Hybrid Bardenpho treatment process system, two cloth media filters, an UV disinfection system, and an effluent lift station to pump treated wastewater to the 90 MG treated effluent storage lagoon. The treated wastewater from the SRRF treatment plant will be mixed in the lagoon with the treated effluent from Allen Harim and discharged via spray irrigation for final disposal.

The treated wastewater (effluent) is discharged via spray irrigation on privately owned agricultural land, under a lease held in perpetuity by Artesian. Spray irrigation sites are listed below.

Current and Future Spray Irrigation Sites

Field	Sussex County Tax Map ID	Gros Area (Acres)	Existing Crop Spray Area (Acres)	Proposed Crop Spray Area (Acres)	Proposed Woods Spray Area (Acres)	Total Spray Area (Acres)	Percent Spray (%)
D	235-6.00-11.00 235-6.00-11.01 235-6.00-11.02 235-7.00-1.00 235-7.00-164.00	125.1	45.3	12.7	32.7	90.7	72.5%
E	235-6.00-21.00	119.0	83.2	7.3	0	90.5	76.0%
F	235-7.00-7.00	126.5	110.5	0	0	110.5	87.3%
G	235-13.00-6.05 235-13.00-6.06	590.5	241.9	34.2	195.0	471.0	79.8%
Total		961.1	480.9	54.2	227.7	762.7	

B. DOCUMENTATION

Construction shall be in accordance with the following documents and as required by this Permit.

1. The State of Delaware *Regulations Governing the Design, Installation and Operation of On-Site Wastewater Treatment and Disposal Systems* (the Regulations).
2. February 8, 2021 Application submittal:
 - a. February 4, 2021 (inadvertently dated 2020) Artesian letter providing resubmittal and addressing comments outlined in DNREC-GWDS's November 30, 2020 letter.
 - b. Application Form for an Amended Operation Permit dated February 4, 2021.
 - c. Application Form for a Construction Permit dated February 3, 2021.
 - d. February 4, 2021 (inadvertently dated 2020) Artesian letter providing Applications.
 - e. February 2021 'Design Engineer Report - Sussex Regional Recharge Facility (SRRF) - Phase 2' prepared by Artesian Resources Corp. for Artesian Wastewater Management, Inc.

C. FACILITY SPECIFIC CONDITIONS

1. In accordance with Secretary's Order No. 2012-W-0052 Issued and Effective March 12, 2013, the Permittee shall:
 - a. Design the treatment plant to look like an agricultural building and have landscaping to screen it from view from its neighbors.
 - b. Ensure that the storage ponds shall not become a breeding ground for mosquitos.
 - c. Maintain all required buffers for the spray fields as set by both the Department

and Sussex County.

- i. Maintain a 100-foot buffer from the wetted field area to the north-west corner of the Sylvan Acres Development.
2. The permittee shall comply with all applicable Sussex county ordinances and conditional use requirements placed on this facility.
3. Wastewater spray irrigation will not be permitted on Field D parcel (2-35-6-11.01) until it is added to an approved Conditional Use. Parcel 2-35-6-11.01 is not included in the current Conditional Use Ordinance 1923, adopted July 31, 2007. Once this parcel has been added to an approved Conditional Use, Permittee must provide a copy of the approved Conditional Use to the Groundwater Discharges Section for approval. Written approval from the Groundwater Discharges Section must be acquired by the permittee prior to wastewater spray irrigation on this parcel.
4. In accordance with Part I.F Schedule of Compliance Item 1a delineated in State Permit DEN Number 359288-04, the Permittee shall obtain written approval from the Department's Groundwater Discharges Section authorizing disposal on Fields D and E prior to implementing spray irrigation.
5. The Department reserves the right to increase required separation/buffer and/or isolation distances at any time for reasons including the following:
 - a. objection by an adjacent property owner due to aerosol migration onto their property;
 - b. change in ownership of adjacent property; or
 - c. change in land use of adjacent property.
6. Phase 2 is designed to require only 37.2 MG of the storage lagoon's 90 MG capacity. If storage volume exceeds 37.2 MG, the Permittee shall notify the Groundwater Discharges Section in writing within five days of discovery.
7. The facility shall be constructed to operate in accordance with the following design criteria (Table 2-1) provided in the DER, dated February 2021, and the Regulations.

Table 2-1: General Information (Continued)

<i>Flow Characteristics</i>					
Parameter ¹	Units	Phase 1 Design Influent ⁴ (to lagoon)	Phase 2 Design Influent (to treatment)	Phase 2 Design Effluent (to lagoon)	Phase 1 + 2 Blend (in lagoon)
Peak Month Avg. Flow	MGD	1.5	0.625	0.625	2.125
Peak Day Daily Flow	MGD	2.0	1.25	1.25	3.25
Peak Instantaneous Flow	gpm	1,400	2,572	N/A	N/A
BOD ₅	mg/L	10	400	10	10
TSS	mg/L	10	450	10	10
TN	mg/L	30	70	10	24.1
Ammonia (as N)	mg/L	0	50	1	0.29
Nitrate + Nitrite (as N)	mg/L	28	5	8	22.1
Total Phosphorous	mg/L	1.0	9	8	3.1
pH	S.U.	6.0 – 9.0	6.5 – 8.5	6.0 – 9.0	6.0 – 9.0
Chlorine Residual	mg/L	0.5 – 4	N/A	N/A	N/A
Fecal Coliform	col/100 mL	20	N/A	20	20
Turbidity	NTU	5	N/A	5	5
Cadmium	mg/L	0.0005	0.002	0.002	0.00094
Copper	mg/L	0.0072	0.07	0.07	0.026
Lead	mg/L	0.001	0.06	0.06	0.018
Nickel	mg/L	0.0074	0.025	0.025	0.011
Zinc	mg/L	0.039	0.2	0.2	0.086
<i>Storage Volume</i>					
Minimum Required Storage (storage calcs)				37.2	MG
Total Available Storage (w/o freeboard) ³				92.6	MG
Surface Area (top of lagoon)				19.4	acres
Surface Area (high water level)				18.8	acres
Surface Area (low water level)				1.6	acres
Freeboard				3.0	ft
Top Elevation				46.0	ft
High Water Elevation				43.0	ft
Low Water Elevation				26.0	ft
Sidewall Slope				2.5:1	

1. All values are based on monthly averages, unless specified otherwise.
2. Permit requirements.
3. See discussion in Section 5.8.
4. The point of compliance for all Phase 1 influent flow to the lagoon shall be the Allen Harim Metering and Monitoring building at their Harbeson facility.

Table 2-1: General Information (Continued)

<i>Spray Area</i>		
Total Available Spray Area (gross acreage)	1,714	acres
Phase 2 Wetted Area (initial construction) ¹	581	acres
Phase 2 Wetted Area (total permitted) ¹	763	acres
Treatment Site Buffer Distance (property line)	30	ft
Treatment Site Buffer Distance (dwelling)	100	ft
Spray Buffer Distance (watercourse)	100	ft
Spray Buffer Distance (upgradient well)	100	ft
Spray Buffer Distance (downgradient well)	150	ft
<i>Spray Irrigation Nitrogen Balance</i>		
Design Percolate Total N	10	mg/L
Available Crop Area (initial construction) ¹	387	acres
Available Woods Area (initial construction) ¹	195	acres
Available Crop Area (total permitted) ¹	535	acres
Available Woods Area (total permitted) ¹	228	acres
Crop Plan	Corn-Wheat-Soybean-Cover	
Crop Plan (alternate option)	Corn-Barley-Soybean-Cover	
Corn Annual N Removal	155	lbs/acre/year
Wheat Annual N Removal	89	lbs/acre/year
Barley Annual N Removal	65	lbs/acre/year
Soybean Annual N Removal	189	lbs/acre/year
Cover Annual N Removal	0	lbs/acre/year
Loblolly Pine Annual N Removal	200	lbs/acre/year
Soybean Fixation	40%	% Annual Removal
Precipitation Deposition of N	5	lbs/acre/year
Ammonia Volatilization	5%	% Ammonia
Denitrification	15%	% Total Nitrogen
Max Hydraulic Loading	1.65	in/week

1. See discussion in Section 5.8.

Table 2-1: General Information (Continued)

<i>Phosphorus Loading</i>		
Phosphorus Limited	Crop Areas of Fields D, F, and G	
Design Percolate Total Phosphorus	8.0	mg/L
Maximum Phosphorous Loading (3-Year Average) ¹	31.2	lbs/acre-year
Maximum Application Rate (3-Year Average) ²	1.2	MG/acre-year
Anticipated Application Rate (3-Year Average) ³	0.93	MG/acre-year
<i>Heavy Metals Loading</i>		
Soil Cation Exchange	0 - 5	meq/100g
Soil Density	1.55	g/cc
Existing Lead in Soil	92.0	mg/kg
Existing Zinc in Soil	34.0	mg/kg
Existing Copper in Soil	13.0	mg/kg
Existing Nickel in Soil	13.0	mg/kg
Existing Cadmium in Soil	0.121	mg/kg
Land Limiting Constituent (LLC)	Zinc	
Approximate Site Life based on LLC	42	years

1. Maximum Phosphorus Loading only applies to the fields which have been identified as having high soil phosphorus. These include the crop areas in Fields D, F, and G. The woods areas in Fields D and G, as well as all of Field E, do not have high phosphorus, and are thus exempt from these criteria. For Phosphorus Limited Sites, the maximum phosphorus loading is based on the three-year average crop removal rate.
2. Maximum Application Rate in MG/acre-year is guideline based on expected concentrations, and not a limit in and of itself. Application limitations will be based on sampled phosphorus concentrations.
3. Anticipated Application Rate is an estimate, and will vary based on operational decisions

Part II

A. CONSTRUCTION REQUIREMENTS

1. The permittee shall notify the Department's Groundwater Discharges Section in writing of the intent to initiate construction activities at least fifteen days prior to the commencement of construction. The written notification shall include a proposed construction schedule.

The permittee shall provide updated construction schedules if the schedule changes as construction progresses.

2. Prior to initiating construction of a large on-site wastewater treatment and disposal system, the Department may require a pre-construction meeting be held on-site and attended by the following individuals: DNREC Soil Scientist, DNREC Environmental Engineer, DNREC Hydrologist, Class D.3 Soil Scientist, Professional Geologist, Project Design Engineer, General Site Contractor, Class E.4 System Contractor and other necessary parties.
3. The permittee shall notify the Department's Groundwater Discharges Section of scheduled construction progress report meetings. The Department's Groundwater Discharges Section staff may attend these meetings.
4. All systems shall be constructed/installed by a DNREC licensed Class E.4 system contractor. Proper construction/installation of the components of the treatment and disposal system shall be certified in writing by the design engineer and the manufacturer's representative prior to startup of the wastewater treatment and disposal system.
5. The Class E.4 system contractor shall have a copy of all valid, required and approved permits on site during construction.
6. The design engineer or designee shall periodically review the construction of the disposal system to ensure compliance with design specifications.
7. All system components shall be surveyed to a common datum point.
8. Soil disturbance to the disposal areas shall be limited to the minimum required for construction. The soils may be rendered unsuitable should unnecessary soil disturbance occur near or within the disposal area. Particular care should be taken when clearing wooded lots so as not to remove the surface soil material (see *Lot Clearing Guidelines*, Attachment 2 of the Regulations).
9. If well pointing is required during construction, the wells shall be installed by a licensed well driller, and a permit to construct such wells shall be obtained from the Department.

10. All construction activities shall be approved by the Department's Groundwater Discharges Section and shall comply with all other applicable local utility construction specifications and standards; and shall be in accordance with the Ten States Standards.
11. Connections and/or additions to the wastewater treatment and disposal system, other than those indicated on the approved plans and specifications, will not be allowed without prior written approval from the Department's Groundwater Discharges Section.
12. Any anticipated facility expansions, production increases, or process modifications that will result in new, different, or increased discharges of pollutants shall be reported in writing to the Department's Groundwater Discharges Section for approval. A new permit may be required.
13. Facility and Construction Changes
The permittee shall submit a written report to the Department's Groundwater Discharges Section for review and approval of any changes to the facility or construction of the system within the following time periods.
 - a. Thirty days before any planned activity, physical alteration to the permitted facility or addition to the permitted facility if that activity, alteration or addition would result in a change in information that was previously submitted to the Department's Groundwater Discharges Section; or
 - b. Thirty days before any anticipated change which would result in noncompliance with any permit condition or the Regulations; or
 - c. Immediately after the permittee becomes aware of relevant facts omitted from, or incorrect information submitted in, a permit application or report to the Department's Groundwater Discharges Section.
14. The permittee shall supply the Department's Groundwater Discharges Section with testing procedures and results conducted on the force main/collection/distribution system (including any lift stations).
15. A construction permit issued by the Department does not relieve the permittee from complying with any local, municipal, county, or state requirement.
16. The Class E.4 system contractor shall contact the design Engineer, licensed operator and the Department's Groundwater Discharges Section to schedule an inspection prior to completion of construction.
17. Upon completion of construction, the permittee shall provide the Department's Groundwater Discharges Section with an approved engineer inspection report(s) demonstrating that the system has been constructed in accordance with the approved Design Engineer Report, Plans and Technical Specifications.

18. The permittee is responsible for supplying the Department's Groundwater Discharges Section with a certificate or letter of completion/approval from the wastewater treatment plant manufacturer upon construction completion of the wastewater treatment plant, if applicable.
19. Construction activities within spray fields shall be minimized. Excessive compaction of surface soils by construction equipment shall be avoided. Re-grading of pipeline trenches shall match original contours. Settlement of trench backfill shall be repaired.
20. In forested systems, it is necessary to only grub the pipe centerline. Excessive clearing and grubbing shall be avoided. Clearing for above-ground piping systems shall involve only vegetation that will interfere with operation of the system.
21. All areas disturbed by construction shall be re-vegetated prior to initiation of irrigation activities.
22. Sloped areas require protection from erosion.
23. Pressure testing of the irrigation force mains and laterals shall be conducted during installation to avoid damage to spray fields from re-excavation and repair. Flushing is necessary to clear distribution system pipes of construction debris which will clog sprinkler nozzles. Care should be exercised to prevent erosion or flooding of the spray fields during pipeline flushing. Every effort should be made to keep trash and debris out of the distribution systems. Sprinklers and drain valves shall be checked for proper operation prior to installation.
24. Wastewater irrigation on bare soil is not allowed beyond what is necessary for germination to establish a vegetative cover. Wastewater application, at the design rate, may begin only after a uniform vegetative cover has been established.
25. Spray fields should be constructed early in the project so a vegetative cover can be re-established on disturbed areas before wastewater irrigation begins.
26. Potable, ground or surface water shall be used for distribution system testing unless authorized in writing by the Department.
27. One growing season may be necessary before new spray fields will accept the design wastewater loading. This start-up period shall be considered in the design and operation of these systems.
28. If testing of the system is required prior to construction completion that will require the operation of the system or the discharge of treated wastewater, the permittee shall request approval in writing from the Department's Groundwater Discharges Section and shall notify the Groundwater Discharges Section of the scheduled testing so that Groundwater

Discharges Section staff may be present during the testing of the system. Testing shall not commence until written approval is received by the Groundwater Discharges Section.

29. The permittee shall take all reasonable steps to minimize any adverse impact to waters of the state resulting from construction under this permit. Such steps shall include, but not be limited to, accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge or reasonable mitigation of such impacts.
30. The permittee must obtain appropriate state permits for the collection and distribution system if applicable.

B. MONITORING REQUIREMENTS

1. Monitoring wells, piezometers and lysimeters are required in accordance with the Phase 1 Construction Permit DEN Number: 359288-01.
2. Information for each monitoring well and piezometer shall be reported using the State of Delaware Well Identification Tag Number that is required on all wells in accordance with the State of Delaware's *Regulations Governing the Construction and Use of Wells*, Section 11.
3. Sampling parameters and frequencies are outlined in the Operations Permit DEN Number: 359288-02 and will be superseded by the proposed Amended Operation Permit DEN Number 359288-04.

C. REQUIREMENTS PRIOR TO PLACING SYSTEM INTO OPERATION

1. The permittee shall notify the Department's Groundwater Discharges Section in writing prior to the completion of construction and request a Construction Completion Inspection to be performed by the Department's Groundwater Discharges Section staff. The Design Engineer, Class E.4 system contractor, licensed operator and the permittee shall be present during the inspection. During the inspection, all mechanical parts are to be tested.
2. A classification shall be performed on the facility in accordance with the State of Delaware's *Regulations Licensing Operators of Wastewater Facilities*. The class of operator required for the facility will be determined by the Board of Certification for Licensed Wastewater Operators in accordance with the *Regulations Licensing Operators of Wastewater Facilities*. All large systems shall be under the direction of a licensed operator. The licensed operator shall be available at all times. The licensed operator shall be on-site at the time the system is put into operation and is to receive all training as necessary to properly operate the system.
3. Upon completion of construction, the permittee shall submit to the Department's Groundwater Discharges Section the following applicable items. The items shall be combined in one package and submitted electronically.

- a. Design Engineer Inspection Report(s) certifying the facility has been constructed in accordance with approved plans and specifications.
- b. Copies of any other applicable State/County inspection reports.
- c. Contractor's Certificate of Completion.
- d. A certificate or letter of completion/approval from the wastewater treatment plant manufacturer.
- e. A set of "as-built" drawings of the facility bearing the seal and signature of a licensed Professional Engineer registered in the State of Delaware.
The "as-built" drawings shall include the following information.
 - i. Site map showing the location of all structures, piping and appurtenances, disposal areas and buffers.
 - ii. A full equipment list and technical specifications for all equipment used, if different than submitted in the permit application.
 - iii. The new topography elevations of the system.
 - iv. Monitoring/Observation well elevations at the top of the casing (TOC) and at the ground surface, GPS coordinates (State Plane), and local topography tied to a common benchmark.
 - v. The location and screen depth, length of stick up, and well ID's shall be provided for each monitor well.
 - vi. Surface water monitoring points.
- f. A copy of all Collection System Permit(s).
- g. Inspection Reports demonstrating collection system has been installed and inspected by Design Engineer.
- h. If the collection system does not require county approval, the permittee must supply the Department's Groundwater Discharges Section with all testing procedures conducted on the collection system, force main(s) and lift station(s).
- i. An amended Operation and Maintenance (O&M) Plan outlined in accordance with Section 6.7 of the Regulations.
- j. Biosolids Management Plan. A copy of a biosolids management contract if a third party will be utilized to manage the biosolids. If the permittee is not contracting out sludge management, the permittee shall obtain any necessary permits for land application of biosolids from the Department and provide a copy to the Groundwater Discharges Section.
- k. Legal documents (see Section 6.4 of the Regulations).
- l. Material Safety Data Sheets for all chemicals to be used by the facility staff/operator.

Part III

A. MANAGEMENT REQUIREMENTS AND RESPONSIBILITIES

1. Right of Entry

The permittee shall allow the Department entry and access, consistent with 7 Del.C. Ch. 60, to:

- a) enter the permitted facility;
- b) inspect any records that must be kept under the conditions of the permit or Regulations;
- c) inspect any facility, equipment, practice, or operation permitted or required by the permit or Regulations; and
- d) sample or monitor for the purpose of assuring permit compliance of any substance or any analytical or operational parameter at the facility.

2. Permit Transferability

Permits may be transferred to a new owner or operator. The permittee shall notify the Department's Groundwater Discharges Section by requesting a change of ownership of the permit before the date of transfer. The transfer shall be consistent with any notarized legal documents and/or CPCN required by the Regulations. The legal documentation shall be provided with the application. The application shall be received 30 days before the transfer.

- a) No person shall transfer a permit from one person to another unless 30 days written notice is given to the Department's Groundwater Discharges Section, indicating the transfer is agreeable to both persons, and approval of such transfer is obtained in writing from the Department's Groundwater Discharges Section, and any conditions of the approval of such transfer is obtained in writing from the Department's Groundwater Discharges Section, and any conditions of the transfer approved by the Department's Groundwater Discharges Section are complied with by the transferor and the transferee.
- b) The notice to the Department's Groundwater Discharges Section shall contain a written agreement between the transferor and the transferee, indicating the specific date of proposed transfer of permit coverage and acknowledging responsibilities of current and new permittees for compliance with and liability for the terms and conditions of this permit. The notice shall be signed by both the transferor and the transferee.

3. Availability of Reports

All reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department of Natural Resources and Environmental Control. Monitoring data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in 7 Del. C., §6013.

4. Non-compliance Notification

The Permittee shall report to the Department's Enforcement Section at (800) 662-8802 any unpermitted release or discharge of any contaminant into the air, or a pollutant, including petroleum substances, into surface waters, groundwater, or onto land as soon as the Permittee has knowledge of, or should have had knowledge of, the release or discharge.

The Permittee shall also report to the Department's Groundwater Discharges Section orally within 24 hours from the time the Permittee became aware of any unpermitted release or discharge of any contaminant into the air, or a pollutant, including petroleum substances, into surface waters, groundwater, or onto land as soon as the Permittee has knowledge of, or should have had knowledge of, the release or discharge or any other action or event that may endanger the public health or the environment by contacting the Department at the telephone numbers cited below. Spill reporting shall follow the requirements of 7 Del. C., 6028.

If for any reason the Permittee does not comply with, or will be unable to comply with, any effluent limitations or other conditions specified in this Permit, the Permittee shall provide the Department's Groundwater Discharges Section with the following information in writing within five days of becoming aware of any actual or potential non-compliance:

- a) a description and cause of the non-compliance with any limitation or condition;
- b) the period of non-compliance including exact dates and times; or, if not yet corrected, the anticipated time the non-compliance is expected to continue; and
- c) the steps being taken or planned to reduce eliminate and/or prevent recurrence of the non-compliant condition.

The notification shall be submitted to the Department at the following address:

Groundwater Discharges Section
Division of Water
Department of Natural Resources and Environmental Control
89 Kings Hwy
Dover, DE 19901
Office Telephone: (302) 739-9948

5. Construction Permit Expiration

- a) If construction has not been initiated prior to the expiration of the construction permit, and there are proposed changes to the approved design, the applicant shall submit a new or updated Design Engineer Report and construction plans as outlined in Sections 6.2.3, 6.5.1.4 and 6.5.1.5 for project re-evaluation. This will require public notification.
- b) If construction has been initiated prior to the expiration of the construction permit, and construction has not been completed prior to the expiration of the permit, the permittee may apply for a one year extension of the construction permit.
- c) If construction has not been initiated or construction has not been completed prior to the expiration of the one year extension, provided, the SIR is valid, and there are no changes to the approved design prior to the expiration of the construction permit, the applicant must submit a construction permit application along with applicable fees, and a construction schedule.

6. Construction Permit Extension

The application for extension shall include the following:

- a) A Department extension form.
- b) Applicable Departmental fees.
- c) Construction schedule.

PART IV

A. PROVISIONS

1. Permit Revocation

The Department may revoke a permit if, among other things, the Permittee violates any permit condition, these regulations, fails to pay applicable Departmental fees, obtains the permit by misrepresentation or fails to fully disclose all relevant facts.

Except in cases of emergency, the Department shall issue a written notice of intent to revoke to the permittee prior to final revocation. Revocation shall become final within 20 days of receipt of the notice by the Permittee, unless within that time the Permittee requests an administrative hearing in writing.

The Department shall notify the Permittee in writing of any revocation hearing at least 20 days prior to the date set for such hearing.

If the Department finds the public health, safety or welfare requires emergency action, the Department shall incorporate findings in support of such action in a written notice of emergency revocation issued to the Permittee. Emergency revocation shall be effective upon receipt by the Permittee. Thereafter, if requested by the Permittee in writing, the Department shall provide the Permittee a revocation hearing.

2. Permit Modifications/Amendments

In consultation with the permittee, the Department may modify or amend an existing permit provided that the modifications would not result in an increased impact or risk to the environment or to public health.

3. State Laws

This permit shall not be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation.

4. Property Rights

The issuance of this permit does not convey any property rights of either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

5. Severability

The provisions of this permit are severable. If any provision of this permit, or the application of any provision of this permit, to any circumstances is held invalid; the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

6. This permit does not relieve the Permittee of complying with any other applicable Federal, State or local regulations.

7. In the event that the *Regulations Governing the Design, Installation and Operation of On-Site Wastewater Treatment and Disposal Systems* or applicable federal regulations are revised, this permit may be opened and modified accordingly after notice and opportunity for a public hearing.