Connecticut Department of Energy and Environmental Protection

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Report of the Nitrogen Credit Advisory Board for Calendar Years 2021–2022

To the Joint Standing Environment Committee of the General Assembly

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REPORT OF THE NITROGEN CREDIT ADVISORY BOARD FOR CALENDAR YEARS 2021–2022

TO THE JOINT STANDING ENVIRONMENT COMMITTEE OF THE GENERAL ASSEMBLY

Concerning the

NITROGEN CREDIT EXCHANGE PROGRAM

As required by Section 22a-523(c) of the Connecticut General Statutes

This report has been prepared by the Nitrogen Credit Advisory Board and is respectfully submitted to the Joint Standing Environment Committee of the General Assembly pursuant to the requirement of Connecticut General Statutes Section 22a-523(c). Such section requires that the Nitrogen Credit Advisory Board submit to the Joint Standing Environment Committee of the General Assembly a report that addresses issues associated with the implementation of the Nitrogen Credit Exchange Program. This report covers the period from January 1, 2021, to December 31, 2022.

This report provides a summary of the technical progress and financial requirements that the Nitrogen Credit Advisory Board deems necessary to achieve progress in this important program in reducing nitrogen loads to Long Island Sound. The continued success of this program is dependent upon the development and application of innovative approaches and management techniques to meet nutrient reduction goals for Long Island Sound.

Executive Summary

In accordance with Connecticut General Statutes Sec. 22a-523(c), the Nitrogen Credit Advisory Board (NCAB) submits this Report for the calendar years 2021 and 2022 on the progress of the Nitrogen Credit Exchange Program (NCEP).

One of the Connecticut Department of Energy and Environmental Protection's (DEEP) management strategies to reduce the State's nitrogen load to Long Island Sound (LIS) was the implementation of an innovative nitrogen trading program among the State's publicly owned Water Pollution Control Facilities (WPCFs) regulated under the General Permit for Nitrogen Discharges (NGP). 78 WPCFs in the State are covered under this general permit. Following the U.S. Environmental Protection Agency's 2001 approval of the Total Maximum Daily Load (TMDL) analysis for nitrogen in LIS, the State instituted the nitrogen trading program in 2002 with the goal of cost-effectively reducing the nitrogen load from WPCFs by 63.5% by the end of 2014 (from a 1988-1990 baseline load) by:

- encouraging denitrification at WPCFs with increased Clean Water Fund (CWF) grants;
- spreading nitrogen removal upgrades over several years, thereby reducing the financial impact on the CWF; and
- providing a fiscal alternative to the immediate expenditure of capital funds.

Major accomplishments and activities relative to the 2021 and 2022 NCE Program operations include:

- In 2021, Connecticut WPCFs regulated under the NGP discharged 6,983 equivalent pounds of nitrogen per day (eq. lbs. N/day) to LIS and in 2022, discharged 6,288 eq. lbs. N/day to LIS, both years complying with the aggregate statewide wasteload allocation (WLA) of 9,162 eq. lbs. N/day. The 3-year average aggregate equivalent nitrogen load (2020-2022) is 6,850 eq. lbs. N/day, which represents a 73% reduction in nitrogen from the TMDL baseline load. In 2021 Connecticut received 53 inches of rainfall which is above the annual average of 48 inches for the State. As a result of warm weather and below-average rainfall in 2022, WPCFs cumulatively discharged the lowest annual aggregate equivalent nitrogen load to LIS that year since the NCEP began in 2002.

- The Killingly WPCF became a Project Facility in 2021 and there were no new Project Facilities in 2022. Killingly WPCF marks a total of sixty-four (64) Project Facilities at the end of 2022.

- The CWF has provided over $480M in funding to municipalities for nitrogen removal projects through the end of 2022. The NCEP has enabled the bulk of that money to be directed to the communities where nitrogen removal would be most cost effective and yield the greatest benefit for LIS. Connecticut coastal communities have benefitted from a reduction in eutrophication in tidal waters as well as cost burden reduction.

The Nitrogen Credit Advisory Board (NCAB) highlights:

- In 2021, the NCAB approved values of nitrogen credits for buyers at $4.84 and sellers at $1.09. That year, twenty-five (25) facilities were required to purchase credits equivalent to 632.28 eq. lbs. N/day to remain in compliance with the NGP. Those payments totaled $1,116,988 and were shared amongst the fifty-two (52) facilities selling credits equivalent to 2,810.93 eq. lbs. N/day. One facility recorded a zero balance and neither purchased nor sold any credits this trading year.

- In 2022, the NCAB approved values of nitrogen credits for buyers at $4.56 and sellers at $0.51. That year, nineteen (19) facilities were required to purchase credits equivalent to 361.76 eq. lbs. N/day to remain in compliance with the NGP. Those payments totaled $602,113 and were shared amongst the fifty-eight (58) facilities selling credits equivalent to 3,236.52 eq. lbs. N/day. One facility recorded a zero balance and neither purchased nor sold any credits this trading year

I. Introduction

Background

One of the most pressing water quality issues affecting Long Island Sound (LIS) is seasonally recurrent low levels of dissolved oxygen (DO) in its bottom waters, a condition known as hypoxia. Generally defined by DO concentrations below 3.0 milligrams per liter (mg/l), hypoxia occurs in LIS during the late summer months of July through September and is caused by an overabundance of nutrients (particularly nitrogen) in the water body combined with a naturally occurring density stratification in the water column.

While nitrogen is essential to a productive ecosystem, nitrogen is also the limiting nutrient for algal production in LIS, so an overabundance of nitrogen leads to excessive algae growth. As algae die and sink to the bottom, they are decomposed by oxygen-breathing bacteria that use up the available oxygen in the lower water column and sediments, gradually lowering the DO concentration to unhealthy levels. During the summer, there is a high temperature difference between the warm surface waters and cool bottom waters of LIS, which combined with the salinity gradient throughout the water column, results in a density stratification of water layers that hinders the oxygenated surface waters from circulating downward and mixing with the hypoxic bottom waters. The hypoxic conditions are inadequate for supporting healthy marine populations because they create an imbalance in the ecosystem that disrupts the feeding, growth, and reproduction of nearly all forms of aquatic life. Primary sources of nitrogen to LIS include municipal water pollution control facility (WPCF) discharges, atmospheric deposition, and storm water runoff from urban, suburban, and agricultural areas.

For waters not meeting water quality standards, Section 303(d) of the federal CWA requires states to prioritize those waters for Total Maximum Daily Load (TMDL) development or other management plans for restoration or protection. LIS is "impaired" — meaning it does not meet the State's minimum water quality standards to support its designated uses. In April 2001, the EPA approved Connecticut and New York's jointly submitted TMDL to address the impairment of LIS water quality that results from excessive nitrogen loading. The TMDL established the maximum load of nitrogen that LIS can assimilate without causing impairment to water quality, apportioned the maximum load among various sources, and created a plan to achieve the load reductions necessary to meet water quality regulations for each state. The TMDL required that by 2014, both Connecticut and New York achieve a 58.5% collective reduction of nitrogen loading from point source discharges and urban and agricultural runoff sources to the LIS from an established TMDL baseline, which for most facilities was based on monitoring data collected between 1988-1990. A 63.5% reduction goal was set for Connecticut WPCFs through a wasteload allocation process.

"Nitrogen trading" was identified by the Connecticut Department of Energy and Environmental Protection (DEEP) as a mechanism for cost-effectively attaining the aggregate reduction goal for the State's WPCFs. Public Act 01-180, codified in the Connecticut General Statutes (CGS) in Sections 22a-521 through 527, established a Nitrogen Credit Exchange Program (NCEP) overseen by a Nitrogen Credit Advisory Board (NCAB – Attachments A and B), and authorized the issuance of a General Permit for Nitrogen Discharges (a.k.a. the Nitrogen General Permit – NGP – Attachment O). Collectively, the NCEP, NCAB, and NGP form the foundation of the nitrogen trading program which was instituted by the State in 2002 and has now completed 21 years of operation.

Condition of Long Island Sound

Nitrogen treatment at WPCFs has led to significant reductions in Connecticut's nitrogen load to LIS. Signs of improvement to the hypoxia issues are evident, but more load reductions continue to be necessary to meet management goals and attain a healthy LIS. Additional reductions must be achieved from point and nonpoint sources outside of the State, atmospheric sources, and CT's storm water discharges and nonpoint source runoff.

The areas affected by hypoxia in LIS are monitored each summer by DEEP staff with funding from the EPA Long Island Sound Study (LISS), providing a good indicator of the overall condition of LIS. Although annual variation can be large, subject to changing weather conditions that affect the severity of hypoxia each year, the underlying long-term trend in hypoxic area is downward, as illustrated by the hypoxic area trend line in **Figure 1** below. The five-year rolling average hypoxic area from 2019-2023 was 102 square miles, compared to an average hypoxic area of 208 square miles during the span of 1987-1999, representing a 51 percent reduction. The severity of the hypoxia issue has also declined, with fewer measurements below 1 mg/l of dissolved oxygen taken in recent years.

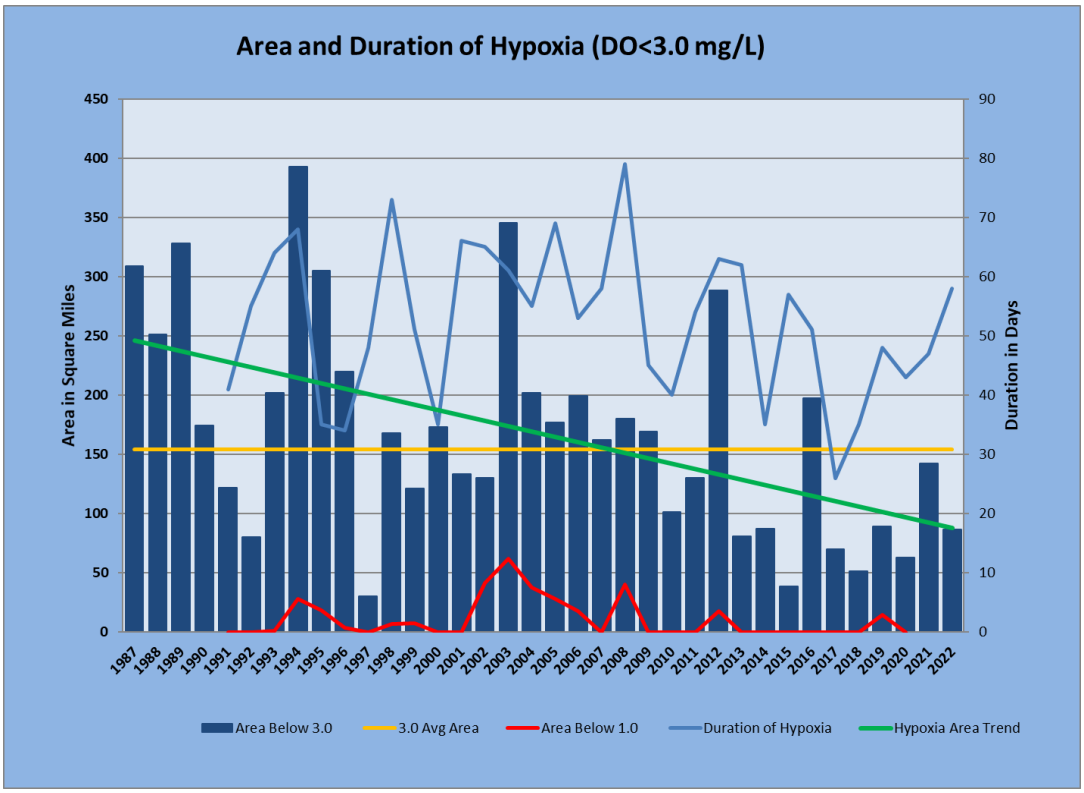


Figure 1. Area and duration of hypoxia in Long Island Sound, 1987-2022.

Nitrogen General Permit (NGP)

DEEP first issued the NGP in January 2002 following EPA's 2001 approval of the LIS TMDL and in response to the establishment of Section 22a-522 of the CGS, which authorizes the NGP's issuance. The purpose of the NGP is to protect LIS from nitrogen discharged by publicly owned treatment works (POTWs). The NGP authorizes the discharge of total nitrogen from POTWs up to a specified "wasteload allocation" (WLA). Each year following 2002, WLAs for each POTW were incrementally reduced until the final WLAs were established in 2014. The final WLAs for each facility represents a 63.5% end-of-

pipe nitrogen load reduction from TMDL baseline values. Seventy-eight (78) out of eighty-three (84) publicly owned treatment works (POTWs) in the State are currently covered under the NGP and are each assigned a WLA for total nitrogen.

The NGP also establishes an equivalency factor for each facility, representing its proximity from and likely contribution to the hypoxic area in LIS by factoring in mixing patterns and the natural attenuation of nitrogen en route to LIS. A facility's equivalent nitrogen load discharged is the product of the nitrogen load discharged and the equivalency factor.

The statewide aggregate equivalent WLA of 9,162 equivalent pounds of nitrogen per day (eq. lbs. N/day) is calculated by summing the products of all facilities' individual WLAs and equivalency factors as listed in the NGP. This equalization and aggregation allows us to track the overall combined impact of nitrogen in POTW discharges on LIS hypoxia.

2021 and 2022 Performance of the Nitrogen Credit Exchange

In 2021, NGP-regulated POTWs discharged an aggregate of 6,983 eq. lbs. N/day to LIS and in 2022, they discharged an aggregate of 6,288 eq. lbs. N/day to LIS. The aggregate equivalent loads for both years were well below the statewide aggregate equivalent WLA of 9,162 eq. lbs. N/day. Despite some heavy storms in 2021, nitrogen discharged remained under TMDL target levels. 2022 marked a warm and dry year and the nitrogen load discharged by POTWs was the lowest since the NCEP's inception in 2022. Notably, unusually warm winters in recent years have enhanced nitrification efficiency during those cooler months. In 2021, Connecticut received 53 inches of rainfall which is above the annual average of 48 inches for the State. In contrast, 2022 was generally characterized by drought conditions with 45 inches received in total.

The aggregate monthly performance of NGP-regulated facilities is shown in **Figure 2** below. The worst aggregate monthly performance over the 2021-2022 span was April 2022, when NGP-regulated facilities discharged 9,648 eq. lbs. N/day. This was the only month over the 2-year span that exceeded the NGP aggregate equivalent WLA of 9,162 eq. lbs./day. The best aggregate monthly performance during that span was in August 2022, when facilities discharged only 4,454 eq. lbs. N/day, a new historic low.

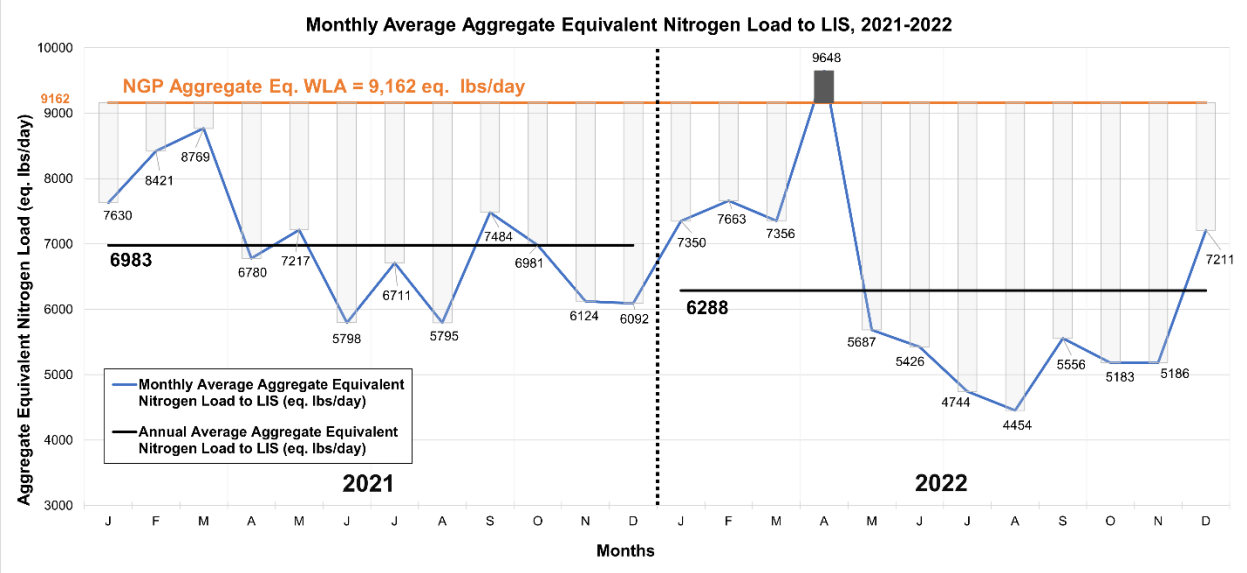


Figure 2. Aggregate Monthly Performance of NGP-Regulated Facilities during 2021 and 2022.

II. 2021 and 2022 Nitrogen Credit Exchange Program

Credit Price

To remain in compliance with the NGP, any POTW that discharges more nitrogen in a calendar year than its NGP WLA allows, is required to buy equivalent nitrogen credits from the State in the amount by which it exceeded the WLA. A POTW that discharges less nitrogen than its WLA sells its excess allowance back to the State in the form of equivalent nitrogen credits.

Annually, the NCAB proposes the price of an equivalent nitrogen credit for buyers as well as the value for sellers to the Commissioner of the DEEP. The price of a credit for buyers is calculated by dividing the total annual project cost by the total annual equivalent nitrogen reduction by all Project Facilities (in eq. lbs. N/year). The state statute identifies the "total annual project cost" as:

1) capital expenditures for planning, design, and construction of nitrogen removal facilities and
2) ongoing operation and maintenance costs for nitrogen removal treatment.

Therefore, the price of a credit for buyers is calculated from the following formula:

$$Price\ of\ an\ equivalent\ credit = \frac{(Capital\ Costs + Operation\ \&\ Maintenance\ Costs)}{Total\ Annual\ Equivalent\ Nitrogen\ Reduction}$$

- *"Capital Costs" are derived from "Nitrogen Removal Projects" as defined below.*
- *"Operation and Maintenance Costs" and "Total annual equivalent nitrogen reduction" are calculated only for "Project Facilities" as defined below.*

The value of a credit for sellers is then determined by dividing the total revenue collected from the buyers by the total amount of credits available from the sellers. Thus, the revenue collected from buyers is distributed proportionally amongst the sellers based upon the number of credits each seller has available.

"Nitrogen Removal Project" is defined as any alteration of the physical structure of a wastewater treatment facility specifically constructed to remove nitrogen and financed by Connecticut's Clean Water Fund (CWF) program.

"Project Facility" is defined as any facility with a fully operational nitrogen removal system of any scale as of January 1st of the trading year. The Killingly WPCF became a Project Facility in 2021 and there were no new Project Facilities in 2022. Over sixty (60) Project Facilities to date have completed Nitrogen removal upgrades.

"Capital Costs" were established by the NCAB using the annual CWF repayment amount associated with the construction of nitrogen treatment facilities, as set forth in the loan agreements between the municipalities and DEEP. The grant portion of CWF financing is not considered to be part of the capital cost for the purpose of setting credit prices. Using this procedure, the NCAB established the total annual capital cost for nitrogen removal in 2021 as $15,836,977 (Attachment J) and as $14,542,281 in 2022 (Attachment K). These values represent the annual interest and repayment of principal cost on the 2% low-interest loans for Nitrogen Removal Projects.

"Operation and Maintenance (O&M) Costs" related to nitrogen removal are estimated by means of an annual survey that is sent to all Project Facilities. The DEEP modified the annual survey template in 2021 and again in 2022 both to improve user-friendliness and to obtain more detailed O&M data from facilities

in an effort to more accurately estimate O&M costs related to nitrogen removal. In 2021, the NCAB adopted an annual O&M cost of $16,149,770 for nitrogen removal. In 2022, the NCAB adopted an annual O&M cost of $16,657,608 for nitrogen removal. Combining capital costs and O&M costs yields a total annual project cost of $31,986,747 in 2021 and $31,199,889 in 2022 (Attachments J and K).

The total annual equivalent nitrogen reduction is calculated by subtracting each Project Facility's average daily nitrogen load for the year from their respective baseline loads established in the TMDL for LIS. The load reductions are then multiplied by their respective equivalency factors, which are listed in the NGP and are based off each facility's proximity and likely contribution to the hypoxic area in LIS. This converts the load reductions from lbs. N/day to eq. lbs. N/day. All of the equivalent load reductions are then totaled and multiplied by the number of days in the year to get the total annual equivalent nitrogen reduction. Following this procedure, the total annual nitrogen reduction from the baseline for Project Facilities in 2021 was calculated to be 6,605,040 eq. lbs. N/day (Attachment H). In 2022, the total annual nitrogen reduction from the baseline was 6,841,768 eq. lbs. eq. lbs. N/day (Attachment I).

For 2021, the cost of an equivalent credit for buyers was determined by dividing the total annual project cost of $31,986,747 by the total annual nitrogen reduction of 6,605,040 eq. lbs., equaling $4.84. Twenty-five (25) facilities were required to purchase an aggregate total of 632.28 equivalent credits at $4.84 each in order to meet their NGP limits, resulting in $1,116,988 being shared proportionally among the sellers. Fifty-two (52) facilities performed better than their NGP limits and had a total of 2,810.93 equivalent credits to sell. One facility recorded a zero balance and neither bought nor sold any credits. Dividing the $1,116,988 from the buyers by the 2810.93 credits produced by the sellers results in an equivalent nitrogen credit value of $1.088935 for sellers (Attachment F).

For 2022, the cost of an equivalent credit for buyers was determined by dividing the total annual project cost of $31,199,889 by the total annual nitrogen reduction of 6,841,768.05 eq. lbs., equaling $4.56. Nineteen (19) facilities were required to purchase an aggregate total of 361.76 equivalent credits at $4.56 each in order to meet their NGP limits, resulting in $602,113 being shared proportionally among the sellers. Fifty-eight (58) facilities met their NGP limits and had 3,236.52 equivalent credits to sell. One facility recorded a zero balance and neither bought nor sold any credits. Dividing the $602,113 from the buyers by the 3,236.52 credits produced by the sellers results in an equivalent nitrogen credit value of $0.509691 for sellers (Attachment G).

Revision of the 2021 Credit Values

Prior to the finalization of the 2021 credit values calculated above, the NCAB had originally established an equivalent nitrogen credit of $4.84 for buyers and a value of $1.160409 for the calendar year 2021. However, DEEP received a comment from one WPCF during the fifteen-day comment period which resulted in an adjustment in credit value for sellers to $1.0886935 (Attachment M).

For calendar year 2022, credit values of $4.56 for buyers and $0.509691 for sellers were approved by the NCAB in March 2023 (Attachment N).

III. Compliance with TMDL Goal

Nitrogen Loading Trend

Figure 3 demonstrates the reduction in the trade-equalized nitrogen load to LIS since the inception of the NCEP. This reduction is evidenced by the 12-month rolling average load (bold black line), which smooths out the seasonal variation in the data.

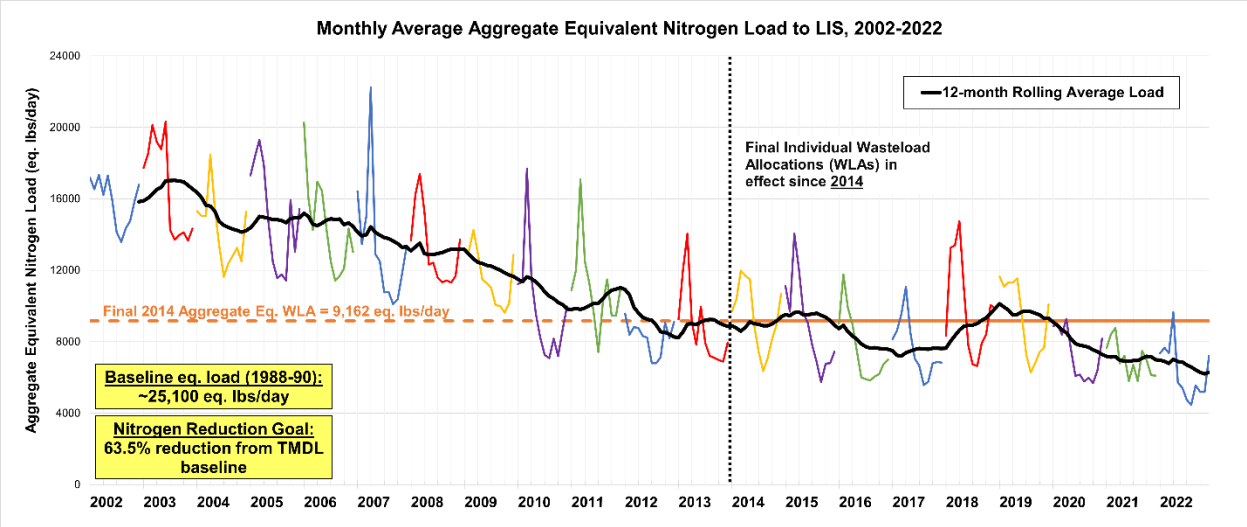


Figure 3. Monthly Aggregate Equivalent Total Nitrogen Loading to Long Island Sound

This reduction in nitrogen correlates with the completion of nitrogen removal upgrades at WPCFs, as shown in **Figure 4**. Of the seventy-eight (78) POTWs covered under the NGP, sixty-four (64) have completed nitrogen removal upgrade projects since 1990, a majority of which were also funded by the CWF. These upgrades have resulted in an annual reduction of millions of pounds of nitrogen to LIS compared to the TMDL baseline. During this reporting cycle, the Killingly WPCF became a Project Facility in 2021. CWF-funded upgrades in Southington, Torrington, and Wallingford were completed in 2022 and will be included in the calculation of nitrogen credits beginning in 2023.

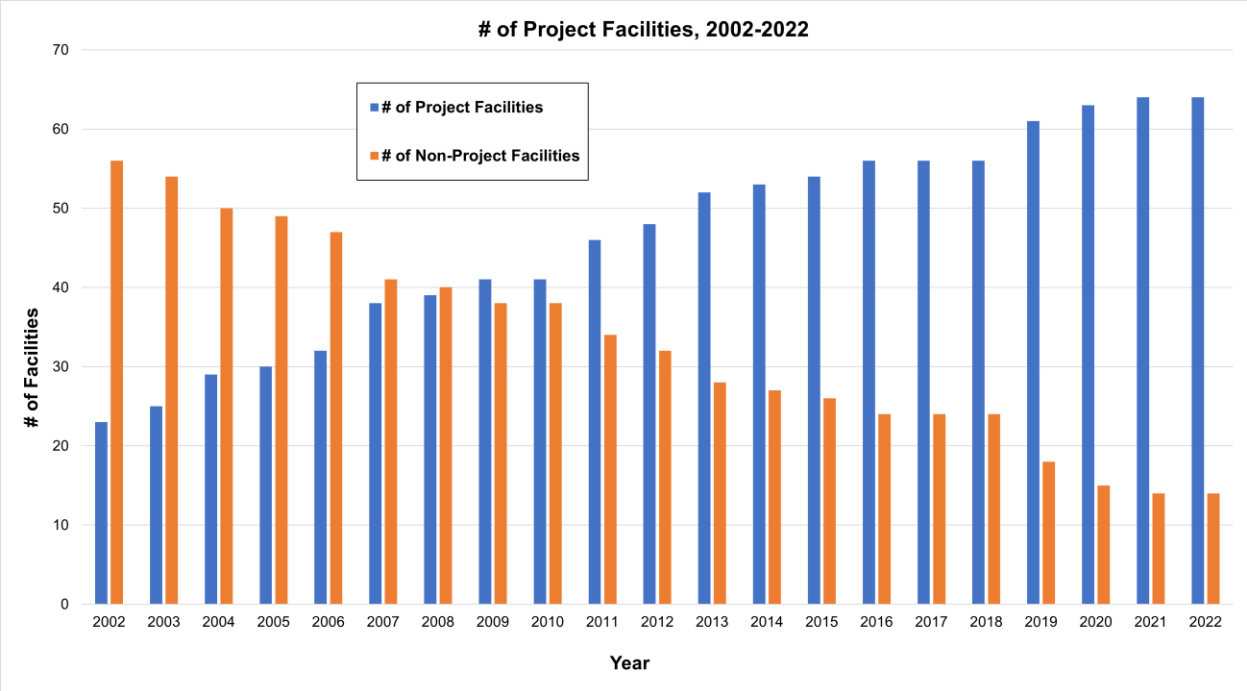


Figure 4. Nitrogen Upgrades at WPCFs, 2002-2022

Meeting the Wasteload Allocation and Permit Limits.

The NCEP has been an innovative approach to cost effectively meeting the TMDL goal of reducing nitrogen loading from POTWs to LIS by 63.5% (from the TMDL baseline load) by 2014. Advantages of the trading program included:

- Encouraging denitrification at WPCFs with increased Clean Water Fund grants,
- Spreading nitrogen removal upgrades over fifteen years, allowing WPCFs to purchase credits rather than immediately upgrade to meet 63.5% removal requirements,
- Providing a fiscal alternative to the immediate expenditure of capital funds, and
- Allowing available CWF funding to be directed to those communities where nitrogen removal is more cost effective and where it will yield a greater benefit for the environment.

Since the final WLAs went into effect in 2014, the aggregate equivalent nitrogen load to LIS has been below the aggregate equivalent WLA of 9,162 eq. lbs. N/day in 6 out of 9 years, as illustrated by **Figure 5** below. The aggregate equivalent WLA represents a 63.5% reduction in nitrogen load from the TMDL baseline of ~25,100 eq. lbs. N/day.

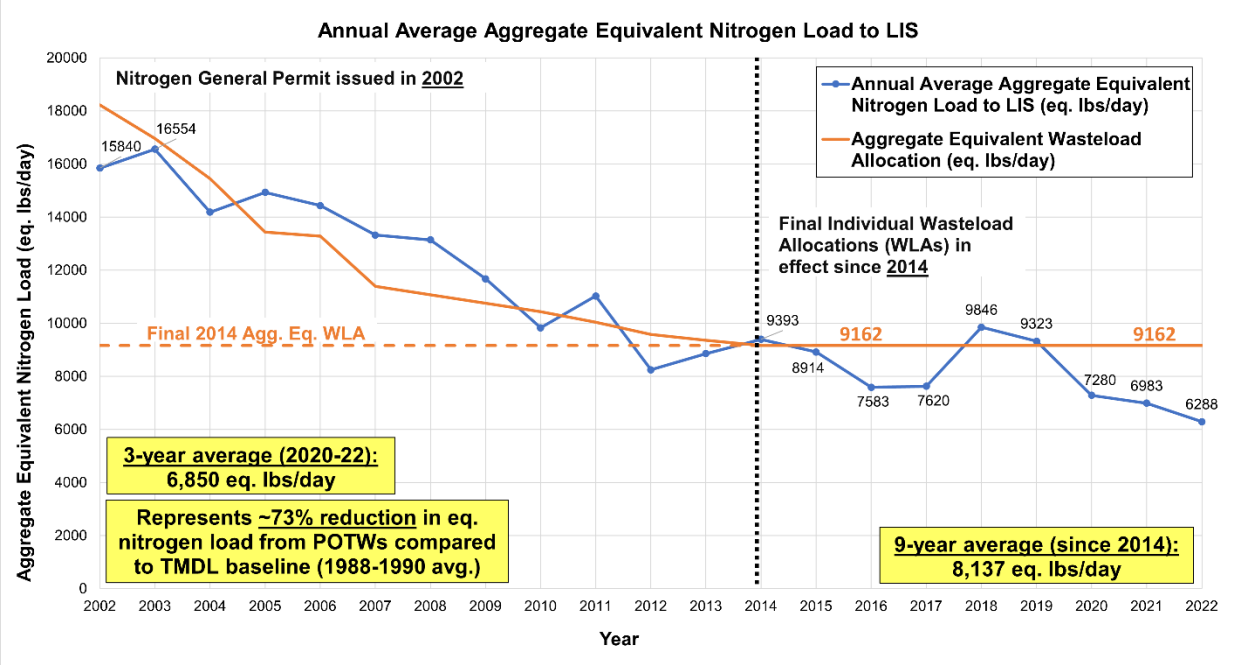


Figure 5. Annual Aggregate Equivalent Total Nitrogen Loading to Long Island Sound

The average aggregate equivalent nitrogen load since the start of 2014, a 9-year average, is 8,137 eq. lbs. N/day, representing a ~68% reduction in aggregate equivalent nitrogen load from the TMDL baseline. The 3-year average of 6,850 eq. lbs. N/day from 2020-2022 represents a ~73% reduction in aggregate equivalent nitrogen load from the TMDL baseline.

DEEP expects that the State will continue to comply with the NGP aggregate equivalent WLA in the future as more facilities continue to complete nitrogen removal upgrades.

IV. Finances

Use of Nitrogen Credit Exchange Funds

According to CGS Sec. 22a-524(b)(11), the Commissioner, in consultation with the NCAB, shall: "Establish accounts of funds created from the purchase and sale of equivalent nitrogen credits to be used for administration of the Nitrogen Credit Exchange Program and which may be used for nitrogen removal projects, habitat restoration projects, and research". Furthermore, per CGS Sec. 22a-524(b)(12), the Commissioner, in consultation with the NCAB, shall: "Establish any other policies or procedures the Commissioner may deem necessary to carry out the Nitrogen Credit Exchange Program"; and per CGS Sec. 22a-524(b)(13), may "establish a technical assistance program to educate and assist municipalities in implementing the Nitrogen Credit Exchange Program".

In previous years, the NCAB has recommended that funds be used for a variety of purposes, including providing training and technical assistance to wastewater operators throughout the State, funding the purchase of modern nitrogen monitoring equipment for those facilities without it, and funding data collection initiatives.

Regarding data collection initiatives, the NCAB continues to provide funding to the United States Geological Survey (USGS) for enhanced nitrogen monitoring to supplement nitrogen monitoring efforts statewide, including in the tidal portion of the Connecticut River. For example, the NCAB approved supplemental funding of $195,000 for federal fiscal year 2023 (Oct. 1, 2022 to Sept. 30, 2023) for USGS to continue to provide supplemental Water Quality Monitoring assistance along several streams to LIS. Statewide nitrogen monitoring by USGS has helped to improve DEEP's understanding of the nitrogen loads to LIS throughout the State. In 2018, the USGS released a report entitled "Concentrations and Loads for the Connecticut River at Middle Haddam, Connecticut, Computed With the Use of Autosampling and Continuous Measurements of Water Quality for Water Years 2009 to 2014" which summarizes some of their work. The report can be accessed here. Data from this effort has also been aggregated with other nitrogen sampling efforts and used in the Nitrogen Loading Dashboard created and maintained by the USGS.

V. Revisions to the TMDL/Upper Connecticut River

The Total Maximum Daily Load (TMDL) for nitrogen loading to LIS, adopted in 2001, includes a timeline for regular evaluation of TMDL progress and revisions, as appropriate, in order to provide for a phased implementation approach of the TMDL. Regular evaluations were anticipated to account for finalization of the federal dissolved oxygen criteria for coastal waters, anticipated changes in Connecticut and New York water quality regulations, a new System-Wide Eutrophication Model (SWEM) for LIS, more specific nitrogen reduction targets for upper Connecticut River sources throughout Massachusetts, New Hampshire, and Vermont, and for atmospheric deposition. By 2010, the federal dissolved oxygen criteria were finalized, Connecticut and New York's water quality regulations for dissolved oxygen were adopted, the SWEM model was prepared for LIS, and several studies related to nitrogen loading and delivery in the upper Connecticut River watershed were completed.

In 2010, the EPA Regional Administrators (Regions 1 and 2) and the Commissioners from the LIS watershed states agreed to proceed with a five-state TMDL. A TMDL workgroup was formed which held bi-weekly conference calls to work through the necessary tasks relative to TMDL implementation and evaluation. In 2011, the workgroup identified technical issues and held a joint meeting with state water directors and the EPA. The outcome of this meeting was to develop an enhanced implementation plan for

the current TMDL, while moving forward with a more comprehensive analysis to support the revision of the TMDL at a later date. In 2013, the five states and the New England Interstate Water Pollution Control Commission completed an evaluation of current storm water and nonpoint source control efforts to qualitatively assess whether they were adequate for meeting the 2000 TMDL load allocations. Further discussions regarding the TMDL revision ceased shortly after completion of this report.

In 2015, EPA released a plan to develop a new Nitrogen Reduction Strategy for LIS, which is intended to advance implementation of the TMDL and increase the area subject to nitrogen reductions. The approach addresses three watershed groups of LIS: coastal watersheds (embayments), large riverine watersheds (Housatonic River, Connecticut River, and Thames River), and western LIS. EPA's strategy involves the use of nitrogen thresholds to develop ecologically based targets for each of these groups. EPA initiated the first phase of this process in the fall of 2016 which focused on six embayment complexes in CT, the Connecticut River, and the eastern and western narrows of LIS. DEEP, along with NYSDEC and select members of the academic and non-profit community served on the technical stakeholder group for this project. EPA launched Phase 2 of this effort in 2018, which included a peer review of the work completed in Phase 1, additional collaboration with similar efforts, and completion of the analysis developed in Phase 1 for additional embayments, as well as the Housatonic and Thames Rivers. This phase was completed in 2022 and EPA is working to publish a dashboard that can be used to interpret and visualize the strategy products.

In 2016 DEEP formalized a new nitrogen reduction plan named the Second-Generation Nitrogen Strategy, as it follows initial efforts aimed at reducing nitrogen in order to achieve healthy dissolved oxygen concentrations in LIS. The Second-Generation Nitrogen Strategy focuses on nitrogen reduction efforts in these main areas: wastewater treatment plants, nonpoint sources and storm water, and embayments. DEEP's strategy also includes a number of specific efforts that are in various stages of completion. This includes prioritizing watersheds and embayments for additional actions towards nitrogen reductions (completed in 2017); a special study to develop nitrogen guidelines for the Niantic River Estuary (ongoing); evaluation of the nitrogen load from onsite wastewater treatment systems (completed in 2023); and collaboration with UConn's Center for Land Use Education and Research (CLEAR) to communicate coastal nitrogen issues and provide best management options to mitigate nitrogen pollution (completed in 2017). DEEP has also initiated a modeling effort which consisted of enhanced data collection and development of a statewide watershed model, and focused embayment data collection with development of nutrient models for priority embayments. The statewide watershed model will be completed in 2024 and four embayment nutrient models will be completed in 2026.

In 2010, a project to improve the SWEM model was undertaken and funded by the LISS. The project improved the calibration of SWEM to more accurately reflect actual production and respiration estimates, incorporated an algal production formulation, implemented a high-resolution output in NETCDF format, and included development of a website dedicated to making SWEM more accessible to the scientific community. The project also made the model more consistent with the scientific community's understanding of mixing and circulation in estuaries. While the model is now more consistent with observed estimates of primary production and community respiration, it continues to over-predict DO levels in the bottom waters of LIS and has been deemed limited for management use. Considering advancements in technology since SWEM was developed, LISS has decided to contract with the New York City Department of Environmental Protection to develop a more robust hydrodynamic and water quality model that, in addition to taking advantage of processing and storage advances, includes a finer grid resolution that extends spatially into embayments and tributaries. Conceptually, this effort will result in an integrated watershed, estuary, and ecosystem model. The model is being developed in stages with input from modeling experts and resource managers and is expected to be completed in 2025.

In 2019, EPA Region 1 developed a strategy to incorporate nitrogen limits into wastewater treatment plants located in Vermont (VT), New Hampshire (NH), and Massachusetts (MA). This strategy applies nitrogen concentrations of 10, 8, and 5 mg/L based on design flow breakpoints, as well as an optimization condition. WWTPs with design flows between 0.1 million gallons per day (MGD) and 1.0 MGD (MA) and 1.5 MGD (VT/NH) only have an optimization condition in their permits. WWTPs with design flows less than 0.1 MGD are only required to monitor for nitrogen. This strategy is incorporated into the state's permits when they are drafted for renewal.

EPA's Long Island Sound Office continues to support the development of a tracking system to quantitatively assess progress relative to the original 2000 TMDL nonpoint source and storm water allocations. The New England Interstate Water Pollution Control Commission has obtained grant funding to pursue the development of a tracking tool for the LIS Watershed. A preliminary spreadsheet tool that includes best management practices vetted through a technical advisory committee has been developed. Additional steps include determining a baseline year and land cover layer, piloting the tool in several CT communities, and evaluating the costs and resources of implementing the tool throughout the LIS watershed. If advanced, the tool will have to be converted into a shareable (potentially web-based) format with data collection integrated into other efforts.

VI. Attachments

A. Nitrogen Credit Advisory Board Members – 2021
B. Nitrogen Credit Advisory Board Members – 2022
C. Total Nitrogen Balance Sheet – 2021 Monthly Averages by Plant
D. Total Nitrogen Balance Sheet – 2022 Monthly Averages by Plant
E. Total Nitrogen Balance Sheet – Monthly Averages by Plant 2004-2022
F. LIS Total Nitrogen Credit Exchange Balance – 2021
G. LIS Total Nitrogen Credit Exchange Balance – 2022
H. Nitrogen Load Reductions by Project Facilities – 2021
I. Nitrogen Load Reductions by Project Facilities – 2022
J. Total Annual Project Cost – 2021
K. Total Annual Project Cost – 2022
L. Nitrogen Removal Projects Funded by the CWF through 2022
M. Notification of Revised Invoice – 2021
N. Notification of Final Invoice – 2022
O. 2019 General Permit for Nitrogen Discharges

VII. Acknowledgements

DEEP wishes to thank the members of the NCAB for their contributions to this document and their ongoing participation in the NCE Program.

Attachment A

NITROGEN CREDIT ADVISORY BOARD MEMBERS – 2021

	Name	**Appointing Authority**	**Term***
1.	Nisha Patel (Chair) DEEP 79 Elm St Hartford, CT 06016 Phone: (860) 424-3704	Katherine S. Dykes Commissioner Energy & Environmental Protection	No specific term
2.	Eric Lindquist Office of Policy and Management 450 Capitol Avenue Hartford, CT 06016	Melissa McCaw Secretary Office of Policy and Management	No specific term
3.	Kimberly Masson Office of the Treasurer 165 Capitol Avenue Hartford, CT 06106 Phone: (860) 702-3000	Shawn T. Wooden State Treasurer	No specific term
4.	William Norton, Director City of West Haven WPCA 355 Main Street West Haven, CT 06516 Phone: (203) 937-3706	Joe Aresimowicz Speaker of the House (Amann appointee)*	3 years
5.	Thomas A. Tyler The Metropolitan District 240 Brainard Road Hartford, CT 06114	Martin M. Looney Senate President Pro Tempore (Williams appointee)*	3 years
6.	VACANT	Matthew Ritter House Majority Leader	3 years

7.	VACANT	Matthew Ritter House Majority Leader	3 years
8.	VACANT	Bob Duff Senate Majority Leader	3 years
9.	VACANT	Bob Duff Senate Majority Leader	3 years
10.	Gary Zrelak Greater New Haven WPCA 260 East Street New Haven, CT 06511	Denise W. Merrill Secretary of State	3 years
11.	VACANT	Len Fasano Senate Minority Leader	3 years
12.	VACANT	Ned Lamont Governor	3 years

* Appointees remain active until removed by their appointing authority

Attachment B

NITROGEN CREDIT ADVISORY BOARD MEMBERS – 2022

	Name	**Appointing Authority**	**Term***
1.	Nisha Patel (Chair) DEEP 79 Elm St Hartford, CT 06016 Phone: (860) 424-3704	Katherine S. Dykes Commissioner Energy & Environmental Protection	No specific term
2.	Rebecca Augur, AICP Office of Policy and Management 450 Capitol Avenue Hartford, CT 06016	Jeffrey R. Beckham Secretary Office of Policy and Management	No specific term
3.	Kimberly Masson Office of the Treasurer 165 Capitol Avenue Hartford, CT 06106 Phone: (860) 702-3000	Shawn T. Wooden State Treasurer	No specific term
4.	VACANT	Speaker of the House	3 years
5.	Thomas A. Tyler The Metropolitan District 240 Brainard Road Hartford, CT 06114	Martin M. Looney Senate President Pro Tempore (Williams appointee)*	3 years
6.	VACANT	Matthew Ritter House Majority Leader	3 years

7.	VACANT	Matthew Ritter House Majority Leader	3 years
8.	VACANT	Bob Duff Senate Majority Leader	3 years
9.	VACANT	Bob Duff Senate Majority Leader	3 years
10.	Gary Zrelak Greater New Haven WPCA 260 East Street New Haven, CT 06511	Denise W. Merrill Secretary of State	3 years
11.	VACANT	Len Fasano Senate Minority Leader	3 years
12.	VACANT	Ned Lamont Governor	3 years

* Appointees remain active until removed by their appointing authority

Attachment C

Total Nitrogen Balance Sheet – 2021 Monthly Averages by Plant

Plant	Limit	Avg	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Zone 1														
GROTON CITY WPCF	99	72	115	88	85	66	67	54	46	45	43	101	84	70
GROTON TOWN WPCF	153	184	213	509	361	205	121	110	113	113	122	117	112	110
JEWETT CITY WPCF	15	18	34	51	50	16	7	5	8	4	6	7	14	8
KILLINGLY WPCF	131	82	42	56	130	142	70	79	62	73	70	79	79	100
LEDYARD WPCF	7	3	4	6	4	3	3	3	3	2	3	3	3	3
MONTVILLE WPCF	118	58	73	80	55	54	52	49	71	66	63	38	44	47
NEW LONDON WPCF	386	327	398	431	403	419	374	364	331	277	341	207	193	182
NORWICH WPCF	201	526	601	586	762	604	468	392	465	390	764	415	426	436
PLAINFIELD NORTH WPCF	34	41	67	55	76	62	49	22	27	14	36	28	33	26
PLAINFIELD VILLAGE WPCF	24	43	31	20	35	27	27	96	45	36	53	45	64	32
PUTNAM WPCF	53	33	36	34	40	43	57	23	25	32	53	19	21	15
SPRAGUE WPCF	7	17	19	20	23	19	29	17	18	14	17	10	9	3
STAFFORD SPRINGS WPCF	60	97	96	132	126	119	108	70	123	101	82	74	71	61
STONINGTON BOROUGH WPCF	14	10	5	5	5	10	6	6	11	17	16	14	11	9
STONINGTON MYSTIC WPCF	27	22	29	39	28	33	22	21	29	18	18	7	9	12
STONINGTON PAWCATUCK WPCF	24	17	19	21	18	30	15	15	14	16	18	13	13	13
THOMPSON WPCF	10	39	49	49	41	19	16	26	46	38	44	38	49	47
UCONN WPCF	44	27	25	32	28	15	9	15	13	28	30	31	40	62
WINDHAM WPCF	125	81	88	89	85	69	97	71	107	69	80	74	77	64
Zone 2														
BRISTOL WPCF	398	518	529	459	525	830	603	355	484	373	604	444	504	500
CANTON WPCF	24	52	52	49	58	48	51	48	43	47	60	60	62	51
EAST HAMPTON WPCF	54	103	93	88	162	179	109	64	72	88	123	94	88	80
EAST HARTFORD WPCF	292	279	368	329	397	359	260	179	252	184	238	205	263	314
EAST WINDSOR WPCF	59	62	59	46	50	53	59	48	86	64	92	61	64	61
ENFIELD WPCF	278	180	221	166	202	166	208	161	265	164	195	146	138	128
FARMINGTON WPCF	178	177	201	207	209	159	116	133	178	221	230	190	158	121
GLASTONBURY WPCF	98	72	94	101	91	99	94	34	62	49	61	75	48	52
HARTFORD WPCF	2377	2530	2955	3295	2934	1886	2947	2497	2223	2430	2099	2484	1976	2638
MANCHESTER WPCF	312	205	447	456	320	174	162	133	160	94	135	104	125	148
MATTABASSETT WPCF	1056	830	1085	1584	1325	914	634	515	510	578	795	774	640	611
NEW HARTFORD WPCF	3	1	0	1	1	0	1	1	1	1	1	1	0	0
PLAINVILLE WPCF	101	73	84	75	76	73	62	56	85	66	84	97	67	52
PLYMOUTH WPCF	42	100	128	137	123	103	122	105	82	82	99	76	71	75
PORTLAND WPCF	31	29	45	33	45	30	23	16	29	20	30	23	26	26

Total Nitrogen Balance Sheet – 2021 Monthly Averages by Plant

Plant	Limit	Avg	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ROCKY HILL WPCF	288	230	295	234	337	315	182	110	248	188	248	227	203	167
SIMSBURY WPCF	107	36	49	41	44	25	28	27	25	29	32	37	38	51
SOUTH WINDSOR WPCF	106	100	115	95	88	86	97	86	131	102	116	97	96	88
SUFFIELD WPCF	45	20	22	27	19	22	18	16	17	15	31	12	10	30
VERNON WPCF	184	393	369	342	355	411	435	339	471	377	453	425	364	369
WINDSOR LOCKS WPCF	66	76	71	62	71	50	55	50	128	100	93	86	74	74
WINDSOR POQUONOCK WPCF	98	408	401	379	422	388	413	373	476	422	412	428	404	373
WINSTED WPCF	64	61	61	52	46	54	74	59	69	48	64	74	68	66
Zone 3														
BRANFORD WPCF	192	110	176	185	100	83	133	70	78	77	197	56	64	104
CHESHIRE WPCF	103	67	108	62	47	23	23	24	68	58	113	157	64	53
MERIDEN WPCF	449	216	224	214	273	118	110	137	125	282	733	274	47	54
NEW HAVEN EAST WPCF	1568	810	1000	1230	1896	914	886	475	534	558	775	591	464	392
NORTH HAVEN WPCF	158	115	140	119	144	134	126	115	117	82	128	76	102	98
SOUTHINGTON WPCF	204	149	81	386	553	70	64	71	47	96	56	64	194	109
WALLINGFORD WPCF	269	397	628	529	554	433	353	332	345	255	355	291	355	334
WEST HAVEN WPCF	353	281	268	398	297	239	231	179	177	165	268	637	265	251
Zone 4														
ANSONIA WPCF	115	29	35	39	43	24	28	29	23	21	25	26	30	27
BEACON FALLS WPCF	12	57	83	74	61	55	54	48	50	49	58	58	50	47
DANBURY WPCF	442	373	258	339	368	257	299	360	368	316	399	557	660	290
DERBY WPCF	71	54	54	56	74	58	57	67	57	39	44	44	45	47
LITCHFIELD WPCF	24	13	8	8	19	17	8	10	8	13	26	12	11	15
MILFORD BEAVER BROOK WPCF	94	56	70	65	58	35	66	56	46	41	61	74	44	58
MILFORD HOUSATONIC WPCF	307	204	249	235	322	339	195	158	150	135	181	118	187	175
NAUGATUCK TREATMENT Co.	246	195	273	234	202	221	179	229	164	178	190	155	150	165
NEW MILFORD WPCF	28	28	28	31	30	28	30	33	31	27	23	22	25	24
NEWTOWN WPCF	42	11	12	13	9	9	9	8	12	9	11	12	22	9
NORFOLK WPCF	11	14	16	9	11	10	10	8	17	13	24	17	18	18
NORTH CANAAN WPCF	13	27	32	32	31	25	18	25	36	21	30	24	25	25
SALISBURY WPCF	21	40	40	37	49	50	39	26	31	31	42	47	49	37
SEYMOUR WPCF	61	65	62	60	53	59	83	66	62	46	74	55	75	86
SHELTON WPCF	106	65	108	59	71	55	62	58	47	58	68	58	73	66
STRATFORD WPCF	356	144	143	183	182	117	93	85	158	94	267	119	167	118
THOMASTON WPCF	42	31	17	18	20	42	19	49	42	23	53	29	47	15

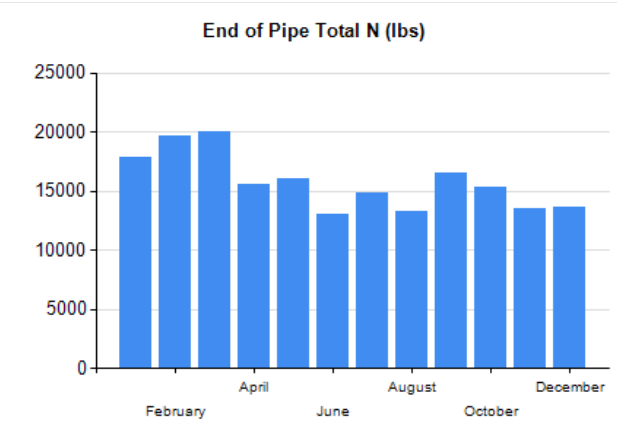
Total Nitrogen Balance Sheet – 2021 Monthly Averages by Plant

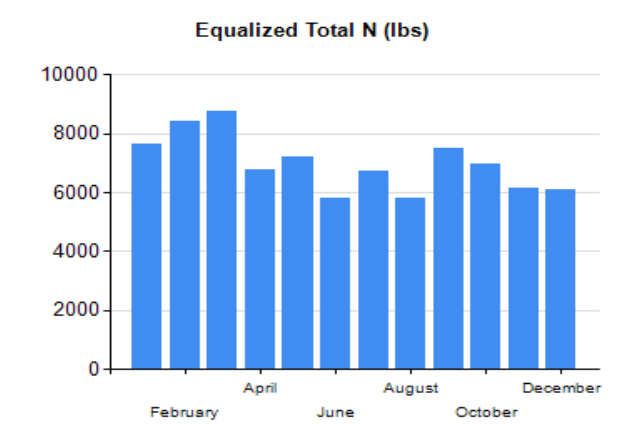
Plant	Limit	Avg	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
TORRINGTON WCPF	248	190	355	410	379	220	188	105	136	36	93	168	97	91
WATERBURY WPCF	1049	654	649	703	606	545	689	640	1032	827	725	628	461	340
Zone 5														
BRIDGEPORT EAST WPCF	362	231	189	260	209	226	429	299	235	142	203	198	176	200
BRIDGEPORT WEST WPCF	1041	1314	1108	1374	1429	1341	1631	1060	1340	976	1235	1691	1089	1491
FAIRFIELD WPCF	406	275	236	255	245	277	347	261	272	291	351	250	237	273
WESTPORT WPCF	87	43	32	56	90	26	28	26	60	23	45	25	49	55
Zone 6														
GREENWICH WPCF	479	421	504	452	454	433	437	355	446	407	407	367	413	375
NEW CANAAN WPCF	64	16	17	17	19	11	16	11	14	12	23	14	23	20
NORWALK WPCF	718	519	516	597	554	383	418	418	592	516	589	530	608	509
RIDGEFIELD SOUTH ST. WPCF	29	49	50	56	59	53	43	42	40	34	50	71	48	44
STAMFORD WPCF	926	281	356	288	309	262	260	255	245	218	442	229	259	251
End of Pipe Total			17813	19644	20075	15571	16011	13033	14859	13264	16518	15284	13532	13641
Equalized Total			7630	8421	8769	6780	7217	5798	6711	5795	7484	6981	6124	6092

End of Pipe Permit = 18,450
End of Pipe Avg = 15,770

Equalized Permit = 9,162
Equalized Avg = 6,983

Project Facilities are in BOLD





Attachment D

Total Nitrogen Balance Sheet – 2022 Monthly Averages by Plant

Plant	Limit	Avg	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Zone 1														
GROTON CITY WPCF	99	77	86	109	92	78	97	82	45	51	65	61	66	86
GROTON TOWN WPCF	153	125	130	149	145	132	128	98	103	106	144	113	107	147
JEWETT CITY WPCF	15	10	6	27	7	4	4	3	3	3	17	4	3	41
KILLINGLY WPCF	131	107	67	110	161	86	99	76	115	98	114	99	101	163
LEDYARD WPCF	7	3	3	6	4	3	2	2	2	1	3	3	3	7
MONTVILLE WPCF	118	55	54	118	74	52	52	48	30	36	39	50	56	56
NEW LONDON WPCF	386	275	190	295	322	368	308	303	219	177	267	338	221	291
NORWICH WPCF	201	456	457	502	542	487	490	392	375	345	430	380	450	626
PLAINFIELD NORTH WPCF	34	32	25	76	96	42	21	17	12	12	18	20	16	26
PLAINFIELD VILLAGE WPCF	24	18	32	28	43	27	15	13	11	6	13	8	7	13
PUTNAM WPCF	53	22	39	26	21	16	28	25	22	12	15	18	19	22
SPRAGUE WPCF	7	15	3	18	18	17	17	16	19	7	17	11	17	23
STAFFORD SPRINGS WPCF	60	65	57	65	78	74	67	53	63	64	69	65	66	62
STONINGTON BOROUGH WPCF	14	14	12	13	15	17	11	20	11	15	18	17	10	14
STONINGTON MYSTIC WPCF	27	13	18	10	13	13	15	9	13	12	10	12	17	17
STONINGTON PAWCATUCK WPCF	24	15	16	18	18	16	15	14	13	11	13	14	14	17
THOMPSON WPCF	10	46	49	50	55	52	51	53	42	38	48	49	35	35
UCONN WPCF	44	23	20	32	35	30	18	15	16	17	23	26	20	24
WINDHAM WPCF	125	70	72	86	85	90	65	60	50	49	75	57	70	76
Zone 2														
BRISTOL WPCF	398	392	465	477	604	529	345	316	274	306	318	296	321	458
CANTON WPCF	24	42	45	45	49	52	47	40	30	31	41	36	40	53
EAST HAMPTON WPCF	54	136	96	126	112	95	142	266	201	112	85	119	140	143
EAST HARTFORD WPCF	292	215	248	298	298	293	169	122	109	114	358	240	151	181
EAST WINDSOR WPCF	59	40	54	72	69	95	45	22	22	21	37	23	8	17
ENFIELD WPCF	278	148	148	155	120	184	122	136	141	113	120	163	158	220
FARMINGTON WPCF	178	142	177	147	164	168	149	132	111	105	114	143	139	151
GLASTONBURY WPCF	98	63	55	82	98	82	65	54	105	52	35	31	51	46
HARTFORD WPCF	2377	2488	2738	3334	2728	2926	2306	2912	2119	2062	2285	2180	2060	2203
MANCHESTER WPCF	312	221	322	450	304	229	208	166	140	114	139	114	197	271
MATTABASSETT WPCF	1056	770	799	1133	1290	1248	629	532	893	346	618	480	455	820
NEW HARTFORD WPCF	3	0	1	1	1	0	0	0	0	0	1	1	0	0
PLAINVILLE WPCF	101	55	47	56	79	81	54	42	43	45	48	39	48	73
PLYMOUTH WPCF	42	105	106	110	108	110	112	90	97	101	92	90	130	119

Total Nitrogen Balance Sheet – 2022 Monthly Averages by Plant

Plant	Limit	Avg	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PORTLAND WPCF	31	30	39	41	51	46	30	18	15	16	18	23	29	31
ROCKY HILL WPCF	288	185	214	239	252	262	142	150	137	111	164	154	189	209
SIMSBURY WPCF	107	36	71	37	35	45	33	33	30	21	31	27	38	31
SOUTH WINDSOR WPCF	106	92	95	87	97	99	82	96	100	84	93	78	96	91
SUFFIELD WPCF	45	20	33	30	19	24	20	18	11	16	10	12	23	23
VERNON WPCF	184	368	363	402	401	477	376	434	420	339	352	346	245	257
WINDSOR LOCKS WPCF	66	67	86	85	80	69	69	97	38	46	55	58	65	55
WINDSOR POQUONOCK WPCF	98	380	381	428	439	471	357	371	329	302	359	361	379	380
WINSTED WPCF	64	79	60	87	88	76	55	61	94	89	82	84	66	103
Zone 3														
BRANFORD WPCF	192	82	96	129	95	89	83	73	59	68	84	42	64	104
CHESHIRE WPCF	103	79	236	77	32	82	44	27	86	37	111	25	122	66
MERIDEN WPCF	449	67	101	63	55	123	99	56	48	47	57	59	47	49
NEW HAVEN EAST WPCF	1568	894	1360	1031	1045	1954	1013	574	466	437	465	469	557	1360
NORTH HAVEN WPCF	158	96	133	157	125	127	79	74	54	54	62	76	80	129
SOUTHINGTON WPCF	204	83	145	149	153	107	88	63	38	60	38	42	45	73
WALLINGFORD WPCF	269	327	387	438	472	527	309	253	230	177	221	262	236	417
WEST HAVEN WPCF	353	291	252	320	294	480	349	146	152	95	558	217	235	393
Zone 4														
ANSONIA WPCF	115	30	39	39	36	26	25	27	21	18	21	23	31	48
BEACON FALLS WPCF	12	35	44	41	40	31	30	26	25	24	28	27	52	56
DANBURY WPCF	442	316	339	388	398	306	294	288	274	307	268	208	344	376
DERBY WPCF	71	50	69	85	60	72	38	66	32	28	42	31	31	49
LITCHFIELD WPCF	24	10	8	13	15	14	9	6	4	6	12	6	9	16
MILFORD BEAVER BROOK WPCF	94	64	76	76	189	74	51	54	38	37	31	32	48	56
MILFORD HOUSATONIC WPCF	307	169	244	242	238	189	131	130	82	66	158	160	180	213
NAUGATUCK TREATMENT Co.	246	206	198	245	276	216	380	97	164	161	198	174	159	208
NEW MILFORD WPCF	28	26	26	28	32	27	28	28	22	20	25	27	23	29
NEWTOWN WPCF	42	8	9	8	10	10	6	6	7	6	8	9	11	11
NORFOLK WPCF	11	10	12	13	17	23	12	10	6	6	5	7	6	8
NORTH CANAAN WPCF	13	26	22	35	32	38	22	17	17	19	22	21	26	35
SALISBURY WPCF	21	43	38	49	29	75	51	34	31	36	49	50	33	40
SEYMOUR WPCF	61	67	68	88	76	90	64	74	47	42	34	46	61	114
SHELTON WPCF	106	77	72	70	74	90	71	95	66	85	66	62	86	92
STRATFORD WPCF	356	191	146	436	169	352	135	132	134	175	172	114	112	213

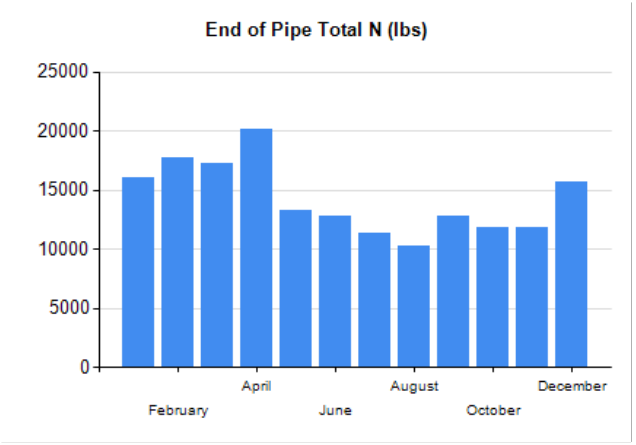
Total Nitrogen Balance Sheet – 2022 Monthly Averages by Plant

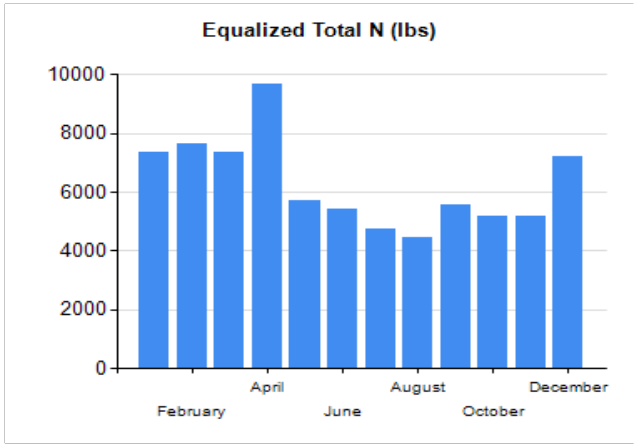
Plant	Limit	Avg	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
THOMASTON WPCF	42	36	28	70	43	90	36	21	17	28	24	24	26	25
TORRINGTON WCPF	248	77	48	85	101	133	91	92	37	90	66	52	58	73
WATERBURY WPCF	1049	537	373	385	804	696	473	435	447	585	630	562	503	551
Zone 5														
BRIDGEPORT EAST WPCF	362	192	177	224	217	257	190	223	135	125	200	159	172	219
BRIDGEPORT WEST WPCF	1041	1143	1475	1438	1307	2657	793	847	671	699	962	794	767	1306
FAIRFIELD WPCF	406	245	388	317	295	362	160	162	242	102	176	369	179	188
WESTPORT WPCF	87	30	36	23	24	25	21	24	25	38	24	23	42	60
Zone 6														
GREENWICH WPCF	479	357	423	392	332	422	273	431	262	242	192	344	430	537
NEW CANAAN WPCF	64	19	21	20	17	17	13	19	10	10	12	21	30	42
NORWALK WPCF	718	548	643	591	516	801	483	520	555	523	623	487	383	448
RIDGEFIELD SOUTH ST. WPCF	29	40	45	48	48	60	44	35	28	31	47	33	23	38
STAMFORD WPCF	926	238	267	256	216	208	195	231	200	184	197	272	274	351
End of Pipe Total			16023	17729	17192	20115	13243	12803	11355	10274	12741	11772	11811	15674
Equalized Total			7350	7663	7356	9648	5687	5426	4744	4454	5656	5183	5186	7211

End of Pipe Permit = 18,489
End of Pipe Avg = 14,227

Equalized Permit = 9,162
Equalized Avg = 6,288

Project Facilities are in BOLD





Attachment E

Total Nitrogen Balance Sheet - Monthly Averages lbs/day by plant , 2004 - 2022

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg. from 2018 to 2022
ZONE:1																				
GROTON CITY WPCF	179	132	118	129	110	114	107	99	76	98	98	80	80	83	80	77	72	77	72	76
GROTON TOWN WPCF	447	444	470	421	451	353	278	260	246	199	220	240	244	266	211	152	128	125	184	160
JEWETT CITY WPCF	39	13	10	13	13	8	9	6	5	11	7	9	7	14	6	12	5	10	18	10
KILLINGLY WPCF	159	177	152	158	191	126	170	247	225	277	151	129	102	128	223	153	197	107	82	152
LEDYARD WPC	4	5	7	5	7	5	5	6	6	6	7	4	6	6	7	4	3	3	3	4
MONTVILLE WPCF	222	92	98	69	82	91	82	115	63	54	62	55	51	45	63	67	52	55	58	59
NEW LONDON WPCF	332	434	423	414	377	391	335	304	243	296	281	280	380	373	366	301	270	275	327	308
NORWICH WPCF	769	748	828	684	673	612	481	470	457	535	562	452	512	515	507	535	546	456	526	514
PLAINFIELD NORTH WPC	78	90	119	108	105	88	481	65	66	108	88	63	68	46	50	52	50	32	41	45
PLAINFIELD VILLAGE WP	41	49	54	42	42	43	51	31	28	48	49	56	29	31	29	30	19	18	43	28
PUTNAM WPCF	174	193	205	206	206	157	140	147	153	68	42	43	44	35	36	44	39	22	33	35
SPRAGUE WPCF	10	13	22	14	15	21	21	16	7	12	12	9	10	24	31	30	17	15	17	22
STAFFORD SPRINGS WPCF	121	131	114	120	160	162	129	191	208	164	89	74	63	76	88	79	87	65	97	83
STONINGTON BOROUGH W	42	47	37	22	19	13	11	8	7	11	14	4	5	7	8	6	9	14	10	9
STONINGTON MYSTIC WP	49	48	51	31	30	25	32	28	30	41	30	15	20	41	60	26	27	13	22	30
STONINGTON PAWCATUC	46	30	25	18	19	25	33	32	22	18	16	11	16	19	20	23	20	15	17	19
THOMPSON WPCF	29	33	28	28	21	18	30	29	44	31	47	36	41	45	48	32	20	46	39	37
UCONN WPCF	107	65	94	67	103	83	65	55	52	60	73	57	104	124	103	62	28	23	27	49
WINDHAM WPCF	216	165	167	174	258	364	340	289	146	112	141	92	82	133	202	107	80	70	81	108
End of Pipe Total	3064	2909	3022	2723	2882	2699	2800	2398	2084	2149	1989	1709	1864	2011	2138	1792	1669	1441	1697	
ZONE:2																				
BRISTOL WPCF	793	567	575	532	511	452	560	632	416	517	508	427	414	506	613	630	544	392	518	539
CANTON WPCF	101	106	113	92	99	100	121	103	90	95	81	59	44	41	50	51	48	42	52	49
EAST HAMPTON WPCF	96	85	140	110	136	121	117	127	82	101	83	80	80	92	103	102	89	136	103	107
EAST HARTFORD WPCF	812	803	902	391	417	418	366	505	397	525	462	309	346	389	389	399	313	215	279	319
EAST WINDSOR WPCF	31	45	32	32	27	26	20	31	32	29	30	28	37	45	61	51	40	40	62	51
ENFIELD WPCF	275	535	331	218	272	282	248	324	219	252	253	238	155	203	247	253	208	148	180	207
FARMINGTON WPCF	401	398	440	433	309	269	250	340	241	289	311	373	268	315	382	255	192	142	177	230
GLASTONBURY WPCF	340	214	290	295	364	223	118	101	77	51	62	49	62	84	75	62	85	63	72	71
HARTFORD WPCF	6529	6831	7408	5839	5326	4217	3841	5090	3282	3888	3194	4360	3563	3546	3846	4218	2882	2488	2530	3193
MANCHESTER WPCF	755	772	785	715	705	851	866	1069	1064	946	674	293	174	152	271	313	250	221	205	252
MATTABASSETT WPCF	1453	1408	1202	1129	1053	1123	1261	1377	1200	1127	1198	822	402	529	797	535	758	770	830	738
MIDDLETOWN WPCF	424	486	440	397	446	490	497	567	521	581	544	501	503	467	512	488				500
NEW HARTFORD WPCF										3	4	1	1	2	1	1	1	0	1	1
PLAINVILLE WPCF	311	285	301	280	315	135	97	129	122	104	112	82	67	117	134	109	107	55	73	96
PLYMOUTH WPCF	68	76	80	71	87	85	68	100	74	83	67	57	23	57	85	115	147	105	100	110
PORTLAND WPCF	36	33	34	26	33	33	28	39	25	23	21	23	29	27	33	25	26	30	29	29
ROCKY HILL WPCF	780	919	787	610	484	526	498	542	446	412	420	457	350	293	376	247	270	185	230	262
SIMSBURY WCPF	323	368	206	84	70	84	43	84	50	48	57	37	36	48	37	40	44	36	36	39
SOUTH WINDSOR WPCF	317	340	298	322	323	326	342	276	111	109	103	104	95	90	96	93	96	92	100	95
SUFFIELD WPCF	38	72	88	74	88	47	25	35	34	36	27	22	21	26	21	17	18	20	20	19
VERNON WPCF	538	488	580	469	426	361	386	520	422	344	427	395	424	529	565	510	424	368	393	452
WINDSOR LOCKS WPCF	100	143	98	94	110	113	96	89	58	71	56	51	49	64	88	85	64	67	76	76
WINDSOR POQUONOCK	441	467	432	419	457	450	494	500	483	512	525	503	482	534	571	574	413	380	408	469

Total Nitrogen Balance Sheet - Monthly Averages lbs/day by plant , 2004 - 2022																				
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg. from 2018 to 2022
WINSTED WPCF	201	206	223	120	82	66	64	70	63	79	84	72	60	71	92	103	87	79	61	84
End of Pipe Total	17167	17652	17791	14759	14148	12807	12416	14661	11521	12238	11317	11358	9701	10244	11463	11295	9126	8095	8557	333
ZONE:3																				
BRANFORD WPCF	129	135	103	111	105	94	110	102	94	131	108	92	113	100	101	86	111	82	110	98
CHESHIRE WPCF	536	480	171	74	75	63	38	74	48	78	73	60	56	93	145	91	67	79	67	90
MERIDEN WPCF	882	781	827	810	1008	1051	696	253	142	164	145	116	159	98	189	239	139	67	216	170
NEW HAVEN EAST WPCF	1408	1703	2271	2201	1650	1592	1494	1993	1493	1667	2894	3183	1224	648	1696	1950	838	894	810	1238
NORTH HAVEN WPCF	489	424	226	214	249	191	164	199	172	150	158	138	145	179	213	200	138	96	115	152
SOUTHINGTON WPCF	768	754	761	868	911	725	194	262	99	99	198	83	136	180	114	149	133	83	149	126
WALLINGFORD WPCF	627	657	522	340	381	429	456	517	356	427	423	463	379	415	529	413	399	327	397	413
WEST HAVEN WPCF	511	601	546	498	779	549	612	673	326	249	291	211	196	229	257	264	273	291	281	273
End of Pipe Total	5349	5535	5427	5116	5158	4694	3764	4073	2730	2965	4290	4346	2408	1942	3244	3392	2098	1919	2145	320
ZONE:4																				
ANSONIA WPCF	260	287	289	237	260	270	178	76	63	59	59	52	43	44	61	53	37	30	29	42
BEACON FALLS WPCF	38	42	44	50	57	58	60	52	40	42	52	50	48	50	56	70	69	35	57	57
DANBURY WPCF	1825	1766	2072	1778	1885	1974	644	576	462	401	374	339	346	348	395	355	277	316	373	343
DERBY WPCF	58	59	65	63	64	64	63	82	71	54	66	68	81	63	67	78	69	50	54	64
LITCHFIELD WPCF	35	49	39	38	45	43	35	39	24	24	21	16	12	18	22	29	13	10	13	17
MILFORD BEAVER BROOK	120	127	130	132	121	137	101	127	74	70	55	51	48	70	113	70	68	64	56	74
MILFORD HOUSATONIC	431	479	574	662	742	324	238	598	291	343	365	262	206	263	291	299	230	169	204	239
NAUGATUCK TREATMEN	234	279	263	250	344	345	248	320	222	251	232	182	162	240	306	356	225	206	195	258
NEW MILFORD WPCF	56	91	86	88	103	109	135	117	32	27	25	24	23	38	26	25	24	26	28	26
NEWTOWN WPCF	32	24	36	26	19	18	21	20	18	15	13	15	13	13	17	16	12	8	11	13
NORFOLK WPCF	12	20	29	32	29	26	23	30	21	17	16	12	14	15	16	19	16	10	14	15
NORTH CANAAN WPCF	21	31	23	25	24	25	26	26	24	28	25	27	28	42	35	36	26	26	27	30
SALISBURY WPCF	23	28	29	28	34	32	34	35	28	33	28	22	21	28	34	25	32	43	40	35
SEYMOUR WPCF	61	69	66	62	58	69	62	89	41	52	63	53	57	58	85	65	85	67	65	73
SHELTON WPCF	509	501	480	413	219	219	113	121	69	61	64	87	86	99	197	100	75	77	65	103
SOUTHBURY TR. SCHOOL	16	14	10	7	8	4	7	9	3	3										
STRATFORD WPCF	431	539	537	616	1425	605	245	259	179	300	352	245	198	305	386	250	356	191	144	265
THOMASTON WPCF	45	45	44	32	42	40	25	27	18	31	29	21	20	24	29	23	22	36	31	28
TORRINGTON WCPF	287	254	265	247	275	226	242	298	195	266	250	274	227	236	254	191	244	77	190	191
WATERBURY WPCF	913	965	1001	1034	869	857	802	914	582	742	667	571	504	814	907	1286	789	537	654	835
End of Pipe Total	5407	5669	6082	5820	6623	5445	3302	3815	2457	2819	2756	2371	2137	2768	3297	3346	2669	1978	2250	143
ZONE:5																				
BRIDGEPORT EAST WPCF	459	470	468	271	253	301	412	376	325	444	400	357	228	213	271	249	220	192	231	233
BRIDGEPORT WEST WPCF	1158	1564	1145	1146	1262	1019	1211	1017	1006	919	925	1029	1452	1277	1761	1589	1274	1143	1314	1416
FAIRFIELD WPCF	417	383	530	408	488	431	325	388	338	296	273	296	299	310	381	308	285	245	275	299
WESTPORT WPCF	152	148	153	70	44	38	41	35	25	27	28	20	24	29	39	34	31	30	43	35
End of Pipe Total	2186	2565	2296	1895	2047	1789	1989	1816	1694	1686	1626	1702	2003	1829	2452	2180	1810	1610	1863	496
ZONE:6																				
GREENWICH WPCF	443	556	520	697	479	461	458	572	430	443	475	441	443	482	569	508	418	357	421	455
NEW CANAAN WPCF	20	30	30	38	29	30	29	39	21	25	26	17	14	16	26	22	15	19	16	20
NORWALK WPCF	784	818	755	1043	766	881	600	742	640	702	738	583	625	551	752	567	499	548	519	577
RIDGEFIELD SOUTH ST.	28	35	28	32	34	38	42	39	38	47	43	43	45	41	52	44	44	40	49	46
STAMFORD WPCF	1523	1418	1029	726	550	510	497	592	506	440	408	278	265	261	293	302	278	238	281	278
End of Pipe Total	2798	2857	2362	2536	1858	1920	1626	1984	1635	1657	1690	1362	1392	1351	1692	1443	1254	1202	1286	275
State End of Pipe Total	33966	33182	34974	30842	30702	27345	27345	28747	22121	23514	23668	22848	19505	20145	24286	23448	18626	16245	17798	313

Attachment F

2021 LIS Total Nitrogen Credit Exchange

FINAL

SELLING Credits

Facility Name	Equalized Credits	2021 at $1.0886935
STAMFORD WPCF	645.00	$256,306
NEW HAVEN EAST WPCF	454.80	$180,725
WATERBURY WPCF	237.00	$94,177
NORWALK WPCF	199.00	$79,077
STRATFORD WPCF	142.04	$56,443
MERIDEN WPCF	114.17	$45,368
BRIDGEPORT EAST WPCF	111.35	$44,247
FAIRFIELD WPCF	111.35	$44,247
MILFORD HOUSATONIC WPCF	69.01	$27,423
GREENWICH WPCF	58.00	$23,048
ANSONIA WPCF	57.62	$22,897
BRANFORD WPCF	49.20	$19,551
NEW CANAAN WPCF	48.00	$19,074
MATTABASSETT WPCF	45.20	$17,961
WEST HAVEN WPCF	43.20	$17,167
WESTPORT WPCF	37.40	$14,862
TORRINGTON WCPF	34.80	$13,829
DANBURY WPCF	31.74	$12,613
NAUGATUCK TREATMENT Co.	30.60	$12,160
SHELTON WPCF	27.47	$10,916
SOUTHINGTON WPCF	26.95	$10,709
NORTH HAVEN WPCF	25.80	$10,252
MILFORD BEAVER BROOK WPCF	25.46	$10,117
MANCHESTER WPCF	20.33	$8,079
ENFIELD WPCF	18.62	$7,399
CHESHIRE WPCF	17.64	$7,010
NEWTOWN WPCF	14.26	$5,667
SIMSBURY WPCF	12.78	$5,078
ROCKY HILL WPCF	11.60	$4,610
DERBY WPCF	11.39	$4,526
MONTVILLE WPCF	10.80	$4,292
NEW LONDON WPCF	10.62	$4,220
KILLINGLY WPCF	6.86	$2,726
THOMASTON WPCF	6.60	$2,623
WINDHAM WPCF	6.60	$2,623
GLASTONBURY WPCF	5.20	$2,066
PLAINVILLE WPCF	5.04	$2,003
GROTON CITY WPCF	4.86	$1,931
SUFFIELD WPCF	4.75	$1,888
LITCHFIELD WPCF	3.85	$1,530
PUTNAM WPCF	2.80	$1,113
UCONN WPCF	2.55	$1,013
EAST HARTFORD WPCF	2.47	$982
STONINGTON PAWCATUCK WPCF	1.19	$473
SOUTH WINDSOR WPCF	1.14	$453
STONINGTON MYSTIC WPCF	0.90	$358
STONINGTON BOROUGH WPCF	0.72	$286
LEDYARD WPCF	0.72	$286
WINSTED WPCF	0.54	$215
PORTLAND WPCF	0.40	$159
NEW HARTFORD WPCF	0.36	$143
FARMINGTON WPCF	0.18	$72
NEW MILFORD WPCF	0	$0
Total	**2810.93**	**$1,116,988**

BUYING Credits

Facility Name	Equalized Credits	2021 at $4.84
BRIDGEPORT WEST WPCF	232.05	$409,940
WALLINGFORD WPCF	76.80	$135,675
WINDSOR POQUONOCK WPCF	58.90	$104,053
NORWICH WPCF	58.50	$103,346
VERNON WPCF	39.71	$70,152
HARTFORD WPCF	30.60	$54,058
BEACON FALLS WPCF	30.15	$53,263
BRISTOL WPCF	21.60	$38,159
RIDGEFIELD SOUTH ST. WPCF	20.00	$35,332
PLYMOUTH WPCF	10.44	$18,443
EAST HAMPTON WPCF	9.80	$17,313
SALISBURY WPCF	6.65	$11,748
GROTON TOWN WPCF	5.58	$9,858
STAFFORD SPRINGS WPCF	5.55	$9,805
CANTON WPCF	5.04	$8,904
NORTH CANAAN WPCF	4.90	$8,656
THOMPSON WPCF	4.06	$7,172
SEYMOUR WPCF	2.68	$4,734
PLAINFIELD VILLAGE WPCF	2.66	$4,699
WINDSOR LOCKS WPCF	1.90	$3,357
SPRAGUE WPCF	1.60	$2,827
NORFOLK WPCF	1.05	$1,855
PLAINFIELD NORTH WPCF	0.98	$1,731
EAST WINDSOR WPCF	0.57	$1,007
JEWETT CITY WPCF	0.51	$901
Total	**632.28**	**$1,116,988**

The self-sufficient program was approved under Public Act 15-38 in 2016. The program consists of buyers purchasing the credits (632.28) credits at $4.84) they need to meet their Nitrogen General Permit (NGP) limits, with those payments ($1,116,988) being shared proportionally amongst the facilities (2,810.93 credits at $1.0886935) that met their NGP limits and are selling their excess allowance for the year. The State no longer purchases excess credits. The calendar year 2021 credits are traded in 2022.

Attachment G

2022 LIS Total Nitrogen Credit Exchange

FINAL

SELLING Credits

Facility Name	Equalized Credits	2022 at $0.509691
STAMFORD WPCF	688	$127,994
NEW HAVEN EAST WPCF	404.4	$75,233
WATERBURY WPCF	307.2	$57,151
MERIDEN WPCF	187.18	$34,822
NORWALK WPCF	170	$31,626
BRIDGEPORT EAST WPCF	144.5	$26,882
FAIRFIELD WPCF	136.85	$25,459
GREENWICH WPCF	122	$22,697
STRATFORD WPCF	110.55	$20,566
TORRINGTON WCPF	102.6	$19,087
MILFORD HOUSATONIC WPCF	92.46	$17,201
BRANFORD WPCF	66	$12,278
SOUTHINGTON WPCF	59.29	$11,030
DANBURY WPCF	57.96	$10,783
MATTABASSETT WPCF	57.2	$10,641
ANSONIA WPCF	56.95	$10,595
WESTPORT WPCF	48.45	$9,014
NEW CANAAN WPCF	45	$8,372
WEST HAVEN WPCF	37.2	$6,921
NORTH HAVEN WPCF	37.2	$6,921
ENFIELD WPCF	24.7	$4,595
NAUGATUCK TREATMENT CO.	24	$4,465
ROCKY HILL WPCF	20.6	$3,832
MILFORD BEAVER BROOK WPCF	20.1	$3,739
NEW LONDON WPCF	19.98	$3,717
SHELTON WPCF	19.43	$3,615
MANCHESTER WPCF	17.29	$3,217
NEWTOWN WPCF	15.64	$2,910
EAST HARTFORD WPCF	14.63	$2,722
DERBY WPCF	14.07	$2,618
SIMSBURY WPCF	12.78	$2,378
CHESHIRE WPCF	11.76	$2,188
MONTVILLE WPCF	11.34	$2,110
PLAINVILLE WPCF	8.28	$1,540
WINDHAM WPCF	8.25	$1,535
GLASTONBURY WPCF	7	$1,302
FARMINGTON WPCF	6.48	$1,206
GROTON TOWN WPCF	5.04	$938
LITCHFIELD WPCF	4.9	$912
SUFFIELD WPCF	4.75	$884
PUTNAM WPCF	4.34	$807
GROTON CITY WPCF	3.96	$737
EAST WINDSOR WPCF	3.61	$672
THOMASTON WPCF	3.6	$670
KILLINGLY WPCF	3.36	$625
UCONN WPCF	3.15	$586
SOUTH WINDSOR WPCF	2.66	$495
STONINGTON MYSTIC WPCF	2.52	$469
STONINGTON PAWCATUCK WPCF	1.53	$285
BRISTOL WPCF	1.08	$201
NEW MILFORD WPCF	0.92	$171
JEWETT CITY WPCF	0.85	$158
PLAINFIELD VILLAGE WPCF	0.84	$156
LEDYARD WPCF	0.72	$134

BUYING Credits

Facility Name	Equalized Credits	2022 at $4.56
BRIDGEPORT WEST WPCF	86.70	$409,940
WINDSOR POQUONOCK WPCF	53.58	$135,675
NORWICH WPCF	45.90	$104,053
VERNON WPCF	34.96	$103,346
WALLINGFORD WPCF	34.80	$70,152
HARTFORD WPCF	22.20	$54,058
EAST HAMPTON WPCF	16.40	$53,263
BEACON FALLS WPCF	15.41	$38,159
PLYMOUTH WPCF	11.34	$35,332
RIDGEFIELD SOUTH ST. WPCF	11.00	$18,443
SALISBURY WPCF	7.70	$17,313
THOMPSON WPCF	5.04	$11,748
NORTH CANAAN WPCF	4.55	$9,858
SEYMOUR WPCF	4.02	$9,805
CANTON WPCF	3.24	$8,904
WINSTED WPCF	2.70	$8,656
SPRAGUE WPCF	1.28	$7,172
STAFFORD SPRINGS WPCF	0.75	$4,734
WINDSOR LOCKS	0.19	$4,699
Total	**361.76**	**$602,113**

The self-sufficient program was approved under Public Act 15-38 in 2016. The program consists of buyers purchasing the credits (361.76) credits at $4.56) they need to meet their Nitrogen General Permit (NGP) limits, with those payments ($602,113) being shared proportionally amongst the facilities (3,236.52 credits at $0.509691) that met their NGP limits and are selling their excess allowance for the year. The State no longer purchases excess credits. The calendar year 2022 credits are traded in 2023.

2022 LIS Total Nitrogen Credit Exchange

FINAL

SELLING Credits

Facility Name	Equalized Credits	2022 at $0.509691
NEW HARTFORD WPCF	0.54	$100
NORFOLK WPCF	0.35	$65
PLAINFIELD NORTH WPCF	0.28	$52
PORTLAND WPCF	0.2	$37
STONINGTON BOROUGH	0	$0
Total	**3236.52**	**$602,113**

Attachment H

Nitrogen Load Reductions by Project Facilities – 2021

Project Facilities	Baseline Load (lbs./day)	2021 Average TN (lbs./day)	EOP Reduced (lbs./day)	Eq. Factor	Eq. Lbs Reduced (eq. lbs./day)
ANSONIA WPCF	314	29	285	0.67	190.95
BRANFORD WPCF	526	110	416	0.6	249.6
BRIDGEPORT EAST WPCF	991	229	762	0.85	647.7
BRIDGEPORT WEST WPCF	2852	1309	1543	0.85	1311.55
BRISTOL WPCF	1091	517	574	0.18	103.32
CHESHIRE WPCF	281	66	215	0.49	105.35
DANBURY WPCF	1211	372	839	0.46	385.94
DERBY WPCF	195	53	142	0.67	95.14
EAST HAMPTON WPCF	148	103	45	0.2	9
EAST HARTFORD WPCF	801	278	523	0.19	99.37
EAST WINDSOR WPCF	163	61	102	0.19	19.38
ENFIELD WPCF	763	179	584	0.19	110.96
FAIRFIELD WPCF	1113	275	838	0.85	712.3
FARMINGTON WPCF	486	177	309	0.18	55.62
GLASTONBURY WPCF	268	70	198	0.2	39.6
GREENWICH WPCF	1313	421	892	1	892
GROTON CITY WPCF	272	71	201	0.18	36.18
GROTON TOWN WPCF	420	184	236	0.18	42.48
HARTFORD WPCF	6512	2529	3983	0.2	796.6
JEWETT CITY WPCF	42	17	25	0.17	4.25
KILLINGLY WPCF	359	82	277	0.14	38.78
LEDYARD WPCF	20	3	17	0.18	3.06
LITCHFIELD WPCF	64	13	51	0.35	17.85
MANCHESTER WPCF	855	204	651	0.19	123.69
MATTABASSETT WPCF	2892	827	2065	0.2	413
MERIDEN WPCF	1230	220	1010	0.49	494.9
MILFORD BEAVER BROOK WPCF	258	55	203	0.67	136.01
MILFORD HOUSATONIC WPCF	844	208	636	0.67	426.12
MONTVILLE WPCF	323	57	266	0.18	47.88
NAUGATUCK TREATMENT Co.	675	194	481	0.6	288.6
NEW CANAAN WPCF	175	16	159	1	159
NEW HARTFORD WPCF	12	0	12	0.18	2.16
NEW HAVEN EAST WPCF	4294	820	3474	0.6	2084.4
NEW LONDON WPCF	1057	324	733	0.18	131.94
NEW MILFORD WPCF	77	27	50	0.46	23
NEWTOWN WPCF	115	11	104	0.46	47.84
NORTH HAVEN WPCF	433	114	319	0.6	191.4
NORWALK WPCF	1967	519	1448	1	1448
PLAINVILLE WPCF	277	72	205	0.18	36.9

Nitrogen Load Reductions by Project Facilities – 2021

Project Facilities	Baseline Load (lbs./day)	2021 Average TN (lbs./day)	EOP Reduced (lbs./day)	Eq. Factor	Eq. Lbs Reduced (eq. lbs./day)
PLYMOUTH WPCF	114	99	15	0.18	2.7
PORTLAND WPCF	86	28	58	0.2	11.6
PUTNAM WPCF	145	32	113	0.14	15.82
RIDGEFIELD SOUTH ST. WPCF	80	48	32	1	32
ROCKY HILL WPCF	789	227	562	0.2	112.4
SEYMOUR WPCF	167	64	103	0.67	69.01
SHELTON WPCF	290	65	225	0.67	150.75
SIMSBURY WPCF	293	35	258	0.18	46.44
SOUTH WINDSOR WPCF	289	99	190	0.19	36.1
SOUTHINGTON WPCF	557	152	405	0.49	198.45
STAFFORD SPRINGS WPCF	164	95	69	0.15	10.35
STAMFORD WPCF	2536	280	2256	1	2256
STONINGTON MYSTIC WPCF	74	21	53	0.18	9.54
STRATFORD WPCF	974	147	827	0.67	554.09
SUFFIELD WPCF	122	20	102	0.19	19.38
THOMASTON WPCF	114	31	83	0.6	49.8
TORRINGTON WCPF	680	188	492	0.6	295.2
UCONN WPCF	120	27	93	0.15	13.95
WALLINGFORD WPCF	737	407	330	0.6	198
WATERBURY WPCF	2872	651	2221	0.6	1332.6
WEST HAVEN WPCF	967	277	690	0.6	414
WESTPORT WPCF	238	43	195	0.85	165.75
WINDHAM WPCF	344	80	264	0.15	39.6
WINDSOR LOCKS WPCF	180	75	105	0.19	19.95
WINSTED WPCF	175	60	115	0.18	20.7
Average daily reduction in equalized pounds:					**18096**
Annual reduction in equalized pounds:					**6,605,040**
Project Cost:					**$ 31,986,747**
Buyer's Cost of a Credit:					**$ 4.84**
Seller's Cost of a Credit:					**$ 1.0886935**

Attachment I

Nitrogen Load Reduction by Project Facilities - 2022

Project Facilities	Baseline Load (lbs/day)	2022 Average TN (lbs/day)	EOP Reduced (lbs/day)	Eq. Factor	Eq. Lbs Reduced (eq. lbs/day)
ANSONIA WPCF	314	30	284	0.67	190.28
BRANFORD WPCF	526	82	444	0.6	266.4
BRIDGEPORT EAST WPCF	991	192	799	0.85	679.15
BRIDGEPORT WEST WPCF	2852	1143	1709	0.85	1452.65
BRISTOL WPCF	1091	392	699	0.18	125.82
CHESHIRE WPCF	281	79	202	0.49	98.98
DANBURY WPCF	1211	316	895	0.46	411.7
DERBY WPCF	195	50	145	0.67	97.15
EAST HAMPTON WPCF	148	136	12	0.2	2.4
EAST HARTFORD WPCF	801	215	586	0.19	111.34
EAST WINDSOR WPCF	163	40	123	0.19	23.37
ENFIELD WPCF	763	148	615	0.19	116.85
FAIRFIELD WPCF	1113	245	868	0.85	737.8
FARMINGTON WPCF	486	142	344	0.18	61.92
GLASTONBURY WPCF	268	63	205	0.2	41
GREENWICH WPCF	1313	357	956	1	956
GROTON CITY WPCF	272	77	195	0.18	35.1
GROTON TOWN WPCF	420	125	295	0.18	53.1
HARTFORD WPCF	6512	2488	4024	0.2	804.8
JEWETT CITY WPCF	42	10	32	0.17	5.44
KILLINGLY WPCF	359	107	252	0.14	35.28
LEDYARD WPCF	20	3	17	0.18	3.06
LITCHFIELD WPCF	64	10	54	0.35	18.9
MANCHESTER WPCF	855	221	634	0.19	120.46
MATTABASSETT WPCF	2892	770	2122	0.2	424.4
MERIDEN WPCF	1230	67	1163	0.49	569.87
MILFORD BEAVER BROOK WPCF	258	64	194	0.67	129.98
MILFORD HOUSATONIC WPCF	844	169	675	0.67	452.25
MONTVILLE WPCF	323	55	268	0.18	48.24
NAUGATUCK TREATMENT CO.	675	206	469	0.6	281.4
NEW CANAAN WPCF	175	19	156	1	156
NEW HARTFORD WPCF	12	0	12	0.18	2.16
NEW HAVEN EAST WPCF	4294	894	3400	0.6	2040
NEW LONDON WPCF	1057	275	782	0.18	140.76
NEW MILFORD WPCF	77	26	51	0.46	23.46
NEWTOWN WPCF	115	8	107	0.46	49.22
NORTH HAVEN WPCF	433	96	337	0.6	202.2

Nitrogen Load Reduction by Project Facilities - 2022

Project Facilities	Baseline Load (lbs/day)	2022 Average TN (lbs/day)	EOP Reduced (lbs/day)	Eq. Factor	Eq. Lbs Reduced (eq. lbs/day)
NORWALK WPCF	1967	548	1419	1	1419
PLAINVILLE WPCF	277	55	222	0.18	39.96
PLYMOUTH WPCF	114	105	9	0.18	1.62
PORTLAND WPCF	86	30	56	0.2	11.2
PUTNAM WPCF	145	22	123	0.14	17.22
RIDGEFIELD SOUTH ST. WPCF	80	40	40	1	40
ROCKY HILL WPCF	789	185	604	0.2	120.8
SEYMOUR WPCF	167	67	100	0.67	67
SHELTON WPCF	290	77	213	0.67	142.71
SIMSBURY WPCF	293	36	257	0.18	46.26
SOUTH WINDSOR WPCF	289	92	197	0.19	37.43
SOUTHINGTON WPCF	557	83	474	0.49	232.26
STAFFORD SPRINGS WPCF	164	65	99	0.15	14.85
STAMFORD WPCF	2536	238	2298	1	2298
STONINGTON MYSTIC WPCF	74	13	61	0.18	10.98
STRATFORD WPCF	974	191	783	0.67	524.61
SUFFIELD WPCF	122	20	102	0.19	19.38
THOMASTON WPCF	114	36	78	0.6	46.8
TORRINGTON WCPF	680	77	603	0.6	361.8
UCONN WPCF	120	23	97	0.15	14.55
WALLINGFORD WPCF	737	327	410	0.6	246
WATERBURY WPCF	2872	537	2335	0.6	1401
WEST HAVEN WPCF	967	291	676	0.6	405.6
WESTPORT WPCF	238	30	208	0.85	176.8
WINDHAM WPCF	344	70	274	0.15	41.1
WINDSOR LOCKS WPCF	180	67	113	0.19	21.47
Average daily reduction in equalized pounds:					**18744.57**
Annual reduction in equalized pounds:					**6,841,768.05**
Project Cost:				$	**31,199,889.00**
Buyer's Cost of a Credit:				$	**4.56**
Seller's Cost of a Credit:				$	**0.509691**

Attachment J

Total Annual Project Cost – 2021			
Project Facilities	**Total Annual Capital Cost from Nitrogen Removal Projects**	**Total Annual O&M Cost from Project Facilities**	**Total Annual Project Cost**
ANSONIA WPCF	$682,019.00	$682,019.00	$682,019.00
BRANFORD WPCF	$277,637.00	$277,637.00	$277,637.00
BRIDGEPORT EAST WPCF	$331,981.00	$331,981.00	$331,981.00
BRIDGEPORT WEST WPCF	$548,414.00	$548,414.00	$548,414.00
BRISTOL WPCF	$348,014.00	$348,014.00	$348,014.00
CHESHIRE WPCF	$525,553.00	$525,553.00	$525,553.00
DANBURY WPCF	$742,149.00	$742,149.00	$742,149.00
DERBY WPCF	$577,268.00	$577,268.00	$577,268.00
EAST HAMPTON WPCF	$101,567.00	$101,567.00	$101,567.00
EAST HARTFORD WPCF	$548,486.00	$548,486.00	$548,486.00
EAST WINDSOR WPCF	$76,298.00	$76,298.00	$76,298.00
ENFIELD WPCF	$368,702.00	$368,702.00	$368,702.00
FAIRFIELD WPCF	$867,498.00	$867,498.00	$867,498.00
FARMINGTON WPCF	$327,759.00	$327,759.00	$327,759.00
GLASTONBURY WPCF	$393,580.00	$393,580.00	$393,580.00
GREENWICH WPCF	$207,280.00	$207,280.00	$207,280.00
GROTON CITY WPCF	$65,371.00	$65,371.00	$65,371.00
GROTON TOWN WPCF	$362,730.00	$362,730.00	$362,730.00
HARTFORD WPCF	$2,641,234.00	$2,641,234.00	$2,641,234.00
JEWETT CITY WPCF	$158,077.00	$158,077.00	$158,077.00
KILLINGLY WPCF	$197,441.00	$197,441.00	$197,441.00
LEDYARD WPCF	$59,348.00	$59,348.00	$59,348.00
LITCHFIELD WPCF	$93,630.00	$93,630.00	$93,630.00
MANCHESTER WPCF	$607,890.00	$607,890.00	$607,890.00
MATTABASSETT WPCF	$1,795,313.00	$1,795,313.00	$1,795,313.00
MERIDEN WPCF	$2,066,410.00	$2,066,410.00	$2,066,410.00
MILFORD BEAVER BROOK WPCF	$260,994.00	$260,994.00	$260,994.00
MILFORD HOUSATONIC WPCF	$606,796.00	$606,796.00	$606,796.00
MONTVILLE WPCF	$42,962.00	$42,962.00	$42,962.00
NAUGATUCK TREATMENT Co.	$590,033.00	$590,033.00	$590,033.00
NEW CANAAN WPCF	$109,102.00	$109,102.00	$109,102.00
NEW HARTFORD WPCF	$45,935.00	$45,935.00	$45,935.00
NEW HAVEN EAST WPCF	$1,190,501.00	$1,190,501.00	$1,190,501.00
NEW LONDON WPCF	$359,756.00	$359,756.00	$359,756.00
NEW MILFORD WPCF	$400,152.00	$400,152.00	$400,152.00

NEWTOWN WPCF	$80,588.00	$80,588.00	$80,588.00
NORTH HAVEN WPCF	$230,243.00	$230,243.00	$230,243.00
NORWALK WPCF	$346,795.00	$346,795.00	$346,795.00
PLAINVILLE WPCF	$518,540.00	$518,540.00	$518,540.00
PLYMOUTH WPCF	$96,137.00	$96,137.00	$96,137.00
PORTLAND WPCF	$118,509.00	$118,509.00	$118,509.00
PUTNAM WPCF	$69,032.00	$69,032.00	$69,032.00
RIDGEFIELD SOUTH ST. WPCF	$36,862.00	$36,862.00	$36,862.00
ROCKY HILL WPCF	$551,510.00	$551,510.00	$551,510.00
SEYMOUR WPCF	$101,127.00	$101,127.00	$101,127.00
SIMSBURY WPCF	$446,265.00	$446,265.00	$446,265.00
SHELTON WPCF	$286,215.00	$286,215.00	$286,215.00
SOUTHINGTON WPCF	$1,114,807.00	$1,114,807.00	$1,114,807.00
SOUTH WINDSOR WPCF	$432,123.00	$432,123.00	$432,123.00
STAFFORD SPRINGS WPCF	$65,201.00	$65,201.00	$65,201.00
STAMFORD WPCF	$3,413,370.00	$3,413,370.00	$3,413,370.00
STONINGTON MYSTIC WPCF	$121,638.00	$121,638.00	$121,638.00
STRATFORD WPCF	$815,251.00	$815,251.00	$815,251.00
SUFFIELD WPCF	$151,110.00	$151,110.00	$151,110.00
THOMASTON WPCF	$96,403.00	$96,403.00	$96,403.00
TORRINGTON WCPF	$239,999.00	$239,999.00	$239,999.00
UCONN WPCF	$170,057.00	$170,057.00	$170,057.00
WALLINGFORD WPCF	$274,402.00	$274,402.00	$274,402.00
WATERBURY WPCF	$1,545,341.00	$1,545,341.00	$1,545,341.00
WEST HAVEN WPCF	$983,517.00	$983,517.00	$983,517.00
WESTPORT WPCF	$567,232.00	$567,232.00	$567,232.00
WINDHAM WPCF	$266,803.00	$266,803.00	$266,803.00
WINDSOR LOCKS WPCF	$149,288.00	$149,288.00	$149,288.00
WINSTED WPCF	$120,502.00	$120,502.00	$120,502.00
TOTAL	$15,836,977.00	$16,149,770.00	$31,986,747.00

Project Facility: defined as any facility with a fully operational nitrogen removal system of any scale as of January 1st of the trading year.
Nitrogen Removal Project: defined as any alteration to the physical structure of a WPCF specifically constructed to remove nitrogen and financed by Connecticut's Clean Water Fund (CWF) program.

There are no new project facilities in 2021.

Attachment K

Total Annual Project Cost – 2022			
Project Facilities	**Total Annual Capital Cost from Nitrogen Removal Projects**	**Total Annual O&M Cost from Project Facilities**	**Total Annual Project Cost**
ANSONIA WPCF	$465,697.00	$128,676.00	$594,373.00
BRANFORD WPCF	$168,661.00	$127,288.00	$295,949.00
BRIDGEPORT EAST WPCF	$95,092.00	$243,355.00	$338,447.00
BRIDGEPORT WEST WPCF	$107,232.00	$472,761.00	$579,993.00
BRISTOL WPCF	$28,545.00	$174,446.00	$202,991.00
CHESHIRE WPCF	$314,127.00	$324,691.00	$638,818.00
DANBURY WPCF	$155,057.00	$776,189.00	$931,246.00
DERBY WPCF	$0.00	$106,115.00	$106,115.00
EAST HAMPTON WPCF	$0.00	$59,024.00	$59,024.00
EAST HARTFORD WPCF	$73,978.00	$287,943.00	$361,921.00
EAST WINDSOR WPCF	$0.00	$61,522.00	$61,522.00
ENFIELD WPCF	$0.00	$392,802.00	$392,802.00
FAIRFIELD WPCF	$418,727.00	$436,350.00	$855,077.00
FARMINGTON WPCF	$195,484.00	$212,120.00	$407,604.00
GLASTONBURY WPCF	$272,568.00	$84,893.00	$357,461.00
GREENWICH WPCF	$0.00	$207,901.00	$207,901.00
GROTON CITY WPCF	$0.00	$53,205.00	$53,205.00
GROTON TOWN WPCF	$242,100.00	$141,167.00	$383,267.00
HARTFORD WPCF	$1,752,285.00	$729,167.00	$2,481,452.00
JEWETT CITY WPCF	$65,659.00	$92,200.00	$157,859.00
KILLINGLY WPCF	$0.00	$213,757.00	$213,757.00
LEDYARD WPCF	$0.00	$43,744.00	$43,744.00
LITCHFIELD WPCF	$45,829.00	$53,644.00	$99,473.00
MANCHESTER WPCF	$333,911.00	$345,700.00	$679,611.00
MATTABASSETT WPCF	$1,235,054.00	$419,330.00	$1,654,384.00
MERIDEN WPCF	$1,381,784.00	$867,707.00	$2,249,491.00
MILFORD BEAVER BROOK WPCF	$68,543.00	$132,163.00	$200,706.00
MILFORD HOUSATONIC WPCF	$399,082.00	$307,761.00	$706,843.00
MONTVILLE WPCF	$0.00	$42,247.00	$42,247.00
NAUGATUCK TREATMENT Co.	$0.00	$465,631.00	$465,631.00
NEW CANAAN WPCF	$0.00	$127,347.00	$127,347.00
NEW HARTFORD WPCF	$0.00	$50,787.00	$50,787.00
NEW HAVEN EAST WPCF	$478,591.00	$829,970.00	$1,308,561.00
NEW LONDON WPCF	$0.00	$226,405.00	$226,405.00
NEW MILFORD WPCF	$299,782.00	$41,378.00	$341,160.00

NEWTOWN WPCF	$0.00	$98,098.00	$98,098.00
NORTH HAVEN WPCF	$52,930.00	$157,136.00	$210,066.00
NORWALK WPCF	$0.00	$392,941.00	$392,941.00
PLAINVILLE WPCF	$253,448.00	$270,533.00	$523,981.00
PLYMOUTH WPCF	$30,972.00	$40,864.00	$71,836.00
PORTLAND WPCF	$0.00	$58,989.00	$58,989.00
PUTNAM WPCF	$0.00	$68,511.00	$68,511.00
RIDGEFIELD SOUTH ST. WPCF	$0.00	$35,834.00	$35,834.00
ROCKY HILL WPCF	$406,463.00	$174,609.00	$581,072.00
SEYMOUR WPCF	$0.00	$116,735.00	$116,735.00
SHELTON WPCF	$182,428.00	$270,469.00	$452,897.00
SIMSBURY WPCF	$211,063.00	$132,339.00	$343,402.00
SOUTH WINDSOR WPCF	$303,783.00	$106,955.00	$410,738.00
SOUTHINGTON WPCF	$663,190.00	$1,053,236.00	$1,716,426.00
STAFFORD SPRINGS WPCF	$0.00	$88,922.00	$88,922.00
STAMFORD WPCF	$2,185,463.00	$1,249,811.00	$3,435,274.00
STONINGTON MYSTIC WPCF	$0.00	$167,003.00	$167,003.00
STRATFORD WPCF	$429,871.00	$276,951.00	$706,822.00
SUFFIELD WPCF	$0.00	$147,269.00	$147,269.00
THOMASTON WPCF	$0.00	$104,107.00	$104,107.00
TORRINGTON WCPF	$0.00	$335,217.00	$335,217.00
UCONN WPCF	$0.00	$169,274.00	$169,274.00
WALLINGFORD WPCF	$120,828.00	$165,922.00	$286,750.00
WATERBURY WPCF	$0.00	$841,561.00	$841,561.00
WEST HAVEN WPCF	$560,923.00	$252,721.00	$813,644.00
WESTPORT WPCF	$350,705.00	$202,618.00	$553,323.00
WINDHAM WPCF	$69,630.00	$203,718.00	$273,348.00
WINDSOR LOCKS WPCF	$84,200.00	$68,628.00	$152,828.00
WINSTED WPCF	$38,596.00	$127,251.00	$165,847.00
TOTAL	$14,542,281.00	$16,657,608.00	$31,199,889.00

Project Facility: defined as any facility with a fully operational nitrogen removal system of any scale as of January 1st of the trading year.
Nitrogen Removal Project: defined as any alteration to the physical structure of a WPCF specifically constructed to remove nitrogen and financed by Connecticut's Clean Water Fund (CWF) program.

There are no new project facilities in 2022.

Attachment L

Nitrogen Removal Projects Funded by the CWF through 2022				
City or Town	**Total Project Cost**	**Nitrogen Portion Cost**	**First Year on Project Facility List**	**Final Payment Year**
Seymour	$12,045,531	$250,000	1993	2012
East Windsor	$12,287,080	$1,000,000	1996	2015
Fairfield (1)	$1,922,569	$1,922,569	1996	2015
Greenwich	$450,478	$450,478	1996	2015
Milford Beaver Brook (1)	$1,000,000	$1,000,000	1996	2015
Milford Housatonic (1)	$461,173	$461,173	1996	2015
Norwalk (1)	$1,051,989	$1,051,989	1996	2015
Ridgefield	$210,000	$210,000	1996	2015
Stratford (1)	$783,638	$783,638	1996	2015
Univ. of Conn	$12,000,000	$1,058,500	1996	2015
West Haven (1)	$800,845	$800,845	1996	2015
Westport (1)	$553,500	$553,500	1996	2015
Ledyard	$3,607,344	$350,000	1997	2016
New Haven (1)	$7,560,267	$7,560,267	1997	2016
Newtown	$38,758,885	$1,058,000	1997	2016
Stamford (1)	$1,949,000	$1,949,000	1997	2016
Derby	$3,022,053	$747,984	2000	2019
New Canaan	$15,080,040	$1,333,264	2000	2019
Norwalk (2)	$61,446,916	$5,538,000	2000	2019
Waterbury	$119,004,779	$17,365,546	2000	2019
East Hampton	$709,963	$709,963	2001	2020
Thomaston	$10,979,359	$1,327,428	2001	2020
New London	$2,715,937	$2,669,000	2002	2021
Portland	$5,105,240	$1,052,850	2002	2021
Branford	$26,008,587	$3,969,036	2003	2022
Fairfield (2)	$40,492,560	$12,116,595	2003	2022
Windsor Locks	$2,350,805	$1,841,000	2003	2022
Bridgeport East	$2,237,773	$2,237,773	2004	2023
Bridgeport West	$2,523,446	$2,523,446	2004	2023
Bristol	$671,750	$671,750	2004	2023
Enfield	$2,800,000	$2,800,000	2004	2023
Litchfield	$5,740,425	$1,078,477	2004	2023
Jewett City	$14,891,045	$1,545,129	2005	2024
North Haven	$1,245,589	$1,245,589	2006	2025
Stamford (2)	$101,179,065	$59,500,000	2006	2025

Nitrogen Removal Projects Funded by the CWF through 2022				
City or Town	**Total Project Cost**	**Nitrogen Portion Cost**	**First Year on Project Facility List**	**Final Payment Year**
Wallingford	$2,843,389	$2,843,389	2006	2025
Cheshire	$7,392,226	$7,392,226	2007	2026
East Hartford	$1,740,891	$1,740,891	2007	2026
Simsbury	$26,799,491	$4,044,000	2007	2026
Suffield	$1,157,875	$3,370,000	2007	2026
Winsted	$908,270	$908,270	2007	2026
Shelton	$21,104,165	$4,293,000	2008	2027
Westport (2)	$36,295,720	$8,253,000	2008	2027
Hartford (1)	$6,900,000	$6,900,000	2009	2028
Plainville	$24,952,504	$5,964,296	2009	2028
Milford Beaver Brook (2)	$13,504,201	$1,613,000	2010	2029
Milford Housatonic (2)	$40,512,605	$9,391,446	2010	2029
Stratford (2)	$59,019,249	$10,116,000	2010	2029
Danbury	$3,648,894	$3,648,894	2011	2030
Groton Town	$18,309,882	$5,697,248	2011	2030
Meriden	$46,578,035	$32,517,000	2011	2030
New Hartford	$1,003,670	$1,000,000	2011	2030
Southington	$15,606,597	$15,606,597	2011	2030
Glastonbury	$25,230,975	$6,414,240	2012	2031
Ansonia	$45,761,682	$10,959,072	2013	2032
New Milford	$28,391,718	$7,054,657	2013	2032
South Windsor	$35,001,533	$7,148,811	2013	2032
West Haven (2)	$39,951,086	$13,200,000	2013	2032
Windham	$20,100,805	$1,638,583	2013	2032
Hartford (2)	$547,000,000	$74,688,881	2015	2034
Mattabassett	$108,699,555	$29,064,061	2015	2034
Manchester	$48,112,562	$7,857,802	2016	2035
New Haven (2)	$49,132,144	$11,262,508	2016	2035
Plymouth	$1,672,154	$728,845	2016	2035
Rocky Hill	$44,717,763	$9,565,130	2019	2038
Farmington	$57,513,126	$10,986,461	2020	2039
Torrington	$63,976,443	$12,103,100	2023	2042
Southington	$47,952,094	$735,884	2023	2042
Wallingford	$53,818,567	$12,479,160	2023	2042
Totals	**$2,058,957,502**	**$481,919,241**		

Attachment M

To: Connecticut Municipalities with Water Pollution Control Facilities (WPCFs)

From: Katherine S. Dykes, Commissioner, Department of Energy and Environmental Protection
Katherine S. Dykes
Nisha Patel, P.E., Chair, Nitrogen Credit Advisory Board

Date: May 24, 2022

Subject: Revised Value of an Equivalent Nitrogen Credit and Revised Invoice Notification - Purchase or Sale of Equivalent Nitrogen Credits for 2021

The Connecticut Department of Energy and Environmental Protection (Department), working with the Nitrogen Credit Advisory Board, has established a Nitrogen Credit Exchange Program and General Permit to comply with Sections 22a-521 through 22a-527 of the Connecticut General Statutes (The Nitrogen Reduction Program in Connecticut for Long Island Sound).

Under the Nitrogen Credit Exchange Program, on March 9, 2022, the Nitrogen Credit Advisory Board established a draft value for an equivalent nitrogen credit of $4.84 for buyers and a value of $1.160409 for sellers for the calendar year 2021. On March 31, 2022, the Department issued a draft ruling accepting the values for equivalent nitrogen credits and sent draft invoices to all municipalities participating in the Nitrogen Credit Exchange Program. The Department received comments from one WPCF during the fifteen days provided for review of the proposed value of equivalent nitrogen credits. Upon review of those comments, it was determined that such WPCF incorrectly entered data which was subsequently used to determine credit cost and generate draft invoices. The data has now been corrected and credit prices have changed accordingly. The price of nitrogen credit for buyers remains at $4.84 as the affected WPCF is not a Project Facility. However, for sellers, the credit value is affected since less money is now being collected from buyers. The value of a credit for sellers is now $1.0886935 instead of $1.160409, a change of about 6%.

On May 9, 2022, the DEEP in conjunction with Nitrogen Credit Advisory Board approved revised values of nitrogen credits of $4.84 for buyers and $1.0886935 for sellers.

If your WPCF discharged more nitrogen than allowed by its NGP limit, the Exchange Program will require payment by check, money order, or other form of payment acceptable to the Treasurer in the full amount listed on the final invoice no later than July 31, 2022. If your WPCF performed better than its NGP limit, the Exchange Program will issue a check for the full amount shown on the final invoice to the Water Pollution Control Authority of the municipality on or after August 15, 2022.

Enclosed with this notice is the municipality's final invoice and a table that lists the facilities that will be buying and selling nitrogen credits under the Exchange Program for the calendar year 2021. Should you have any questions please contact Ms. Iliana Raffa of the Department's Water Protection and Land Reuse Bureau at 860- 424-3758 or via email at iliana.raffa@ct.gov

Attachment N

Connecticut
Department of Energy &
Environmental Protection

portal.ct.gov/DEEP

To: Connecticut Municipalities with Water Pollution Control Facilities (WPCFs)

From: Tracy Babbidge, Acting Deputy Commissioner, Environmental Quality Branch, Department of Energy and Environmental Protection

Nisha Patel, P.E., Chair, Nitrogen Credit Advisory Board

Date: June 9, 2023

Subject: Final Value of an Equivalent Nitrogen Credit and Invoice Notification - Purchase or Sale of Equivalent Nitrogen Credits for CY2022

The Connecticut Department of Energy and Environmental Protection (the Department), in conjunction with the Nitrogen Credit Advisory Board, has established a Nitrogen Credit Exchange Program and General Permit to comply with Sections 22a-521 through 22a-527 of the CT General Statutes, and has issued the General Permit for Nitrogen Discharges (NGP) to assist with the implementation of the Total Maximum Daily Load (TMDL) for Nitrogen in Long Island Sound.

Under the Nitrogen Credit Exchange Program, on March 10, 2023, the Nitrogen Credit Advisory Board established a **draft value for an equivalent nitrogen credit of $4.56 for buyers, and a value of $0.509691 for sellers for the calendar year 2022**. On March 30, 2023, the Department issued a draft ruling accepting the values for equivalent nitrogen credits and sent draft invoices to all municipalities participating in the Nitrogen Credit Exchange Program. The Department didn't receive any comments; therefore the cost of nitrogen credit is considered final.

If a Water Pollution Control Facility (WPCF) discharged more nitrogen than allowed by its NGP limit, the Exchange Program will require payment by check, or money order to the Office of the State Treasurer in the full amount listed on the final invoice no later than July 31, 2023, or alternatively, the WPCF will have the option to submit the payment electronically via an Automatic Clearing House (ACH) system. The information of how to make the electronic payment is included in the invoice. If the WPCF performed better than its NGP limit, the Exchange Program will issue a check for the full amount shown on the final invoice to the Water Pollution Control Authority of the pertinent municipality on or after August 15, 2023.

Enclosed with this memo is a sample of a municipality's final invoice, and a table that lists the facilities that will be buying and selling nitrogen credits under the Exchange Program for the calendar year 2022. Should you have any questions on this information, please contact Iliana Raffa of my staff at 860- 424-3758 or via email at iliana.raffa@ct.gov.

79 Elm Street
Hartford, CT 06106-5127
860.424.3000

Attachment O

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

General Permit for Nitrogen Discharges

Effective Date: January 1, 2019
Expiration Date: December 31, 2023

Bureau of Water Protection and Land Reuse
Water Planning and Management Division
860-424-3704

General Permit for Nitrogen Discharges

Table of Contents

General Permit for Nitrogen Discharges

Section 1. Authority

This general permit is issued under the authority of *Sections 22a-521 through 527 and Chapter 446k* of the Connecticut General Statutes (CGS).

Section 2. Definitions

As used in this general permit, and as defined or modified from Section *22a-521 of the CGS:*

"Annual mass loading of total nitrogen" (expressed in pounds per day) means the sum of monthly mass loading of total nitrogen for each month from January through December divided by 12 and rounded to the nearest whole number.

"*Authorized activity"* means any activity authorized by this general permit.

"CFR" means Code of Federal Regulations.

"*Commissioner"* means Commissioner of the Department of Energy and Environmental Protection as defined by Section 22a-2(b) of the CGS.

"Daily composite" means a composite sample taken over a full operating day consisting of grab samples collected at equal intervals of no more than sixty (60) minutes and combined proportionally to flow; or, a composite sample continuously collected over a full operating day proportional to flow.

"Daily mass loading of total nitrogen" (expressed in pounds per day) means the total nitrogen concentration (expressed in mg/L to the nearest 0.1 mg/L) multiplied by the daily flow volume (expressed as MGD, to the nearest 0.1 MGD for facilities with a design capacity of 1.0 MGD or greater and to the nearest 0.01 MGD for facilities with a design capacity of less than 1.0 MGD) multiplied by 8.34 and rounded to the nearest whole number to convert to pounds per day units.

"Department" means the Department of Energy and Environmental Protection.

"Discharge Monitoring Report" or *"DMR*" means a report form provided or approved by the Commissioner for use by a permittee to submit discharge monitoring data to the Department relating to compliance with limits and conditions established in the individual permit for a facility.

"Equivalency factor" means a ratio of the unit response of dissolved oxygen to nitrogen in Long Island Sound for each POTW based on the geographic location of the specific POTW's discharge point divided by the unit response of the geographic area with the highest impact.

"Equivalent nitrogen credit" means a nitrogen credit multiplied by the equivalency factor.

"Individual permit" means a permit issued to a named permittee under Section 22a-430-4 of the Regulations of Connecticut State Agencies (RCSA).

"Monthly mass loading of total nitrogen" (expressed in pounds per day) means the sum of the daily mass loading of total nitrogen for each monitored day during the month divided by the number of monitoring days during the month and rounded to the nearest whole number.

"Monthly Operating Report" or *"MOR"* means a report form provided or approved by the Commissioner for use by a permittee in submitting data to the Department related to the operation of a facility.

"Municipality" means municipality as defined by Section 22a-423 of the CGS.

"Nitrogen Analysis Report" or *"NAR"* means a report form provided or approved by the Commissioner for use by a permittee in submitting monitoring data to the Department related to the discharge of nitrogen from a facility.

"Nitrogen credit" means the difference between the annual mass loading of total nitrogen specified for a POTW in the general permit for treated nitrogen discharges and the monitored annual mass loading of total nitrogen discharged by that POTW expressed as pounds of nitrogen per day.

"Nitrogen credit exchange program" means the program within the Department established pursuant to *Section 22a-524 of the CGS.*.

"Nitrogen Wasteload Allocation" means a total load of nitrogen assigned to a discharger expressed in pounds per day of total nitrogen discharged.

"Permittee" means a municipality or person discharging nitrogen as authorized by the general permit.

"Person" means person as defined by Section 22a-423 of the CGS.

"Publicly Owned Treatment Works" or *"POTW"* means a system used for the collection, treatment or disposal of sewage from one or more parcels of land and that discharges to the waters of the state and is owned by a municipality of the state.

"TMDL" means the Total Maximum Daily Load analysis to achieve water quality standards for dissolved oxygen in Long Island Sound as established by the Department and as approved by the United States Environmental Protection Agency on April 3, 2001.

"Total nitrogen" means the total of the concentrations of ammonia nitrogen, organic nitrogen, nitrite nitrogen, and nitrate nitrogen expressed as milligrams of nitrogen per liter.

Section 3. Authorization Under This General Permit

(a) Eligible Activities or Discharges

This general permit authorizes the discharge of total nitrogen from the POTWs listed in Appendix 1, provided the activities are conducted in accordance with this general permit.

This general permit does not authorize any discharge of water, substance or material into the waters of the state other than the one specified in this section. Any person or municipality which initiates, creates, originates or maintains such a discharge must first apply for and obtain authorization under Section 22a-430 of the CGS.

(b) Geographic Area

This general permit applies throughout the State of Connecticut.

(c) Effective Date and Expiration Date of this General Permit

This general permit is effective on *January 1, 2019 and expires on December 31, 2023.*

(d) Effective Date of Authorization

An activity is authorized by this general permit on the date the general permit is issued.

Section 4. Conditions of this General Permit

A permittee shall conduct activities authorized by this general permit in accordance with the following conditions:

(a) *Discharge Limits*

(1) Annual discharge limit applicable to each POTW are set forth in Appendix 1, which is incorporated herein in its entirety, as part of this general permit.

(2) Each permittee shall limit the discharge of nitrogen to the annual discharge limits set forth in Appendix 1, except as set forth in paragraph (b)(1)(b) of this Section.

(b) *Compliance During Term of Permit*

(1) A permittee shall be in compliance with this general permit if:

(a) the POTW's annual mass loading of total nitrogen is less than or equal to the discharge limit set forth in Appendix 1; or,

(b) the permittee has secured state-owned equivalent nitrogen credits equal to the amount the POTW exceeded the annual discharge limit set forth in Appendix 1 in accordance with the Nitrogen Credit Exchange Program and Sections 22a-521 through 527 of the CGS.

(2) A permittee shall be out of compliance with the general permit and subject to the enforcement provisions of Chapter 446k of the CGS if:

(a) the POTW's annual mass loading of total nitrogen is greater than the discharge limit set forth in Appendix 1; and

(b) the permittee fails to secure sufficient state-owned equivalent nitrogen credits in a timely manner in accordance with the Nitrogen Credit Exchange Program and Sections 22a-521 through 527 of the CGS.

(c) Operation of Nitrogen Removal Process Equipment

The permittee shall not bypass or fail to operate any of the approved nitrogen removal equipment or processes without the written approval of the Commissioner. The permittee shall operate all necessary equipment to optimize nitrogen removal so as to reduce nitrogen discharges to the maximum extent practicable. This includes but is not limited to all recycle pumping systems, aeration equipment, aeration tank cycling, mixing equipment, anoxic basins, chemical feed systems or any other process equipment necessary for the optimal removal of nitrogen.

(d) Monitoring Requirements

(1) Effective upon issuance of this general permit, the permittee shall monitor total nitrogen in the final effluent in accordance with the following frequency:

(a) POTWs with a design flow rate specified in the individual permit for the facility of less than 10 MGD shall monitor the final effluent at a minimum frequency of weekly.

(b) POTWs with a design flow rate specified in the individual permit for the facility equal to or greater than 10 MGD shall monitor the final effluent at a minimum frequency of twice per week.

(2) Monitoring requirements shall commence on *January 1st 2019.*

(3) Final effluent and monitoring location shall be identical to that used to determine compliance with final effluent limitations and monitoring conditions established in the individual permit for the facility.

(4) All samples analyzed to determine compliance with limits on total nitrogen shall be daily composite samples unless otherwise approved in writing by the Commissioner.

(5) Chemical analyses to determine compliance with effluent limits and conditions established in this general permit shall be performed using the methods approved in or pursuant to 40 CFR 136 unless an alternative method has been approved in writing pursuant to 40 CFR 136.4.

(6) The permittee shall measure the total daily flow of wastewater received by the facility at the main flow meter as set forth in the individual permit for the facility.

(7) In the event of a flow meter malfunction on a day when a sample for total nitrogen analysis is collected, the permittee shall utilize the arithmetic average of the 7 highest daily flows measured during the previous 30-day period to calculate the total daily nitrogen loading unless an alternative procedure has been agreed to by the Commissioner.

(e) Reporting Requirements

The results of chemical analyses for the total nitrogen in all samples collected during the month and the total daily flow effluent for each day during the month shall be entered on the MOR and NAR and reported to the Department. Results must also be entered in the DMR as a calculated monthly mass loading of total nitrogen. The MOR, NAR and DMR must be received at the following address by the 15th day of the month following the month samples are collected.

ATTN: Municipal Wastewater Unit
Connecticut Department of Energy and Environmental Protection
Bureau of Water Protection and Land Reuse
79 Elm Street
Hartford, CT 06106-5127

(f) *Record Keeping Requirements*

The permittee shall retain copies of all reports required by this general permit, and records of all data used to compile these reports for a period of at least five years from the date of the report submission to the Department.

(g) *Duty to Correct and Report Violations*

Upon learning of a violation of a condition of this general permit, including any failure of flow monitoring equipment, the permittee shall immediately take all reasonable action to determine the cause of such violation, correct such violation and mitigate its results, prevent further such violation, and report in writing such violation and such corrective action to the Commissioner within five (5) days of the permittee learning of such violation. Such report shall be certified in accordance with subsection 4(i) of this general permit.

(h) Duty to Provide Information

If the Commissioner requests any information pertinent to the authorized activity or to ensure compliance with this general permit, the permittee shall provide such information in writing within thirty (30) days of such request. Such information shall be certified in accordance with subsection 4(i) of this general permit.

(i) Certification of Documents

Any document, including but not limited to any notice, which is submitted to the Commissioner under this general permit shall be signed by, as applicable, the permittee in accordance with Section 22a-430-3(b)(2) of the RCSA, and by the individual or individuals responsible for actually preparing such document, each of whom shall certify in writing as follows:

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in the submitted information may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute."

(j) Date of Filing

For purposes of this general permit, the date of filing with the Commissioner of any document is the date such document is received by the Commissioner. The word "day" as used in this general permit means the calendar day; if any date specified in the general permit falls on a Saturday, Sunday, or legal holiday, such deadline shall be the next business day thereafter.

(k) False Statements

(k) False Statements

Any false statement in any information submitted pursuant to this general permit may be punishable as a criminal offense, in accordance with Section 22a-6 and under Section 53a-157b of the CGS.

(l) Correction of Inaccuracies

Within fifteen days after the date a permittee becomes aware of a change in any information in any material submitted pursuant to this general permit, or becomes aware that any such information is inaccurate or misleading or that any relevant information has been omitted, such permittee shall correct the inaccurate or misleading information or supply the omitted information in writing to the Commissioner. Such information shall be certified in accordance with subsection 4(i) of this general permit.

(m) *Other Applicable Law*

Nothing in this general permit shall relieve the permittee of the obligation to comply with any applicable federal, state and local law, including but not limited to the obligation to obtain and comply with any authorizations required by such law. In the event a POTW is subject to a more stringent nitrogen limitation than set forth in this general permit, the Permittee shall comply with that more stringent limitation and may not purchase or transfer nitrogen credits to comply with that additional limitation.

(n) *Other Rights*

This general permit is subject to and does not derogate any present or future rights or powers of the State of Connecticut and conveys no rights in real or personal property nor any exclusive privileges, and is subject to all public and private rights and to any federal, state, and local laws pertinent to the property or activity affected by such general permit. In conducting any discharge authorized hereunder, the permittee may not cause pollution, impairment, or destruction of the air, water, or other natural resources of the state.

Section 5. Commissioner's Powers

(a) Abatement of Violations

The Commissioner may take any action provided by law to abate a violation of this general permit, including the commencement of proceedings to collect penalties for such violation. The Commissioner may, by summary proceedings or otherwise and for any reason provided by law, including violation of this general permit, revoke a permittee's authorization hereunder in accordance with Sections 22a-3a-2 through 22a-3a-6, inclusive, of the RCSA. Nothing herein shall be construed to affect any remedy available to the Commissioner by law.

(b) General Permit Revocation, Suspension, or Modification

The Commissioner may, for any reason provided by law, by summary proceedings or otherwise, revoke or suspend this general permit or modify it to establish any appropriate conditions, schedules of compliance, or other provisions which may be necessary to protect human health or the environment or to implement the TMDL.

Issued: October 5, 2018

Robert E. Kaliszewski
Deputy Commissioner

APPENDIX 1

ANNUAL DISCHARGE LIMITS FOR TOTAL NITROGEN

Zone	Publicly Owned Treatment Works	Equivalency Factor	Total Nitrogen (Pounds/Day) 2019-2023
1	JEWETT CITY WPCF	0.17	15
1	GROTON CITY WPCF	0.18	99
1	GROTON TOWN WPCF	0.18	153
1	KILLINGLY WPCF	0.14	131
1	LEDYARD WPC	0.18	7
1	MONTVILLE WPCF	0.18	118
1	NEW LONDON WPCF	0.18	386
1	NORWICH WPCF	0.18	201
1	STONINGTON PAWCATUCK WPCF	0.17	24
1	PLAINFIELD NORTH WPCF	0.14	34
1	PLAINFIELD VILLAGE WPCF	0.14	24
1	PUTNAM WPCF	0.14	53
1	SPRAGUE WPCF	0.16	7
1	STAFFORD SPRINGS WPCF	0.15	60
1	STONINGTON BOROUGH WPCF	0.18	14
1	STONINGTON MYSTIC WPCF	0.18	27
1	THOMPSON WPCF	0.14	10
1	UCONN WPCF	0.15	44
1	WINDHAM WPCF	0.15	125
2	BRISTOL WPCF	0.18	398
2	CANTON WPCF	0.18	24
2	EAST HAMPTON WPCF	0.20	54
2	EAST HARTFORD WPCF	0.19	292
2	EAST WINDSOR WPCF	0.19	59
2	ENFIELD WPCF	0.19	278
2	FARMINGTON WPCF	0.18	178
2	GLASTONBURY WPCF	0.20	98
2	HARTFORD WPCF	0.20	2377
2	MANCHESTER WPCF	0.19	312
2	MATTABASSET WPCF[1]	0.20	834
2	MIDDLETOWN WPCF[1]	0.20	222
2	NEW HARTFORD	0.18	3
2	PLAINVILLE WPCF	0.18	101
2	PLYMOUTH WPCF	0.18	42
2	WINDSOR POQUONOCK WPCF	0.19	98
2	PORTLAND WPCF	0.20	31

Zone	Publicly Owned Treatment Works	Equivalency Factor	Total Nitrogen (Pounds/Day) 2019-2023
5	WESTPORT WPCF	0.85	87
6	GREENWICH WPCF	1.00	479
6	NEW CANAAN WPCF	1.00	64
6	NORWALK WPCF	1.00	718
6	RIDGEFIELD SOUTH ST. WPCF	1.00	29
6	STAMFORD WPCF	1.00	926

(1) The annual discharge limit for total nitrogen for the Mattabasset WPCF will be increased from 834 pounds/day to 1056 pounds/day. This increase will occur when the Middletown WPCF is abandoned and all of Middletown's flow is conveyed to the Mattabasset WPCF.