

A. Program Management and Information/Data Quality Objectives

A1. Title Page

Quality Assurance Project Plan

for

Chesapeake Bay Point Source Data Collection

Prepared for:

Delaware Department of Natural Resources and Environmental Control
Division of Watershed Stewardship
Watershed Assessment and Management Section
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A2. Approval Page**Concurrence****Project/Operations Manager/Author**

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Note: This approval action represents EPA's determination that the document(s) under review comply with applicable requirements of the EPA Region 3 Quality Management Plan [<https://www.epa.gov/sites/production/files/2020-06/documents/r3qmp-final-r3-signatures-2020.pdf>] and other applicable requirements in EPA quality regulations and policies [<https://www.epa.gov/quality>]. This approval action does not represent EPA's verification of the accuracy or completeness of document(s) under review and is not intended to constitute EPA direction of work by contractors, grantees or subgrantees, or other non-EPA parties.

A3. Table of Contents, Document Format, and Document Control

Document Format

This Quality Assurance Project Plan (QAPP) was developed in accordance with the U.S. EPA Quality Assurance Project Plan Standard. The order of the elements in this QAPP follows the Standard, as seen in the Table of Contents. The QAPP is also in accordance with the U.S. EPA Region 3 Quality Management Plan, DCN R3QMP001-20200601.

Document Control

This table shows changes to this controlled document over time. The most recent version is presented in the top row of the table. Previous versions of the document are maintained by Quality Manager.

Document Control Number	History/ Changes	Effective Date
240359	Updated the format of the document to follow the USEPA Quality Assurance Project Plan Standard.	9/3/2024
22072	Provided updates to 2023 Process. Removed Bridgeville WWTP, which no longer discharges. Updated format of document.	9/1/2023
220072	Provided updates to 2023 Process, responded to comments from EPA staff on previous draft. Updated format of document.	12/1/2022

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ACRONYMS AND ABBREVIATIONS

CBP	Chesapeake Bay Program
CBPO	Chesapeake Bay Program Office
DMR	Discharge Monitoring Report
DNREC	Delaware Department of Natural Resources and Environmental Control
DQO	data quality objectives
DWS	Division of Watershed Stewardship
eDMR	Electronic Discharge Monitoring Report
EPA	Environmental Protection Agency
ICIS	Integrated Compliance Information System
NEIEN	National Environmental Information Exchange Network
NPDES	National Pollutant Discharge Elimination System
NWIS	National Water Information System
PARCC	precision, accuracy, representativeness, completeness and comparability
PCS	Permit Compliance System
PM	Project Manager
QA	quality assurance
QAM	Quality Assurance Manager
QAO	Quality Assurance Officer
QAPP	quality assurance project plan
QC	quality control
QCO	Quality Control Officer
QNCR	Quarterly Non-compliance Reports
SOP	standard operating procedure
STORET	EPA Storage and retrieval warehouse
TMDL	total maximum daily load
TRI	Toxics Release Inventory
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
WIP	watershed implementation plan
WWTP	wastewater treatment plant

A4. Project Purpose, Problem Definition, and Background

Purpose and Problem Definition

The purpose of this Quality Assurance Project Plan (QAPP) is to describe the quality system that data generators and Delaware's Department of Natural Resources and Environmental Control (DNREC) users will implement to collect, compile, and harmonize discharge monitoring data and report it electronically to the Chesapeake Bay Program Office (CBPO). Data reported are used by the U.S. Environmental Protection Agency's (EPA's) CBP staff to assess and evaluate performance of the Chesapeake Bay Watershed Implementation Plan (WIP).

On December 29, 2010, the EPA established the Chesapeake Bay Total Maximum Daily Load (TMDL), which includes accountability features to guide actions to restore clean water in the Chesapeake Bay and the region's streams, creeks and rivers.

Despite extensive restoration efforts during the prior 25 years, the TMDL was prompted by insufficient progress and poor water quality in the Chesapeake Bay and its tidal tributaries. The TMDL is the largest ever developed by EPA, encompassing a 64,000-square-mile watershed. The TMDL identifies the necessary pollution reductions from major sources of nitrogen, phosphorus and sediment across the bay jurisdictions and sets pollution limits necessary to meet water quality standards. Bay jurisdictions include Delaware, Maryland, New York, Pennsylvania, Virginia, West Virginia and the District of Columbia.

WIPs were developed to assist local agencies toward their compliance with TMDL load and wasteload allocations. The Chesapeake Bay WIPs are described at

<https://www.epa.gov/chesapeake-bay-tmdl/chesapeake-bay-watershed-implementation-plans-wips>.

WIPs include clear and measurable objectives with regard to their pollution prevention and restoration activities. The WIPs include interim goals toward attainment of TMDL allowable loads (loading capacity), wasteload allocations (WLAs; for point sources) and load allocations (Las; for nonpoint sources). Annually the CBP prepares a report on WIP progress including adherence to schedule, issues impacting schedule or resource limitations, and environmental results and performance of management measures. To facilitate the CBP annual report on watershed implementation, monitoring results for DNREC's National Pollutant Discharge Elimination System (NPDES) permitted dischargers will be used to assess progress toward pollutant load reductions. DNREC will access available discharge characterization data, and other information (primarily electronic Discharge Monitoring Reports [eDMRs]), review them for completeness and apparent quality, and prepare files in a format that is compatible with EPA's models and analytical tools.

This QAPP includes data quality objectives (DQOs) and quality control (QC) procedures to ensure that the final product satisfies the Bay grant guidance requirements. This QAPP also addresses the collection and assessment of secondary data (data collected for another purpose or collected by an organization or organizations not under the scope of this QAPP). It is anticipated that secondary data will be collected almost exclusively from permittee eDMR submissions.

Background

This QAPP is intended to cover only point source data collection from Industrial and Municipal facilities along the Chesapeake Bay watershed in Delaware. Data are collected by the permitted facilities or authorized contracted laboratories that use methods approved at 40 CFR Part 136 and participate in EPA's Discharge Monitoring Report - Quality Assurance (DMR-QA) proficiency testing program. Discharge monitoring data are reported to an information system in accordance with the requirements of 7 Del. C. 1953, § 6014, regulatory and compliance information, facility performance and public information. Currently, data are reported electronically using the eDMR online results system, which are then reformatted as appropriate for data exchange to EPA Region 3 Chesapeake Bay Program Office.

Other QA Documents

Table A4-1 contains a list of all related QA documents.

Table A4-1. Other QA Planning Documents that have Relevant Requirements

Document Title	Directive #, DCN, or Revision	Effective Date	Pertinence to this QAPP
U.S. EPA Quality Assurance Plan Standard	Directive No: CIO 2105-S-02.1	July 18, 2023	QAPP developed in accordance with
U.S. EPA Region 3 Quality Management Plan	R3QMP001-2020061	June 1, 2020	QAPP developed in accordance with
U.S. EPA Guidance for Quality Assurance Project Plans EPA QA/G-5	EPA/240/R-02/009	December 2002	QAPP developed in accordance with
NRMRL QAPP Requirements for Secondary Data Projects		October 2008	QAPP developed in accordance with
Guidance on Systematic Planning Using the Data Quality Objectives Process EPA QA/G-4	EPA/240/B-06/001	February 2006	QAPP developed in accordance with
Chesapeake Bay Program Wastewater Facility and BMP Implementation Data Submission Specifications and Requirements	Attachment 7 of CBP Grant Guidance	December 2022	QAPP developed in accordance with

A5. Project Task Description

This QAPP addresses the steps DNREC will take to identify and access NPDES permitted discharge monitoring data from four permitted point source discharges in the Chesapeake Bay watershed (Table A5-1); review them for completeness and apparent representativeness; and harmonize or reformat the data as necessary to ensure data integrity in the exchange or transfer of data to CBPO. The boundaries of the data collection focus on the four NPDES permitted discharges to the Nanticoke River.

This QAPP previously addressed five permitted point sources in the watershed; however, the Bridgeville Wastewater Treatment Plant (WWTP) has since terminated its NPDES discharge. The Bridgeville facility has been taken offline and directs its wastewater to the city of Seaford's WWTP where the effluent is treated at a higher level before being discharged to the Nanticoke River.

DNREC's point source data collection focuses on collecting data from the four permitted industrial and municipal facilities (three significant and one insignificant) currently located in the Chesapeake Bay watershed. The data are collected through each facility's submission of eDMRs as required by their permit. eDMRs are reports that provide analytical results of chemicals and nutrients being discharged by NPDES permitted facilities (point sources) into the waterways of Delaware. The data undergo rigorous quality assurance checks before being uploaded into DNREC's online reporting eDMR system (Delaware Environmental Navigator [DEN]) and uploaded into EPA's Integrated Compliance Information System (ICIS).

Annually, the point-source data are compiled into a report to be used by the EPA's CBP in Chesapeake Bay modeling assessment to track the environmental impact upon bay waters. The Chesapeake Bay Program Grant Guidance requires a QAPP for the collection and use of environmental data. A QAPP documents the procedure for obtaining thorough, correct data to ensure consistency from year to year.

Table A5-1. Permitted Point Source Discharges and Identifying Information

Facility Name	NPDES Permit Number	Federal Registry ID Number	DNREC ID Number
City of Seaford Wastewater Treatment Facility	DE0020265	110039821271	WPCC 3161F/74
Town of Laurel Wastewater Treatment Plant	DE0020125	110012890354	WPCC 3165F/74
INV Performance Materials, LLC (Formerly Invista S.A.R.L.)	DE0000035	110064631849	WPCC 3223E/74
Mobile Gardens Trailer Park	DE 0050725	110010052646	WPCC 3014F/77

This task does not require environmental measurement or generation of laboratory data but involves the use of primary and secondary data generated by permittees. Data quality used are anticipated to be consistent with EPA's competency policy, produced by authorized permittees and suitably accredited laboratories using methods approved for use at 40 CFR Part 136. Thus, unless there are observations or other compelling reasons not to believe that the data are scientifically valid, chemical, physical, and biological monitoring data collected under an accepted sampling and analysis plan, including quality control, quality assurance procedures, data will be converted, reformatted, or harmonized (e.g., units of measure) to achieve compatibility with CPBO. All data manipulation or handling necessary to 'harmonize' the datasets for supplemental analyses must be documented and retained in electronic metadata records and project files. No original DMR files will be overwritten or directly revised, but staff may make copies of files as appropriate and include the date in the filename to reinforce version control.

A6. Information/Data Quality Objectives and Performance/Acceptance Criteria

This task entails collecting, compiling, assessing and summarizing permitted discharge monitoring data and analytical results, and formatting or repackaging data and information to ensure its compatibility with CBPO technical specifications, completeness for its use in annual report development, and its availability to other exchange partners. No original DMR data collection has been specified. Accordingly, the most relevant QA procedure for this project is professional review of available information, analyses, and written work products.

The basic requirements of this project are that DNREC must ensure that the analyses performed and subsequent interpretations under this task are quality products that are based on sound scientific principles, and that any revisions and updates are reproducible and transparent. The analyses provided will be logical, consistent, and defensible.

Since the task does not include the development or application of a mechanistic model and does not involve sampling/primary data collection, this QAPP follows an abbreviated format and does not describe modeling-related activities but relies more on the guidance described in EPA's *QAPP Requirements for Secondary Data Projects* (USEPA 2008). If DNREC, in response to EPA CBP technical direction or grant amendment, requests support that entails additional environmental data operations, or if revisions to the QAPP are required to describe environmental data operations not included in this plan, DNREC will prepare any required updates or amendments and provide to EPA for review and approval prior to performing any environmental data operations identified. The approved attachments or amendments will be distributed by the DNREC PM and EPA CBP QA Officer. Distribution of approved updates or plan revisions (approved by the same persons as the original plan) must include all persons identified in the distribution list in addition to signatory staff, and any other technical staff assigned to support the project.

Data Quality Objectives

The basic requirements of this project are that DNREC must ensure capture of all available

characterization data for point source discharges within the Chesapeake Bay watershed, and that those data are efficiently compiled and translated as necessary to make them available to EPA's CBP staff. DNREC will describe QA compliance in the final deliverables, including any gaps or limitations in the available data. DNREC will communicate the level of QA/QC review associated with each data transfer in metadata records describing the transformed dataset.

The Data Quality Objectives (DQO) process describes the technical planning for a specific project or task in the context of the problem being addressed, the study questions to be answered, the decisions to be made, the information and resources required to inform management decisions, and the tolerance for error (importance of the decision in terms of risk). EPA has recommended published guidance on technical project planning using the DQO process as described in EPA's *Guidance on Systematic Planning Using the Data Quality Objectives Process QA/G-4* (USEPA 2006). The seven step DQO process is loosely applied to the current approach, as the full DQO process includes development of sampling design and technical specifications, which is not necessary for this task. The current task is to access available discharge monitoring data and prepare it for its transfer to CBPO for EPA's use in annual reporting on the watershed implementation plan.

The data quality objectives and criteria specific to this project have been updated in 2022 and are described in Attachment 7 of the Chesapeake Bay Program Grant Guidance "Chesapeake Bay Program Wastewater Facility and BMP Implementation Data Submission Specifications and Requirements." The document includes established data submission requirements that meet the communications and management needs of the Chesapeake Bay Program. DNREC will use the CBP's Point Source Data Submission Application to submit wastewater facility DMR data from the four facilities in the Chesapeake Bay Watershed. The guidelines require submission of spray irrigation, biosolids, large onsite septic, and rapid infiltration basin (RIBs) data using the Point Source Data Submission Application, however, permits for large onsite septic systems do not require sampling of the effluent. Where available, previous year data for these inputs should be used in accordance with CBP protocol. Beginning with 2023 progress, DNREC submitted available data for spray irrigation, biosolids, large onsite septic, and RIBs. The submissions for large onsite septic, however, do not include TN data for the reason stated above. A default value for TN concentration is therefore used to calculate loads.

Updated data submissions for monthly concentration and flow data for all parameters for each discharger facility will be submitted. Data for the following parameters will be submitted: average monthly flows and average monthly concentrations of NH₃, TKN, NO₂3 (or NO₂+NO₃), TN, PO₄, TP, BOD₅, DO and TSS. All nitrogen species will be reported as nitrogen and phosphorus species as phosphorus. DNREC will go through the Application's QA/QC procedures prior to data submission. For any missing concentration data, DNREC will submit the CBP Water Quality Goal Implementation Team's Wastewater Treatment Workgroup agreed to default concentration data or calculated data based on the species relationship listed in Appendix B. All default or calculated data will be flagged with appropriate descriptions. DNREC will update the facility list annually and identify newly added or removed facilities in the annual data report. The location (county, latitude/longitude) of discharge point, significant or non-significant,

facility type (municipal or industrial), ownership (federal or non-federal) and design flow (MGD) will be reported for newly added facilities.

Performance and Acceptance Criteria

DNREC will implement quality control checks, procedures, and metrics described in Sections A6 and B3 for routine data collections from external electronic databases or hard copy reports. DNREC will determine in consultation with the EPA CBP staff whether additional acceptance criteria should be applied to existing data sources. Additional acceptance criteria for information in these sources could include specific spatial requirements and temporal limits for specific measurement parameters, or specific parameter selection to provide consistency in the evaluation (e.g., flow data). For example, information from monitoring studies in the watershed might be acceptable for assessing or verifying water quality if collected from a particular geographic location where no discharge data have been collected. Non-discharge characterization data are outside the scope of this plan, but they may be useful if discharge monitoring data are not available, or if there are apparent gaps in discharge characterization.

Relevance to the task— DNREC is primarily concerned in this project with compiling, evaluating, analyzing, and summarizing flow, nutrient and sediment water quality characterization data in permitted point source discharges to facilitate EPA's analyses comparing current conditions to prevailing standards and implementation plan goals, to assess the progress of program implementation relative to the schedule and goals of the WIP, to assess the performance of control measures and management practices, and to estimate load reductions as an indicator of plan effectiveness.

Representative of the areas and times of interest—for this task, no supplemental data are prescribed other than for discharge characterization. However, if required, DNREC may require inclusion of supplemental data to address a specific need. DNREC will only include data collected under a documented quality program and for which data quality or limitations are documented or can be determined. Depending on the availability of additional data, results from the most recent collections with the least geographical disparity will be considered. EPA will render final decisions as to the appropriateness of any external data available based on spatial (how close to the permittee's discharge) and temporal coverage (how long ago).

Individual observations: anomalous or extreme outliers—Individual data values might be in error because of transcription errors or equipment malfunctions. If the error results in an anomalous or unrealistic value, it can be detected and excluded from analysis. In consultation with EPA CBP staff, DNREC will examine the data for anomalous values and reject values reported well beyond the range of observed variability. Following discussions with EPA, DNREC will report on data gaps including documenting the number of exclusions, if any, the source of the data excluded, and the rationale for exclusion (and cause of the error if it is apparent). This documentation will be retained with project data files used in analysis. Currently, wastewater data are submitted via CBP's Point Source data submission application. The application pulls data from EPA's ICIS database which originates from electronic discharge monitoring reports (eDMRs) submitted by facilities (permittees). eDMRs undergo QA/QC before being uploaded to ICIS. Additionally, the Point Source data application includes checks which flag data points that

are out of range for further validation (involves checking with our Compliance & Enforcement staff or respective facilities if necessary).

DNREC will not be conducting the primary analyses performed with the data collected and prepared for exchange under this plan. Reports from EPA's modeling and analysis tools will include documentation of the methodology(ies) and assumptions used in the analyses and may also include sensitivity analyses. For the purposes of this data collection and management task, tolerance limits only placed on data handling, formatting, and transfer are appropriate. The exact tolerance limits that are appropriate to this project depend in part on the quantity and quality of available water quality and flow information from the dischargers, and any potential variability or limitations of EPA's modeling or analytical tools. To guide the technical information provided by the analysis, general acceptance criteria and procedures for secondary data quality are described in Section B7 of this QAPP.

Data Quality Indicators

Datasets will be reviewed relative to the general PARCC quality characteristics of the data provided or available for download, in accordance with EPA's *Guidance for Quality Assurance Project Plans EPA QA/G-5* (USEPA 2002). These attributes are described below.

Precision

Precision of data reported in published databases is generally unknown. Unless there is compelling evidence in an individual data compilation that the precision of the data is unacceptable, it is assumed that the data reported are of precision that meets the quality criteria of the reference method or analytical service's quality system requirements and is sufficient for use in this project.

Accuracy (bias)

Accuracy of data reported in data compilations is generally unknown, as it implies that measurements are being recorded on a known sample. Unless there is compelling evidence that the data were collected incorrectly and are inaccurate, it is assumed that the results for the analysis of positive and negative laboratory controls, calibration verification, and spiked sample analyses meet the quality criteria of the reference method or analytical service's quality system requirements, and that the data quality is sufficient for use in this project.

Procedural performance accuracy criteria for data handling parameters are presented in Table A6-1.

Table A6-1. Procedural (data management) performance criteria^a

Measurement parameter	Accuracy	Description
Data entry	≤ 5% incorrectly entered data	20 percent of manual data entries will be checked. All errors will be corrected.
Data transfers	≤ 10% incorrectly transferred data	10 percent of data transfers of pertinent data from existing sources for use in deliverables will be checked. All errors will be corrected.

Extraction/interpretation of pertinent data from existing	≤10% incorrectly	10 percent of extraction/interpretations of pertinent data from existing sources for use in deliverables will be
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Measurement parameter	Accuracy	Description
sources for use in deliverables	extracted/interpreted data	checked. All errors will be corrected.
Data conversions	≤ 5% incorrect data transformations	20 percent of data conversions will be checked. All errors will be corrected.
Data calculations	≤10% incorrect calculations	10 percent of data calculations will be checked. All errors will be corrected.

^aAnalytical truth is unknown for precision; accuracy of all measurement parameters in Table 2 will be enforced using the approach described in Sections C and D of this QAPP.

Representativeness

See the discussion of representativeness in the section on Performance and Acceptance Criteria above.

Comparability

Comparability is an issue when different sampling or analytical methods are used among different studies that are being combined among parts of a single study. It is expected that if external data and information collections are provided from disparate monitoring studies that variable file formats may need to be synthesized. For interpretation of these external data, if required, DNREC will ensure that different values are expressed in comparable units and that differences among values are clearly tied to how those values were developed.

Completeness

Whenever possible, data will be downloaded electronically from various electronic sources to reduce scanning of hard copy documents. DNREC staff will develop dedicated hard copy and electronic files. In addition, the following steps for assigning staff and general project procedures will be used to ensure the completeness and correctness of data used in the deliverables:

- All original work performed by any member of the technical staff will be subject to QC checks by a different member of the technical staff who is capable of performing the QC checks.
- All QC reviews will be documented.
- Use of data evaluation factors and limits.
- Members of the DNREC staff are capable of collecting technical data and managing data sources.
- The DNREC PM will ensure data sources are managed in accordance with Section A6 and B7 of this QAPP.
- The DNREC PM will maintain a continuing dialog with the EPA CBP PM on technical issues, including discussions regarding the inclusiveness and comprehensiveness of the data sources collected for the project.
- The DNREC PM will provide answers to specific management questions.

Sensitivity

Sensitivity is the ability of available measurement systems to detect the presence of individual pollutants or indicators, or to detect change. In routine surface water monitoring, it is expected that monitoring designs and QAPPs would prescribe reporting or other quantitative limits appropriate for comparison to prevailing water quality criteria. However, a lack of sensitivity is most problematic where samples are determined to be free of contaminants, as estimated concentrations (due to over-dilution, for instance) are of greater value than reported non-detects at inflated quantitation limits.

A7. Distribution List

This quality assurance project plan (QAPP) will be distributed to the Delaware Department of Natural Resources and Environmental Control, Division of Watershed Stewardship (DNREC-DWS), Division of Water (DNREC-DW) and United States Environmental Protection Agency (EPA) staff listed below through the DNREC Project Manager (PM) and EPA Chesapeake Bay Program (CBP) PM (see Table A7-1).

Table A7-1. QAPP Distribution List and Project Roles

Name & title	Phone number & email address	Mailing address
Delaware Department of Natural Resources and Environmental Control (DNREC)		
George Mwangi Project Manager, Division of Water (WR)	302-739-9352 George.Mwangi@Delaware.gov	DNREC 89 Kings Hwy. SW Dover, DE 19904
Holly Walker Environmental Scientist V Division of Watershed Stewardship – CHIP Program	302-739-9921 Holly.Walker@delaware.gov	
Joseph Schell Quality Assurance Officer, Division of Watershed Stewardship – CHIP Program	302-608-5486 joseph.schell@delaware.gov	
U.S. Environmental Protection Agency, Chesapeake Bay Program (USEPA-CBP)		
Autumn Rose CBP Grants Project Officer	410-267-5780 Rose.Autumn@epa.gov	USEPA - Chesapeake Bay Program
Durga Ghosh Quality Assurance Coordinator, CBPO	410-267-5731 dghosh@chesapeakebay.net	Annapolis City Marina 410 Severn Avenue Suite 109 Mail Code: 3CB00 Annapolis, MD 21403

A8. Project Organization

The organizational aspects of the program provide the framework for conducting the necessary tasks. The organizational structure and function also facilitate project performance and adherence to QC procedures and quality assurance (QA) requirements. Key project roles are filled by the persons who are leading the various technical phases of the project and the persons who are ultimately responsible for approving and accepting final products and deliverables. The responsibilities of these persons are described below.

If, during the period of performance, additional updates, amendments, or revisions to the QAPP are required to describe environmental data operations not included in this plan, DNREC will submit any required updates or amendments to EPA for review and approval prior to performing any environmental data operations identified. The approved attachments or amendments will be distributed by the DNREC PM and the EPA CBP PM to the personnel identified in the distribution list, and to any other technical staff assigned to support the project.

Laura Pleasanton, is the DNREC Program Administrator for the project. She will provide overall administrative and oversight support to the DNREC PM, George Mwangi to ensure availability of resources and technical support to provide EPA's CBP with valid, reliable data for its continuing assessment and evaluation of the Chesapeake Watershed Implementation Plan.

George Mwangi is the DNREC PM, for the Division of Water and he will provide overall project and program oversight for the project. He is coordinating the development of this plan for implementation in DNREC offices and will oversee plan implementation upon approval. Mr. Mwangi will also collaborate with the EPA CBP PM, Autumn Rose, to ensure that project objectives are sufficiently documented and presented in this plan. The DNREC PM will also have the responsibilities listed below:

- Provide oversight for selection of analytical tools used to support data reporting to the CBPO, including data quality assessment, and adherence to project objectives and system requirements and protocols.
- Maintain the official approved QAPP for DNREC.
- Facilitate participation of the DNREC, EPA, and key local participants on the project workgroup(s)
- Coordinate with contractors, reviewers, and others to ensure technical quality and contract adherence.

Joseph Schell, is the QA Officer for DNREC's Division of Watershed Stewardship, (DWS), and he or his designee will be the primary point of contact for DNREC in this task, as it is limited to development of QA guidance (this plan) for collection and reporting of data to CBPO. Mr. Schell will coordinate amongst DNREC and EPA/CBPO staff and management participating in this project, as needed.

Autumn Rose, the EPA CBP PM, will support DNREC Project staff in technical and managerial oversight of the project including establishing technical requirements and specifications, review of interim and final work products. She will also provide final review and approval of this plan and subsequent deliverables developed under it on behalf of the EPA CBP.

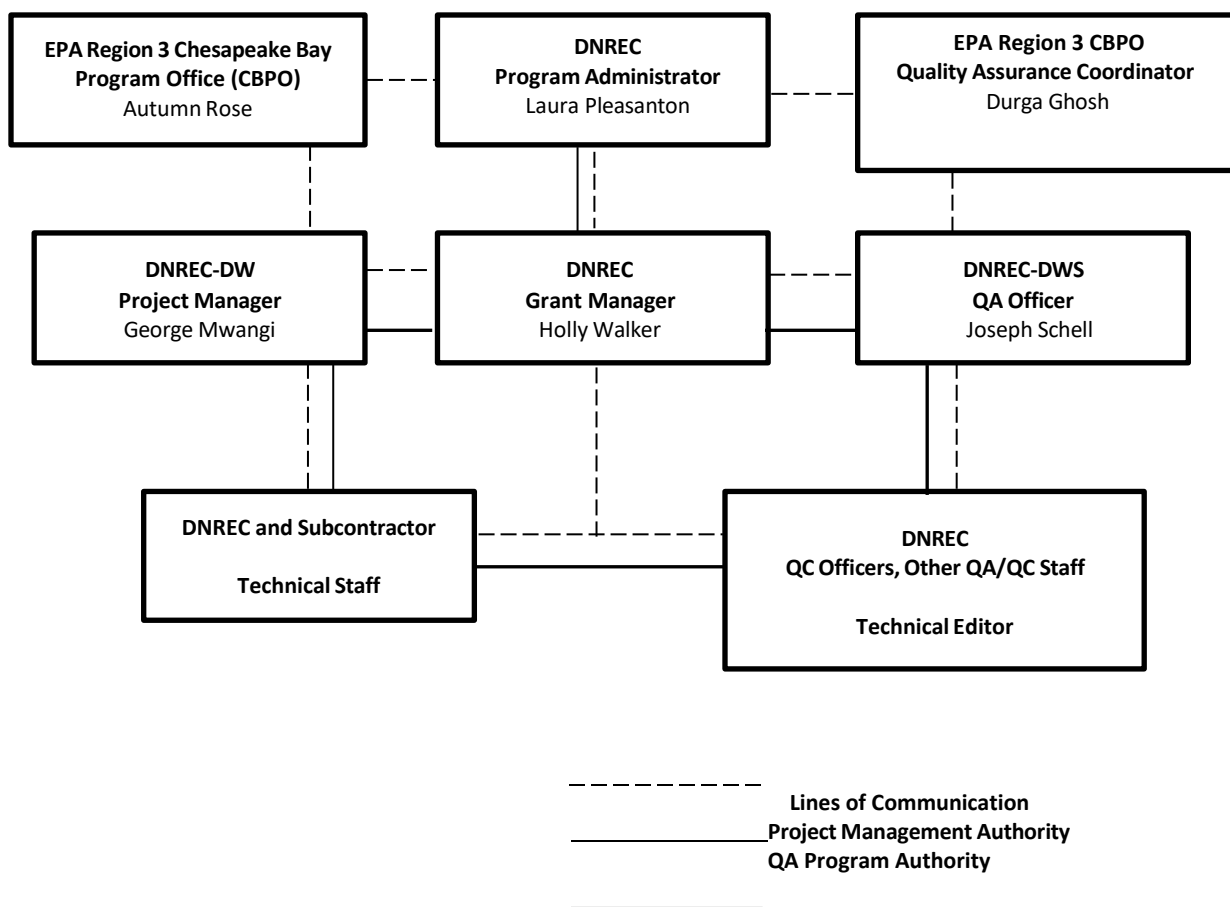
The EPA CBP Quality Assurance Coordinator (QAC) is Durga Ghosh. The QAC, or their designee, will review and approve this plan, conduct external performance and system audits, as appropriate, and participate in any other EPA QA reviews of the study.

A9. Project Quality Assurance Manager Independence

The Project QAM (QA Officer) shall be independent of environmental information operations. This independence will be ensured by the QAM not participating in any environmental information collection activities outside of their role of quality oversight, e.g., the QAM will not collect data but can conduct assessments in the field. The Project QAM is not required to be independent of senior management who are nominally, but not functionally, involved in operations. The Project Manager or designee will not have authority to sign QAPPs for the QAM or designee, nor will the QAM or designee have authority to sign QAPPs for the Project Manager or designee.

A10. Project Organization Chart and Communications Project Chart

The project organization chart, presented in Figure A10-1, includes relationships and lines of communication among all participants and data users.

Figure A10-1. Project Organization Chart

A11. Personnel/Training Certification

DNREC has assembled a team of highly trained and experienced staff to provide support to the CBP in developing datasets for use in future analysis and reporting. DNREC's is intimately familiar with the reporting and management of water quality data, the TMDL process and development program, and the requirements of this plan. DNREC staff will work closely with CBPO PM, Autumn Rose, to ensure that system specifications are met, and that necessary data requirements and elements are compatible with the user modeling and analysis applications.

A12. Documents and Records

The DNREC PM will distribute the QAPP to their respective staff working on this project. If any changes in the body of the QAPP are required during the project, the DNREC PM will send a memo to each person on the distribution list as soon as possible describing the change(s), following approval by the appropriate persons. The memo(s) will be attached to the QAPP. If a more substantive revision is warranted, the QAPP will be revised, and a document revision history will be included before the plan is submitted to the CBP for review and approval. The DNREC PM and CBP PM will distribute the plan as appropriate to their respective project staff.

The DNREC PM will maintain a central project file in their Dover, Delaware offices to contain all related documents, reports, communications, data compilations, checklists or other records, and deliverables (electronic files and hard copies).

Project records will contain descriptions of the work performed, data sets used in analyses, and output data sets, and descriptions of relevant analyses and outputs. Interim and final electronic files used in the development of project deliverables will be stored on the secure local network server in the project office. In addition, a broader description of overall data management is provided in Section B10 of this QAPP.

Project-Specific Documents and Records

Project records will be managed in accordance with the current EPA policies. The Project Manager will be responsible for saving electronic files on the shared drive to ensure they are automatically backed up. Hard copy records will be filed in location and scanned to be saved electronically in the project folder.

QAPP Preparation and Distribution

This QAPP conforms to the format described in the U.S. Environmental Protection Agency publication Quality Assurance Project Plan Standard [Directive No: CIO 2105-S-02.0]. The QAPP shall always govern the operation of the project and must be accessible during operations. Each responsible party listed in Table A7-1 shall adhere to the procedural requirements of the QAPP and ensure that subordinate personnel do likewise.

This QAPP shall be reviewed at least annually to ensure that the project will achieve all intended purposes. In addition, it is expected that ongoing and perhaps unexpected changes may need to be made to the project. Project Managers, QA Staff and other applicable personnel in Table A7-1 shall participate in the review of the QAPP. The Project Manager(s) shall authorize all changes or deviations in the operation of the project. The review and any revisions will be documented. If significant changes need to be made, the QAPP will be sent to the DAO again for approval. Examples of significant revisions include changes in:

- 1) the scope of the project resulting in new or revised objectives
- 2) implementation such as how information will be collected, produced, evaluated, or used
- 3) the design, construction, operation, or application of environmental technology
- 4) the statement of work or workplan for extramural agreements
- 5) expiration of the QAPP
- 6) the organization's mission or structure, such as in the delegation status of QAPPs
- 7) performance criteria as to how results will be assessed for acceptance.

The Project Manager will document the effective date of all changes made in the QAPP and distribute revised versions to all individuals listed in Table A7-1.

Field Documentation

Not applicable.

Storage

DNREC's computer systems and network servers are specified, inventoried and maintained (either directly or by external service contract) by a dedicated information technology staff, and all interim (working) and final electronic files used in development of project deliverables will be stored on DNREC's secure network, which is backed up daily. DNREC project scientists will store all computer files associated with the project (including all sources used to prepare deliverables) in a project subdirectory (subject to regular system backups) in the Dover, Delaware office, and will copy the files to disk for archive for 3 years subsequent to project completion (unless otherwise directed by the EPA CBP). DNREC may use a tracking spreadsheet specifically designed for this project to document data collection, assessment and information sources compiled for this project. To maintain version control, DNREC will clearly identify files using the subject of the file and corresponding dates of preparation. The DNREC PM is responsible for ensuring that data sources are managed in accordance with this section, as well as Sections A6 and B4 of this QAPP.

B. Implementing Environmental Operations

B1. Identification of Project Environmental Information Operations

Data and information from permitted dischargers will be accessed from DMRs (eDMR or historical data management systems), and from EPAs ICIS, or legacy permit compliance system (PCS). This plan targets two municipal wastewater treatment plants, a mobile home park wastewater treatment facility and a single industrial discharger to the Nanticoke River within the Chesapeake Bay watershed. As the current plan was developed specifically for discharge characterization data and likely relies almost solely on eDMR and NPDES discharge monitoring data, the balance of the sources identified below may be beneficial in the CBP's future analyses. The types and sources of information required to inform EPA's annual assessment are listed below:

- Government databases (e.g., Delaware's Water Quality Portal); U.S. Geological Survey [USGS] National Water Information System [NWIS] data for flows and selected water quality measures; EPA Environmental Information Management System: storage and retrieval data warehouse [STORET]; Permit Compliance System and Integrated Compliance Information System [PCS-ICIS; for point sources], or Toxics Release Inventory [TRI])
- Government report(s) including DNREC's most recent integrated report.
- Government publications (e.g., technical support documents, research reports on management practices and control measures)
- Maps, geographic information system (GIS) layers, plots, land surveys, photographs
- Existing TMDLs
- Published reports.

B2. Methods for Environmental Information Acquisition

Data are collected from all permitted industrial and municipal facilities in the Chesapeake Bay watershed on no less than a yearly basis. Depending on the permit requirements, the reporting frequency can be monthly, quarterly, semi-annual or annual. Permittees prepare and submit DMRs as instructed by DNREC's *e-DMR Manual* (DNREC, n.d.). Permit holders submit discharge monitoring data via eDMR (as instructed by eDMR manual). The data undergo quality assurance checks by DNREC personnel (Compliance and Enforcement personnel) before being electronically uploaded into the DEN after which it is electronically uploaded to EPA's ICIS.

Data received are first verified to correspond with the facility's respective permit and to ensure there were no apparent errors in the loading of the data to DNREC's eDMR submittal system. The eDMR system has numerous QA/QC procedures built directly into the interface that prevents facilities from submitting erroneous data, such as detecting missing information or improper units. Facilities cannot submit their eDMR until the errors have been addressed, thus all data received should have a very high standard of completeness and accuracy. DNREC's Compliance and Enforcement personnel still review all submitted data to look for any errors that may not have been detected by the eDMR system filters and work with the facility representative over the telephone or via email or written correspondence to rectify the

reporting problem.

Quarterly Non-compliance reports (QNCR) are available within one month following each quarter. The QNCR are generated from ICIS and will show missing eDMR data and data that violate the permit limits and conditions, as well as show any facilities that failed to submit a scheduled eDMR during the quarter. The Compliance and Enforcement personnel will rectify any missing data and verify the validity of the violations by comparing the eDMR data provided by the facility against the limits and conditions within the permit and contact facility representatives to obtain the necessary reporting data as needed.

B3. Integrity of Environmental Information

Information/Data/Sample Handling

The methods and procedures described in this document are intended to reduce the magnitude of measurement error sources and the frequency of error occurrence. The relevant quality objectives for this project include existing data quality and sample (data) handling. The project quality objectives related to data handling are included below:

- Maintaining and documenting a continuing dialog with the EPA CBP staff on technical issues, as appropriate
- Providing answers to specific questions from the CBP Program Manager responsive to the goals of the EPA and DNREC's Chesapeake Bay WIP
- Providing an assessment of data uncertainty, where applicable
- Documenting and presenting results in the form of interim, draft and final reports in the project files.

Information from data collection operations other than those provided by EPA and DNREC that are found to be of unacceptable quality will not be used. DNREC will document in the project files the quality requirements for data collection and how DNREC ensured that information collected for this project was as inclusive and comprehensive as possible. Apparent deficiencies in EPA- or DNREC-provided data or information will be discussed with the EPA CBP PM and QAO, as appropriate, and a decision made as to the level of effort that should be dedicated to its further assessment.

Uncertainty in the data due to sampling and measurement errors or errors introduced during data manipulation could result in providing incorrect results. Reducing data uncertainty is of highest priority, and it is important to reduce uncertainty by using QC protocols. A discussion of conventional data quality attributes—precision, accuracy, representativeness, completeness, and comparability (PARCC) are presented in section A6. However, these attributes are more related to measurement system performance and monitoring design than in the current project's application of the data. Spot checking of data during compilation will aid in identifying or eliminating erroneous values, most data are assumed to have satisfied the measurement performance requirements published in the methods or adapted within the laboratory's quality system of standard operating procedures (SOPs). SOPs occasionally do not fully comply with reference method objectives but are based on actual data collected in the laboratory. Examples of differences include estimates of method sensitivity and laboratory method detection limit

study data and use of control charts for development of in-house limits. Data assessments against these study- or statistically derived criteria are often of greater value in data interpretation and determining potential limitations.

Sample Transportation

Not applicable.

Laboratory Certification/Accreditation

Not applicable.

B4. Quality Control

The project team will follow the policies and procedures detailed in this QAPP using standard analytical tools and protocols under the direction and oversight of the DNREC PM. Critical QC aspects for the task are handling and preserving the integrity of data and information from secondary sources.

A DNREC QC Officer will evaluate the correctness of transferred data and will review a minimum of 10 percent of all data extractions, transformations and calculations, as described further in this section of the QAPP. Any senior staff member familiar with the project, task, or specific data operation or analysis can serve as QC Officer on work performed by others. In this regard, many persons may fulfill a QC Officer function in advance of the higher-level Project QC Officer reviews. The DNREC PM will review staff performance throughout the project to ensure adherence to project protocols.

Reducing uncertainty by using appropriate QC protocols is of the highest priority. The following procedures for assigning staff and general project procedures will be used to ensure the completeness and correctness of data used in the collected data deliverables:

- All original work performed by any member of the technical staff will be subject to QC checks by a different member of the technical staff who is capable of performing the QC checks.
- All QC reviews will be documented.
- If applicable, 100 percent of scanned or hand entered data from hard copy documents will be reviewed by a technical staff member who did not perform the original work.
- 10 percent of transferred data from each source will be reviewed by a technical staff member who did not perform the original work.
- 10 percent of each type of data transformation will be evaluated by the DNREC QC Officer (or their designee)
- 10 percent of each type of calculation will be evaluated by the DNREC QC Officer (or their designee)
- The DNREC PM will maintain a continuing dialog with the EPA CBP PM on technical issues.
- The DNREC PM will provide answers to specific management questions.

DNREC will review data compilations and data value distributions in the final compiled data through analysis of complete data transfer at the time of transfer and by enumerating records in the original data sources and the final compilation. Data that are transferred among databases will be checked for completeness at the time of transfer by enumerating the number of records in the original and final data sets. Data transfers will be tagged with upload dates and times to accommodate completeness reviews. If data transfer is incomplete, the missing records will be sought and transferred individually if they are valid. A second round of completeness checks will ensue after successive transfers. Once data sets are compiled, the complete set of data value distributions will be analyzed to identify outliers or bimodal distributions that may result from data entry errors or erroneous unit conversions. This will be accomplished by plotting the distributions against expectations of a normal distribution. The DNREC team data analysts are familiar with expected values for all data types that will be collected for this project. Because of this familiarity, they will be able to identify unusual and potentially erroneous values. If necessary, outliers and bimodal distributions will be identified and resolved. Valid outliers can occur and will not be eliminated if the experienced analyst thinks they are plausible. Outliers that are not plausible or show a pattern of potential error will be brought to the attention of the original data supplier and will be excluded from analysis until the original data supplier can confirm their validity. Wastewater data submission is completed using CBP's Point Source app. The Point Source data application includes checks that flag data points that are out of range as well as trend reports, which compare current loads and projected loads from the previous year.

The accuracy of the transfer of data from electronic databases to the project database(s) will be determined by checking whether data from the original database have been transferred to appropriate rows and columns, whether the same number of decimal places after the decimal point in the original database has been used, and whether the same units from the original database have been used. Such QC checks will be performed on approximately every 10th line of data in each electronic data set transferred into the project database(s). This procedure will enhance the evaluation process by improving consistency in data transfers. After the initial transfer(s) or extraction(s) and corresponding QC check(s), if the percentage of incorrectly transferred or extracted data exceeds one percent for a staff member, a DNREC QC Officer will review an additional 10 percent of the data transfers or extractions performed by that staff member to determine whether that staff member is performing acceptable data entries. If the percentage of incorrect data transfers or extractions for the additional sources evaluated exceeds one percent, a DNREC QC Officer might evaluate 100 percent of the data transfers or extractions performed by that staff member to ensure accuracy of the information. Any discrepancies in data transfers or extractions reviewed by a DNREC QC Officer will be resolved with the technical staff member who originally performed the transfers or extractions during the review process to ensure 100 percent agreement in data transfers and extractions for the sources.

Permittees are required to submit data via eDMR unless there is a catastrophic electronic system failure. However, if any raw data are received in hard copy format, they will be entered

into a standard database and a DNREC QC Officer will compare 100 percent of data entries to the original hard copy data sheets. A DNREC QC Officer will check 10 percent of the data transformations from hard copy data and eDMR data and will recalculate 10 percent of the calculations to ensure that correct formula commands were entered into the programs. If more than one percent of the data transformations are incorrect, all data transformations will be rechecked after the correction is made to the database. Data quality will be assessed by comparing entered data to original data and checking the accuracy of data transformations and calculations.

B5. Instrument/Equipment Calibration, Testing, Inspection, and Maintenance

Not applicable.

B6. Inspection/Acceptance of Supplies and Services

Not applicable

B7. Environmental Information Management

Non-direct measurements (also referred to as *secondary data*) are data that were previously collected under an effort outside this project. DNREC, in consultation with EPA CBP, will use available discharge characterization data, interim monitoring reports, and pollutant and flow data primarily from permitted dischargers to prepare data files suitable for performing analyses necessary to complete the requested technical tasks. Where data are not available from online sources, DNREC will consult with EPA and permittees on specific data sources and characteristics (water quality monitoring stations, and USGS gage locations) to identify datasets that may fulfill the technical requirements, as well as any EPA tools or procedures for conducting analyses and flow statistics.

DNREC will collect information and prepare data for the CBP to summarize the magnitude of nutrient and sediment concentrations and compare measured observations under a variety of flow conditions to prevailing water quality criteria and load reduction goals. DNREC will compile available discharge characterization data, and any other data necessary to conduct required analyses into new datasets for this project, as described in Section A6 of this QAPP.

DNREC will exclude, to the extent possible, any data that have not been collected under documented QA plans or been subject to quality systems and screening in their evaluation for acceptance to established federal or state data management systems (e.g., EPA STORET and USGS NWIS). DNREC expects that project specific QAPPs or similar documentation describing the performance criteria evaluated and met were available for federal and state data recipients to assess the data for acceptance and inclusion of the data in their compilations. It is assumed that data used by or obtained from government agencies have been screened and have met specified measurement performance criteria. If it is apparent that this documentation is not readily available, or if data qualification or other indication of quality limitations are apparent, DNREC will consult with the EPA CBP PM to determine how much effort should be expended to find reports or metadata that might qualify or disqualify the data from use.

DNREC conducts assessments of all point source DMR data in the Chesapeake Bay watershed on a yearly basis. In 2018 CBPO released the CBP's Point Source Data Submission Application which allows jurisdictions to report point source data to CBP for use in its annual progress runs. The Point Source Data Application uses ICIS-NPDES as the initial source of data. Prior to the release of the Point Source Data Application, DNREC staff prepared and evaluated the annual data between July 1st and June 30th of the year of the June date, and adhered to the following QA procedures during data preparation and submittal:

- Ensured all eDMR data had been properly recorded in DEN by June 30 of each year.
- Extracted Chesapeake Bay watershed data from DEN and converted into an Excel spreadsheet to be uploaded into CBPO.
- Analyzed and evaluated data for accuracy and completeness as outlined by the Chesapeake Bay Phase 5 Community Watershed Model (particularly Section 7: Point Sources, Water Withdraws, and On-Site Waste Disposal Systems) (USEPA 2010), the Chesapeake Bay Program Wastewater Facility and Nonpoint Source Data Submission Specifications and Requirements Attachment 7, updated March 2022 (USEPA 2016) and the Delaware *Online Electronic Discharge Monitoring Report (e-DMR) Manual* (DNREC, n.d.)
- Completed mathematical calculations for data fields that had no analytical data provided, utilizing the standards and specification provided by EPA in the Chesapeake Bay Program Wastewater Facility and Nonpoint Source Data Submission Specifications and Requirements (USEPA 2016)
- Once the Chesapeake Bay point-source data had been compiled, QC'd and formatted, the data were provided to the CBP no later than December 1st of that year.
- Participated in meetings and conferences.

DNREC submits average monthly flow (mgd) and concentration (mg/L) data for each outfall of the four wastewater treatment facilities in the Chesapeake Bay watershed. Data for the following parameters are submitted:

- | | | | |
|---------------------|-------|-------------------|------------|
| • NH ₃ | • TON | • PO ₄ | • CBOD/BOD |
| • NO _{2,3} | • TKN | • TOP | • DO |
| • Flow | • TN | • TP | • TSS |

Also prior to the release of the Point Source Data application DNREC followed the process outlined by the CBP and shown in Appendix A – Wastewater Facility Nutrient Data Processing Flow Diagram, when compiling and reporting nutrient data for wastewater treatment plants in the Chesapeake Bay watershed.

The City of Seaford Wastewater Treatment Facility, Town of Laurel WWTP and INV Performance Materials, LLC are required under their NPDES permit to collect all twelve (12) parameters above. Prior to the release of the Point Source Data Application, DNREC downloaded monthly

eDMR data for each of these facilities from DEN in Microsoft Excel format. The data for each parameter would be entered into EPA's Chesapeake Bay wastewater data spreadsheet. A data check ($TKN > NH_3$, $TKN = NH_3 + TON$, $TN = TKN + NO_{23}$, $TP > PO_4$ and $TP = PO_4 + TOP$) as outlined under the "Compiled Data Check" step of the Wastewater Facility Nutrient Data Processing Flow Diagram shown in Appendix A would then be performed. If the sum of the nutrient species $< > TN$ or TP , the species would be proportioned to add up to TN and TP as follows (TKN' , NO_{23}' , NH_3' , TON' , PO_4' and TOP' are proportioned/adjusted values):

$$TKN' = TN * TKN / (TKN + NO_{23})$$

$$NO_{23}' = TN * NO_{23} / (TKN + NO_{23})$$

$$NH_3' = TKN * NH_3 / (NH_3 + TON)$$

$$TON' = TKN' - NH_3'$$

$$PO_4' = TP * PO_4 / (PO_4 + TOP)$$

$$TOP' = TP - PO_4'$$

Mobile Gardens Trailer Park normally discharges to rapid infiltration basin systems (RIBs) with occasional discharge at the outfall. When there is no discharge at the outfall during a particular month, flow is reported as zero "0" for that month. When discharge at the outfall occurs, an adjusted flow value is calculated based on the number of "discharge days." Calculations for an adjusted flow are not necessary when discharge occurs every day during a particular month. The Chesapeake Bay model does not currently have an input for "days of discharge." Even if discharge is only for one day, the model assumes any reported discharge concentration occurs every day of the month. In addition, the model assumes a full month of flow to calculate the nutrient load. The adjusted flow is therefore calculated as shown below to account for days without flow.

$$(\text{Reported Flow}) \times (\text{Days of Discharge}) / \text{Calendar Days in a Month}$$

The facility is required to collect flow, DO, BOD₅, TSS, TN and TP. Prior to the release of the Point Source Data Application, the average monthly data for these parameters in the event of a discharge at the outfall, would be downloaded from DEN and the missing parameters would be calculated as follows using the nutrient species default relationships for wastewater data provided in the CBP data submission specifications and requirements:

$$NH_3 = 0.07 \text{ TN}$$

$$NO_{23} = 0.8 \text{ TN}$$

$$TON = 0.13 \text{ TN}$$

$$TKN = NH_3 + TON$$

$$PO_4 = 0.67 \text{ TP}$$

$$TOP = 0.33 \text{ TP}$$

In each report, default or calculated values would be marked with appropriate descriptions. Columns were added to the right of the values, which included the descriptions. Once the data had been reviewed and verified to be complete, the data would be submitted to the EPA CBP. The EPA CBP would then send a summary of the discharge loads (nutrients and sediment) back to DNREC for review.

Following its release, DNREC used the Point Source Data Application for the 2018 submission and has continued to do so since then. As mentioned above, the Point Source Data Application uses ICIS-NPDES as the initial source of data. When a progress submission is due, DNREC logs into the Application and creates a data set for the reporting period. DNREC performs all the facility/data checks and fixes within the Application. To address errors generated from failed nutrient species checks, DNREC utilizes the fix options available in the application. The application also includes checks which flag data points that are out of range. Validation of flagged data points may include contacting DNREC's Compliance and Enforcement personnel or respective facilities if necessary. For the special case of the Mobile Gardens Trailer Park, which does not have a continuous flow, DNREC calculates an adjusted flow as discussed above and manually enters the calculated values in the Application. This same methodology had been applied for the Town of Bridgeville WWTP (no longer a permitted NPDES discharge) that also did not have a continuous stream discharge. Since Mobile Gardens Trailer Park is not required to submit data for all nutrient parameters, DNREC utilizes the option available in the application to calculate values based on the TN and TP values submitted. Calculations are based on the nutrient species relationships above. After completing the data submission process, DNREC notifies CBPO who then reviews the submission.

C. ASSESSMENT AND OVERSIGHT

C1. ASSESSMENT AND RESPONSE ACTIONS

The QA program under which this project will be performed could include performance and system audits, with independent checks of the data obtained from data-gathering activities and subsequent analyses. Final versions of any deliverable that is to be published or widely distributed by EPA must be reviewed by the DNREC PM or authorized designee to ensure that all revisions have been properly made and that the deliverable is consistent with overall contract goals and requirements and does not contain information that could expose EPA to liability. Written deliverables metadata records or other text documentation should be reviewed by a qualified editor or authorized designee.

The DNREC QC Officer will assist the DNREC PM in conducting internal reviews of the deliverables prepared for this project. They will identify and document all issues that could affect quality and make recommendations for improving the reports if appropriate. When internal reviews have been completed, the DNREC PM will submit written deliverables, if any, to a qualified technical editor for editorial review to ensure that the writing is clear and concise; that the written material conforms to predetermined requirements for format, style, and usage; and that the terms, resources, and format are used consistently throughout the document.

The essential corrective action steps in the QA program for addressing any problems that could occur during the project are as follows:

- Identify and define the problem.
- Assign responsibility for investigating the problem.
- Investigate and determine the cause of the problem.
- Identify the corrective action.
- Assign and accept responsibility for implementing appropriate corrective action.
- Establish the effectiveness of and implement the corrective action.
- Verify that the corrective action has eliminated the problem.

Most of the technical problems that might occur in collecting and reformatting data will be solved on the spot by the staff members involved; for example, by modifying the technical approach or correcting errors or deficiencies in documentation. Immediate corrective actions form part of normal operating procedures and are noted in records for the project. Problems not solved this way require more formalized, long-term corrective action.

If quality problems that require attention are identified, the project team will determine whether attaining acceptable quality requires short- or long-term actions. If a failure in an analytical system occurs (e.g., performance requirements are not met), the DNREC QC Officer will be responsible for corrective action and will immediately inform the DNREC PM. Subsequent steps taken will depend on the nature and significance of the problem.

The DNREC PM has primary responsibility for monitoring the activities of this project and identifying or verifying correction of any quality problems. These problems will also be brought to the attention of the QA Officer, who will either initiate or verify the corrective action system components described above, document the nature of the problem, and ensure that the

recommended corrective action is carried out. The QA Officer has the authority to stop work on the project if problems that affect data quality and require extensive effort to resolve are identified. The DNREC PM and the EPA CBP PM will be notified of major corrective actions and stop work orders. The DNREC PM has primary responsibility for monitoring the activities of this project and identifying and verifying that any quality problems are sufficiently investigated, that appropriate solutions are evaluated, and that corrective actions are implemented, verified to be adequate to address the problem(s), and documented in project reports.

Failure to meet any QC requirements requires that appropriate corrective actions be taken. All major QC failures and associated corrective actions (and their effectiveness) will be documented and submitted to the EPA CBP PM along with the associated dataset(s). Data associated with QC problems will be clearly identified, along with an assessment as to the potential effects(s) of the QC failure on data quality. The DNREC PM or QA Officer will notify the EPA CBP PM of such problems/corrective actions as soon as possible after the actual occurrence.

C2. OVERSIGHT AND REPORTS TO MANAGEMENT

The DNREC PM will submit a report to the EPA CBP PM describing the status of the project and deliverables, including a discussion of QA/QC activities, the status of data collection and evaluation efforts, and any significant quality problems encountered and how they were addressed.

DNREC will provide to the EPA CBP PM any written reports generated in routine surveillance.

D. ENVIRONMENTAL INFORMATION REVIEW AND USABILITY DETERMINATION**D1. ENVIRONMENTAL INFORMATION DATA REVIEW**

Data review, verification, and validation processes aid in determining the usability and limitations of data and provide a standardized data quality assessment. No primary data will be collected for this task; therefore, DNREC will not validate data. DNREC will perform data verification as necessary to determine the accuracy of data entries. DNREC will verify the accuracy of data transfers from electronic files into analysis spreadsheets, and correctness of calculations performed in the statistical analyses of these data.

Copies of all original data will be made while compiling data into the project database. The project database will be filed under a separate filename in a project-specific folder that will include screening results and observations and documentation of EPA direction and collaboration on the final resolution of specific data quality or completeness deficiencies.

DNREC staff will obtain the data or technical information required to perform the evaluations from EPA and from government databases and web sites, where appropriate. The CBP must provide written technical direction if additional work should be performed to verify values and extract statements of data quality from the original generators. If, in consultation with EPA (who has considered the use of the data and importance of the decision to be made), it is determined that such searches are not necessary and the data must be used in the project, a disclaimer will be added to the metadata records indicating that the quality of the secondary data is assumed to be satisfactory for exchange and subsequent analyses.

As values are transferred to a spreadsheet (data entry) or into a deliverable (word processing), the person performing this action will review the transfer for accuracy and write the complete citation for the source of the data, following the appropriate style guide format, with the short citation entered in the database, text, or footnote, as appropriate (e.g., author, year). All data will have its source identified during deliverable preparation. The QC Officer will manually check the data transfers for accuracy and proper citation of the data source and will report data discrepancies to the technical staff member(s) who originally extracted the data or information. The reviewer initials and dates a copy of the marked data or notes the review in a spreadsheet or on a review form to document the review. The corrections will be made and rechecked by the QC Officer.

D2. USABILITY DETERMINATION

The DNREC PM will ensure that the type of data, quantity, and quality of sources have been documented, data transfers checked, and any data quality limitations or uncertainties clearly identified in the deliverables. If any problems are encountered in meeting the data acceptance criteria, the DNREC PM will discuss observations with EPA to reconcile the problems, if possible. The EPA CBP PM will also review all deliverables for content accuracy. If EPA determines that DNREC's data are factually inaccurate or if any other technical errors are found, DNREC will initiate appropriate corrective action investigation, isolate the cause of error, implement appropriate corrective action, and redo the work, if required.

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APPENDIX A. DATA FLOW, PROCESS DIAGRAMS

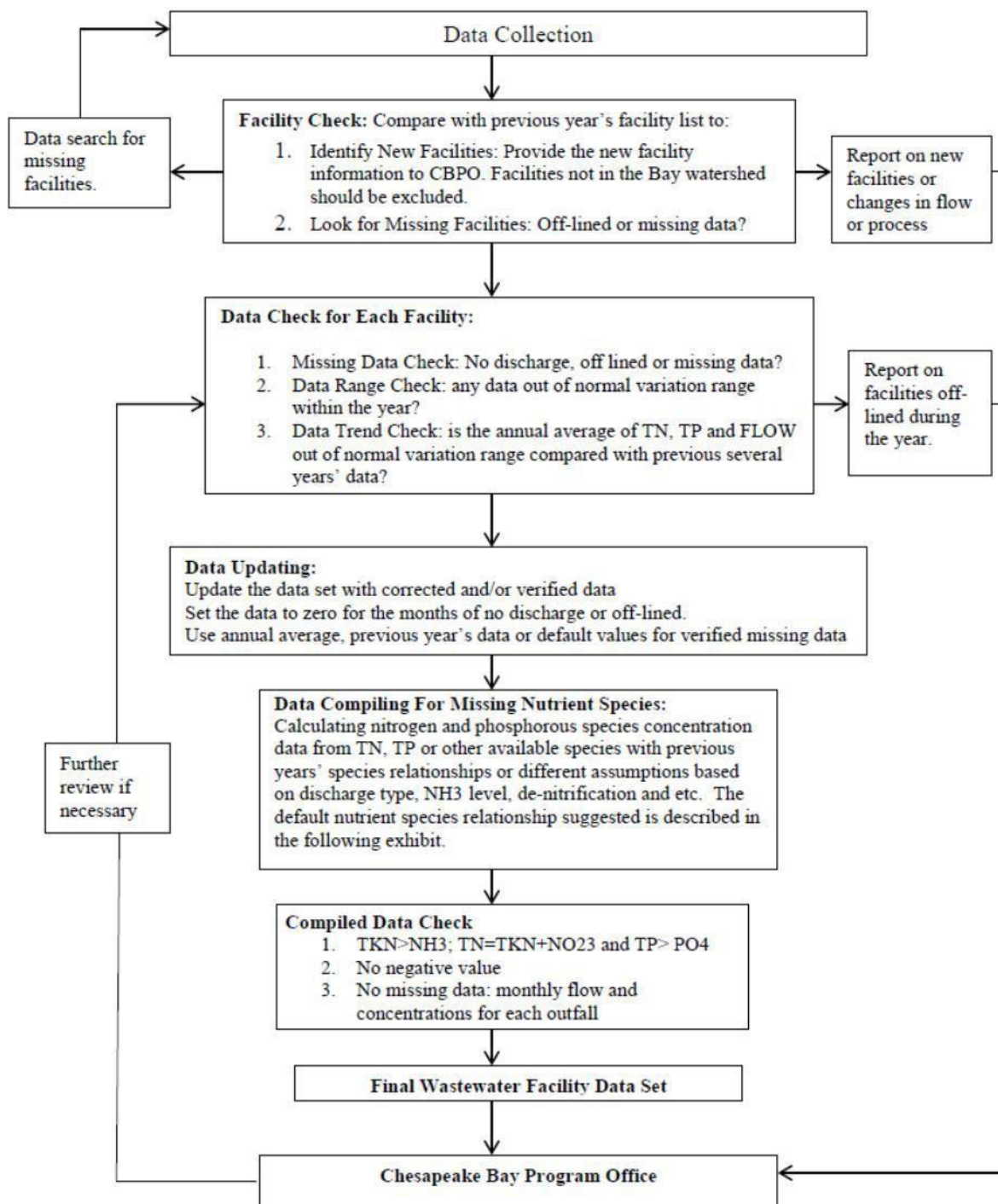


Figure A-1. Wastewater facility nutrient data processing flow diagram (source: USEPA 2016).

APPENDIX B. SPECIES RELATIONSHIP

Type of Facility		NH ₃ /NO ₃ /TON (w/o Nitrification)	NH ₃ /NO ₃ /TON (w/ Nitrification)++	NH ₃ /NO ₃ /TON (w/Denitrification)
Municipalities (phase IV)		80/5/15 ⁽¹⁾	7/85/8	12/73/15
Municipalities (phase V)		80/3/17**	7/80/13**	12/73/15 ⁽²⁾
Industries	Chemical	7/85/8+		
	Pulp & Paper	1/0/99**		
	Poultry Facilities w/BNR			8/75/17**
	Nonchemical (includes seafood, poultry, & food processors w/out BNR)	80/3/17**	7/85/8+	8/75/17**

(1) Stearns and Wheeler recommended 80/0/20; however, the PSWG felt that there would often be minimal (5%) NO_x present.

(2) Unchanged from the ratio recommended by Stearns and Wheeler in Phase IV.

++Apply this relationship wherever NH₃ limits apply

+Assumed by performing an analysis of MD chemical industry wastewater effluents which showed it is very close to the relationship for nitrifying sewage. This would apply to all chemical discharges and assumes that wastewaters are treated chemically and thus would not vary as for sewage relationships

** Updated, as based on an analysis of actual data from plants operating in Virginia.

Type of Facility	Facilities w/out TP Control PO ₄ /TOP ratio	Facilities With TP Control PO ₄ /TOP Ratio
All	71/29 ^a	67/33 ^a

^a determined by averaging the actual data from MD and VA plants (including Blue Plains for "with TP Reduction".

Facility with TP Control is defined as a facility having a permit limit for total phosphorus.

Period	TSS Default (All jurisdictions)	TSS Default w/out NRT	TSS Default w/ NRT
1985-1990 ^b	45		
1990-2000	25		
2000-2010		15	8

Type of Facility	DO concentration 1985-1990	DO Concentration 1990-2010
All	4.5 mg/l ^(b)	5.0 mg/l

(b) takes into account a number of NMP facilities operating across the watershed.

Species Relationship (source: CBP Grant Guidance – Attachment 6)

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