

Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for Sewage Facilities Planning

The strategy outlined in this guidance document is intended to supplement existing requirements. Nothing in the strategy shall affect regulatory requirements. The information herein is not an adjudication or a regulation. There is no intent on the part of the Department to give the strategy described in this document that weight or deference. This document establishes the framework, within which the Department will exercise its administrative discretion in the future. The Department reserves the discretion to deviate from this strategy if circumstances warrant.

Introduction

Maryland amended its water quality standards on August 29, 2005, as part of a multi-jurisdictional effort to address impairment of the Chesapeake Bay from nutrients and sediment. In accordance with the federal Clean Water Act and Pennsylvania regulations, Maryland's changes result in the need for nutrient reductions in Pennsylvania to comply with the new standards.

More than 85% of Pennsylvania's nutrient loads, specifically nitrogen as the limiting nutrient for the brackish and saline waters of the Bay, originate from non-point sources. This leaves less than 15% of the nutrient loads originating from point sources. Pennsylvania's past nutrient reduction strategies acknowledged this, and focused on reducing the nitrogen loads from non-point sources. With the new water quality standards in effect in Maryland, Pennsylvania is taking a comprehensive approach to nutrient reductions.

DEP has developed a plan to meet these requirements. First, in anticipation of the new water quality standards, DEP issued its Chesapeake Bay Tributary Strategy (CBTS) in December 2004. This Strategy includes specific initiatives to address reductions from point sources and non-point sources. The Strategy does not prescribe mandatory requirements, but rather describes how the legal obligations can be met through a combination of actions, including changes to NPDES permits. The CBTS continues to be a framework for addressing these issues.

On December 30, 2006, the Department published an amended strategy for allocating the point source cap loads, in conjunction with its Nutrient and Sediment Trading Policy. This amended strategy was developed with extensive input from the public during 2006 and amends relevant portions of the 2004 CBTS.

Since population growth is the single most important factor resulting in increased nutrient discharges to the Chesapeake Bay, point sources play an important role in any plan to achieve and maintain nutrient cap loads. Increased population results in increased discharge rates at sewage treatment plants and increases in the number of septic systems discharging nutrients to the ground water. Septic systems are considered non-point sources and will not be further discussed in this document, other than to identify abandonment and replacement through connection to point sources as a method of generating offsets.

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Basic Principles Encompassed in the Chesapeake Bay Tributary Strategy

The necessary nutrient reductions for achieving the new water quality standards for the Chesapeake Bay were established by EPA for total nitrogen (TN) and total phosphorus (TP) from all source categories (point and non-point). As a result, EPA determined a "cap load" for each jurisdiction (state) and watershed. These cap loads were accepted by the individual jurisdictions in 2003. Pennsylvania's "cap load", for all sources, is the mass load limitation that Pennsylvania must maintain to meet the new water quality standards adopted by Maryland to address impairment of the Bay. Meeting these cap loads not only protects the downstream water quality standards, it also helps restore the designated uses in the Bay. The aggregate cap load for each nutrient (Phosphorus and Nitrogen) remains constant into 2010 and beyond for future protection of the Bay and its designated uses.

Pennsylvania's CBTS allocates a portion of this overall cap load to the point sources within the Bay watershed. As outlined in the amended CBTS, point sources comprised approximately 14 percent of the total nitrogen (TN) load and about 22 percent of the total phosphorus (TP) load delivered to the Bay during 2002. Consequently, point sources are being asked to provide 14 percent and 22 percent of the required reductions in TN and TP, respectively. These reductions result in the overall point source cap loads.

The CBTS also provides a method for allocating a specific "cap load" from the overall point source cap load to each existing point source discharger in Pennsylvania's portion of the Chesapeake Bay. To preserve the "cap load" approach using the calculation methodology in the point source allocation strategy, any new sources or expansions of existing sources must not add any "net" TN or TP load to the overall "cap load".

Since the point source cap loads do not include an allocation for new point sources, which includes new discharges or expansions of existing discharges, maintaining the "zero net" increase to the cap load will be accomplished using such methods as land application of effluent, recycle and reuse, acquiring offsets for loads from replacement, reduction or retirement of existing sources, or the purchasing of credits elsewhere (trading).

Definitions

For the purposes of this implementation plan the following terms have the meaning as stated herein:

"Credit" – The unit of compliance that corresponds with a pound of reduction of nutrient or sediment as recognized by the Department, which when registered by the Department may be used in a trade.

"Design Flow" --- The design annual average daily flow on August 29, 2005, that a treatment facility is intended to treat during the final year of its proposed useful life. Any plant with final Act 537 approval or approval of a Corrective Action Plan (CAP) under Chapter 94 before August 29, 2005 (effective date of Maryland water quality regulations) is considered to have a design flow based upon the annual average daily flow approved with the plan.

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“Non-significant point source” --- A point source with a design flow of less than 0.4 Million Gallons per Day (MGD).

“Offset” --- Verb - The act of reducing the aggregate production of nutrients from an action or activity by use of a complimentary action, activity or technology on that site or directly related to the activity. Noun - The load in pounds of nitrogen or phosphorus created by an action, activity or technology that is available to apply against the proposed load to be generated. Offsets are not the same as credits as they cannot be bought, sold or transferred between owners, projects, or properties.

“Point source” --- For the purposes of this guidance, any discernible, confined and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, landfill leachate collection system, or vessel or other floating craft, from which pollutants are or may be discharged. Examples of point sources are wastewater treatment plants.

“Significant industrial waste point source” – An industrial waste point source discharging at least 75 pounds per day of Total Nitrogen or 25 pounds per day of Total Phosphorus (computed as an average daily load over the entire year).

“Significant sewage point source” --- A sewage point source with a design flow of 0.4 MGD or greater.

“TN” --- Total nitrogen defined as the sum of the Total Khejdahl Nitrogen (TKN), nitrate-nitrogen (NO₃-N) and nitrite-nitrogen (NO₂-N).

“TP” --- Total Phosphorus.

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Sewage Facilities Planning

Background

Portions of Pennsylvania's aggregate cap loads for TN and TP will be allocated to individual point sources in NPDES permits. These facility specific cap loads are individual allocations of the larger water quality-based waste load allocation for point sources necessary to meet water quality standards in Maryland. The Chesapeake Bay Point Source Strategy contains no "reserve" TN or TP loads for new point source discharges or for existing discharges that propose to expand beyond their existing load limits, as described above. Therefore, new loads must be addressed by options such as land application of effluent, recycle and reuse, allowing offsets for loads from replacement, reduction or retirement of existing sources, or the purchasing of credits elsewhere (trading). The Department has adopted a final nutrient trading policy that outlines the development and certification of nutrient credits from point and non-point sources.

Sewage Facilities Planning will ultimately be more challenging because of the need to demonstrate a net zero increase in TN and TP. Municipalities must evaluate alternatives in a manner that recognizes the need for compliance with the cap load and zero net load increases. Consequently, the municipal government and the permittee must consider information beyond that simply related to hydraulic and organic capacity. Planning module forms and instructions have been revised to capture this information. The revised forms should be used, as soon as they are available after the release of this document. The base planning guide, a.k.a. the Blue Book, will be revised to incorporate the new considerations related to planning for the adequate management of the point source water quality-based wasteload allocation. Until that revision is complete, municipalities should contact their regional DEP office for special instructions.

New Department Strategy

For existing point sources, cap loads for TN and TP are to be established in NPDES permits. Once established, those cap loads will remain in effect unless or until the CBTS is updated or revised. Section 71.21(a)(5)(iii) of the DEP regulations requires that all alternatives identified in sewage facilities planning be evaluated for compliance with applicable water quality standards and effluent limitations. This requirement applies to base plans as well as new land development plans.

Maryland's adoption of new water quality standards on August 29, 2005, necessitated this implementation plan to ensure proper sewage facilities planning for new or expanded wastewater discharges. Any new wastewater treatment plant, or expansion of an existing plant, for which sewage facilities planning was approved after August 29, 2005, is considered to be a new point source. In the case of an expanding wastewater plant, only that portion of the flow or load for which planning was approved after August 29, 2005, is considered a new point source load.

The Department will assist municipalities in which new discharges or facility expansions are proposed by facilitating planning. However, each permittee will be responsible for managing its new connections and its cap load, to assure that the point source water quality-based wasteload

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allocation is not exceeded. This management could take the form of the permittee accepting nutrient credits from developers to offset new discharge loads, or negotiation of other arrangements including capital contributions for future treatment plant upgrades and expansions. DEP will not participate in these deliberations and negotiations, but instead, will rely on the documentation from the local government indicating that these issues have been resolved, and that Section 71.21(a)(5)(iii) has been addressed.

I. Planning Exemptions

In order to effectively assure that Pennsylvania's point source cap load is maintained, planning exemptions should be requested only when a treatment facility has provided the proper assurance that new development can be accommodated without any changes to the treatment works or the NPDES permit. Requests for planning exemptions where there are unresolved nutrient issues should not be submitted. The Department will likely determine that the local government has not provided the assurance that Section 71.21(a)(5)(iii) of the regulations has been addressed.

II. New Discharges and Facility Expansions

Any combination of the options described below may be proposed for new discharges and facility expansions, provided that the result is no net increase in nutrient loadings to the watershed. Note, as in all planning proposals, the adopting municipality must be provided with sufficient technical and institutional details and documentation to ensure that no net increase of nutrient loads is delivered to the watershed.

The following alternatives should be evaluated during planning:

- A. Recycle and reuse technology – For new discharges and facility expansions, zero net TN and TP loads discharged may be achieved by recycle and reuse technologies. More information on recycle and reuse can be found in the DEP Water Reuse Manual. If wastewater is recycled and reused instead of being discharged, and no additional nutrient load is discharged to the watershed, then the zero net discharge requirement is satisfied.
- B. Treatment followed by proper land application – For new discharges and facility expansions, zero net TN load discharge may be achieved by providing treatment followed by proper land application. In these situations, preliminary treatment must result in a concentration and form of nitrogen that when applied to the soil and assimilated by crop uptake results in no appreciable net increase of the TN load to the surface and ground water.¹ Because plant uptake is only available during the growing season, sufficient winter storage is necessary to ensure that no appreciable TN load reaches the groundwater. In such a treatment scenario, TP is expected to be held in the soil profile.

¹ "no appreciable" means no breakthrough of nitrate to the ground water.

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C. Retiring existing on-lot systems –

1. For new discharges and facility expansions, offsets may be obtained in the form of load reductions from retiring existing on-lot systems². If a new facility or an expansion of an existing facility results in the retirement of existing individual on-lot systems, the equivalent 25 pounds per year of TN from each individual on-lot system can be considered to offset an increased point source TN load.
2. If a new facility or an expansion of an existing facility results in the retirement of existing community on-lot systems, the equivalent pounds per year of TN should be calculated using the design annual average daily flow of the system in gallons per day, divided by 262.5 and multiplied by 25. The result, in pounds per year, can be considered to offset an increased point source TN load.
3. Retirement of on-lot systems does not result in a transfer of TP loads since on-lot systems do not contribute TP to the ground water. It is also important to note that at least for the near term; plans proposing the use of new on-lot systems are not subject to nutrient reduction or the zero net TN and TP requirements. In the future, if additional nutrient reductions are necessary to meet Pennsylvania's commitment, this may change.

III. Nutrient Trading

Where recycle/ reuse and land application are not technologically feasible, purchasing nutrient reduction credits elsewhere through the nutrient trading program is another potential option for achieving zero net TN and TP loads. Where credits are purchased for new land development projects that result in new discharges or facility expansions, a developer or municipality must commit in writing, as part of the sewage facilities planning process, to purchase nutrient credits sufficient to offset nutrient loads from the project.

The developer or municipality is only required to actually purchase credits sufficient to satisfy each NPDES permit cycle. Nevertheless, the planning submission must include assurances that the credits will be provided to guarantee the long-term operation, maintenance and compliance of the treatment facility, in accordance with Sections 71.65, 71.71 and 71.72 of the DEP regulations. If the purchase of credits is necessary to maintain the zero net increase of nutrients, then the assurance must provide for those credits for the duration of the design life of the project. A formal agreement between the municipality and a permittee that establishes the permittee's responsibility for operating and maintaining the system in compliance with its permit by providing credits, and the responsibility of the municipality or local agency for oversight of the system, would normally be an acceptable assurance.

² On-lot systems must have been in existence prior to and retired after January 1, 2003.

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Procedure

I. Pre-planning Meetings

Since the zero net TN and TP load requirements are new, developers, consultants and municipalities may need DEP assistance in understanding and addressing them. DEP will, when requested, conduct pre-planning meetings to discuss the Chesapeake Bay Tributary Strategy, offsets, credits, trading, Act 537 planning and NPDES and Water Quality Management permitting.

II. Preliminary Effluent Limitations

A written request for preliminary effluent limits may be submitted to the Department by a municipality, authority or developer. That request should include a USGS 7.5 minute topographic map depicting the point of proposed discharge, the design flow of the proposed facility, the basis of calculation of that design flow, proposed TN and TP concentrations to be achieved and details of any offsets available to apply to the project's nutrient removal deficit.

DEP staff working with the Permit Section will provide a preliminary effluent limit determination for planning purposes. That determination will include preliminary information about the pounds per year of TN and TP credits required for the project.

III. Official Plan Update Revisions (base plans)

The DEP Guide for Preparing Act 537 Update Revisions (the Blue Book) provides a detailed process for initiating and completing base plan updates, and municipalities should continue to follow current guidance.

Section V.B. of the Blue Book³ provides detail related to conducting the initial meeting between a municipality and DEP to discuss the plan update. During that meeting participants should discuss the net zero load limitations, potential sources of offsets, treatment options and availability of credits. Since these additional planning elements are necessary for meeting the requirements of Chapter 71, plan development and plan review may be more complex. It is important that these issues are fully discussed and understood by the municipality, authority or developer at these meetings.

Ultimately, the effluent limitations are enforced upon the NPDES permittee. In most cases, the municipality preparing the base plan update is not that permittee. Therefore, it is also critical that the requirements of Section 71.21(a)(5)(vi) are discussed in detail with the municipality. Both the municipality and DEP need to be careful to not create a future compliance problem by not fully considering nutrient issues in planning.

³ Note that this document, along with the Task Activity Report Instructions, will be revised to include a reference to the Tributary Strategy and TMDLs in general.

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DEP staff will continue to review base plans in accordance with the regulations and the guidance provided in the Blue Book. Appendix I of the Blue Book contains the Plan Content and Environmental Assessment Checklist. Consultants should continue to use this checklist as well. It does not need to be revised at this point, as it requires (Item 8 in Part 2 and Item VII.D. of part 3) that Section 71.21(a)(5)(iii) be adequately addressed.

IV. Plan Revisions for New Land Development

Currently, the Tributary Strategy affects only new land development proposals that result in a point source discharge, either directly or indirectly. The use of new on-lot systems is not subject to nutrient reduction or the zero net TN and TP requirements. In the future, if additional nutrient reductions are necessary to meet Pennsylvania's commitment, this may change.

Implementation of the Tributary Strategy will change the new land development planning process for treatment facilities, as it exists. It is this part of the sewage facilities planning program that is most affected, as it is new land development that, for the most part, will ultimately be subject to the zero net TN and TP load restrictions.

The current planning practice only considers hydraulic and organic capacity as it relates to the treatment facility. Although not current practice, perhaps because it is assumed, the treatment facility's ability to meet its effluent limitations must be analyzed in every situation in which a new or expanding discharge is proposed.

A. Application Mailer

Requests for Planning Exemptions under Section 8 of the mailer are to be reviewed by DEP staff to determine compliance with Section 71.51(b)(2)(i). DEP staff will determine if the existing treatment facility is able to meet its cap load, based on an evaluation of the existing effluent quality. Where an existing treatment facility is not meeting its cap load, or will not be able to meet its cap load in accordance with the compliance time line in the existing permit, a planning exemption will generally not be granted.

B. Component 3

Component 3 and the Instructions have been revised.

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1. Existing Facilities

- (a) Existing facilities will receive TN and TP cap loads in their individual NPDES permits beginning in 2007. These cap loads will remain in effect until or unless the point source tributary strategy is amended. Note that the only way these cap loads can be increased is through application of offsets.
- (b) When a new land development proposal is submitted, the existing facilities will be required to not only certify that they have hydraulic and organic capacity available pursuant to Chapter 94, but also to document that the existing facility can accept the wastewater from the new development and still meet all of its effluent limitations, including the TN and TP cap loads according to any compliance timeline in the NPDES permit.
- (c) Where a treatment facility operator cannot provide documentation that a new land development project can be connected to their existing treatment facility without resulting in an effluent limit violation according to any compliance timeline in their permit, the planning submission may be considered incomplete, unless other acceptable measures (e.g. application of nutrient credits) are provided that result in zero net nutrient loads.

2. Expanding Facilities

- (a) It is the responsibility of the permittee and the municipality to ensure the compliance of its treatment facility with its cap loads for the duration of the design life of a facility.
- (b) Existing facilities proposing expansion will not be allowed to exceed the existing TN and TP cap loads for the facility once those cap loads go into effect under the permit. Increased discharge loads above those cap loads will have to be addressed as described in Section B.1. above, to result in a zero net discharge
- (c) The zero net discharge can be achieved by the permittee accepting sufficient nutrient credits from developers to account for new discharge loads, or negotiation of other arrangements including capital contributions for future treatment plant upgrades and expansions.
- (d) DEP will not get involved in negotiations between developers, municipalities and authorities, but instead, will rely on the documentation from the local government indicating that these issues have been resolved and that Section 71.21(a)(5)(iii) has been addressed.

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3. New Discharges (Excluding Land Application described above)
 - (a) There is no wasteload allocation of TN or TP available for new discharges.
 - (b) Unless sufficient offsets are provided as part of the land development project that result in a zero net discharge of TN and TP, the acquisition of nutrient credits must be part of any formal proposal to DEP for a new discharge.
 - (c) Upon submission of a complete, municipally adopted Act 537 sewage facilities planning module, DEP will use the estimated design annual average daily flow and nutrient loads from the new development, estimated offsets and their sources and the anticipated treatment levels to make a final determination regarding the credits needed for the specific planning proposal.
 - (d) Staff will contact the trading staff in the Water Planning Office regarding the availability of these credits or to convey information about any source of these credits that has been identified by the developer.
 - (e) An executed Letter of Intent between the developer and the source of nutrient credits must be part of the planning module submission, unless an actual contract for these credits is included. For phased developments, sufficient credits must be purchased for the first phase of the development prior to the issuance of a new NPDES permit.
 - (f) It is the responsibility of the developer and the municipality to ensure that credits are available for the duration of the design life of a project. This should be viewed as an operation and maintenance issue and handled similarly. The municipality must require assurances (see Sections 71.65, 71.71 and 71.72 of the DEP regulations) from the project sponsor.

C. Reimbursement

Section 6(a) of the Sewage Facilities Act (the Act) provides that grants may be given to counties, municipalities and authorities to assist them in preparing official plans and revisions to official plans for sewage systems required by the Act, and for carrying out related studies, surveys, investigations, inquiries, research and analysis. To the extent that studies or evaluations concerning sources of nutrient offsets such as non-point source BMPs or legacy sediments relate to the preparation of an official plan or plan revision, costs associated with such studies or evaluations may be eligible for grants under Section 6(a) of the Act.

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D. Additional Planning Guidance

1. On-lot System Connections Offsets

Implementation of the Tributary Strategy has created additional areas of evaluation that are now to be addressed by Sewage Facilities (Act 537) plans. One area is the retiring of on-lot systems.

Individual and community on-lot sewage systems, as defined in Chapter 71 of the regulations, rely on soil for the final treatment step and the ultimate disposal of sewage. The technology employed by the systems is not designed to remove nitrogen from the sewage. Eventually, the TN associated with these discharges to groundwater makes it to a surface waterway, and the Bay. The Bay Model estimates that about 4 percent of the total TN load delivered from Pennsylvania is from on-lot systems.

These TN loads have been measured as part of the total TN load delivered to the Bay from Pennsylvania. Since there is no method to measure the actual loads discharged to the environment from the on-lot systems, they have been included in the total non-point source loading to the Bay.

Each time an individual or community system is eliminated (retired), a small portion of the non-point source load is also retired. The most common scenario in which an on-lot system is eliminated is the connection of the source to a community sewerage system (defined in Chapter 71). In these cases, the TN load is transferred from the aggregate non-point source loading to the Bay to the aggregate point source loading to the Bay.

However, upon review of this scenario, it can be stated that the entire TN load from the source (calculated prior to retirement of the on-lot system) is no longer being discharged to the environment, and ultimately the Bay. The least stringent requirement for point sources of sewage is secondary treatment. Secondary treatment plants actually provide some denitrification, and the data show that they remove approximately 50 percent of the TN, based on influent and effluent concentration values. Therefore, each time an on-lot system is retired through connection of the source to a community sewerage system providing secondary treatment, approximately 50 percent of the TN loads from that source is also retired. Further, retiring on-lot systems through connection to community treatment facilities designed to denitrify to levels of less than 8 mg/l of TN will retire an even greater amount of the non-point source TN load reaching the Bay.

Pennsylvania's Tributary Strategy allows the loads retired as a result of on-lot sources connecting to community sewerage systems to be used to offset loads generated by new land development connections.

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In general, the Bay model is based on the assumption that each on-lot sewage system discharges an effluent to groundwater that contains about 45 mg/l of TN. The assumptions used in developing the model allow for some degradation through fate and transport, such that the load actually reaching the Bay is based on the average daily flow of the on-lot system at a concentration of approximately 39 mg/l, or about 31 lbs./yr.

For every individual on-lot disposal system (OLDS) that is connected to a POTW, a credit of 25 lbs may be given. This is an average value that will be applied to all OLDS connections. Retiring of community on-lot systems results in offsets as well, which are calculated using the ratio of the design annual average daily flow to 262.5 times the 25 pounds per year.

Retirement of on-lot systems does not result in a transfer of TP loads since on-lot systems do not contribute TP to the ground water.

Since the year 2002 is the base year for Pennsylvania's Tributary Strategy, facilities may request consideration of offsets for on-lot sewage systems retired through connection to a community sewerage system beginning on January 1, 2003. Any municipality, owner or operator of a facility requesting offsets for on-lot systems retired during that period must be able and willing to document the information required for the formulae above through an Act 537 base plan update.

Offsets for retired on-lot systems could play a vital role in allowing for increased loads needed for growth. Annual tracking of these types of offsets through the Wasteload Management program should be required.

2. Recycle and Reuse

The Department has published a separate guidance document for recycle and reuse of treated effluent. That document should be consulted for these types of proposals.

3. Land Treatment

The Department has published a separate guidance document for land treatment of treated effluent. That document should be consulted for these types of proposals.

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Appendix

DRAFT

**LETTER OF INTENT TO ENTER INTO A
NUTRIENT TRADING AGREEMENT**

The purpose of this document is to declare the intent of the signatories to arrange for the sale of nutrient credits under the Department of Environmental Protection's (DEP) Trading of Nutrient and Sediment Reduction Credits Policy, so that the buyer can make a demonstration required by the Department to show that its new or expanded discharge will not result in a net increase in nutrients delivered to the Chesapeake Bay.

PARTIES

Seller-

Buyer-

TERM

The Term of this document shall be _____, unless otherwise terminated by either party upon written notice to the Department.

PARTIES' INTENTIONS

The Buyer intends to purchase, and the Seller intends to sell, ____ credits of Nitrogen, and ____ credits of Phosphorus, according to the following schedule:

[describe timing]

BUYER'S CALCULATION OF CREDITS NEEDED

Buyer estimates that it will need ____ credits of N and ____ credits of P, based on

[describe]

CREDIT-GENERATING PROJECT

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[Enter a summary of the project]

SELLER'S CALCULATION OF CREDITS AVAILABLE FOR SALE

Seller has obtained a certification by the department of certain BMPs to generate the credits needed by Buyer. DEP correspondence is attached.

For the Seller-

Signature

Date

Name

For the Buyer-

Signature

Date

Name, Title