

**Standard Operating Procedure (SOP)¹ for District Mining Operations
Evaluating Non-Discharge Alternatives
SOP No. BMP-014
14 November 2023**

BACKGROUND

A non-discharge alternative (NDA) is a means of disposing of wastewater from a structure or activity that does not result in pollutants reaching surface waters of the Commonwealth. Antidegradation regulations [§ 93.4c (b)(1)(i)(A)] require applicants to evaluate non-discharge alternatives for any proposed discharge to a Special Protection watershed (High Quality or Exceptional Value). The use of non-discharge alternatives may also be proposed by applicants in other sensitive waters, such as streams without a waste load allocation (e.g., subject to a Total Maximum Daily Load (TMDL)), and to mitigate potentially degrading discharges.

Chapter 91 General Provisions cover potential pollution resulting from underground disposal [§ 91.51-52] and require that permitting of underground disposal be issued in accordance with Chapter 92a (relating to National Pollutant Discharge Elimination System permitting, monitoring and compliance).

The purpose of this document is to promote consistent procedures in the District Mining Offices for evaluating and permitting NDAs and to ensure that NDAs work as intended. This document focuses on infiltration methods, which is a commonly used NDA for mining operations.

PROGRAM OVERVIEW

The Anti-Degradation Supplement (5600-PM-BMP0007) is used by the applicant when a mining activity is proposed in Special Protection watersheds. This document outlines the process the applicant must undertake for permit approval, guiding them through the process of the non-discharge alternatives analysis and, if a subsequent discharge will still occur, the Anti-degradation Best Available Combination of Technologies (ABACT) process.

The applicant is required to individually evaluate use of each of the following NDAs:

- Alternative project siting (in whole or in part)
- Alternative discharge locations/discharging to another (non-special protection) watershed
- Infiltration – galleries or land application
- Limiting disturbed area (vertically or horizontally), extent and/or duration of mining
- Recycling/reuse of water onsite
- Constructed treatment wetlands
- Holding facilities and/or wastewater hauling
- Injection
- Vegetated riparian buffers

¹ Disclaimer: The process and procedures outlined in this SOP are intended to supplement existing requirements. Nothing in the SOP shall affect regulatory requirements. The process, procedures and interpretations herein are not an adjudication or a regulation. There is no intent on the part of the Department to give the rules in this SOP 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 policy statement if circumstances warrant.

- Specific pollution prevention processes
- Other(s)

Technical Guidance Document (TGD) 391-0300-002 “Water Quality Antidegradation Implementation Guidance” Chapter 6: Protection of HQ and EV Waters, Chapter 7: Non-Discharge Alternatives and Appendix D: Antidegradation Best Available Combination of Technologies for Mining Activities should be used for additional information on NDAs.

The applicant may also propose NDAs in situations where the receiving stream lacks assimilative capacity. This most commonly occurs in degraded watersheds that are not subject to a TMDL or where there is a TMDL in effect, but no waste load allocations are available to allow a discharge without restrictive effluent limitations.

PROGRAM SPECIFIC PRACTICES

The following are specific program practices regarding implementing NDAs on a mining permit.

Pre-application meetings are critical to evaluating operators’ proposals to meet the anti-degradation requirements and should be required. These meetings ensure that applicant understands the requirements for NDAs and can fully implement them as required once a permit is issued.

As part of the full application review, the reviewer considers feasibility and cost data submitted by the applicant in support of their conclusion to use or not use each non-discharge option. The regulations require that if feasible NDAs exist for the proposed mine site, they must be employed.

The permit reviewer/tech chief will make written findings specific to the Antidegradation requirements, which will be issued along with the permit, documenting the required use of NDAs, and explaining those that will be deployed at the mining operation in question.

As the NDAs are installed and implemented, the inspection staff evaluates the progress and oversees compliance with the permit conditions.

A. Permit Review

Infiltration evaluation

Many mining permit applicants elect to use an infiltration system or systems as their NDA. Infiltration systems are designed to prevent all discharges (from a treatment facility or a discharge from a sediment pond) to surface waters that result from a storm event that does not exceed the 10-year/24-hour criteria by directing water to the subsurface via infiltration galleries (usually buried) or land application (e.g. “spider pipes” which are placed on a bed of stone). Infiltration occurs within the system design area or adjacent to it.

- The permit reviewer will evaluate the design and the applicant’s demonstration that the infiltration of effluent water will not result in a discharge to surface waters via overland or subsurface pathways to surface waters. This constitutes a “no discharge” permit.
- Where infiltration galleries or land application is proposed as an NDA, the permit reviewer must have an adequate demonstration from the applicant regarding soil infiltration rates to justify the proposed design.
- The permit reviewer will evaluate this information and may request additional information to demonstrate that the plans and designs are reasonable and justifiable for the specific conditions and proposed activities.
- Considerations include ground slope, hydrological connection to the surface waters, and

seasonal conditions.

- Infiltration systems may not function properly when the ground near the system is frozen or saturated. Therefore, if the mine site is located in an area in which it is reasonable to expect that the ground will be frozen or saturated, the reviewer should discuss with the applicant whether an infiltration gallery is preferable to a land application system and consider other alternatives to manage effluent during the winter.
- The permit reviewer should ensure that the applicant has demonstrated that all other NDAs also meet the regulatory requirement to avoid discharge to the Special Protection or impaired water.

Protection of groundwater

- In an infiltration scenario, the permit reviewer will assess the applicant's demonstration that the groundwater quality is protected. An applicant should be required to characterize the effluent entering the infiltration system and to demonstrate that the existing groundwater uses will be maintained. In most cases, however, where sediment is the primary constituent of concern, any potential impact to the groundwater (or any subsurface connection to a surface water body) is reduced by the process of natural filtering through soils layers and bedrock before reaching the groundwater table.
- Occasionally, situations arise where an effective NDA includes infiltration within the pit. Examples of this include some sand and gravel and large anthracite pits. In these cases, while it may not be possible to establish effluent limits, a qualitative evaluation of the potential to adversely impact the groundwater should be done.

Determining soil types and infiltration rates

- Soil types and infiltration rates, and the means for testing these, should be discussed with the applicant during the pre-application process.
- A site investigation of the proposed infiltration area should be conducted as part of the pre-application review to look for limiting factors such as previous land disturbance, sinkholes, rock outcrops, or conditions that conflict with the published data or may result in the malfunctioning or ineffectiveness of the infiltration system. The permit-specific infiltration rate can be established either through calculations using the published values or via on-site infiltration testing. When using published data from the NRCS county soil surveys, or soil maps obtained from Pennsylvania State University to provide the necessary soil types and infiltration rates, the conservative (lower) end of the range of infiltration rates given should be used. When an applicant chooses to use published data, the Department can require on-site testing and calculations to confirm the accuracy of those data on the proposed site, depending on the degree of confidence there is in the published estimates and proposed rates.
- Collection of onsite data to determine specific soil type and infiltration rate may be necessary depending on site factors such as watershed designation, location, local geology, topography, expected life of mining, and other factors. In complicated or uncertain situations, the permit reviewer may require that a qualified soils professional provide the required data and analysis for the design of the system to ensure the permit will meet the regulatory standards for water quality. The Bureau of Watershed Management's TGD 363-0300-002 "Pennsylvania Stormwater Best Management Practices Manual", Appendix C – "Site Evaluation and Soil Testing" is a useful reference.

System Design

The typical infiltration gallery design involves installation of a trench or series of trenches where the infiltration piping will be buried below the frost line within stone fill. A typical land application system will be set on the ground surface and may also be covered with stone. The flow is dispersed through the system where it is introduced into the groundwater through perforated pipes.

Examples of conceptual designs are included in Figures 1, 2 & 3.

When infiltration is proposed, the permit reviewer will consider the following:

- Locations of the proposed infiltration systems are correctly depicted on the “Operations” map,
- Good correlation exists between the proposed NDA(s) and the anticipated volume and constituent load of the proposed wastewater stream,
- Operational narratives fully describe the function of the systems,
- System design specifications are included, and calculations are correct,
- A sampling port is available for monitoring the inflow to the system, and
- A thorough evaluation of the proposed infiltration area has been conducted to determine if there is any indication that soil type and site conditions may preclude acceptance of the effluent at the rates proposed.

SEDIMENTATION POND / TREATMENT BASIN
DISCHARGE MANIFOLD

NOT TO SCALE

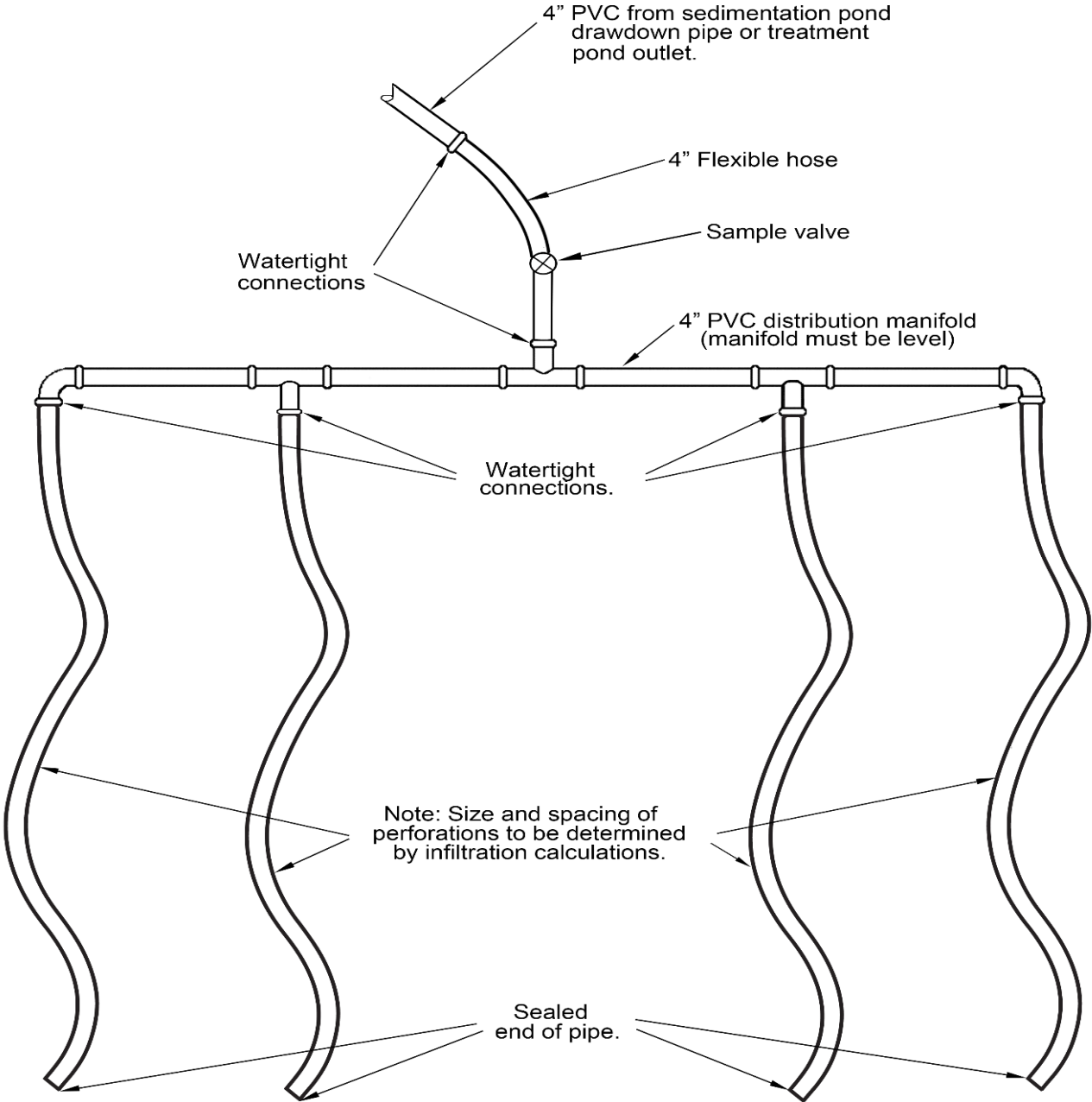
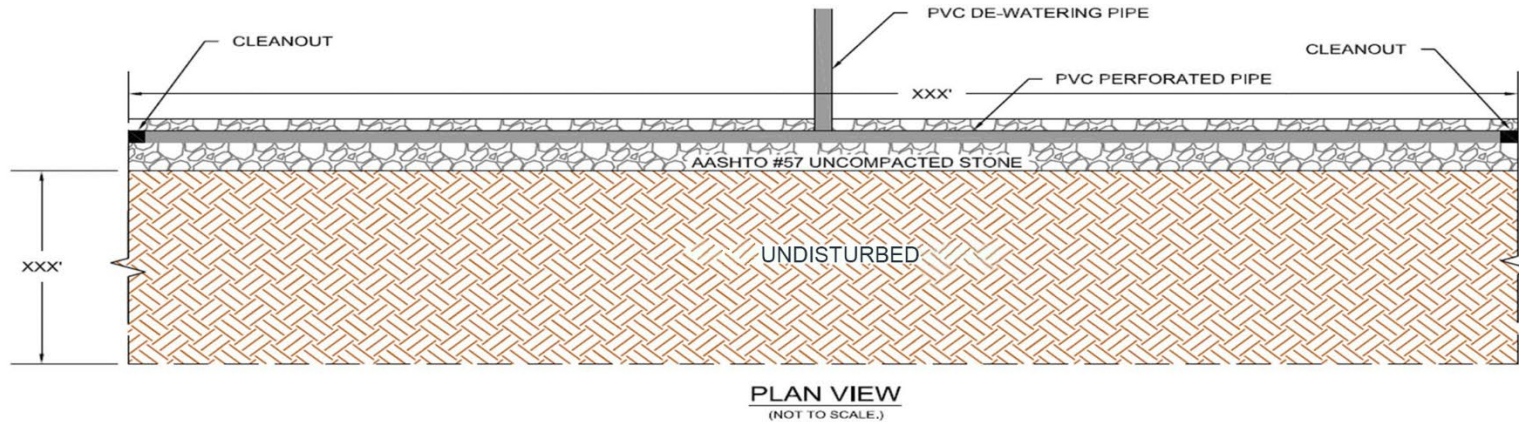
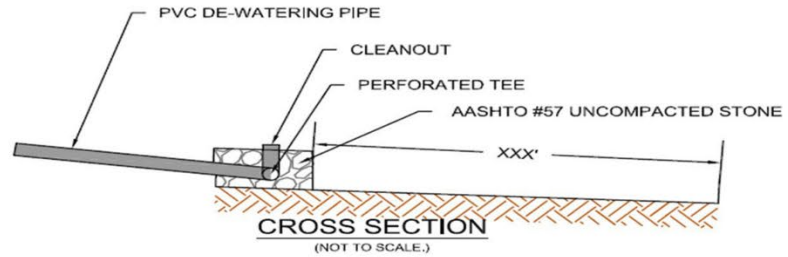


Figure 1

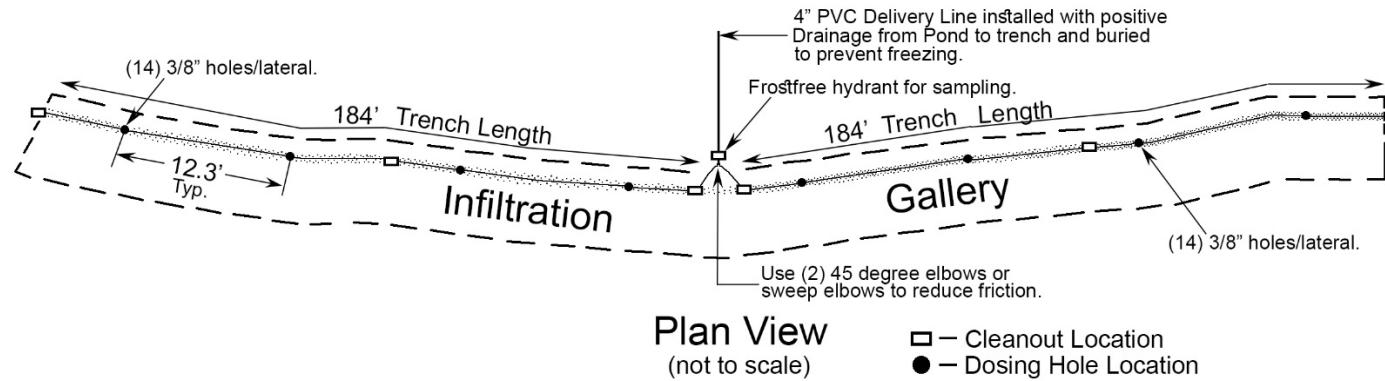
NOTES:

1. MINIMUM PERFORATED PIPE LENGTH IS 100'
2. SIZE AND PLACE PERFORATIONS ALONG THE PIPE TO ENSURE THAT WATER IS DISTRIBUTED THROUGHOUT THE LENGTH OF LAND APPLICATION SYSTEM.
3. ENSURE THAT FLOW BELOW THE SYSTEM DOES NOT BECOME CONCENTRATED BY SILT FENCE, MANMADE BENCHES, OR NATURAL DRAINAGE PATHS.
4. REQUIRED INFILTRATION AREA IS TO BE DETERMINED BASED ON THE RESULTS OF INFILTRATION TESTING AND/OR SOIL SURVEY PERMEABILITY INFORMATION.
5. LENGTH AND WIDTH OF INFILTRATION AREA TO BE DETERMINED BY SITE GEOMETRY AND REQUIRED INFILTRATION AREA.
6. LAND APPLICATION SYSTEM LIMITED TO 10% OR FLATTER SLOPES.
7. CLEANOUTS AND ENDS OF PERFORATED PIPE SHALL BE CAPPED.



ALTERNATE LAND APPLICATION SYSTEM TYPICAL DETAIL
(NOT TO SCALE.)

Figure 2



1. Trench to be installed level and along existing contours.
2. Clean-outs to be installed at ends of trench and at 10' maxim spacing along trench.
3. End clean-outs to be installed with 45 degree elbow and standpipe to surface with sealed cap.
4. Center clean-outs to be installed with 45 degree Wye and standpipe to surface with sealed cap.
5. Signs should be placed around the perimeter of the infiltration gallery warning people to not drive over the gallery to prevent soil compaction.

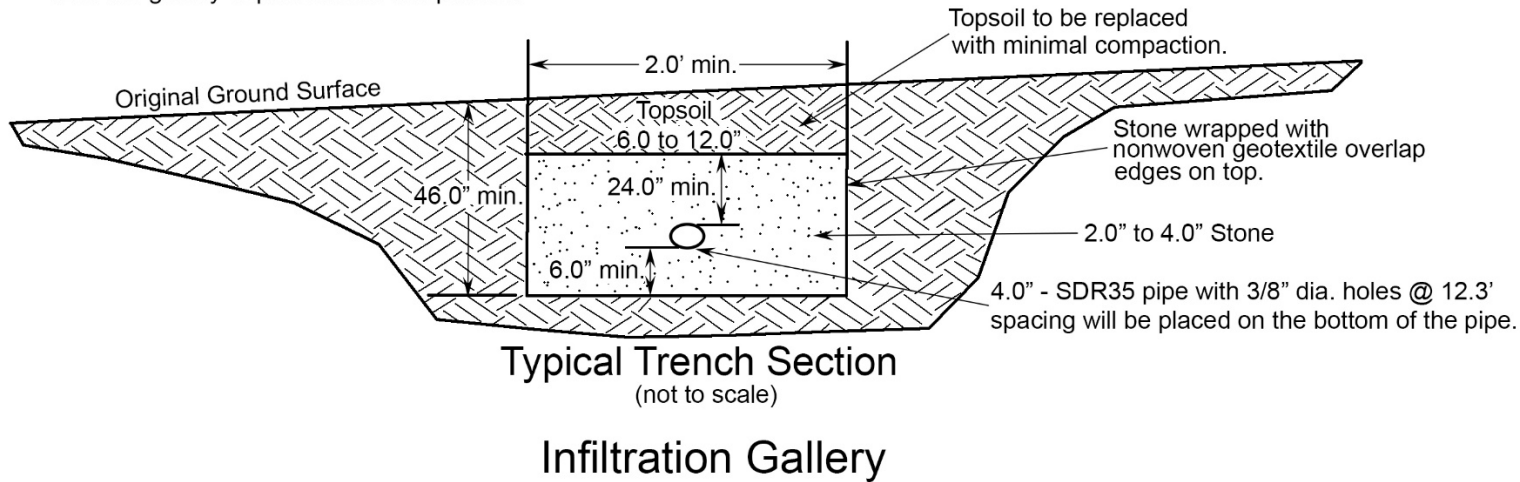


Figure 3

B. Permit Issuance

Above the list of outfalls in Sections A and B of the NPDES permit, check the box for “The facilities listed below utilize non-discharge technologies. Additional info is in section A.1 or B.1.”

Include the applicable limits in the NPDES Permit in Section A for treatment facilities and Section B for sediment ponds. The effluent limits for water entering the non-discharge alternatives are based on the applicable Best Available Technology (BAT) standards from the mining regulations that apply to the permit. Total Suspended Solids limits equal to the BAT standards that are applied to coal permits (i.e., 35/70/90 mg/L) should also be applied to water entering NDAs on noncoal permits in accordance with the established guidance for applying effluent limits to noncoal permits. A limit for alkalinity greater than acidity may also be applied to discharges into NDAs on noncoal permits if the site is in the coal measures of Pennsylvania or there is documented acidic overburden. The limits apply to samples taken at each infiltration system sample port, regardless of watershed designation or TMDL waste load availability. Treatment and sediment ponds that route effluent to the infiltration system should be designed to meet the applicable limits.

See **Table A – Discharge Limitation**

Emergency Spillways

When infiltration systems are proposed for a sedimentation pond, appropriate effluent limits are also assigned to the emergency spillway. This is necessary in scenarios when high precipitation causes the capacity of the infiltration system to be exceeded (i.e., in excess of the 10-year/24-hour event) and the facility discharges via the emergency spillway.

The effluent limits for an emergency spillway should be applied as they would for any other point source discharge (i.e. based on receiving stream designation/quality and TMDL status).

If permitting within a Special Protection watershed, non-degrading limits for the emergency spillway should be calculated according to TGD 391-0300-002 “Water Quality Antidegradation Implementation Guidance”.

See **Table B – Emergency Spillway**

NPDES Permit

Sections A.1 and/or B.1. should be included in the NPDES permit for the treatment ponds and sediments to document the NDA requirements.

Section A.1. NONDISCHARGE ALTERNATIVES

For HQ or EV Waters. This permit requires non-discharge alternatives in accordance with the Antidegradation requirements of 25 PA Code, Chapter 93.4(c) regulations relative to water quality standards. These regulations preclude any surface discharge to [receiving stream], which has a [designated or existing] use of [high-quality or exceptional value]. No point source surface discharges are allowed from treatment ponds. The details of the discharge methods from treatment ponds are contained in [Module] of the permit application materials.

[insert summary description of treatment and type of NDA]

[and/or]

For TMDL waters. This permit requires non-discharge alternatives in order to assure compliance with the approved [TMDL Name] TMDL. No point source surface discharges are allowed from treatment ponds. The details of the discharge methods from treatment ponds are contained in [Module] of the permit application materials.

[insert summary description of the NDA]

Section B.1. NONDISCHARGE ALTERNATIVES

For HQ or EV Waters This permit requires non-discharge alternatives in accordance with the Antidegradation requirements of 25 PA Code, Chapter 93.4(c) regulations relative to water quality standards. These regulations preclude any surface discharge to [receiving stream, which has a [designated or existing] use of [high-quality or exceptional value]. No point source surface discharges are allowed from sediment ponds except from the emergency spillway in response to a greater than 10yr/24hr precipitation event. The details of the discharge methods from sediment ponds are contained in [Module] of the permit application materials.

[insert summary description of treatment and type of NDA]

[and/or]

For TMDL waters. This permit requires non-discharge alternatives in order to assure compliance with the approved [TMDL Name] TMDL. No point source surface discharges are allowed from sediment ponds except from the emergency spillway in response to a greater than 10yr/24hr precipitation event. The details of the discharge methods from sediment ponds are contained in [Module] of the permit application materials.

[insert summary description of the NDA]

Note: District mining offices should reach out to mine operators to discuss the sites applicable effluent limits.

Recommended permit conditions

Effluent Characterization Conditions for NPDES Permit:

- If there is a point source discharge from a mine drainage treatment facility, the permittee shall provide analysis of samples collected from the mine drainage treatment outfalls no later than two years after the initial discharge of each facility in compliance with 40 CFR 122.21(k)(5)(vi). Specifically, sampling results are required for the pollutants listed in 40 CFR 122, Appendix D, Table III (Report all), and for Appendix D Tables II and IV for those that are expected to be present. This quantitative data requirement is subject to the small business exemption at 40CFR 122.21(g)(8) for Table II.
- If there is a point source discharge from a stormwater control facility the permittee shall provide analysis of samples collected from erosion and sedimentation control outfalls within two years of the initial discharge of each facility in compliance with 40 CFR 122.26(c)(1)(i)(G). Specifically, sampling results are required for the pollutants listed in 40 CFR 122, Appendix D, Table III (Report All), and for Appendix D, Tables II and IV for those that are expected to be present and pH, specific conductivity, temperature, alkalinity, acidity, iron, manganese, aluminum, sulfate, chloride, settleable solids, total dissolved solids, oil and grease, BOD5, COD, Kjeldahl nitrogen, and nitrate plus nitrite nitrogen. This quantitative data requirement is subject to the small business exemption at 40 CFR 122.21(g)(8) for Table II.

Additional conditions can be added to the permit to describe infiltration system limitations or specify system requirements including regular sampling, monitoring, and maintenance. The following are example permit conditions that may be considered:

- The infiltration system cannot be utilized if the ground is frozen or saturated. (for land application NDAs)
- The operator shall notify the mine inspector at the initiation of construction of each [type of NDA].
- The completed infiltration system must be certified by a licensed engineer (P.E.) or professional land surveyor (PLS) and "as built" drawings provided to the Department.
- Should the non-discharge alternative systems designed to handle treated wastewater and stormwater on this site result in a point source discharge or otherwise fail to function as designed, the permittee shall implement the Noncompliance Reporting procedures found in the Mandated National Pollution Discharge Elimination System Permit Conditions and Requirements section of this permit. The permittee must also, within fifteen days, submit and implement corrective design changes or make application for point surface discharge. This condition is not meant to limit any action the Department may take as the result of an unauthorized point source discharge, should one occur.

Entering NDA Outfalls into the Water Management System (WMS)

For a NPDES permit with NDAs, an outfall must be created in the Sample Information System (SIS). The outfall will be numbered sequentially like point source NPDES outfalls (i.e., 001, 002, etc.). Each outfall will have a Stage Code added for "NDA-Infiltration Port" and, if it is a Sediment Pond outfall, then it will also need a "NDA-Emergency Spillway" Stage Code. The effluent limits and reporting requirements would be added under each Stage Code.

001 - POND #1 - (SWO)	Limits Limit Period Details
Effective Period: Effective [4/1/2021] To Expiration [3/25/2026] Stage: NDA-Infiltration Port Report Frequency: Monthly eDMR: Yes Chesapeake Bay Annual Report: No	
001 - POND #1 - (SWO)	Limits Limit Period Details
Effective Period: Effective [4/1/2021] To Expiration [3/25/2026] Stage: NDA-Emergency Spillway Report Frequency: Monthly eDMR: Yes Chesapeake Bay Annual Report: No	

C. Post-issuance installation and function

Coordination between permitting and compliance staff is recommended to ensure the proper installation and function of the infiltration systems. The mine conservation inspector should inspect the infiltration system during construction and inform the permitting staff if the design or installation does not match the approved plans or if the plans appear insufficient for the anticipated water quantity or quality.

Further, the permit may require additional measures be deployed to evaluate infiltration system function including the use of downgradient monitoring wells, or the use of closely bracketed stream monitoring points near the location of the infiltration system. Temporary or permanent requirements are at the discretion of the permit reviewer, depending on the topography, geology, aquifer use, or stream designation.

If evidence exists to show that degradation is occurring, the inspector will take compliance action and inform the permitting staff. If repairs cannot resolve the issue, the permittee must revise the permit and conduct a new non-discharge alternatives evaluation.

TABLE A – Discharge Limitations

Waters entering the [Type of NDA] must meet the following instantaneous limitations:						
Outfalls: Grab samples are to be obtained via a sample port.						
DISCHARGE LIMITATIONS					MONITORING REQUIREMENTS	
Discharge Parameter	Minimum	Average Monthly	Maximum Daily	Instantaneous Maximum	Measurement Frequency* (minimum)	Sample Type
pH (S.U.)	6.0	N/A	N/A	9.0	2/Month	Grab
Total Suspended Solids (mg/L)	N/A	N/A	N/A	90.0	2/Month	Grab
Iron, Total (mg/L)	N/A	N/A	N/A	7.0	2/Month	Grab
Manganese, Total (mg/L)	N/A	N/A	N/A	5.0	2/Month	Grab
Aluminum, Total (mg/L)	N/A	N/A	N/A	5.0	2/Month	Grab
Net Alkalinity (as CaCO ₃ , mg/L)	0.0	N/A	N/A	N/A	2/Month	Grab
Alkalinity, Total (as CaCO ₃ , mg/L)	Report				2/Month	Grab
Acidity, Total (as CaCO ₃ , mg/L)	Report				2/Month	Grab
Temperature (°C)	Report				2/Month	Measured
Specific Conductance (µmhos/cm)	Report				2/Month	Grab
Sulfate, Total (mg/L)	Report				2/Month	Grab
Flow (gpm)	Report				2/Month	Measured
* The measurement frequency the minimum number of sampling events required. Permittees are encouraged to obtain more than the minimum number of sampling events, which provides a better demonstration of compliance.						

TABLE B – Emergency Spillway

During precipitation events GREATER THAN the 10-year/24-hour precipitation event, and for 24 hours after, the following alternate discharge limitations apply to discharges from the emergency spillways of stormwater facilities. The alternative discharge limits and monitoring requirements are subject to demonstration by the permittee that the discharge occurred only as a result of a precipitation event in accordance with [Applicable Reg, ex.25 Pa. Code §§ 87.103 (coal surface mining) or 89.53 (coal preparation facilities)].

<u>Outfall No.</u>	<u>Latitude</u>			<u>Longitude</u>			<u>To</u>
()	°	'	''	°	'	''	

Subject to the following instantaneous limitations:

DISCHARGE LIMITATIONS					MONITORING REQUIREMENTS	
Discharge Parameter	Minimum	Average Monthly	Maximum Daily	Instantaneous Maximum	Measurement Frequency* (minimum)	Sample Type
Total Suspended Solids (mg/L)	N/A	N/A	N/A	90.0	2/Month	Grab
pH (S.U.)	6.0	N/A	N/A	9.0	2/Month	Grab
Net Alkalinity (as CaCO ₃ , mg/L)	0.0	N/A	N/A	N/A	2/Month	Grab
Alkalinity, Total (as CaCO ₃ , mg/L)	Report				2/Month	Grab
Acidity, Total (as CaCO ₃ , mg/L)	Report				2/Month	Grab