

**New Hope Crushed Stone Quarry Reclamation Project
Primrose Creek Restoration Project
Emergency Pumping Relief Pipeline
Non-Coal Surface Mining Permit No. 7974SM3
Solebury Township, Bucks County, Pennsylvania**

Background:

The Pennsylvania Department of Environmental Protection's, Pottsville District Mining Office (Department) has the responsibility of reclaiming the forfeited surface mining permit at the New Hope Crushed Stone Quarry in Solebury Township, Bucks County, Pennsylvania. The quarry operations ceased in 2018 and the quarry pit has been filling with water since that date. (See **Drawing 1: NHCS Location**)

When the quarry was in operation, they had mined through the path of the Primrose Creek and maintained creek flow through pumping the water from the quarry to downstream Primrose Creek. Now that the quarry has filled, the Department must restore natural flow by building a channel from the quarry to the existing downstream reach of Primrose Creek.

Obtaining approval for design and construction of the channel has been challenging and in the interim, the Department has been pumping water at great expense in order to keep the quarry from overflowing in an uncontrolled manner over un-reclaimed quarry property. If the quarry was allowed to overflow in this manner, environmental harm may occur to the downstream Primrose Creek and wetlands due to the erosive effects of the flow of water.

The Department anticipates additional delay for channel design and construction and requests an Emergency Permit from the Department of Dam Safety to build a 435 foot long, 24" (24 inch) diameter pipeline at the natural stream gradient to convey the quarry overflow to Primrose Creek to alleviate the cost of pumping and allow the water to flow naturally.

Environmental Considerations:

The Department has conducted all necessary environmental evaluations for the construction of the Primrose Creek channel. The location of the proposed pipeline is within the footprint of the proposed channel. Please see attached PNDI and responses from the Pennsylvania Fish and Boat Commission and the Pennsylvania Department of Conservation and Natural Resources, Bureau of Forestry.

United States Army Corps of Engineers Approval for Project:

The Department has reviewed the channel project with the United States Army Corps of Engineers (USACE) and has received a Memorandum for Record stating that the channel project does not require any form of jurisdictional determination and qualifies as a non-reporting activity. Please see attached USACE Memorandum for Record

Pipeline design considerations:

When the quarry was operating, the quarry occasionally pumped a maximum of 16 MGD (24.75 CFS) of water from the quarry without environmental or property damage to downstream Primrose Creek. However, recent pumping volumes approach 14 MGD (21.66 CFS) and the Department has chosen 22 CFS as a design parameter and with a minimum design parameter discharge of 0.6563 MGD (1.00 CFS). The department proposes to construct a 24" HDPE pipeline within the footprint of the proposed channel to convey the water.

The pipeline invert at the quarry edge will be set at natural ground surface which may be approximately 98' MSL and the Pipeline invert at the point where the pipeline discharges into downstream Primrose Creek will be 91' MSL. These elevations have been determined by both survey of the site and an investigation into the historic natural ground elevation at the quarry edge.

A 435-foot long, 24" HDPE pipeline set at a 98' MSL inlet invert and an outlet invert at 91' MSL results in a gradient of 0.0161 ft/ft and will easily convey 22 CFS. Flow in the pipeline from storms producing more than 22 CFS will be relieved by an emergency preferential flow path adjacent and south of the intended route of the Proposed Primrose Creek Channel. The preferential flow path was created in 2022 as a directed path for water to flow if an extreme weather event should occur and has an approximate elevation of 101.5 feet MSL. Flow in the emergency preferential flow path will begin at approximately 15.07 MGD (23.33 CFS).

Pipeline Calculation Assumptions:

Project Location: Latitude 40°22'41.1", Longitude -74°58'34.5"

Quadrangle: Stockton

Township: Solebury

County: Bucks

Target Flow Quantity (Q) = 22 Cubic Feet Per Second (CFS)

Approximate Length of Pipeline (L) = 435'

Desired Pipeline Inlet Invert = 98' MSL

Desired Pipeline Outlet Invert = 91' MSL

Slope of Pipeline (S) = 7'/435' = 0.0161 ft/ft

Quarry edge elevation at Preferential Flow Path = 101.5' MSL

Free board above Pipeline Inlet Invert = 3.5'

HDPE Manning's n = 0.012

Downstream Primrose Creek Manning's n = 0.035

Pipeline sizing determination:

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| From Figure 1: Culvert Capacity Chart | Use 24" Pipeline (2') |
| From Figure 2: Critical Depth Chart (d_c) | Use 1.75' |
| From Figure 3: Inlet Control Nomograph (HW/D) (Square Edge with Headwall) | HW/D = 1.65 HW = 3.3' |
| From Figure 4: Outlet Control Nomograph (Find H) | H = 4.6' |
| From Figure 5: Design Computation Sheet (Controlling HW) | HW = 3.3' |

Use a 24" (2 foot) pipeline. Inlet Control

Calculation Check: FHWA HY8 Run attached

Pipeline will carry 22 CFS at a HW of 101.26' MSL which is 3.26' above the pipeline invert. At 101.5' MSL, flow in pipeline will be 23.33 CFS and flow will begin in the preferential flow path at elevation 101.5' MSL

Pipeline Outlet Protection:

From FHWA HY8 Run:

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| Tailwater Depth = | 0.75' |
| Velocity V = | 10.76 ft/sec |

Rip Rap Outlet

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| From Figure 6: | Minimum Length =12' Minimum Rip Rap = R-3 |
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From Figure 7: Apron minimum width at Outfall is 6', Minimum Length is 12', Width at end of Apron 12', Lined with R-5 Rip Rap.

Please see the following drawings for more information:

Drawing 2: Overview

Drawing 3: Plan View

Drawing 4: Cross Sections

Pipeline Installation:

Important Condition: Prior to Pipeline construction excavate a test trench from the quarry rim to elevation 101' or to the top of native material under the observation of the Department's Representative. Slope, step, stabilize the sides of the test trench as needed for Department's Representative to access within 3 feet of the bottom for observation of subgrade conditions. Remove all loose material from test excavation to expose subgrade for observation.

If native soil is not encountered above elevation 98' continue excavating the test trench eastward from the quarry with a bottom elevation 98' to Sta 3+25. If native soil is still not encountered, deepen the trench in increments no greater than 6" until native soil is encountered and set the outlet elevation at the elevation where native soil is encountered. If native soil is encountered above or below elevation 98', revise the grade of the channel. To the extent practical, keep a maximum of 1.7% channel grade as directed by the Department's Representative.

Pipeline Installation Sequence:

A generalized construction sequence is provided below. The construction sequence is meant to provide a general course of action in order to assist the contractor with construction of the pipeline. Necessary parts for proper and complete execution of work pertaining to this plan, whether specifically mentioned or not, are to be performed by the contractor. The contractor shall comply with all requirements, listed in this section. The contractor may be required to alter construction based on differing conditions encountered in the field. Pipeline installation shall be in accordance with practices detailed in ASTM D2321.

1. Use and maintain existing access road.
2. Locate the channel and pipeline centerline and extent of grading, with staking and/or flagging prior to construction.
3. Install silt fence near the existing stream as necessary before excavation. After excavation silt fence may be installed within excavation areas if necessary.
4. Strip and stock-pile topsoil if encountered.
5. Prior to Pipeline construction excavate a test trench from the quarry rim to elevation 101' or to the top of native material under the observation of the Department's Representative. Slope, step, and stabilize the sides of the test trench as needed for Department's Representative to access within 3 feet of the bottom for observation of subgrade conditions. Remove all loose material from test excavation to expose subgrade for observation.

If native soil is not encountered above elevation 98' continue excavating the test trench eastward from the quarry with a bottom elevation 98' to Sta 3+25. If native soil is still not encountered, deepen the trench in increments no greater than 6" until native soil is encountered and set the outlet elevation at the elevation where native soil is encountered. If native soil is encountered above or below elevation 98', revise the grade of the channel. To the extent practical, keep a maximum of 1.7% channel grade as directed by the Department's Representative.

6. Begin excavation for the pipeline from the downslope end at Sta 0+00. Match the elevation of the end of the pipeline to the existing stream channel.
7. Pump water as necessary out of the excavation area.
8. Install the R-5 Rip Rap Apron at the discharge end of the pipeline according to minimum dimensions listed in Figure 7.
9. Complete the installation of the pipeline up until the interface of the pipeline with the quarry pit at elevation at or near 98' MSL as determined in Step 5. Proceed upgradient maintaining an upslope barrier to protect the work until final connection is made. Installation of the pipeline shall be in accordance with practices detailed in ASTM D2321.
10. Install Controlled Low Strength Material Backfill – Anti Seep Collar at pipeline inlet at quarry edge.
11. Backfill and compact pipeline trench to average grade along pipeline path.
12. Grade and seed pipeline construction area with a permanent seed mixture.

Quarry Pumping Plan:

1. Maintain existing 8" and 12" pumps as needed to lower quarry water level to an elevation where water from the quarry will not infiltrate into pipeline trench and excavation of the trench can proceed safely.
2. Discontinue use of pumps only when pipeline construction and trench backfilling is completed, and installation of Anti Seep Collar is secure.

Erosion and Sedimentation Control Plan:

1. The contractor will install erosion and sediment controls as needed throughout the project.

2. The E & S Control Plan consists of minimizing sediment transport from the site primarily using temporary items such as: silt fence and stabilization of graded areas as soon as practical with vegetative cover and mulching.
3. Additional E & S controls, other than those specified, may be required for stockpiled materials and areas disturbed during stockpiling operations.
4. Runoff from graded areas adjacent to undisturbed areas shall be kept to a minimum and directed to the quarry pit if able.

Additional details regarding E & S Control BMP specifications, Construction Specifications as applicable to the pipeline installation and quarry dewatering information may be found in these drawings.

Drawing 5a: General Notes for Erosion Control BMP's

Drawing 5b: General Notes for Construction Procedure