FINAL REPORT:
CLINTON ROAD ACID MINE DRAINAGE REMEDIATION SYSTEM

Environmental Stewardship/Watershed Protection Project
Growing Greener Project Document No. 4100020380

Watershed: Montour Run (Allegheny County)
Grantee: Montour Run Watershed Association (MRWA)

DEP Project Advisor: Ron Horansky

A. Technical Report

1. Narrative Description of Project

   a. What was the project supposed to accomplish?

      (1) Immediate water quality improvement in the 2 1/2-mile-long West Fork of Enlow Run (a tributary to Montour Run) and positive impact on nine miles of the main trunk of Montour Run. A total flow on the order of 50 gallons per minute emerges at the Clinton Road site from several small mine seeps and from a more significant upwelling through partially regraded mine spoil.
      (2) Significant decrease in non-point-source acid and metals loadings (particularly aluminum) to the West Fork of Enlow Run.
      (3) Improved survival of fish and other aquatic life in the main trunk of Montour Run.
      (4) Preservation and enhancement of existing wetlands in the project area.

   b. What you actually did and how it differs from your plan?

      As documented in the attached detailed technical report, the project to design and construct the Clinton Road Acid Mine Drainage Remediation System proceeded in close compliance with plans:

      (1) A low-maintenance facility has been established and is successfully treating acid, metal-bearing drainage from abandoned surface and underground coal mines that previously degraded the West Fork of Enlow Run. Subcontractor tasks included design, permitting, erosion and sedimentation controls, clearing, access road construction, dewatering, grading, and revegetation.

      (2) The system consists of two vertical flow ponds – basically limestone- and mulch-filled basins that neutralize the acidity and precipitate the dissolved aluminum.

      (3) No formal wetland creation is included in this project; however, existing wetland areas are utilized and enhanced in the treatment process.

      (4) An Operation, Maintenance, and Replacement Plan is included in the detailed technical report.

c. What were your successes and reasons for your success?

(1) Based on the results of initial after-construction sampling, the passive treatment system that has been established in this project has reduced the acidity from about 300 to 14 mg/l and the total aluminum from about 32 to less than 5 mg/L in the discharge leaving the site.

(2) The acid and aluminum loadings to the receiving stream from the Clinton Road site have been significantly reduced. The system is preventing about 44,000 pounds of acid and 6,000 pounds of aluminum annually from entering the West Fork of Enlow Run. There also appears to be a significant reduction in iron loading. As a result, the health of an estimated 2 ½ miles' length of this stream has been substantially improved. Our success in obtaining these results has been due primarily to the capabilities of our prime subcontractor, N.A. Water Systems, and its sub-tier contractor, Quality Aggregates, Inc.

(3) Water quality in the main trunk of Montour Run has been positively impacted by the cleanup of Enlow Run, improving the survivability of fish and other aquatic life.

(4) The treatment ponds discharge to approximately 3 acres of existing wetland areas, which are being preserved and enhanced by the installation of these treatment facilities.

(5) The design and construction of the Clinton Road Acid Mine Drainage Remediation System was described in three issues of the MRWA's newsletter, "Montour Run Review," in three other newsletter issues, and in several articles in area newspapers. A pre-construction public tour of the site was conducted on March 14, 2004. An on-site dedication ceremony for the completed facility was attended by approximately 20 citizens and officials on June 2, 2006.

d. What problems were encountered and how you dealt with them?

Our main problem was related to delays and unanticipated efforts incurred in obtaining the necessary permits from the various agencies having oversight.

e. How your work contributed to solution of original problems?

The new system provides direct reductions in the environmentally damaging mine drainage originally entering Montour Run and one of its major tributaries from the Clinton Road site.

f. What else needs to be done?

Other implementation projects remain to be completed as per recommendations in the MRWA's Abandoned Mine Drainage Cleanup Plan, September 2003. A concurrent Growing Greener-funded project to design and construct the North Fork Montour Run Restoration Project was recently launched. This and other highly ranked AMD source remediations will eliminate much of the contamination that reaches the main trunk of Montour Run.

g. What are your plans for disseminating results of your work?

We will appear at a Findlay Township supervisors' meeting in the near future to present a copy of the detailed technical report. A copy will also be permanently placed on file at the West Allegheny Library in Imperial, PA. Additional copies will be sent to local Pennsylvania representatives, and a copy will be exhibited with the MRWA's public displays.

h. How well did your spending align with your budget request?

The $243,525 combined funding granted by the Pennsylvania Department of Environmental Protection, the Office of Surface Mining, and the Allegheny County Airport Authority for the Clinton Road project were completely consumed on the project tasks as proposed. An additional $10,000 in supplemental funding was granted by the Western Pennsylvania Watershed Program to subsidize construction activities.

2. Summary in 50 words or less suitable for sharing with the public:

A new facility has been designed, permitted, and constructed to treat acid, metal-bearing drainage from abandoned surface and underground coal mines on the property of Pittsburgh International Airport near Clinton Road in Findlay Township, Allegheny County. The system is preventing about 44,000 pounds of acid and more than 6,000 pounds of metals annually, primarily aluminum, from entering the West Fork of Enlow Run, a tributary to Montour Run. This was a project of the Montour Run Watershed Association with subcontractors N.A. Water Systems and Quality Aggregates, Inc. The total funding was $253,525 ($70,525 from a Pennsylvania Department of Environmental Protection Growing Greener Grant; $73,000 from an Office of Surface Mining Appalachian Clean Streams Initiative grant; $100,000 from the Allegheny County Airport Authority; and $10,000 from the Western Pennsylvania Watershed Program).

3. Accomplishment Worksheets: attached.

4. Photographs: attached.

5. Detailed Technical Report: attached.

6. Operation, Maintenance, and Replacement Plans: included as Section 4 of the detailed technical report.

B. Financial Report: submitted under separate cover.

This project was financed in part by a Growing Greener Grant provided by the Pennsylvania Department of Environmental Protection. The views expressed herein are those of the author and do not necessarily reflect the views of the Department of Environmental Protection.

Stan Sattinger
Vice President, MRWA
July 20, 2006

7010-FM-PPCA0010 9/2003

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Growing Greener
Goals and Accomplishments Worksheets

Project Name Clinton Road Acid Mine Drainage Remediation System

Project Number SW30137 County Allegheny

State Watershed Plan Name and Code Montour Run - 20G
(e.g., Clark-Paxton Creeks – 7C)

Date Prepared 07 / 20 / 2006 (month/day/year)

This Report is *(choose one)*:

☐ Project Goals

☒ Project Accomplishments *(to be submitted with final report)*

Project Type *(check all that apply)*

☐ Organization of a Watershed Group *(fill out Sheet A*)*

Watershed Assessments and Development of Restoration and/or Protection Plan *(check all that apply and fill out sheet B*)*

- ☐ AML/AMD
- ☐ Non-Point Source
- ☐ Assessment
- ☐ Development of Restoration Plan
- ☐ Development of Protection Plan

Implementation of Watershed Restoration and/or Protection Project *(check all that apply and fill out Sheets C, D, E, F, and G*)*

- ☒ AML/AMD
- ☐ Oil and Gas
- ☒ Non-Point Source
- ☒ Restoration
- ☐ Protection

☐ Demonstration *(fill out Sheet H*)*

☐ Education/Outreach *(fill out Sheet I*)*

*Please fill out all the appropriate information on the sheets corresponding to your project type. Leave blank any sheets or information on the sheets that do not apply to your specific project. If you have any questions call the Grants Center at 717-705-5400.

7010-FM-PPCA0010 9/2003

Receiving Stream West Fork Enlow Run / Findlay Township, Allegheny County name/location

Sheet C

Receiving Stream Benefits

Upstream Quality – Before		Upstream Quality – After	Downstream Quality – Before		Downstream Quality – After
Iron	13.5	5.3 mg/L	Iron	58.5	0.7 mg/L
pH	2.8	2.8 S.U.	pH	3.7	5.9 S.U.
Acid	392	307 mg/L as $CaCO_3$	Acid	270	13.8 mg/L as $CaCO_3$
Alk	<1	<1 mg/L as $CaCO_3$	Alk	BDL	9.7 mg/L as $CaCO_3$
Al	40.0	31.5 mg/L	Al	32.3	5.3 mg/L
Mn	3.5	3.2 mg/L	Mn	19.4	10.1 Mg/L

AMD Treatment

☐ Anoxic Limestone Drain TBD tons Limestone(LS)

☒ Successive Alkalinity Producing System (SAP)

1500 tons (LS) 625 yards tons organic matter

☒ Wetlands 3 existing and unmodified aerobic acres
_____ anaerobic acres

☐ Diversion Wells _____ #
_____ total LS capacity

☐ Settling Ponds _____ # _____ capacity (gpm)

☐ Limestone Channel _____ ft. OLC _____ ft. MOLC

☐ Limestone Dosing/Dumping _____ tons LS

☐ Reverse Alkalinity Producing Systems _____ #

☐ Bactericide Remediation _____ lbs/acre

☐ Beneficial Use of Dredged Material _____ tons

☐ Manganese Oxidizing Bacteria Systems _____ #

Total Treated Flow Rate

35-50 gpm average 100 gpm high

Predicted lifespan of system 20 years

Sludge Capacity 7-8 years

Contaminants removed/Contained by system (average)

Iron _____ ppd Al 16 ppd

AML

☐ Openings Closed _____ #

☐ High Walls Removed _____ Feet

☐ Land Remined _____ Acres

☐ Wildlife Habitat Improved _____ Acres

☐ Trees Planted _____ #

☐ Sealing Mine Portals _____ #
_____ wet or dry seal

☐ Revegetation _____ acres

☐ Grout Injection _____ tons

☐ Mine Capping _____ acres

Oil and Gas

Wells Plugged _____ #

Total Flow Before _____ gpm

Total Flow After _____ gpm

Contaminants Removed/Prevented

Iron _____ (ppd) pounds per day

Acidity _____ (ppd)

Alkalinity _____ (ppd)

Wildlife Habitat Created _____ acres

Describe Activities to Date:

7010-FM-PPCA0010 9/2003

ppd Acid 120 ppd

Excess Alkalinity added ______ ppd

pH change 3.5 influent 5.5 effluent

Sheet C

PHOTOGRAPHS OF THE CLINTON ROAD SITE

Fig. 1 - Seeps that discharged to the West Fork of Enlow Run prior to construction of the Clinton Road AMD Passive Treatment System.

Fig. 2 - Vertical Flow Pond No. 1, February 2006.

Fig. 3 - Vertical Flow Pond No. 2, February 2006.

Fig. 4 - Dedication ceremony for the Clinton Road AMD Passive Treatment System held June 2, 2006. Left to right: Ron Horansky, PADEP; Chris Caruso, Findlay Township Planning Commission; Ed Nelson, MRWA; Jason Orsini, Findlay Water/Sewer Authority; Donna Rosser, MRWA; Donna Walker, MRWA; Stan Sattinger, MRWA; PA Rep. Mark Mustio; Matt Campion, PA Senator John Pippy's Office; Mark Fedosick, MRWA; Kevin Gurchak, Allegheny County Airport Authority; Gary Klingman, Findlay Township Manager; Bob Anderson, N.A. Water Systems. Vertical Flow Pond #1 is visible at the left side of the photo.

Clinton Road Acid Mine Drainage Remediation System

FIG. 1

FIG. 2

FIG. 3

FIG. 4

Montour Run Watershed Association
Pittsburgh, Pennsylvania

Clinton Road Site AMD Passive Treatment System Construction Report

July 2006

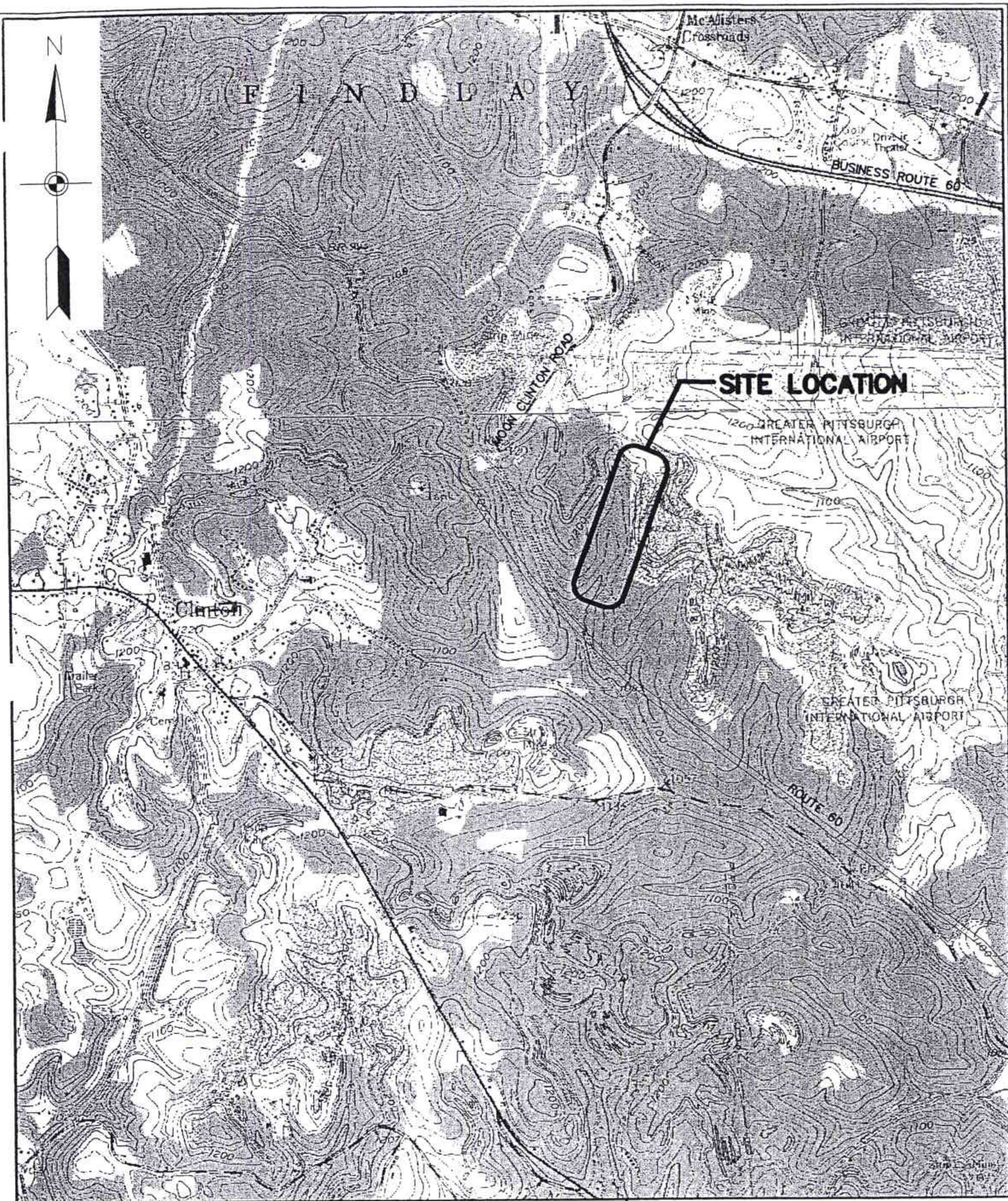
Montour Run Watershed Association
Clinton Road Site – Construction Report
AMD Passive Treatment System

Section 1
Project Description

This report describes the construction activities related to the installation of the acid mine drainage (AMD) remediation system on the Pittsburgh International Airport (PIA) property near Old Clinton Road and new Route 60 that has been designated the "Clinton Road Site." The AMD discharge at this site is characterized by relatively high acidity and dissolved metals, specifically aluminum.

The site is located on an isolated portion of the PIA property adjacent to a small, unnamed contributory valley to an unnamed stream to Enlow Run (see Topo location figure). The valley has been impacted by surface and underground mining activities, and much of the area either has not been reclaimed or has been graded for other purposes by the Allegheny County Airport Authority. The objective of the project was to improve the water quality discharging into a low area of the valley depression characterized by mine seeps and degraded wetlands. A passive, flow-through treatment system was constructed to reduce the amount of aluminum and provide some neutralization of the acidity in the mine discharges. The total flow into the valley area consists of several relatively small mine seeps and a more significant upwelling flow through partially regraded mine spoil.

The remediation system consists of two vertical flow ponds (VFPs) that have been designed to handle the average flow of the two main discharges. These vertical flow ponds are basically lime- and mulch-filled depressions that will neutralize the acidity and precipitate dissolved aluminum. The base flow/average dry weather flow portion of the AMD is conveyed into the VFPs through diversion structures and distributed throughout the VFPs via a piping network in the lime and mulch. The systems are designed to provide enough retention time for partial neutralization and enough pH adjustment to cause sufficient aluminum to precipitate out. Ultimately the flow is returned to the degraded wetland area where continued improvement will be achieved by the biological activity of the lowland vegetation. No formal wetland creation was included in this project. However, the existing degraded wetland areas, are utilized in the treatment process. Further down slope from the project area are two established wetland areas that are also beneficially utilized because of their position downstream of the treatment system.



Designer RGK	Lead SKE
Checker SKE	Manager RWA
Date 06/05	Scale 1''-2000'
Drawing 8888G010	Sheet 1

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BAR-1" AT PLOT SCALE

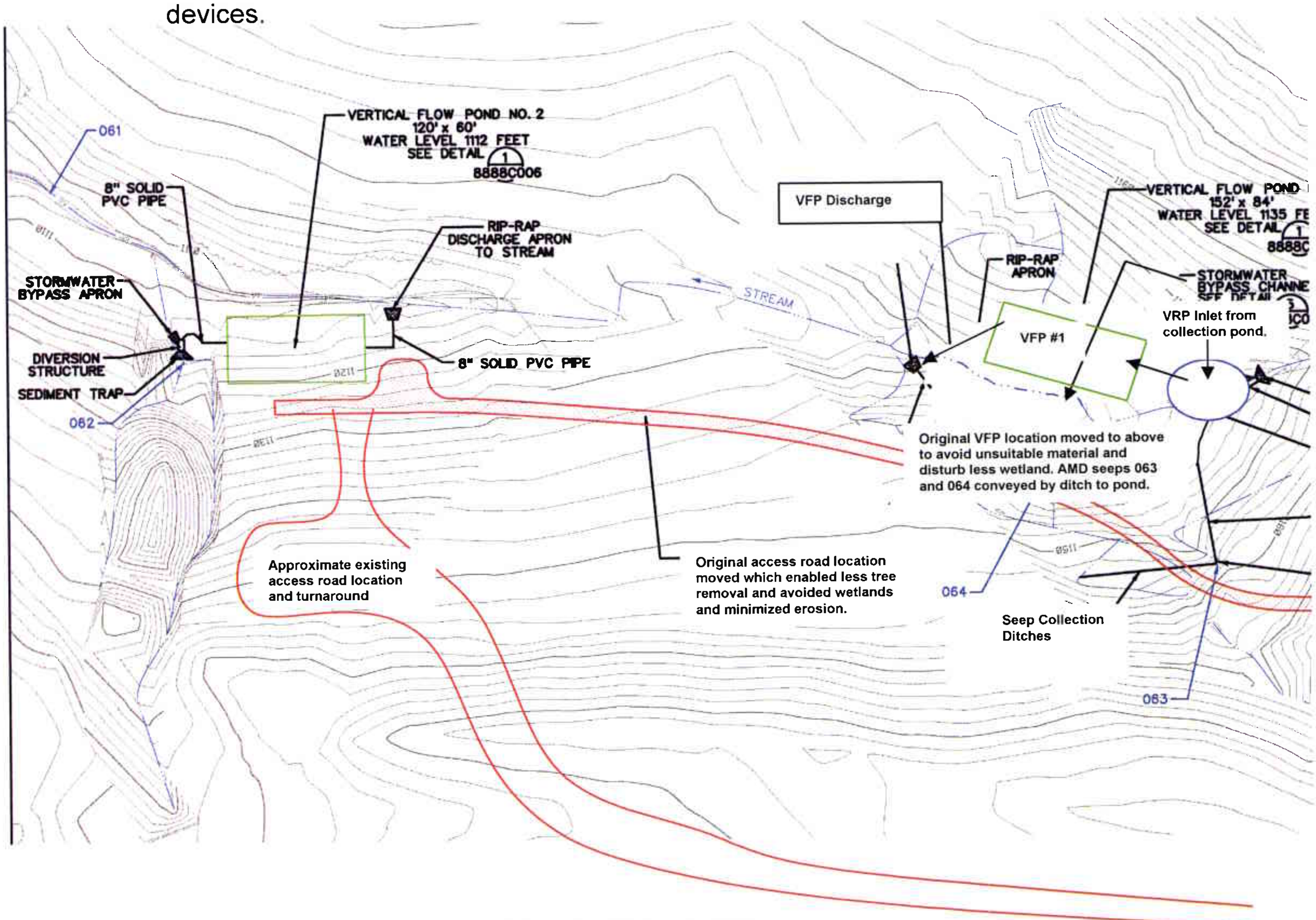
NA WATERSYSTEMS

VEOLIA Water Systems

TEL 1-412-809-6000
MOON TOWNSHIP, PA
PROCESS SOLUTIONS FOR THE WATER INDUSTRY

LOCATION MAP
CLINTON, PA
USGS GUADRANGLE
7.5 MINUTE SERIES
(TOPOGRAPHIC)

A series of drawings are included in the text of this document which show the construction details of the diversion structures and VFPs. Construction of the system followed the original design virtually throughout the project and the modification and exception are noted in this document. The VFPs are designed for neutralization of the median range of flows monitored at the site over the last several years by various entities. The original design flow for the upper VFP was 50 gallons per minute (gpm), and the lower VFP was designed for 20 gpm. Subsequent flow measurements resulted in a lower average flow. Therefore, the design basis for the upper VFP was revised to between 15 and 35 gpm. Stormwater diversion structures will be used to divert flow directly to the stream when flow amounts are exceeded. Diversion channels have been included to handle excess flow and prevent erosion as water moves past the VFP collection devices.



VFP LOCATION DRAWING TAKEN FROM DESIGN DRAWING SHOWING THE GENERAL AS-CONSTRUCTED CONFIGURATION OF VFP #1 AND VFP#2 WITH THE MAJOR ASSOCIATED CONVEYANCE AND COLLECTION STRUCTURES (SEE DESIGN FOR ORIGINAL LAYOUT)

Section 2
Construction Sequence

The following information provides a brief outline of the construction tasks (and sequence) that were conducted to construct the Clinton Road AMD Passive Treatment System. These tasks include:

- Mobilization
- Install E&S controls
- Clear/Grub to allow site access
- Begin grading work
- Construct access road (segments as needed)
- Install the upstream diversion structure
- Construct stormwater bypass channel to isolate area for VFP No. 1
- Construct VFP No. 1
- Construct discharge riprap apron for VFP No. 1
- Install 8-inch perforated pipe to collect seeps (or equivalent collection/conveyance feature)
- Install downstream diversion structure
- Construct VFP No.2
- Install AMD conveyance channels associated with VFP No. 1 and VFP No. 2
- Remove diversions and allow VFP No. 1, retention pond, and VFP No. 2 to fill with AMD water
- Adjust diversion structures to design flow requirements
- Finalize remaining grading work
- Re-vegetate where directed
- Remove E&S controls
- Demobilize

Montour Run Watershed Association
Clinton Road Site – Construction Report
AMD Passive Treatment System

Section 3

Modification from Original Design

The following minor modifications were incorporated into the actual construction due to reduced flow considerations and to limit access disturbance:

1. Extent of disturbed area for access roads has been reduced due to right-of –way clearance by the gas company. Future consideration for more permanent road should consider adverse weather conditions. The Airport Authority has assisting in providing access roads to the VFP structures.

2. As a result of 1, there was not the need for as much filter fence since disturbed area, including tree removal, was significantly reduced.

3. Eliminated HDPE liner. Geosynthetic was used with native clay and other excavated material to provide sufficient liner material.

4. VFP#1 has been reduced in size to more accurately address more average flow considerations. It was shifted slightly to the northwest (other side of valley) to avoid encountering unsuitable material and due to access constraints. This has lessened the amount of impact to the existing wetlands and enabled the AMD seeps to be collected more easily.

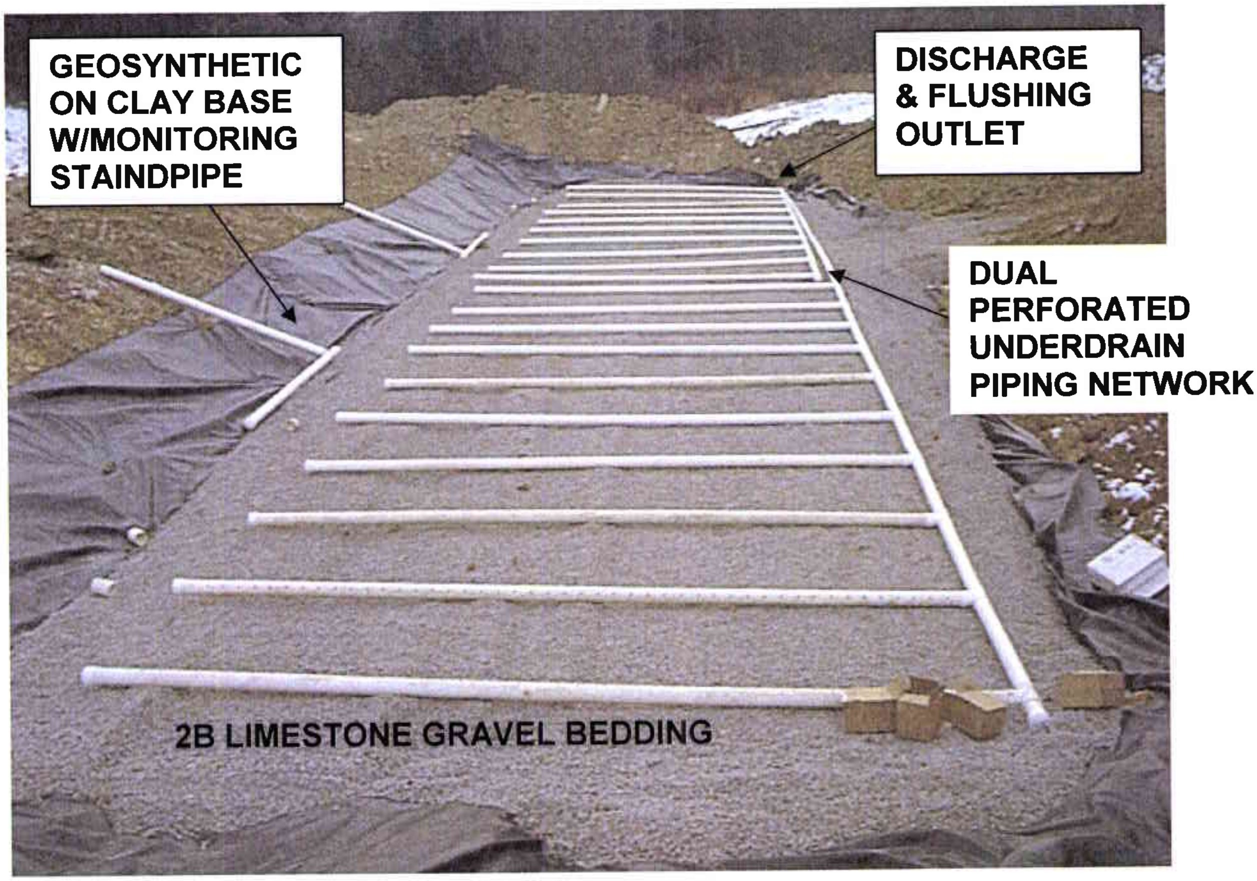
5. The auxiliary iron precipitation pond near VFP #1 was eliminated. In shifting the pond, the feature was deemed unnecessary. Most iron will precipitate in VFP or adjacent wetlands.

6. VFP#2 has been built to size specifications. The access road was configured to impact as minimal an area as possible given the room and material constraints across and around the gas line.

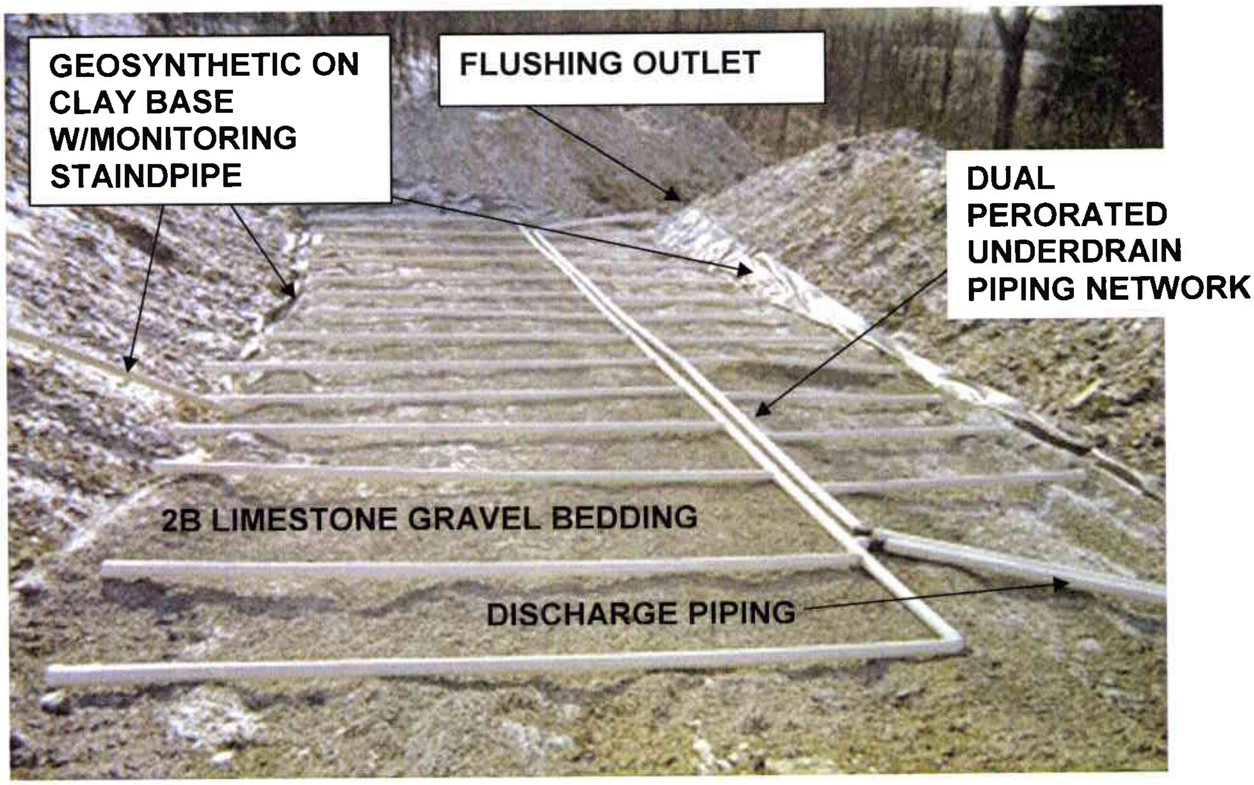
7. Flow control structures to VFPs were adjusted to the design flow as the ponds filled. Most of the flow was initially diverted to fill the VFPs and then scaled back to match the design flow.

8. The length and dimensions of the upstream stormwater diversion has been modified based on the adjusted configuration of VFP #1. The pre-existing watercourse has been used as much as possible for the storm water by-pass.

9. Final configurations of the PVC piping network at each VFP was based on size modifications and flow condition. At least 2 piping segments at each utilized at each VFP, see diagrams below.



VERTICAL FLOW POND #1 LOOKING DOWNSTREAM



VERTICAL FLOW POND #2 LOOKING DOWNSTREAM

Once the piping networks had been completed, the vertical flow ponds were filled with #3 limestone to the appropriate depth. The limestone was covered with compost and wood chips and then the ponds were filled until the mulch was covered.

Mulch Covering Limestone in Both VFPs

The acid mine drainage seeps were conveyed through drainage channels to a small collection pond at the head of each VFP. A valved inlet pipe was used to convey flow to the VFPs and control the flow rate from the collection pond. The water level in the VFP was controlled by telescoping discharge pipes that enabled each of the underdrain piping networks to be monitored, see figure below:

Discharge Piping and VFP Water Level Control

Section 4

Operation, Maintenance and Replacement

The ponds are designed to operate continuously at the design flow. Stormwater will by-pass the VPF intakes and be diverted around the structures. Periodic inspection of the ponds will consist of keeping obstructions from plugging the intake piping and valve at the collection ponds. When the quality of the discharge starts to show consistent degradation, the ponds can be flushed by opening the discharge valves (see figure) that are located at the toe of the downstream side of the ponds. There is flush valve for both piping segments of the underdrain network. The progression of precipitation of the metals within the pond can also monitored through the riser staindpipes which transverse along the slopes of the ponds. A piece of extension pipe with a coupling may have to be emplaced so that a bailer can be used at the monitoring pipes.

Flush Valves

Sizing of the ponds (neutralization/retention calibrations) was calculated on up to a 20 year life. However, it is projected that most of the metals precipitation will take place within the VFP itself. Other than periodic flushing, a significant retrofit should not be needed for at least 7-8 years. During periodic inspections, the integrity of the impoundments and the discharge pipes will be observed so that routine maintenance and repairs can be made if required.

Performance Results

The Army Corps of Engineers has requested that the performance of the remediation system will be monitored quarterly for the first 5 years. As of the preparation of this report, one round of data has been collected. Samples are collected from at least three sampling points. The monitoring network will include the main influent point for the system, designated 066, plus the upstream and downstream point on the receiving stream designated R-U and R-D, respectively. The locations of these point are include on the following figure.

The results of the initial round of sampling in comparison to the background sampling data is as follows:

	R-U	R-U	R-D	R-D	066
	10/11/2005	3/31/2006	10/11/2005	3/31/2006	3/31/2006
Flow	<5 gpm	25 gpm	30 gpm	95 gpm	65 gpm
pH	7.38	6.83	3.74	5.87	2.8
TSS	12	<2	27	22	<2
Sulfate	305	308	967	1010	826
T. Iron	2.3	1.97	58.5	0.7	5.3
Mn	2.4	0.57	19.4	10.1	3.2
T. Al	0.863	0.62	32.3	5.28	31.5
D. Al	NA	0.37	NA	<0.10	31.4
Acidity	BDL	<1	270	13.8	307
Alkalinity	137	90.3	BDL	9.7	<1

Notice the significant reduction in aluminum downstream receiving stream sample from the background data and from the main seep 066. There is even some alkalinity to the water which was a secondary objective of the project. Subsequent monitoring will determine the consistency of these results.

MRWA – Clinton Road AMD

Site Contours