

# **EROSION & SEDIMENT POLLUTION CONTROL PLAN NARRATIVE**

## **RHEEMS QUARRY 30 ACRE EXPANSION**

**PIERSON RHEEMS LLC**

West Donegal & Mt. Joy Township's  
Lancaster County, PA

May 28, 2024



A handwritten signature in black ink, appearing to read "Scott W. Akens".

*Prepared By:*  
*Akens Engineering Associates, Inc.*  
*219 East Main Street*  
*Shiremanstown, PA 17011*

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Soils Report  
Pond Certification

## **PROJECT DESCRIPTION**

The purpose of this report is to provide erosion and sedimentation pollution controls for a request to add 29.58 acres to the existing Large Noncoal Surface Mining Permit # 36080301. The mine site is located in West Donegal and Mt. Joy Township, Lancaster County, Pennsylvania, and is known as the Rheems Quarry. The proposed surface mine permit area is 132.22 acres. The quarry is located by travelling on PA Route 283 South to Rheems Exit, Right on Cloverleaf Rd. to Right on East Harrisburg Ave. through to West Harrisburg Ave. to intersection with Heisey Quarry Rd., Quarry on Left. The Elizabethtown and Columbia West, PA, U.S. Geological Survey 7.5-minute topographic maps contains the area described. The receiving stream is an unnamed tributary to Donegal Creek, which is classified as “TSF” (Trout Stocked Fisheries). The existing NPDES permit # is PA0224651. No changes are proposed to the existing NPDES permit, water rate or quality an additional point is proposed to address the concrete plant which will generally infiltrate.

## **EXISTING SITE CHARACTERISTICS**

The project site discharge is to an unnamed tributary to Donegal Creek, which is classified as “TSF” (Trout Stocked Fisheries). No additional or conflicting existing uses are indicated by information currently available via the Pennsylvania Department of Environmental Protection (PADEP) website. No changes in quantity or quality are proposed for the existing NPDES points.

The proposed expansion is located in an adjacent watershed which is an unnamed tributary to the Donegal Creek (West Tributary) which confluent with UNT that quarry currently discharges (East Tributary) to approximately 1 mile downstream. There are no current quarry discharges to the tributary to the west.

The existing land use where the proposed expansion is sited is agriculture which consists of rotated crops between soybeans and corn. The existing quarry operation has been completely stripped of topsoils and overburden which are stored in existing piles.

The soils within the proposed expansion areas are mapped as Hagerstown silt loam and Duffield silt loam. The Soils map is attached.

This application to mine is concerned with a 30-acre parcel of land located contiguous to the existing operation. Historically, as the quarry pit and the surface support area has been enlarged, virtually all stormwater runoff has drained to the pit sump, allowed to quiesce, and pumped through NPDES Discharge Point #1 to an unnamed tributary to Donegal Creek.

Surface water runoff from lands surrounding the quarry site is limited by the small upstream drainage areas as indicated on the drainage area map and StreamStats report for both tributaries. The total drainage area to Monitoring #3 is 21.84 acres and is from 7 residential properties. Monitoring point #3 is at the point where the PVC piping of the west tributary begins. Contributing to that piped system is runoff from industrial facilities AgriSource and the Wenger Group. The upstream drainage area of the quarry of the East tributary is 245.83 acres. The total contributing drainage area to NPDES 002 which is the downstream point from the quarry operation is 351.00 acres. The quarry

surface area that contains the stockpiles, office trailer, etc. lies along and very close to the Western edge of the unnamed tributary to Donegal Creek (East Trib). A stone berm provides treatment along a portion of the eastern edge of the quarry operation. A variance to use the area within 100' of the streams for support activities has been previously granted. From the south, the surface drainage pattern is away from the quarry.

## **CONCRETE PLANT**

A 13-acre parcel of land, owned by Pierson Rheems LLC, is located north of the Conrail Tracks and is separate from the land that is being quarried and the expansion but is within the Surface Mine Permit boundary. This is part of the upstream drainage area. The runoff from this area is collected, treated in the sediment trap near the entrance which has a volume 5325 CF. The pond is manually discharge using pumps to a 4" flexible discharge line to an infiltration bed shown on the plans. An additional NPDES point 003 is being proposed to cover this area. The area is generally a no discharge area due to the infiltration bed. This parcel is occupied by Delaware Valley Concrete.

## **PROPOSED SITE CHARACTERISTICS**

This application proposes to continue that existing operation. The 30-acre expansion will be accessed from the southwest area of the existing pit in such a way as to cause all precipitation runoff to drain to the existing pit sump.

## **SOILS DESCRIPTIONS**

The project site soils are comprised of:

**HaA - Hagerstown silt loam, 0 to 3 percent slopes**

**HaB - Hagerstown silt loam, 3 to 8 percent slopes**

The Hagerstown component makes up 90 percent of the map unit. Slopes are 0 to 3 percent. This component is on low hills on limestone valleys piedmonts. The parent material consists of residuum weathered from limestone. The depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. This component is in the F148XY026PA Moist, High Base-Saturation, Upland, Mixed Oak - Hickory - Conifer Forest ecological site. Nonirrigated land capability classification is 1. This soil does not meet hydric criteria.

**DbA - Duffield silt loam, 3 to 8 percent slopes**

The Duffield component makes up 90 percent of the map unit. Slopes are 3 to 8 percent. This component is on limestone hillslopes, piedmonts. The parent material consists of residuum weathered from limestone and siltstone. The depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-

swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. This component is in the F148XY026PA Moist, High Base-Saturation, Upland, Mixed Oak – Hickory – Conifer Forest ecological site. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

## WATER QUALITY MEASURES

The project includes the following water quality measures:

A combination of infiltration bed, silt barrier, sediment traps, sediment basin, and stabilized swales.

## PERMANENT BMP MAINTENANCE

### General Erosion and Sedimentation Pollution Control Notes:

Immediately upon discovering unforeseen circumstances posing the potential for accelerated erosion and/or sediment pollution, the operator shall implement appropriate best management practices to eliminate the potential for accelerated erosion and/or sediment pollution.

All pumping of sediment laden water shall be through a sediment control BMP, such as a sump or trap.

All channels must be kept free of obstructions such as fill ground, fallen leaves & woody debris, accumulated sediment, and construction materials/wastes. Channels should be kept mowed and/or free of all weedy, brushy or woody growth.

Vegetated channels shall be constructed free of rocks, tree roots, stumps or other projections that will impede normal channel flow and/or prevent good lining to soil contact. The channel shall be initially over-excavated to allow for the placement of topsoil. Sediment basins/traps shall be kept free of all trash, concrete wash water and other debris that pose the potential for clogging the basin/trap outlet structures and/or pose the potential for pollution to waters of the Commonwealth.

Sediment basins/traps must be protected from unauthorized acts of third parties.

Fill material for the embankments shall be free of roots, or other woody vegetation, organic material, large stones, and other objectionable materials.

Permanent stabilization is defined as a minimum uniform 70% perennial vegetative cover or other permanent non-vegetative cover with a density sufficient to resist accelerated surface erosion and subsurface characteristics sufficient to resist sliding

and other movements.

All disturbed areas will be stabilized, using permanent or temporary techniques depending on work remaining, within 20 days of the most recent earthmoving activity in that area, weather permitting.

### PERMANENT VEGETATIVE SURFACE STABILIZATION

For all areas that are to be brought to final grade in less than 20 days, vegetate with permanent ground cover as follows:

Ernst Conservation Seed ERNMX-181 Native Steep Slope Mix w/ Annual Ryegrass or equivalent. The mix should be applied at 60 lbs per acre. The seeding schedule has been attached to this report. Hydroseeding planting recommendations have been attached.

The permanent control measures and maintenance used in the erosion and sedimentation pollution control plan are silt fence barrier, swales, diversion ditches, sedimentation basins, and sediment traps.

### TEMPORARY BEST MANAGEMENT PRACTICES (BMPs)

#### TEMPORARY SEDIMENT POLLUTION CONTROL MEASURES

##### TEMPORARY VEGETATIVE SURFACE STABILIZATION

For all areas that are not to be brought to final grade within 20 days, or in the event of a construction delay of 20 or more days, revegetate with an interim groundcover as follows:

1. Prior to seeding, apply agricultural grade limestone at a rate of 3 tons per acre.
2. Fertilize with N at a rate of 100 pounds per acre and P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O, both at a rate of 200 pounds per acre.
3. Seed with annual ryegrass at a rate of 40 pounds per acre.
4. Mulch with hay or straw at a rate of 3 tons per acre.

*Notes:*

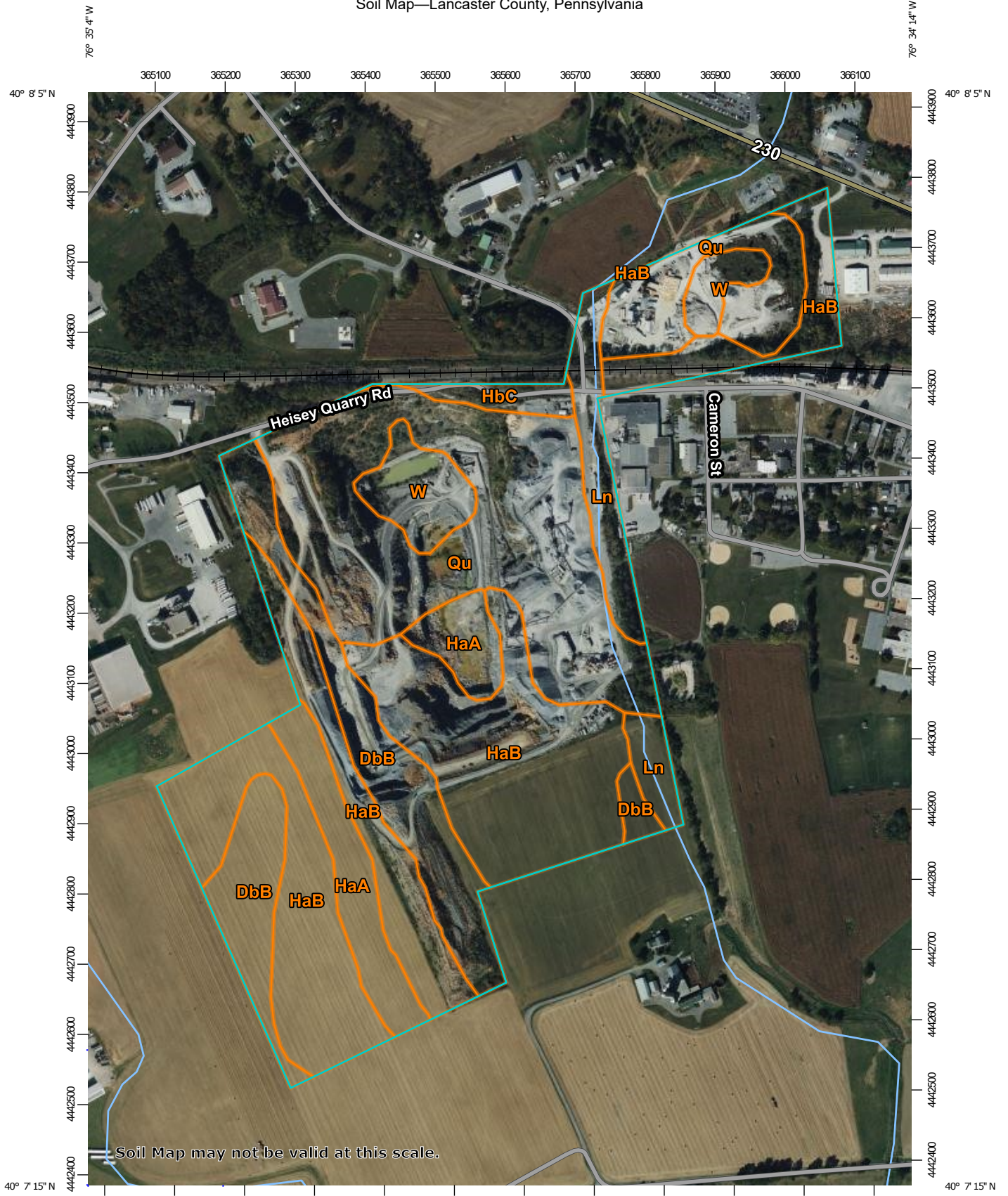
Seeding quantities and rates taken from Table 116, "Mixtures for Various Sites," and Table 115, "Seed Mixtures for Conservation Planting," The Penn State Agronomy Guide 1993-1994. Temporary Control Measures and Maintenance.

Until the site is 70% stabilized, all erosion and sedimentation control measures must be maintained properly. Maintenance must include inspections of all erosion and sedimentation control measures after each storm event, and on a weekly basis. All preventative and remedial maintenance work, including clean out, repair, replacement, regrading, re-seeding, re-mulching, and re-netting must be performed immediately.

STAGING OF EARTHMOVING ACTIVITIES AND  
EROSION AND SEDIMENTATION CONTROL MEASURES

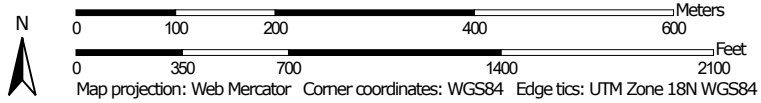
- STAGE 1: Install erosion and sedimentation pollution control facilities as shown on the plans, reports, and detail sheets. Install silt barrier/stone berm where shown.
- STAGE 2: Begin clearing and grubbing the northeast corner of the expansion area. The top two feet should be removed and stockpiled as shown on the operations map as prime agricultural topsoil stockpile. Remove enough overburden material to construct municipal berm and provide one season of cleared area for blasting. As the topsoil and overburden piles reach the final proposed limits seed with a permanent seed mixture.
- STAGE 3: Clear and grub in a southwesterly direction as needed to provide one season of blasting area with the topsoil stockpiled in the prime ag storage pile. Maintain drainage patterns to the existing pit.
- STAGE 4: Maintain all sediment facilities throughout quarry operations. Inspecting facilities as specified above.
- STAGE 5: Upon completion of mining activities reclamation should be completed as specified in the reclamation plan. Use prime agricultural topsoil pile to re-establish farming areas. Stabilize all disturbed areas. Remove all equipment and erosion control facilities.

Soil Map—Lancaster County, Pennsylvania




Soil Map may not be valid at this scale.

Map Scale: 1:7,590 if printed on A portrait (8.5" x 11") sheet.



### MAP LEGEND

**Area of Interest (AOI)**

 Area of Interest (AOI)




















**Soils**







 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

**Special Point Features**






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features


**Water Features**

 Streams and Canals

**Transportation**

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

**Background**

 Aerial Photography

### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

**Warning:** Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL:  
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lancaster County, Pennsylvania  
 Survey Area Data: Version 22, Sep 4, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 6, 2020—Nov 7, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
DbB	Duffield silt loam, 3 to 8 percent slopes	19.4	14.2%
HaA	Hagerstown silt loam, 0 to 3 percent slopes	9.8	7.2%
HaB	Hagerstown silt loam, 3 to 8 percent slopes	49.5	36.3%
HbC	Hagerstown silty clay loam, 8 to 15 percent slopes	2.0	1.5%
Ln	Lindside silt loam	7.3	5.3%
Qu	Pits, quarry	41.9	30.7%
W	Water	6.5	4.8%
<b>Totals for Area of Interest</b>		<b>136.4</b>	<b>100.0%</b>

Basin Inspection, Report, & Certification  
Rheems Quarry  
SMP 36080301  
NPDES PA0224651

Mt. Joy & West Donegal Township &, Lancaster County, PA

Prepared for:

Pierson Rheems, LLC  
P.O.Box 430  
Woodstown, NJ 08098

Date:  
May 21, 2024

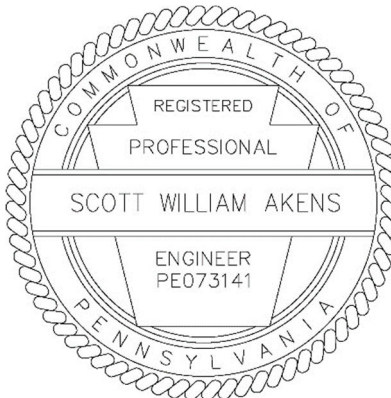
as prepared by:



**Akens Engineering Associates, Inc.**

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*Scott W. Akens*

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## 1.0 Introduction

### 1.1 Executive Summary:

This report is being submitted to the Pennsylvania Department of Environmental Protection specifically to address correspondence from William S. Allen, Jr., Director, Bureau of Mining Programs regarding a policy notification for Impoundment Certifications.

This report and attached addendums will address specifically impoundments already built. For those sediment ponds, treatment ponds, processing ponds, and sediment traps with a volume over 2,000 cubic feet that are in place at noncoal mines, bituminous coal mines, and bituminous prep plants that have not been previously certified, an as-built certification must be submitted. If design information for the impoundment is not available, that column of the applicable form (Treatment or Sediment pond) should be left blank and only the "as constructed" information should be provided. The as-built certification must be submitted by the permit anniversary date. After the as-built certification is submitted, annual certification should be submitted for these impoundments at bituminous coal mines and bituminous prep plants in accordance with 25 Pa Code Sections 87.112 and 89.101.

### 1.2 General Site Information:

The subject site is located in Mt Joy Township, Lancaster County, PA. The site is permitted as a Large Noncoal Surface Mine SMP# 36080301 and has an NPDES Permit # PA0224651. The SMP permit area is 132.22 acres with 115.04 acres bonded.

This Surface Mine Permit was originally issued on October 31, 2008.

We have attached a completed Sediment Pond Certification forms for each of the existing facilities constructed on the permit. We also included detailed maps of each facility.

## 2.0 Inspection Report

On May 17, 2024 Akens Engineering personnel (Dale Jackson) under the supervision of Scott W. Akens Licensed Professional Engineer conducted an inspection and completed an “As-Built” survey for the existing facilities.

### Sediment Trap #1

There are no known designs for these ponds. The pond is functioning appropriately. Visual inspections show no problems with function, stabilization, or embankment structural competency. Flows are from stormwater runoff from haul roads and plant area. Volume was confirmed as follows:

$$\text{Depth } 13' \times \text{Avg width } 16' \times \text{Avg length } 25.6' = 5,325 \text{ CF}$$

### Infiltration Bed

There are no known designs for this feature. It was reported the bed is functioning properly. Visual inspections show no problems with function, stabilization, or embankment structural competency. Flows are from stormwater runoff from haul roads and plant area. The flows are pumps manually turned-on which pumps through a 4” flexible discharge line to a 12” steel pipe which is driven into the filled in quarry pit.

Appendix A  
Site Plans

Appendix B  
Pictures



CONCRETE PLANT SEDIMENT TRAP #1



SEDIMENT TRAP DISCHARGE TO INFILTRATION BED 12" STEEL PIPE

Appendix C  
Certification Forms



### SEDIMENT POND CERTIFICATION

Permittee: Pierson Rheems, LLC Site Name: Rheems Quarry SMP No.: 36080301  
 Engineer/Land Surveyor: Akens Engineering, Inc. Structure ID #: Concrete Pond 1 NPDES Outfall ID #: P. 003  
 Location (point of discharge): Latitude (DMS): 40° 07' 54.13" Longitude (DMS): -76°34' 33.63"  
 Drainage Area: 10.10 acres Design Storm: 10 year / 24 hour Rainfall Amount: 4.48 inches  
 Average Watershed Slope: 2.73 Land Use: Quarry Soil Type: Quarry Pits Curve Number: 98  
 Peak Discharge: N/A cubic feet/second NPDES Average Flow: No Dis. mgd NPDES Design Flow: N/A mgd

	<i>Permit Application</i>	<i>As Constructed</i>
Embankment	Top Width (Minimum)	3'
	Outside Slope (Maximum) (H:V)	3.5:1
	Inside Slope (Maximum) (H:V)	3.5:1
	Top Elevation	379.33
	Bottom Elevation	370.11
	Upstream Toe Elevation	390.00
	Downstream Toe Elevation	383.00
	Type of Cover	Soil/Rip Rap
	Incised Slope (if any)	
	Inside Slope (Maximum) (H:V)	1:1
	Top Elevation	381.11
Bottom Elevation	368.11	
Principal Spillway	Type	N/A
	Conduit Diameter (if barrel/riser give both)	
	Inlet Elevation	
	Outlet Protection	
Dewatering Device	Spillway Capacity (cubic feet/second)	
	Type/Size	4" Flex
	Inlet Elevation	422.88
	Discharge Regulation (self-draining or valved)	Manual Pump to infiltr.
	Discharge Capacity (cubic feet/second)	0.579 CFS
Emergency Spillway	Time to Dewater Full Pond	8 hours
	Type	N/A
	Width	
	Depth (with 2 feet of freeboard)	
	Length	
	Sideslopes (H:V)	
	Crest Elevation	
	Slope	
Type of Lining/Protection		
Storage Capacity	Spillway Capacity (provide design calculations)	
	Length @ Bottom	12.0'
	Width @ Bottom	16'
	Length @ Dewatering Device	20'
	Width @ Dewatering Device	35'
	Volume @ Dewatering Device	5,319 CF
	Length @ Principal Spillway	N/A
	Width @ Principal Spillway	N/A
	Volume @ Principal Spillway	N/A
	Length @ Crest of Emergency Spillway	N/A
	Width @ Crest of Emergency Spillway	N/A
	Volume @ Crest of Emergency Spillway	N/A

Will the sediment pond be constructed in previously disturbed, fractured, or unconsolidated material?  Yes  No

If yes, specify the type of liner that will be used: \_\_\_\_\_

## SEDIMENT POND CONSTRUCTION CERTIFICATION

Permittee: Pierson Rheems, LLC Site Name: Rheems Quarry SMP No.: 36080301  
 Engineer/Land Surveyor: Akens Engineering, Inc. Structure ID #: Concrete Pond 1 NPDES Outfall ID #: P. 003

- |  |   |  |  |
|--|---|--|--|
| 1. Has the facility been constructed at the location shown in the approved permit?           | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No            |  |
| 2. Is the emergency spillway constructed at the location shown in the approved plan?         | <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No |  |
| 3. Is the principal spillway constructed at the location shown in the approved plan?         | <input type="checkbox"/> Yes            | <input type="checkbox"/> No            | <input checked="" type="checkbox"/> NA |
| 4. Is the dewatering device constructed at the location shown in the approved plan?          | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No            |  |
| 5. Are the collection channel inlets constructed at the location shown in the approved plan? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No            |  |
| 6. Do the collection channel inlets have adequate inlet protection?                          | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No            |  |
| 7. Has the liner been installed in accordance with the approved plan?                        | <input type="checkbox"/> Yes            | <input type="checkbox"/> No            | <input checked="" type="checkbox"/> NA |
| 8. Has the non-discharge alternative been constructed in accordance with the approved plan?  | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No            | <input type="checkbox"/> NA            |
| 9. Was coal encountered during construction of the pond?                                     | <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No |  |
| 10. If yes, was a liner used?  | <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No |  |
| 11. Identify any conditions or deficiencies in the facility that need to be corrected.       |   |  | <input checked="" type="checkbox"/> NA |
- See Attached Report
- 
- 
- 

### Stage of Construction

(specify stage e.g. layout, impoundment/embankment construction, spillway/piping installation, non-discharge alternative construction)

Stage of Construction	Date of Inspection	Inspected By
Completion	05/17/2024	Dale Jackson

Supervising Professional Engineer/Registered Professional Land Surveyor Scott W. Akens  
 Address and phone 219 East Main Street  
Shiremanstown, PA 17011  
717-975-9933

I certify in accordance with 25 Pa Code Section 77.531, 87.112, 89.101, or 90.112 that the above-mentioned structure is complete and has been constructed.

*Scott W. Akens* 05/17/2024  
 Signature of Registered Professional Engineer/Registered Professional Land Surveyor Date

PE073141 09/30/2025  
 Registration Number and Expiration Date



*Chris Emel* 5-24-24 G-M  
 Signature of Permittee or Responsible Official Date Title



**NOAA Atlas 14, Volume 2, Version 3**  
**Location name: Elizabethtown, Pennsylvania,**  
**USA\***

**Latitude: 40.1318°, Longitude: -76.5758°**  
**Elevation: 413 ft\*\***

\* source: ESRI Maps  
 \*\* source: USGS



**POINT PRECIPITATION FREQUENCY ESTIMATES**

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M. Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerals](#)

**PF tabular**

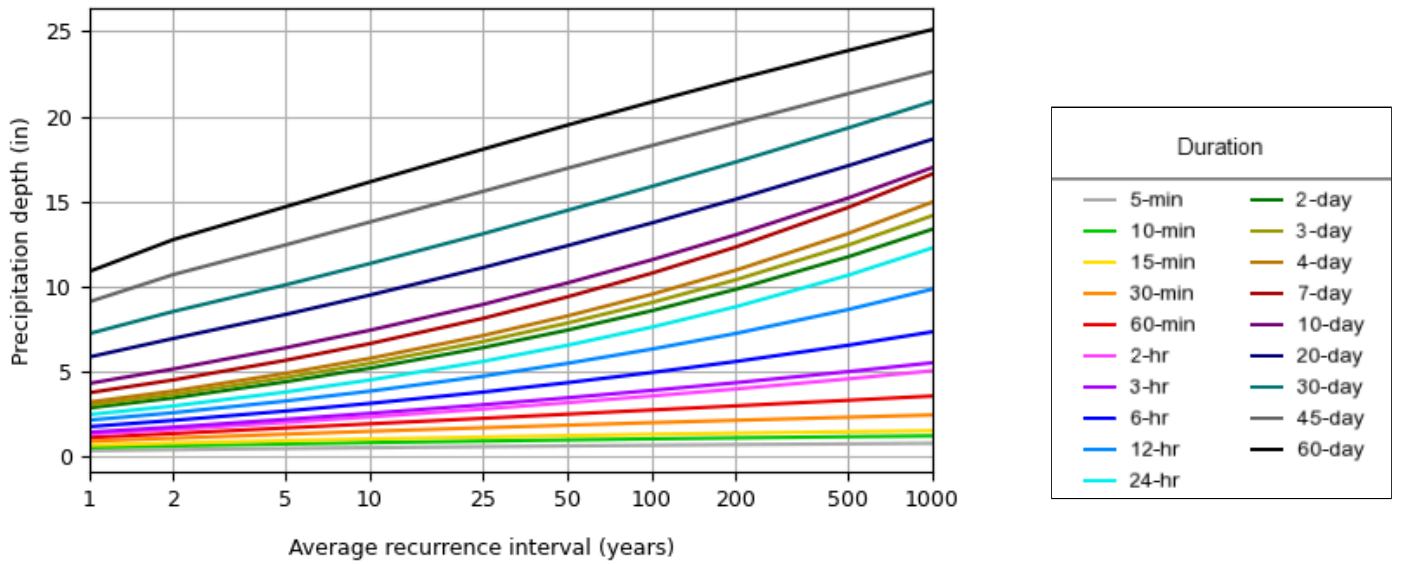
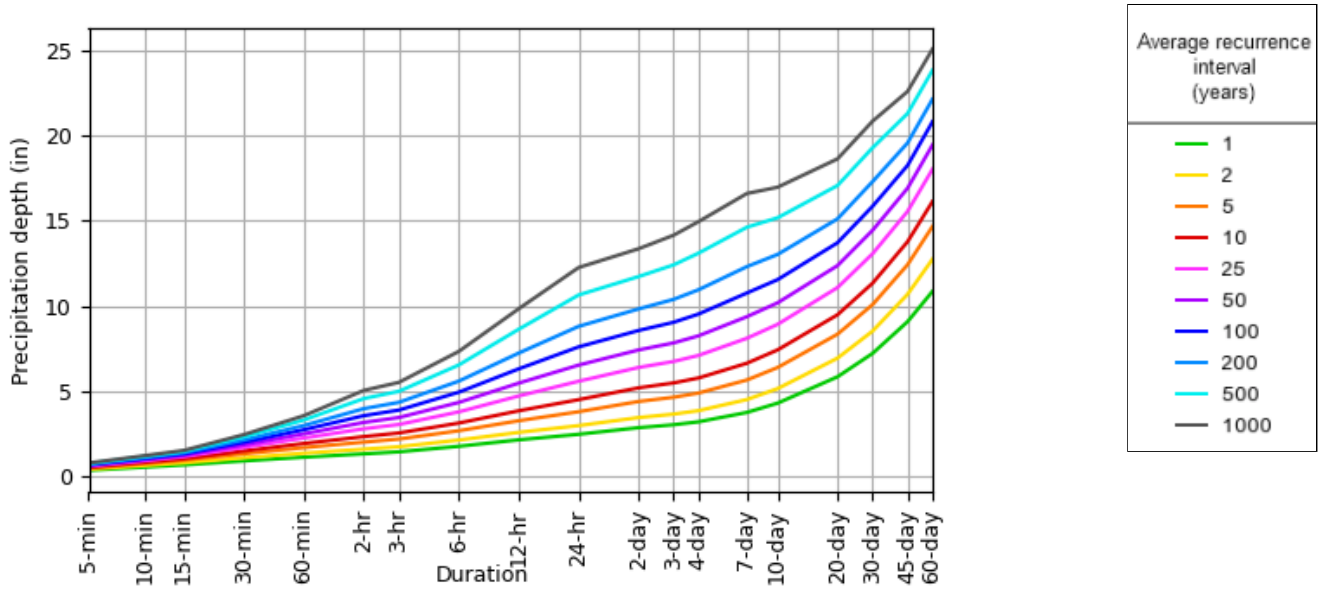
<b>PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)<sup>1</sup></b>										
<b>Duration</b>	<b>Average recurrence interval (years)</b>									
	<b>1</b>	<b>2</b>	<b>5</b>	<b>10</b>	<b>25</b>	<b>50</b>	<b>100</b>	<b>200</b>	<b>500</b>	<b>1000</b>
<b>5-min</b>	<b>0.321</b> (0.289-0.356)	<b>0.382</b> (0.344-0.425)	<b>0.450</b> (0.404-0.500)	<b>0.499</b> (0.447-0.553)	<b>0.558</b> (0.498-0.618)	<b>0.600</b> (0.534-0.664)	<b>0.641</b> (0.568-0.709)	<b>0.678</b> (0.598-0.751)	<b>0.723</b> (0.633-0.800)	<b>0.757</b> (0.659-0.839)
<b>10-min</b>	<b>0.512</b> (0.462-0.569)	<b>0.610</b> (0.549-0.679)	<b>0.720</b> (0.648-0.801)	<b>0.797</b> (0.716-0.885)	<b>0.889</b> (0.794-0.984)	<b>0.955</b> (0.850-1.06)	<b>1.02</b> (0.903-1.13)	<b>1.07</b> (0.948-1.19)	<b>1.14</b> (1.00-1.27)	<b>1.19</b> (1.04-1.32)
<b>15-min</b>	<b>0.641</b> (0.577-0.711)	<b>0.767</b> (0.691-0.854)	<b>0.911</b> (0.819-1.01)	<b>1.01</b> (0.905-1.12)	<b>1.13</b> (1.01-1.25)	<b>1.21</b> (1.08-1.34)	<b>1.29</b> (1.14-1.42)	<b>1.36</b> (1.20-1.50)	<b>1.44</b> (1.26-1.59)	<b>1.50</b> (1.30-1.66)
<b>30-min</b>	<b>0.878</b> (0.792-0.975)	<b>1.06</b> (0.954-1.18)	<b>1.29</b> (1.16-1.44)	<b>1.46</b> (1.31-1.62)	<b>1.67</b> (1.49-1.85)	<b>1.82</b> (1.62-2.02)	<b>1.97</b> (1.75-2.18)	<b>2.11</b> (1.86-2.34)	<b>2.29</b> (2.01-2.54)	<b>2.42</b> (2.11-2.68)
<b>60-min</b>	<b>1.10</b> (0.987-1.22)	<b>1.33</b> (1.20-1.48)	<b>1.66</b> (1.49-1.84)	<b>1.90</b> (1.71-2.11)	<b>2.22</b> (1.98-2.46)	<b>2.47</b> (2.20-2.73)	<b>2.72</b> (2.41-3.00)	<b>2.96</b> (2.61-3.28)	<b>3.29</b> (2.88-3.64)	<b>3.54</b> (3.08-3.92)
<b>2-hr</b>	<b>1.29</b> (1.17-1.44)	<b>1.57</b> (1.41-1.74)	<b>1.98</b> (1.79-2.20)	<b>2.31</b> (2.07-2.56)	<b>2.77</b> (2.47-3.06)	<b>3.14</b> (2.79-3.47)	<b>3.54</b> (3.12-3.90)	<b>3.95</b> (3.46-4.36)	<b>4.54</b> (3.94-5.02)	<b>5.02</b> (4.32-5.56)
<b>3-hr</b>	<b>1.41</b> (1.27-1.57)	<b>1.71</b> (1.55-1.91)	<b>2.16</b> (1.95-2.41)	<b>2.52</b> (2.27-2.81)	<b>3.02</b> (2.70-3.35)	<b>3.43</b> (3.05-3.80)	<b>3.87</b> (3.41-4.28)	<b>4.32</b> (3.79-4.78)	<b>4.97</b> (4.31-5.51)	<b>5.50</b> (4.72-6.10)
<b>6-hr</b>	<b>1.74</b> (1.57-1.95)	<b>2.10</b> (1.90-2.36)	<b>2.65</b> (2.38-2.97)	<b>3.10</b> (2.78-3.47)	<b>3.76</b> (3.34-4.19)	<b>4.32</b> (3.81-4.80)	<b>4.92</b> (4.30-5.45)	<b>5.57</b> (4.83-6.17)	<b>6.52</b> (5.58-7.22)	<b>7.32</b> (6.18-8.11)
<b>12-hr</b>	<b>2.12</b> (1.90-2.40)	<b>2.56</b> (2.29-2.90)	<b>3.24</b> (2.90-3.67)	<b>3.82</b> (3.40-4.32)	<b>4.70</b> (4.14-5.28)	<b>5.45</b> (4.76-6.11)	<b>6.29</b> (5.44-7.04)	<b>7.22</b> (6.18-8.06)	<b>8.62</b> (7.24-9.62)	<b>9.83</b> (8.14-11.0)
<b>24-hr</b>	<b>2.44</b> (2.24-2.69)	<b>2.95</b> (2.71-3.25)	<b>3.77</b> (3.46-4.15)	<b>4.48</b> (4.09-4.92)	<b>5.56</b> (5.04-6.08)	<b>6.51</b> (5.85-7.09)	<b>7.58</b> (6.74-8.23)	<b>8.79</b> (7.71-9.52)	<b>10.6</b> (9.18-11.5)	<b>12.3</b> (10.4-13.2)
<b>2-day</b>	<b>2.83</b> (2.60-3.13)	<b>3.43</b> (3.15-3.79)	<b>4.37</b> (4.01-4.83)	<b>5.18</b> (4.73-5.70)	<b>6.37</b> (5.78-6.99)	<b>7.40</b> (6.66-8.11)	<b>8.55</b> (7.63-9.34)	<b>9.82</b> (8.66-10.7)	<b>11.7</b> (10.2-12.8)	<b>13.4</b> (11.4-14.6)
<b>3-day</b>	<b>3.00</b> (2.77-3.30)	<b>3.63</b> (3.35-3.99)	<b>4.62</b> (4.25-5.08)	<b>5.46</b> (5.01-5.99)	<b>6.73</b> (6.12-7.35)	<b>7.82</b> (7.06-8.53)	<b>9.03</b> (8.10-9.84)	<b>10.4</b> (9.21-11.3)	<b>12.4</b> (10.8-13.5)	<b>14.2</b> (12.2-15.4)
<b>4-day</b>	<b>3.18</b> (2.93-3.47)	<b>3.83</b> (3.54-4.19)	<b>4.87</b> (4.50-5.32)	<b>5.76</b> (5.29-6.29)	<b>7.08</b> (6.47-7.72)	<b>8.24</b> (7.47-8.96)	<b>9.52</b> (8.56-10.3)	<b>10.9</b> (9.75-11.9)	<b>13.1</b> (11.5-14.2)	<b>15.0</b> (13.0-16.2)
<b>7-day</b>	<b>3.73</b> (3.46-4.06)	<b>4.49</b> (4.16-4.89)	<b>5.64</b> (5.22-6.14)	<b>6.62</b> (6.11-7.20)	<b>8.09</b> (7.42-8.79)	<b>9.36</b> (8.53-10.2)	<b>10.8</b> (9.73-11.7)	<b>12.3</b> (11.0-13.3)	<b>14.6</b> (12.9-15.9)	<b>16.6</b> (14.5-18.0)
<b>10-day</b>	<b>4.28</b> (3.98-4.62)	<b>5.13</b> (4.78-5.55)	<b>6.37</b> (5.93-6.88)	<b>7.41</b> (6.88-7.99)	<b>8.91</b> (8.22-9.60)	<b>10.2</b> (9.35-11.0)	<b>11.5</b> (10.5-12.4)	<b>13.0</b> (11.8-14.0)	<b>15.2</b> (13.6-16.4)	<b>17.0</b> (15.0-18.3)
<b>20-day</b>	<b>5.83</b> (5.48-6.21)	<b>6.92</b> (6.52-7.39)	<b>8.33</b> (7.84-8.89)	<b>9.48</b> (8.89-10.1)	<b>11.1</b> (10.4-11.8)	<b>12.4</b> (11.5-13.2)	<b>13.7</b> (12.7-14.6)	<b>15.1</b> (14.0-16.1)	<b>17.1</b> (15.6-18.2)	<b>18.6</b> (17.0-20.0)
<b>30-day</b>	<b>7.20</b> (6.81-7.65)	<b>8.52</b> (8.05-9.04)	<b>10.1</b> (9.52-10.7)	<b>11.3</b> (10.7-12.0)	<b>13.1</b> (12.3-13.9)	<b>14.4</b> (13.5-15.3)	<b>15.9</b> (14.8-16.8)	<b>17.3</b> (16.1-18.4)	<b>19.3</b> (17.8-20.5)	<b>20.9</b> (19.1-22.2)
<b>45-day</b>	<b>9.07</b> (8.63-9.55)	<b>10.7</b> (10.2-11.2)	<b>12.4</b> (11.8-13.1)	<b>13.8</b> (13.1-14.5)	<b>15.6</b> (14.8-16.4)	<b>16.9</b> (16.0-17.8)	<b>18.3</b> (17.2-19.2)	<b>19.6</b> (18.4-20.6)	<b>21.3</b> (20.0-22.5)	<b>22.6</b> (21.1-23.9)
<b>60-day</b>	<b>10.9</b> (10.4-11.4)	<b>12.7</b> (12.2-13.4)	<b>14.7</b> (14.0-15.4)	<b>16.1</b> (15.4-16.9)	<b>18.0</b> (17.2-18.9)	<b>19.5</b> (18.5-20.4)	<b>20.8</b> (19.7-21.9)	<b>22.2</b> (20.9-23.3)	<b>23.9</b> (22.4-25.1)	<b>25.1</b> (23.5-26.4)

<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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**PF graphical**

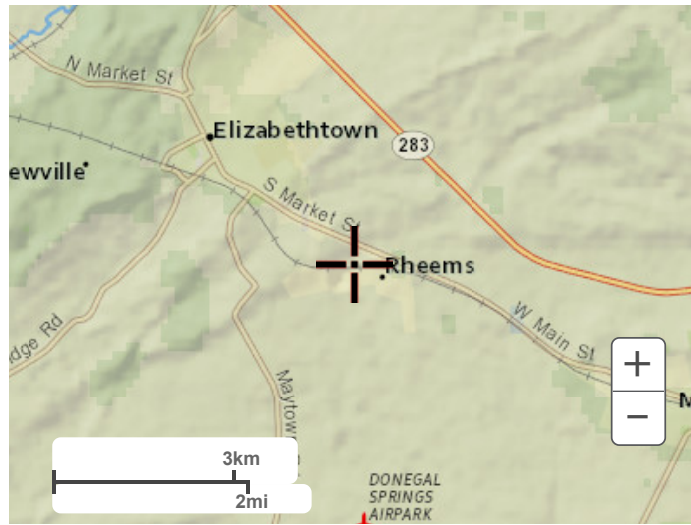
PDS-based depth-duration-frequency (DDF) curves  
Latitude: 40.1318°, Longitude: -76.5758°



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**Maps & aerials**

**Small scale terrain**



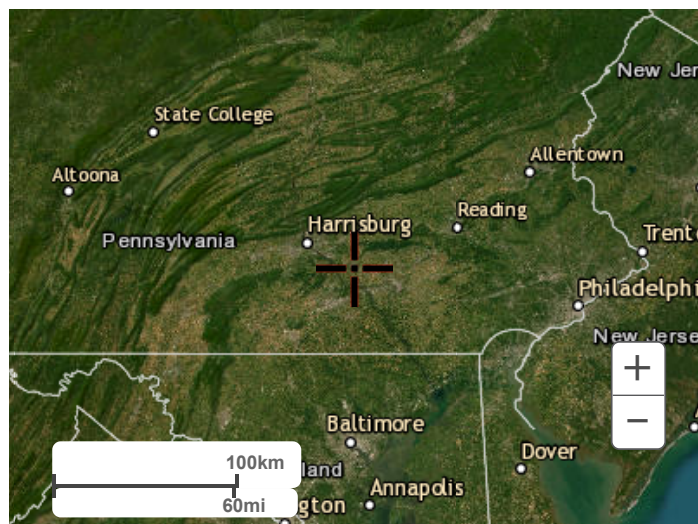
Large scale terrain



Large scale map



Large scale aerial



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