Module 13: Impoundments/Treatment Facilities

[§§77.457/77.461/77.526/77.531/Chapter 105]

13.1 Treatment

Provide a plan for the treatment of surface and groundwater drainage from the areas disturbed by the mining activities. Include a construction and treatment narrative, flow diagram, design criteria, and design calculations (which include the proposed capacity) of the treatment facilities. Identify treatment chemicals to be used. Do not include any facilities included in Module 12.

Water needing treated will be treated in sediment pond P-1 (see Exhibit 9).

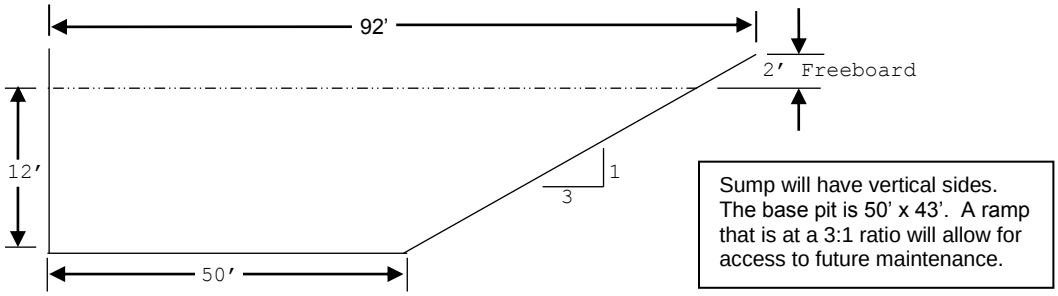
Flow Diagram

Surface Runoff / Affected Area Flow → Sediment Pond → Clarification, etc. → Discharge as per NPDES

13.2 Quarry/Pit Sump

Provide a description of the sump including size, location, depth, method of pumping, etc. (Key location to Exhibits 6.2 and 9).

A sump will be added to address the disturbance associated with the second set of underground mine opening on the southern side of the mine. The sump is shown on the exhibit 9. It is sized at 35,088 ft^3 to handle the 5 acres of disturbance. The dimensions are shown below. Electric or diesel pumps will be used to pump the water from the sump to control ditch (CD-2) which flows down to the on site sedimentation pond (P-1). Both CD-2 and P-1 have been sized to include the 5 acres of runoff associated with the mine opening and the Pit sump.



13.3 Dams and Impoundments (General) Do not include any facilities included in Module 12

a) Proposed use.

The sedimentation pond (P-1) is used to provide detention time to allow for the settling of eroded particles (settleable solids) before releasing water from the mine site. Sedimentation pond P-1 is located within the 100-year floodplain of Ten Mile Creek. Neiswonger Construction, Inc. is requesting a waiver of the permit requirements under Chapter 105.12(a)(6).

b) Map and location (key to maps).

See Exhibit 9: Operations Map.

c) Provide a design report and construction plans and specifications to include detailed cross-sections and plan view scale drawings of the proposed structure which show: principal spillway, dewatering devices, embankment details (including maximum height, top width, and cutoff trench), crest of emergency spillway and existing ground.

The volume of sedimentation pond P-1 is to be upgraded to accommodate the drainage from the added area and the sump pit. The design items to be included with the expansion of the pond are given on pages 3-3 to 3-17 of this module. The pond has not seen the equivalent of what were excessive rains of 2018, which the pond was adequately designed for at the time. Currently, the pond is holding a limited amount of water. If conditions hold the pond should allow for easy expansion and installation of dewatering devices. If the pond is holding large amounts of site runoff then the temporary installation of a internal cofferdam internal may be necessary to dewater the area while modifications are made to the existing structure.

The pond is an existing structure, presently without a dewatering devise containing only an emergency spillway. The operator will reconstruct the pond to the designed specifications. The inlet elevation of the new draw-down pipe will be at 2.0' above the pond bottom. Drawdown will be accomplished with the use of a skimmer device.

A revised Pond P-1 design is enclosed with a sed pond certification on page 13-3.

Specifications including detailed cross-sections and plan view drawings for Pond P-1 are attached.

d) Complete a Certification Form for each structure as appropriate:
Sediment Pond Certification form 5600-PM-BMP0408 – Attached
Treatment Pond Certification form 5600-PM-BMP0455 – Not Applicable

e) If the impoundment is located outside of the area covered by the geology and hydrology description contained in Modules 7 and 8, include a preliminary geology and hydrology report.

Not Applicable. The pond is located within the area covered by the geology and hydrology description contained in Modules 7 and 8.

f) Describe the potential effect on the structure from subsidence from underground mining when applicable.

Based on drill hole H-BH-4, which was located very near to sediment pond P-1, there is approximately 105 feet from the surface to the bottom of the mine void. This should be adequate cover over the underlying workings in the Pittsburgh coal seam to prevent subsidence.

g) If the detailed design plans are not included with the initial submittal of this application, identify when the detailed design plans will be submitted. (**Note:** The detailed design plans must be approved by the Department before construction of the structure begins.)

Please see the attached design plans.

13.4 Class C Dams

Not Applicable. There are no Class C Dams proposed for this site.

A separate permit is required for impoundments that meet one or more of the following:

1) a contributory drainage area exceeding 100 acres;

2) a depth of water measured by the upstream toe of the dam at maximum storage elevation exceeding 15 ft;

3) an impounding capacity at maximum storage elevation exceeding 50 acre-feet.

13.5 Operation and Maintenance Requirements

Describe the operation and maintenance requirements for the structure, including dewatering of the impoundments following storm events.

The impoundment will self-dewater if the pond is filled to the principal spillway. 24 hours after each storm event, the operator will drain down the pond utilizing the 6" PVC skimmer drawdown device with a 5.0" orifice. The inlet of the pipe will be 2.0' above the bottom of the pond. The skimmer design is on page 13-14.

13.6 Removal

Describe the timetable and plans for removal of the impoundment and reclamation of the area.

The owner of the property, John Kosky Contracting Inc., has signed a request to allow sedimentation pond P-1 to remain as a permanent postmining structure. The original request is on file under SMP#63100401.

SEDIMENT POND CERTIFICATION

Permittee: Neiswonger Construction, Inc. Site Name: Maggie Lynn Underground Mine SMP No.:63192001

Engineer/Land Surveyor: Christopher Carl Peterson Structure ID #: P-1 NPDES Outfall ID #: 001

Location (point of discharge): Latitude (DMS): 39°59′54.8″ Longitude (DMS): 80°02′35.2″

Drainage Area: 44.5 acres Design Storm: 10/100 year / 24 hour Rainfall Amount: 3.35/4.99 inches

Average Watershed Slope: Steep Land Use: Forestland Soil Type: Nw Curve Number: 85

Peak Discharge: 90/177 cubic feet/second NPDES Average Flow: 0.0371 mgd NPDES Design Flow: 0.2595 mgd

		Permit Application	***As Constructed***
Embankment	Top Width (Minimum)	10′	
	Outside Slope (Maximum) (H:V)	3:1	
	Inside Slope (Maximum) (H:V)	2.5:1	
	Top Elevation	829.8	
	Bottom Elevation	814.8	
	Upstream Toe Elevation	817.8	
	Downstream Toe Elevation	815.8	
	Type of Cover	grass	
	Incised Slope (if any)	N/A	
	Inside Slope (Maximum) (H:V)		
	Top Elevation		
	Bottom Elevation		
Principal Spillway	Type	SLCPP	
	Conduit Diameter (if barrel/riser give both)	12"	
	Inlet Elevation	823.2	
	Outlet Protection	Riprap Apron	
	Spillway Capacity (cubic feet/second)	8.20 cfs	
Dewatering Device	Type/Size	6" PVC pipe w/skimmer	
	Inlet Elevation	816.8	
	Discharge Regulation (self-draining or valved)	valved	
	Discharge Capacity (cubic feet/second)	0.73 cfs	
	Time to Dewater Full Pond	117.2 hrs (5 days)	
Emergency Spillway	Type	Trapezoidal	
	Width	22′	
	Depth (with 1 foot of freeboard)	3.1'	
	Length	20′, 72′	
	Sideslopes (H:V)	2:1	
	Crest Elevation	826.7	
	Slope	0.0%, 2.6%	
	Type of Lining/Protection	R-4 Rock	
	Spillway Capacity (provide design calculations)	177 cfs (pg 13-9)	
Storage Capacity	Length @ Bottom	292′	
	Width @ Bottom	62′	
	Length @ Dewatering Device	300′	
	Width @ Dewatering Device	72′	
	Volume @ Dewatering Device	39,677 cf	
	Length @ Principal Spillway	325.6′	
	Width @ Principal Spillway	104.0'	
	Volume @ Principal Spillway	176,606 cf	
	Length @ Crest of Emergency Spillway	339.60'	
	Width @ Crest of Emergency Spillway	121.5'	
	Volume @ Crest of Emergency Spillway	347,607 cf	

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: N/A

MODULE 13 ADDENDUM

Calculations for Sediment Pond P-1 are given on the following pages of this addendum to Module 13. Design Criteria used:

- Storm Event for all calculation were done using table 5.1, Pennsylvania Rainfall by County (page 109 of the Pennsylvania Department of Environmental Protection Erosion and Sediment Pollution Control Program Manual (E&S Manual). The table is included on page 13-7 of this module.

- Dewatering Elevation determined using 1,000 ft^3/ac, specified on Standard Worksheet #12, from page 383 of the E&S Manual.

- Principal Spillway Elevation determined using design criteria number six from page 159 of the E&SPCP Manual. Base design of 5,000 cubic feet for each disturbed and undisturbed acre has been reduced to 3,950 using the criteria of page 164 of the E&S Manual.

- Principal Spillway Design volume is determined using the following equation, $Q = a\ [(2gh)/(1+K_m+K_pL)]^{.5}$ this is equation number three for using pipe flow as the determinate for the principal spillway discharge capacity on page 175 of the E&S Manual.

- Emergency Spillway Elevation determined using a capacity to hold the runoff from a ten-year storm. This is calculated above the dewatering elevation.

- Emergency Spillway Design was done using the 100-year storm and then increasing the freeboard by 12 inches. This is labeled as an acceptable alternative for using the 25-year storm event with two feet of freeboard as labeled on page 192 of the E&S manual.

The calculations for the pond are on the following pages. All design criteria are labeled in red while the design of the pond is all in bold type. Tables used within the calculations are included as pages 13-7 through 13-10. Design sheets include construction detail #7-1: Skimmer Detail, #7-12: Sediment Basin Emergency Spillway with Riprap Lining, Standard E&S Worksheet #12, Sediment Basin Capacity Requirements, and Standard E&S Worksheet #13: Sediment Basin Dimensions and Elevations.

SEDIMENTATION POND P-1 (CALCULATIONS)

Pond Dimensions Criteria
Drainage Area = 39.5 affected acres + 5.0 unaffected acres = 44.5 acres
Curve Number = 85, Slope = Steep
Washington County 10 year/ 24 hour storm event = 3.35 in.; see table 5.1 E&S Manual
100 year/ 24 hour storm event = 4.99 in.
Runoff from 10 year/ 24 hour storm event = 1.89 in. = 0.1575 ft.; SCS TR-16 chart

Dewatering Elevation
Required pond volume at drawdown elevation = 39.5 ac. X 1,000 ft³/ac. = 39,500 ft³
Design Dimensions: Drawdown elevation = 2.0'
Area at Dewatering 2.0' Elev. = 300.0' X 72.0' = 21,600 ft²
Area at Mid-Point 1.0' Elev.= 296.0' X 67.0' = 19,832 ft²
Area at Pond Bottom = 292.0' X 62.0' = 18,104 ft²

Available pond volume at dewatering elev. = $\frac{21,600 + 18,104 + (19,832 \times 4)}{6} \times 2.0$ = **39,677 ft³**

This pond will be dewatered with a 6" schedule 40 PVC pipe with a 5.0" orifice plate (see page 13-14) over a 4 to 7 day period.

Principal Spillway Elevation
Required pond volume between the principal spillway elevation and dewatering elevation = 5,000 ft³/ac. - top dewatering (700 ft³/ac.) – 4 to 7 day dewatering (350 ft³/ac.) = 3,950 ft³/ac.
Required volume at principal spillway elevation = 3,950 ft³/ac. X 44.5 acres = 175,775 ft³
Design Dimensions: Principal spillway elevation = 8.4'
Area at Principal Spillway 8.4' Elev. = 325.6' X 104.0' = 33,862.4 ft²
Area at Mid-Point 5.2' Elev. = 312.8' X 88.0' = 27,526.4 ft²
Area at Dewatering 2.0' Elev. = 300.0' X 72.0' = 21,600.0 ft²

Available pond volume between the principal spillway elevation and dewatering elevation = $\frac{33,862.4 + 21,600 + (27,526.4 \times 4)}{6} \times (8.4 - 2.0)$ = **176,606 ft³**

Principal Spillway Design – Snout Inlet – Corrugated Pipe, smooth bore
Pipe Diameter = 12"; Length – 60'; Head = 4.5'
Discharge Capacity = $A\ ((2gH) / (1 + Km + KpL))^{0.5}$
A = 0.79 sq.ft., g = 32.2 ft/sec., H = Head =4.0', Km = 1.0,
Kp = pipe friction coefficient = 0.0115 for 12" smooth bore plastic pipe
L = Length of pipe = 60 ft.
$Q = 0.79((2 \times 32.2 \times 4.5) / (1 + 1.0 + (0.0115 \times 60)))^{0.5}$ = **8.20 cfs**

Emergency Spillway Elevation
Required volume between the emergency spillway elevation and dewatering elevation = 44.5 ac. x 43,560 ft²/ ac. x 0.1575 ft. (10 year 24 hr. runoff) = 305,301 ft³
Design Dimensions: Emergency spillway elevation = 11.9'
Area at Emergency Spillway 11.9' Elev. = 339.6' X 121.5' = 41,261.4 ft²
Area at Dewatering 2.0' Elev. = 300.0' X 72.0' = 21,600 ft²
Area at Mid-Point 6.95' Elev. = 319.8' X 96.75' = 30,940.65 ft²

Available pond volume between the emergency spillway elevation and dewatering elevation = $\frac{41,261.4 + 21,600 + (30,940.65 \times 4)}{6} \times (11.9 - 2.0)$ = **307,929.6 ft³**

Volume @ crest of Emergency Spillway = 39,677 ft³ + 307,929.6 ft³ = 347,607 ft³

Emergency Spillway Design
Design Storm Event: 100 yr./24 hr.
CN = 85; Total Drainage Area: 44.5 ac.
Rainfall Depth = 4.99" (100 yr./24 hr.)
Slope of Drainage Area = steep
Peak Discharge = 185 cfs. = Required Capacity from ES 1027
Page 197, PA E&S Control Manual $Q = CLH^{1.5}$ $L = Q/CH^{1.5}$
Q_{min} = 176.8 cfs, C = 2.4, H = 2.1
L = 24.21' use 25'
$Q = 2.4(25.0)(2.1)^{1.5}$, Q = 182.58 cfs
Available Capacity = 8.20 cfs PS + 182.58 cfs ES = **190.78 cfs.**

Maximum Pond Dewatering Time (Assumes the Principle Spillway is not used)

The average head at the dewatering pipe will be 20% of the elevation from the dewatering pipe to the emergency spillway. This can be control with the valve on the dewatering pipe.
Discharge Capacity = $A\ ((2gH) / (1 + Km + KpL))^{0.5}$
A = 0.131 sq.ft.(4,9' diameter orifice), g = 32.2 ft/sec., H = Head =1.28', Km = 1.0,
Kp = pipe friction coefficient = 0.0115 for a smooth bore plastic pipe
L = Length of pipe = 60 ft.
$Q = 0.131((2 \times 32.2 \times 1.28) / (1 + 1.0 + (0.0115 \times 60)))^{0.5}$ = **0.73 cfs**

Time to dewater from the Emergency spillway to the Dewatering pipe
Pond Capacity between the emergency spillway and the dewatering point is 243,547 cubic feet
307,929.6 cf dewatered at a rate of 0.73 cfs
307,929.6/0.95 = 324,136.84 seconds to dewater. This equals 117.17 hours.

TABLE 5.1
Pennsylvania Rainfall by County
(For Use with Technical Release 55 - Urban Hydrology for Small Watersheds)
NOT TO BE USED WITH THE RATIONAL EQUATION

COUNTY	24 HR RAINFALL FOR VARIOUS FREQUENCIES							COUNTY	24 HR RAINFALL FOR VARIOUS FREQUENCIES						
	1 yr.	2 yr.	5 yr.	10 yr.	25 yr.	50 yr.	100 yr.		1 yr.	2 yr.	5 yr.	10 yr.	25 yr.	50 yr.	100 yr.
Adams	2.52	3.02	3.77	4.43	5.48	6.45	7.59	Lackawanna	2.12	2.55	3.15	3.69	4.55	5.35	6.30
Allegheny	1.97	2.35	2.88	3.30	3.90	4.40	4.92	Lancaster	2.51	3.02	3.85	4.56	5.63	6.56	7.59
Armstrong	2.03	2.42	2.95	3.40	4.01	4.53	5.06	Lawrence	1.99	2.37	2.90	3.33	3.94	4.44	4.96
Beaver	1.97	2.35	2.87	3.30	3.90	4.40	4.91	Lebanon	2.50	3.02	3.84	4.55	5.64	6.59	7.67
Bedford	2.19	2.62	3.27	3.81	4.60	5.27	5.99	Lehigh	2.69	3.24	4.05	4.73	5.75	6.63	7.60
Berks	2.65	3.19	4.00	4.68	5.67	6.50	7.41	Luzerne	2.37	2.84	3.53	4.13	5.08	5.96	6.99
Blair	2.23	2.68	3.33	3.87	4.63	5.28	5.96	Lycoming	2.38	2.85	3.53	4.12	5.04	5.88	6.87
Bradford	2.05	2.44	2.98	3.41	3.99	4.45	4.93	McKean	2.08	2.48	3.03	3.48	4.13	4.66	5.21
Bucks	2.71	3.26	4.10	4.80	5.81	6.67	7.59	Mercer	2.05	2.44	2.99	3.43	4.07	4.58	5.13
Butler	2.02	2.40	2.93	3.37	3.98	4.49	5.02	Mifflin	2.36	2.83	3.52	4.10	4.95	5.68	6.49
Cambria	2.17	2.59	3.18	3.68	4.39	4.97	5.59	Monroe	2.63	3.16	3.92	4.60	5.68	6.70	7.91
Cameron	2.11	2.53	3.10	3.60	4.35	5.02	5.80	Montgomery	2.67	3.21	4.03	4.70	5.68	6.50	7.38
Carbon	2.74	3.29	4.09	4.79	5.92	6.96	8.20	Montour	2.35	2.82	3.50	4.09	5.05	5.94	6.99
Centre	2.20	2.64	3.29	3.82	4.58	5.22	5.91	Northampton	2.64	3.16	3.95	4.61	5.60	6.45	7.41
Chester	2.70	3.25	4.07	4.75	5.73	6.55	7.44	Northumberland	2.32	2.78	3.45	4.04	4.96	5.82	6.83
Clarion	2.09	2.49	3.05	3.50	4.14	4.67	5.22	Perry	2.34	2.81	3.49	4.08	5.03	5.90	6.92
Clearfield	2.13	2.54	3.12	3.60	4.28	4.85	5.44	Philadelphia	2.72	3.28	4.12	4.83	5.85	6.72	7.68
Clinton	2.18	2.61	3.19	3.67	4.34	4.89	5.47	Pike	2.45	2.94	3.64	4.26	5.23	6.13	7.20
Columbia	2.38	2.85	3.54	4.14	5.10	5.99	7.04	Potter	2.01	2.40	2.96	3.44	4.21	4.91	5.74
Crawford	2.08	2.49	3.04	3.50	4.14	4.67	5.23	Schuylkill	2.77	3.33	4.14	4.85	5.96	6.97	8.17
Cumberland	2.35	2.82	3.50	4.11	5.08	5.97	7.02	Snyder	2.60	3.12	3.88	4.55	5.59	6.56	7.71
Dauphin	2.50	3.01	3.78	4.45	5.50	6.44	7.52	Somerset	2.06	2.46	3.08	3.61	4.44	5.16	5.97
Delaware	2.69	3.25	4.10	4.82	5.87	6.75	7.72	Sullivan	2.54	3.04	3.73	4.30	5.12	5.82	6.58
Elk	2.08	2.48	3.02	3.48	4.12	4.65	5.21	Susquehanna	2.23	2.67	3.26	3.74	4.41	4.96	5.55
Erie	2.13	2.56	3.19	3.71	4.46	5.09	5.76	Tioga	1.96	2.34	2.88	3.35	4.07	4.73	5.49
Fayette	2.08	2.47	3.02	3.46	4.08	4.60	5.13	Union	2.41	2.89	3.58	4.19	5.13	6.01	7.04
Forest	2.06	2.46	3.00	3.45	4.08	4.59	5.14	Venango	2.05	2.45	2.99	3.44	4.07	4.58	5.12
Franklin	2.44	2.94	3.65	4.26	5.17	5.97	6.86	Warren	2.07	2.47	3.01	3.47	4.11	4.63	5.19
Fulton	2.27	2.73	3.39	3.93	4.73	5.40	6.13	Washington	1.99	2.38	2.91	3.35	3.96	4.46	4.99
Greene	2.01	2.40	2.92	3.36	3.96	4.45	4.96	Wayne	2.38	2.86	3.53	4.12	5.03	5.86	6.83
Huntingdon	2.21	2.65	3.29	3.83	4.60	5.25	5.94	Westmoreland	2.05	2.45	2.99	3.43	4.06	4.57	5.11
Indiana	2.15	2.57	3.14	3.62	4.29	4.85	5.44	Wyoming	2.16	2.58	3.18	3.69	4.46	5.14	5.91
Jefferson	2.09	2.50	3.05	3.50	4.14	4.67	5.23	York	2.45	2.96	3.80	4.53	5.65	6.64	7.76
Juniata	2.36	2.83	3.52	4.11	5.02	5.84	6.79								

NWS - NOAA Atlas 14, Sept 25-29, 2008

RAINFALL-RUNOFF DEPTHS FOR SELECTED RUNOFF CURVE NUMBERS

Inches \ Tenths	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.06	0.09
1	0.13	0.17	0.22	0.27	0.32	0.38	0.44	0.50	0.56	0.63
2	0.70	0.76	0.83	0.91	0.98	1.06	1.13	1.21	1.29	1.37
3	1.45	1.53	1.61	1.69	1.77	1.86	1.94	2.03	2.11	2.20
4	2.29	2.37	2.46	2.55	2.64	2.73	2.82	2.91	3.00	3.08
5	3.17	3.26	3.35	3.45	3.54	3.63	3.72	3.81	3.90	4.00
6	4.09	4.18	4.28	4.37	4.46	4.55	4.65	4.74	4.84	4.93
7	5.02	5.12	5.21	5.31	5.40	5.50	5.60	5.69	5.78	5.88
8	5.98	6.07	6.17	6.26	6.36	6.45	6.55	6.65	6.74	6.84
9	6.93	7.03	7.13	7.22	7.32	7.42	7.51	7.61	7.71	7.80
10	7.90	8.00	8.09	8.19	8.29	8.39	8.48	8.26	8.68	8.77
11	8.87	8.97	9.07	9.16	9.26	9.36	9.46	9.56	9.65	9.75
12	9.85	9.94	10.04	10.14	10.24	10.34	10.44	10.53	10.63	10.73

CURVE 83

0	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.05	0.08	0.11
1	0.15	0.20	0.25	0.30	0.35	0.41	0.48	0.54	0.61	0.68
2	0.74	0.82	0.89	0.97	1.04	1.12	1.20	1.28	1.36	1.44
3	1.52	1.60	1.68	1.77	1.85	1.94	2.03	2.11	2.20	2.29
4	2.37	2.46	2.55	2.64	2.73	2.82	2.91	3.00	3.09	3.18
5	3.27	3.37	3.46	3.55	3.64	3.73	3.82	3.92	4.01	4.11
6	4.20	4.29	4.39	4.48	4.58	4.67	4.76	4.86	4.95	5.05
7	5.14	5.24	5.33	5.43	5.52	5.62	5.71	5.81	5.91	6.00
8	6.10	6.20	6.30	6.39	6.48	6.58	6.68	6.77	6.87	6.97
9	7.06	7.16	7.26	7.35	7.45	7.55	7.65	7.74	7.84	7.94
10	8.03	8.13	8.23	8.33	8.42	8.52	8.61	8.71	8.81	8.91
11	9.01	9.10	9.20	9.30	9.40	9.50	9.60	9.69	9.79	9.89
12	9.99	10.09	10.19	10.28	10.38	10.48	10.57	10.67	10.77	10.87

CURVE 84

0	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.06	0.09	0.13
1	0.18	0.22	0.28	0.33	0.39	0.45	0.52	0.59	0.65	0.73
2	0.80	0.87	0.95	1.02	1.10	1.18	1.26	1.34	1.42	1.51
3	1.59	1.68	1.76	1.85	1.93	2.02	2.11	2.20	2.28	2.37
4	2.46	2.55	2.64	2.73	2.82	2.91	3.00	3.09	3.19	3.28
5	3.37	3.47	3.56	3.65	3.74	3.84	3.93	4.03	4.12	4.21
6	4.31	4.40	4.50	4.59	5.69	4.78	4.87	4.97	5.06	5.16
7	5.26	5.35	5.45	5.55	5.64	5.74	5.84	5.93	6.03	6.12
8	6.22	6.32	6.41	6.50	6.60	6.70	6.80	6.90	6.99	7.09
9	7.19	7.28	7.38	7.48	7.57	7.97	7.77	7.87	7.97	8.06
10	8.16	8.26	8.35	8.45	8.55	8.65	8.75	8.84	8.94	9.04
11	9.14	9.24	9.33	9.43	9.53	9.63	9.73	9.82	9.92	10.02
12	10.12	10.22	10.32	10.42	10.51	10.61	10.71	10.81	10.91	11.01

CURVE 85

Exhibit 2-7A

REFERENCE	U.S. DEPARTMENT OF AGRICULTURE	RTSC-NE-ENG.
SCS TR - 16	SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	220 SHEET 9 OF 14

11-54.4

DESIGN DATA FOR EARTH SPILLWAYS

SIDE SLOPE 2:1
VEGETATED n=0.040

(Hp) IN FEET	SPILLWAY VARIABLES	BOTTOM WIDTH (b) IN FEET																	
		8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
0.5	Q	6	7	8	10	11	13	14	15	17	18	20	21	22	24	25	27	28
	V	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
	S	3.9	3.9	3.9	3.9	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
	X	32	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
0.6	Q	8	10	12	14	16	18	20	22	24	26	28	30	32	34	35	37	39
	V	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	S	3.7	3.7	3.7	3.7	3.6	3.7	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	X	36	36	36	36	36	36	37	37	37	37	37	37	37	37	37	37	37
0.7	Q	11	13	16	18	20	23	25	28	30	33	35	38	41	43	44	46	48
	V	3.2	3.2	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
	S	3.5	3.5	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
	X	39	40	40	40	41	41	41	41	41	41	41	41	41	41	41	41	41
0.8	Q	13	16	19	22	26	29	32	35	38	42	45	46	48	51	54	57	60
	V	3.5	3.5	3.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	S	3.3	3.3	3.3	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	X	44	44	44	44	45	45	45	45	45	45	45	45	45	45	45	45	45
0.9	Q	17	20	24	28	32	35	39	43	47	51	53	57	60	64	68	71	75
	V	3.7	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
	S	3.2	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	X	47	47	48	48	48	48	48	48	48	48	49	49	49	49	49	49	49
1.0	Q	20	24	29	33	38	42	47	51	56	61	63	68	72	77	81	86	90
	V	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
	S	3.1	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	X	51	51	51	51	52	52	52	52	52	52	52	52	52	52	52	52	52
1.1	Q	23	28	34	39	44	49	54	60	65	70	74	79	84	89	95	100	105
	V	4.2	4.2	4.2	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
	S	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
	X	55	55	55	55	55	55	55	56	56	56	56	56	56	56	56	56	56
1.2	Q	28	33	40	45	51	58	64	69	76	80	86	92	98	104	110	116	122
	V	4.4	4.4	4.4	4.4	4.4	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
	S	2.9	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
	X	58	58	59	59	59	59	59	59	60	60	60	60	60	60	60	60	60
1.3	Q	32	38	46	53	58	65	73	80	86	91	99	106	112	119	125	133	140
	V	4.5	4.6	4.6	4.6	4.6	4.6	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
	S	2.8	2.8	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
	X	62	62	62	63	63	63	63	63	63	63	63	64	64	64	64	64	64
1.4	Q	37	44	51	59	66	74	82	90	96	103	111	119	127	134	142	150	158
	V	4.7	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
	S	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
	X	65	66	66	66	66	67	67	67	67	67	67	68	68	68	68	68	69
	Q	41	50	58	66	75	85	92	101	108	116	125	133	142	150	160	169	178
	V	4.8	4.9	4.9	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.1	5.1	5.1
	S	2.7	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.5	2.5
	X	69	69	70	70	71	71	71	71	71	71	71	72	72	72	72	72	72
1.6	Q	46	56	65	75	84	94	104	112	122	132	142	149	158	168	178	187	197
	V	5.0	5.1	5.1	5.1	5.1	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
	S	2.6	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	X	72	74	74	75	75	76	76	76	76	76	76	76	76	76	76	76	76
1.7	Q	52	62	72	83	94	105	115	126	135	145	156	167	175	187	196	206	217
	V	5.2	5.2	5.2	5.3	5.3	5.3	5.3	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
	S	2.6	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	X	76	78	79	80	80	80	80	80	80	80	80	80	80	80	80	80	80
1.8	Q	58	69	81	93	104	116	127	138	150	160	171	182	194	204	214	226	233
	V	5.3	5.4	5.4	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.6	5.6	5.6	5.6	5.6	5.6
	S	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	X	80	82	83	84	84	84	84	84	84	84	84	84	84	84	84	84	84
1.9	Q	64	76	88	102	114	127	140	152	164	175	188	201	213	225	235	248	260
	V	5.5	5.5	5.5	5.6	5.6	5.6	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
	S	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	X	84	85	86	87	88	88	88	88	88	88	88	88	88	88	88	88	88
2.0	Q	71	83	97	111	125	138	153	164	178	193	204	218	232	245	256	269	283
	V	5.6	5.7	5.7	5.7	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.9	5.9	5.9	5.9	5.9	5.9
	S	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	X	88	90	91	91	91	91	92	92	92	92	92	92	92	92	92	92	92
2.1	Q	77	91	107	122	135	149	162	177	192	207	220	234	250	267	276	291	305
	V	5.7	5.8	5.9	5.9	5.9	5.9	5.9	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
	S	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	X	92	93	95	95	95	95	95	95	95	96	96	96	96	96	96	96	96
2.2	Q	84	100	116	131	146	163	177	194	210	224	238	253	269	288	301	314	330
	V	5.9	5.9	6.0	6.0	6.0	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.2	6.2	6.2	6.2
	S	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	X	96	98	99	99	99	99	99	100	100	100	100	100	100	100	100	100	100
2.3	Q	90	108	124	140	158	175	193	208	226	243	258	275	292	306	323	341	354
	V	6.0	6.1	6.1	6.1	6.2	6.2	6.2	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
	S	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	X	100	102	102	103	103	103	104	104	104	105	105	105	105	105	105	105	105
2.4	Q	99	116	136	152	170	189	206	224	241	260	275	294	312	327	346	364	378
	V	6.1	6.2	6.2	6.3	6.3	6.3	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4
	S	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	X	105	105	106	107	107	108	108	108	108	109	109	109	109	109	109	109	109

Exhibit 11-3.1

REFERENCE

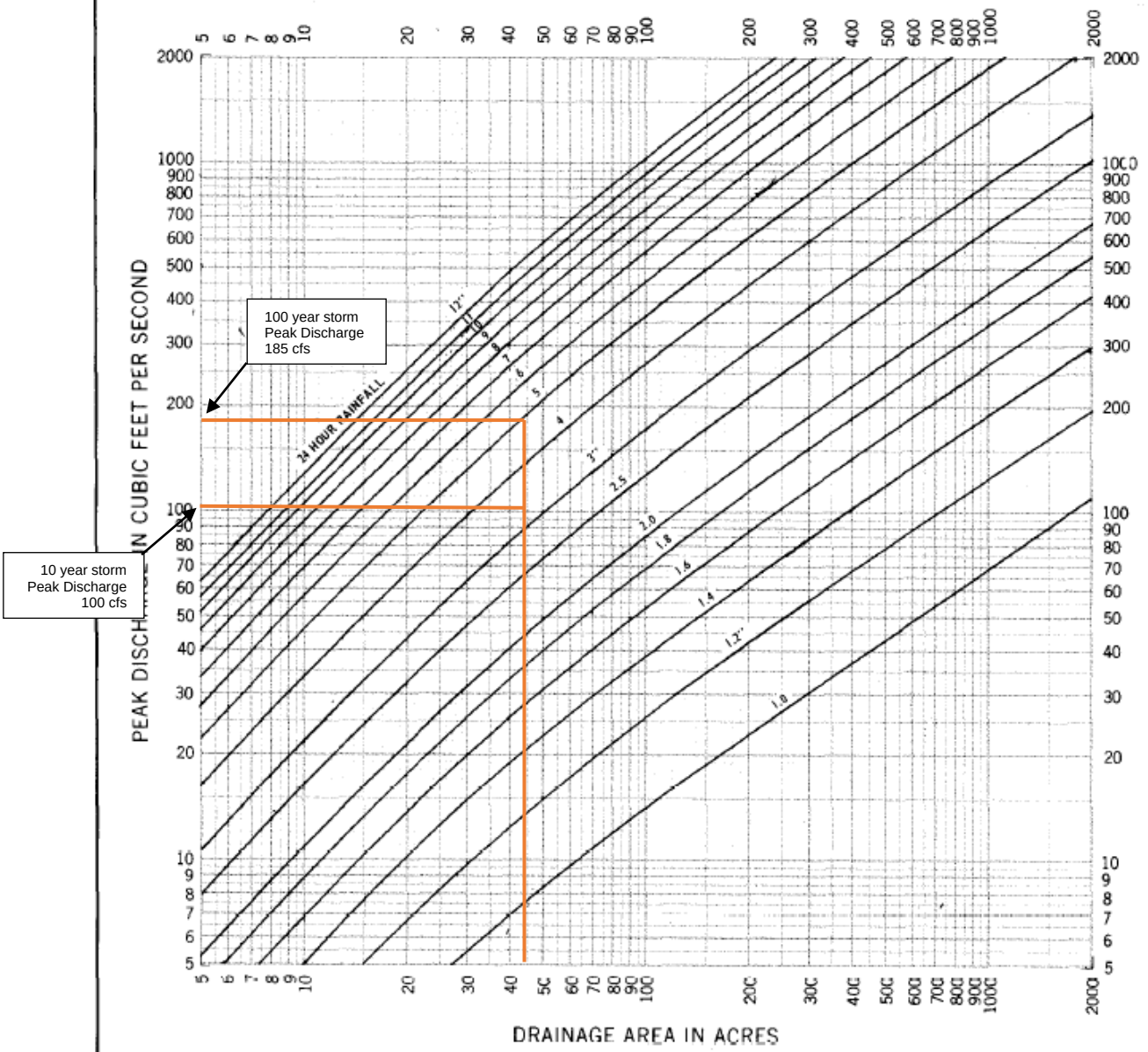
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ENGINEERING & WATERSHED PLANNING UNIT
BROOMALL, PENNSYLVANIA

TSC-NE-ENG.
1110
SHEET 4 OF 11

PEAK RATES OF DISCHARGE FOR SMALL WATERSHEDS
TYPE II STORM DISTRIBUTION

SLOPES - **STEEP**
CURVE NUMBER - 85

24 HOUR RAINFALL FROM US WB TP-40



STANDARD DWG. NO.
ES-1027
SHEET 20 OF 21
DATE 2-15-71

STANDARD E&S WORKSHEET # 12
Sediment Basin Capacity Requirements

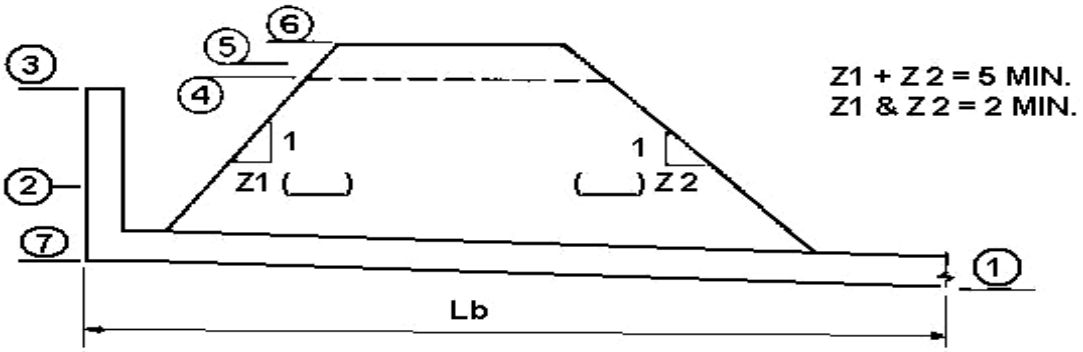
PROJECT NAME: Maggie Lynn Underground Mine SMP No. 63192001
LOCATION: Deemston Borough, Washington County
PREPARED BY: Sherman Bloom, PE DATE: November 6, 2020
CHECKED BY: _____ DATE: _____

BASIN NUMBER		P-1	
PERMANENT OR TEMPORARY BASIN?	(P or T)	P	
SPECIAL PROTECTION WATERSHED?	(YES OR NO)	NO	
Karst soils?	(YES OR NO)	NO	
(A) MAXIMUM TOTAL DRAINAGE AREA	(AC)	44.5	
IS DRAINAGE AREA (A) MORE THAN 10% LARGER THAN THE PRECONSTRUCTION CONDITION?	(YES OR NO)	NO	
(A1) DISTURBED ACRES IN DRAINAGE AREA	(AC)	39.5	
(I) INITIAL REQ'D DEWATERING ZONE (5,000 X A)	(CF)	222,250	
(T) REDUCTION FOR TOP DEWATERING (-700 X A)	(CF)	31,150	
(P) REDUCTION FOR PERMANENT POOL (-700 X A)	(CF)	N/A	
(L) REDUCTION FOR 4:1 FLOW LENGTH:WIDTH (-350 X A)	(CF)	N/A	
(D) REDUCTION FOR 4 TO 7 DAY DEWATERING (- 350 X A)	(CF)	15,575	
(Sv) REQUIRED DEWATERING ZONE [I - (T+P+L+D)][1]	(CF)	175,525	
(Sd) REQUIRED SEDIMENT STORAGE VOLUME (1000 X A_1)	(CF)	39,500	
(St) TOTAL REQUIRED STORAGE VOLUME (Sv + Sd)	(CF)	215,025	
TOTAL STORAGE VOLUME PROVIDED (@ ELEV 3)[2]	(CF)	216,283	
DEWATERING TIME FOR DEWATERING ZONE	(DAYS)	4 days	
REQUIRED DISCHARGE CAPACITY (2 X A)	(CFS)[3]	89.0	
PRINCIPAL SPILLWAY TYPE (PERFORATED RISER, SKIMMER, etc.)		12" SLCPP	
PEAK FLOW FROM 10 YR/24 HR STORM FOR DRAINAGE AREA (A)		100	
PRINCIPAL SPILLWAY CAPACITY (@ ELEV 5)	(CFS)[4]	8.20	
EMERGENCY SPILLWAY CAPACITY (@ ELEV 5)	(CFS)[4]	177	
TOTAL BASIN DISCHARGE CAPACITY (@ ELEV 5)	(CFS)	185.20	
EMERGENCY SPILLWAY PROTECTIVE LINING[5]		R-4	
OUTLET TO A SURFACE WATER?	(YES OR NO)[6]	No	
PEAK FLOW FROM A 100 YR/24 HR STORM FOR DRG. AREA	(A)	185 cfs	

1 The minimum dewatering zone capacity for sediment basins is (3,600 X A). No reduction is permitted in Special Protection (HQ and EV) Watersheds.
2 Total Storage Volume provided at riser crest.
3 Or provide calculations to show peak flow from 25 yr./24 hr. storm for area (A) is routed through the basin.
4 Provide supporting computations.
5 If grass lining is proposed, spillway should be constructed in original ground unless a suitable TRM lining is used. Wherever a TRM is used, riprap should be placed at the bottom of the embankment to prevent scour.
6 If no, and basin is permanent or drainage area is more than 10% larger than pre-construction, provide supporting calculations to show accelerated erosion will not result from the proposed discharge. For discharges increasing volume or rate of flow onto a neighboring property prior to entering a surface water, an easement should be obtained prior to plan submittal.

STANDARD E&S WORKSHEET # 13
Sediment Basin Dimensions and Elevations

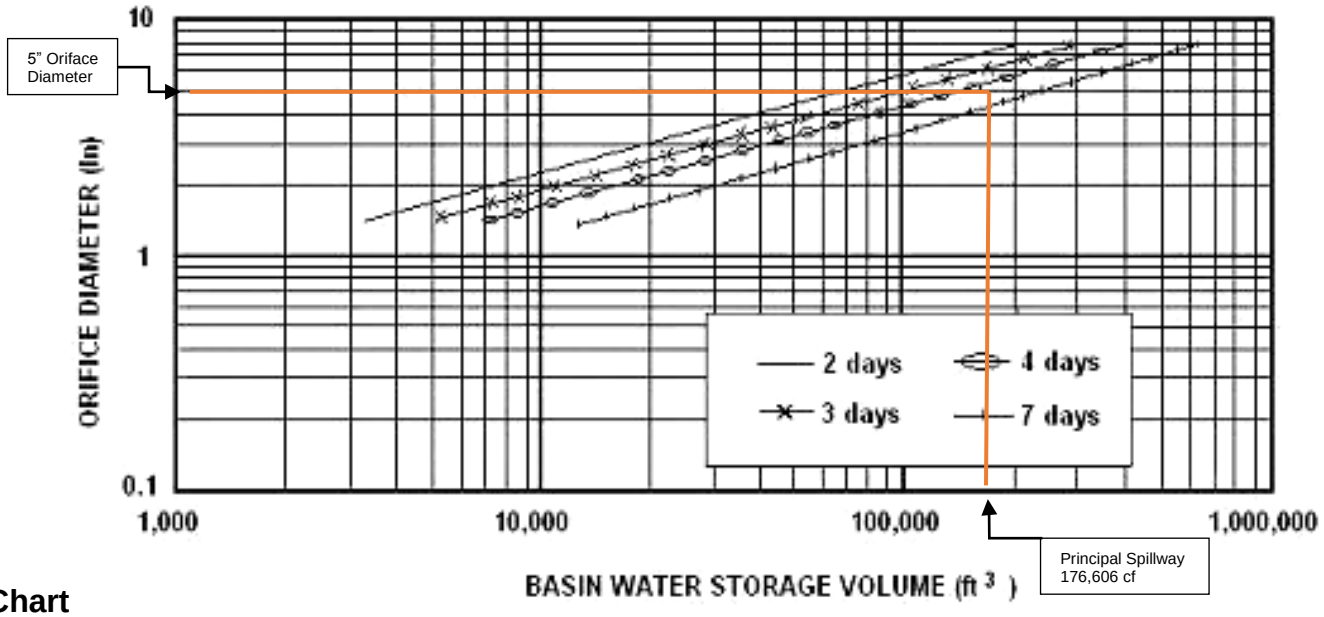
PROJECT NAME: Maggie Lynn Underground Mine SMP No. 63192001
LOCATION: Deemston Borough, Washington County
PREPARED BY: Sherman Bloom, PE DATE: November 6, 2020
CHECKED BY: _____ DATE: _____



BASIN NUMBER		P-1	
1. DISCHARGE PIPE ELEVATION	(FT)	812.8′	
2. ELEVATION AT TOP OF SEDIMENT STORAGE ZONE (@ Sd) (MIN. 1.0′ ABOVE ELEVATION 7)	(FT)	816.8′	
3. ELEVATION AT TOP OF DEWATERING ZONE (St) (CREST OF PRINCIPAL SPILLWAY)	(FT)	823.2′	
4. EMERGENCY SPILLWAY CREST ELEVATION (MIN. 0.5′ ABOVE ELEVATION 3)	(FT)	826.7′	
5. 2 CFS/ACRE OR 25-YR/24-HR FLOW ELEVATION	(FT)	828.0′	
6. TOP OF EMBANKMENT ELEVATION (MIN. 24” ABOVE ELEVATION 5 OR 12” WITH ROUTED 100-YR/24-HR STORM)	(FT)	829.8′	
7. BASIN BOTTOM ELEVATION	(FT)	814.8′	
AVERAGE BOTTOM WIDTH	(FT)	62′	
AVERAGE BOTTOM LENGTH	(FT)	292′	
(SAmin) REQUIRED SURFACE AREA AT ELEVATION 2	(SQ. FT.)	8,200	
SURFACE AREA PROVIDED AT ELEVATION 2	(SQ. FT.)	21,600	
AVERAGE BASIN WIDTH (W) AT ELEVATION 3	(FT)	104.0′	
FLOW LENGTH (L) AT ELEVATION 3	(FT)	325.6′	
FLOW LENGTH:WIDTH RATIO AT ELEVATION 3	(L/W)	3.13	
SILT CURTAIN OR FOREBAY? (IF YES, INDICATE WHICH)		NO	
EMBANKMENT TOP WIDTH	(FT, 8’)	10′	
EMBANKMENT SOIL TYPE(S)		Nw	
KEY TRENCH DEPTH	(FT, 2’ MIN.)	2	
KEY TRENCH WIDTH	(FT, 4’ MIN.)	4	
RISER DIAMETER/TYPE	(15” MIN.)	15″ Snout	
BARREL DIAMETER/TYPE	(12” MIN.)	12″	
Lb (BARREL LENGTH)	(FT)	60	
EMERGENCY SPILLWAY WIDTH	(FT)	22	
EMERGENCY SPILLWAY SIDE SLOPES	(H:V)	2:1	
EMERGENCY SPILLWAY DEPTH	(FT)	2.1	

For irregular shaped traps, provide stage storage data

FIGURE 7.2
Skimmer Orifice Design



Chart

Adapted from Penn State Agricultural and Biological Fact Sheet F-253

Figure 7.2 is for use in designing the orifice plate for the skimmer shown in Standard Construction Detail # 7-1 or # 7-2. It assumes a 2" to 5" head (depending upon the size of the skimmer). The required head for use of Figure 7.2 varies as follows: For a skimmer with a dewatering tube ≤ 2 ½" diameter, use a 2" head. For a 3" diameter tube, use a 2.5" head; 4" tube, use 3.3" head; 5" tube use 4" head, and 6" diameter tube use 5" head.

Find the vertical line representing the basin's dewatering zone volume. At the intersection of the vertical line with the desired dewatering time, read horizontally to the left to find the required skimmer orifice diameter.

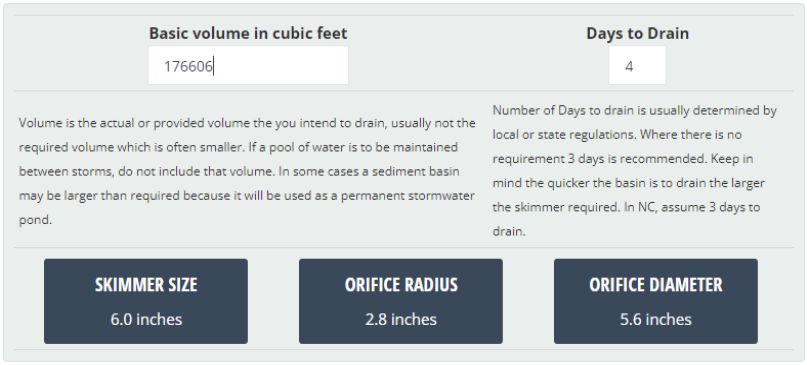
Skimmer Orifice Design Example:

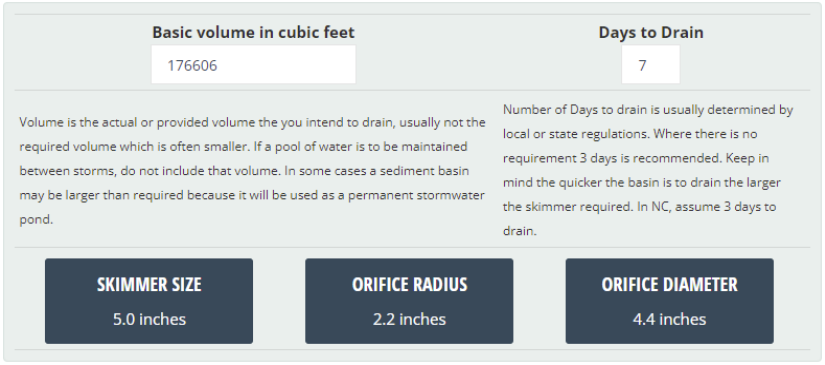
For a basin with a dewatering volume of 40,000 cubic feet and a desired dewatering time of two days, the required skimmer orifice diameter is 4 inches. Indicate this dimension on the plan drawings (as a note on the typical or in the summary table). There must be a sufficient number of holes in the underside of the water entry unit of the skimmer to allow water to enter freely into the skimmer orifice. The outlet pipe or barrel must be capable of discharging at the rate permitted by the skimmer and in all cases must be equal to or larger in dimension than the orifice diameter. This dimension should also be indicated on the plan drawings. Anti-seep collars are recommended for the barrel.

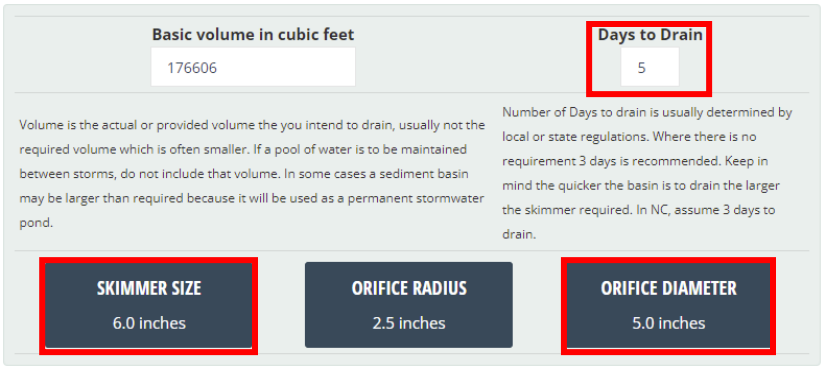
When erodible soils or soils having a high content of fine silts will be disturbed in the drainage area of a sediment basin, longer settling times will result in a higher percentage of suspended solids removal.
Therefore, settling times of 4 to 7 days are recommended in such situations.

Based on the results of figure 7.2, and wanting to create a settling time of 4 to 7 days, and it is estimated that a 5" diameter orifice will be needed.

The following results were taken off the Faircloth Skimmer website for skimmer sizing. 176,606 cubic feet is the volume of the pond from the principal spillway to the dewatering pipe.





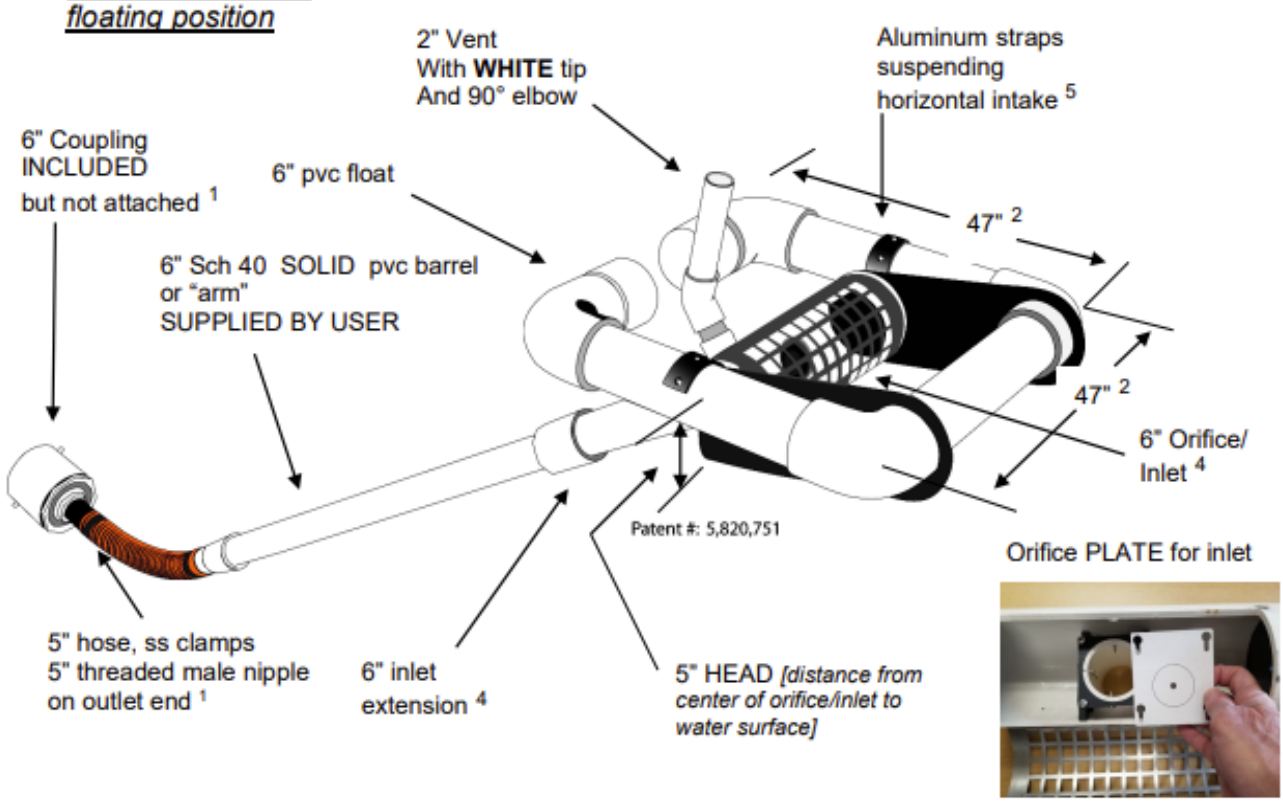


The skimmer used with the Maggie Lynn pond will be a 6" skimmer with a 5.0-inch orifice. This is capable of dewatering the pond in 5 days.

6" *Faircloth Skimmer®* Cut Sheet

J. W. Faircloth & Son, Inc.
www.FairclothSkimmer.com

Skimmer shown in floating position



Orifice PLATE for inlet

1. Hose can be attached to outlet using the threaded 5" nipple. Typical methods used: a) a metal structure with a steel stub out welded on the side at the bottom with a 5" threaded coupling or reducer(s); b) a concrete structure with a hole or orifice at the bottom - use a steel plate with a hole and coupling welded to it that will fit over the hole in the concrete and bolted to the structure with sealant.

2. Dimensions are approximate, not intended as plans for construction.

3. Barrel (solid, not foam core pipe) should be 1.4 times the depth of water with a minimum length of 8' so the inlet can be pulled to the side for maintenance. If more than 12' long, weight may have to be added to inlet to counter the increased buoyancy.

4. Orifice/Inlet tapers down from 6" maximum inlet to a 5" flex hose. The orifice/inlet can be reduced using the plate and cutter provided to control the outflow rate – see # 6.

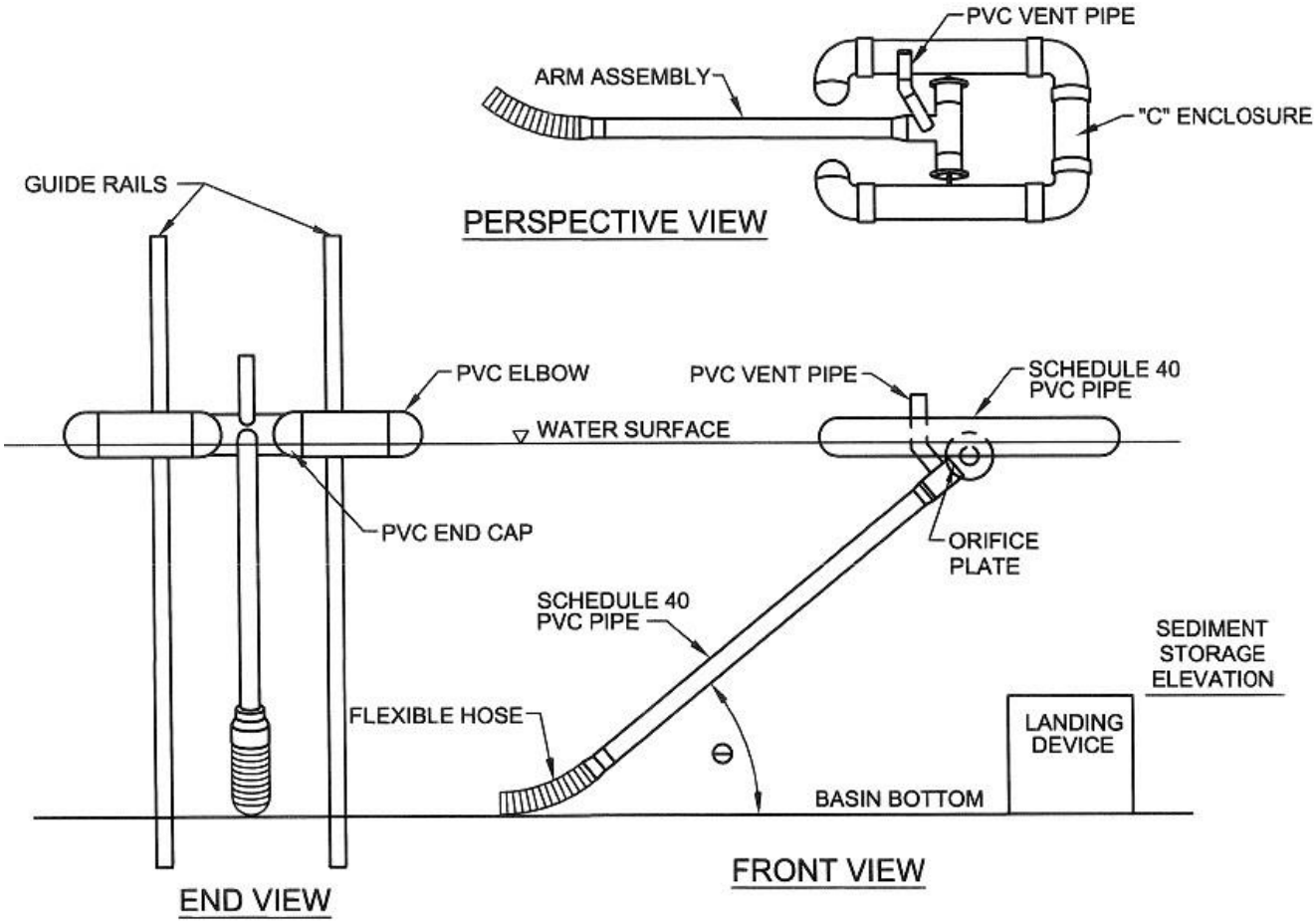
5. Horizontal intake is 10" pipe between the straps with slots cut in the inlet and aluminum screen door (smaller than shown in illustration) for access to the 6" inlet and orifice inside.

6. **Capacity**: 51,840 cubic feet per day maximum with 6" inlet and 5" head. Inlet can be reduced by installing a smaller orifice using the plate and cutter provided to adjust flow rate for the particular drawdown time required. Please use the sizing template at www.fairclothskimmer.com .

7. Ships assembled. User glues inlet extension and barrel, installs vent, cuts orifice in plate and attaches to outlet pipe or structure. Includes float, flexible hose, rope, and orifice plate and cutter. User supplies 6" Sch 40 PVC barrel.

6inchCut 1-2-21

STANDARD CONSTRUCTION DETAIL # 7-1
Skimmer



Adapted from Penn State Agricultural and Biological fact Sheet F-253

NOTE: This table is intentionally blank and should be filled in by the plan preparer.

Basin No.	Water Surface Elevation (ft)	Arm Length (ft)	Arm Dia. (in)	Orifice Size* (in)	Top of Landing Device Elevation (ft)	Flexible Hose Length (in)	Flexible Hose Attachment Elevation (ft)
P-1	823.2	10.0	6	5.0	816.8	24	815.0

*** Must be equal to or less than arm diameter**

A rope shall be attached to the skimmer arm to facilitate access to the skimmer once installed. Skimmer shall be inspected weekly and after each runoff event.

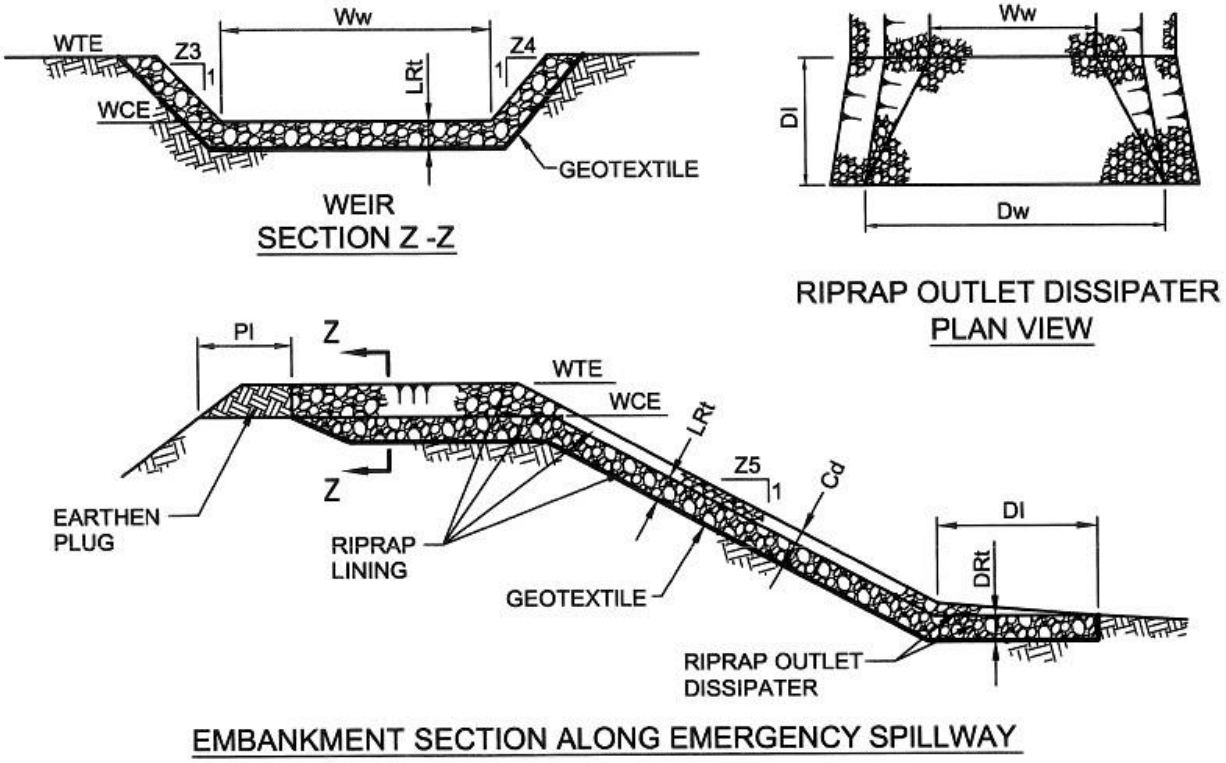
Any malfunctioning skimmer shall be repaired or replaced within 24 hours of inspection.

Ice or sediment buildup around the principal spillway shall be removed so as to allow the skimmer to respond to fluctuating water elevations.

Sediment shall be removed from the basin when it reaches the level marked on the sediment clean-out stake or the top of the landing device.

A semi-circular landing zone may be substituted for the guide rails (Standard Construction Detail # 7-3)

STANDARD CONSTRUCTION DETAIL # 7-12
Sediment Basin Emergency Spillway with Riprap Lining



PA DEP

NOTE: This table is intentionally blank and should be filled in by the plan preparer.

	WEIR					LINING		CHANNEL		DISSIPATER			
BASIN NO.	Z3 (FT)	Z4 (FT)	TOP ELEV WTE (FT)	CREST ELEV WCE (FT)	WIDTH Ww (FT)	RIPRAP SIZE (R-)	RIPRAP THICK. LRt (IN)	Z5 (FT)	DEPTH Cd (FT)	LENGTH DI (FT)	WIDTH Dw (FT)	RIPRAP SIZE (R-___)	RIPRAP THICK. DRt (IN)
P-1	2	2	829.8	826.7	22.0	4	18	3	1.0	20	26	4	18

Dimension PI shall be 5' minimum.

Displaced riprap within the spillway and/or outlet channel shall be replaced immediately.