

March 10, 2020

Mr. John Aultman, P.E.
Vulcan Materials Company
201 Brown Road
Piedmont, SC 29673

Subject: Fairfield Mine Permit — Storm Water Runoff Design Summary

This letter and accompanying attachments provide guidelines for the design of sediment ponds and additional sediment and erosion control measures at the Vulcan property located in Winnsboro, Fairfield County, South Carolina. The described measures are necessary to control sediment and storm water runoff related to overburden and stockpile area construction.

The overburden areas will be located on the north end of the project site. The overburden areas are labeled as overburden areas 1 and 2, with Overburden Area 1 being the easternmost overburden area and Overburden Area 2 being the westernmost overburden area. Four sediment ponds, three for Overburden Area 1 and one for Overburden Area 2, will be needed due to the topography and size of the area. The four sediment ponds are labeled as Pond 1, Pond 2, Pond 3, and Pond 4. Pond 1 will be located on the east side of Overburden Area 1. Pond 2 will be located on the northwest side of Overburden Area 1. Pond 3 will be located on the southwest side of Overburden Area 1. Pond 4 will be located on the southwest side of Overburden Area 2. Storm water will be routed to the ponds via ditches, terraces, and down drains.

The sediment ponds will treat the storm water from the overburden area and the treated storm water will be discharged downstream. The locations of the overburden area and ponds can be found in the site construction plans.

SEDCAD hydrologic software was used to determine existing and future storm water runoff volumes and flow rates. The rainfall input data used to estimate storm flows in SEDCAD was provided by the SC DHEC Storm Water Management BMP Handbook. The ponds will meet the criteria of not overtopping during a 100-year storm event and will maintain a minimum of 6 vertical inches between the pond surface elevation and the emergency spillway during a 10-year storm event. The ponds have been designed to manage storm water flows from the overburden area designated on the grading plans. The ditch systems shown on the grading plans will allow for proper drainage to the ponds. The drainage areas for each pond are shown on a figure included as **Attachment 1**. The attachment titled Pond Parameters describes the

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drainage areas, flow rates, and individual design guideline criteria for each of the ponds (**Attachment 2**). The design guideline criteria for the ponds are shown as a detail on the grading plans and in the attached chart titled Pond General Construction Guidelines (**Attachment 3**). Attachment 2 is intended for field use. The calculations for the sediment ponds are included as **Attachment 4**.

The predominant soil type in the area is Wilkes sandy loam. The Wilkes soil type carries a hydrologic soil group classification of C. Pre-construction ground cover is considered to be woods-grass combination (tree farm) in fair hydrologic condition. The curve number representing pre-construction conditions is 76. The future groundcover with the placement of overburden is considered to have approximately 50 percent grass cover with a relatively poor hydrologic soil condition. The curve number representing the future conditions is 86. There are areas that contribute runoff to the discharge points that will remain undisturbed and will bypass the four sediment ponds. Curve Numbers for these areas are identical to pre-construction conditions. A soil map is included as **Attachment 5**.

The sediment produced from the overburden area will be routed to the four ponds, which will maintain a sediment trapping efficiency of at least 80 percent during a 25-year, 24-hour storm event.

The following criteria will be identical for sediment ponds 1, 2, 3, and 4:

- Concrete riser structure
 - Minimum dimensions 3 feet x 3 feet
 - Trash rack
 - Floating Skimmers
- Rip-rap (SCDOT Class C) dike surrounding riser
 - #5 stone on face
 - Tie-in to earthen berm
 - Minimum 5 feet distance between rip-rap and riser
- Outlet pipe
 - Concrete or corrugated metal
 - Tie-in to riser
- Discharge location
 - Plunge pool-shaped rip-rap stone bed apron
 - Filter fabric underlain and tied in to adjacent grades
 - Apron length and width adequate for proper energy dissipation

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- Berm designs
 - All Ponds
 - Minimum width of 25 feet
 - Tie-in to existing ground
 - 3:1 side slope design

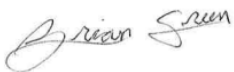
Check dams downstream of the pond discharge locations are recommended. The purposes of the check dams would be to reduce concentrated flows as an additional energy dissipation method and to provide additional settling.

In addition, best management practices — including, but not limited to, silt fence, check dams, storm water ditching, and grassing — shall be used throughout the site during and after construction of the overburden areas to control any and all erosion and/or offsite sedimentation.

Please review the package and respond with comments at your convenience.

Sincerely,

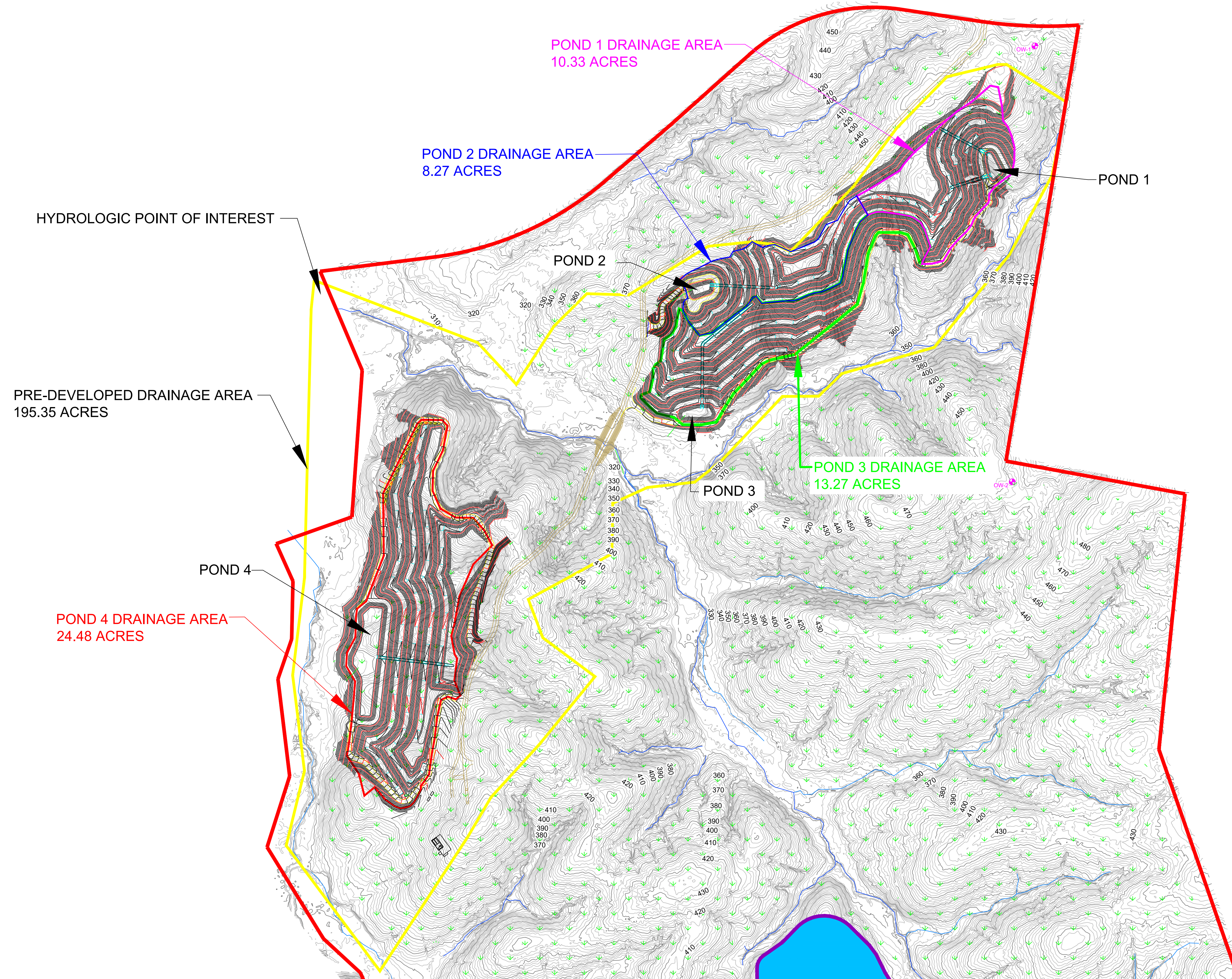
SynTerra Corp.



Brian Green, P.E.

ATTACHMENTS:

1. Drainage Area Figure
2. Pond Parameters
3. Pond General Construction Guidelines
4. SEDCAD Calculations
5. Soil Map



NOTES:
 1. BASE TOPOGRAPHY PROVIDED BY:
 TUCK MAPPING SOLUTIONS
 BIG STONE GAP, VIRGINIA
 DATE OF PHOTOGRAPHY: JUNE 6, 2019

P:\VULCAN CONSTRUCTION MATERIALS\963118 - FAIRFIELD QUARRY\01.2019 MINE MAP AMENDMENT\DWG\96311801-MINE LAND USE-REV A.DWG



E					
D					
C					
B					
A	03/03/2020	FOR CLIENT REVIEW	CCN		
	DATE	REVISION	BY		

TOLERANCES—UNLESS NOTED
 FRACTIONAL: ± 1/16"
 DECIMAL: ± 0.010"
 ANGLE: ± 0.1"
 THIS DRAWING IN DESIGN AND DETAIL IS THE PROPERTY OF VULCAN MATERIALS COMPANY AND MUST BE RETURNED UPON DEMAND. THIS DRAWING MUST NOT BE COPIED, REPRODUCED, OR USED WITHOUT PERMISSION.



POST -DEVELOPED DRAINAGE AREAS

DIVISION		PLANT	
BY N. DAVIS		FAIRFIELD QUARRY	
DATE 02/14/2020	BY B. GREEN	PROJ. NO.	FILE SERVER
DWG. NO.	DATE 3/3/2020	SCALE 1" = 300'	SHEET 1 OF 1
			REV. A

Pond Parameters

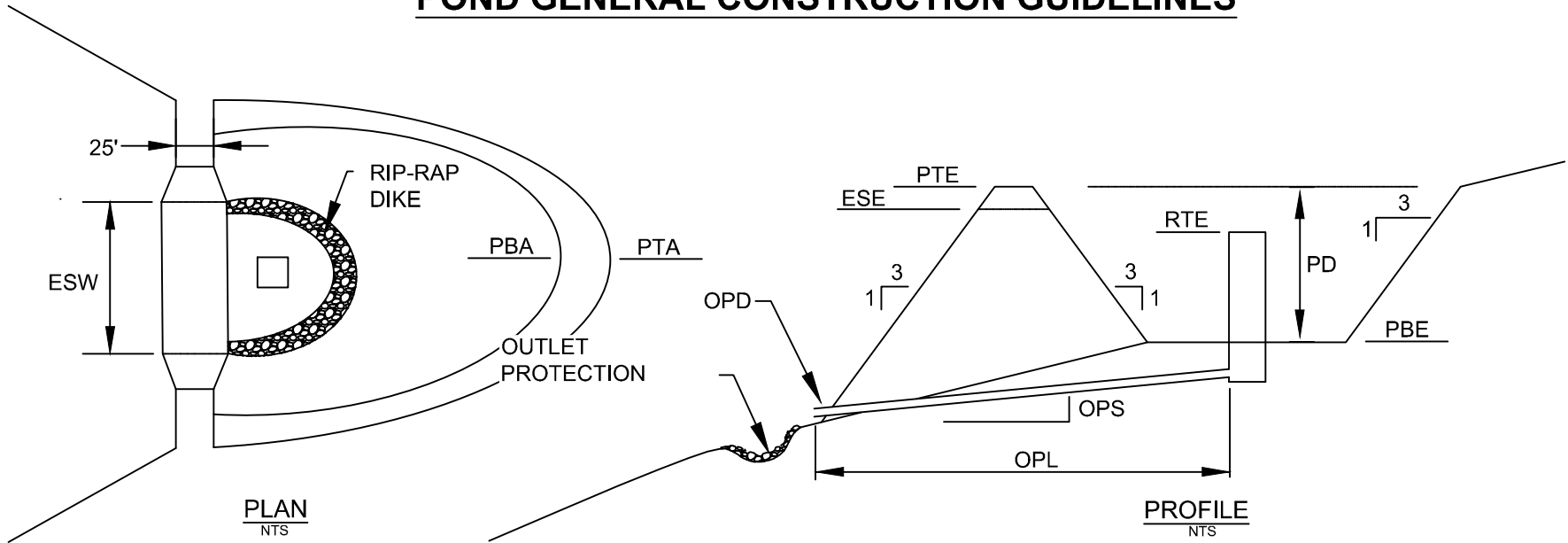
Pre-Development Drainage Area					
Existing (acre)	195.35				
Post-Development Drainage Area					
	Pond 1	Pond 2	Pond 3	Pond 4	Total
Overburden (acre)	10.33	8.27	13.27	24.48	56.35
Offsite (acre)					139.00
Total (acre)					195.35

Pre-Development Flow Rates (cfs)	
Storm Event	Hydrologic Point of Interest
2-year, 24-hour	182.49
10-year, 24-hour	360.11
25-year, 24-hour	491.17
100-year, 24-hour	713.99
Post-Development Flow Rates (cfs)	
Storm Event	Hydrologic Point of Interest
2-year, 24-hour	139.88
10-year, 24-hour	272.89
25-year, 24-hour	393.44
100-year, 24-hour	634.74

Pond Dimensions				
	Pond 1	Pond 2	Pond 3	Pond 4
Bottom Elevation (ft)	386	372	332	328
Top Elevation (ft)	396	382	342	338
Depth (ft)	10	10	10	10
Full Pond Surface Area (acre)	0.560	0.381	0.640	2.455
Pond Emergency Spillway				
Width (ft)	20.0	38.3	20.0	20.0
Elevation (ft)	395	381	341	337
Pond Riser				
Riser Height (ft)	8	8	8	8
Skimmer Diameter (in)	4	4	4	4
Orifice Elevation (ft)	388.5	374.5	334.0	330.0
Pond Outlet Pipe				
Diameter (in)	24	24	24	24
Length (ft)	117	161	188	106
Minimum Slope (%)	1.7	1.2	1.06	1.9
Material	RCP	RCP	RCP	RCP

VULCAN QUARRIES - FAIRFIELD

POND GENERAL CONSTRUCTION GUIDELINES



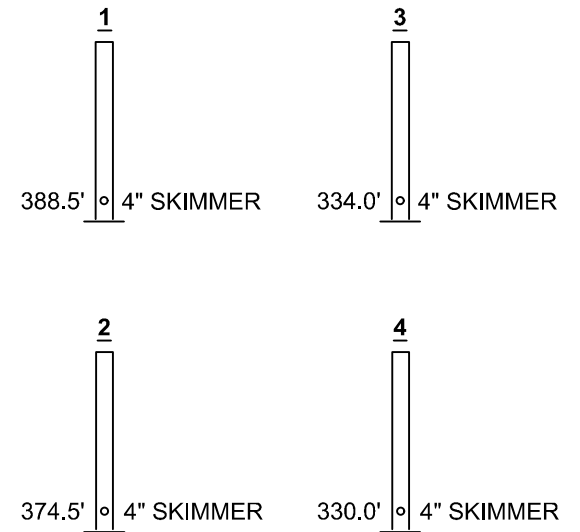
ABBREVIATIONS

- PTE POND TOP ELEVATION
- ESE EMERGENCY SPILLWAY ELEVATION
- RTE RISER TOP ELEVATION
- PD POND DEPTH
- PBE POND BOTTOM ELEVATION
- ESW EMERGENCY SPILLWAY WIDTH
- PBA POND BOTTOM AREA
- PTA POND TOP AREA
- OPL OUTLET PIPE LENGTH
- OPS OUTLET PIPE SLOPE
- OPD OUTLET PIPE DIAMETER

PONDS

	1	2	3	4
PTE	396.0'	382.0'	342.0'	338.0'
ESE	395.0'	381.0'	341.0'	337.0'
RTE	394.0'	380.0'	340.0'	336.0'
PD	10'	10'	10'	10'
PBE	386.0'	372.0'	332.0'	328.0'
ESW	20'	38.3'	20'	20'
PBA	0.156 ac	0.103 ac	0.200 ac	1.387 ac
PTA	0.560 ac	0.381 ac	0.640 ac	2.455 ac
OPL	117'	161'	188'	106'
OPS	1.7%	1.2%	1.06%	1.90%
OPD	24"	24"	24"	24"

RISERS



Vulcan Fairfield Quarry

Pre-development Calculations

2-year 24-hour Storm Event

3.5 inches

N. Davis

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	2 yr - 24 hr
Rainfall Depth:	3.500 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Hydrologic Point of Interest

#1 Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	195.350	195.350	182.49	22.10

Structure Detail:

Structure #1 (Null)

Hydrologic Point of Interest

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	195.350	0.596	0.000	0.000	76.000	TR55	182.49	22.102
		Σ 195.350						182.49	22.102

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	1. Forest with heavy ground litter	12.96	14.00	108.00	0.910	0.032
		1. Forest with heavy ground litter	23.75	62.00	261.00	1.230	0.058
		8. Large gullies, diversions, and low flowing streams	1.48	98.00	6,632.00	3.640	0.506
#1	1	Time of Concentration:					0.596

Vulcan Fairfield Quarry

Post-development Calculations

2-year 24-hour Storm Event

3.5 inches

N. Davis

General Information

Storm Information:

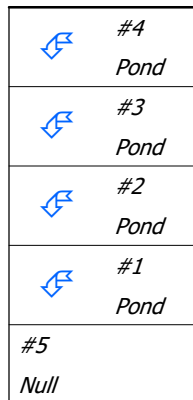
Storm Type:	NRCS Type II
Design Storm:	2 yr - 24 hr
Rainfall Depth:	3.500 inches

Particle Size Distribution:

Size (mm)	Wilkes
1.4000	100.000%
1.0000	85.200%
0.0630	51.300%
0.0440	45.100%
0.0380	45.100%
0.0040	8.900%
0.0030	5.800%
0.0010	0.000%

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	#5	0.195	0.425	Pond 1
Pond	#2	==>	#5	0.132	0.402	Pond 2
Pond	#3	==>	#5	0.264	0.395	Pond 3
Pond	#4	==>	#5	0.237	0.398	Pond 4
Null	#5	==>	End	0.000	0.000	Hydrologic Point of Interest/pond bypass



Structure Routing Details:

Stru #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1. Forest with heavy ground litter	17.02	16.00	94.00	1.04	0.025
	9. Small streams flowing bankfull	1.17	70.00	5,984.44	9.73	0.170
#1	Muskingum K:					0.195
#2	8. Large gullies, diversions, and low flowing streams	5.71	56.00	981.02	7.16	0.038
	9. Small streams flowing bankfull	0.59	14.00	2,355.31	6.93	0.094
#2	Muskingum K:					0.132
#3	1. Forest with heavy ground litter	4.39	14.00	319.00	0.53	0.167
	9. Small streams flowing bankfull	0.64	16.00	2,509.01	7.18	0.097
#3	Muskingum K:					0.264
#4	1. Forest with heavy ground litter	4.33	12.00	277.00	0.52	0.147
	9. Small streams flowing bankfull	0.67	16.00	2,404.20	7.34	0.090
#4	Muskingum K:					0.237

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc. (ml/l)	24VW (ml/l)
#4 In	24.480	24.480	51.87	4.28	2,458.6	593,724	359.45	207.49
#4 Out			0.23	0.75	17.0	55,131	0.00	0.00
#3 In	13.270	13.270	26.92	2.36	1,208.4	548,506	329.67	187.99
#3 Out			0.23	0.77	27.8	54,025	0.00	0.00
#2 In	8.270	8.270	16.78	1.47	711.7	524,555	315.29	179.26
#2 Out			0.23	0.76	34.9	155,456	0.01	0.00
#1 In	10.330	10.330	21.89	1.80	935.4	548,141	331.86	190.54
#1 Out			0.23	0.77	36.2	161,945	0.01	0.00
#5	139.000	195.350	139.88	21.06	1,870.5	139,024	72.71	37.29

Particle Size Distribution(s) at Each Structure

Structure #4 (Pond 4):

Size (mm)	In	Out
1.4000	100.000%	100.000%
1.0000	85.200%	100.000%
0.0630	51.300%	100.000%
0.0440	45.100%	100.000%
0.0380	45.100%	100.000%
0.0040	8.900%	100.000%
0.0030	5.800%	100.000%
0.0010	0.000%	0.000%

Structure #3 (Pond 3):

Size (mm)	In	Out
1.4000	100.000%	100.000%
1.0000	87.307%	100.000%
0.0630	52.569%	100.000%
0.0440	46.216%	100.000%
0.0380	46.216%	100.000%
0.0040	9.120%	100.000%
0.0030	5.943%	100.000%
0.0010	0.000%	0.000%

Structure #2 (Pond 2):

Size (mm)	In	Out
1.4000	100.000%	100.000%
1.0000	87.297%	100.000%
0.0630	52.563%	100.000%
0.0440	46.210%	100.000%
0.0380	46.210%	100.000%
0.0040	9.119%	100.000%
0.0030	5.943%	100.000%
0.0010	0.000%	0.000%

Structure #1 (Pond 1):

Size (mm)	In	Out
1.4000	100.000%	100.000%
1.0000	85.200%	100.000%
0.0630	51.300%	100.000%
0.0440	45.100%	100.000%
0.0380	45.100%	100.000%
0.0040	8.900%	100.000%
0.0030	5.800%	100.000%
0.0010	0.000%	0.000%

Structure #5:

Size (mm)	In/Out
1.4000	100.000%
1.0000	100.000%
0.0630	67.010%
0.0440	59.659%
0.0380	59.659%
0.0040	16.744%
0.0030	13.069%
0.0010	0.000%

Structure Detail:

Structure #4 (Pond)

Pond 4

Pond Inputs:

Initial Pool Elev:	329.50 ft
Initial Pool:	2.19 ac-ft
*Sediment Storage:	0.00 ac-ft
Dead Space:	20.00 %

**No sediment capacity defined*

Enhanced Perf. Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
31.56	8.00	24.00	106.00	1.90	0.0160	336.00	4

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
337.00	31.00	6.66:1	6.66:1	20.00

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
337.00	31.00	6.66:1	6.66:1	20.00

Pond Results:

Peak Elevation:	331.92 ft
H'graph Detention Time:	16.99 hrs
Pond Model:	CSTRS
Dewater Time:	26.50 days
Trap Efficiency:	99.31 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
328.00	1.387	0.000	0.000	Top of Sed. Storage
328.01	1.388	0.014	0.000	
328.50	1.436	0.706	0.000	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
329.00	1.487	1.437	0.000	
329.50	1.538	2.193	0.000	
330.00	1.590	2.975	0.233	40.61*
330.50	1.641	3.782	0.233	41.95*
331.00	1.693	4.616	0.233	43.28*
331.50	1.746	5.475	0.233	44.64*
331.92	1.790	6.218	0.233	0.00 Peak Stage
332.00	1.799	6.362	0.233	
332.50	1.851	7.274	0.233	
333.00	1.904	8.213	0.233	
333.50	1.958	9.178	0.233	
334.00	2.012	10.171	0.233	
334.50	2.066	11.190	0.233	
335.00	2.120	12.236	0.233	
335.50	2.175	13.310	0.233	
336.00	2.231	14.412	0.233	Spillway #1
336.50	2.286	15.541	9.289	
337.00	2.342	16.698	25.846	Spillway #2
337.50	2.398	17.883	56.632	
338.00	2.455	19.096	85.951	

*Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.

Detailed Discharge Table

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User-input discharge (cfs)	Combined Total Discharge (cfs)
328.00	0.000	0.000	0.000	0.000
328.01	0.000	0.000	0.000	0.000
328.50	0.000	0.000	0.000	0.000
329.00	0.000	0.000	0.000	0.000
329.50	0.000	0.000	0.000	0.000
330.00	0.000	0.000	0.233	0.233
330.50	0.000	0.000	0.233	0.233
331.00	0.000	0.000	0.233	0.233
331.50	0.000	0.000	0.233	0.233
332.00	0.000	0.000	0.233	0.233
332.50	0.000	0.000	0.233	0.233
333.00	0.000	0.000	0.233	0.233
333.50	0.000	0.000	0.233	0.233
334.00	0.000	0.000	0.233	0.233

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
334.50	0.000	0.000	0.233	0.233
335.00	0.000	0.000	0.233	0.233
335.50	0.000	0.000	0.233	0.233
336.00	0.000	0.000	0.233	0.233
336.50	9.056	0.000	0.233	9.289
337.00	25.613	0.000	0.233	25.846
337.50	32.036	24.363	0.233	56.632
338.00	36.992	48.726	0.233	85.951

Structure #3 (Pond)

Pond 3

Pond Inputs:

Initial Pool Elev:	333.50 ft
Initial Pool:	0.33 ac-ft
*Sediment Storage:	0.00 ac-ft
Dead Space:	20.00 %

**No sediment capacity defined*

Enhanced Perf. Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
31.56	8.00	24.00	188.00	1.06	0.0160	340.00	4

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
341.00	31.00	6.66:1	6.66:1	20.00

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
341.00	31.00	6.66:1	6.66:1	20.00

Pond Results:

Peak Elevation:	339.50 ft
H'graph Detention Time:	16.40 hrs
Pond Model:	CSTRS
Dewater Time:	5.05 days
Trap Efficiency:	97.70 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
332.00	0.200	0.000	0.000	Top of Sed. Storage
332.01	0.200	0.002	0.000	
332.50	0.214	0.104	0.000	
333.00	0.229	0.214	0.000	
333.50	0.244	0.333	0.000	
334.00	0.260	0.459	0.233	6.55*
334.50	0.276	0.593	0.233	6.96*
335.00	0.292	0.735	0.233	7.37*
335.50	0.309	0.885	0.233	7.80*
336.00	0.326	1.043	0.233	8.24*
336.50	0.343	1.211	0.233	8.69*
337.00	0.361	1.387	0.233	9.14*
337.50	0.379	1.571	0.233	9.60*
338.00	0.397	1.765	0.233	10.07*
338.50	0.422	1.970	0.233	10.63*
339.00	0.448	2.188	0.233	11.29*
339.50	0.474	2.417	0.233	0.00 Peak Stage
339.50	0.475	2.418	0.233	
340.00	0.502	2.662	0.233	Spillway #1
340.50	0.535	2.921	9.289	
341.00	0.569	3.197	25.846	Spillway #2
341.50	0.604	3.491	56.632	
342.00	0.640	3.801	84.492	

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
332.00	0.000	0.000	0.000	0.000
332.01	0.000	0.000	0.000	0.000
332.50	0.000	0.000	0.000	0.000
333.00	0.000	0.000	0.000	0.000
333.50	0.000	0.000	0.000	0.000
334.00	0.000	0.000	0.233	0.233
334.50	0.000	0.000	0.233	0.233

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
335.00	0.000	0.000	0.233	0.233
335.50	0.000	0.000	0.233	0.233
336.00	0.000	0.000	0.233	0.233
336.50	0.000	0.000	0.233	0.233
337.00	0.000	0.000	0.233	0.233
337.50	0.000	0.000	0.233	0.233
338.00	0.000	0.000	0.233	0.233
338.50	0.000	0.000	0.233	0.233
339.00	0.000	0.000	0.233	0.233
339.50	0.000	0.000	0.233	0.233
340.00	0.000	0.000	0.233	0.233
340.50	9.056	0.000	0.233	9.289
341.00	25.613	0.000	0.233	25.846
341.50	32.036	24.363	0.233	56.632
342.00	35.533	48.726	0.233	84.492

Structure #2 (Pond)

Pond 2

Pond Inputs:

Initial Pool Elev:	374.00 ft
Initial Pool:	0.00 ac-ft
*Sediment Storage:	0.25 ac-ft
Dead Space:	20.00 %

**Sediment capacity was entered by user*

Enhanced Perf. Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
31.56	8.00	24.00	161.00	1.20	0.0160	380.00	4

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
381.00	31.00	6.66:1	6.66:1	38.33

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
381.00	31.00	6.66:1	6.66:1	38.33

Pond Results:

Peak Elevation:	379.54 ft
H'graph Detention Time:	16.43 hrs
Pond Model:	CSTRS
Dewater Time:	2.90 days
Trap Efficiency:	95.10 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
373.99	0.146	0.000	0.000		Top of Sed. Storage
374.00	0.146	0.001	0.000		
374.50	0.157	0.077	0.233	3.94*	
375.00	0.169	0.158	0.233	4.24*	
375.50	0.181	0.246	0.233	4.55*	
376.00	0.194	0.340	0.233	4.87*	
376.50	0.207	0.440	0.233	5.20*	
377.00	0.220	0.546	0.233	5.53*	
377.50	0.233	0.660	0.233	5.88*	
378.00	0.247	0.780	0.233	6.23*	
378.50	0.263	0.907	0.233	6.62*	
379.00	0.279	1.043	0.233	7.04*	
379.50	0.296	1.187	0.233	7.48*	
379.54	0.298	1.200	0.233	0.00	Peak Stage
380.00	0.314	1.339	0.233		Spillway #1
380.50	0.330	1.500	9.289		
381.00	0.347	1.669	25.846		Spillway #2
381.50	0.364	1.847	75.613		
382.00	0.381	2.033	123.913		

Detailed Discharge Table

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User-input discharge (cfs)	Combined Total Discharge (cfs)
373.99	0.000	0.000	0.000	0.000
374.00	0.000	0.000	0.000	0.000
374.50	0.000	0.000	0.233	0.233
375.00	0.000	0.000	0.233	0.233
375.50	0.000	0.000	0.233	0.233
376.00	0.000	0.000	0.233	0.233

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
376.50	0.000	0.000	0.233	0.233
377.00	0.000	0.000	0.233	0.233
377.50	0.000	0.000	0.233	0.233
378.00	0.000	0.000	0.233	0.233
378.50	0.000	0.000	0.233	0.233
379.00	0.000	0.000	0.233	0.233
379.50	0.000	0.000	0.233	0.233
380.00	0.000	0.000	0.233	0.233
380.50	9.056	0.000	0.233	9.289
381.00	25.613	0.000	0.233	25.846
381.50	32.036	43.344	0.233	75.613
382.00	36.992	86.688	0.233	123.913

Structure #1 (Pond)

Pond 1

Pond Inputs:

Initial Pool Elev:	388.00 ft
Initial Pool:	0.00 ac-ft
*Sediment Storage:	0.36 ac-ft
Dead Space:	20.00 %

**Sediment capacity was entered by user*

Enhanced Perf. Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
31.56	8.00	24.00	117.00	1.70	0.0160	394.00	4

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
395.00	31.00	6.66:1	6.66:1	20.00

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
395.00	31.00	6.66:1	6.66:1	20.00

Pond Results:

Peak Elevation:	393.31 ft
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H'graph Detention Time:	16.57 hrs
Pond Model:	CSTRS
Dewater Time:	3.95 days
Trap Efficiency:	96.13 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
388.00	0.208	0.000	0.000		Top of Sed. Storage
388.00	0.208	0.001	0.000		
388.50	0.222	0.108	0.233	5.58*	
389.00	0.236	0.223	0.233	5.94*	
389.50	0.251	0.344	0.233	6.32*	
390.00	0.266	0.474	0.233	6.71*	
390.50	0.281	0.610	0.233	7.10*	
391.00	0.296	0.755	0.233	7.49*	
391.50	0.312	0.907	0.233	7.89*	
392.00	0.328	1.067	0.233	8.31*	
392.50	0.352	1.237	0.233	8.83*	
393.00	0.377	1.419	0.233	9.47*	
393.31	0.393	1.539	0.233	0.00	Peak Stage
393.50	0.403	1.614	0.233		
394.00	0.430	1.822	0.233		Spillway #1
394.50	0.461	2.045	9.289		
395.00	0.493	2.283	25.846		Spillway #2
395.50	0.526	2.538	56.632		
396.00	0.560	2.809	85.951		

Detailed Discharge Table

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
388.00	0.000	0.000	0.000	0.000
388.00	0.000	0.000	0.000	0.000
388.50	0.000	0.000	0.233	0.233
389.00	0.000	0.000	0.233	0.233
389.50	0.000	0.000	0.233	0.233
390.00	0.000	0.000	0.233	0.233
390.50	0.000	0.000	0.233	0.233
391.00	0.000	0.000	0.233	0.233

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
391.50	0.000	0.000	0.233	0.233
392.00	0.000	0.000	0.233	0.233
392.50	0.000	0.000	0.233	0.233
393.00	0.000	0.000	0.233	0.233
393.50	0.000	0.000	0.233	0.233
394.00	0.000	0.000	0.233	0.233
394.50	9.056	0.000	0.233	9.289
395.00	25.613	0.000	0.233	25.846
395.50	32.036	24.363	0.233	56.632
396.00	36.992	48.726	0.233	85.951

Structure #5 (Null)

Hydrologic Point of Interest/pond bypass

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#4	1	24.480	0.096	0.000	0.000	86.000	TR55	51.87	4.277
	Σ	24.480						51.87	4.277
#3	1	13.270	0.167	0.000	0.000	86.000	TR55	26.92	2.356
	Σ	13.270						26.92	2.356
#2	1	8.270	0.141	0.000	0.000	86.000	TR55	16.78	1.468
	Σ	8.270						16.78	1.468
#1	1	10.330	0.088	0.000	0.000	86.000	TR55	21.89	1.805
	Σ	10.330						21.89	1.805
#5	1	139.000	0.527	0.000	0.000	76.000	TR55	138.25	15.720
	Σ	195.350						139.88	21.060

Subwatershed Sedimentology Detail:

Stru #	SWS #	Soil K	L (ft)	S (%)	C	P	PS #	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc (ml/l)	24VW (ml/l)
#4	1	0.320	60.00	33.33	0.9000	1.0000	1	2,458.6	593,724	359.45	207.49
	Σ							2,458.6	593,724	359.45	207.49
#3	1	0.320	60.00	33.33	0.9000	1.0000	1	1,208.4	548,506	329.67	187.99
	Σ							1,208.4	548,506	329.67	187.99
#2	1	0.320	60.00	33.33	0.9000	1.0000	1	711.7	524,555	315.29	179.26
	Σ							711.7	524,555	315.29	179.26
#1	1	0.320	60.00	33.33	0.9000	1.0000	1	935.4	548,141	331.86	190.54
	Σ							935.4	548,141	331.86	190.54
#5	1	0.320	100.00	14.00	0.3500	1.0000	1	1,754.7	139,970	78.20	43.96
	Σ							1,870.5	139,024	72.71	37.29

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	5. Nearly bare and untilled, and alluvial valley fans	10.00	2.50	25.00	3.160	0.002
		6. Grassed waterway	2.49	17.00	683.00	2.360	0.080

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
		8. Large gullies, diversions, and low flowing streams	28.16	69.00	245.00	15.920	0.004
		9. Small streams flowing bankfull	0.50	0.23	46.00	6.360	0.002
#1	1	Time of Concentration:					0.088
#2	1	5. Nearly bare and untilled, and alluvial valley fans	10.00	2.50	25.00	3.160	0.002
		6. Grassed waterway	1.26	10.00	793.02	1.680	0.131
		8. Large gullies, diversions, and low flowing streams	23.43	82.00	350.00	14.520	0.006
		9. Small streams flowing bankfull	5.00	8.00	160.00	20.120	0.002
#2	1	Time of Concentration:					0.141
#3	1	5. Nearly bare and untilled, and alluvial valley fans	22.92	22.00	96.00	4.780	0.005
		7. Paved area and small upland gullies	1.66	14.00	844.03	2.590	0.090
		7. Paved area and small upland gullies	6.74	70.00	1,038.00	5.220	0.055
		7. Paved area and small upland gullies	3.48	8.00	230.00	3.750	0.017
#3	1	Time of Concentration:					0.167
#4	1	5. Nearly bare and untilled, and alluvial valley fans	1.00	1.15	115.00	1.000	0.031
		8. Large gullies, diversions, and low flowing streams	2171.00	2,171.00	100.00	139.780	0.000
		5. Nearly bare and untilled, and alluvial valley fans	2.63	10.00	380.01	1.620	0.065
#4	1	Time of Concentration:					0.096
#5	1	1. Forest with heavy ground litter	9.82	100.00	1,018.00	0.790	0.357
		9. Small streams flowing bankfull	1.17	70.00	5,984.44	9.730	0.170
#5	1	Time of Concentration:					0.527

Vulcan Fairfield Quarry

Pre-development Calculations

10-year 24-hour Storm Event

5.1 inches

N. Davis

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	5.100 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Hydrologic Point of Interest

#1 Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	195.350	195.350	360.11	42.38

Structure Detail:

Structure #1 (Null)

Hydrologic Point of Interest

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	195.350	0.596	0.000	0.000	76.000	TR55	360.11	42.382
	Σ	195.350						360.11	42.382

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	1. Forest with heavy ground litter	12.96	14.00	108.00	0.910	0.032
		1. Forest with heavy ground litter	23.75	62.00	261.00	1.230	0.058
		8. Large gullies, diversions, and low flowing streams	1.48	98.00	6,632.00	3.640	0.506
#1	1	Time of Concentration:					0.596

Vulcan Fairfield Quarry

Post-development Calculations

10-year 24-hour Storm Event

5.1 inches

N. Davis

General Information

Storm Information:

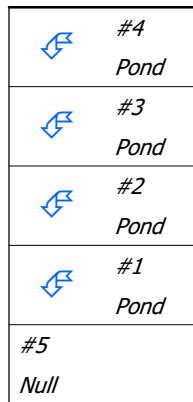
Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	5.100 inches

Particle Size Distribution:

Size (mm)	Wilkes
1.4000	100.000%
1.0000	85.200%
0.0630	51.300%
0.0440	45.100%
0.0380	45.100%
0.0040	8.900%
0.0030	5.800%
0.0010	0.000%

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	#5	0.195	0.425	Pond 1
Pond	#2	==>	#5	0.132	0.402	Pond 2
Pond	#3	==>	#5	0.264	0.395	Pond 3
Pond	#4	==>	#5	0.237	0.398	Pond 4
Null	#5	==>	End	0.000	0.000	Hydrologic Point of Interest/pond bypass



Structure Routing Details:

Stru #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1. Forest with heavy ground litter	17.02	16.00	94.00	1.04	0.025
	9. Small streams flowing bankfull	1.17	70.00	5,984.44	9.73	0.170
#1	Muskingum K:					0.195
#2	8. Large gullies, diversions, and low flowing streams	5.71	56.00	981.02	7.16	0.038
	9. Small streams flowing bankfull	0.59	14.00	2,355.31	6.93	0.094
#2	Muskingum K:					0.132
#3	1. Forest with heavy ground litter	4.39	14.00	319.00	0.53	0.167
	9. Small streams flowing bankfull	0.64	16.00	2,509.01	7.18	0.097
#3	Muskingum K:					0.264
#4	1. Forest with heavy ground litter	4.33	12.00	277.00	0.52	0.147
	9. Small streams flowing bankfull	0.67	16.00	2,404.20	7.34	0.090
#4	Muskingum K:					0.237

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc. (ml/l)	24VW (ml/l)
#4 In	24.480	24.480	83.58	7.26	4,318.0	602,478	364.75	213.01
#4 Out			0.23	0.77	26.8	84,591	0.00	0.00
#3 In	13.270	13.270	44.35	4.00	2,149.0	567,229	342.20	195.88
#3 Out			4.88	2.15	207.4	132,451	3.66	2.16
#2 In	8.270	8.270	27.64	2.49	1,265.5	542,684	327.40	186.86
#2 Out			4.73	1.65	148.3	150,451	15.22	7.94
#1 In	10.330	10.330	35.27	3.06	1,642.9	556,419	336.87	195.73
#1 Out			3.48	1.74	153.4	158,567	3.07	1.47
#5	139.000	195.350	272.89	36.45	4,226.2	151,670	75.91	43.28

Particle Size Distribution(s) at Each Structure

Structure #4 (Pond 4):

Size (mm)	In	Out
1.4000	100.000%	100.000%
1.0000	85.200%	100.000%
0.0630	51.300%	100.000%
0.0440	45.100%	100.000%
0.0380	45.100%	100.000%
0.0040	8.900%	100.000%
0.0030	5.800%	100.000%
0.0010	0.000%	0.000%

Structure #3 (Pond 3):

Size (mm)	In	Out
1.4000	100.000%	100.000%
1.0000	86.227%	100.000%
0.0630	51.918%	100.000%
0.0440	45.644%	100.000%
0.0380	45.644%	100.000%
0.0040	9.007%	93.322%
0.0030	5.870%	60.817%
0.0010	0.000%	0.000%

Structure #2 (Pond 2):

Size (mm)	In	Out
1.4000	100.000%	100.000%
1.0000	86.217%	100.000%
0.0630	51.912%	100.000%
0.0440	45.638%	100.000%
0.0380	45.638%	100.000%
0.0040	9.006%	76.855%
0.0030	5.869%	50.085%
0.0010	0.000%	0.000%

Structure #1 (Pond 1):

Size (mm)	In	Out
1.4000	100.000%	100.000%
1.0000	85.200%	100.000%
0.0630	51.300%	100.000%
0.0440	45.100%	100.000%
0.0380	45.100%	100.000%
0.0040	8.900%	95.343%
0.0030	5.800%	62.134%
0.0010	0.000%	0.000%

Structure #5:

Size (mm)	In/Out
1.4000	100.000%
1.0000	100.000%
0.0630	66.909%
0.0440	60.354%
0.0380	60.354%
0.0040	20.781%
0.0030	13.763%
0.0010	0.000%

Structure Detail:

Structure #4 (Pond)

Pond 4

Pond Inputs:

Initial Pool Elev:	329.50 ft
Initial Pool:	2.19 ac-ft
*Sediment Storage:	0.00 ac-ft
Dead Space:	20.00 %

**No sediment capacity defined*

Enhanced Perf. Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
31.56	8.00	24.00	106.00	1.90	0.0160	336.00	4

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
337.00	31.00	6.66:1	6.66:1	20.00

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
337.00	31.00	6.66:1	6.66:1	20.00

Pond Results:

Peak Elevation:	333.50 ft
H'graph Detention Time:	16.67 hrs
Pond Model:	CSTRS
Dewater Time:	26.50 days
Trap Efficiency:	99.38 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
328.00	1.387	0.000	0.000	Top of Sed. Storage
328.01	1.388	0.014	0.000	
328.50	1.436	0.706	0.000	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
329.00	1.487	1.437	0.000	
329.50	1.538	2.193	0.000	
330.00	1.590	2.975	0.233	40.61*
330.50	1.641	3.782	0.233	41.95*
331.00	1.693	4.616	0.233	43.28*
331.50	1.746	5.475	0.233	44.64*
332.00	1.799	6.362	0.233	46.02*
332.50	1.851	7.274	0.233	47.39*
333.00	1.904	8.213	0.233	48.75*
333.50	1.957	9.175	0.233	0.00 Peak Stage
333.50	1.958	9.178	0.233	
334.00	2.012	10.171	0.233	
334.50	2.066	11.190	0.233	
335.00	2.120	12.236	0.233	
335.50	2.175	13.310	0.233	
336.00	2.231	14.412	0.233	Spillway #1
336.50	2.286	15.541	9.289	
337.00	2.342	16.698	25.846	Spillway #2
337.50	2.398	17.883	56.632	
338.00	2.455	19.096	85.951	

*Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.

Detailed Discharge Table

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User-input discharge (cfs)	Combined Total Discharge (cfs)
328.00	0.000	0.000	0.000	0.000
328.01	0.000	0.000	0.000	0.000
328.50	0.000	0.000	0.000	0.000
329.00	0.000	0.000	0.000	0.000
329.50	0.000	0.000	0.000	0.000
330.00	0.000	0.000	0.233	0.233
330.50	0.000	0.000	0.233	0.233
331.00	0.000	0.000	0.233	0.233
331.50	0.000	0.000	0.233	0.233
332.00	0.000	0.000	0.233	0.233
332.50	0.000	0.000	0.233	0.233
333.00	0.000	0.000	0.233	0.233
333.50	0.000	0.000	0.233	0.233
334.00	0.000	0.000	0.233	0.233

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
334.50	0.000	0.000	0.233	0.233
335.00	0.000	0.000	0.233	0.233
335.50	0.000	0.000	0.233	0.233
336.00	0.000	0.000	0.233	0.233
336.50	9.056	0.000	0.233	9.289
337.00	25.613	0.000	0.233	25.846
337.50	32.036	24.363	0.233	56.632
338.00	36.992	48.726	0.233	85.951

Structure #3 (Pond)

Pond 3

Pond Inputs:

Initial Pool Elev:	333.50 ft
Initial Pool:	0.33 ac-ft
*Sediment Storage:	0.00 ac-ft
Dead Space:	20.00 %

**No sediment capacity defined*

Enhanced Perf. Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
31.56	8.00	24.00	188.00	1.06	0.0160	340.00	4

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
341.00	31.00	6.66:1	6.66:1	20.00

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
341.00	31.00	6.66:1	6.66:1	20.00

Pond Results:

Peak Elevation:	340.26 ft
H'graph Detention Time:	7.52 hrs
Pond Model:	CSTRS
Dewater Time:	6.60 days
Trap Efficiency:	90.35 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
332.00	0.200	0.000	0.000	Top of Sed. Storage
332.01	0.200	0.002	0.000	
332.50	0.214	0.104	0.000	
333.00	0.229	0.214	0.000	
333.50	0.244	0.333	0.000	
334.00	0.260	0.459	0.233	6.55*
334.50	0.276	0.593	0.233	6.96*
335.00	0.292	0.735	0.233	7.37*
335.50	0.309	0.885	0.233	7.80*
336.00	0.326	1.043	0.233	8.24*
336.50	0.343	1.211	0.233	8.69*
337.00	0.361	1.387	0.233	9.14*
337.50	0.379	1.571	0.233	9.60*
338.00	0.397	1.765	0.233	10.07*
338.50	0.422	1.970	0.233	10.63*
339.00	0.448	2.188	0.233	11.29*
339.50	0.475	2.418	0.233	11.98*
340.00	0.502	2.662	0.233	12.68* Spillway #1
340.26	0.520	2.795	4.876	37.15 Peak Stage
340.50	0.535	2.921	9.289	
341.00	0.569	3.197	25.846	Spillway #2
341.50	0.604	3.491	56.632	
342.00	0.640	3.801	84.492	

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
332.00	0.000	0.000	0.000	0.000
332.01	0.000	0.000	0.000	0.000
332.50	0.000	0.000	0.000	0.000
333.00	0.000	0.000	0.000	0.000
333.50	0.000	0.000	0.000	0.000
334.00	0.000	0.000	0.233	0.233
334.50	0.000	0.000	0.233	0.233

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
335.00	0.000	0.000	0.233	0.233
335.50	0.000	0.000	0.233	0.233
336.00	0.000	0.000	0.233	0.233
336.50	0.000	0.000	0.233	0.233
337.00	0.000	0.000	0.233	0.233
337.50	0.000	0.000	0.233	0.233
338.00	0.000	0.000	0.233	0.233
338.50	0.000	0.000	0.233	0.233
339.00	0.000	0.000	0.233	0.233
339.50	0.000	0.000	0.233	0.233
340.00	0.000	0.000	0.233	0.233
340.50	9.056	0.000	0.233	9.289
341.00	25.613	0.000	0.233	25.846
341.50	32.036	24.363	0.233	56.632
342.00	35.533	48.726	0.233	84.492

Structure #2 (Pond)

Pond 2

Pond Inputs:

Initial Pool Elev:	374.00 ft
Initial Pool:	0.00 ac-ft
*Sediment Storage:	0.25 ac-ft
Dead Space:	20.00 %

**Sediment capacity was entered by user*

Enhanced Perf. Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
31.56	8.00	24.00	161.00	1.20	0.0160	380.00	4

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
381.00	31.00	6.66:1	6.66:1	38.33

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
381.00	31.00	6.66:1	6.66:1	38.33

Pond Results:

Peak Elevation:	380.25 ft
H'graph Detention Time:	8.66 hrs
Pond Model:	CSTRS
Dewater Time:	4.46 days
Trap Efficiency:	88.28 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
373.99	0.146	0.000	0.000		Top of Sed. Storage
374.00	0.146	0.001	0.000		
374.50	0.157	0.077	0.233	3.94*	
375.00	0.169	0.158	0.233	4.24*	
375.50	0.181	0.246	0.233	4.55*	
376.00	0.194	0.340	0.233	4.87*	
376.50	0.207	0.440	0.233	5.20*	
377.00	0.220	0.546	0.233	5.53*	
377.50	0.233	0.660	0.233	5.88*	
378.00	0.247	0.780	0.233	6.23*	
378.50	0.263	0.907	0.233	6.62*	
379.00	0.279	1.043	0.233	7.04*	
379.50	0.296	1.187	0.233	7.48*	
380.00	0.314	1.339	0.233	7.92*	Spillway #1
380.25	0.322	1.419	4.726	37.30	Peak Stage
380.50	0.330	1.500	9.289		
381.00	0.347	1.669	25.846		Spillway #2
381.50	0.364	1.847	75.613		
382.00	0.381	2.033	123.913		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User-input discharge (cfs)	Combined Total Discharge (cfs)
373.99	0.000	0.000	0.000	0.000
374.00	0.000	0.000	0.000	0.000
374.50	0.000	0.000	0.233	0.233
375.00	0.000	0.000	0.233	0.233

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
375.50	0.000	0.000	0.233	0.233
376.00	0.000	0.000	0.233	0.233
376.50	0.000	0.000	0.233	0.233
377.00	0.000	0.000	0.233	0.233
377.50	0.000	0.000	0.233	0.233
378.00	0.000	0.000	0.233	0.233
378.50	0.000	0.000	0.233	0.233
379.00	0.000	0.000	0.233	0.233
379.50	0.000	0.000	0.233	0.233
380.00	0.000	0.000	0.233	0.233
380.50	9.056	0.000	0.233	9.289
381.00	25.613	0.000	0.233	25.846
381.50	32.036	43.344	0.233	75.613
382.00	36.992	86.688	0.233	123.913

Structure #1 (Pond)

Pond 1

Pond Inputs:

Initial Pool Elev:	388.00 ft
Initial Pool:	0.00 ac-ft
*Sediment Storage:	0.36 ac-ft
Dead Space:	20.00 %

**Sediment capacity was entered by user*

Enhanced Perf. Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
31.56	8.00	24.00	117.00	1.70	0.0160	394.00	4

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
395.00	31.00	6.66:1	6.66:1	20.00

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
395.00	31.00	6.66:1	6.66:1	20.00

Pond Results:

Peak Elevation:	394.18 ft
H'graph Detention Time:	8.77 hrs
Pond Model:	CSTRS
Dewater Time:	5.49 days
Trap Efficiency:	90.67 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
388.00	0.208	0.000	0.000		Top of Sed. Storage
388.00	0.208	0.001	0.000		
388.50	0.222	0.108	0.233	5.58*	
389.00	0.236	0.223	0.233	5.94*	
389.50	0.251	0.344	0.233	6.32*	
390.00	0.266	0.474	0.233	6.71*	
390.50	0.281	0.610	0.233	7.10*	
391.00	0.296	0.755	0.233	7.49*	
391.50	0.312	0.907	0.233	7.89*	
392.00	0.328	1.067	0.233	8.31*	
392.50	0.352	1.237	0.233	8.83*	
393.00	0.377	1.419	0.233	9.47*	
393.50	0.403	1.614	0.233	10.13*	
394.00	0.430	1.822	0.233	10.82*	Spillway #1
394.18	0.442	1.902	3.476	36.95	Peak Stage
394.50	0.461	2.045	9.289		
395.00	0.493	2.283	25.846		Spillway #2
395.50	0.526	2.538	56.632		
396.00	0.560	2.809	85.951		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User-input discharge (cfs)	Combined Total Discharge (cfs)
388.00	0.000	0.000	0.000	0.000
388.00	0.000	0.000	0.000	0.000
388.50	0.000	0.000	0.233	0.233
389.00	0.000	0.000	0.233	0.233
389.50	0.000	0.000	0.233	0.233
390.00	0.000	0.000	0.233	0.233

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
390.50	0.000	0.000	0.233	0.233
391.00	0.000	0.000	0.233	0.233
391.50	0.000	0.000	0.233	0.233
392.00	0.000	0.000	0.233	0.233
392.50	0.000	0.000	0.233	0.233
393.00	0.000	0.000	0.233	0.233
393.50	0.000	0.000	0.233	0.233
394.00	0.000	0.000	0.233	0.233
394.50	9.056	0.000	0.233	9.289
395.00	25.613	0.000	0.233	25.846
395.50	32.036	24.363	0.233	56.632
396.00	36.992	48.726	0.233	85.951

Structure #5 (Null)

Hydrologic Point of Interest/pond bypass

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#4	1	24.480	0.096	0.000	0.000	86.000	TR55	83.58	7.257
	Σ	24.480						83.58	7.257
#3	1	13.270	0.167	0.000	0.000	86.000	TR55	44.35	3.998
	Σ	13.270						44.35	3.998
#2	1	8.270	0.141	0.000	0.000	86.000	TR55	27.64	2.492
	Σ	8.270						27.64	2.492
#1	1	10.330	0.088	0.000	0.000	86.000	TR55	35.27	3.062
	Σ	10.330						35.27	3.062
#5	1	139.000	0.527	0.000	0.000	76.000	TR55	271.95	30.145
	Σ	195.350						272.89	36.451

Subwatershed Sedimentology Detail:

Stru #	SWS #	Soil K	L (ft)	S (%)	C	P	PS #	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc (ml/l)	24VW (ml/l)
#4	1	0.320	60.00	33.33	0.9000	1.0000	1	4,318.0	602,478	364.75	213.01
	Σ							4,318.0	602,478	364.75	213.01
#3	1	0.320	60.00	33.33	0.9000	1.0000	1	2,149.0	567,229	342.20	195.88
	Σ							2,149.0	567,229	342.20	195.88
#2	1	0.320	60.00	33.33	0.9000	1.0000	1	1,265.5	542,684	327.40	186.86
	Σ							1,265.5	542,684	327.40	186.86
#1	1	0.320	60.00	33.33	0.9000	1.0000	1	1,642.9	556,419	336.87	195.73
	Σ							1,642.9	556,419	336.87	195.73
#5	1	0.320	100.00	14.00	0.3500	1.0000	1	3,690.6	151,759	86.21	48.81
	Σ							4,226.2	151,670	75.91	43.28

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	5. Nearly bare and untilled, and alluvial valley fans	10.00	2.50	25.00	3.160	0.002
		6. Grassed waterway	2.49	17.00	683.00	2.360	0.080

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
		8. Large gullies, diversions, and low flowing streams	28.16	69.00	245.00	15.920	0.004
		9. Small streams flowing bankfull	0.50	0.23	46.00	6.360	0.002
#1	1	Time of Concentration:					0.088
#2	1	5. Nearly bare and untilled, and alluvial valley fans	10.00	2.50	25.00	3.160	0.002
		6. Grassed waterway	1.26	10.00	793.02	1.680	0.131
		8. Large gullies, diversions, and low flowing streams	23.43	82.00	350.00	14.520	0.006
		9. Small streams flowing bankfull	5.00	8.00	160.00	20.120	0.002
#2	1	Time of Concentration:					0.141
#3	1	5. Nearly bare and untilled, and alluvial valley fans	22.92	22.00	96.00	4.780	0.005
		7. Paved area and small upland gullies	1.66	14.00	844.03	2.590	0.090
		7. Paved area and small upland gullies	6.74	70.00	1,038.00	5.220	0.055
		7. Paved area and small upland gullies	3.48	8.00	230.00	3.750	0.017
#3	1	Time of Concentration:					0.167
#4	1	5. Nearly bare and untilled, and alluvial valley fans	1.00	1.15	115.00	1.000	0.031
		8. Large gullies, diversions, and low flowing streams	2171.00	2,171.00	100.00	139.780	0.000
		5. Nearly bare and untilled, and alluvial valley fans	2.63	10.00	380.01	1.620	0.065
#4	1	Time of Concentration:					0.096
#5	1	1. Forest with heavy ground litter	9.82	100.00	1,018.00	0.790	0.357
		9. Small streams flowing bankfull	1.17	70.00	5,984.44	9.730	0.170
#5	1	Time of Concentration:					0.527

Vulcan Fairfield Quarry

Pre-development Calculations

25-year 24-hour Storm Event

6.2 inches

N. Davis

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 24 hr
Rainfall Depth:	6.200 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Hydrologic Point of Interest

#1 Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	195.350	195.350	491.17	57.52

Structure Detail:

Structure #1 (Null)

Hydrologic Point of Interest

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	195.350	0.596	0.000	0.000	76.000	TR55	491.17	57.521
	Σ	195.350						491.17	57.521

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	1. Forest with heavy ground litter	12.96	14.00	108.00	0.910	0.032
		1. Forest with heavy ground litter	23.75	62.00	261.00	1.230	0.058
		8. Large gullies, diversions, and low flowing streams	1.48	98.00	6,632.00	3.640	0.506
#1	1	Time of Concentration:					0.596

Vulcan Fairfield Quarry

Post-development Calculations

25-year 24-hour Storm Event

6.2 inches

N. Davis

General Information

Storm Information:

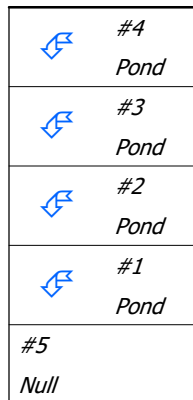
Storm Type:	NRCS Type II
Design Storm:	25 yr - 24 hr
Rainfall Depth:	6.200 inches

Particle Size Distribution:

Size (mm)	Wilkes
1.4000	100.000%
1.0000	85.200%
0.0630	51.300%
0.0440	45.100%
0.0380	45.100%
0.0040	8.900%
0.0030	5.800%
0.0010	0.000%

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	#5	0.195	0.425	Pond 1
Pond	#2	==>	#5	0.132	0.402	Pond 2
Pond	#3	==>	#5	0.264	0.395	Pond 3
Pond	#4	==>	#5	0.237	0.398	Pond 4
Null	#5	==>	End	0.000	0.000	Hydrologic Point of Interest/pond bypass



Structure Routing Details:

Stru #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1. Forest with heavy ground litter	17.02	16.00	94.00	1.04	0.025
	9. Small streams flowing bankfull	1.17	70.00	5,984.44	9.73	0.170
#1	Muskingum K:					0.195
#2	8. Large gullies, diversions, and low flowing streams	5.71	56.00	981.02	7.16	0.038
	9. Small streams flowing bankfull	0.59	14.00	2,355.31	6.93	0.094
#2	Muskingum K:					0.132
#3	1. Forest with heavy ground litter	4.39	14.00	319.00	0.53	0.167
	9. Small streams flowing bankfull	0.64	16.00	2,509.01	7.18	0.097
#3	Muskingum K:					0.264
#4	1. Forest with heavy ground litter	4.33	12.00	277.00	0.52	0.147
	9. Small streams flowing bankfull	0.67	16.00	2,404.20	7.34	0.090
#4	Muskingum K:					0.237

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc. (ml/l)	24VW (ml/l)
#4 In	24.480	24.480	105.27	9.38	5,671.2	608,313	368.29	215.67
#4 Out			0.23	0.79	32.5	98,678	0.00	0.00
#3 In	13.270	13.270	56.33	5.16	2,835.9	576,889	348.52	199.47
#3 Out			18.42	3.32	428.7	142,299	26.92	18.93
#2 In	8.270	8.270	35.11	3.22	1,670.1	552,045	333.52	190.32
#2 Out			17.55	2.37	283.7	155,178	34.50	21.77
#1 In	10.330	10.330	44.42	3.96	2,157.7	561,941	340.21	198.24
#1 Out			14.61	2.63	318.4	157,291	28.95	17.94
#5	139.000	195.350	393.44	50.02	6,277.5	167,922	85.21	47.47

Particle Size Distribution(s) at Each Structure

Structure #4 (Pond 4):

Size (mm)	In	Out
1.4000	100.000%	100.000%
1.0000	85.200%	100.000%
0.0630	51.300%	100.000%
0.0440	45.100%	100.000%
0.0380	45.100%	100.000%
0.0040	8.900%	100.000%
0.0030	5.800%	100.000%
0.0010	0.000%	0.000%

Structure #3 (Pond 3):

Size (mm)	In	Out
1.4000	100.000%	100.000%
1.0000	85.816%	100.000%
0.0630	51.671%	100.000%
0.0440	45.426%	100.000%
0.0380	45.426%	100.000%
0.0040	8.964%	59.301%
0.0030	5.842%	38.645%
0.0010	0.000%	0.000%

Structure #2 (Pond 2):

Size (mm)	In	Out
1.4000	100.000%	100.000%
1.0000	85.806%	100.000%
0.0630	51.665%	100.000%
0.0440	45.421%	100.000%
0.0380	45.421%	100.000%
0.0040	8.963%	52.765%
0.0030	5.841%	34.386%
0.0010	0.000%	0.000%

Structure #1 (Pond 1):

Size (mm)	In	Out
1.4000	100.000%	100.000%
1.0000	85.200%	100.000%
0.0630	51.300%	100.000%
0.0440	45.100%	100.000%
0.0380	45.100%	100.000%
0.0040	8.900%	60.310%
0.0030	5.800%	39.303%
0.0010	0.000%	0.000%

Structure #5:

Size (mm)	In/Out
1.4000	100.000%
1.0000	100.000%
0.0630	67.549%
0.0440	61.431%
0.0380	61.431%
0.0040	18.792%
0.0030	12.426%
0.0010	0.000%

Structure Detail:

Structure #4 (Pond)

Pond 4

Pond Inputs:

Initial Pool Elev:	329.50 ft
Initial Pool:	2.19 ac-ft
*Sediment Storage:	0.00 ac-ft
Dead Space:	20.00 %

**No sediment capacity defined*

Enhanced Perf. Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
31.56	8.00	24.00	106.00	1.90	0.0160	336.00	4

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
337.00	31.00	6.66:1	6.66:1	20.00

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
337.00	31.00	6.66:1	6.66:1	20.00

Pond Results:

Peak Elevation:	334.54 ft
H'graph Detention Time:	16.37 hrs
Pond Model:	CSTRS
Dewater Time:	26.50 days
Trap Efficiency:	99.43 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
328.00	1.387	0.000	0.000	Top of Sed. Storage
328.01	1.388	0.014	0.000	
328.50	1.436	0.706	0.000	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
329.00	1.487	1.437	0.000	
329.50	1.538	2.193	0.000	
330.00	1.590	2.975	0.233	40.61*
330.50	1.641	3.782	0.233	41.95*
331.00	1.693	4.616	0.233	43.28*
331.50	1.746	5.475	0.233	44.64*
332.00	1.799	6.362	0.233	46.02*
332.50	1.851	7.274	0.233	47.39*
333.00	1.904	8.213	0.233	48.75*
333.50	1.958	9.178	0.233	50.13*
334.00	2.012	10.171	0.233	51.54*
334.50	2.066	11.190	0.233	52.94*
334.54	2.071	11.277	0.233	0.00 Peak Stage
335.00	2.120	12.236	0.233	
335.50	2.175	13.310	0.233	
336.00	2.231	14.412	0.233	Spillway #1
336.50	2.286	15.541	9.289	
337.00	2.342	16.698	25.846	Spillway #2
337.50	2.398	17.883	56.632	
338.00	2.455	19.096	85.951	

*Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.

Detailed Discharge Table

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User-input discharge (cfs)	Combined Total Discharge (cfs)
328.00	0.000	0.000	0.000	0.000
328.01	0.000	0.000	0.000	0.000
328.50	0.000	0.000	0.000	0.000
329.00	0.000	0.000	0.000	0.000
329.50	0.000	0.000	0.000	0.000
330.00	0.000	0.000	0.233	0.233
330.50	0.000	0.000	0.233	0.233
331.00	0.000	0.000	0.233	0.233
331.50	0.000	0.000	0.233	0.233
332.00	0.000	0.000	0.233	0.233
332.50	0.000	0.000	0.233	0.233
333.00	0.000	0.000	0.233	0.233
333.50	0.000	0.000	0.233	0.233
334.00	0.000	0.000	0.233	0.233

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
334.50	0.000	0.000	0.233	0.233
335.00	0.000	0.000	0.233	0.233
335.50	0.000	0.000	0.233	0.233
336.00	0.000	0.000	0.233	0.233
336.50	9.056	0.000	0.233	9.289
337.00	25.613	0.000	0.233	25.846
337.50	32.036	24.363	0.233	56.632
338.00	36.992	48.726	0.233	85.951

Structure #3 (Pond)

Pond 3

Pond Inputs:

Initial Pool Elev:	333.50 ft
Initial Pool:	0.33 ac-ft
*Sediment Storage:	0.00 ac-ft
Dead Space:	20.00 %

**No sediment capacity defined*

Enhanced Perf. Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
31.56	8.00	24.00	188.00	1.06	0.0160	340.00	4

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
341.00	31.00	6.66:1	6.66:1	20.00

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
341.00	31.00	6.66:1	6.66:1	20.00

Pond Results:

Peak Elevation:	340.78 ft
H'graph Detention Time:	5.11 hrs
Pond Model:	CSTRS
Dewater Time:	5.08 days
Trap Efficiency:	84.88 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
332.00	0.200	0.000	0.000	Top of Sed. Storage
332.01	0.200	0.002	0.000	
332.50	0.214	0.104	0.000	
333.00	0.229	0.214	0.000	
333.50	0.244	0.333	0.000	
334.00	0.260	0.459	0.233	6.55*
334.50	0.276	0.593	0.233	6.96*
335.00	0.292	0.735	0.233	7.37*
335.50	0.309	0.885	0.233	7.80*
336.00	0.326	1.043	0.233	8.24*
336.50	0.343	1.211	0.233	8.69*
337.00	0.361	1.387	0.233	9.14*
337.50	0.379	1.571	0.233	9.60*
338.00	0.397	1.765	0.233	10.07*
338.50	0.422	1.970	0.233	10.63*
339.00	0.448	2.188	0.233	11.29*
339.50	0.475	2.418	0.233	11.98*
340.00	0.502	2.662	0.233	12.68* Spillway #1
340.50	0.535	2.921	9.289	0.34*
340.78	0.554	3.074	18.418	0.55 Peak Stage
341.00	0.569	3.197	25.846	Spillway #2
341.50	0.604	3.491	56.632	
342.00	0.640	3.801	84.492	

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
332.00	0.000	0.000	0.000	0.000
332.01	0.000	0.000	0.000	0.000
332.50	0.000	0.000	0.000	0.000
333.00	0.000	0.000	0.000	0.000
333.50	0.000	0.000	0.000	0.000
334.00	0.000	0.000	0.233	0.233
334.50	0.000	0.000	0.233	0.233

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
335.00	0.000	0.000	0.233	0.233
335.50	0.000	0.000	0.233	0.233
336.00	0.000	0.000	0.233	0.233
336.50	0.000	0.000	0.233	0.233
337.00	0.000	0.000	0.233	0.233
337.50	0.000	0.000	0.233	0.233
338.00	0.000	0.000	0.233	0.233
338.50	0.000	0.000	0.233	0.233
339.00	0.000	0.000	0.233	0.233
339.50	0.000	0.000	0.233	0.233
340.00	0.000	0.000	0.233	0.233
340.50	9.056	0.000	0.233	9.289
341.00	25.613	0.000	0.233	25.846
341.50	32.036	24.363	0.233	56.632
342.00	35.533	48.726	0.233	84.492

Structure #2 (Pond)

Pond 2

Pond Inputs:

Initial Pool Elev:	374.00 ft
Initial Pool:	0.00 ac-ft
*Sediment Storage:	0.25 ac-ft
Dead Space:	20.00 %

**Sediment capacity was entered by user*

Enhanced Perf. Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
31.56	8.00	24.00	161.00	1.20	0.0160	380.00	4

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
381.00	31.00	6.66:1	6.66:1	38.33

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
381.00	31.00	6.66:1	6.66:1	38.33

Pond Results:

Peak Elevation:	380.75 ft
H'graph Detention Time:	6.17 hrs
Pond Model:	CSTRS
Dewater Time:	2.92 days
Trap Efficiency:	83.01 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
373.99	0.146	0.000	0.000		Top of Sed. Storage
374.00	0.146	0.001	0.000		
374.50	0.157	0.077	0.233	3.94*	
375.00	0.169	0.158	0.233	4.24*	
375.50	0.181	0.246	0.233	4.55*	
376.00	0.194	0.340	0.233	4.87*	
376.50	0.207	0.440	0.233	5.20*	
377.00	0.220	0.546	0.233	5.53*	
377.50	0.233	0.660	0.233	5.88*	
378.00	0.247	0.780	0.233	6.23*	
378.50	0.263	0.907	0.233	6.62*	
379.00	0.279	1.043	0.233	7.04*	
379.50	0.296	1.187	0.233	7.48*	
380.00	0.314	1.339	0.233	7.92*	Spillway #1
380.50	0.330	1.500	9.289	0.21*	
380.75	0.338	1.585	17.548	0.25	Peak Stage
381.00	0.347	1.669	25.846		Spillway #2
381.50	0.364	1.847	75.613		
382.00	0.381	2.033	123.913		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User-input discharge (cfs)	Combined Total Discharge (cfs)
373.99	0.000	0.000	0.000	0.000
374.00	0.000	0.000	0.000	0.000
374.50	0.000	0.000	0.233	0.233
375.00	0.000	0.000	0.233	0.233

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
375.50	0.000	0.000	0.233	0.233
376.00	0.000	0.000	0.233	0.233
376.50	0.000	0.000	0.233	0.233
377.00	0.000	0.000	0.233	0.233
377.50	0.000	0.000	0.233	0.233
378.00	0.000	0.000	0.233	0.233
378.50	0.000	0.000	0.233	0.233
379.00	0.000	0.000	0.233	0.233
379.50	0.000	0.000	0.233	0.233
380.00	0.000	0.000	0.233	0.233
380.50	9.056	0.000	0.233	9.289
381.00	25.613	0.000	0.233	25.846
381.50	32.036	43.344	0.233	75.613
382.00	36.992	86.688	0.233	123.913

Structure #1 (Pond)

Pond 1

Pond Inputs:

Initial Pool Elev:	388.00 ft
Initial Pool:	0.00 ac-ft
*Sediment Storage:	0.36 ac-ft
Dead Space:	20.00 %

**Sediment capacity was entered by user*

Enhanced Perf. Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
31.56	8.00	24.00	117.00	1.70	0.0160	394.00	4

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
395.00	31.00	6.66:1	6.66:1	20.00

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
395.00	31.00	6.66:1	6.66:1	20.00

Pond Results:

Peak Elevation:	394.66 ft
H'graph Detention Time:	6.00 hrs
Pond Model:	CSTRS
Dewater Time:	3.97 days
Trap Efficiency:	85.24 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
388.00	0.208	0.000	0.000		Top of Sed. Storage
388.00	0.208	0.001	0.000		
388.50	0.222	0.108	0.233	5.58*	
389.00	0.236	0.223	0.233	5.94*	
389.50	0.251	0.344	0.233	6.32*	
390.00	0.266	0.474	0.233	6.71*	
390.50	0.281	0.610	0.233	7.10*	
391.00	0.296	0.755	0.233	7.49*	
391.50	0.312	0.907	0.233	7.89*	
392.00	0.328	1.067	0.233	8.31*	
392.50	0.352	1.237	0.233	8.83*	
393.00	0.377	1.419	0.233	9.47*	
393.50	0.403	1.614	0.233	10.13*	
394.00	0.430	1.822	0.233	10.82*	Spillway #1
394.50	0.461	2.045	9.289	0.29*	
394.66	0.472	2.121	14.609	0.35	Peak Stage
395.00	0.493	2.283	25.846		Spillway #2
395.50	0.526	2.538	56.632		
396.00	0.560	2.809	85.951		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User-input discharge (cfs)	Combined Total Discharge (cfs)
388.00	0.000	0.000	0.000	0.000
388.00	0.000	0.000	0.000	0.000
388.50	0.000	0.000	0.233	0.233
389.00	0.000	0.000	0.233	0.233
389.50	0.000	0.000	0.233	0.233
390.00	0.000	0.000	0.233	0.233

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
390.50	0.000	0.000	0.233	0.233
391.00	0.000	0.000	0.233	0.233
391.50	0.000	0.000	0.233	0.233
392.00	0.000	0.000	0.233	0.233
392.50	0.000	0.000	0.233	0.233
393.00	0.000	0.000	0.233	0.233
393.50	0.000	0.000	0.233	0.233
394.00	0.000	0.000	0.233	0.233
394.50	9.056	0.000	0.233	9.289
395.00	25.613	0.000	0.233	25.846
395.50	32.036	24.363	0.233	56.632
396.00	36.992	48.726	0.233	85.951

Structure #5 (Null)

Hydrologic Point of Interest/pond bypass

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#4	1	24.480	0.096	0.000	0.000	86.000	TR55	105.27	9.376
	Σ	24.480						105.27	9.376
#3	1	13.270	0.167	0.000	0.000	86.000	TR55	56.33	5.165
	Σ	13.270						56.33	5.165
#2	1	8.270	0.141	0.000	0.000	86.000	TR55	35.11	3.219
	Σ	8.270						35.11	3.219
#1	1	10.330	0.088	0.000	0.000	86.000	TR55	44.42	3.956
	Σ	10.330						44.42	3.956
#5	1	139.000	0.527	0.000	0.000	76.000	TR55	371.51	40.912
	Σ	195.350						393.44	50.019

Subwatershed Sedimentology Detail:

Stru #	SWS #	Soil K	L (ft)	S (%)	C	P	PS #	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc (ml/l)	24VW (ml/l)
#4	1	0.320	60.00	33.33	0.9000	1.0000	1	5,671.2	608,313	368.29	215.67
	Σ							5,671.2	608,313	368.29	215.67
#3	1	0.320	60.00	33.33	0.9000	1.0000	1	2,835.9	576,889	348.52	199.47
	Σ							2,835.9	576,889	348.52	199.47
#2	1	0.320	60.00	33.33	0.9000	1.0000	1	1,670.1	552,045	333.52	190.32
	Σ							1,670.1	552,045	333.52	190.32
#1	1	0.320	60.00	33.33	0.9000	1.0000	1	2,157.7	561,941	340.21	198.24
	Σ							2,157.7	561,941	340.21	198.24
#5	1	0.320	100.00	14.00	0.3500	1.0000	1	5,214.8	157,908	90.35	51.07
	Σ							6,277.5	167,922	85.21	47.47

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	5. Nearly bare and untilled, and alluvial valley fans	10.00	2.50	25.00	3.160	0.002
		6. Grassed waterway	2.49	17.00	683.00	2.360	0.080

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
		8. Large gullies, diversions, and low flowing streams	28.16	69.00	245.00	15.920	0.004
		9. Small streams flowing bankfull	0.50	0.23	46.00	6.360	0.002
#1	1	Time of Concentration:					0.088
#2	1	5. Nearly bare and untilled, and alluvial valley fans	10.00	2.50	25.00	3.160	0.002
		6. Grassed waterway	1.26	10.00	793.02	1.680	0.131
		8. Large gullies, diversions, and low flowing streams	23.43	82.00	350.00	14.520	0.006
		9. Small streams flowing bankfull	5.00	8.00	160.00	20.120	0.002
#2	1	Time of Concentration:					0.141
#3	1	5. Nearly bare and untilled, and alluvial valley fans	22.92	22.00	96.00	4.780	0.005
		7. Paved area and small upland gullies	1.66	14.00	844.03	2.590	0.090
		7. Paved area and small upland gullies	6.74	70.00	1,038.00	5.220	0.055
		7. Paved area and small upland gullies	3.48	8.00	230.00	3.750	0.017
#3	1	Time of Concentration:					0.167
#4	1	5. Nearly bare and untilled, and alluvial valley fans	1.00	1.15	115.00	1.000	0.031
		8. Large gullies, diversions, and low flowing streams	2171.00	2,171.00	100.00	139.780	0.000
		5. Nearly bare and untilled, and alluvial valley fans	2.63	10.00	380.01	1.620	0.065
#4	1	Time of Concentration:					0.096
#5	1	1. Forest with heavy ground litter	9.82	100.00	1,018.00	0.790	0.357
		9. Small streams flowing bankfull	1.17	70.00	5,984.44	9.730	0.170
#5	1	Time of Concentration:					0.527

Vulcan Fairfield Quarry

Pre-development Calculations

100-year 24-hour Storm Event

8.0 inches

N. Davis

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	8.000 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Hydrologic Point of Interest

#1 Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	195.350	195.350	713.99	83.50

Structure Detail:

Structure #1 (Null)

Hydrologic Point of Interest

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	195.350	0.596	0.000	0.000	76.000	TR55	713.99	83.496
	Σ	195.350						713.99	83.496

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	1. Forest with heavy ground litter	12.96	14.00	108.00	0.910	0.032
		1. Forest with heavy ground litter	23.75	62.00	261.00	1.230	0.058
		8. Large gullies, diversions, and low flowing streams	1.48	98.00	6,632.00	3.640	0.506
#1	1	Time of Concentration:					0.596

Vulcan Fairfield Quarry

Post-development Calculations

100-year 24-hour Storm Event

8.0 inches

N. Davis

General Information

Storm Information:

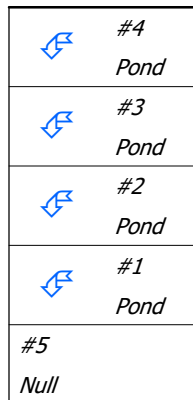
Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	8.000 inches

Particle Size Distribution:

Size (mm)	Wilkes
1.4000	100.000%
1.0000	85.200%
0.0630	51.300%
0.0440	45.100%
0.0380	45.100%
0.0040	8.900%
0.0030	5.800%
0.0010	0.000%

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	#5	0.195	0.425	Pond 1
Pond	#2	==>	#5	0.132	0.402	Pond 2
Pond	#3	==>	#5	0.264	0.395	Pond 3
Pond	#4	==>	#5	0.237	0.398	Pond 4
Null	#5	==>	End	0.000	0.000	Hydrologic Point of Interest/pond bypass



Structure Routing Details:

Stru #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1. Forest with heavy ground litter	17.02	16.00	94.00	1.04	0.025
	9. Small streams flowing bankfull	1.17	70.00	5,984.44	9.73	0.170
#1	Muskingum K:					0.195
#2	8. Large gullies, diversions, and low flowing streams	5.71	56.00	981.02	7.16	0.038
	9. Small streams flowing bankfull	0.59	14.00	2,355.31	6.93	0.094
#2	Muskingum K:					0.132
#3	1. Forest with heavy ground litter	4.39	14.00	319.00	0.53	0.167
	9. Small streams flowing bankfull	0.64	16.00	2,509.01	7.18	0.097
#3	Muskingum K:					0.264
#4	1. Forest with heavy ground litter	4.33	12.00	277.00	0.52	0.147
	9. Small streams flowing bankfull	0.67	16.00	2,404.20	7.34	0.090
#4	Muskingum K:					0.237

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc. (ml/l)	24VW (ml/l)
#4 In	24.480	24.480	140.46	12.91	7,971.5	617,272	373.71	219.08
#4 Out			1.80	1.12	57.9	114,644	0.00	0.00
#3 In	13.270	13.270	75.82	7.11	4,005.5	589,691	356.76	203.82
#3 Out			56.74	5.26	854.3	172,390	47.86	33.55
#2 In	8.270	8.270	47.26	4.43	2,358.9	564,456	341.51	194.52
#2 Out			44.10	3.58	533.5	179,618	52.03	33.45
#1 In	10.330	10.330	59.27	5.45	3,032.9	570,423	345.35	201.44
#1 Out			49.14	4.12	631.5	176,933	48.30	31.97
#5	139.000	195.350	634.74	73.47	9,994.9	180,356	92.52	52.11

Particle Size Distribution(s) at Each Structure

Structure #4 (Pond 4):

Size (mm)	In	Out
1.4000	100.000%	100.000%
1.0000	85.200%	100.000%
0.0630	51.300%	100.000%
0.0440	45.100%	100.000%
0.0380	45.100%	100.000%
0.0040	8.900%	100.000%
0.0030	5.800%	100.000%
0.0010	0.000%	0.000%

Structure #3 (Pond 3):

Size (mm)	In	Out
1.4000	100.000%	100.000%
1.0000	85.402%	100.000%
0.0630	51.421%	100.000%
0.0440	45.207%	100.000%
0.0380	45.207%	100.000%
0.0040	8.921%	41.826%
0.0030	5.814%	27.258%
0.0010	0.000%	0.000%

Structure #2 (Pond 2):

Size (mm)	In	Out
1.4000	100.000%	100.000%
1.0000	85.392%	100.000%
0.0630	51.415%	100.000%
0.0440	45.201%	100.000%
0.0380	45.201%	100.000%
0.0040	8.920%	39.441%
0.0030	5.813%	25.703%
0.0010	0.000%	0.000%

Structure #1 (Pond 1):

Size (mm)	In	Out
1.4000	100.000%	100.000%
1.0000	85.200%	100.000%
0.0630	51.300%	100.000%
0.0440	45.100%	100.000%
0.0380	45.100%	100.000%
0.0040	8.900%	42.748%
0.0030	5.800%	27.858%
0.0010	0.000%	0.000%

Structure #5:

Size (mm)	In/Out
1.4000	100.000%
1.0000	99.340%
0.0630	68.078%
0.0440	62.361%
0.0380	62.361%
0.0040	17.167%
0.0030	11.389%
0.0010	0.000%

Structure Detail:

Structure #4 (Pond)

Pond 4

Pond Inputs:

Initial Pool Elev:	329.50 ft
Initial Pool:	2.19 ac-ft
*Sediment Storage:	0.00 ac-ft
Dead Space:	20.00 %

**No sediment capacity defined*

Enhanced Perf. Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
31.56	8.00	24.00	106.00	1.90	0.0160	336.00	4

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
337.00	31.00	6.66:1	6.66:1	20.00

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
337.00	31.00	6.66:1	6.66:1	20.00

Pond Results:

Peak Elevation:	336.09 ft
H'graph Detention Time:	14.53 hrs
Pond Model:	CSTRS
Dewater Time:	27.58 days
Trap Efficiency:	99.27 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
328.00	1.387	0.000	0.000	Top of Sed. Storage
328.01	1.388	0.014	0.000	
328.50	1.436	0.706	0.000	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
329.00	1.487	1.437	0.000		
329.50	1.538	2.193	0.000		
330.00	1.590	2.975	0.233	40.61*	
330.50	1.641	3.782	0.233	41.95*	
331.00	1.693	4.616	0.233	43.28*	
331.50	1.746	5.475	0.233	44.64*	
332.00	1.799	6.362	0.233	46.02*	
332.50	1.851	7.274	0.233	47.39*	
333.00	1.904	8.213	0.233	48.75*	
333.50	1.958	9.178	0.233	50.13*	
334.00	2.012	10.171	0.233	51.54*	
334.50	2.066	11.190	0.233	52.94*	
335.00	2.120	12.236	0.233	54.34*	
335.50	2.175	13.310	0.233	55.76*	
336.00	2.231	14.412	0.233	57.20*	Spillway #1
336.09	2.240	14.607	1.800	26.00	Peak Stage
336.50	2.286	15.541	9.289		
337.00	2.342	16.698	25.846		Spillway #2
337.50	2.398	17.883	56.632		
338.00	2.455	19.096	85.951		

*Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.

Detailed Discharge Table

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User-input discharge (cfs)	Combined Total Discharge (cfs)
328.00	0.000	0.000	0.000	0.000
328.01	0.000	0.000	0.000	0.000
328.50	0.000	0.000	0.000	0.000
329.00	0.000	0.000	0.000	0.000
329.50	0.000	0.000	0.000	0.000
330.00	0.000	0.000	0.233	0.233
330.50	0.000	0.000	0.233	0.233
331.00	0.000	0.000	0.233	0.233
331.50	0.000	0.000	0.233	0.233
332.00	0.000	0.000	0.233	0.233
332.50	0.000	0.000	0.233	0.233
333.00	0.000	0.000	0.233	0.233
333.50	0.000	0.000	0.233	0.233
334.00	0.000	0.000	0.233	0.233

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
334.50	0.000	0.000	0.233	0.233
335.00	0.000	0.000	0.233	0.233
335.50	0.000	0.000	0.233	0.233
336.00	0.000	0.000	0.233	0.233
336.50	9.056	0.000	0.233	9.289
337.00	25.613	0.000	0.233	25.846
337.50	32.036	24.363	0.233	56.632
338.00	36.992	48.726	0.233	85.951

Structure #3 (Pond)

Pond 3

Pond Inputs:

Initial Pool Elev:	333.50 ft
Initial Pool:	0.33 ac-ft
*Sediment Storage:	0.00 ac-ft
Dead Space:	20.00 %

**No sediment capacity defined*

Enhanced Perf. Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
31.56	8.00	24.00	188.00	1.06	0.0160	340.00	4

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
341.00	31.00	6.66:1	6.66:1	20.00

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
341.00	31.00	6.66:1	6.66:1	20.00

Pond Results:

Peak Elevation:	341.50 ft
H'graph Detention Time:	3.45 hrs
Pond Model:	CSTRS
Dewater Time:	5.09 days
Trap Efficiency:	78.67 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
332.00	0.200	0.000	0.000		Top of Sed. Storage
332.01	0.200	0.002	0.000		
332.50	0.214	0.104	0.000		
333.00	0.229	0.214	0.000		
333.50	0.244	0.333	0.000		
334.00	0.260	0.459	0.233	6.55*	
334.50	0.276	0.593	0.233	6.96*	
335.00	0.292	0.735	0.233	7.37*	
335.50	0.309	0.885	0.233	7.80*	
336.00	0.326	1.043	0.233	8.24*	
336.50	0.343	1.211	0.233	8.69*	
337.00	0.361	1.387	0.233	9.14*	
337.50	0.379	1.571	0.233	9.60*	
338.00	0.397	1.765	0.233	10.07*	
338.50	0.422	1.970	0.233	10.63*	
339.00	0.448	2.188	0.233	11.29*	
339.50	0.475	2.418	0.233	11.98*	
340.00	0.502	2.662	0.233	12.68*	Spillway #1
340.50	0.535	2.921	9.289	0.34*	
341.00	0.569	3.197	25.846	0.70	Spillway #2
341.50	0.604	3.491	56.632		
341.50	0.605	3.492	56.738	0.20	Peak Stage
342.00	0.640	3.801	84.492		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
332.00	0.000	0.000	0.000	0.000
332.01	0.000	0.000	0.000	0.000
332.50	0.000	0.000	0.000	0.000
333.00	0.000	0.000	0.000	0.000
333.50	0.000	0.000	0.000	0.000
334.00	0.000	0.000	0.233	0.233
334.50	0.000	0.000	0.233	0.233

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
335.00	0.000	0.000	0.233	0.233
335.50	0.000	0.000	0.233	0.233
336.00	0.000	0.000	0.233	0.233
336.50	0.000	0.000	0.233	0.233
337.00	0.000	0.000	0.233	0.233
337.50	0.000	0.000	0.233	0.233
338.00	0.000	0.000	0.233	0.233
338.50	0.000	0.000	0.233	0.233
339.00	0.000	0.000	0.233	0.233
339.50	0.000	0.000	0.233	0.233
340.00	0.000	0.000	0.233	0.233
340.50	9.056	0.000	0.233	9.289
341.00	25.613	0.000	0.233	25.846
341.50	32.036	24.363	0.233	56.632
342.00	35.533	48.726	0.233	84.492

Structure #2 (Pond)

Pond 2

Pond Inputs:

Initial Pool Elev:	374.00 ft
Initial Pool:	0.00 ac-ft
*Sediment Storage:	0.25 ac-ft
Dead Space:	20.00 %

**Sediment capacity was entered by user*

Enhanced Perf. Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
31.56	8.00	24.00	161.00	1.20	0.0160	380.00	4

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
381.00	31.00	6.66:1	6.66:1	38.33

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
381.00	31.00	6.66:1	6.66:1	38.33

Pond Results:

Peak Elevation:	381.18 ft
H'graph Detention Time:	4.26 hrs
Pond Model:	CSTRS
Dewater Time:	2.93 days
Trap Efficiency:	77.38 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
373.99	0.146	0.000	0.000		Top of Sed. Storage
374.00	0.146	0.001	0.000		
374.50	0.157	0.077	0.233	3.94*	
375.00	0.169	0.158	0.233	4.24*	
375.50	0.181	0.246	0.233	4.55*	
376.00	0.194	0.340	0.233	4.87*	
376.50	0.207	0.440	0.233	5.20*	
377.00	0.220	0.546	0.233	5.53*	
377.50	0.233	0.660	0.233	5.88*	
378.00	0.247	0.780	0.233	6.23*	
378.50	0.263	0.907	0.233	6.62*	
379.00	0.279	1.043	0.233	7.04*	
379.50	0.296	1.187	0.233	7.48*	
380.00	0.314	1.339	0.233	7.92*	Spillway #1
380.50	0.330	1.500	9.289	0.21*	
381.00	0.347	1.669	25.846	0.45	Spillway #2
381.18	0.353	1.735	44.098	0.10	Peak Stage
381.50	0.364	1.847	75.613		
382.00	0.381	2.033	123.913		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User-input discharge (cfs)	Combined Total Discharge (cfs)
373.99	0.000	0.000	0.000	0.000
374.00	0.000	0.000	0.000	0.000
374.50	0.000	0.000	0.233	0.233
375.00	0.000	0.000	0.233	0.233

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
375.50	0.000	0.000	0.233	0.233
376.00	0.000	0.000	0.233	0.233
376.50	0.000	0.000	0.233	0.233
377.00	0.000	0.000	0.233	0.233
377.50	0.000	0.000	0.233	0.233
378.00	0.000	0.000	0.233	0.233
378.50	0.000	0.000	0.233	0.233
379.00	0.000	0.000	0.233	0.233
379.50	0.000	0.000	0.233	0.233
380.00	0.000	0.000	0.233	0.233
380.50	9.056	0.000	0.233	9.289
381.00	25.613	0.000	0.233	25.846
381.50	32.036	43.344	0.233	75.613
382.00	36.992	86.688	0.233	123.913

Structure #1 (Pond)

Pond 1

Pond Inputs:

Initial Pool Elev:	388.00 ft
Initial Pool:	0.00 ac-ft
*Sediment Storage:	0.36 ac-ft
Dead Space:	20.00 %

**Sediment capacity was entered by user*

Enhanced Perf. Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
31.56	8.00	24.00	117.00	1.70	0.0160	394.00	4

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
395.00	31.00	6.66:1	6.66:1	20.00

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
395.00	31.00	6.66:1	6.66:1	20.00

Pond Results:

Peak Elevation:	395.38 ft
H'graph Detention Time:	4.04 hrs
Pond Model:	CSTRS
Dewater Time:	3.98 days
Trap Efficiency:	79.18 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
388.00	0.208	0.000	0.000		Top of Sed. Storage
388.00	0.208	0.001	0.000		
388.50	0.222	0.108	0.233	5.58*	
389.00	0.236	0.223	0.233	5.94*	
389.50	0.251	0.344	0.233	6.32*	
390.00	0.266	0.474	0.233	6.71*	
390.50	0.281	0.610	0.233	7.10*	
391.00	0.296	0.755	0.233	7.49*	
391.50	0.312	0.907	0.233	7.89*	
392.00	0.328	1.067	0.233	8.31*	
392.50	0.352	1.237	0.233	8.83*	
393.00	0.377	1.419	0.233	9.47*	
393.50	0.403	1.614	0.233	10.13*	
394.00	0.430	1.822	0.233	10.82*	Spillway #1
394.50	0.461	2.045	9.289	0.29*	
395.00	0.493	2.283	25.846	0.50	Spillway #2
395.38	0.518	2.476	49.136	0.10	Peak Stage
395.50	0.526	2.538	56.632		
396.00	0.560	2.809	85.951		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User-input discharge (cfs)	Combined Total Discharge (cfs)
388.00	0.000	0.000	0.000	0.000
388.00	0.000	0.000	0.000	0.000
388.50	0.000	0.000	0.233	0.233
389.00	0.000	0.000	0.233	0.233
389.50	0.000	0.000	0.233	0.233
390.00	0.000	0.000	0.233	0.233

Elevation (ft)	Enh. PerfRiser (cfs)	Emergency Spillway (cfs)	User- input discharge (cfs)	Combined Total Discharge (cfs)
390.50	0.000	0.000	0.233	0.233
391.00	0.000	0.000	0.233	0.233
391.50	0.000	0.000	0.233	0.233
392.00	0.000	0.000	0.233	0.233
392.50	0.000	0.000	0.233	0.233
393.00	0.000	0.000	0.233	0.233
393.50	0.000	0.000	0.233	0.233
394.00	0.000	0.000	0.233	0.233
394.50	9.056	0.000	0.233	9.289
395.00	25.613	0.000	0.233	25.846
395.50	32.036	24.363	0.233	56.632
396.00	36.992	48.726	0.233	85.951

Structure #5 (Null)

Hydrologic Point of Interest/pond bypass

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#4	1	24.480	0.096	0.000	0.000	86.000	TR55	140.46	12.907
	Σ	24.480						140.46	12.907
#3	1	13.270	0.167	0.000	0.000	86.000	TR55	75.82	7.109
	Σ	13.270						75.82	7.109
#2	1	8.270	0.141	0.000	0.000	86.000	TR55	47.26	4.431
	Σ	8.270						47.26	4.431
#1	1	10.330	0.088	0.000	0.000	86.000	TR55	59.27	5.446
	Σ	10.330						59.27	5.446
#5	1	139.000	0.527	0.000	0.000	76.000	TR55	539.63	59.387
	Σ	195.350						634.74	73.470

Subwatershed Sedimentology Detail:

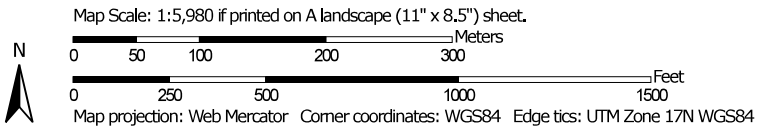
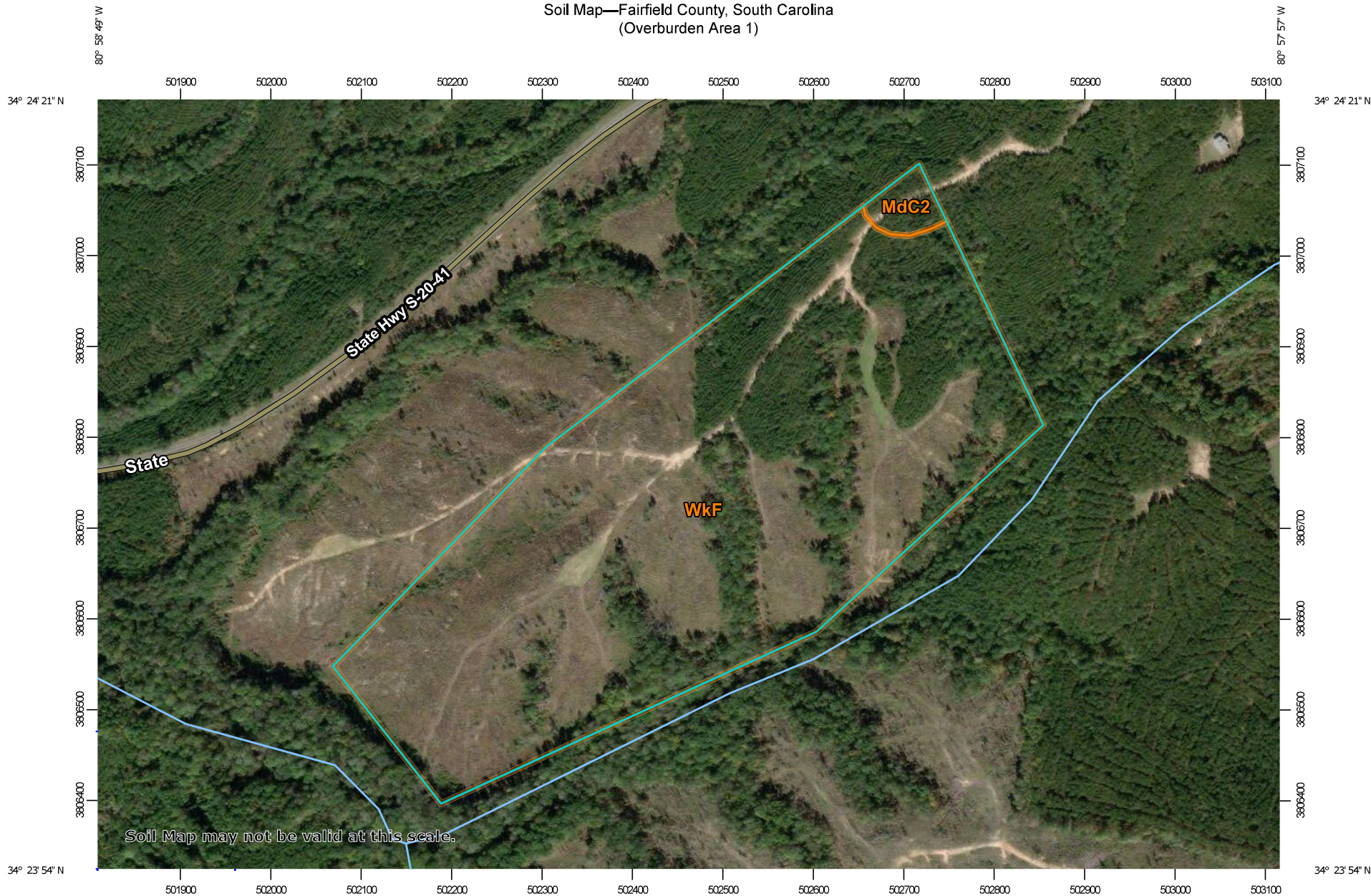
Stru #	SWS #	Soil K	L (ft)	S (%)	C	P	PS #	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc (ml/l)	24VW (ml/l)
#4	1	0.320	60.00	33.33	0.9000	1.0000	1	7,971.5	617,272	373.71	219.08
	Σ							7,971.5	617,272	373.71	219.08
#3	1	0.320	60.00	33.33	0.9000	1.0000	1	4,005.5	589,691	356.76	203.82
	Σ							4,005.5	589,691	356.76	203.82
#2	1	0.320	60.00	33.33	0.9000	1.0000	1	2,358.9	564,456	341.51	194.52
	Σ							2,358.9	564,456	341.51	194.52
#1	1	0.320	60.00	33.33	0.9000	1.0000	1	3,032.9	570,423	345.35	201.44
	Σ							3,032.9	570,423	345.35	201.44
#5	1	0.320	100.00	14.00	0.3500	1.0000	1	7,918.8	165,404	95.33	53.69
	Σ							9,994.9	180,356	92.52	52.11

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	5. Nearly bare and untilled, and alluvial valley fans	10.00	2.50	25.00	3.160	0.002
		6. Grassed waterway	2.49	17.00	683.00	2.360	0.080


Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
		8. Large gullies, diversions, and low flowing streams	28.16	69.00	245.00	15.920	0.004
		9. Small streams flowing bankfull	0.50	0.23	46.00	6.360	0.002
#1	1	Time of Concentration:					0.088
#2	1	5. Nearly bare and untilled, and alluvial valley fans	10.00	2.50	25.00	3.160	0.002
		6. Grassed waterway	1.26	10.00	793.02	1.680	0.131
		8. Large gullies, diversions, and low flowing streams	23.43	82.00	350.00	14.520	0.006
		9. Small streams flowing bankfull	5.00	8.00	160.00	20.120	0.002
#2	1	Time of Concentration:					0.141
#3	1	5. Nearly bare and untilled, and alluvial valley fans	22.92	22.00	96.00	4.780	0.005
		7. Paved area and small upland gullies	1.66	14.00	844.03	2.590	0.090
		7. Paved area and small upland gullies	6.74	70.00	1,038.00	5.220	0.055
		7. Paved area and small upland gullies	3.48	8.00	230.00	3.750	0.017
#3	1	Time of Concentration:					0.167
#4	1	5. Nearly bare and untilled, and alluvial valley fans	1.00	1.15	115.00	1.000	0.031
		8. Large gullies, diversions, and low flowing streams	2171.00	2,171.00	100.00	139.780	0.000
		5. Nearly bare and untilled, and alluvial valley fans	2.63	10.00	380.01	1.620	0.065
#4	1	Time of Concentration:					0.096
#5	1	1. Forest with heavy ground litter	9.82	100.00	1,018.00	0.790	0.357
		9. Small streams flowing bankfull	1.17	70.00	5,984.44	9.730	0.170
#5	1	Time of Concentration:					0.527

Soil Map—Fairfield County, South Carolina
(Overburden Area 1)




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 1:20,000.

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: Fairfield County, South Carolina

Survey Area Data: Version 14, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales

1:50,000 or larger.

Date(s) aerial images were photographed: Apr 23, 2014—Oct

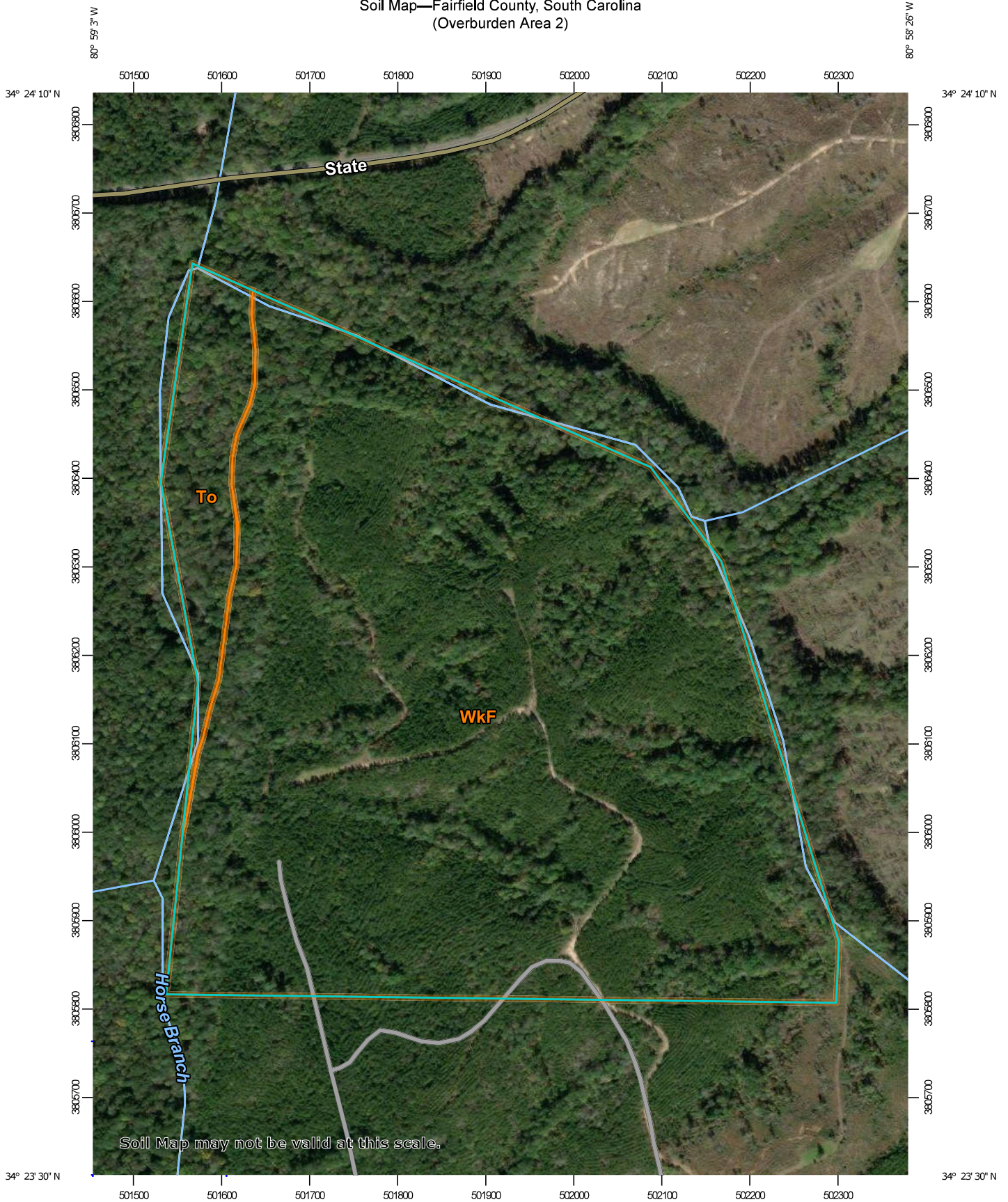
24, 2016

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
MdC2	Madison sandy clay loam, 6 to 10 percent slopes, eroded	1.1	1.8%
WkF	Wilkes sandy loam, 15 to 40 percent slopes	59.3	98.2%
Totals for Area of Interest		60.4	100.0%

Soil Map—Fairfield County, South Carolina
(Overburden Area 2)




Soil Map may not be valid at this scale.

Map Scale: 1:5,970 if printed on A portrait (8.5" x 11") sheet.
 0 50 100 200 300 Meters
 0 250 500 1000 1500 Feet
 Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84


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



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Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



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Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



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Major Roads



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MAP INFORMATION

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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.

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Soil Survey Area: Fairfield County, South Carolina

Survey Area Data: Version 14, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales

1:50,000 or larger.

Date(s) aerial images were photographed: Apr 23, 2014—Oct

24, 2016

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
To	Toccoa loam	8.3	7.2%
WkF	Wilkes sandy loam, 15 to 40 percent slopes	107.2	92.8%
Totals for Area of Interest		115.6	100.0%