

**CROW LANE LANDFILL
Newburyport, Massachusetts**

**Corrective Action Design (CAD)
Final Landfill Closure**

REVISED STORM WATER CALCULATIONS

October 2010 Submittal

Prepared for:

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Table 1
Peak Flows from Site, cfs

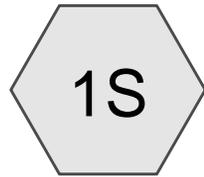
<i>Study Location</i>		<i>2-Year Storm (3.10")</i>	<i>10-Year Storm (4.50")</i>	<i>25-Year Storm (5.40")</i>	<i>50-Year Storm (6.00")</i>	<i>100-Year Storm (6.40")</i>
Existing Conditions	Western Wetland	0.09	1.68	4.62	7.04	8.80
	Northern Wetland	0.06	1.15	3.18	4.84	6.05
	Vernal Pool	0.04	0.83	2.29	3.48	4.35
	Eastern Wetland	0.03	0.46	1.26	1.92	2.40
Post Closure	Western Wetland	0.66	2.67	4.32	5.53	6.37
	Northern Wetland	0.48	1.12	1.64	2.02	2.28
	Vernal Pool	0.03	0.15	0.25	0.32	0.36
	Eastern Wetland	0.00	0.10	0.45	0.84	1.10

Table 2
Peak Volumes to Vernal Pool, ac.-ft.

	<i>2-Year Storm (3.10")</i>	<i>10-Year Storm (4.50")</i>	<i>25-Year Storm (5.40")</i>	<i>50-Year Storm (6.00")</i>	<i>100-Year Storm (6.40")</i>
Existing Conditions	0.020	0.113	0.203	0.274	0.325
Post Closure	0.005	0.029	0.121	0.147	0.178

Table 2
Detention Pond Routing Characteristics

	<i>2-Year Storm (3.10")</i>	<i>10-Year Storm (4.50")</i>	<i>25-Year Storm (5.40")</i>	<i>50-Year Storm (6.00")</i>	<i>100-Year Storm (6.40")</i>
Detention Pond 1 (Western Wetland & Vernal Pool)					
Peak Inflow, cfs	15.13	23.05	28.10	31.45	33.67
Peak Outflow, cfs	0.11	0.15	0.17	0.56	0.93
Attenuation	99%	99%	99%	98%	97%
Peak Elevation, ft	48.32	50.10	50.94	51.23	51.34
Freeboard, ft	10.68	8.90	8.06	7.77	7.66
Detention Pond 2 (Northern Wetland & Eastern Wetland)					
Peak Inflow, cfs	18.04	27.43	33.41	37.38	40.02
Peak Outflow, cfs	0.37	0.56	0.96	1.73	2.35
Attenuation	98%	98%	97%	95%	94%
Peak Elevation, ft	50.57	51.90	52.61	52.83	52.96
Freeboard, ft	6.43	5.10	4.39	4.17	4.04



1S

4P

Western Wetland



2S

5P

Northern Wetland



3S

6P

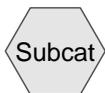
Vernal Pool



4S

7P

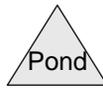
Eastern Wetland



Subcat



Reach



Pond



Link

Drainage Diagram for Pre-Closure Analysis

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Pre-Closure Analysis

Type III 24-hr 2-Year Storm Event Rainfall=3.10"

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10/26/2010

Subcatchment 1S:

Runoff = 0.09 cfs @ 13.80 hrs, Volume= 0.043 af, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Storm Event Rainfall=3.10"

Area (sf)	CN	Description
324,144	49	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0300	0.2		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.3	50	0.0300	2.8		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
1.0	303	0.0970	5.0		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
6.2	403	Total			

Subcatchment 2S:

Runoff = 0.06 cfs @ 13.80 hrs, Volume= 0.029 af, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Storm Event Rainfall=3.10"

Area (sf)	CN	Description
218,528	49	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.2		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.3	50	0.0400	3.2		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
1.1	308	0.0900	4.8		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
5.7	408	Total			

Subcatchment 3S:

Runoff = 0.04 cfs @ 13.78 hrs, Volume= 0.020 af, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Storm Event Rainfall=3.10"

Area (sf)	CN	Description
150,666	49	

Pre-Closure Analysis

Type III 24-hr 2-Year Storm Event Rainfall=3.10"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	50	0.1400	0.3		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.5	178	0.1400	6.0		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
1.5	283	0.0380	3.1		Shallow Concentrated Flow, Flow on Road Unpaved Kv= 16.1 fps
4.6	511	Total			

Subcatchment 4S:

Runoff = 0.03 cfs @ 13.81 hrs, Volume= 0.012 af, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Storm Event Rainfall=3.10"

Area (sf)	CN	Description
88,843	49	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.1		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.1	75	0.2700	8.4		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
0.5	96	0.0400	3.2		Shallow Concentrated Flow, Flow on Plateau Unpaved Kv= 16.1 fps
0.0	14	0.2900	8.7		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
6.3	235	Total			

Pond 4P: Western Wetland

Inflow Area = 7.441 ac, Inflow Depth = 0.07" for 2-Year Storm Event event
Inflow = 0.09 cfs @ 13.80 hrs, Volume= 0.043 af
Primary = 0.09 cfs @ 13.80 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Pond 5P: Northern Wetland

Inflow Area = 5.017 ac, Inflow Depth = 0.07" for 2-Year Storm Event event
Inflow = 0.06 cfs @ 13.80 hrs, Volume= 0.029 af
Primary = 0.06 cfs @ 13.80 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Pre-Closure Analysis

Type III 24-hr 2-Year Storm Event Rainfall=3.10"

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Pond 6P: Vernal Pool

Inflow Area = 3.459 ac, Inflow Depth = 0.07" for 2-Year Storm Event event
Inflow = 0.04 cfs @ 13.78 hrs, Volume= 0.020 af
Primary = 0.04 cfs @ 13.78 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Pond 7P: Eastern Wetland

Inflow Area = 2.040 ac, Inflow Depth = 0.07" for 2-Year Storm Event event
Inflow = 0.03 cfs @ 13.81 hrs, Volume= 0.012 af
Primary = 0.03 cfs @ 13.81 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Pre-Closure Analysis

Type III 24-hr 10-Year Storm Event Rainfall=4.50"

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Subcatchment 1S:

Runoff = 1.68 cfs @ 12.16 hrs, Volume= 0.242 af, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Event Rainfall=4.50"

Area (sf)	CN	Description
324,144	49	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0300	0.2		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.3	50	0.0300	2.8		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
1.0	303	0.0970	5.0		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
6.2	403	Total			

Subcatchment 2S:

Runoff = 1.15 cfs @ 12.15 hrs, Volume= 0.163 af, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Event Rainfall=4.50"

Area (sf)	CN	Description
218,528	49	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.2		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.3	50	0.0400	3.2		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
1.1	308	0.0900	4.8		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
5.7	408	Total			

Subcatchment 3S:

Runoff = 0.83 cfs @ 12.12 hrs, Volume= 0.113 af, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Event Rainfall=4.50"

Area (sf)	CN	Description
150,666	49	

Pre-Closure Analysis

Type III 24-hr 10-Year Storm Event Rainfall=4.50"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	50	0.1400	0.3		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.5	178	0.1400	6.0		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
1.5	283	0.0380	3.1		Shallow Concentrated Flow, Flow on Road Unpaved Kv= 16.1 fps
4.6	511	Total			

Subcatchment 4S:

Runoff = 0.46 cfs @ 12.16 hrs, Volume= 0.066 af, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Event Rainfall=4.50"

Area (sf)	CN	Description
88,843	49	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.1		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.1	75	0.2700	8.4		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
0.5	96	0.0400	3.2		Shallow Concentrated Flow, Flow on Plateau Unpaved Kv= 16.1 fps
0.0	14	0.2900	8.7		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
6.3	235	Total			

Pond 4P: Western Wetland

Inflow Area = 7.441 ac, Inflow Depth = 0.39" for 10-Year Storm Event event
Inflow = 1.68 cfs @ 12.16 hrs, Volume= 0.242 af
Primary = 1.68 cfs @ 12.16 hrs, Volume= 0.242 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Pond 5P: Northern Wetland

Inflow Area = 5.017 ac, Inflow Depth = 0.39" for 10-Year Storm Event event
Inflow = 1.15 cfs @ 12.15 hrs, Volume= 0.163 af
Primary = 1.15 cfs @ 12.15 hrs, Volume= 0.163 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Pre-Closure Analysis

Type III 24-hr 10-Year Storm Event Rainfall=4.50"

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Pond 6P: Vernal Pool

Inflow Area = 3.459 ac, Inflow Depth = 0.39" for 10-Year Storm Event event
Inflow = 0.83 cfs @ 12.12 hrs, Volume= 0.113 af
Primary = 0.83 cfs @ 12.12 hrs, Volume= 0.113 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Pond 7P: Eastern Wetland

Inflow Area = 2.040 ac, Inflow Depth = 0.39" for 10-Year Storm Event event
Inflow = 0.46 cfs @ 12.16 hrs, Volume= 0.066 af
Primary = 0.46 cfs @ 12.16 hrs, Volume= 0.066 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Pre-Closure Analysis

Type III 24-hr 25-Year Storm Event Rainfall=5.40"

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Subcatchment 1S:

Runoff = 4.62 cfs @ 12.12 hrs, Volume= 0.436 af, Depth= 0.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Event Rainfall=5.40"

Area (sf)	CN	Description
324,144	49	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0300	0.2		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.3	50	0.0300	2.8		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
1.0	303	0.0970	5.0		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
6.2	403	Total			

Subcatchment 2S:

Runoff = 3.18 cfs @ 12.11 hrs, Volume= 0.294 af, Depth= 0.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Event Rainfall=5.40"

Area (sf)	CN	Description
218,528	49	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.2		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.3	50	0.0400	3.2		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
1.1	308	0.0900	4.8		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
5.7	408	Total			

Subcatchment 3S:

Runoff = 2.29 cfs @ 12.10 hrs, Volume= 0.203 af, Depth= 0.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Event Rainfall=5.40"

Area (sf)	CN	Description
150,666	49	

Pre-Closure Analysis

Type III 24-hr 25-Year Storm Event Rainfall=5.40"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	50	0.1400	0.3		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.5	178	0.1400	6.0		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
1.5	283	0.0380	3.1		Shallow Concentrated Flow, Flow on Road Unpaved Kv= 16.1 fps
4.6	511	Total			

Subcatchment 4S:

Runoff = 1.26 cfs @ 12.12 hrs, Volume= 0.120 af, Depth= 0.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Event Rainfall=5.40"

Area (sf)	CN	Description
88,843	49	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.1		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.1	75	0.2700	8.4		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
0.5	96	0.0400	3.2		Shallow Concentrated Flow, Flow on Plateau Unpaved Kv= 16.1 fps
0.0	14	0.2900	8.7		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
6.3	235	Total			

Pond 4P: Western Wetland

Inflow Area = 7.441 ac, Inflow Depth = 0.70" for 25-Year Storm Event event
 Inflow = 4.62 cfs @ 12.12 hrs, Volume= 0.436 af
 Primary = 4.62 cfs @ 12.12 hrs, Volume= 0.436 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Pond 5P: Northern Wetland

Inflow Area = 5.017 ac, Inflow Depth = 0.70" for 25-Year Storm Event event
 Inflow = 3.18 cfs @ 12.11 hrs, Volume= 0.294 af
 Primary = 3.18 cfs @ 12.11 hrs, Volume= 0.294 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Pre-Closure Analysis

Type III 24-hr 25-Year Storm Event Rainfall=5.40"

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Pond 6P: Vernal Pool

Inflow Area = 3.459 ac, Inflow Depth = 0.70" for 25-Year Storm Event event
Inflow = 2.29 cfs @ 12.10 hrs, Volume= 0.203 af
Primary = 2.29 cfs @ 12.10 hrs, Volume= 0.203 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Pond 7P: Eastern Wetland

Inflow Area = 2.040 ac, Inflow Depth = 0.70" for 25-Year Storm Event event
Inflow = 1.26 cfs @ 12.12 hrs, Volume= 0.120 af
Primary = 1.26 cfs @ 12.12 hrs, Volume= 0.120 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Pre-Closure Analysis

Type III 24-hr 50-Year Storm Event Rainfall=6.00"

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Subcatchment 1S:

Runoff = 7.04 cfs @ 12.11 hrs, Volume= 0.589 af, Depth= 0.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Storm Event Rainfall=6.00"

Area (sf)	CN	Description
324,144	49	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0300	0.2		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.3	50	0.0300	2.8		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
1.0	303	0.0970	5.0		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
6.2	403	Total			

Subcatchment 2S:

Runoff = 4.84 cfs @ 12.11 hrs, Volume= 0.397 af, Depth= 0.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Storm Event Rainfall=6.00"

Area (sf)	CN	Description
218,528	49	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.2		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.3	50	0.0400	3.2		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
1.1	308	0.0900	4.8		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
5.7	408	Total			

Subcatchment 3S:

Runoff = 3.48 cfs @ 12.09 hrs, Volume= 0.274 af, Depth= 0.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Storm Event Rainfall=6.00"

Area (sf)	CN	Description
150,666	49	

Pre-Closure Analysis

Type III 24-hr 50-Year Storm Event Rainfall=6.00"

Prepared by {enter your company name here}

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10/26/2010

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	50	0.1400	0.3		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.5	178	0.1400	6.0		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
1.5	283	0.0380	3.1		Shallow Concentrated Flow, Flow on Road Unpaved Kv= 16.1 fps
4.6	511	Total			

Subcatchment 4S:

Runoff = 1.92 cfs @ 12.11 hrs, Volume= 0.161 af, Depth= 0.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Storm Event Rainfall=6.00"

Area (sf)	CN	Description
88,843	49	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.1		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.1	75	0.2700	8.4		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
0.5	96	0.0400	3.2		Shallow Concentrated Flow, Flow on Plateau Unpaved Kv= 16.1 fps
0.0	14	0.2900	8.7		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
6.3	235	Total			

Pond 4P: Western Wetland

Inflow Area = 7.441 ac, Inflow Depth = 0.95" for 50-Year Storm Event event
Inflow = 7.04 cfs @ 12.11 hrs, Volume= 0.589 af
Primary = 7.04 cfs @ 12.11 hrs, Volume= 0.589 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Pond 5P: Northern Wetland

Inflow Area = 5.017 ac, Inflow Depth = 0.95" for 50-Year Storm Event event
Inflow = 4.84 cfs @ 12.11 hrs, Volume= 0.397 af
Primary = 4.84 cfs @ 12.11 hrs, Volume= 0.397 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Pre-Closure Analysis

Type III 24-hr 50-Year Storm Event Rainfall=6.00"

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Pond 6P: Vernal Pool

Inflow Area = 3.459 ac, Inflow Depth = 0.95" for 50-Year Storm Event event
Inflow = 3.48 cfs @ 12.09 hrs, Volume= 0.274 af
Primary = 3.48 cfs @ 12.09 hrs, Volume= 0.274 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Pond 7P: Eastern Wetland

Inflow Area = 2.040 ac, Inflow Depth = 0.95" for 50-Year Storm Event event
Inflow = 1.92 cfs @ 12.11 hrs, Volume= 0.161 af
Primary = 1.92 cfs @ 12.11 hrs, Volume= 0.161 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Pre-Closure Analysis

Type III 24-hr 100-Year Storm Event Rainfall=6.40"

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Subcatchment 1S:

Runoff = 8.80 cfs @ 12.11 hrs, Volume= 0.699 af, Depth= 1.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Storm Event Rainfall=6.40"

Area (sf)	CN	Description			
324,144	49				
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0300	0.2		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.3	50	0.0300	2.8		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
1.0	303	0.0970	5.0		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
6.2	403	Total			

Subcatchment 2S:

Runoff = 6.05 cfs @ 12.10 hrs, Volume= 0.472 af, Depth= 1.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Storm Event Rainfall=6.40"

Area (sf)	CN	Description			
218,528	49				
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.2		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.3	50	0.0400	3.2		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
1.1	308	0.0900	4.8		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
5.7	408	Total			

Subcatchment 3S:

Runoff = 4.35 cfs @ 12.09 hrs, Volume= 0.325 af, Depth= 1.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Storm Event Rainfall=6.40"

Area (sf)	CN	Description
150,666	49	

Pre-Closure Analysis

Type III 24-hr 100-Year Storm Event Rainfall=6.40"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	50	0.1400	0.3		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.5	178	0.1400	6.0		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
1.5	283	0.0380	3.1		Shallow Concentrated Flow, Flow on Road Unpaved Kv= 16.1 fps
4.6	511	Total			

Subcatchment 4S:

Runoff = 2.40 cfs @ 12.11 hrs, Volume= 0.192 af, Depth= 1.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Storm Event Rainfall=6.40"

Area (sf)	CN	Description
88,843	49	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.1		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.1	75	0.2700	8.4		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
0.5	96	0.0400	3.2		Shallow Concentrated Flow, Flow on Plateau Unpaved Kv= 16.1 fps
0.0	14	0.2900	8.7		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
6.3	235	Total			

Pond 4P: Western Wetland

Inflow Area = 7.441 ac, Inflow Depth = 1.13" for 100-Year Storm Event event
Inflow = 8.80 cfs @ 12.11 hrs, Volume= 0.699 af
Primary = 8.80 cfs @ 12.11 hrs, Volume= 0.699 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Pond 5P: Northern Wetland

Inflow Area = 5.017 ac, Inflow Depth = 1.13" for 100-Year Storm Event event
Inflow = 6.05 cfs @ 12.10 hrs, Volume= 0.472 af
Primary = 6.05 cfs @ 12.10 hrs, Volume= 0.472 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Pre-Closure Analysis

Type III 24-hr 100-Year Storm Event Rainfall=6.40"

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Pond 6P: Vernal Pool

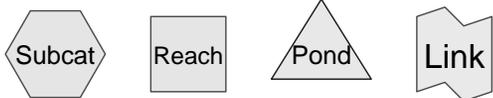
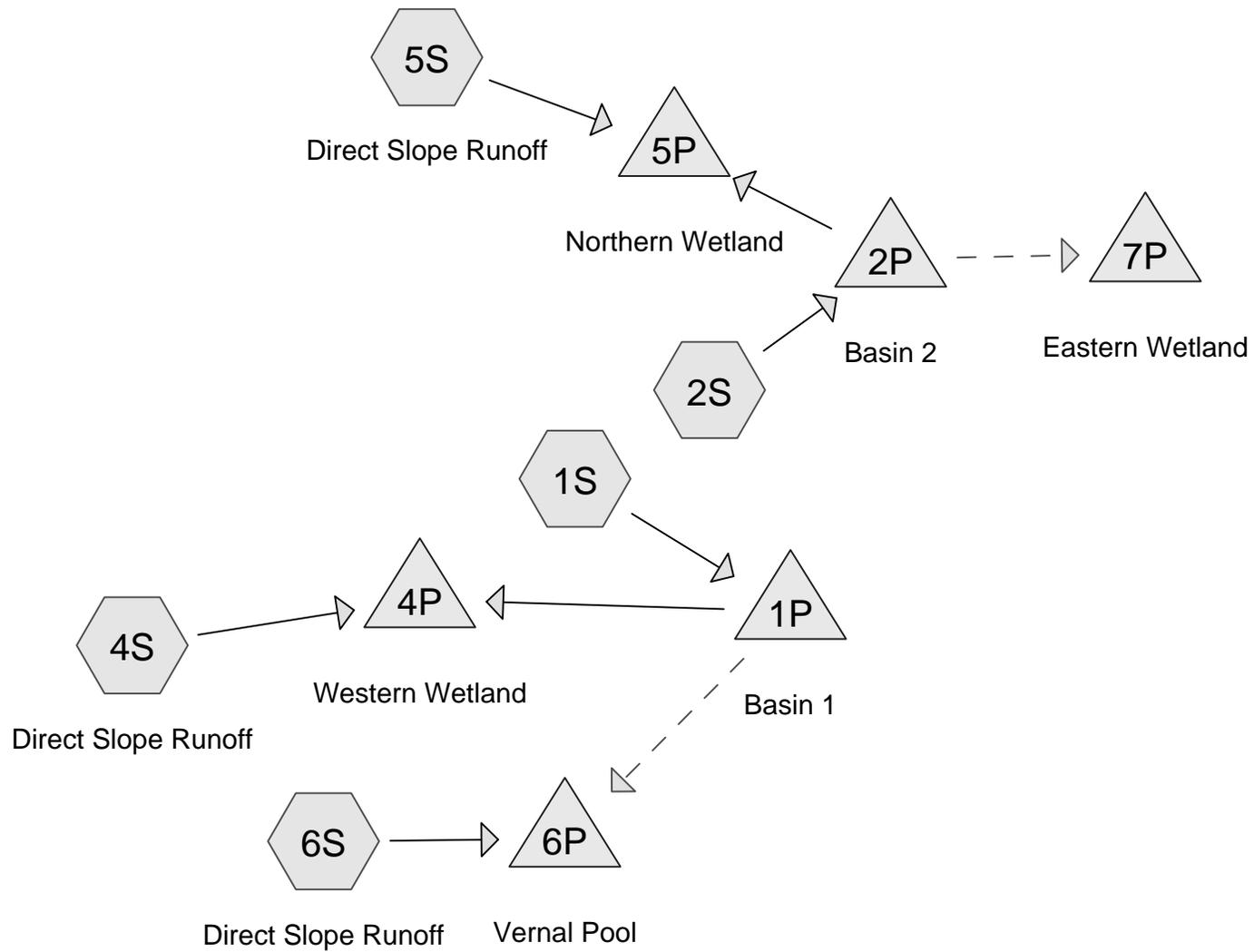
Inflow Area = 3.459 ac, Inflow Depth = 1.13" for 100-Year Storm Event event
Inflow = 4.35 cfs @ 12.09 hrs, Volume= 0.325 af
Primary = 4.35 cfs @ 12.09 hrs, Volume= 0.325 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Pond 7P: Eastern Wetland

Inflow Area = 2.040 ac, Inflow Depth = 1.13" for 100-Year Storm Event event
Inflow = 2.40 cfs @ 12.11 hrs, Volume= 0.192 af
Primary = 2.40 cfs @ 12.11 hrs, Volume= 0.192 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs



Drainage Diagram for Post-Closure Analysis
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Post-Closure Analysis

Type III 24-hr 2-Year Storm Event Rainfall=3.10"

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Subcatchment 1S:

Runoff = 15.13 cfs @ 12.24 hrs, Volume= 1.591 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Storm Event Rainfall=3.10"

Area (sf)	CN	Description
339,986	94	Landfill Cover

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.1200	0.2		Sheet Flow, Sheet Flow Grass: Dense n= 0.240 P2= 3.10"
0.2	75	0.1200	5.6		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
14.0					Direct Entry, Swale Concentrated Flow--2fps
18.3	125	Total			

Subcatchment 2S:

Runoff = 18.04 cfs @ 12.08 hrs, Volume= 1.317 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Storm Event Rainfall=3.10"

Area (sf)	CN	Description
281,328	94	Landfill Cover

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.2100	0.3		Sheet Flow, Sheet Flow n= 0.240 P2= 3.10"
0.6	250	0.2100	7.4		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
1.7					Direct Entry, Concentrated Flow--2 fps
5.6	300	Total			

Subcatchment 4S: Direct Slope Runoff

Runoff = 0.59 cfs @ 12.21 hrs, Volume= 0.091 af, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Storm Event Rainfall=3.10"

Area (sf)	CN	Description
127,868	60	

Post-Closure Analysis

Type III 24-hr 2-Year Storm Event Rainfall=3.10"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 5S: Direct Slope Runoff

Runoff = 0.17 cfs @ 12.21 hrs, Volume= 0.026 af, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Storm Event Rainfall=3.10"

Area (sf)	CN	Description
37,357	60	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 6S: Direct Slope Runoff

Runoff = 0.03 cfs @ 12.21 hrs, Volume= 0.005 af, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Storm Event Rainfall=3.10"

Area (sf)	CN	Description
7,448	60	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Pond 1P: Basin 1

Inflow Area = 7.805 ac, Inflow Depth = 2.45" for 2-Year Storm Event event
 Inflow = 15.13 cfs @ 12.24 hrs, Volume= 1.591 af
 Outflow = 0.11 cfs @ 24.25 hrs, Volume= 0.504 af, Atten= 99%, Lag= 720.6 min
 Primary = 0.11 cfs @ 24.25 hrs, Volume= 0.504 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 48.32' @ 24.25 hrs Surf.Area= 20,914 sf Storage= 64,416 cf
 Plug-Flow detention time= 1,799.4 min calculated for 0.504 af (32% of inflow)
 Center-of-Mass det. time= 1,655.0 min (2,454.6 - 799.6)

#	Invert	Avail.Storage	Storage Description
1	45.00'	381,054 cf	Custom Stage Data (Pyramidal) Listed below

Post-Closure Analysis

Type III 24-hr 2-Year Storm Event Rainfall=3.10"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
45.00	16,386	0	0	16,386
46.00	17,742	17,060	17,060	17,839
50.00	23,212	81,663	98,723	23,767
60.00	33,572	282,332	381,054	36,111

#	Routing	Invert	Outlet Devices
1	Device 4	52.50'	36.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600
2	Device 4	51.00'	1.0' long Broad-Crested Rectangular Weir Head (feet) 1.00 10.00 Coef. (English) 3.30 3.30
3	Device 4	45.00'	1.5" Vert. Orifice/Grate C= 0.600
4	Primary	42.00'	24.0" x 100.0' long Culvert CMP, projecting, no headwall, Ke= 0.900 Outlet Invert= 41.75' S= 0.0025 '/' n= 0.013 Cc= 0.900
5	Secondary	49.80'	1.0" Vert. Orifice/Grate C= 0.600
6	Secondary	51.20'	6.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.11 cfs @ 24.25 hrs HW=48.32' (Free Discharge)

↑ **4=Culvert** (Passes 0.11 cfs of 27.54 cfs potential flow)
 ↑ **1=Orifice/Grate** (Controls 0.00 cfs)
 ↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↑ **3=Orifice/Grate** (Orifice Controls 0.11 cfs @ 8.7 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=45.00' (Free Discharge)

↑ **5=Orifice/Grate** (Controls 0.00 cfs)
 ↑ **6=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: Basin 2

Inflow Area = 6.458 ac, Inflow Depth = 2.45" for 2-Year Storm Event event
 Inflow = 18.04 cfs @ 12.08 hrs, Volume= 1.317 af
 Outflow = 0.37 cfs @ 17.49 hrs, Volume= 1.243 af, Atten= 98%, Lag= 324.5 min
 Primary = 0.37 cfs @ 17.49 hrs, Volume= 1.243 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
 Starting Elev= 48.00' Surf.Area= 15,657 sf Storage= 43,393 cf
 Peak Elev= 50.57' @ 17.49 hrs Surf.Area= 18,137 sf Storage= 86,646 cf (43,253 cf above start)
 Plug-Flow detention time= 2,948.1 min calculated for 0.247 af (19% of inflow)
 Center-of-Mass det. time= 1,297.6 min (2,085.4 - 787.8)

#	Invert	Avail.Storage	Storage Description
1	45.00'	175,675 cf	Custom Stage Data (Prismatic) Listed below

Post-Closure Analysis

Type III 24-hr 2-Year Storm Event Rainfall=3.10"

Prepared by {enter your company name here}

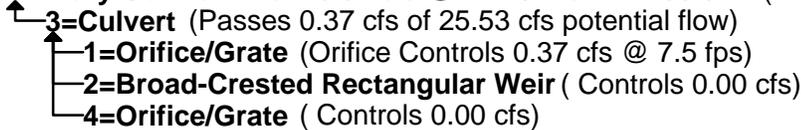
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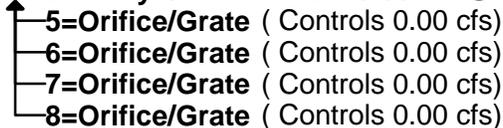
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
45.00	12,977	0	0
47.00	14,759	27,736	27,736
49.00	16,555	31,314	59,050
51.00	18,569	35,124	94,174
53.00	20,363	38,932	133,106
55.00	22,206	42,569	175,675

#	Routing	Invert	Outlet Devices
1	Device 3	48.00'	3.0" Vert. Orifice/Grate C= 0.600
2	Device 3	52.60'	1.0' long Broad-Crested Rectangular Weir Head (feet) 1.00 10.00 Coef. (English) 3.30 3.30
3	Primary	45.00'	24.0" x 100.0' long Culvert CMP, projecting, no headwall, Ke= 0.900 Outlet Invert= 44.00' S= 0.0100 '/' n= 0.012 Cc= 0.900
4	Device 3	54.00'	36.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600
5	Secondary	50.95'	2.0" Vert. Orifice/Grate C= 0.600
6	Secondary	52.25'	6.0" Vert. Orifice/Grate C= 0.600
7	Secondary	52.60'	6.0" Vert. Orifice/Grate C= 0.600
8	Secondary	53.00'	4.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.37 cfs @ 17.49 hrs HW=50.57' (Free Discharge)



Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=48.00' (Free Discharge)



Pond 4P: Western Wetland

Inflow Area = 10.740 ac, Inflow Depth = 0.66" for 2-Year Storm Event event
 Inflow = 0.66 cfs @ 12.22 hrs, Volume= 0.594 af
 Primary = 0.66 cfs @ 12.22 hrs, Volume= 0.594 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Pond 5P: Northern Wetland

Inflow Area = 7.316 ac, Inflow Depth = 2.08" for 2-Year Storm Event event
 Inflow = 0.48 cfs @ 12.34 hrs, Volume= 1.270 af
 Primary = 0.48 cfs @ 12.34 hrs, Volume= 1.270 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Post-Closure Analysis

Type III 24-hr 2-Year Storm Event Rainfall=3.10"

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Pond 6P: Vernal Pool

Inflow Area = 0.171 ac, Inflow Depth = 0.37" for 2-Year Storm Event event
Inflow = 0.03 cfs @ 12.21 hrs, Volume= 0.005 af
Primary = 0.03 cfs @ 12.21 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Pond 7P: Eastern Wetland

Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Post-Closure Analysis

Type III 24-hr 10-Year Storm Event Rainfall=4.50"

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Subcatchment 1S:

Runoff = 23.05 cfs @ 12.24 hrs, Volume= 2.482 af, Depth= 3.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Event Rainfall=4.50"

Area (sf)	CN	Description
339,986	94	Landfill Cover

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.1200	0.2		Sheet Flow, Sheet Flow Grass: Dense n= 0.240 P2= 3.10"
0.2	75	0.1200	5.6		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
14.0					Direct Entry, Swale Concentrated Flow--2fps
18.3	125	Total			

Subcatchment 2S:

Runoff = 27.43 cfs @ 12.08 hrs, Volume= 2.053 af, Depth= 3.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Event Rainfall=4.50"

Area (sf)	CN	Description
281,328	94	Landfill Cover

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.2100	0.3		Sheet Flow, Sheet Flow n= 0.240 P2= 3.10"
0.6	250	0.2100	7.4		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
1.7					Direct Entry, Concentrated Flow--2 fps
5.6	300	Total			

Subcatchment 4S: Direct Slope Runoff

Runoff = 2.59 cfs @ 12.16 hrs, Volume= 0.249 af, Depth= 1.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Event Rainfall=4.50"

Area (sf)	CN	Description
127,868	60	

Post-Closure Analysis

Type III 24-hr 10-Year Storm Event Rainfall=4.50"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 5S: Direct Slope Runoff

Runoff = 0.76 cfs @ 12.16 hrs, Volume= 0.073 af, Depth= 1.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Event Rainfall=4.50"

Area (sf)	CN	Description
37,357	60	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 6S: Direct Slope Runoff

Runoff = 0.15 cfs @ 12.16 hrs, Volume= 0.015 af, Depth= 1.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Event Rainfall=4.50"

Area (sf)	CN	Description
7,448	60	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Pond 1P: Basin 1

Inflow Area = 7.805 ac, Inflow Depth = 3.82" for 10-Year Storm Event event
 Inflow = 23.05 cfs @ 12.24 hrs, Volume= 2.482 af
 Outflow = 0.15 cfs @ 24.26 hrs, Volume= 0.654 af, Atten= 99%, Lag= 721.4 min
 Primary = 0.13 cfs @ 24.26 hrs, Volume= 0.639 af
 Secondary = 0.01 cfs @ 24.26 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 50.10' @ 24.26 hrs Surf.Area= 23,316 sf Storage= 101,544 cf
 Plug-Flow detention time= 1,816.3 min calculated for 0.654 af (26% of inflow)
 Center-of-Mass det. time= 1,643.9 min (2,431.8 - 787.9)

#	Invert	Avail.Storage	Storage Description
1	45.00'	381,054 cf	Custom Stage Data (Pyramidal) Listed below

Post-Closure Analysis

Type III 24-hr 10-Year Storm Event Rainfall=4.50"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
45.00	16,386	0	0	16,386
46.00	17,742	17,060	17,060	17,839
50.00	23,212	81,663	98,723	23,767
60.00	33,572	282,332	381,054	36,111

#	Routing	Invert	Outlet Devices
1	Device 4	52.50'	36.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600
2	Device 4	51.00'	1.0' long Broad-Crested Rectangular Weir Head (feet) 1.00 10.00 Coef. (English) 3.30 3.30
3	Device 4	45.00'	1.5" Vert. Orifice/Grate C= 0.600
4	Primary	42.00'	24.0" x 100.0' long Culvert CMP, projecting, no headwall, Ke= 0.900 Outlet Invert= 41.75' S= 0.0025 '/' n= 0.013 Cc= 0.900
5	Secondary	49.80'	1.0" Vert. Orifice/Grate C= 0.600
6	Secondary	51.20'	6.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.13 cfs @ 24.26 hrs HW=50.10' (Free Discharge)

↑ **4=Culvert** (Passes 0.13 cfs of 31.82 cfs potential flow)
 ↑ **1=Orifice/Grate** (Controls 0.00 cfs)
 ↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↑ **3=Orifice/Grate** (Orifice Controls 0.13 cfs @ 10.8 fps)

Secondary OutFlow Max=0.01 cfs @ 24.26 hrs HW=50.10' (Free Discharge)

↑ **5=Orifice/Grate** (Orifice Controls 0.01 cfs @ 2.4 fps)
 ↑ **6=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: Basin 2

Inflow Area = 6.458 ac, Inflow Depth = 3.82" for 10-Year Storm Event event
 Inflow = 27.43 cfs @ 12.08 hrs, Volume= 2.053 af
 Outflow = 0.56 cfs @ 17.41 hrs, Volume= 1.836 af, Atten= 98%, Lag= 320.1 min
 Primary = 0.46 cfs @ 17.41 hrs, Volume= 1.717 af
 Secondary = 0.10 cfs @ 17.41 hrs, Volume= 0.119 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Starting Elev= 48.00' Surf.Area= 15,657 sf Storage= 43,393 cf

Peak Elev= 51.90' @ 17.41 hrs Surf.Area= 19,372 sf Storage= 111,610 cf (68,217 cf above start)

Plug-Flow detention time= 2,422.9 min calculated for 0.839 af (41% of inflow)

Center-of-Mass det. time= 1,351.0 min (2,127.1 - 776.1)

#	Invert	Avail.Storage	Storage Description
1	45.00'	175,675 cf	Custom Stage Data (Prismatic) Listed below

Post-Closure Analysis

Type III 24-hr 10-Year Storm Event Rainfall=4.50"

Prepared by {enter your company name here}

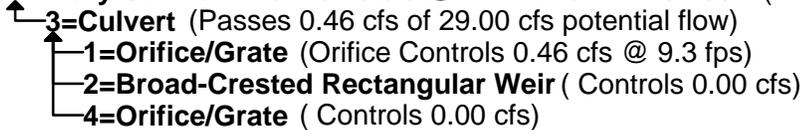
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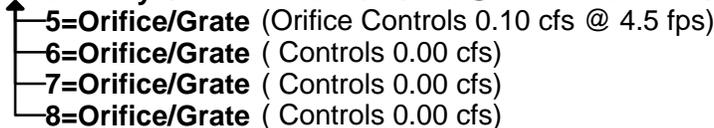
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
45.00	12,977	0	0
47.00	14,759	27,736	27,736
49.00	16,555	31,314	59,050
51.00	18,569	35,124	94,174
53.00	20,363	38,932	133,106
55.00	22,206	42,569	175,675

#	Routing	Invert	Outlet Devices
1	Device 3	48.00'	3.0" Vert. Orifice/Grate C= 0.600
2	Device 3	52.60'	1.0' long Broad-Crested Rectangular Weir Head (feet) 1.00 10.00 Coef. (English) 3.30 3.30
3	Primary	45.00'	24.0" x 100.0' long Culvert CMP, projecting, no headwall, Ke= 0.900 Outlet Invert= 44.00' S= 0.0100 '/' n= 0.012 Cc= 0.900
4	Device 3	54.00'	36.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600
5	Secondary	50.95'	2.0" Vert. Orifice/Grate C= 0.600
6	Secondary	52.25'	6.0" Vert. Orifice/Grate C= 0.600
7	Secondary	52.60'	6.0" Vert. Orifice/Grate C= 0.600
8	Secondary	53.00'	4.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.46 cfs @ 17.41 hrs HW=51.90' (Free Discharge)



Secondary OutFlow Max=0.10 cfs @ 17.41 hrs HW=51.90' (Free Discharge)



Pond 4P: Western Wetland

Inflow Area = 10.740 ac, Inflow Depth = 0.99" for 10-Year Storm Event event
 Inflow = 2.67 cfs @ 12.16 hrs, Volume= 0.889 af
 Primary = 2.67 cfs @ 12.16 hrs, Volume= 0.889 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Pond 5P: Northern Wetland

Inflow Area = 7.316 ac, Inflow Depth = 2.94" for 10-Year Storm Event event
 Inflow = 1.12 cfs @ 12.16 hrs, Volume= 1.790 af
 Primary = 1.12 cfs @ 12.16 hrs, Volume= 1.790 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Post-Closure Analysis

Type III 24-hr 10-Year Storm Event Rainfall=4.50"

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Pond 6P: Vernal Pool

Inflow Area = 0.171 ac, Inflow Depth = 2.03" for 10-Year Storm Event event
Inflow = 0.15 cfs @ 12.16 hrs, Volume= 0.029 af
Primary = 0.15 cfs @ 12.16 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Pond 7P: Eastern Wetland

Inflow = 0.10 cfs @ 17.41 hrs, Volume= 0.119 af
Primary = 0.10 cfs @ 17.41 hrs, Volume= 0.119 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Post-Closure Analysis

Type III 24-hr 25-Year Storm Event Rainfall=5.40"

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Subcatchment 1S:

Runoff = 28.10 cfs @ 12.24 hrs, Volume= 3.059 af, Depth= 4.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Event Rainfall=5.40"

Area (sf)	CN	Description
339,986	94	Landfill Cover

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.1200	0.2		Sheet Flow, Sheet Flow Grass: Dense n= 0.240 P2= 3.10"
0.2	75	0.1200	5.6		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
14.0					Direct Entry, Swale Concentrated Flow--2fps
18.3	125	Total			

Subcatchment 2S:

Runoff = 33.41 cfs @ 12.08 hrs, Volume= 2.531 af, Depth= 4.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Event Rainfall=5.40"

Area (sf)	CN	Description
281,328	94	Landfill Cover

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.2100	0.3		Sheet Flow, Sheet Flow n= 0.240 P2= 3.10"
0.6	250	0.2100	7.4		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
1.7					Direct Entry, Concentrated Flow--2 fps
5.6	300	Total			

Subcatchment 4S: Direct Slope Runoff

Runoff = 4.23 cfs @ 12.15 hrs, Volume= 0.377 af, Depth= 1.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Event Rainfall=5.40"

Area (sf)	CN	Description
127,868	60	

Post-Closure Analysis

Type III 24-hr 25-Year Storm Event Rainfall=5.40"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 5S: Direct Slope Runoff

Runoff = 1.24 cfs @ 12.15 hrs, Volume= 0.110 af, Depth= 1.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Event Rainfall=5.40"

Area (sf)	CN	Description
37,357	60	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 6S: Direct Slope Runoff

Runoff = 0.25 cfs @ 12.15 hrs, Volume= 0.022 af, Depth= 1.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Event Rainfall=5.40"

Area (sf)	CN	Description
7,448	60	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Pond 1P: Basin 1

Inflow Area = 7.805 ac, Inflow Depth = 4.70" for 25-Year Storm Event event
 Inflow = 28.10 cfs @ 12.24 hrs, Volume= 3.059 af
 Outflow = 0.17 cfs @ 24.27 hrs, Volume= 0.799 af, Atten= 99%, Lag= 721.7 min
 Primary = 0.14 cfs @ 24.27 hrs, Volume= 0.700 af
 Secondary = 0.03 cfs @ 24.27 hrs, Volume= 0.099 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 50.94' @ 24.27 hrs Surf.Area= 24,188 sf Storage= 125,332 cf
 Plug-Flow detention time= 1,836.9 min calculated for 0.799 af (26% of inflow)
 Center-of-Mass det. time= 1,656.4 min (2,439.1 - 782.8)

#	Invert	Avail.Storage	Storage Description
1	45.00'	381,054 cf	Custom Stage Data (Pyramidal) Listed below

Post-Closure Analysis

Type III 24-hr 25-Year Storm Event Rainfall=5.40"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
45.00	16,386	0	0	16,386
46.00	17,742	17,060	17,060	17,839
50.00	23,212	81,663	98,723	23,767
60.00	33,572	282,332	381,054	36,111

#	Routing	Invert	Outlet Devices
1	Device 4	52.50'	36.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600
2	Device 4	51.00'	1.0' long Broad-Crested Rectangular Weir Head (feet) 1.00 10.00 Coef. (English) 3.30 3.30
3	Device 4	45.00'	1.5" Vert. Orifice/Grate C= 0.600
4	Primary	42.00'	24.0" x 100.0' long Culvert CMP, projecting, no headwall, Ke= 0.900 Outlet Invert= 41.75' S= 0.0025 '/' n= 0.013 Cc= 0.900
5	Secondary	49.80'	1.0" Vert. Orifice/Grate C= 0.600
6	Secondary	51.20'	6.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.14 cfs @ 24.27 hrs HW=50.94' (Free Discharge)

↑ **4=Culvert** (Passes 0.14 cfs of 33.66 cfs potential flow)
 ↑ **1=Orifice/Grate** (Controls 0.00 cfs)
 ↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↑ **3=Orifice/Grate** (Orifice Controls 0.14 cfs @ 11.7 fps)

Secondary OutFlow Max=0.03 cfs @ 24.27 hrs HW=50.94' (Free Discharge)

↑ **5=Orifice/Grate** (Orifice Controls 0.03 cfs @ 5.1 fps)
 ↑ **6=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: Basin 2

Inflow Area = 6.458 ac, Inflow Depth = 4.70" for 25-Year Storm Event event
 Inflow = 33.41 cfs @ 12.08 hrs, Volume= 2.531 af
 Outflow = 0.96 cfs @ 15.93 hrs, Volume= 2.231 af, Atten= 97%, Lag= 231.1 min
 Primary = 0.51 cfs @ 15.93 hrs, Volume= 1.900 af
 Secondary = 0.45 cfs @ 15.93 hrs, Volume= 0.331 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Starting Elev= 48.00' Surf.Area= 15,657 sf Storage= 43,393 cf

Peak Elev= 52.61' @ 15.93 hrs Surf.Area= 20,016 sf Storage= 125,575 cf (82,182 cf above start)

Plug-Flow detention time= 2,146.5 min calculated for 1.235 af (49% of inflow)

Center-of-Mass det. time= 1,282.4 min (2,053.4 - 771.0)

#	Invert	Avail.Storage	Storage Description
1	45.00'	175,675 cf	Custom Stage Data (Prismatic) Listed below

Post-Closure Analysis

Type III 24-hr 25-Year Storm Event Rainfall=5.40"

Prepared by {enter your company name here}

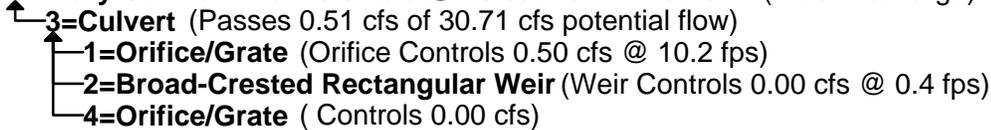
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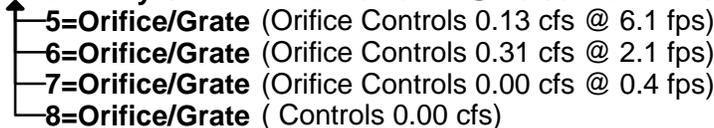
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
45.00	12,977	0	0
47.00	14,759	27,736	27,736
49.00	16,555	31,314	59,050
51.00	18,569	35,124	94,174
53.00	20,363	38,932	133,106
55.00	22,206	42,569	175,675

#	Routing	Invert	Outlet Devices
1	Device 3	48.00'	3.0" Vert. Orifice/Grate C= 0.600
2	Device 3	52.60'	1.0' long Broad-Crested Rectangular Weir Head (feet) 1.00 10.00 Coef. (English) 3.30 3.30
3	Primary	45.00'	24.0" x 100.0' long Culvert CMP, projecting, no headwall, Ke= 0.900 Outlet Invert= 44.00' S= 0.0100 '/' n= 0.012 Cc= 0.900
4	Device 3	54.00'	36.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600
5	Secondary	50.95'	2.0" Vert. Orifice/Grate C= 0.600
6	Secondary	52.25'	6.0" Vert. Orifice/Grate C= 0.600
7	Secondary	52.60'	6.0" Vert. Orifice/Grate C= 0.600
8	Secondary	53.00'	4.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.51 cfs @ 15.93 hrs HW=52.61' (Free Discharge)



Secondary OutFlow Max=0.45 cfs @ 15.93 hrs HW=52.61' (Free Discharge)



Pond 4P: Western Wetland

Inflow Area = 10.740 ac, Inflow Depth = 1.20" for 25-Year Storm Event event
 Inflow = 4.32 cfs @ 12.15 hrs, Volume= 1.077 af
 Primary = 4.32 cfs @ 12.15 hrs, Volume= 1.077 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Pond 5P: Northern Wetland

Inflow Area = 7.316 ac, Inflow Depth = 3.30" for 25-Year Storm Event event
 Inflow = 1.64 cfs @ 12.16 hrs, Volume= 2.010 af
 Primary = 1.64 cfs @ 12.16 hrs, Volume= 2.010 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Post-Closure Analysis

Type III 24-hr 25-Year Storm Event Rainfall=5.40"

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Pond 6P: Vernal Pool

Inflow Area = 0.171 ac, Inflow Depth = 8.49" for 25-Year Storm Event event
Inflow = 0.25 cfs @ 12.15 hrs, Volume= 0.121 af
Primary = 0.25 cfs @ 12.15 hrs, Volume= 0.121 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Pond 7P: Eastern Wetland

Inflow = 0.45 cfs @ 15.93 hrs, Volume= 0.331 af
Primary = 0.45 cfs @ 15.93 hrs, Volume= 0.331 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Post-Closure Analysis

Type III 24-hr 50-Year Storm Event Rainfall=6.00"

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Subcatchment 1S:

Runoff = 31.45 cfs @ 12.24 hrs, Volume= 3.445 af, Depth= 5.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Storm Event Rainfall=6.00"

Area (sf)	CN	Description
339,986	94	Landfill Cover

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.1200	0.2		Sheet Flow, Sheet Flow Grass: Dense n= 0.240 P2= 3.10"
0.2	75	0.1200	5.6		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
14.0					Direct Entry, Swale Concentrated Flow--2fps
18.3	125	Total			

Subcatchment 2S:

Runoff = 37.38 cfs @ 12.08 hrs, Volume= 2.851 af, Depth= 5.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Storm Event Rainfall=6.00"

Area (sf)	CN	Description
281,328	94	Landfill Cover

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.2100	0.3		Sheet Flow, Sheet Flow n= 0.240 P2= 3.10"
0.6	250	0.2100	7.4		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
1.7					Direct Entry, Concentrated Flow--2 fps
5.6	300	Total			

Subcatchment 4S: Direct Slope Runoff

Runoff = 5.43 cfs @ 12.15 hrs, Volume= 0.470 af, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Storm Event Rainfall=6.00"

Area (sf)	CN	Description
127,868	60	

Post-Closure Analysis

Type III 24-hr 50-Year Storm Event Rainfall=6.00"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 5S: Direct Slope Runoff

Runoff = 1.59 cfs @ 12.15 hrs, Volume= 0.137 af, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Storm Event Rainfall=6.00"

Area (sf)	CN	Description
37,357	60	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 6S: Direct Slope Runoff

Runoff = 0.32 cfs @ 12.15 hrs, Volume= 0.027 af, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Storm Event Rainfall=6.00"

Area (sf)	CN	Description
7,448	60	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Pond 1P: Basin 1

Inflow Area = 7.805 ac, Inflow Depth = 5.30" for 50-Year Storm Event event
 Inflow = 31.45 cfs @ 12.24 hrs, Volume= 3.445 af
 Outflow = 0.56 cfs @ 21.18 hrs, Volume= 1.088 af, Atten= 98%, Lag= 536.5 min
 Primary = 0.52 cfs @ 21.18 hrs, Volume= 0.968 af
 Secondary = 0.04 cfs @ 21.18 hrs, Volume= 0.120 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 51.23' @ 21.18 hrs Surf.Area= 24,488 sf Storage= 133,494 cf
 Plug-Flow detention time= 1,548.3 min calculated for 1.088 af (32% of inflow)
 Center-of-Mass det. time= 1,385.6 min (2,165.5 - 779.9)

#	Invert	Avail.Storage	Storage Description
1	45.00'	381,054 cf	Custom Stage Data (Pyramidal) Listed below

Post-Closure Analysis

Type III 24-hr 50-Year Storm Event Rainfall=6.00"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
45.00	16,386	0	0	16,386
46.00	17,742	17,060	17,060	17,839
50.00	23,212	81,663	98,723	23,767
60.00	33,572	282,332	381,054	36,111

#	Routing	Invert	Outlet Devices
1	Device 4	52.50'	36.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600
2	Device 4	51.00'	1.0' long Broad-Crested Rectangular Weir Head (feet) 1.00 10.00 Coef. (English) 3.30 3.30
3	Device 4	45.00'	1.5" Vert. Orifice/Grate C= 0.600
4	Primary	42.00'	24.0" x 100.0' long Culvert CMP, projecting, no headwall, Ke= 0.900 Outlet Invert= 41.75' S= 0.0025 ' /' n= 0.013 Cc= 0.900
5	Secondary	49.80'	1.0" Vert. Orifice/Grate C= 0.600
6	Secondary	51.20'	6.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.51 cfs @ 21.18 hrs HW=51.23' (Free Discharge)

↑ **4=Culvert** (Passes 0.51 cfs of 34.26 cfs potential flow)
 ↑ **1=Orifice/Grate** (Controls 0.00 cfs)
 ↑ **2=Broad-Crested Rectangular Weir** (Weir Controls 0.37 cfs @ 1.6 fps)
 ↑ **3=Orifice/Grate** (Orifice Controls 0.15 cfs @ 12.0 fps)

Secondary OutFlow Max=0.03 cfs @ 21.18 hrs HW=51.23' (Free Discharge)

↑ **5=Orifice/Grate** (Orifice Controls 0.03 cfs @ 5.7 fps)
 ↑ **6=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.6 fps)

Pond 2P: Basin 2

Inflow Area = 6.458 ac, Inflow Depth = 5.30" for 50-Year Storm Event event
 Inflow = 37.38 cfs @ 12.08 hrs, Volume= 2.851 af
 Outflow = 1.73 cfs @ 14.44 hrs, Volume= 2.541 af, Atten= 95%, Lag= 141.9 min
 Primary = 0.89 cfs @ 14.44 hrs, Volume= 2.023 af
 Secondary = 0.84 cfs @ 14.44 hrs, Volume= 0.518 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Starting Elev= 48.00' Surf.Area= 15,657 sf Storage= 43,393 cf

Peak Elev= 52.83' @ 14.44 hrs Surf.Area= 20,214 sf Storage= 129,879 cf (86,486 cf above start)

Plug-Flow detention time= 1,893.5 min calculated for 1.545 af (54% of inflow)

Center-of-Mass det. time= 1,157.7 min (1,925.8 - 768.1)

#	Invert	Avail.Storage	Storage Description
1	45.00'	175,675 cf	Custom Stage Data (Prismatic) Listed below

Post-Closure Analysis

Type III 24-hr 50-Year Storm Event Rainfall=6.00"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
45.00	12,977	0	0
47.00	14,759	27,736	27,736
49.00	16,555	31,314	59,050
51.00	18,569	35,124	94,174
53.00	20,363	38,932	133,106
55.00	22,206	42,569	175,675

#	Routing	Invert	Outlet Devices
1	Device 3	48.00'	3.0" Vert. Orifice/Grate C= 0.600
2	Device 3	52.60'	1.0' long Broad-Crested Rectangular Weir Head (feet) 1.00 10.00 Coef. (English) 3.30 3.30
3	Primary	45.00'	24.0" x 100.0' long Culvert CMP, projecting, no headwall, Ke= 0.900 Outlet Invert= 44.00' S= 0.0100 '/' n= 0.012 Cc= 0.900
4	Device 3	54.00'	36.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600
5	Secondary	50.95'	2.0" Vert. Orifice/Grate C= 0.600
6	Secondary	52.25'	6.0" Vert. Orifice/Grate C= 0.600
7	Secondary	52.60'	6.0" Vert. Orifice/Grate C= 0.600
8	Secondary	53.00'	4.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.89 cfs @ 14.44 hrs HW=52.83' (Free Discharge)

↑ **3=Culvert** (Passes 0.89 cfs of 31.22 cfs potential flow)
 |
 |— **1=Orifice/Grate** (Orifice Controls 0.51 cfs @ 10.4 fps)
 |— **2=Broad-Crested Rectangular Weir** (Weir Controls 0.37 cfs @ 1.6 fps)
 |— **4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.84 cfs @ 14.44 hrs HW=52.83' (Free Discharge)

↑ **5=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.5 fps)
 |
 |— **6=Orifice/Grate** (Orifice Controls 0.55 cfs @ 2.8 fps)
 |— **7=Orifice/Grate** (Orifice Controls 0.15 cfs @ 1.6 fps)
 |— **8=Orifice/Grate** (Controls 0.00 cfs)

Pond 4P: Western Wetland

Inflow Area = 10.740 ac, Inflow Depth = 1.61" for 50-Year Storm Event event
 Inflow = 5.53 cfs @ 12.15 hrs, Volume= 1.438 af
 Primary = 5.53 cfs @ 12.15 hrs, Volume= 1.438 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Pond 5P: Northern Wetland

Inflow Area = 7.316 ac, Inflow Depth = 3.54" for 50-Year Storm Event event
 Inflow = 2.02 cfs @ 12.15 hrs, Volume= 2.161 af
 Primary = 2.02 cfs @ 12.15 hrs, Volume= 2.161 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Post-Closure Analysis

Type III 24-hr 50-Year Storm Event Rainfall=6.00"

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Pond 6P: Vernal Pool

Inflow Area = 0.171 ac, Inflow Depth = 10.32" for 50-Year Storm Event event
Inflow = 0.32 cfs @ 12.15 hrs, Volume= 0.147 af
Primary = 0.32 cfs @ 12.15 hrs, Volume= 0.147 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Pond 7P: Eastern Wetland

Inflow = 0.84 cfs @ 14.44 hrs, Volume= 0.518 af
Primary = 0.84 cfs @ 14.44 hrs, Volume= 0.518 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Post-Closure Analysis

Type III 24-hr 100-Year Storm Event Rainfall=6.40"

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Subcatchment 1S:

Runoff = 33.67 cfs @ 12.24 hrs, Volume= 3.703 af, Depth= 5.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Storm Event Rainfall=6.40"

Area (sf)	CN	Description
339,986	94	Landfill Cover

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.1200	0.2		Sheet Flow, Sheet Flow Grass: Dense n= 0.240 P2= 3.10"
0.2	75	0.1200	5.6		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
14.0					Direct Entry, Swale Concentrated Flow--2fps
18.3	125	Total			

Subcatchment 2S:

Runoff = 40.02 cfs @ 12.08 hrs, Volume= 3.064 af, Depth= 5.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Storm Event Rainfall=6.40"

Area (sf)	CN	Description
281,328	94	Landfill Cover

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.2100	0.3		Sheet Flow, Sheet Flow n= 0.240 P2= 3.10"
0.6	250	0.2100	7.4		Shallow Concentrated Flow, Flow on Slope Unpaved Kv= 16.1 fps
1.7					Direct Entry, Concentrated Flow--2 fps
5.6	300	Total			

Subcatchment 4S: Direct Slope Runoff

Runoff = 6.27 cfs @ 12.15 hrs, Volume= 0.535 af, Depth= 2.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Storm Event Rainfall=6.40"

Area (sf)	CN	Description
127,868	60	

Post-Closure Analysis

Type III 24-hr 100-Year Storm Event Rainfall=6.40"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 5S: Direct Slope Runoff

Runoff = 1.83 cfs @ 12.15 hrs, Volume= 0.156 af, Depth= 2.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Storm Event Rainfall=6.40"

Area (sf)	CN	Description
37,357	60	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 6S: Direct Slope Runoff

Runoff = 0.36 cfs @ 12.15 hrs, Volume= 0.031 af, Depth= 2.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Storm Event Rainfall=6.40"

Area (sf)	CN	Description
7,448	60	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Pond 1P: Basin 1

Inflow Area = 7.805 ac, Inflow Depth = 5.69" for 100-Year Storm Event event
 Inflow = 33.67 cfs @ 12.24 hrs, Volume= 3.703 af
 Outflow = 0.93 cfs @ 17.77 hrs, Volume= 1.341 af, Atten= 97%, Lag= 331.6 min
 Primary = 0.82 cfs @ 17.77 hrs, Volume= 1.194 af
 Secondary = 0.10 cfs @ 17.77 hrs, Volume= 0.147 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 51.34' @ 17.77 hrs Surf.Area= 24,605 sf Storage= 136,673 cf
 Plug-Flow detention time= 1,341.1 min calculated for 1.341 af (36% of inflow)
 Center-of-Mass det. time= 1,190.7 min (1,968.9 - 778.2)

#	Invert	Avail.Storage	Storage Description
1	45.00'	381,054 cf	Custom Stage Data (Pyramidal) Listed below

Post-Closure Analysis

Type III 24-hr 100-Year Storm Event Rainfall=6.40"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
45.00	16,386	0	0	16,386
46.00	17,742	17,060	17,060	17,839
50.00	23,212	81,663	98,723	23,767
60.00	33,572	282,332	381,054	36,111

#	Routing	Invert	Outlet Devices
1	Device 4	52.50'	36.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600
2	Device 4	51.00'	1.0' long Broad-Crested Rectangular Weir Head (feet) 1.00 10.00 Coef. (English) 3.30 3.30
3	Device 4	45.00'	1.5" Vert. Orifice/Grate C= 0.600
4	Primary	42.00'	24.0" x 100.0' long Culvert CMP, projecting, no headwall, Ke= 0.900 Outlet Invert= 41.75' S= 0.0025 '/' n= 0.013 Cc= 0.900
5	Secondary	49.80'	1.0" Vert. Orifice/Grate C= 0.600
6	Secondary	51.20'	6.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.81 cfs @ 17.77 hrs HW=51.34' (Free Discharge)

- ↑ 4=Culvert (Passes 0.81 cfs of 34.50 cfs potential flow)
 - ↑ 1=Orifice/Grate (Controls 0.00 cfs)
 - ↑ 2=Broad-Crested Rectangular Weir (Weir Controls 0.67 cfs @ 1.9 fps)
 - ↑ 3=Orifice/Grate (Orifice Controls 0.15 cfs @ 12.1 fps)

Secondary OutFlow Max=0.09 cfs @ 17.77 hrs HW=51.34' (Free Discharge)

- ↑ 5=Orifice/Grate (Orifice Controls 0.03 cfs @ 5.9 fps)
- ↑ 6=Orifice/Grate (Orifice Controls 0.06 cfs @ 1.3 fps)

Pond 2P: Basin 2

Inflow Area = 6.458 ac, Inflow Depth = 5.69" for 100-Year Storm Event event
 Inflow = 40.02 cfs @ 12.08 hrs, Volume= 3.064 af
 Outflow = 2.35 cfs @ 13.75 hrs, Volume= 2.751 af, Atten= 94%, Lag= 100.1 min
 Primary = 1.25 cfs @ 13.75 hrs, Volume= 2.130 af
 Secondary = 1.10 cfs @ 13.75 hrs, Volume= 0.620 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
 Starting Elev= 48.00' Surf.Area= 15,657 sf Storage= 43,393 cf
 Peak Elev= 52.96' @ 13.75 hrs Surf.Area= 20,330 sf Storage= 132,397 cf (89,004 cf above start)
 Plug-Flow detention time= 1,740.5 min calculated for 1.755 af (57% of inflow)
 Center-of-Mass det. time= 1,083.3 min (1,849.8 - 766.5)

#	Invert	Avail.Storage	Storage Description
1	45.00'	175,675 cf	Custom Stage Data (Prismatic) Listed below

Post-Closure Analysis

Type III 24-hr 100-Year Storm Event Rainfall=6.40"

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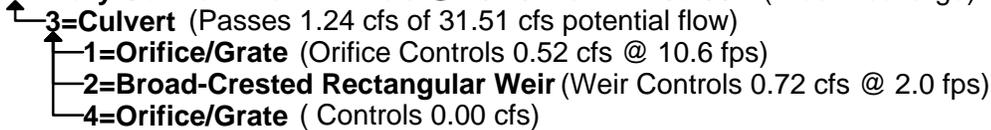
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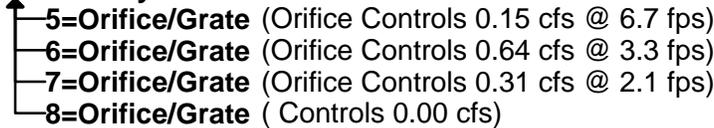
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
45.00	12,977	0	0
47.00	14,759	27,736	27,736
49.00	16,555	31,314	59,050
51.00	18,569	35,124	94,174
53.00	20,363	38,932	133,106
55.00	22,206	42,569	175,675

#	Routing	Invert	Outlet Devices
1	Device 3	48.00'	3.0" Vert. Orifice/Grate C= 0.600
2	Device 3	52.60'	1.0' long Broad-Crested Rectangular Weir Head (feet) 1.00 10.00 Coef. (English) 3.30 3.30
3	Primary	45.00'	24.0" x 100.0' long Culvert CMP, projecting, no headwall, Ke= 0.900 Outlet Invert= 44.00' S= 0.0100 '/' n= 0.012 Cc= 0.900
4	Device 3	54.00'	36.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600
5	Secondary	50.95'	2.0" Vert. Orifice/Grate C= 0.600
6	Secondary	52.25'	6.0" Vert. Orifice/Grate C= 0.600
7	Secondary	52.60'	6.0" Vert. Orifice/Grate C= 0.600
8	Secondary	53.00'	4.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=1.24 cfs @ 13.75 hrs HW=52.96' (Free Discharge)



Secondary OutFlow Max=1.10 cfs @ 13.75 hrs HW=52.96' (Free Discharge)



Pond 4P: Western Wetland

Inflow Area = 10.740 ac, Inflow Depth = 1.93" for 100-Year Storm Event event
 Inflow = 6.37 cfs @ 12.15 hrs, Volume= 1.729 af
 Primary = 6.37 cfs @ 12.15 hrs, Volume= 1.729 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Pond 5P: Northern Wetland

Inflow Area = 7.316 ac, Inflow Depth = 3.75" for 100-Year Storm Event event
 Inflow = 2.28 cfs @ 12.15 hrs, Volume= 2.287 af
 Primary = 2.28 cfs @ 12.15 hrs, Volume= 2.287 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Post-Closure Analysis

Type III 24-hr 100-Year Storm Event Rainfall=6.40"

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Pond 6P: Vernal Pool

Inflow Area = 0.171 ac, Inflow Depth = 12.49" for 100-Year Storm Event event
Inflow = 0.36 cfs @ 12.15 hrs, Volume= 0.178 af
Primary = 0.36 cfs @ 12.15 hrs, Volume= 0.178 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Pond 7P: Eastern Wetland

Inflow = 1.10 cfs @ 13.75 hrs, Volume= 0.620 af
Primary = 1.10 cfs @ 13.75 hrs, Volume= 0.620 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

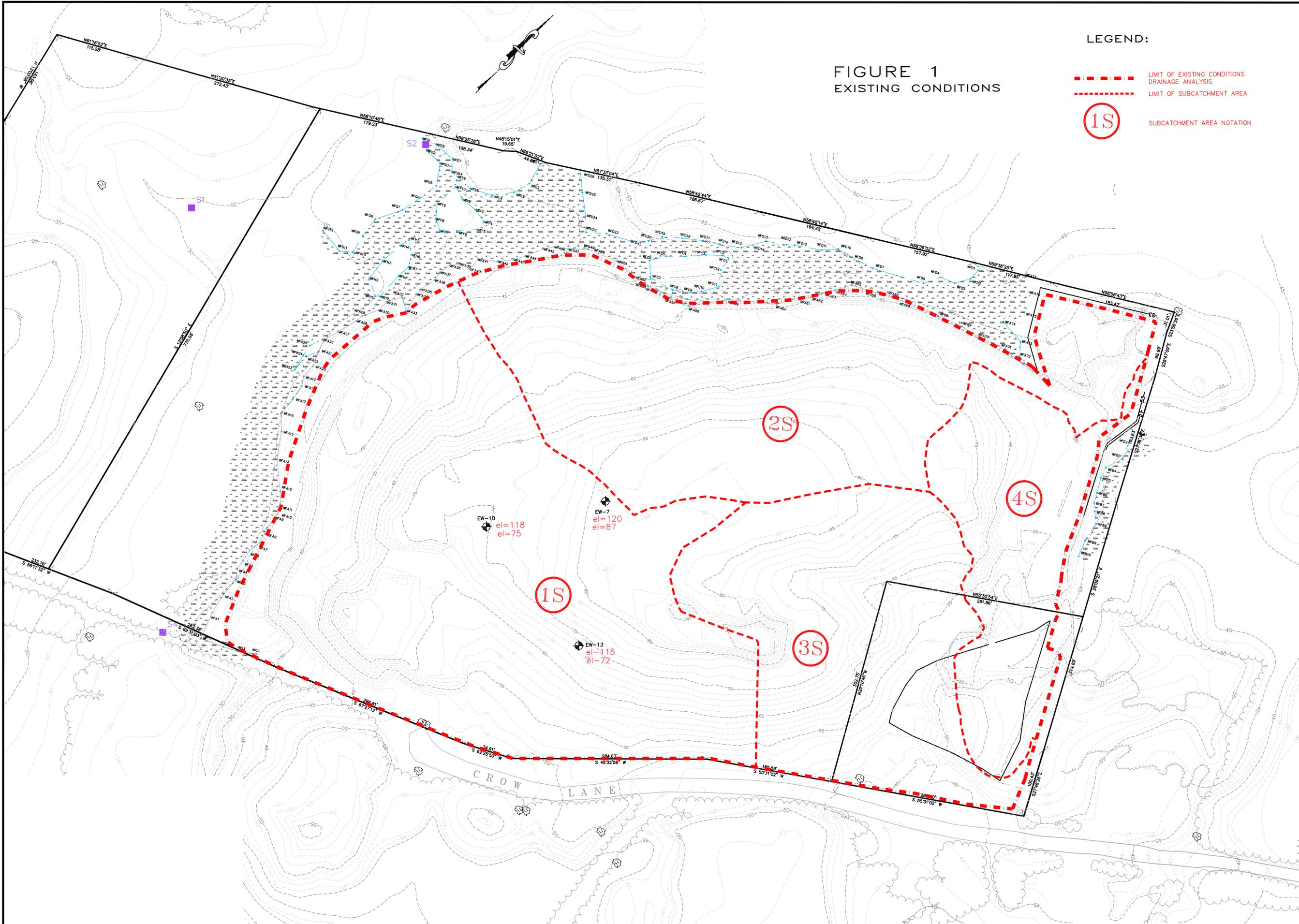


FIGURE 1
EXISTING CONDITIONS

LEGEND:

- - - - - LIMIT OF EXISTING CONDITIONS DRAINAGE ANALYSIS
- LIMIT OF SUBCATCHMENT AREA
- 1S SUBCATCHMENT AREA NOTATION

No.	Date	Revision Description
1	DEC. 20, 2006	REVISED SUBCATCHMENT AREAS BASED ON BSC GROUP STORMWATER MANAGEMENT PLAN ANALYSIS

scale: 1" = 60'
 date: OCT. 27, 2005
 draw: JAC
 check: MQ
 approve: ARQ
 sheet 1 of 1
 drawing number: C-2

project: CROW LANE MUNICIPAL LANDFILL
 NEWBURYPORT, MASSACHUSETTS
 client: NEW VENTURES ASSOCIATES, L.L.C.
 drawing title: STORMWATER MANAGEMENT PLAN
 EXISTING CONDITIONS DRAINAGE AREAS PLAN

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NOTES:
 THIS DRAWING PRESENTS FINAL GRADING FOR THE CONSTRUCTION OF THE WESTERLY PERIMETER BERM AND FINAL GRADING AND DRAINAGE SYSTEM DESIGN DATA FOR THE SOUTHERLY BERM.
 REFER TO DRAWING NO. 3, FINAL GRADING AND STORMWATER MANAGEMENT PLAN FOR LANDFILL SURFACE DRAINAGE FEATURES AND CONSTRUCTION DATA FOR STORMWATER DETENTION BASINS 1 AND 2.

WETLANDS ALTERATION SUMMARY
 AREA 1, WEST SLOPE: 3,426 SF
 AREA 2, WEST SLOPE: 294 SF
 AREA 3, NORTH SLOPE: 1,058 SF
 TOTAL ALTERATION AREA: 4,778 SF

EROSION CONTROLS TO INCLUDE HAYBALES AND SILT FENCE INSTALLED ALONG LIMIT OF CONSTRUCTION. EROSION CONTROLS TO BE MAINTAINED THROUGHOUT CONSTRUCTION.

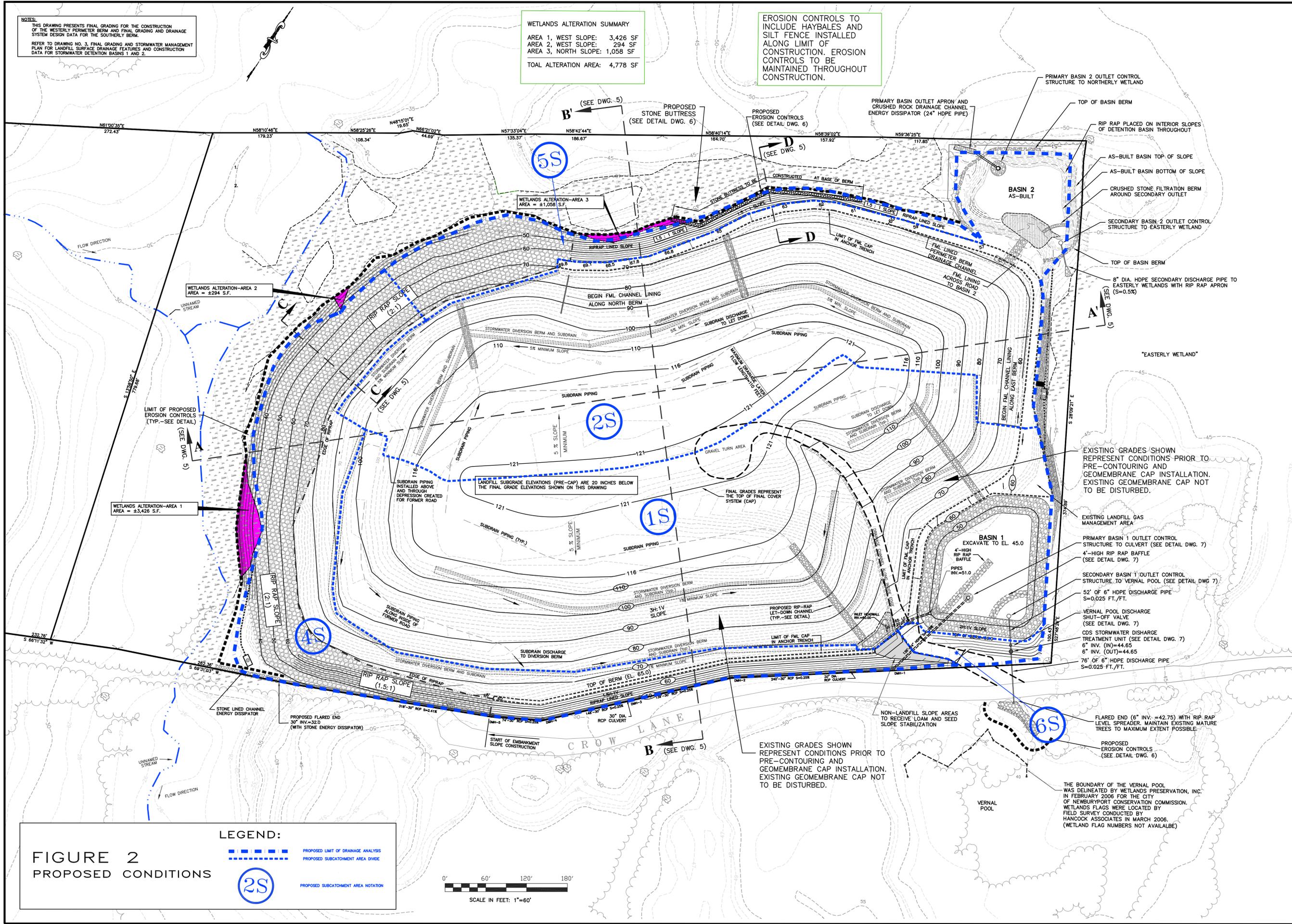
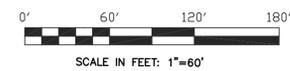


FIGURE 2
PROPOSED CONDITIONS

LEGEND:

- PROPOSED LIMIT OF DRAINAGE ANALYSIS
- PROPOSED SUBCATCHMENT AREA DIVIDE
- 2S PROPOSED SUBCATCHMENT AREA NOTATION



App'd. By	Chkd. By	Revision Description	Date	No.

scale: 1"=60'
 date: SEPT. 13, 2010
 No. 17-60
 project: CROW LANE MUNICIPAL LANDFILL NEWBURYPORT, MASSACHUSETTS
 client: NEW VENTURES ASSOCIATES, L.L.C.
 drawn: MQ
 checked: MQ
 approved:
 drawing number:
 drawing title: STORMWATER MANAGEMENT PLAN PROPOSED CONDITIONS DRAINAGE AREAS PLAN

EXISTING GRADES SHOWN REPRESENT CONDITIONS PRIOR TO PRE-CONTOURING AND GEOMEMBRANE CAP INSTALLATION. EXISTING GEOMEMBRANE CAP NOT TO BE DISTURBED.

EXISTING LANDFILL GAS MANAGEMENT AREA

PRIMARY BASIN 1 OUTLET CONTROL STRUCTURE TO CULTVERT (SEE DETAIL DWG. 7)

4'-HIGH RIP RAP BAFFLE (SEE DETAIL DWG. 7)

SECONDARY BASIN 1 OUTLET CONTROL STRUCTURE TO VERNAL POOL (SEE DETAIL DWG. 7)

52' OF 6" HDPE DISCHARGE PIPE S=0.025 FT./FT.

VERNAL POOL DISCHARGE SHUT-OFF VALVE (SEE DETAIL DWG. 7)

ODS STORMWATER DISCHARGE TREATMENT UNIT (SEE DETAIL DWG. 7)

6" INV. (IN)=44.65
 6" INV. (OUT)=44.65

76' OF 6" HDPE DISCHARGE PIPE S=0.025 FT./FT.

EXISTING GRADES SHOWN REPRESENT CONDITIONS PRIOR TO PRE-CONTOURING AND GEOMEMBRANE CAP INSTALLATION. EXISTING GEOMEMBRANE CAP NOT TO BE DISTURBED.

FLARED END (6" INV.=42.75) WITH RIP RAP LEVEL SPREADER. MAINTAIN EXISTING MATURE TREES TO MAXIMUM EXTENT POSSIBLE.

PROPOSED EROSION CONTROLS (SEE DETAIL DWG. 6)

THE BOUNDARY OF THE VERNAL POOL WAS DELINEATED BY WETLANDS PRESERVATION, INC. IN FEBRUARY 2006 FOR THE CITY OF NEWBURYPORT CONSERVATION COMMISSION. WETLANDS FLAGS WERE LOCATED BY FIELD SURVEY CONDUCTED BY HANCOCK ASSOCIATES IN MARCH 2006. (WETLAND FLAG NUMBERS NOT AVAILABLE)

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Acad. No. DWG 13, CONCEPT C.dwg
 File No. SE05-533