APPENDIX C

ROUTING WORKSHEET

Project Name: Coffin Butte Landfill - Stromwater Master Plan Revision
Client: Valley Landfills, Inc.
Job No.: 2015.A021
Date: 03/24/2015
Calculated By: BGA

	25-yr 24-hr Subarea Contribution to Total Flow (cfs)																																													
	ED-1	ED-2	ED-3	ED-4	ED-5	ED-6A	ED-6B	ED-7	ED-8	ED-9	ED-10	ED-11	ED-12	ED-13A	ED-13B	ED-14	ED-15	ED-16	ED-17	ED-18	ED-19	ED-20A	ED-20B	ED-21	ED-22	ED-23	ED-24	ED-25	ED-26	ED-27A	ED-27B	ED-28	ED-29	ED-30	ED-31	ED-32	ED-33	ED-34	ED-35	ED-36	ED-37	ED-38	ED-39	ED-40	ED-41	ED-42	ED-43	ED-44	ED-45	ED-46
Subarea Contribution to Total Flow (cfs)	1.66	1.21	2.29	0.20	0.65	0.67	0.82	0.97	1.83	0.35	0.18	1.64	1.46	0.98	1.58	0.26	2.45	0.80	2.01	0.76	1.57	1.00	1.53	0.60	2.29	0.67	0.32	1.21	1.70	0.84	1.34	0.86	2.73	0.54	1.25	0.38	2.72	1.13	3.71	1.08	1.42	1.27	1.20	0.50	1.86	0.69	0.23	0.96	0.63	2.23
Time of Peak (hrs)	7.94	7.93	7.96	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.94	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.94	7.93	7.93	7.93	7.84	7.84	7.84	7.84	7.93	7.93	7.93	7.93	7.84	7.93	7.84	7.84	7.84	7.84

	25-yr 24-hr Subarea Contribution to Total Flow (cfs)																																													
	ED-47	ED-48	ED-49	ED-50	ED-51	ED-52	ED-53	ED-54	ED-55	ED-56	ED-57	ED-58	ED-59	ED-60	ED-61	ED-62	ED-63	ED-64	ED-65	ED-66	ED-67	ED-68	ED-69	ED-70	ED-71	ED-72	ED-73	ED-74	ED-75	ED-76	ED-77	ED-78	ED-79	ED-80	ED-81	ED-82	ED-83	ED-84	WD-1	WD-2	WD-3	WD-4	WD-5	WD-6	WD-7	WD-8	WD-9	WD-10
Subarea Contribution to Total Flow (cfs)	0.37	1.41	1.69	0.88	0.82	0.10	0.52	1.35	0.70	2.06	1.17	1.77	3.27	0.45	0.40	0.62	1.23	0.92	1.91	0.78	2.60	0.95	0.67	0.72	0.72	1.21	0.91	1.69	0.85	1.26	0.86	0.84	1.59	0.24	0.66	0.66	13.54	2.43	58.97	4.98	0.83	1.46	1.14	1.54	0.67	1.91	1.69	5.82
Time of Peak (hrs)	7.93	7.84	7.84	7.84	7.84	7.84	7.84	7.93	7.93	7.92	7.84	7.84	7.84	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.84	7.84	7.84	7.84	7.93	7.93	7.93	7.84	7.84	7.84	7.98	7.93	8.01	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.92

	ED-1	ED-4	TOTAL
CP-1	1.66	0.20	1.86

	ED-11	CP-1	TOTAL
CP-2	1.64	1.86	3.50

	ED-18	CP-2	TOTAL
CP-3	0.76	3.50	4.26

	CP-3	ED-17	TOTAL
CP-4	4.26	2.01	6.27

	ED-31	CP-4	TOTAL
CP-5	1.25	6.27	7.52

	ED-37	CP-5	TOTAL
CP-6	1.42	7.52	8.94

	CP-6	ED-53	TOTAL
CP-7	8.94	0.52	9.46

	CP-7	ED-52	TOTAL
CP-8	9.46	0.10	9.56

	ED-50	ED-51	TOTAL
CP-9	0.88	0.82	1.70

	CP-9	ED-61	ED-62	TOTAL
CP-10	1.70	0.40	0.62	2.72

	CP-10	CP-8	TOTAL
CP-11	2.72	9.56	12.28

	CP-11	ED-77	TOTAL
CP-12	12.28	0.86	13.14

	ED-49	ED-60	TOTAL
CP-13	1.69	0.45	2.14

	CP-13	ED-66	ED-67	TOTAL
CP-14	2.14	0.78	2.60	5.52

	ED-38	ED-39	TOTAL
CP-15	1.27	1.20	2.47

	CP-15	ED-54	TOTAL
CP-16	2.47	1.35	3.82

	CP-16	ED-63	TOTAL
CP-17	3.82	1.23	5.05

	CP-14	ED-71	TOTAL
CP-18	5.52	0.72	6.24

	CP-17	CP-18	ED-68	TOTAL
CP-19	5.05	6.24	0.95	12.24

	CP-12	CP-19	ED-78	TOTAL
CP-20	13.14	12.24	0.84	26.22

	ED-70	WD-10	TOTAL
CP-21	0.72	5.82	6.54

	ED-5	ED-12	TOTAL
CP-22	0.65	1.46	2.11

	CP-22	ED-19	TOTAL
CP-23	2.11	1.57	3.68

	CP-23	ED-26	TOTAL
CP-24	3.68	1.70	5.38

	ED-2	ED-6A	TOTAL
CP-25	1.21	0.67	1.88

	CP-25	ED-13A	TOTAL
CP-26	1.88	0.98	2.86

	CP-26	ED-20A	TOTAL
CP-27	2.86	1.00	3.86

	CP-27	ED-27A	TOTAL
CP-28	3.86	0.84	4.70

	CP-24	CP-28	TOTAL
CP-29	5.38	4.70	10.08

	CP-29	ED-55	TOTAL
CP-30	10.08	0.70	10.78

	CP-30	ED-64	TOTAL
CP-31	10.78	0.92	11.70

	CP-31	ED-69	TOTAL
CP-32	11.70	0.67	12.37

	CP-32	CP-20	ED-79	TOTAL
CP-33	12.37	26.22	1.59	40.18

	ED-13B	ED-14	TOTAL
CP-34	1.58	0.26	1.84

	CP-34	ED-20B	ED-21	TOTAL
CP-35	1.84	1.53	0.60	3.97

	CP-35	ED-27B	TOTAL
CP-36	3.97	1.34	5.31

	CP-36	ED-33	TOTAL
CP-37	5.31	2.72	8.03

	CP-37	ED-42	TOTAL
CP-38	8.03	0.69	8.72

	CP-38	ED-56	TOTAL
CP-39	8.72	2.06	10.78

	CP-39	ED-65	TOTAL
CP-40	10.78	1.91	12.69

	CP-40	ED-72	TOTAL
CP-40B	12.69	1.21	13.90

	CP-40B	CP-33	ED-80	TOTAL
CP-41	13.90	40.18	0.24	54.32

	ED-24	ED-28	TOTAL
CP-42	0.32	0.86	1.18

	CP-42	ED-34	TOTAL
CP-43	1.18	1.13	2.31

	CP-43	ED-40	TOTAL
CP-44	2.31	0.50	2.81

	CP-44	ED-43	TOTAL
CP-45	2.81	0.23	3.04

	CP-45	ED-57	TOTAL
CP-46	3.04	1.17	4.21

	CP-46	ED-73	TOTAL
CP-47	4.21	0.91	5.12

	CP-47	CP-41	ED-81	TOTAL
CP-48	5.12	54.32	0.66	60.10

	ED-44	ED-58	TOTAL
CP-49	0.96	1.77	2.73

	CP-49	ED-74	TOTAL
CP-50	2.73	1.69	4.42

	CP-50	CP-48	TOTAL
CP-51	4.42	60.10	64.52

	ED-3	ED-9	ED-84	TOTAL
CP-52	2.29	0.35	2.43	5.07

	ED-6B	ED-7	TOTAL
CP-53	0.82	0.97	1.79

	CP-53	ED-8	TOTAL
CP-54	1.79	1.83	3.62

	CP-54	CP-52	TOTAL
CP-55	3.62	5.07	8.69

	CP-55	ED-16	ED-15	TOTAL
CP-56	8.69	0.80	2.45	11.94

	CP-56	ED-22	ED-23	ED-25	TOTAL
CP-57	11.94	2.29	0.67	1.21	16.11

	CP-57	ED-29	ED-30	TOTAL
CP-58	16.11	2.73	0.54	19.38

	CP-58	ED-36	ED-35	ED-41	TOTAL
CP-59	19.38	1.08	3.71	1.86	26.03

	CP-59	ED-46	ED-10	TOTAL
CP-60	26.03	2.23	0.18	28.44

	CP-60	ED-48	TOTAL
CP-61	28.44	1.41	29.85

	ED-45	ED-47	TOTAL
CP-62	0.63	0.37	1.00

	CP-62	CP-61	TOTAL
CP-63	1.00	29.85	30.85

	CP-63	ED-59	TOTAL
CP-64	30.85	3.27	34.12

	CP-64	ED-75	ED-76	TOTAL
CP-65	34.12	0.85	1.26	36.23

	WD-2	WD-3	TOTAL
CP-66	4.98	0.83	5.81

	CP-66	WD-4	TOTAL
CP-67	5.81	1.46	7.27

	CP-67	WD-8	WD-9	TOTAL
CP-68	7.27	1.91	1.69	10.87

	WD-5	WD-6	WD-7	TOTAL
CP-69	1.14	1.54	0.67	3.35

	CP-69	CP-68	CP-21	WD-1	TOTAL
CP-70	3.35	10.87	6.54	58.97	79.73

APPENDIX D

DRAINAGE CHANNEL DESIGN

HYDRAULIC DRAINAGE STRUCTURES

Project Name: *Coffin Butte Landfill*
Client: *Valley Landfills, Inc.*
Job No.: *2015.A021*
Date: *03/26/2015*
Calculated By: *BGA*
Checked By: *NC*

Channel Section	Channel Slope (%)	Left Side Slope (H:1)	Right Side Slope (H:1)	Bottom Width (feet)	Calculated Channel Depth (feet)	Total Channel Depth (feet)	Total Channel Width (feet)	Available Freeboard (feet)	Design Discharge (cfs)	Flow Velocity (fps)	Erosion Control Protection	Median Rip-Rap Size, D_{50} (in)	Required Rip-Rap Thickness (in)	Rip-Rap Thickness Provided (in)	Rip-Rap Size, D_{50} Provided (in)
Drainage Benches															
4:1 Slope (Max Flow/Min Slope)	3.00%	**4**	**2**	**0**	0.45	**1.00**	6.00	0.55	2.50	4.15	**Erosion Mat**	N/A	N/A	**N/A**	**N/A**
4:1 Slope (Max Flow/Max Slope)	8.00%	**4**	**2**	**0**	0.37	**1.00**	6.00	0.63	2.50	6.00	**Erosion Mat**	N/A	N/A	**N/A**	**N/A**
3.2:1 Slope (Max Flow/Min Slope)	3.00%	**3.2**	**2**	**0**	0.47	**1.00**	5.20	0.53	2.50	4.27	**Erosion Mat**	N/A	N/A	**N/A**	**N/A**
3.2:1 Slope (Max Flow/Max Slope)	8.00%	**3.2**	**2**	**0**	0.39	**1.00**	5.20	0.61	2.50	6.17	**Erosion Mat**	N/A	N/A	**N/A**	**N/A**
Top Deck Berm Channels															
General Channel for Max Flow	0.50%	**2**	**10**	**0**	0.46	**1.00**	12.00	0.54	2.30	1.78	**Erosion Mat**	N/A	N/A	**N/A**	**N/A**
Perimeter Channels															
East Side (Max Flow/Min Slope)	0.50%	**2**	**2**	**0**	2.50	**3.00**	12.00	0.50	64.50	5.15	**Erosion Mat**	N/A	N/A	**N/A**	**N/A**
East Side (Max Flow/Max Slope)	6.00%	**2**	**2**	**0**	1.32	**3.00**	12.00	1.68	40.20	11.62	**Erosion Mat**	N/A	N/A	**N/A**	**N/A**
East Side (Apron @ Downdrains Max Flow)	0.50%	**2**	**2**	**0**	2.98	**3.00**	12.00	0.02	64.50	3.63	**Grouted Rip-Rap**	5.2	11.7	**12.0**	**6.0**
East Side (Apron @ Downdrains Max Slope)	6.00%	**2**	**2**	**0**	1.57	**3.00**	12.00	1.43	40.20	8.20	**Grouted Rip-Rap**	5.3	11.9	**12.0**	**6.0**
West Side (Max Flow/Min Slope)	0.50%	**2**	**2**	**0**	2.42	**3.00**	12.00	0.58	59.00	5.03	**Erosion Mat**	N/A	N/A	**N/A**	**N/A**
West Side (Apron @ Downdrains Max Flow)	0.50%	**2**	**2**	**0**	2.88	**3.00**	12.00	0.12	59.00	3.55	**Grouted Rip-Rap**	5.2	11.7	**12.0**	**6.0**
Runoff Channel															
Max Flow/Min Slope	3.00%	**2**	**2**	**2**	0.23	**0.50**	4.00	0.27	1.40	2.43	**Grouted Rip-Rap**	5.2	11.7	**12.0**	**6.0**
Max Flow/Max Slope	25.00%	**2**	**2**	**2**	0.13	**0.50**	4.00	0.37	1.40	4.91	**Grouted Rip-Rap**	5.2	11.7	**12.0**	**6.0**
Run-on Channel															
Max Flow/Min Slope	3.00%	**2**	**2**	**2**	0.80	**1.00**	6.00	0.20	13.54	4.73	**Grouted Rip-Rap**	5.2	11.7	**12.0**	**6.0**
Max Flow/Max Slope	25.00%	**2**	**2**	**2**	0.46	**1.00**	6.00	0.54	13.54	10.13	**Grouted Rip-Rap**	6.3	14.2	**15.0**	**7.0**
Access Road															
Max Flow	8.00%	**3.2**	**2**	**0**	0.53	**1.00**	5.20	0.47	5.40	7.48	**Grouted Rip-Rap**	5.2	11.7	**12.0**	**6.0**

Project Name: *Coffin Butte Landfill*
Client: *Valley Landfills, Inc.*
Job No.: *2015.A021*
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RIP-RAP SIZING[1]

Channel Section	Sideslope (z_1:1)	Sideslope (z_2:1)	Bottom Width (ft)	Normal Depth (ft)	Discharge (Q) (cfs)	Slope (S) (ft/ft)	Median Stone Diameter (inches)	Max Stone Diameter (inches)	Required Rip-Rap Thickness (inches)	
Runoff Channel										
Max Flow/Max Slope	2.0	2.0	2.0	0.13	1.4	0.2500	8.0	12.0	18.0	
Max Flow/Min Slope	2.0	2.0	2.0	0.23	1.4	0.0300	1.5	2.2	3.3	
Runoff Channel										
Max Flow/Max Slope	2.0	2.0	2.0	0.46	13.5	0.2500	25.3	38.0	57.0	<-- Requires Grouted Rip-Rap
Max Flow/Min Slope	2.0	2.0	2.0	0.80	13.5	0.0300	4.2	6.4	9.5	
Access Road										
Max Flow/Max Slope	2.0	2.0	0.0	0.53	5.4	0.0800	9.7	14.5	21.8	

GROUTED RIP-RAP SIZING[2]

Channel Section	Sideslope (z_1:1)	Sideslope (z_2:1)	Discharge (cfs)	Velocity (ft/s)	Slope (ft/ft)	Required Rip-Rap Thickness (inches)	Max Stone Diameter (inches)	Median Stone Diameter (inches)	Minimum Grout Penetration[3] (inches)
Rip-Rap Apron @ Downdrain									
Max Flow/Max Slope	2.0	2.0	64.5	3.63	0.005	11.8	7.9	5.2	6.0
Max Flow/Min Slope	2.0	2.0	40.2	8.20	0.060	12.0	8.0	5.3	6.0
Runoff Channel									
Max Flow/Max Slope	2.0	2.0	1.4	4.91	0.250	11.8	7.9	5.2	6.0
Runon Channel									
Max Flow/Max Slope	2.0	2.0	13.5	10.13	0.250	14.3	9.5	6.3	6.0
Access Road									
Max Flow/Max Slope	2.0	2.0	5.4	7.48	0.080	11.8	7.9	5.2	6.0

Notes:
1) Rip-rap sized using the following equation for v-notch channels [12(64.4QS13/6(z/(z2+1))]2/5 shown on Figure 7.34 and the equation [12(118QS13/6(R/P)]2/5 for trapezoidal channels shown on Figure 7.31 in the "Erosion and.Sediment Control Handbook", which has been modified to account for varying sidedslopes
2) Grouted rip-rap sized using Figure 57 from "Design of Rip-rap Revetment".
3) Grouted rip-rap grout penetration sized using Section 72-5.02 from "Caltrans Standard Specifications".
4) Rip-rap sized using the following equation $d_{(50bend)} = d_{(50straight)} \times F_b$ and Figure 7.32 in the "Erosion and. Sediment Control Handbook".

Sources:
Brown, Scott A., and Eric S. Clyde, (1989), "Design of Rip-rap Revetment, FHWA-IP-89-016, HEC-11", Office of Implementation, HRT-10, Federal Highway Administration.

Department of Transportation, (2002), "Caltrans Standard Specifications", State of California Department of Transportation Publications Distribution Unit.

Goldman, Steven J., et al., (1986), "Erosion and Sediment Control Handbook", McGraw-Hill, Inc.

Project Name: *Coffin Butte Landfill*
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RIP-RAP APRON SIZING[1]

Channel Section	Culvert Size (inches)	Max Discharge (cfs)	Median Stone Diameter (inches)	Max Stone Diameter (inches)	Required Rip-Rap Thickness (inches)	Minimum Length of Apron (feet)	Minimum Width at Outlet (feet)	Minimum Width at Apron End (feet)
Rip-Rap Apron	24.0	12.7	3.0	4.5	6.8	17.0	6.0	19.0

Notes:
1) Rip-rap apron sized using Figure 7.45 or Figure 7.46 in the "Erosion and Sediment Control Handbook".

Sources:

Goldman, Steven J., Jackson, Katherine, and Bursztynsky, Tara A. (1986) “Erosion and Sediment Control Handbook”, McGraw-Hill, Inc. pp 5.1 – 5.33.

Bench (4:1 Max Flow/Min Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.022	
Channel Slope	0.03000	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	0.00	ft
Discharge	2.50	ft^3/s

Results

Normal Depth	0.45	ft
Flow Area	0.60	ft^2
Wetted Perimeter	2.85	ft
Hydraulic Radius	0.21	ft
Top Width	2.69	ft
Critical Depth	0.53	ft
Critical Slope	0.01184	ft/ft
Velocity	4.15	ft/s
Velocity Head	0.27	ft
Specific Energy	0.72	ft
Froude Number	1.55	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.45	ft
Critical Depth	0.53	ft
Channel Slope	0.03000	ft/ft

Bench (4:1 Max Flow/Max Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.022	
Channel Slope	0.08000	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	0.00	ft
Discharge	2.50	ft^3/s

Results

Normal Depth	0.37	ft
Flow Area	0.42	ft^2
Wetted Perimeter	2.37	ft
Hydraulic Radius	0.18	ft
Top Width	2.24	ft
Critical Depth	0.53	ft
Critical Slope	0.01184	ft/ft
Velocity	6.00	ft/s
Velocity Head	0.56	ft
Specific Energy	0.93	ft
Froude Number	2.45	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.37	ft
Critical Depth	0.53	ft
Channel Slope	0.08000	ft/ft

Bench (3.2:1 Max Flow/Min Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.022	
Channel Slope	0.03000	ft/ft
Left Side Slope	3.20	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	0.00	ft
Discharge	2.50	ft^3/s

Results

Normal Depth	0.47	ft
Flow Area	0.59	ft^2
Wetted Perimeter	2.65	ft
Hydraulic Radius	0.22	ft
Top Width	2.47	ft
Critical Depth	0.56	ft
Critical Slope	0.01183	ft/ft
Velocity	4.27	ft/s
Velocity Head	0.28	ft
Specific Energy	0.76	ft
Froude Number	1.55	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.47	ft
Critical Depth	0.56	ft
Channel Slope	0.03000	ft/ft

Bench (3.2:1 Max Flow/Max Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.022	
Channel Slope	0.08000	ft/ft
Left Side Slope	3.20	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	0.00	ft
Discharge	2.50	ft^3/s

Results

Normal Depth	0.39	ft
Flow Area	0.41	ft^2
Wetted Perimeter	2.21	ft
Hydraulic Radius	0.18	ft
Top Width	2.05	ft
Critical Depth	0.56	ft
Critical Slope	0.01183	ft/ft
Velocity	6.17	ft/s
Velocity Head	0.59	ft
Specific Energy	0.99	ft
Froude Number	2.45	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.39	ft
Critical Depth	0.56	ft
Channel Slope	0.08000	ft/ft

Top Deck Berm

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.022	
Channel Slope	0.00500	ft/ft
Left Side Slope	10.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	0.00	ft
Discharge	2.30	ft^3/s

Results

Normal Depth	0.46	ft
Flow Area	1.29	ft^2
Wetted Perimeter	5.71	ft
Hydraulic Radius	0.23	ft
Top Width	5.57	ft
Critical Depth	0.39	ft
Critical Slope	0.01254	ft/ft
Velocity	1.78	ft/s
Velocity Head	0.05	ft
Specific Energy	0.51	ft
Froude Number	0.65	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.46	ft
Critical Depth	0.39	ft
Channel Slope	0.00500	ft/ft

Perimeter Ch (East Side Max Flow/Max Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.022	
Channel Slope	0.06000	ft/ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	0.00	ft
Discharge	40.20	ft^3/s

Results

Normal Depth	1.32	ft
Flow Area	3.46	ft^2
Wetted Perimeter	5.88	ft
Hydraulic Radius	0.59	ft
Top Width	5.26	ft
Critical Depth	1.91	ft
Critical Slope	0.00832	ft/ft
Velocity	11.62	ft/s
Velocity Head	2.10	ft
Specific Energy	3.41	ft
Froude Number	2.53	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.32	ft
Critical Depth	1.91	ft
Channel Slope	0.06000	ft/ft

Perimeter Ch (East Side Max Flow/Min Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.022	
Channel Slope	0.00500	ft/ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	0.00	ft
Discharge	64.50	ft^3/s

Results

Normal Depth	2.50	ft
Flow Area	12.53	ft^2
Wetted Perimeter	11.19	ft
Hydraulic Radius	1.12	ft
Top Width	10.01	ft
Critical Depth	2.30	ft
Critical Slope	0.00781	ft/ft
Velocity	5.15	ft/s
Velocity Head	0.41	ft
Specific Energy	2.91	ft
Froude Number	0.81	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.50	ft
Critical Depth	2.30	ft
Channel Slope	0.00500	ft/ft

Perimeter Ch (East Side Max Flow/Max Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.022	
Channel Slope	0.06000	ft/ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	0.00	ft
Discharge	40.20	ft^3/s

Results

Normal Depth	1.32	ft
Flow Area	3.46	ft^2
Wetted Perimeter	5.88	ft
Hydraulic Radius	0.59	ft
Top Width	5.26	ft
Critical Depth	1.91	ft
Critical Slope	0.00832	ft/ft
Velocity	11.62	ft/s
Velocity Head	2.10	ft
Specific Energy	3.41	ft
Froude Number	2.53	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.32	ft
Critical Depth	1.91	ft
Channel Slope	0.06000	ft/ft

Perimeter Ch (East Side Apron Max Flow)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.00500	ft/ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	0.00	ft
Discharge	64.50	ft^3/s

Results

Normal Depth	2.98	ft
Flow Area	17.75	ft^2
Wetted Perimeter	13.32	ft
Hydraulic Radius	1.33	ft
Top Width	11.92	ft
Critical Depth	2.30	ft
Critical Slope	0.01977	ft/ft
Velocity	3.63	ft/s
Velocity Head	0.21	ft
Specific Energy	3.18	ft
Froude Number	0.53	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.98	ft
Critical Depth	2.30	ft
Channel Slope	0.00500	ft/ft

Perimeter Ch (East Side Apron Max Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.06000	ft/ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	0.00	ft
Discharge	40.20	ft^3/s

Results

Normal Depth	1.57	ft
Flow Area	4.90	ft^2
Wetted Perimeter	7.00	ft
Hydraulic Radius	0.70	ft
Top Width	6.26	ft
Critical Depth	1.91	ft
Critical Slope	0.02105	ft/ft
Velocity	8.20	ft/s
Velocity Head	1.05	ft
Specific Energy	2.61	ft
Froude Number	1.63	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.57	ft
Critical Depth	1.91	ft
Channel Slope	0.06000	ft/ft

Perimeter Ch (West Side Max Flow/Min Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.022	
Channel Slope	0.00500	ft/ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	0.00	ft
Discharge	59.00	ft^3/s

Results

Normal Depth	2.42	ft
Flow Area	11.72	ft^2
Wetted Perimeter	10.83	ft
Hydraulic Radius	1.08	ft
Top Width	9.68	ft
Critical Depth	2.22	ft
Critical Slope	0.00790	ft/ft
Velocity	5.03	ft/s
Velocity Head	0.39	ft
Specific Energy	2.81	ft
Froude Number	0.81	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.42	ft
Critical Depth	2.22	ft
Channel Slope	0.00500	ft/ft

Perimeter Ch (West Side Apron)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.00500	ft/ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	0.00	ft
Discharge	59.00	ft^3/s

Results

Normal Depth	2.88	ft
Flow Area	16.60	ft^2
Wetted Perimeter	12.88	ft
Hydraulic Radius	1.29	ft
Top Width	11.52	ft
Critical Depth	2.22	ft
Critical Slope	0.02000	ft/ft
Velocity	3.55	ft/s
Velocity Head	0.20	ft
Specific Energy	3.08	ft
Froude Number	0.52	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.88	ft
Critical Depth	2.22	ft
Channel Slope	0.00500	ft/ft

Runoff Ch (Max Flow/Max Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.25000	ft/ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	1.40	ft^3/s

Results

Normal Depth	0.13	ft
Flow Area	0.29	ft^2
Wetted Perimeter	2.57	ft
Hydraulic Radius	0.11	ft
Top Width	2.51	ft
Critical Depth	0.23	ft
Critical Slope	0.03243	ft/ft
Velocity	4.91	ft/s
Velocity Head	0.37	ft
Specific Energy	0.50	ft
Froude Number	2.56	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.13	ft
Critical Depth	0.23	ft
Channel Slope	0.25000	ft/ft

Runoff Ch (Max Flow/Min Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.03000	ft/ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	1.40	ft^3/s

Results

Normal Depth	0.23	ft
Flow Area	0.58	ft^2
Wetted Perimeter	3.05	ft
Hydraulic Radius	0.19	ft
Top Width	2.94	ft
Critical Depth	0.23	ft
Critical Slope	0.03243	ft/ft
Velocity	2.43	ft/s
Velocity Head	0.09	ft
Specific Energy	0.33	ft
Froude Number	0.96	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.23	ft
Critical Depth	0.23	ft
Channel Slope	0.03000	ft/ft

Run-on Ch (Max Flow/Max Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.25000	ft/ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	13.54	ft^3/s

Results

Normal Depth	0.46	ft
Flow Area	1.34	ft^2
Wetted Perimeter	4.05	ft
Hydraulic Radius	0.33	ft
Top Width	3.83	ft
Critical Depth	0.85	ft
Critical Slope	0.02353	ft/ft
Velocity	10.13	ft/s
Velocity Head	1.60	ft
Specific Energy	2.05	ft
Froude Number	3.02	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.46	ft
Critical Depth	0.85	ft
Channel Slope	0.25000	ft/ft

Run-on Ch (Max Flow/Min Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.03000	ft/ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	13.54	ft^3/s

Results

Normal Depth	0.80	ft
Flow Area	2.87	ft^2
Wetted Perimeter	5.57	ft
Hydraulic Radius	0.51	ft
Top Width	5.19	ft
Critical Depth	0.85	ft
Critical Slope	0.02354	ft/ft
Velocity	4.73	ft/s
Velocity Head	0.35	ft
Specific Energy	1.14	ft
Froude Number	1.12	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.80	ft
Critical Depth	0.85	ft
Channel Slope	0.03000	ft/ft

Access Rd

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.022	
Channel Slope	0.08000	ft/ft
Left Side Slope	3.20	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Bottom Width	0.00	ft
Discharge	5.40	ft^3/s

Results

Normal Depth	0.53	ft
Flow Area	0.72	ft^2
Wetted Perimeter	2.94	ft
Hydraulic Radius	0.25	ft
Top Width	2.74	ft
Critical Depth	0.77	ft
Critical Slope	0.01068	ft/ft
Velocity	7.48	ft/s
Velocity Head	0.87	ft
Specific Energy	1.40	ft
Froude Number	2.57	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.53	ft
Critical Depth	0.77	ft
Channel Slope	0.08000	ft/ft

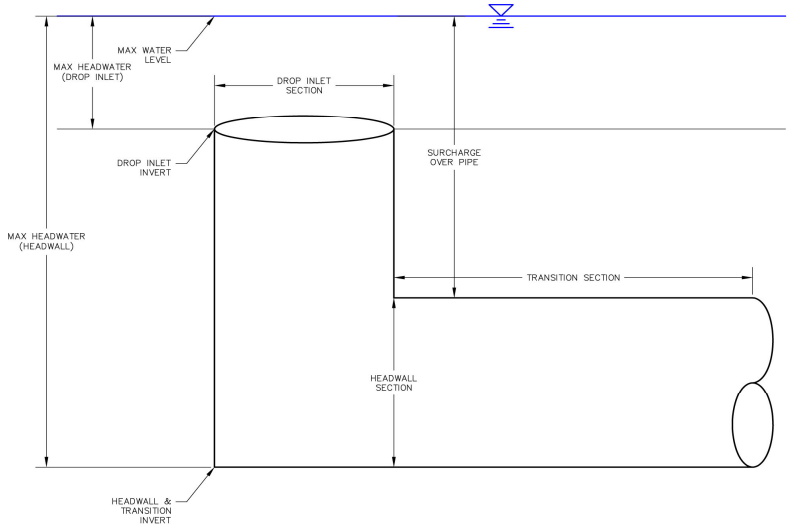
APPENDIX E

CULVERT AND DOWNDRAIN DESIGN

HYDRAULIC DRAINAGE STRUCTURES

Project Name: *Coffin Butte Landfill*
Client: *Valley Landfills, Inc.*
Job No.: *2015.A021*
Date: *03/26/2015*
Calculated By: *BGA*
Checked By: *NC*

Culvert Sections	Entrance Type	Culvert Type	Culvert Size (inches)	Entrance Invert (feet)	Max Headwater (feet)	Surcharge Over Pipe (feet)	Exit Invert (feet)	Max Tailwater (feet)	Culvert Slope (ft/ft)	Flow Into Culvert (cfs)	% of Culvert Capacity	Culvert Max Capacity (cfs)
Downdrains Max Flow												
Top Deck Berm	Projecting	HDPE	**18**	0.00	2.00	0.50	N/A	2.00	0.100	2.30	23%	9.95
Across Bench	Headwall	HDPE	**18**	0.00	3.00	1.50	N/A	N/A	0.020	13.70	96%	14.27
Across Bench	Transition	HDPE	**18**	0.00	2.00	0.50	N/A	N/A	0.020	13.70	85%	16.09
Down Slope	Transition	HDPE	**18**	N/A	N/A	N/A	N/A	N/A	0.333	13.70	21%	65.69
Bench Inlet	Drop Inlet	HDPE	**18**	0.00	N/A	1.00	N/A	N/A	0.020	5.40	31%	17.20
Culvert #1 24" Pipe												
Across Bench	Headwall	HDPE	**24**	0.00	5.00	3.00	N/A	N/A	0.020	29.90	86%	34.60
Across Bench	Transition	HDPE	**24**	0.00	2.00	0.00	N/A	N/A	0.020	29.90	86%	34.70
Down Slope	Transition	HDPE	**24**	N/A	N/A	N/A	N/A	N/A	0.250	29.90	24%	122.53
Bench Inlet	Drop Inlet	HDPE	**24**	0.00	N/A	1.00	N/A	N/A	0.020	5.40	23%	23.00
Culvert #1 36" Pipe												
Across Road	Headwall	HDPE	**36**	0.00	5.00	2.00	N/A	N/A	0.020	36.20	52%	69.34
Across Road	Transition	HDPE	**36**	0.00	3.00	0.00	N/A	N/A	0.020	36.20	35%	102.18
Culvert #2												
Across Road	Headwall	HDPE	**48**	0.00	5.50	1.50	N/A	N/A	0.020	79.70	76%	105.50
Across Road	Transition	HDPE	**48**	0.00	4.00	0.00	N/A	N/A	0.020	79.70	36%	220.06
Bench Inlet	Drop Inlet	HDPE	**48**	0.00	N/A	1.50	N/A	N/A	0.020	79.70	94%	84.50



Culvert Calculator Report
TOP DECK BERM INLET

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	102.00	ft	Headwater Depth/Height	1.33	
Computed Headwater Eleva	102.00	ft	Discharge	9.95	cfs
Inlet Control HW Elev.	101.97	ft	Tailwater Elevation	100.00	ft
Outlet Control HW Elev.	102.00	ft	Control Type	Entrance Control	

Grades					
Upstream Invert	100.00	ft	Downstream Invert	90.00	ft
Length	100.00	ft	Constructed Slope	0.100000	ft/ft

Hydraulic Profile					
Profile	CompositePressureProfileS1S2		Depth, Downstream	10.00	ft
Slope Type	N/A		Normal Depth	0.54	ft
Flow Regime	N/A		Critical Depth	1.22	ft
Velocity Downstream	5.63	ft/s	Critical Slope	0.007799	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.012	
Section Material	Corrugated HDPE (Smooth Interior)		Span	1.50	ft
Section Size	18 inch		Rise	1.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	102.00	ft	Upstream Velocity Head	0.65	ft
Ke	0.20		Entrance Loss	0.13	ft

Inlet Control Properties					
Inlet Control HW Elev.	101.97	ft	Flow Control	N/A	
Inlet Type	Groove end projecting		Area Full	1.8	ft²
K	0.00450		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	3	
C	0.03170		Equation Form	1	
Y	0.69000				

Culvert Calculator Report
Downdrain - Across Bench (Headwall Section)

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	103.00	ft	Headwater Depth/Height	2.00	
Computed Headwater Eleva	103.00	ft	Discharge	14.27	cfs
Inlet Control HW Elev.	103.00	ft	Tailwater Elevation	100.00	ft
Outlet Control HW Elev.	102.79	ft	Control Type	Inlet Control	

Grades					
Upstream Invert	100.00	ft	Downstream Invert	98.00	ft
Length	100.00	ft	Constructed Slope	0.020000	ft/ft

Hydraulic Profile					
Profile	PressureProfile		Depth, Downstream	1.11	ft
Slope Type	N/A		Normal Depth	1.10	ft
Flow Regime	N/A		Critical Depth	1.39	ft
Velocity Downstream	10.17	ft/s	Critical Slope	0.013626	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.012	
Section Material	HDPE (Smooth Interior)		Span	1.50	ft
Section Size	18 inch		Rise	1.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	102.79	ft	Upstream Velocity Head	1.09	ft
Ke	0.20		Entrance Loss	0.20	ft

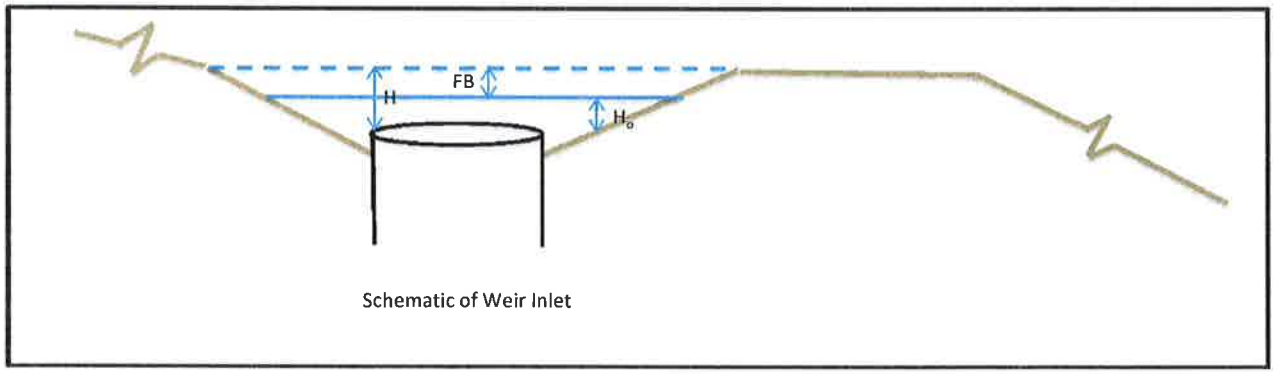
Inlet Control Properties					
Inlet Control HW Elev.	103.00	ft	Flow Control	Submerged	
Inlet Type	Groove end w/headwall		Area Full	1.8	ft²
K	0.00180		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	2	
C	0.02920		Equation Form	1	
Y	0.74000				

Project Name: *Coffin Butte Landfill*
Client: *Valley Landfills, Inc.*
Job No.: *2015.A021*
Date: *03/26/2015*
Calculated By: *BGA*

Bench Downdrain Inlet

Equations:
Circular Weir $Q = C_o \pi D H^{1.5}$

Q_d = Discharge	5.4	(cfs)	*25 Year - 24 Hour Peak Runoff from TR-55*
FB = Freeboard	-	(ft)	
H_o = Crest Height	1.00	(ft)	
D_o = Initial Diameter of Drop Inlet	1.50	(ft)	
H_o/R_s	0.67		
C_s = Weir Coefficient	3.66	($ft^{0.5}/s$)	*Estimate from Design of Small Dams*
Q_p = Weir Discharge Capacity	**17.2**	(cfs)	
H = Total Height of Water (H_o + Freeboard)	**1.00**	(ft)	
D = Design Drop Inlet Diameter	**1.50**	(ft)	



Schematic of Weir Inlet

Source:
United States Department of the Interior Bureau of Reclamation, (1987), "Design of Small Dams", United States Department of the Interior Bureau of Reclamation, pp.407-410 .

Downdrain - Across Bench (Max Flow)

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.02000	ft/ft
Normal Depth	1.50	ft
Diameter	1.50	ft

Results

Discharge	16.09	ft^3/s
Flow Area	1.77	ft^2
Wetted Perimeter	4.71	ft
Hydraulic Radius	0.38	ft
Top Width	0.00	ft
Critical Depth	1.43	ft
Percent Full	100.0	%
Critical Slope	0.01733	ft/ft
Velocity	9.11	ft/s
Velocity Head	1.29	ft
Specific Energy	2.79	ft
Froude Number	0.00	
Maximum Discharge	17.31	ft^3/s
Discharge Full	16.09	ft^3/s
Slope Full	0.02000	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

Downdrain - Across Bench (Max Flow)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.50	ft
Critical Depth	1.43	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.01733	ft/ft

Downdrain - Down Slope (Max Flow)

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.33330	ft/ft
Normal Depth	1.50	ft
Diameter	1.50	ft

Results

Discharge	65.69	ft^3/s
Flow Area	1.77	ft^2
Wetted Perimeter	4.71	ft
Hydraulic Radius	0.38	ft
Top Width	0.00	ft
Critical Depth	1.50	ft
Percent Full	100.0	%
Critical Slope	0.32784	ft/ft
Velocity	37.18	ft/s
Velocity Head	21.48	ft
Specific Energy	22.98	ft
Froude Number	0.00	
Maximum Discharge	70.67	ft^3/s
Discharge Full	65.69	ft^3/s
Slope Full	0.33330	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

Downdrain - Down Slope (Max Flow)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.50	ft
Critical Depth	1.50	ft
Channel Slope	0.33330	ft/ft
Critical Slope	0.32784	ft/ft

Culvert Calculator Report
Culvert #1 - Across Bench (Headwall Section - 24" Pipe)

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	105.00	ft	Headwater Depth/Height	2.50	
Computed Headwater Elev	105.00	ft	Discharge	34.59	cfs
Inlet Control HW Elev.	105.00	ft	Tailwater Elevation	100.00	ft
Outlet Control HW Elev.	104.24	ft	Control Type	Inlet Control	

Grades					
Upstream Invert	100.00	ft	Downstream Invert	98.00	ft
Length	100.00	ft	Constructed Slope	0.020000	ft/ft

Hydraulic Profile					
Profile	CompositeS1S2		Depth, Downstream	1.68	ft
Slope Type	Steep		Normal Depth	1.64	ft
Flow Regime	N/A		Critical Depth	1.92	ft
Velocity Downstream	12.30	ft/s	Critical Slope	0.017338	ft/ft

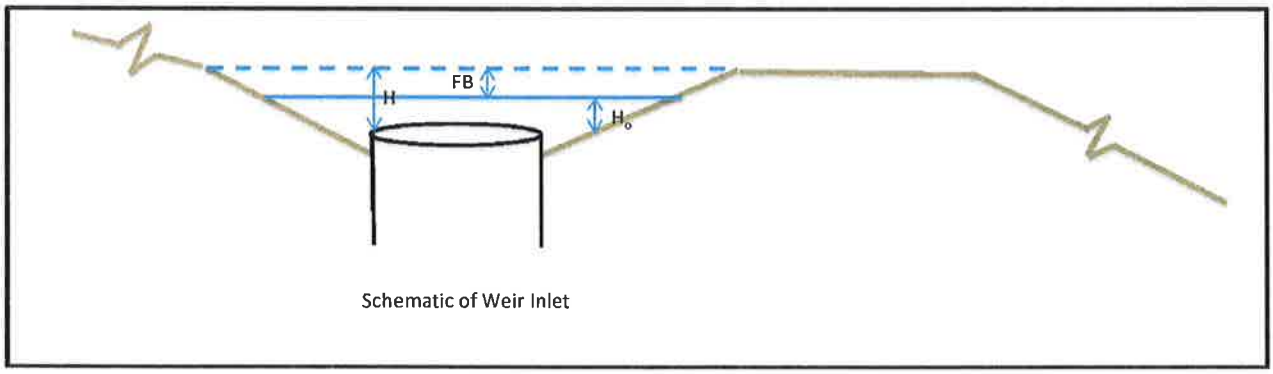
Section					
Section Shape	Circular		Mannings Coefficient	0.012	
Section Material	HDPE (Smooth Interior)		Span	2.00	ft
Section Size	24 inch		Rise	2.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	104.24	ft	Upstream Velocity Head	1.94	ft
Ke	0.20		Entrance Loss	0.39	ft

Inlet Control Properties					
Inlet Control HW Elev.	105.00	ft	Flow Control	Submerged	
Inlet Type	Groove end w/headwall		Area Full	3.1	ft²
K	0.00180		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	2	
C	0.02920		Equation Form	1	
Y	0.74000				

Project Name: *Coffin Butte Landfill*
Client: *Valley Landfills, Inc.*
Job No.: *2015.A021*
Date: *03/26/2015*
Calculated By: *BGA*

Culvert #1 Inlet			
Equations:			
Circular Weir	$Q = C_o \pi D H^{1.5}$		
Q_d = Discharge	5.4	(cfs)	*25 Year - 24 Hour Peak Runoff from TR-55*
FB = Freeboard	-	(ft)	
H_o = Crest Height	1.00	(ft)	
D_o = Initial Diameter of Drop Inlet	2.00	(ft)	
H_o/R_s	0.50		
C_s = Weir Coefficient	3.66	($ft^{0.5}/s$)	*Estimate from Design of Small Dams*
Q_p = Weir Discharge Capacity	**23.0**	(cfs)	
H = Total Height of Water (H_o + Freeboard)	**1.00**	(ft)	
D = Design Drop Inlet Diameter	**2.00**	(ft)	



Schematic of Weir Inlet

Source:
United States Department of the Interior Bureau of Reclamation, (1987), "Design of Small Dams", United States Department of the Interior Bureau of Reclamation, pp.407-410 .

Culvert #1 - Across Bench (Max Flow - 24" Pipe)

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.02000	ft/ft
Normal Depth	2.00	ft
Diameter	2.00	ft

Results

Discharge	34.66	ft^3/s
Flow Area	3.14	ft^2
Wetted Perimeter	6.28	ft
Hydraulic Radius	0.50	ft
Top Width	0.00	ft
Critical Depth	1.92	ft
Percent Full	100.0	%
Critical Slope	0.01741	ft/ft
Velocity	11.03	ft/s
Velocity Head	1.89	ft
Specific Energy	3.89	ft
Froude Number	0.00	
Maximum Discharge	37.28	ft^3/s
Discharge Full	34.66	ft^3/s
Slope Full	0.02000	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

Culvert #1 - Across Bench (Max Flow - 24" Pipe)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.00	ft
Critical Depth	1.92	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.01741	ft/ft

Culvert #1 - Down Slope (Max Flow - 24" Pipe)

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.25000	ft/ft
Normal Depth	2.00	ft
Diameter	2.00	ft

Results

Discharge	122.53	ft^3/s
Flow Area	3.14	ft^2
Wetted Perimeter	6.28	ft
Hydraulic Radius	0.50	ft
Top Width	0.00	ft
Critical Depth	2.00	ft
Percent Full	100.0	%
Critical Slope	0.24649	ft/ft
Velocity	39.00	ft/s
Velocity Head	23.64	ft
Specific Energy	25.64	ft
Froude Number	0.00	
Maximum Discharge	131.81	ft^3/s
Discharge Full	122.53	ft^3/s
Slope Full	0.25000	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

Culvert #1 - Down Slope (Max Flow - 24" Pipe)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.00	ft
Critical Depth	2.00	ft
Channel Slope	0.25000	ft/ft
Critical Slope	0.24649	ft/ft

Culvert Calculator Report
Culvert #1 - Across Bench (Headwall Section - 36" Pipe)

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	105.00	ft	Headwater Depth/Height	1.67	
Computed Headwater Elev	105.00	ft	Discharge	69.34	cfs
Inlet Control HW Elev.	105.00	ft	Tailwater Elevation	100.00	ft
Outlet Control HW Elev.	104.70	ft	Control Type	Inlet Control	

Grades					
Upstream Invert	100.00	ft	Downstream Invert	98.00	ft
Length	100.00	ft	Constructed Slope	0.020000	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	1.96	ft
Slope Type	Steep		Normal Depth	1.81	ft
Flow Regime	Supercritical		Critical Depth	2.65	ft
Velocity Downstream	14.14	ft/s	Critical Slope	0.008257	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.012	
Section Material	HDPE (Smooth Interior)		Span	3.00	ft
Section Size	36 inch		Rise	3.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	104.70	ft	Upstream Velocity Head	1.71	ft
Ke	0.20		Entrance Loss	0.34	ft

Inlet Control Properties					
Inlet Control HW Elev.	105.00	ft	Flow Control	Submerged	
Inlet Type	Groove end w/headwall		Area Full	7.1	ft²
K	0.00180		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	2	
C	0.02920		Equation Form	1	
Y	0.74000				

Culvert #1 - Across Bench (Max Flow - 36" Pipe)

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.02000	ft/ft
Normal Depth	3.00	ft
Diameter	3.00	ft

Results

Discharge	102.18	ft^3/s
Flow Area	7.07	ft^2
Wetted Perimeter	9.42	ft
Hydraulic Radius	0.75	ft
Top Width	0.00	ft
Critical Depth	2.90	ft
Percent Full	100.0	%
Critical Slope	0.01756	ft/ft
Velocity	14.46	ft/s
Velocity Head	3.25	ft
Specific Energy	6.25	ft
Froude Number	0.00	
Maximum Discharge	109.92	ft^3/s
Discharge Full	102.18	ft^3/s
Slope Full	0.02000	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

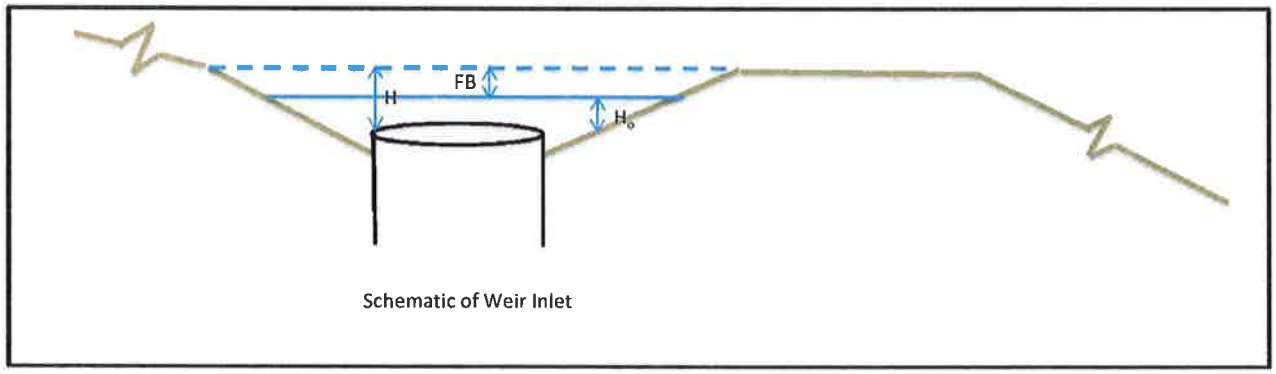
Culvert #1 - Across Bench (Max Flow - 36" Pipe)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	3.00	ft
Critical Depth	2.90	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.01756	ft/ft

Project Name: *Coffin Butte Landfill*
Client: *Valley Landfills, Inc.*
Job No.: *2015.A021*
Date: *03/26/2015*
Calculated By: *BGA*

Culvert #2 Inlet			
Equations:			
Circular Weir	$Q = C_o \pi D H^{1.5}$		
Q_d = Discharge	79.7	(cfs)	*25 Year - 24 Hour Peak Runoff from TR-55*
FB = Freeboard	-	(ft)	
H_o = Crest Height	1.50	(ft)	
D_o = Initial Diameter of Drop Inlet	4.00	(ft)	
H_o/R_s	0.38		
C_s = Weir Coefficient	3.66	($ft^{0.5}/s$)	*Estimate from Design of Small Dams*
Q_p = Weir Discharge Capacity	**84.5**	(cfs)	
H = Total Height of Water (H_o + Freeboard)	**1.50**	(ft)	
D = Design Drop Inlet Diameter	**4.00**	(ft)	



Schematic of Weir Inlet

Source:
United States Department of the Interior Bureau of Reclamation, (1987), "Design of Small Dams", United States Department of the Interior Bureau of Reclamation, pp.407-410 .

Culvert Calculator Report
Culvert #2 - Across Road (Headwall Section - 48" Pipe)

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	105.00	ft	Headwater Depth/Height	1.25	
Computed Headwater Elev	105.00	ft	Discharge	105.54	cfs
Inlet Control HW Elev.	104.98	ft	Tailwater Elevation	100.00	ft
Outlet Control HW Elev.	105.00	ft	Control Type	Entrance Control	

Grades					
Upstream Invert	100.00	ft	Downstream Invert	98.00	ft
Length	100.00	ft	Constructed Slope	0.020000	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	2.20	ft
Slope Type	Steep		Normal Depth	1.95	ft
Flow Regime	Supercritical		Critical Depth	3.11	ft
Velocity Downstream	14.93	ft/s	Critical Slope	0.005105	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.012	
Section Material	Corrugated HDPE (Smooth Interior)		Span	4.00	ft
Section Size	48 inch		Rise	4.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	105.00	ft	Upstream Velocity Head	1.58	ft
Ke	0.20		Entrance Loss	0.32	ft

Inlet Control Properties					
Inlet Control HW Elev.	104.98	ft	Flow Control	Submerged	
Inlet Type	Groove end w/headwall		Area Full	12.6	ft²
K	0.00180		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	2	
C	0.02920		Equation Form	1	
Y	0.74000				

Culvert #2 - Across Road (Max Flow - 48" Pipe)

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.02000	ft/ft
Normal Depth	4.00	ft
Diameter	4.00	ft

Results

Discharge	220.06	ft^3/s
Flow Area	12.57	ft^2
Wetted Perimeter	12.57	ft
Hydraulic Radius	1.00	ft
Top Width	0.00	ft
Critical Depth	3.89	ft
Percent Full	100.0	%
Critical Slope	0.01769	ft/ft
Velocity	17.51	ft/s
Velocity Head	4.77	ft
Specific Energy	8.77	ft
Froude Number	0.00	
Maximum Discharge	236.72	ft^3/s
Discharge Full	220.06	ft^3/s
Slope Full	0.02000	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

Culvert #2 - Across Road (Max Flow - 48" Pipe)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	4.00	ft
Critical Depth	3.89	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.01769	ft/ft

APPENDIX F

WEST SIDE STORMWATER POND DESIGN CALCULATIONS

PRE-DEVELOPMENT HYDROCAD RESULTS

Summary for Subcatchment 1S: Pre-Development

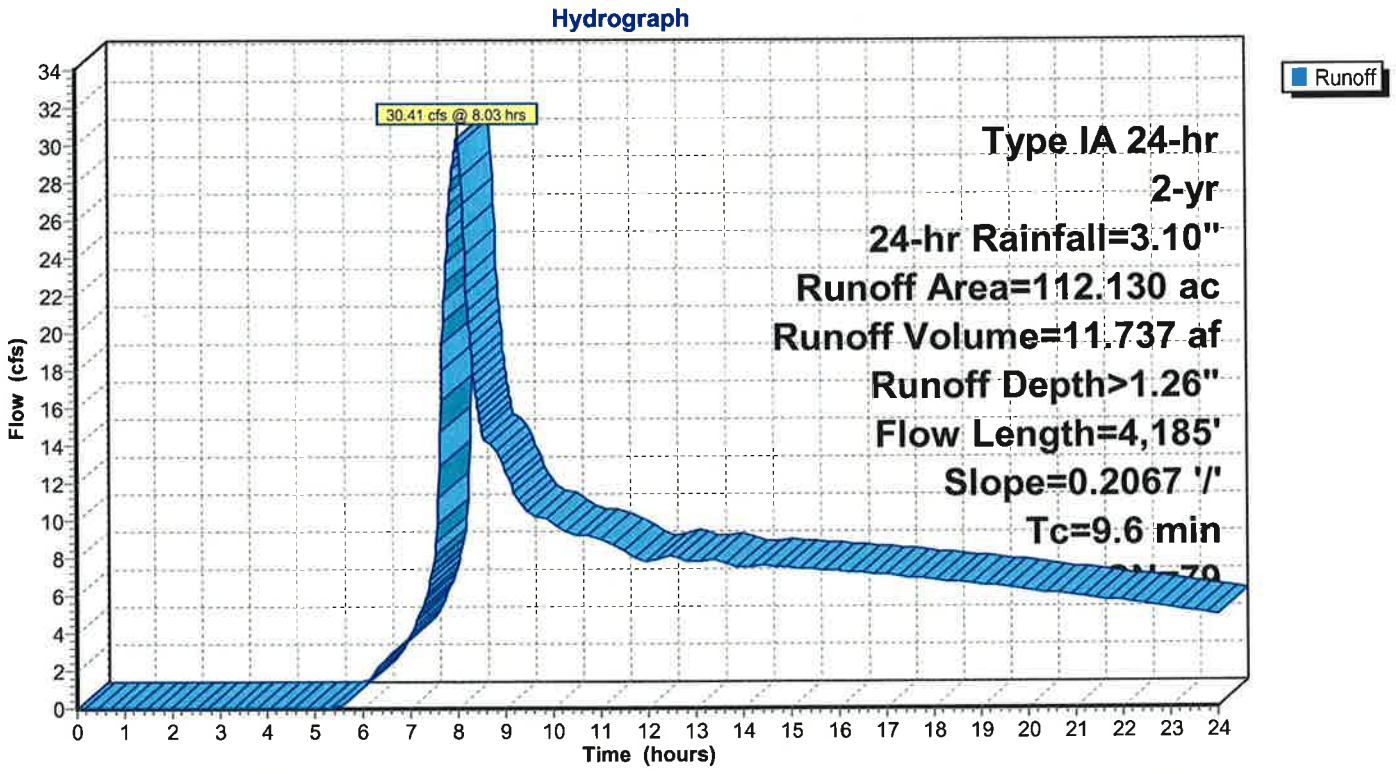
Runoff = 30.41 cfs @ 8.03 hrs, Volume= 11.737 af, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2-yr, 24-hr Rainfall=3.10"

Area (ac)	CN	Description
112.130	79	<50% Grass cover, Poor, HSG B
112.130		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	100	0.2067	0.43		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.2	100	0.2067	7.32		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
5.5	3,985		12.00		**Direct Entry, Channel**
9.6	4,185	Total			

Subcatchment 1S: Pre-Development



Summary for Subcatchment 1S: Pre-Development

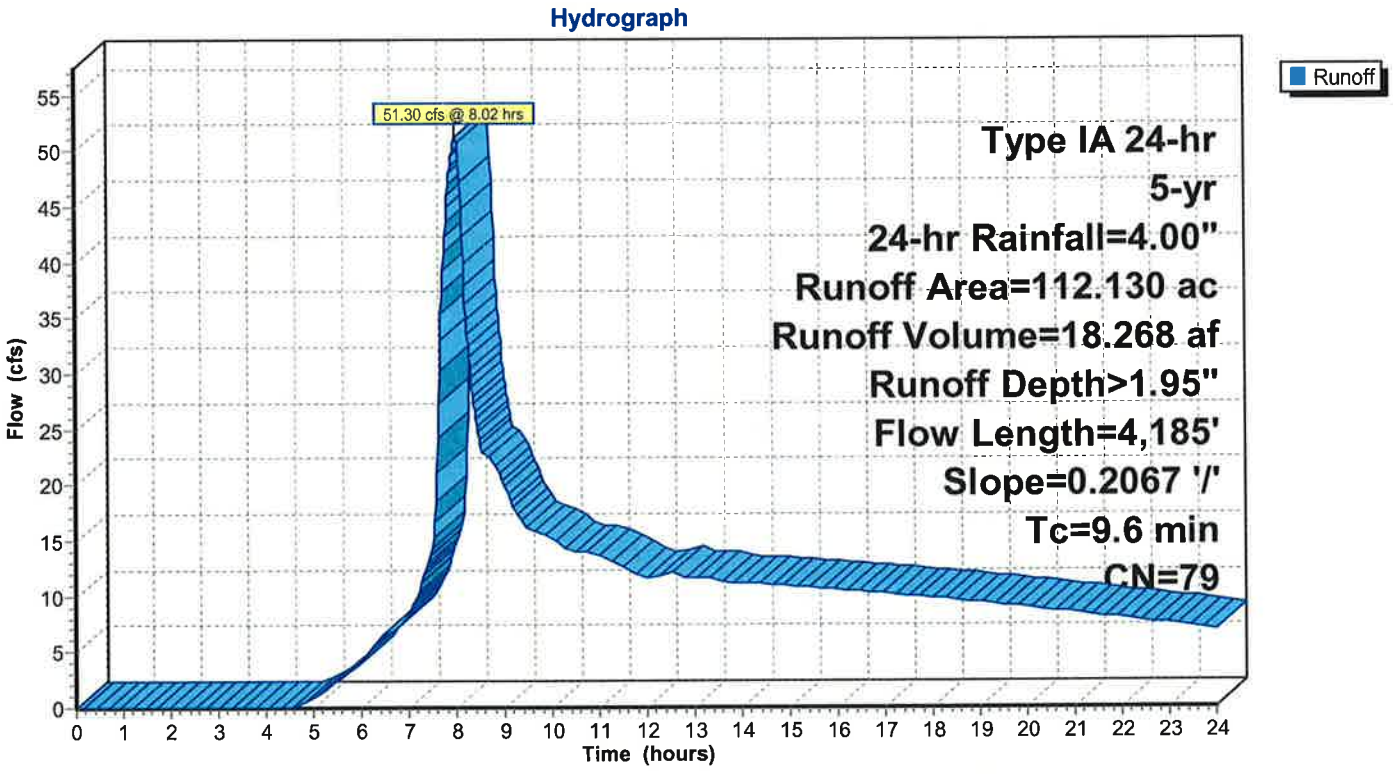
Runoff = 51.30 cfs @ 8.02 hrs, Volume= 18.268 af, Depth> 1.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 5-yr, 24-hr Rainfall=4.00"

Area (ac)	CN	Description
112.130	79	<50% Grass cover, Poor, HSG B
112.130		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	100	0.2067	0.43		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.2	100	0.2067	7.32		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
5.5	3,985		12.00		**Direct Entry, Channel**
9.6	4,185	Total			

Subcatchment 1S: Pre-Development



Summary for Subcatchment 1S: Pre-Development

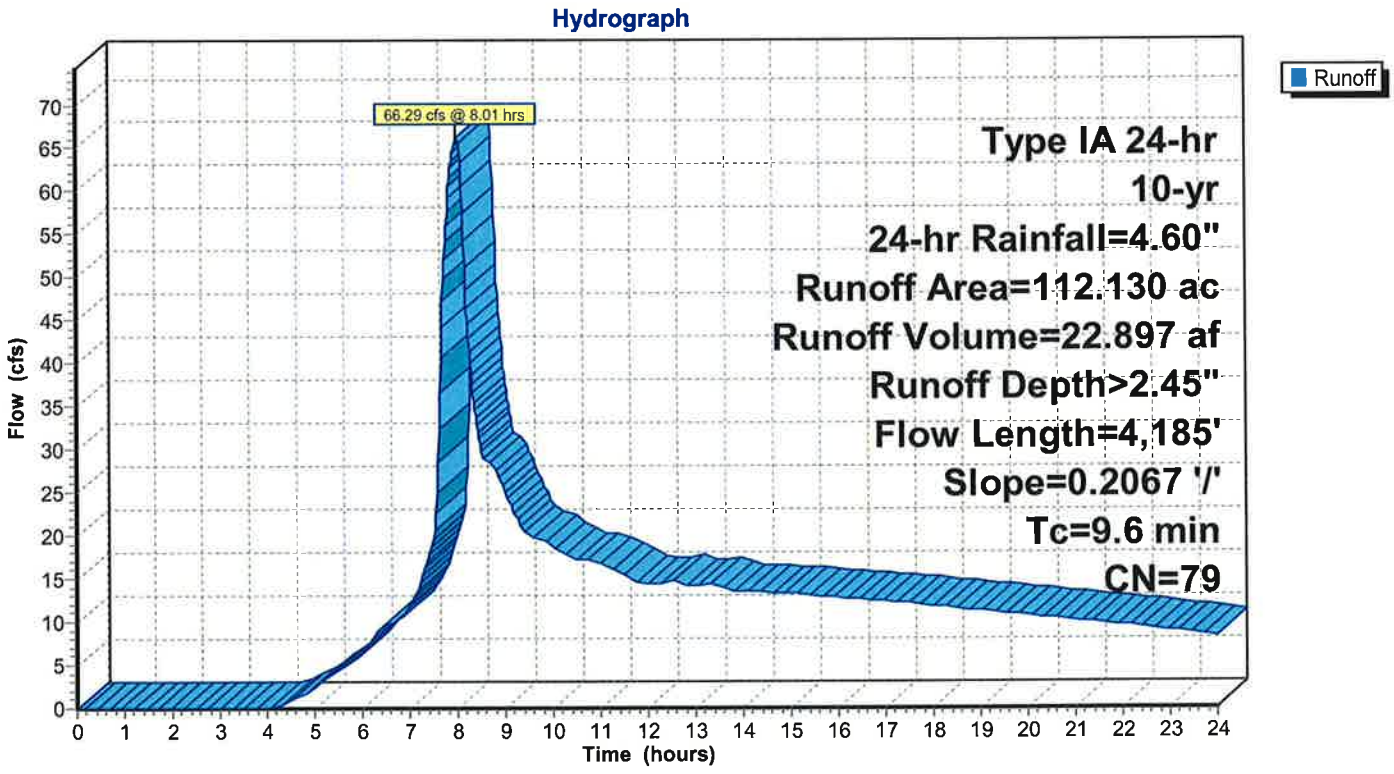
Runoff = 66.29 cfs @ 8.01 hrs, Volume= 22.897 af, Depth> 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10-yr, 24-hr Rainfall=4.60"

Area (ac)	CN	Description
112.130	79	<50% Grass cover, Poor, HSG B
112.130		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	100	0.2067	0.43		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.2	100	0.2067	7.32		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
5.5	3,985		12.00		**Direct Entry, Channel**
9.6	4,185	Total			

Subcatchment 1S: Pre-Development



Summary for Subcatchment 1S: Pre-Development

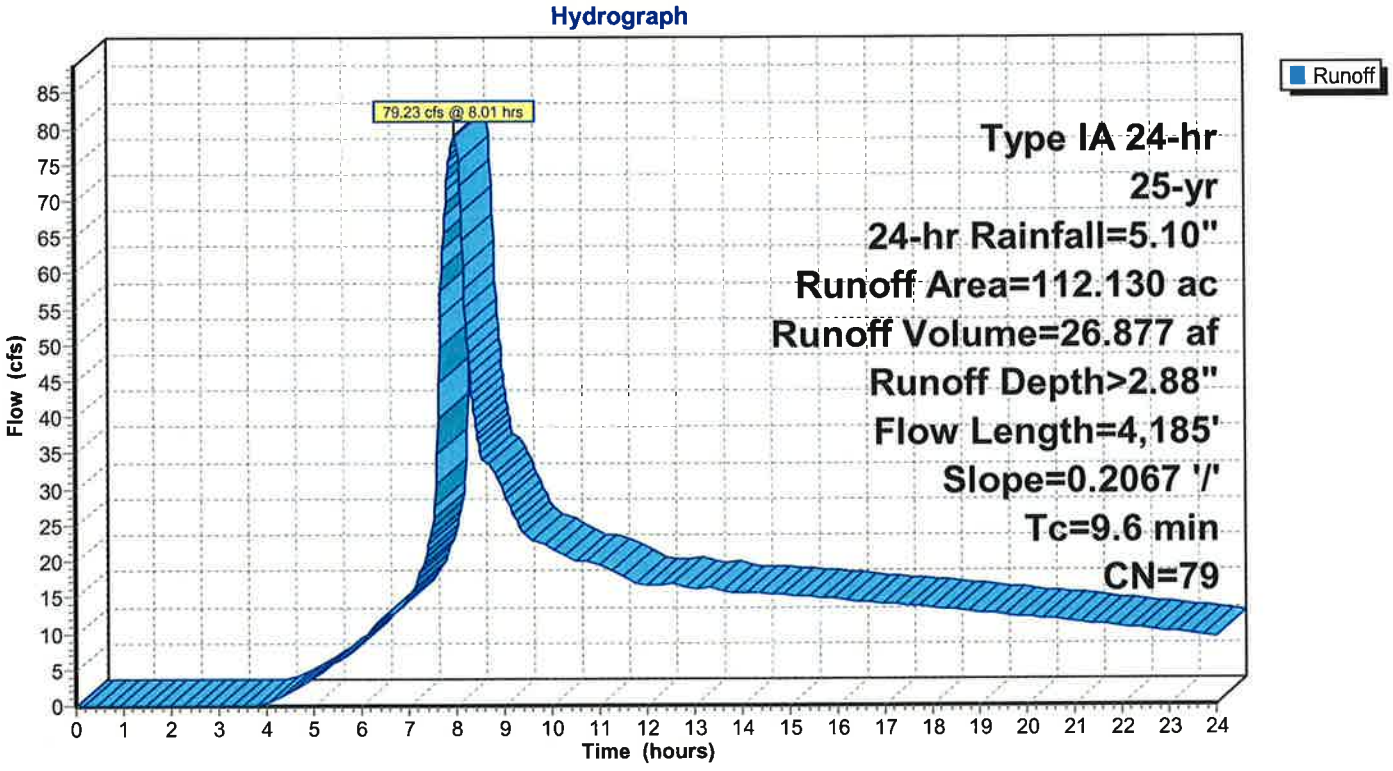
Runoff = 79.23 cfs @ 8.01 hrs, Volume= 26.877 af, Depth> 2.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25-yr, 24-hr Rainfall=5.10"

Area (ac)	CN	Description
112.130	79	<50% Grass cover, Poor, HSG B
112.130		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	100	0.2067	0.43		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.2	100	0.2067	7.32		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
5.5	3,985		12.00		**Direct Entry, Channel**
9.6	4,185	Total			

Subcatchment 1S: Pre-Development



POST-DEVELOPMENT HYDROCAD RESULTS

Summary for Pond 11P: Southwest Pond

Inflow Area = 93.040 ac, 0.00% Impervious, Inflow Depth > 0.53" for 2-yr, 24-hr event
Inflow = 11.47 cfs @ 8.01 hrs, Volume= 4.071 af
Outflow = 6.34 cfs @ 8.38 hrs, Volume= 3.955 af, Atten= 45%, Lag= 22.1 min
Primary = 6.34 cfs @ 8.38 hrs, Volume= 3.955 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Peak Elev= 270.02' @ 8.38 hrs Surf.Area= 0.000 ac Storage= 0.443 af

Plug-Flow detention time= 49.8 min calculated for 3.952 af (97% of inflow)
Center-of-Mass det. time= 31.8 min (829.2 - 797.3)

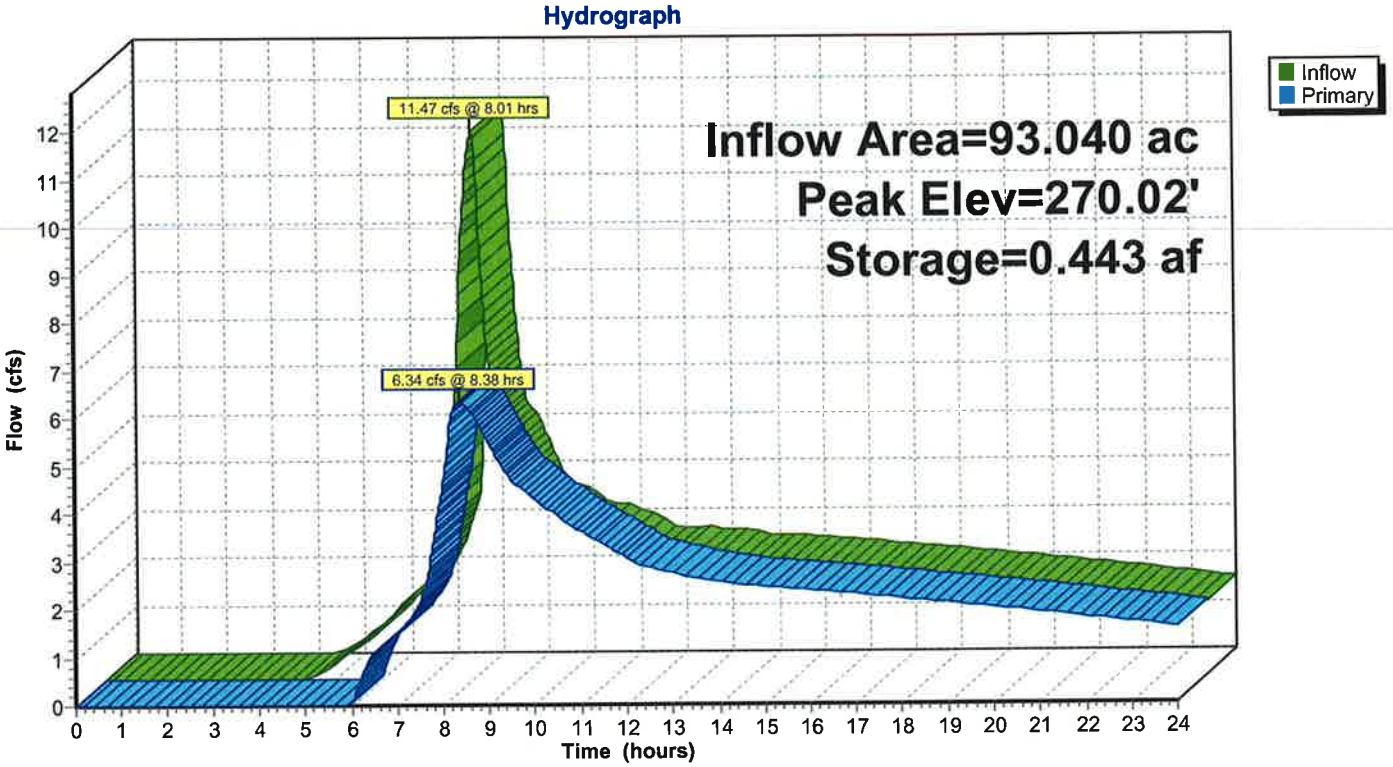
Volume	Invert	Avail.Storage	Storage Description
#1	266.50'	9.426 af	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (acre-feet)
266.50	0.000
268.00	0.085
270.00	0.438
272.00	1.103
274.00	2.121
276.00	3.510
278.00	5.214
280.00	7.179
280.50	7.713
282.00	9.426

Device	Routing	Invert	Outlet Devices
#1	Primary	267.50'	**36.0" Round Culvert** L= 104.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 267.50' / 266.50' S= 0.0096 '/' Cc= 0.900 n= 0.015 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	267.50'	**12.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	269.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#4	Device 1	272.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#5	Device 1	278.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=6.34 cfs @ 8.38 hrs HW=270.02' TW=267.00' (Fixed TW Elev= 267.00')
↑—**1=Culvert** (Passes 6.34 cfs of 31.28 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 5.37 cfs @ 6.84 fps)
—**3=Orifice/Grate** (Orifice Controls 0.97 cfs @ 2.48 fps)
—**4=Orifice/Grate** (Controls 0.00 cfs)
—**5=Orifice/Grate** (Controls 0.00 cfs)

Pond 11P: Southwest Pond



Summary for Pond 11P: Southwest Pond

Inflow Area = 93.040 ac, 0.00% Impervious, Inflow Depth > 0.67" for 2-yr, 24-hr event
Inflow = 14.59 cfs @ 8.01 hrs, Volume= 5.182 af
Outflow = 7.40 cfs @ 8.45 hrs, Volume= 5.045 af, Atten= 49%, Lag= 26.1 min
Primary = 7.40 cfs @ 8.45 hrs, Volume= 5.045 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Peak Elev= 270.41' @ 8.45 hrs Surf.Area= 0.000 ac Storage= 0.574 af

Plug-Flow detention time= 50.1 min calculated for 5.045 af (97% of inflow)
Center-of-Mass det. time= 33.5 min (830.8 - 797.3)

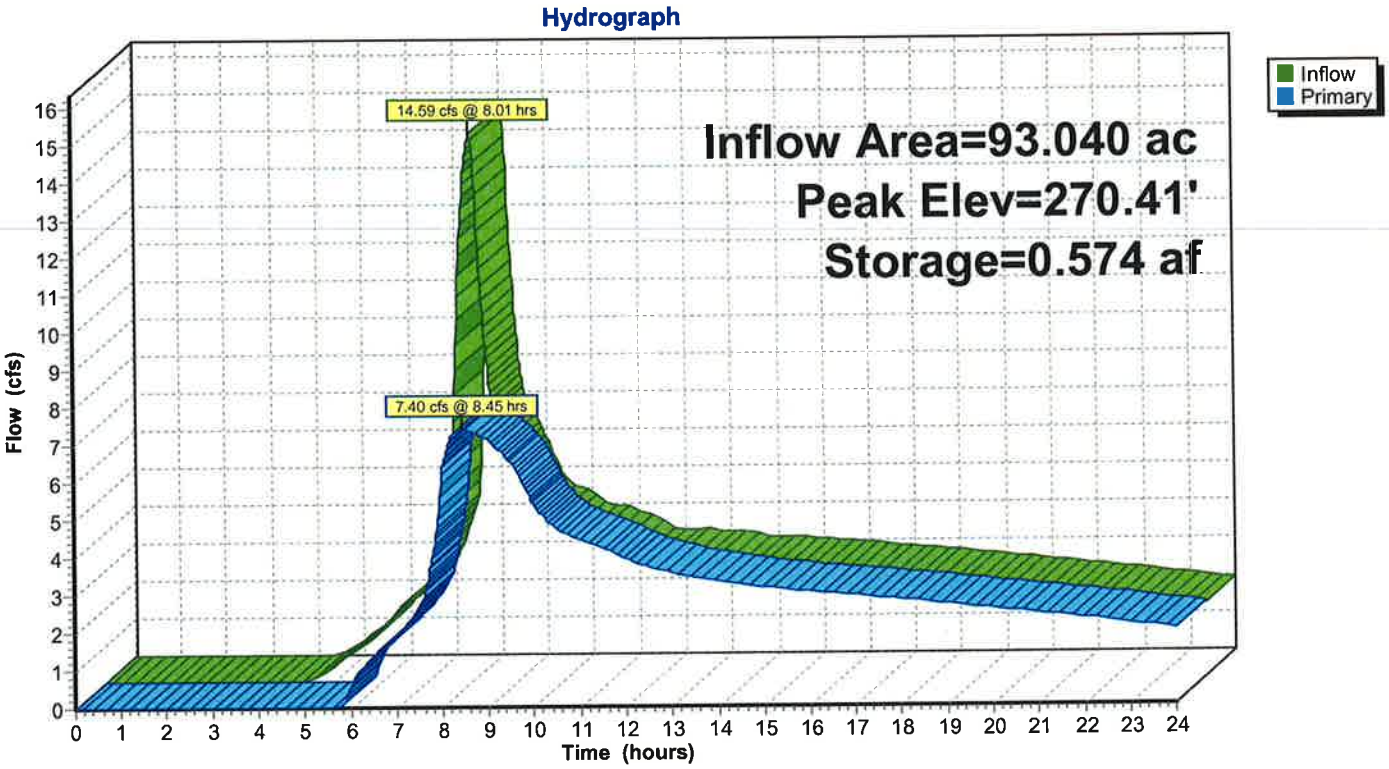
Volume	Invert	Avail.Storage	Storage Description
#1	266.50'	9.426 af	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (acre-feet)
266.50	0.000
268.00	0.085
270.00	0.438
272.00	1.103
274.00	2.121
276.00	3.510
278.00	5.214
280.00	7.179
280.50	7.713
282.00	9.426

Device	Routing	Invert	Outlet Devices
#1	Primary	267.50'	**36.0" Round Culvert** L= 104.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 267.50' / 266.50' S= 0.0096 '/' Cc= 0.900 n= 0.015 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	267.50'	**12.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	269.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#4	Device 1	272.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#5	Device 1	278.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.40 cfs @ 8.45 hrs HW=270.41' TW=267.00' (Fixed TW Elev= 267.00')
↑—**1=Culvert** (Passes 7.40 cfs of 38.37 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 5.87 cfs @ 7.47 fps)
—**3=Orifice/Grate** (Orifice Controls 1.53 cfs @ 3.91 fps)
—**4=Orifice/Grate** (Controls 0.00 cfs)
—**5=Orifice/Grate** (Controls 0.00 cfs)

Pond 11P: Southwest Pond



Summary for Pond 11P: Southwest Pond

Inflow Area = 93.040 ac, 0.00% Impervious, Inflow Depth > 0.80" for 2-yr, 24-hr event
Inflow = 17.37 cfs @ 8.01 hrs, Volume= 6.169 af
Outflow = 8.26 cfs @ 8.50 hrs, Volume= 6.011 af, Atten= 52%, Lag= 29.3 min
Primary = 8.26 cfs @ 8.50 hrs, Volume= 6.011 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Peak Elev= 270.80' @ 8.50 hrs Surf.Area= 0.000 ac Storage= 0.704 af

Plug-Flow detention time= 51.9 min calculated for 6.006 af (97% of inflow)
Center-of-Mass det. time= 35.6 min (833.0 - 797.3)

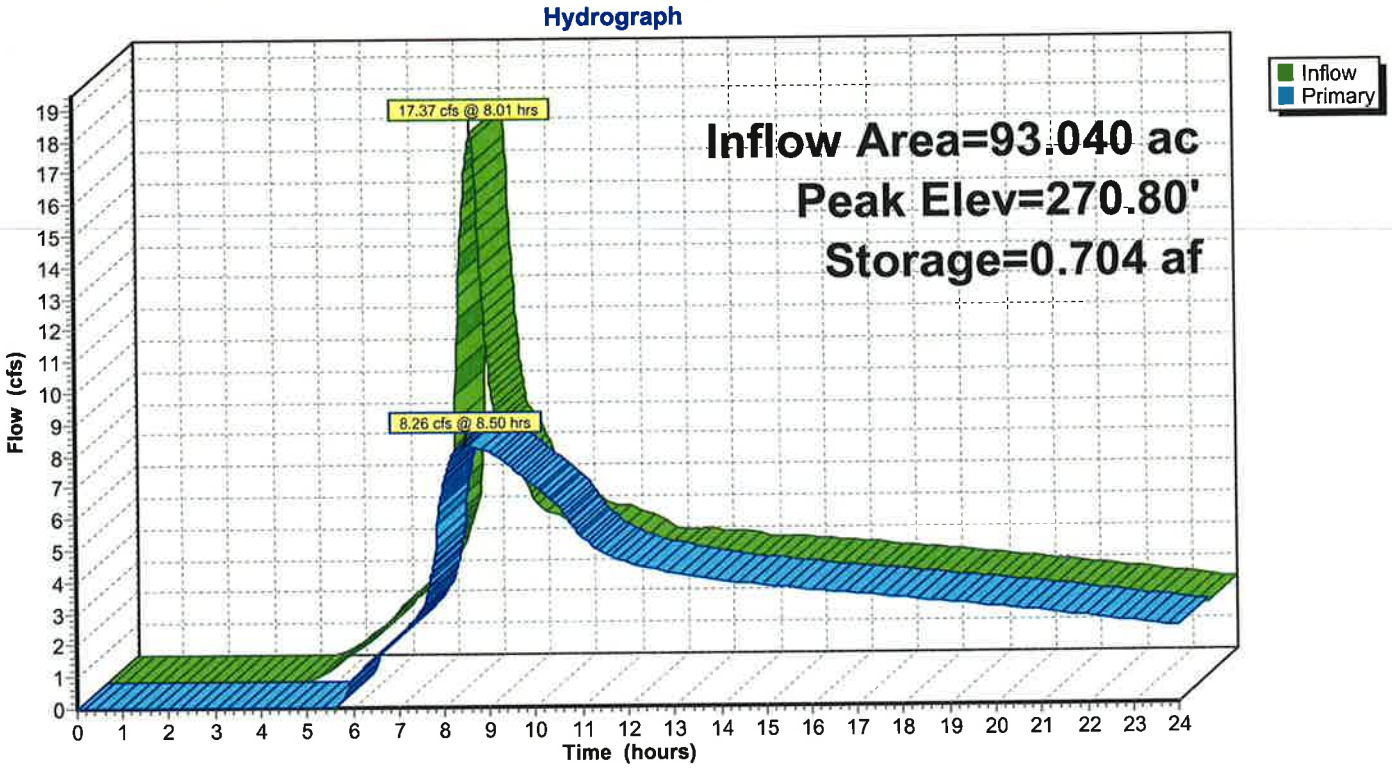
Volume	Invert	Avail.Storage	Storage Description
#1	266.50'	9.426 af	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (acre-feet)
266.50	0.000
268.00	0.085
270.00	0.438
272.00	1.103
274.00	2.121
276.00	3.510
278.00	5.214
280.00	7.179
280.50	7.713
282.00	9.426

Device	Routing	Invert	Outlet Devices
#1	Primary	267.50'	**36.0" Round Culvert** L= 104.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 267.50' / 266.50' S= 0.0096 '/' Cc= 0.900 n= 0.015 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	267.50'	**12.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	269.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#4	Device 1	272.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#5	Device 1	278.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=8.26 cfs @ 8.50 hrs HW=270.80' TW=267.00' (Fixed TW Elev= 267.00')
↑**1=Culvert** (Passes 8.26 cfs of 44.84 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 6.33 cfs @ 8.06 fps)
3=Orifice/Grate (Orifice Controls 1.94 cfs @ 4.93 fps)
4=Orifice/Grate (Controls 0.00 cfs)
5=Orifice/Grate (Controls 0.00 cfs)

Pond 11P: Southwest Pond



Summary for Subcatchment 1S: WD-1

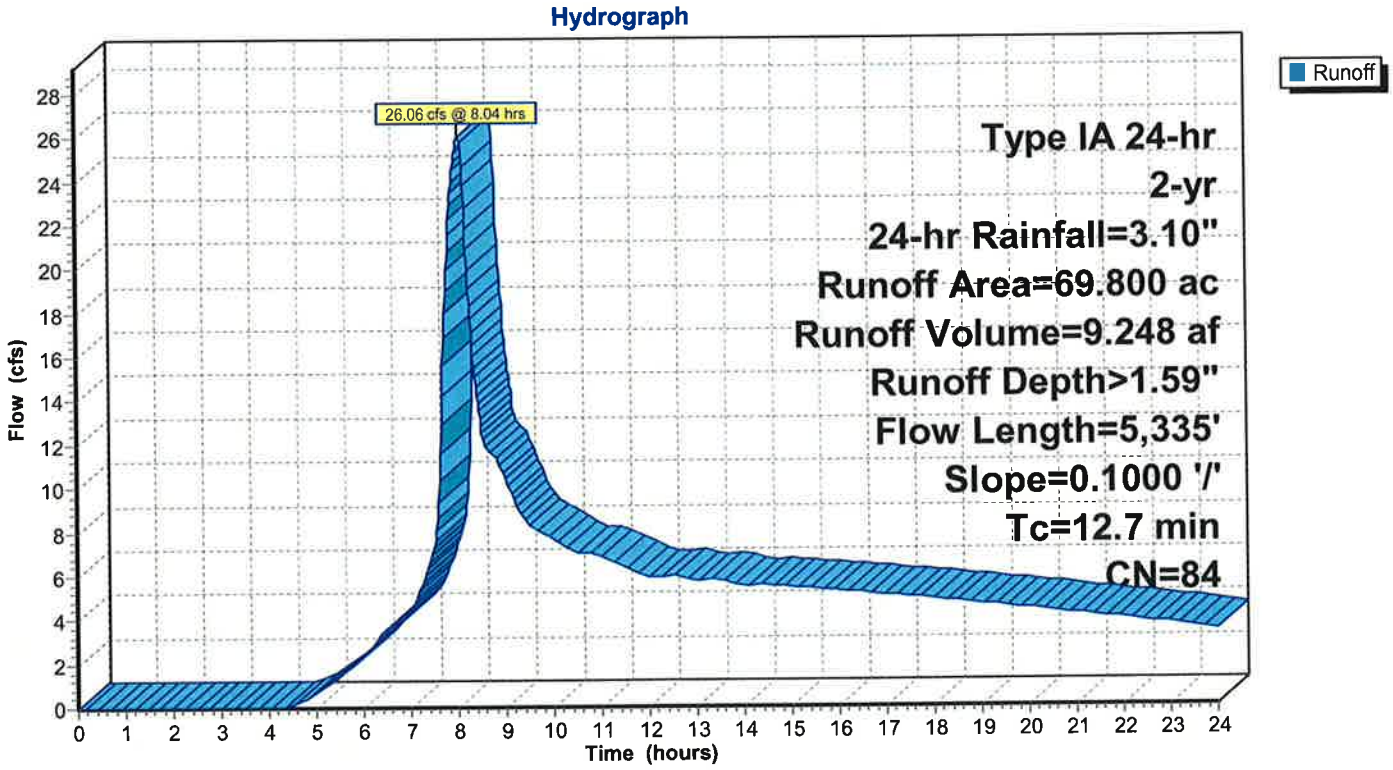
Runoff = 26.06 cfs @ 8.04 hrs, Volume= 9.248 af, Depth> 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2-yr, 24-hr Rainfall=3.10"

Area (ac)	CN	Description
69.800	84	50-75% Grass cover, Fair, HSG D
69.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.1000	0.32		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.5	145	0.1000	5.09		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.0	5,090		12.09		**Direct Entry, Channel**
12.7	5,335	Total			

Subcatchment 1S: WD-1



Summary for Subcatchment 2S: WD-2

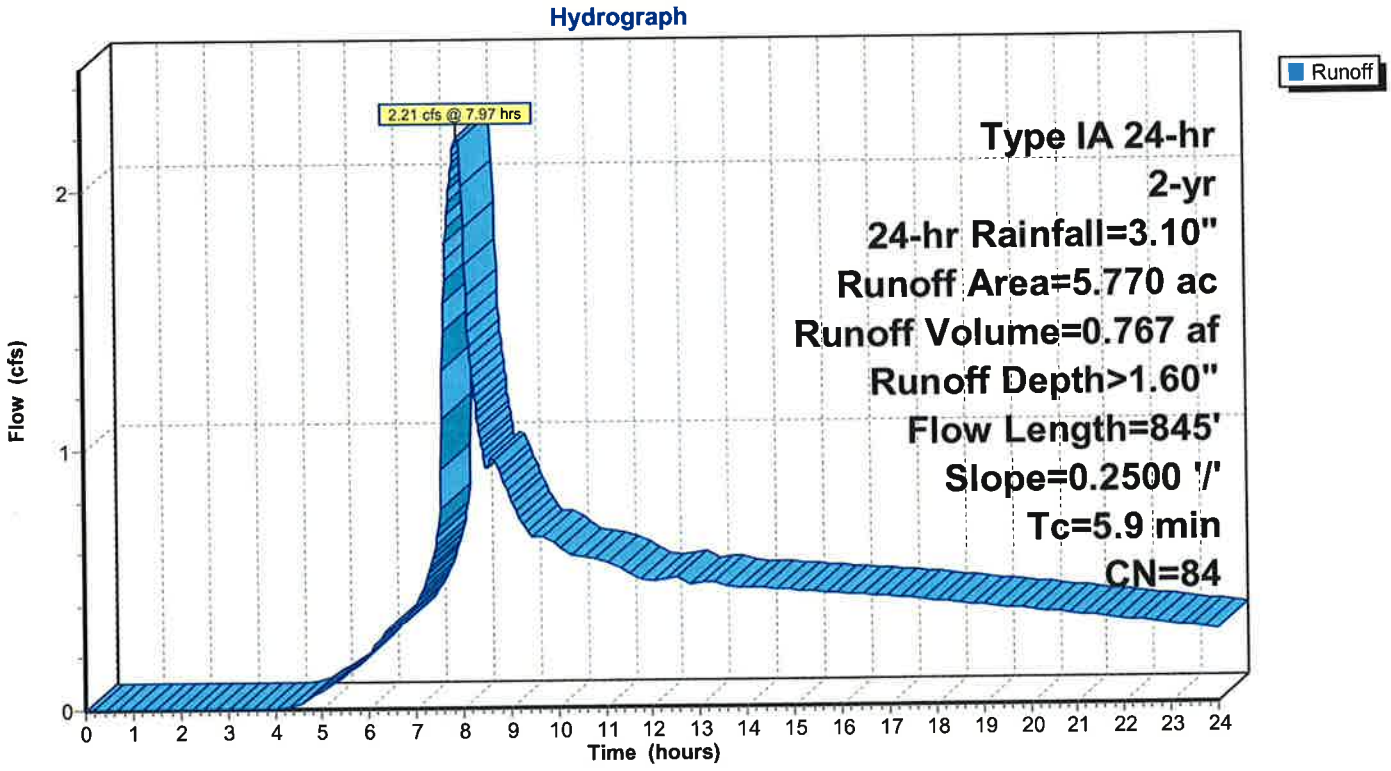
Runoff = 2.21 cfs @ 7.97 hrs, Volume= 0.767 af, Depth> 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2-yr, 24-hr Rainfall=3.10"

Area (ac)	CN	Description
5.770	84	50-75% Grass cover, Fair, HSG D
5.770		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	100	0.2500	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.2	100	0.2500	8.05		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.1	645		5.08		**Direct Entry, Channel**
5.9	845	Total			

Subcatchment 2S: WD-2



Summary for Subcatchment 3S: WD-3

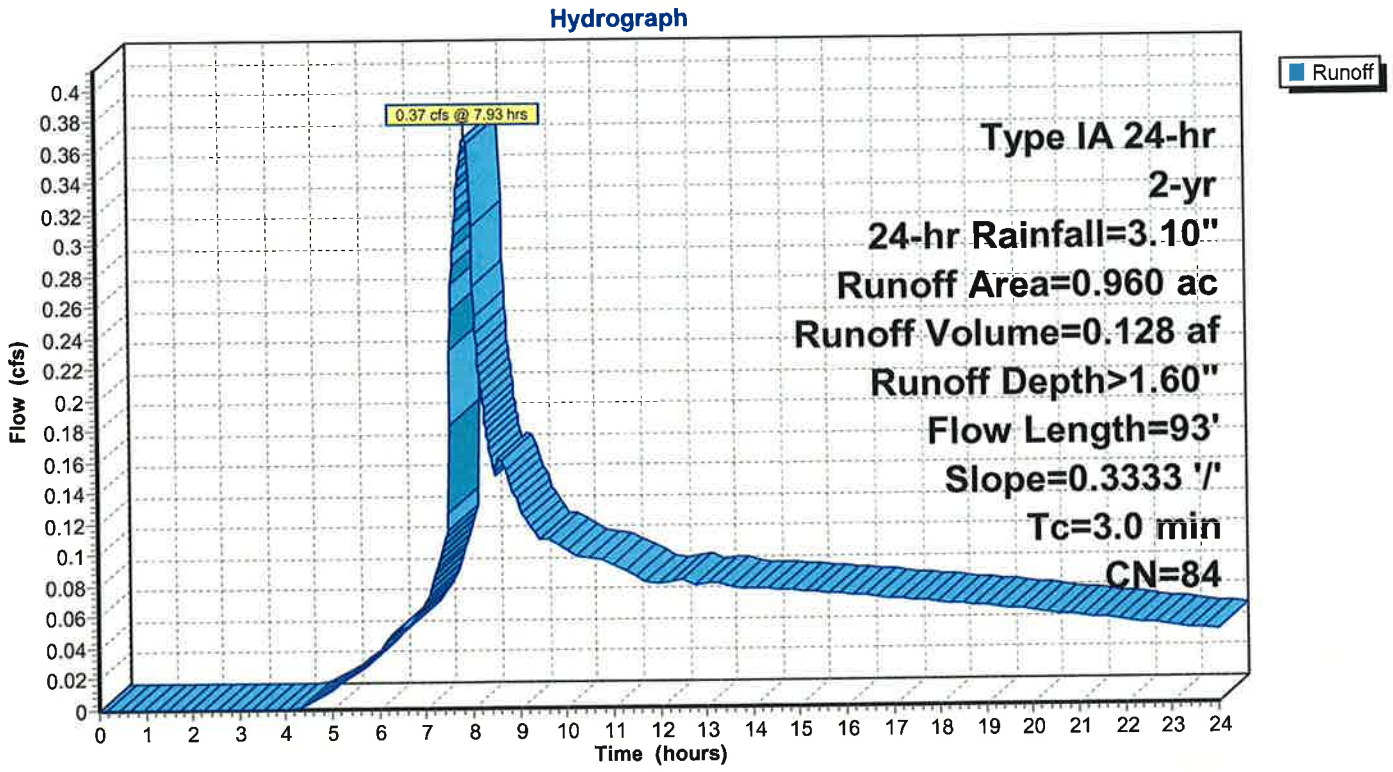
Runoff = 0.37 cfs @ 7.93 hrs, Volume= 0.128 af, Depth> 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2-yr, 24-hr Rainfall=3.10"

Area (ac)	CN	Description
0.960	84	50-75% Grass cover, Fair, HSG D
0.960		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	93	0.3333	0.51		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"

Subcatchment 3S: WD-3



Summary for Subcatchment 4S: WD-4

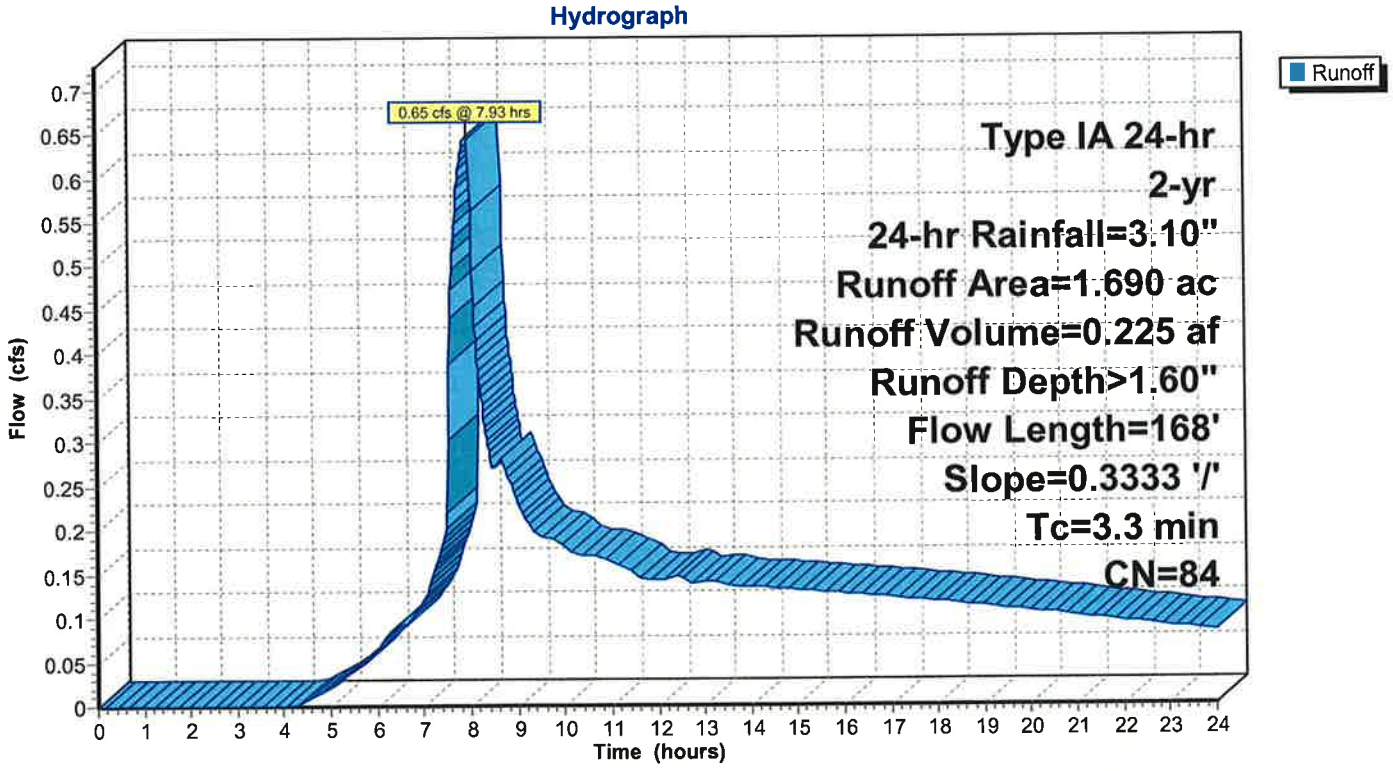
Runoff = 0.65 cfs @ 7.93 hrs, Volume= 0.225 af, Depth> 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2-yr, 24-hr Rainfall=3.10"

Area (ac)	CN	Description
1.690	84	50-75% Grass cover, Fair, HSG D
1.690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	100	0.3333	0.52		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	68	0.3333	9.29		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.3	168	Total			

Subcatchment 4S: WD-4



Summary for Subcatchment 5S: WD-5

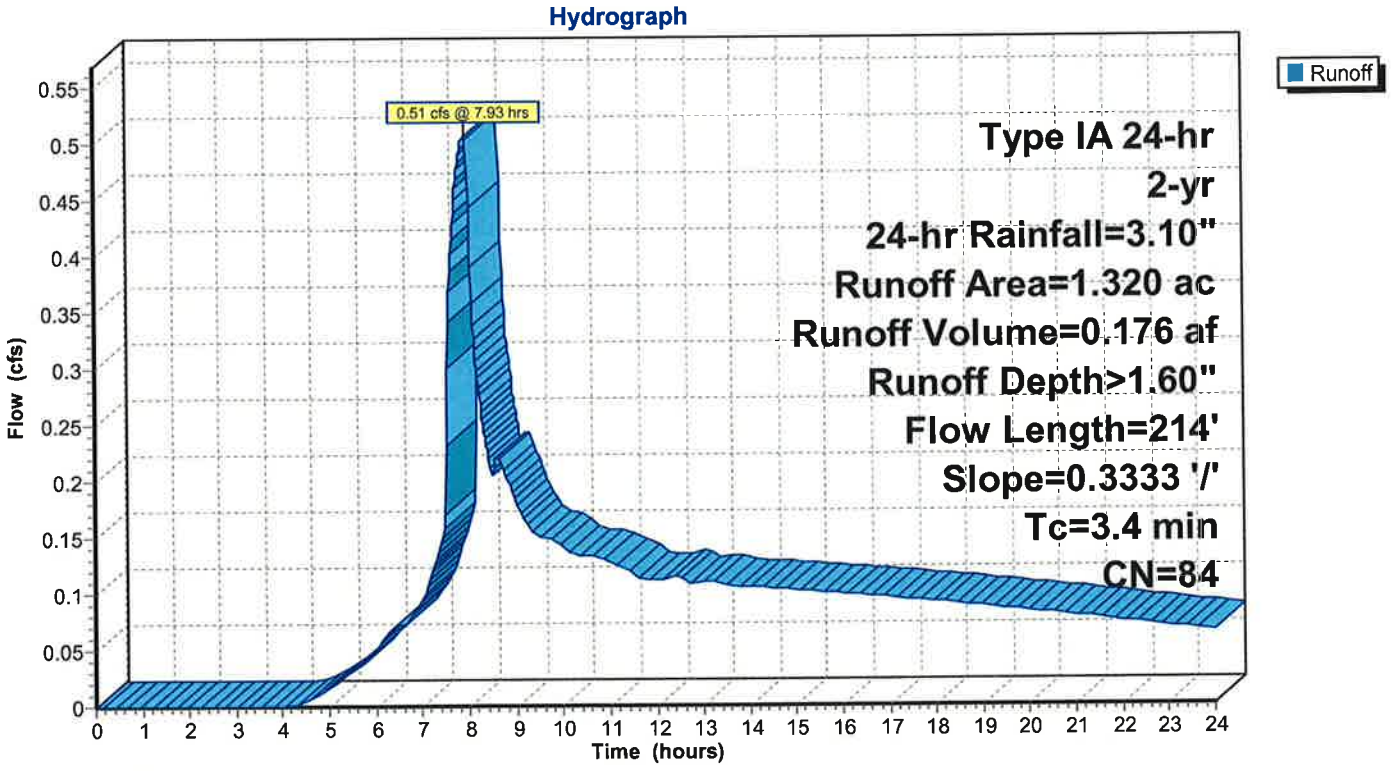
Runoff = 0.51 cfs @ 7.93 hrs, Volume= 0.176 af, Depth> 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2-yr, 24-hr Rainfall=3.10"

Area (ac)	CN	Description
1.320	84	50-75% Grass cover, Fair, HSG D
1.320		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	100	0.3333	0.52		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.2	114	0.3333	9.29		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.4	214	Total			

Subcatchment 5S: WD-5



Summary for Subcatchment 6S: WD-6

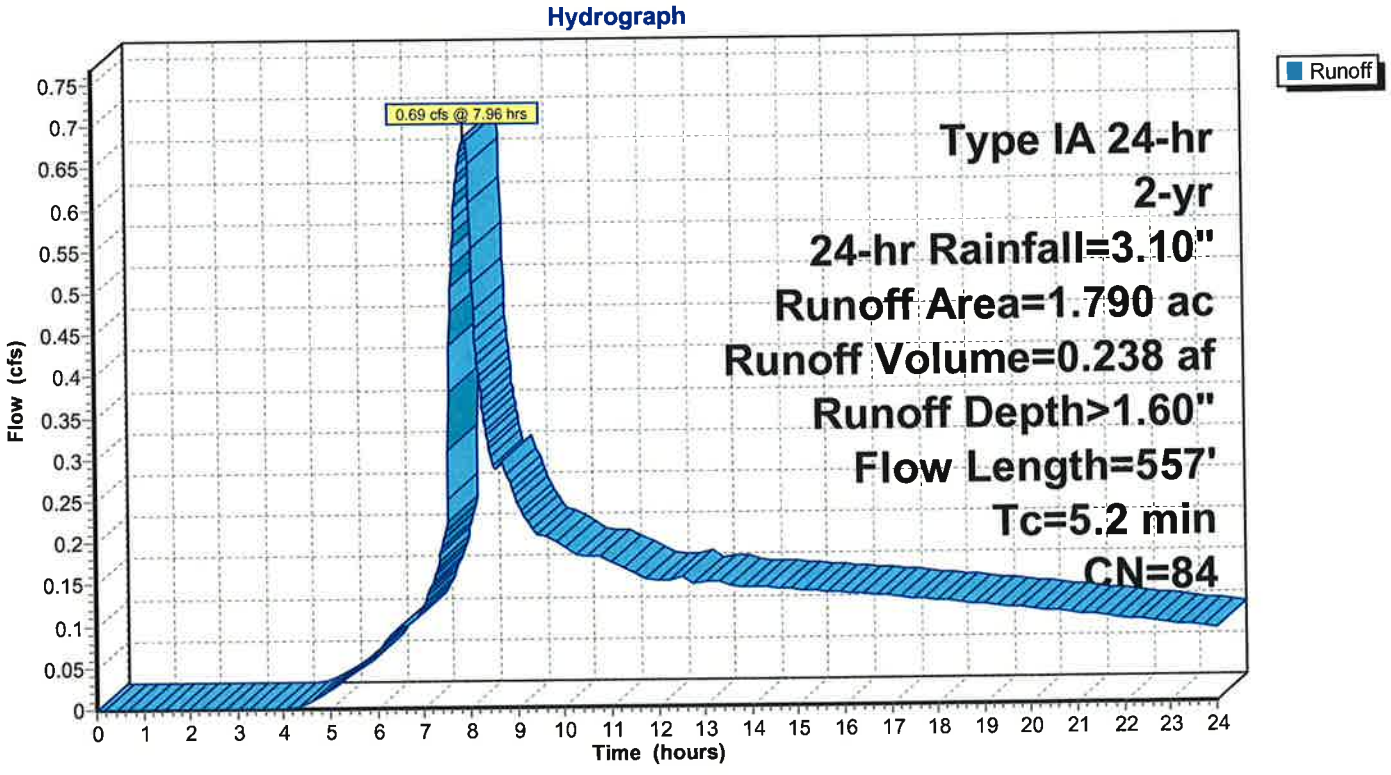
Runoff = 0.69 cfs @ 7.96 hrs, Volume= 0.238 af, Depth> 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2-yr, 24-hr Rainfall=3.10"

Area (ac)	CN	Description
1.790	84	50-75% Grass cover, Fair, HSG D
1.790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2200	0.44		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.5	172	0.1163	5.49		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	285		5.08		**Direct Entry, Channel**
5.2	557	Total			

Subcatchment 6S: WD-6



Summary for Subcatchment 7S: WD-7

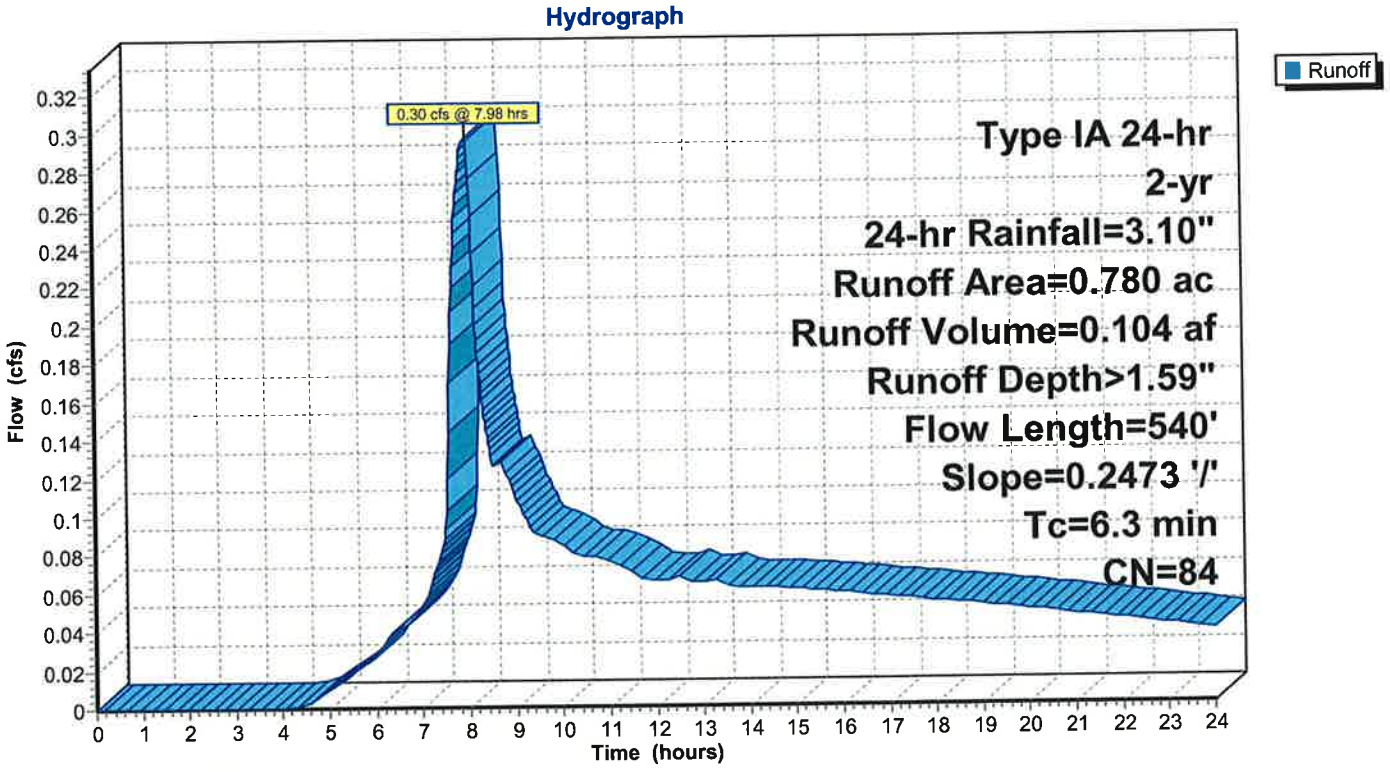
Runoff = 0.30 cfs @ 7.98 hrs, Volume= 0.104 af, Depth> 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2-yr, 24-hr Rainfall=3.10"

Area (ac)	CN	Description
0.780	84	50-75% Grass cover, Fair, HSG D
0.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	93	0.2473	0.45		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
2.9	447		2.56		**Direct Entry, Channel**
6.3	540	Total			

Subcatchment 7S: WD-7



Summary for Subcatchment 8S: WD-8

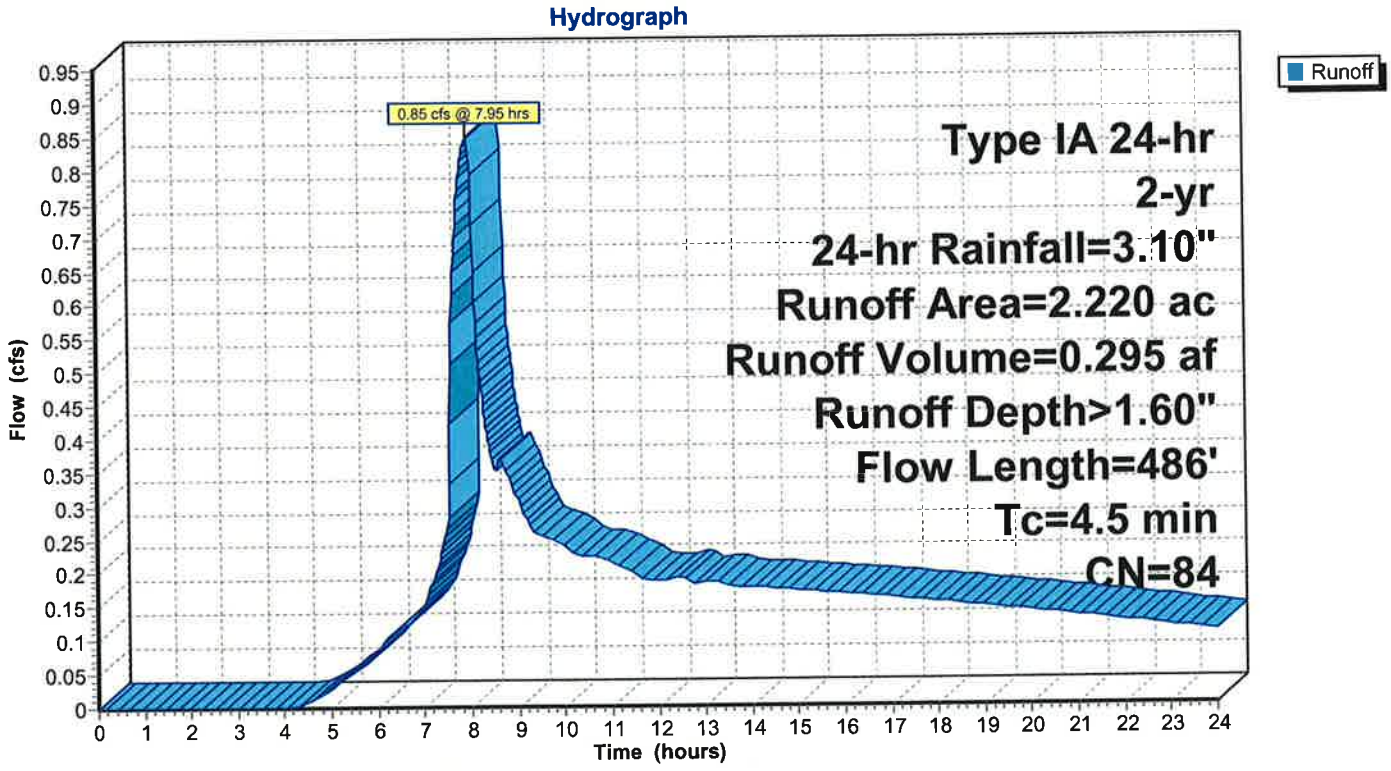
Runoff = 0.85 cfs @ 7.95 hrs, Volume= 0.295 af, Depth> 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2-yr, 24-hr Rainfall=3.10"

Area (ac)	CN	Description
2.220	84	50-75% Grass cover, Fair, HSG D
2.220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	100	0.3200	0.51		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.3	128	0.2344	7.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	258		4.91		**Direct Entry, Channel**
4.5	486	Total			

Subcatchment 8S: WD-8



Summary for Subcatchment 9S: WD-9

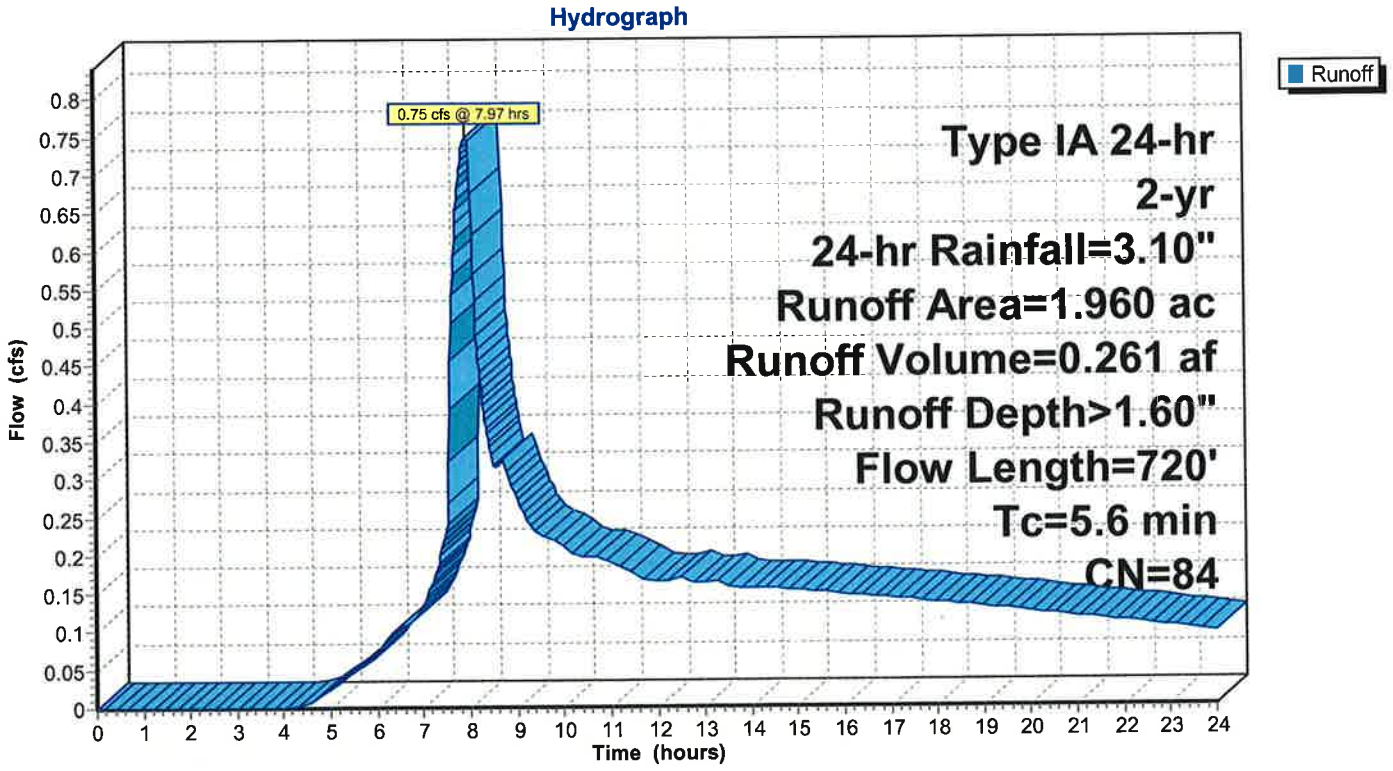
Runoff = 0.75 cfs @ 7.97 hrs, Volume= 0.261 af, Depth> 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2-yr, 24-hr Rainfall=3.10"

Area (ac)	CN	Description
1.960	84	50-75% Grass cover, Fair, HSG D
1.960		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	100	0.2600	0.47		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.6	226	0.1593	6.43		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.4	394		4.76		**Direct Entry, Channel**
5.6	720	Total			

Subcatchment 9S: WD-9



Summary for Subcatchment 10S: WD-10

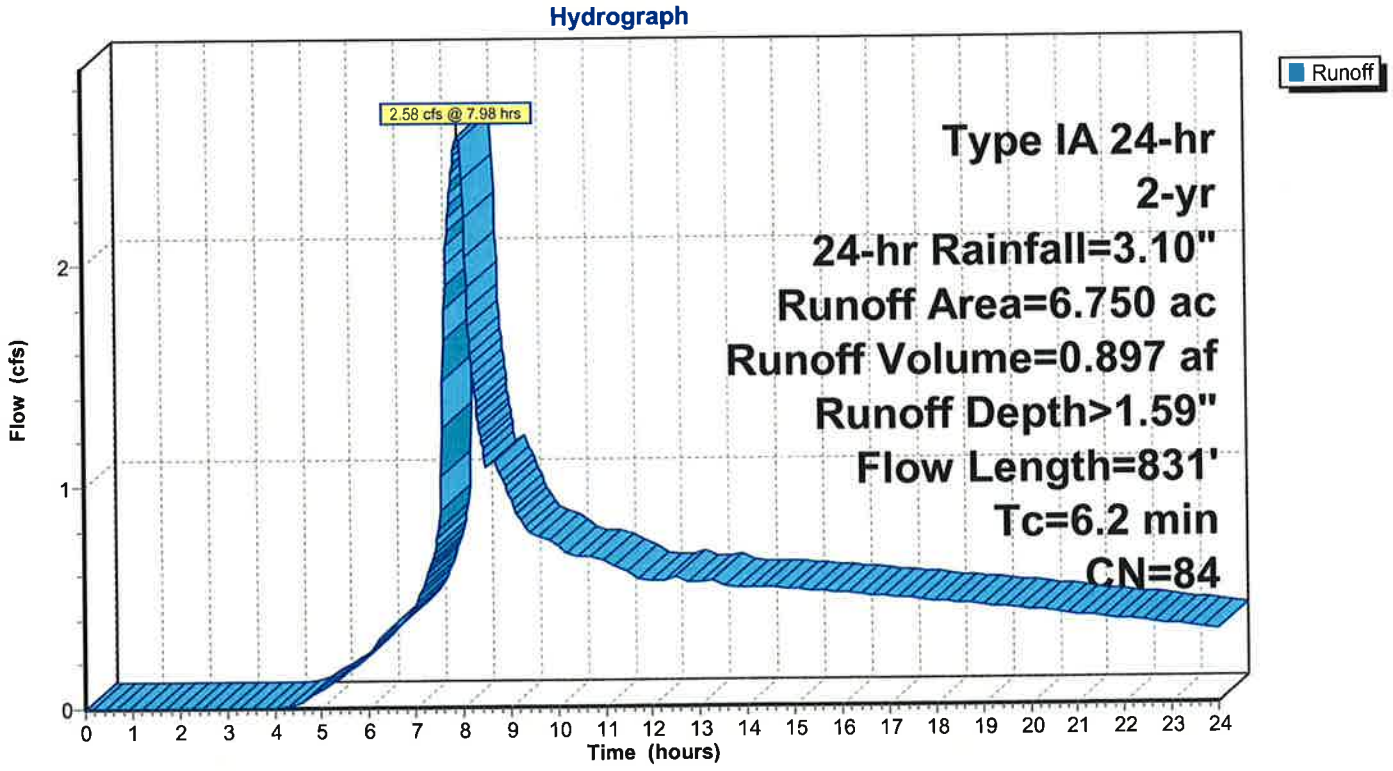
Runoff = 2.58 cfs @ 7.98 hrs, Volume= 0.897 af, Depth> 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2-yr, 24-hr Rainfall=3.10"

Area (ac)	CN	Description
6.750	84	50-75% Grass cover, Fair, HSG D
6.750		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	100	0.3100	0.50		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.4	190	0.2263	7.66		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.5	541		3.66		**Direct Entry, Channel**
6.2	831	Total			

Subcatchment 10S: WD-10



Summary for Pond 11P: Southwest Pond

Inflow Area = 93.040 ac, 0.00% Impervious, Inflow Depth > 1.59" for 2-yr, 24-hr event
Inflow = 34.75 cfs @ 8.01 hrs, Volume= 12.337 af
Outflow = 13.39 cfs @ 9.04 hrs, Volume= 11.972 af, Atten= 61%, Lag= 61.6 min
Primary = 13.39 cfs @ 9.04 hrs, Volume= 11.972 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Peak Elev= 273.19' @ 9.04 hrs Surf.Area= 0.000 ac Storage= 1.711 af

Plug-Flow detention time= 68.8 min calculated for 11.962 af (97% of inflow)
Center-of-Mass det. time= 50.0 min (847.4 - 797.3)

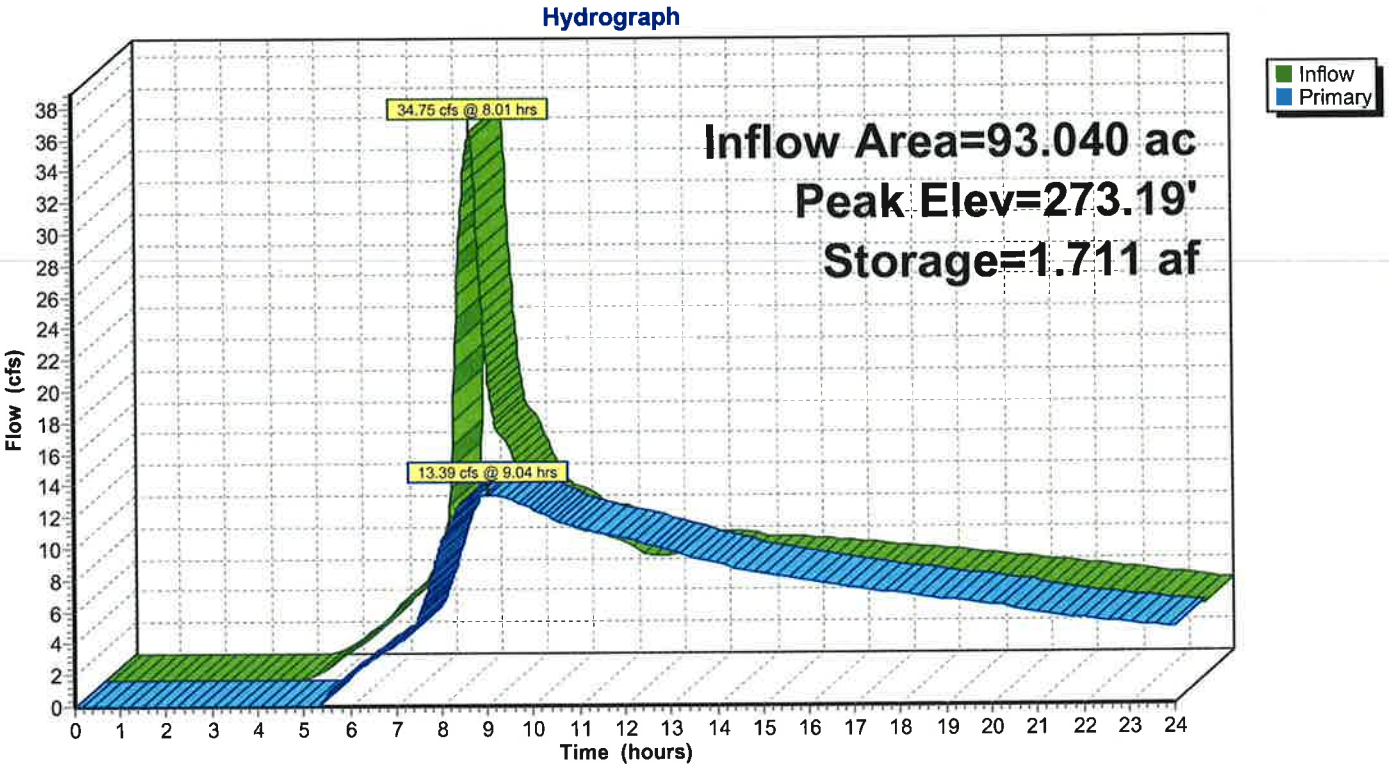
Volume	Invert	Avail.Storage	Storage Description
#1	266.50'	9.426 af	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (acre-feet)
266.50	0.000
268.00	0.085
270.00	0.438
272.00	1.103
274.00	2.121
276.00	3.510
278.00	5.214
280.00	7.179
280.50	7.713
282.00	9.426

Device	Routing	Invert	Outlet Devices
#1	Primary	267.50'	**36.0" Round Culvert** L= 104.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 267.50' / 266.50' S= 0.0096 '/' Cc= 0.900 n= 0.015 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	267.50'	**12.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	269.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#4	Device 1	272.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#5	Device 1	278.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=13.39 cfs @ 9.04 hrs HW=273.19' TW=267.00' (Fixed TW Elev= 267.00')
↑**1=Culvert** (Passes 13.39 cfs of 68.89 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 8.62 cfs @ 10.97 fps)
—**3=Orifice/Grate** (Orifice Controls 3.51 cfs @ 8.94 fps)
—**4=Orifice/Grate** (Orifice Controls 1.26 cfs @ 3.21 fps)
—**5=Orifice/Grate** (Controls 0.00 cfs)

Pond 11P: Southwest Pond



Summary for Subcatchment 1S: WD-1

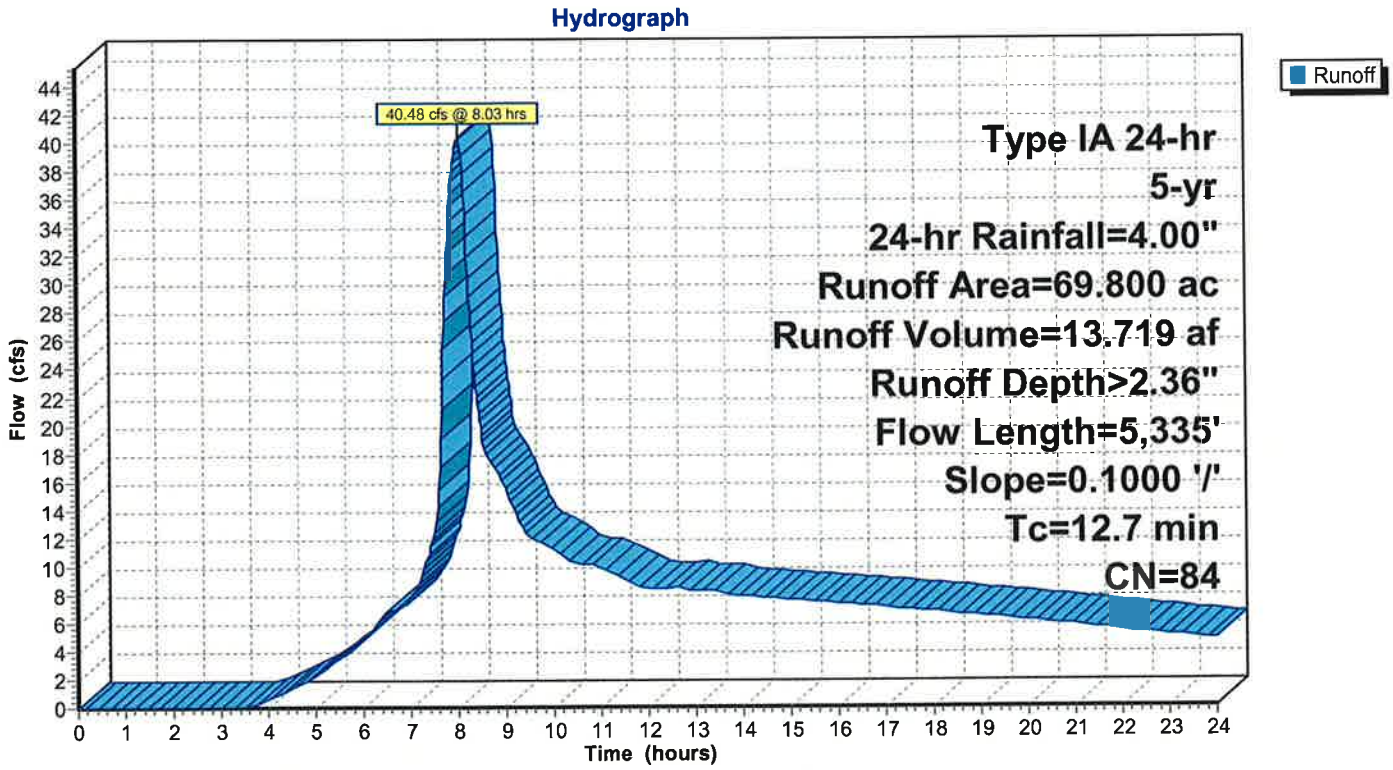
Runoff = 40.48 cfs @ 8.03 hrs, Volume= 13.719 af, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 5-yr, 24-hr Rainfall=4.00"

Area (ac)	CN	Description
69.800	84	50-75% Grass cover, Fair, HSG D
69.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.1000	0.32		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.5	145	0.1000	5.09		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.0	5,090		12.09		**Direct Entry, Channel**
12.7	5,335	Total			

Subcatchment 1S: WD-1



Summary for Subcatchment 2S: WD-2

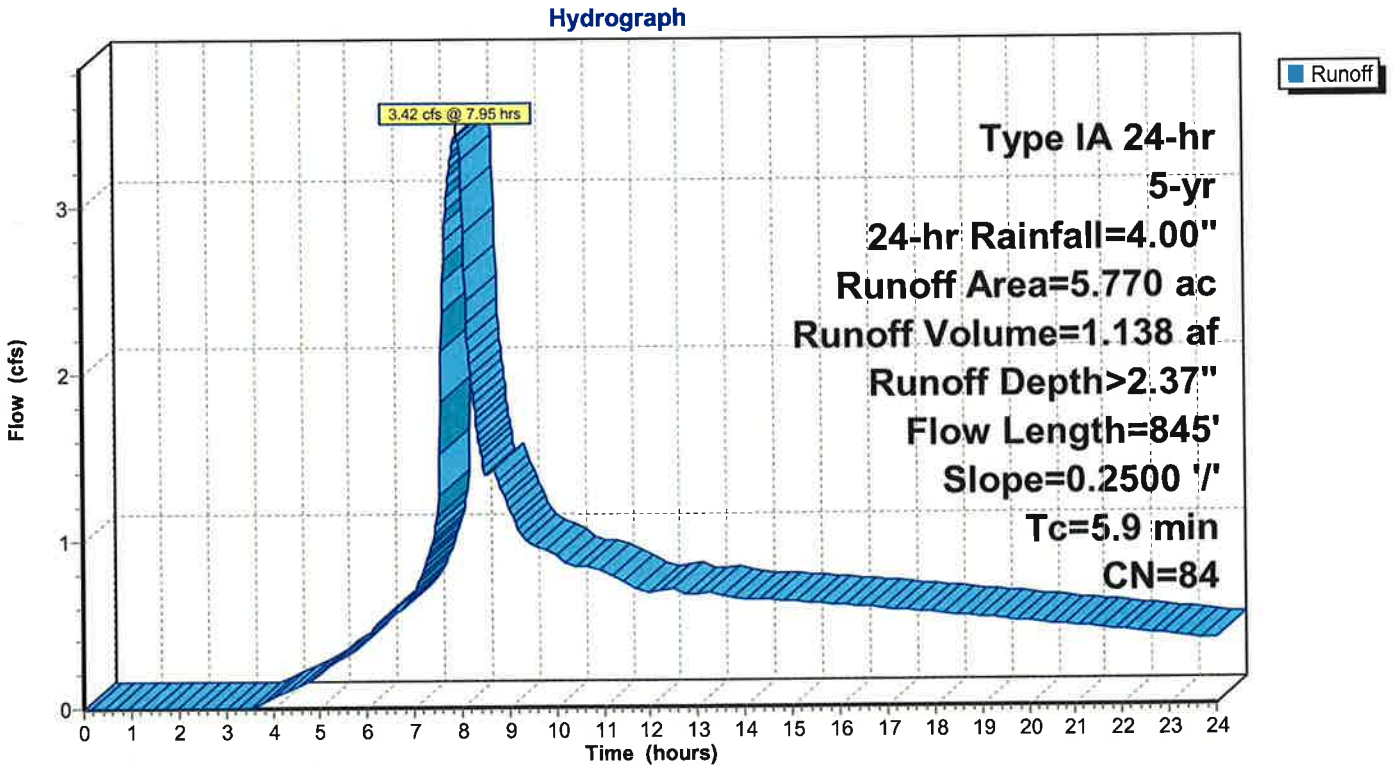
Runoff = 3.42 cfs @ 7.95 hrs, Volume= 1.138 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 5-yr, 24-hr Rainfall=4.00"

Area (ac)	CN	Description
5.770	84	50-75% Grass cover, Fair, HSG D
5.770		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	100	0.2500	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.2	100	0.2500	8.05		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.1	645		5.08		**Direct Entry, Channel**
5.9	845	Total			

Subcatchment 2S: WD-2



Summary for Subcatchment 3S: WD-3

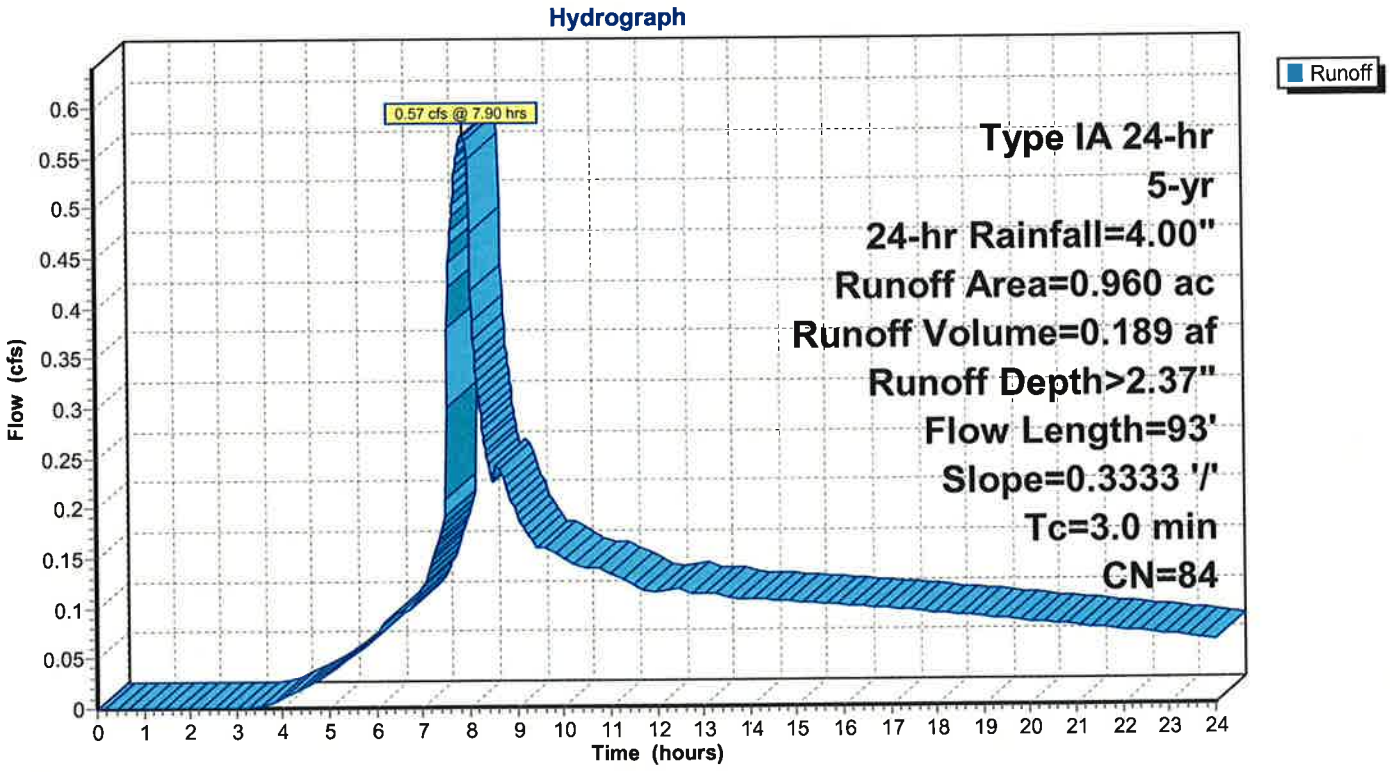
Runoff = 0.57 cfs @ 7.90 hrs, Volume= 0.189 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 5-yr, 24-hr Rainfall=4.00"

Area (ac)	CN	Description
0.960	84	50-75% Grass cover, Fair, HSG D
0.960		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	93	0.3333	0.51		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"

Subcatchment 3S: WD-3



Summary for Subcatchment 4S: WD-4

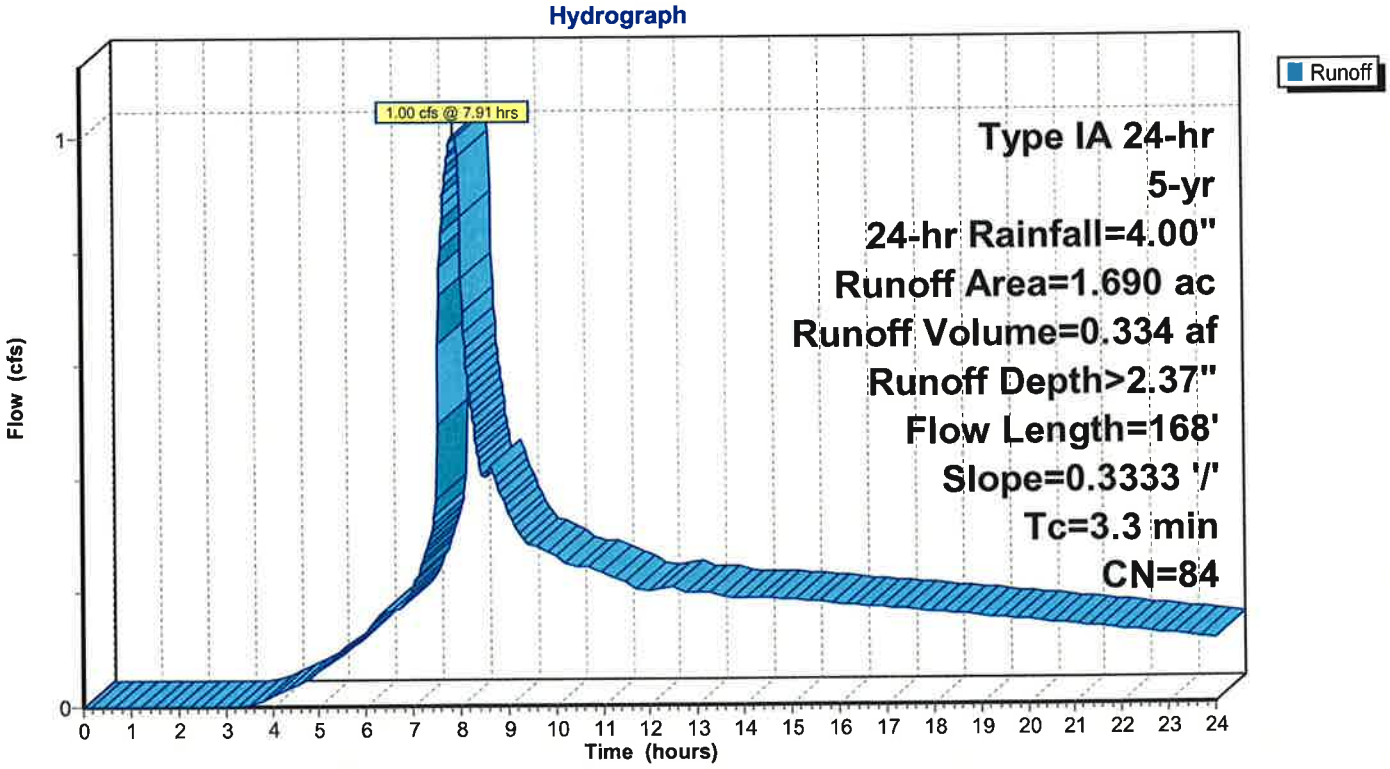
Runoff = 1.00 cfs @ 7.91 hrs, Volume= 0.334 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 5-yr, 24-hr Rainfall=4.00"

Area (ac)	CN	Description
1.690	84	50-75% Grass cover, Fair, HSG D
1.690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	100	0.3333	0.52		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	68	0.3333	9.29		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.3	168	Total			

Subcatchment 4S: WD-4



Summary for Subcatchment 5S: WD-5

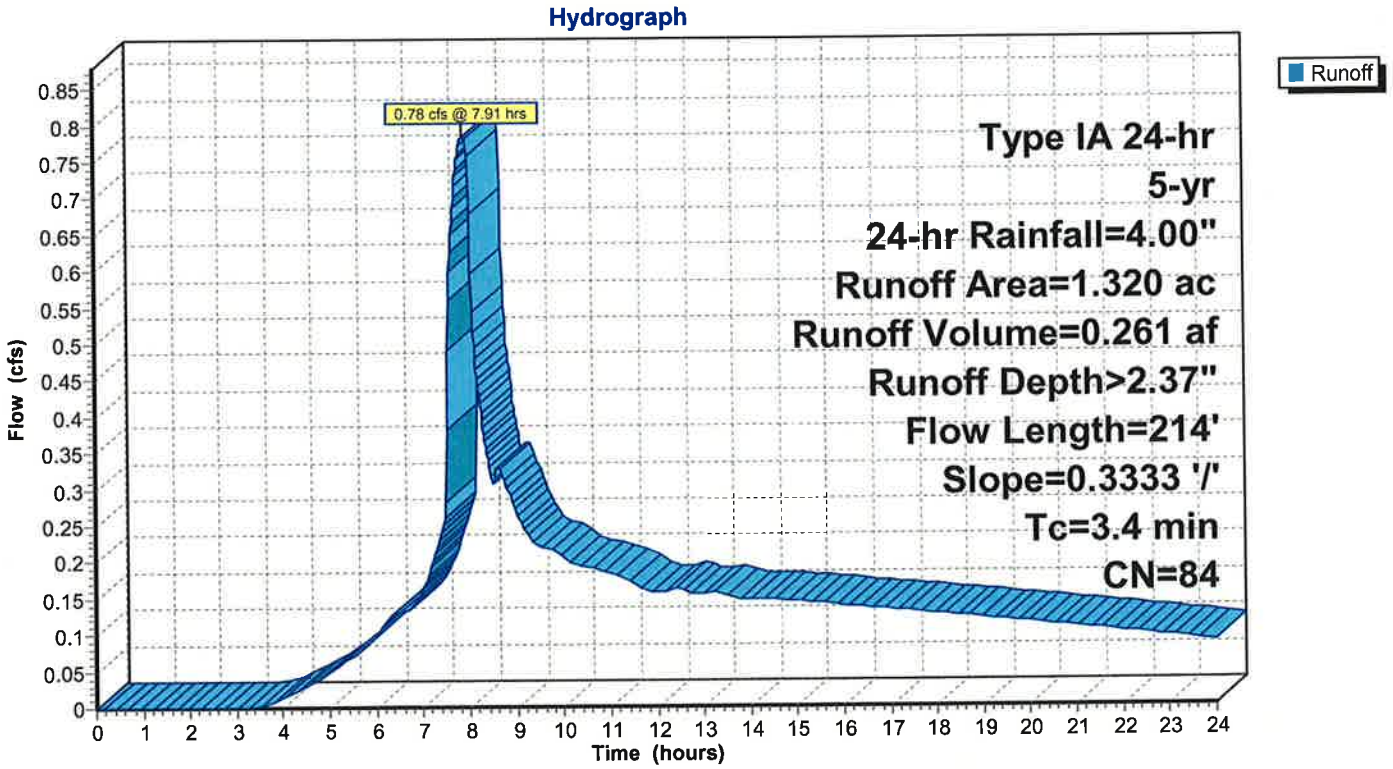
Runoff = 0.78 cfs @ 7.91 hrs, Volume= 0.261 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 5-yr, 24-hr Rainfall=4.00"

Area (ac)	CN	Description
1.320	84	50-75% Grass cover, Fair, HSG D
1.320		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	100	0.3333	0.52		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.2	114	0.3333	9.29		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.4	214	Total			

Subcatchment 5S: WD-5



Summary for Subcatchment 6S: WD-6

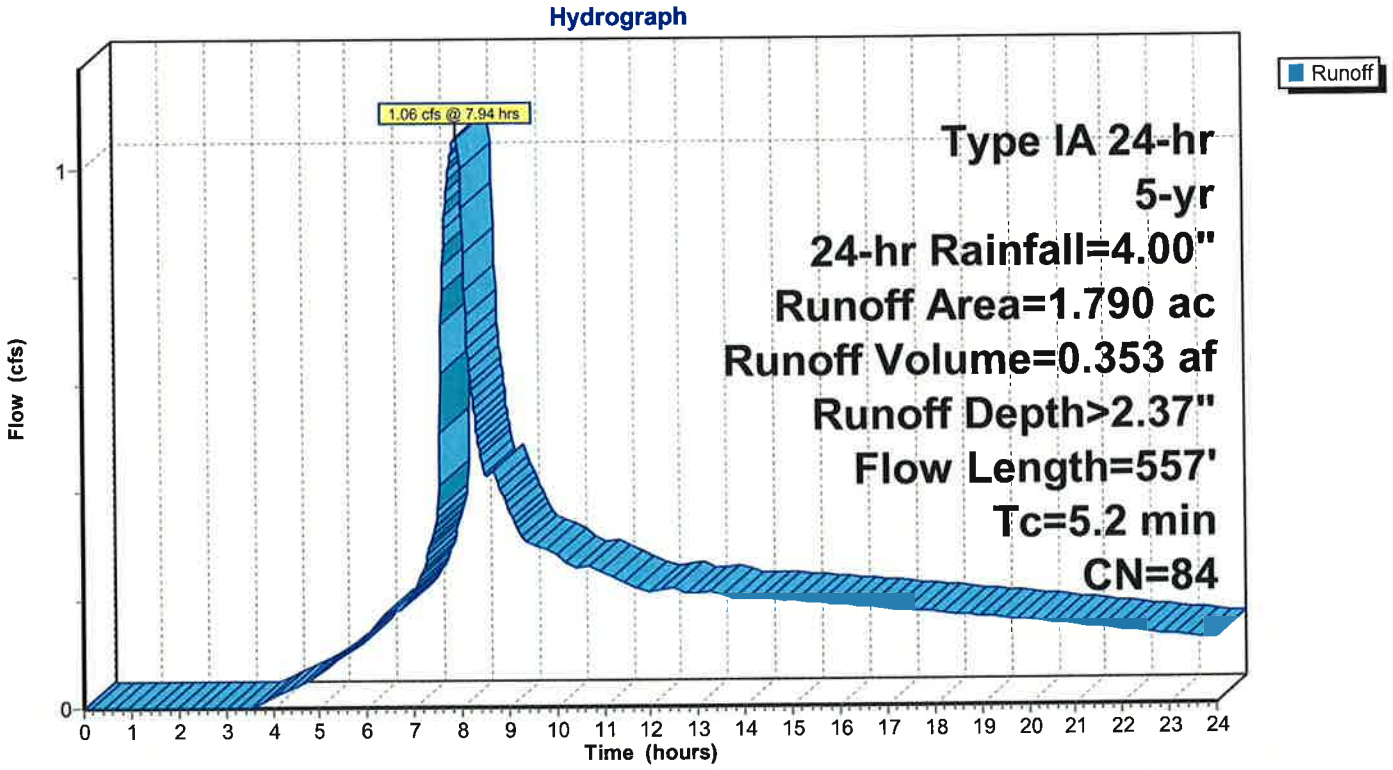
Runoff = 1.06 cfs @ 7.94 hrs, Volume= 0.353 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 5-yr, 24-hr Rainfall=4.00"

Area (ac)	CN	Description
1.790	84	50-75% Grass cover, Fair, HSG D
1.790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2200	0.44		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.5	172	0.1163	5.49		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	285		5.08		**Direct Entry, Channel**
5.2	557	Total			

Subcatchment 6S: WD-6



Summary for Subcatchment 7S: WD-7

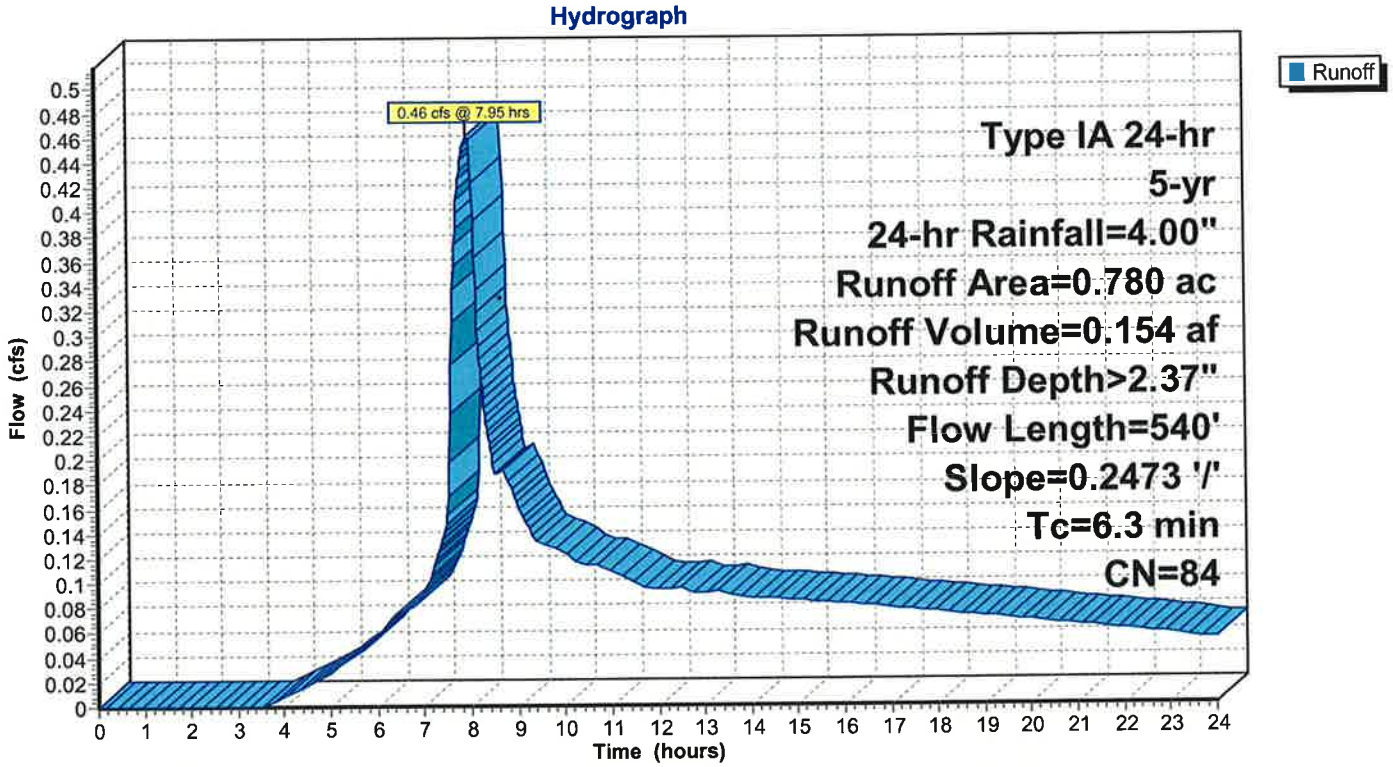
Runoff = 0.46 cfs @ 7.95 hrs, Volume= 0.154 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 5-yr, 24-hr Rainfall=4.00"

Area (ac)	CN	Description
0.780	84	50-75% Grass cover, Fair, HSG D
0.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	93	0.2473	0.45		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
2.9	447		2.56		**Direct Entry, Channel**
6.3	540	Total			

Subcatchment 7S: WD-7



Summary for Subcatchment 8S: WD-8

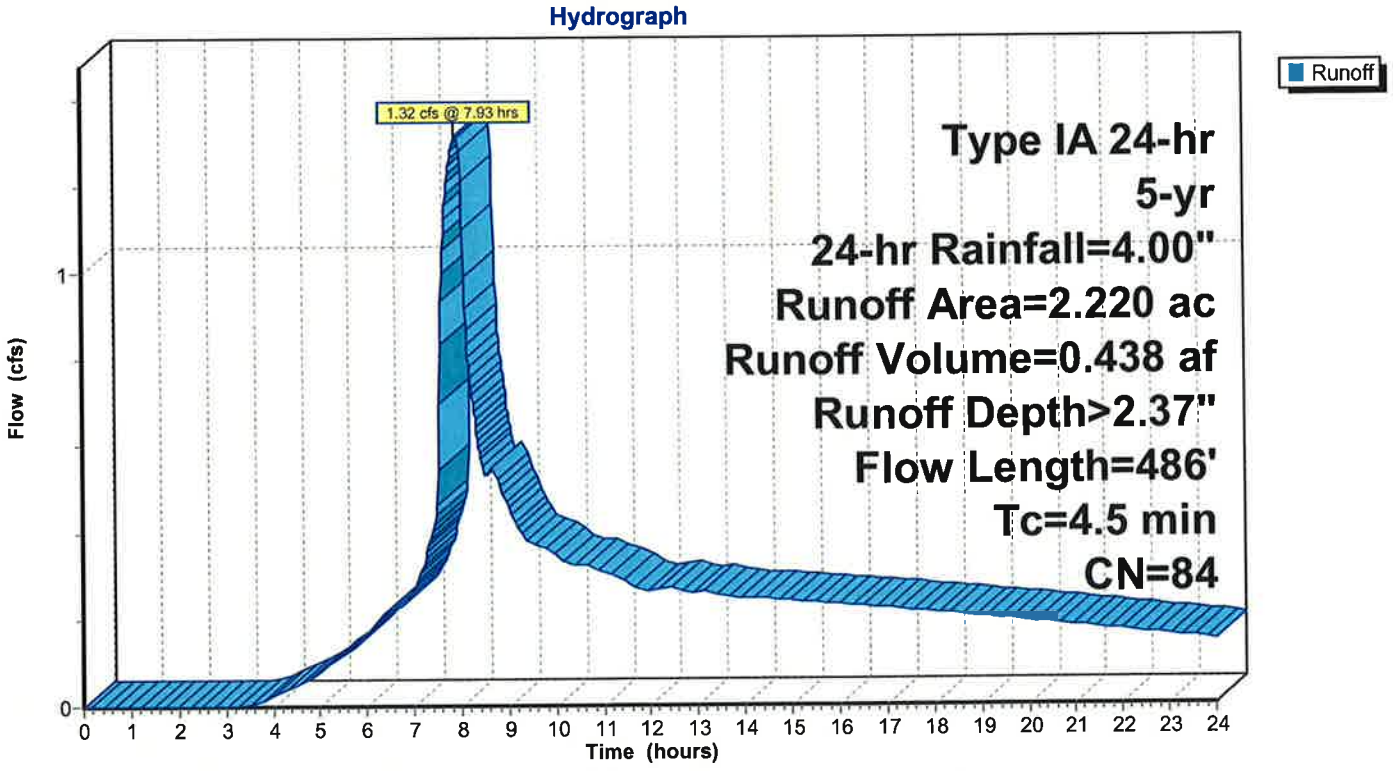
Runoff = 1.32 cfs @ 7.93 hrs, Volume= 0.438 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 5-yr, 24-hr Rainfall=4.00"

Area (ac)	CN	Description
2.220	84	50-75% Grass cover, Fair, HSG D
2.220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	100	0.3200	0.51		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.3	128	0.2344	7.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	258		4.91		**Direct Entry, Channel**
4.5	486	Total			

Subcatchment 8S: WD-8



Summary for Subcatchment 9S: WD-9

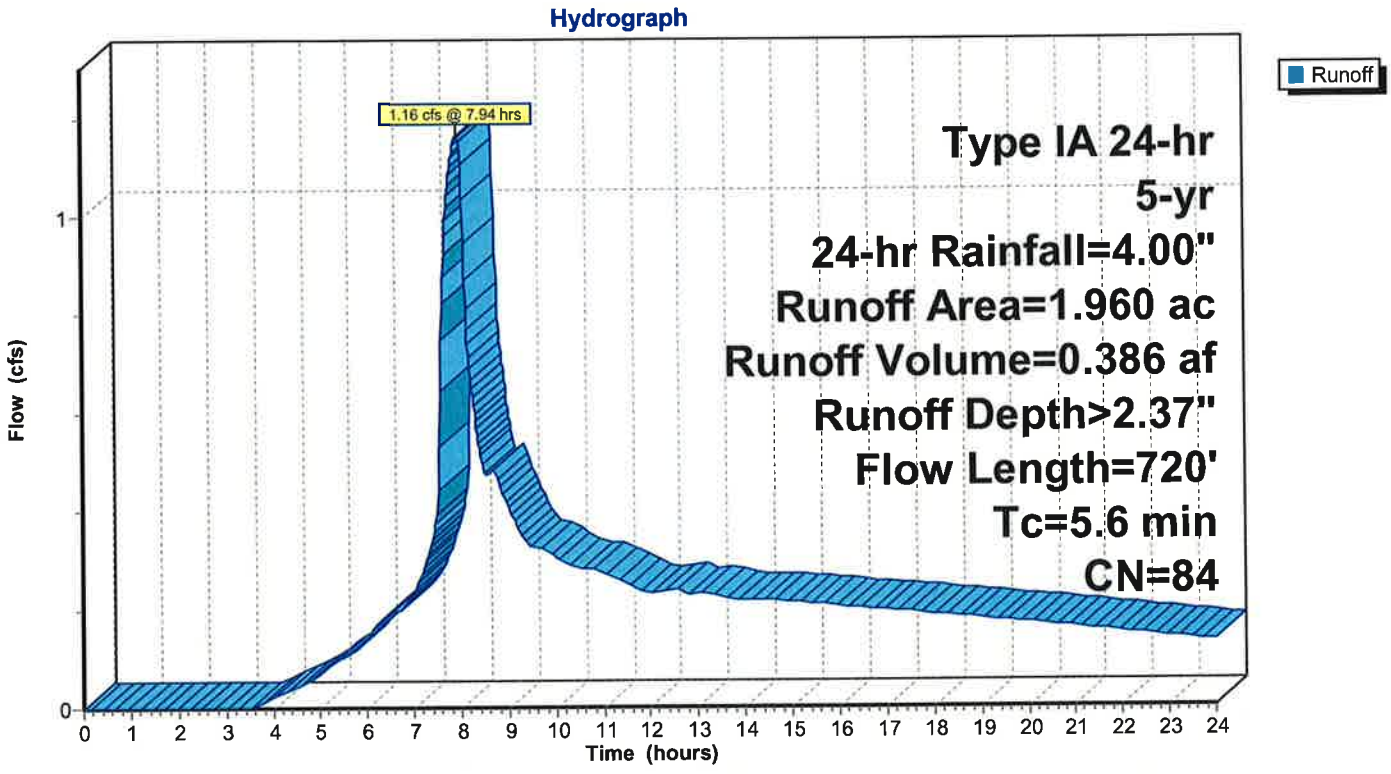
Runoff = 1.16 cfs @ 7.94 hrs, Volume= 0.386 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 5-yr, 24-hr Rainfall=4.00"

Area (ac)	CN	Description
1.960	84	50-75% Grass cover, Fair, HSG D
1.960		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	100	0.2600	0.47		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.6	226	0.1593	6.43		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.4	394		4.76		**Direct Entry, Channel**
5.6	720	Total			

Subcatchment 9S: WD-9



Summary for Subcatchment 10S: WD-10

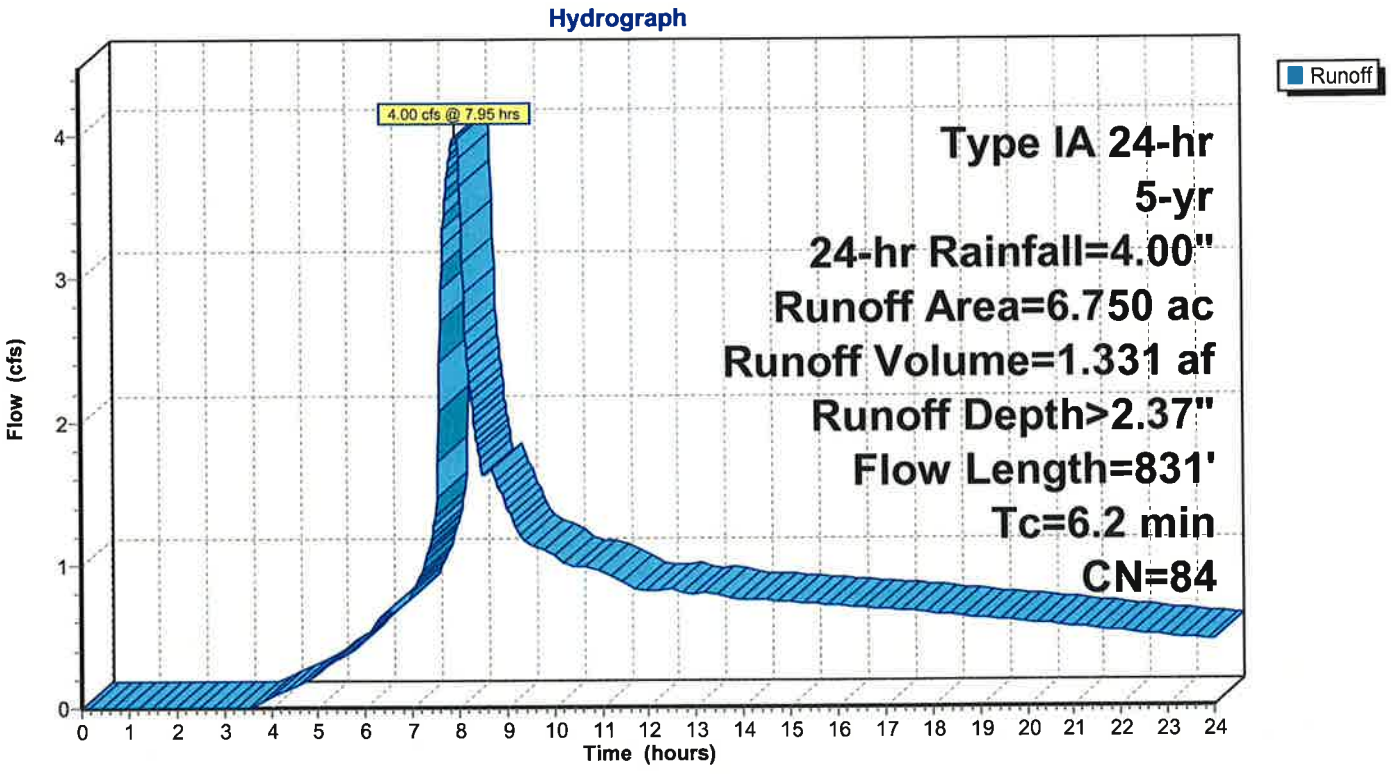
Runoff = 4.00 cfs @ 7.95 hrs, Volume= 1.331 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 5-yr, 24-hr Rainfall=4.00"

Area (ac)	CN	Description
6.750	84	50-75% Grass cover, Fair, HSG D
6.750		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	100	0.3100	0.50		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.4	190	0.2263	7.66		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.5	541		3.66		**Direct Entry, Channel**
6.2	831	Total			

Subcatchment 10S: WD-10



Summary for Pond 11P: Southwest Pond

Inflow Area = 93.040 ac, 0.00% Impervious, Inflow Depth > 2.36" for 5-yr, 24-hr event
Inflow = 53.93 cfs @ 8.01 hrs, Volume= 18.302 af
Outflow = 17.77 cfs @ 9.24 hrs, Volume= 17.755 af, Atten= 67%, Lag= 73.6 min
Primary = 17.77 cfs @ 9.24 hrs, Volume= 17.755 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Peak Elev= 275.34' @ 9.24 hrs Surf.Area= 0.000 ac Storage= 3.055 af

Plug-Flow detention time= 90.4 min calculated for 17.755 af (97% of inflow)
Center-of-Mass det. time= 70.9 min (844.9 - 774.1)

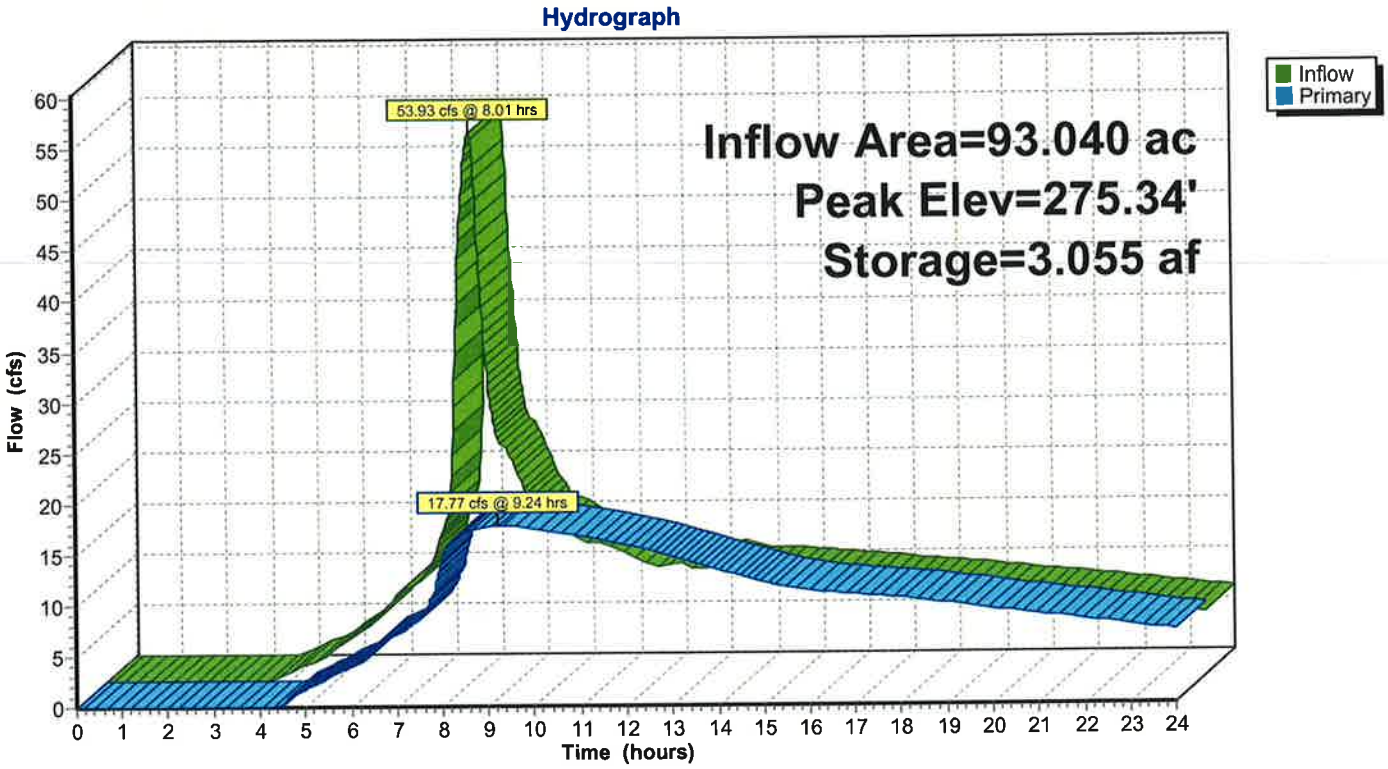
Volume	Invert	Avail.Storage	Storage Description
#1	266.50'	9.426 af	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (acre-feet)
266.50	0.000
268.00	0.085
270.00	0.438
272.00	1.103
274.00	2.121
276.00	3.510
278.00	5.214
280.00	7.179
280.50	7.713
282.00	9.426

Device	Routing	Invert	Outlet Devices
#1	Primary	267.50'	**36.0" Round Culvert** L= 104.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 267.50' / 266.50' S= 0.0096 '/' Cc= 0.900 n= 0.015 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	267.50'	**12.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	269.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#4	Device 1	272.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#5	Device 1	278.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=17.77 cfs @ 9.24 hrs HW=275.34' TW=267.00' (Fixed TW Elev= 267.00')
↑—**1=Culvert** (Passes 17.77 cfs of 85.73 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 10.25 cfs @ 13.05 fps)
—**3=Orifice/Grate** (Orifice Controls 4.47 cfs @ 11.39 fps)
—**4=Orifice/Grate** (Orifice Controls 3.05 cfs @ 7.76 fps)
—**5=Orifice/Grate** (Controls 0.00 cfs)

Pond 11P: Southwest Pond



Summary for Subcatchment 1S: WD-1

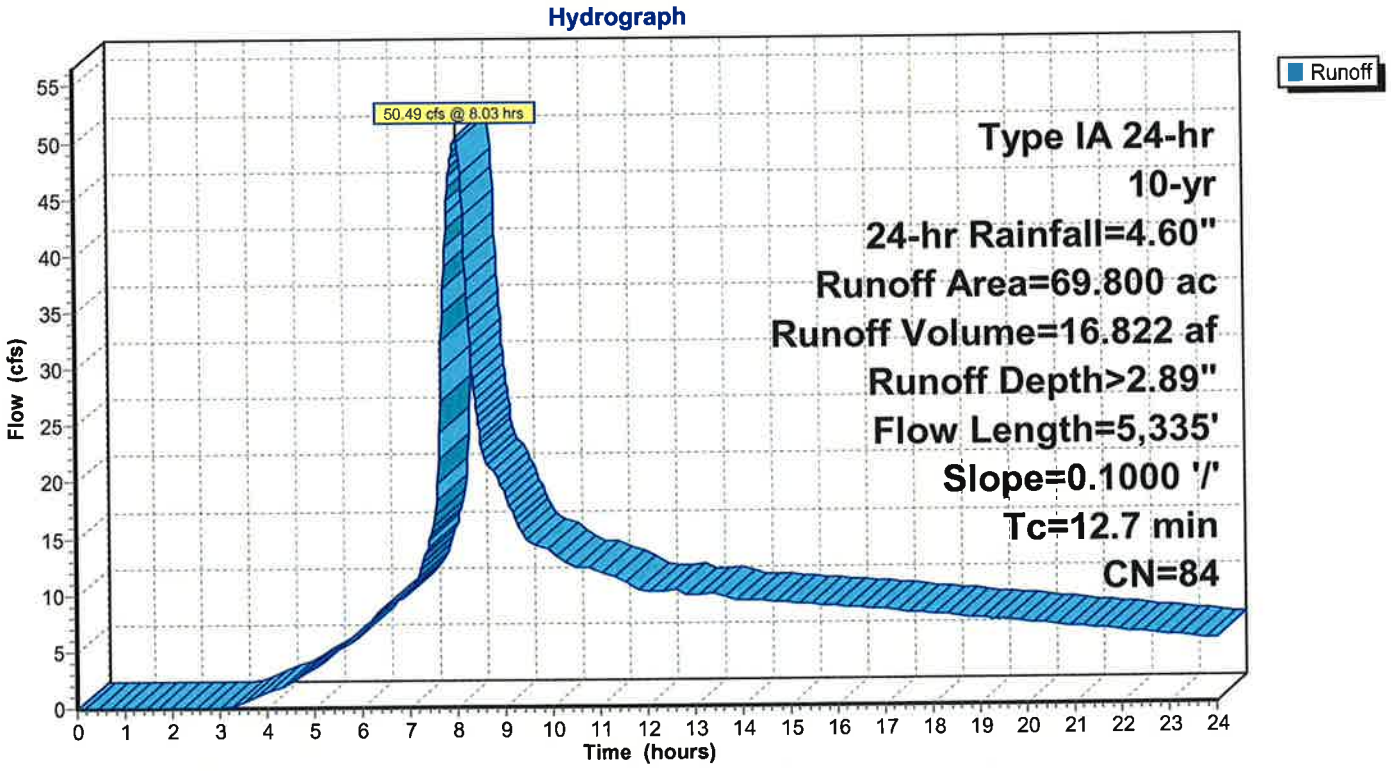
Runoff = 50.49 cfs @ 8.03 hrs, Volume= 16.822 af, Depth> 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10-yr, 24-hr Rainfall=4.60"

Area (ac)	CN	Description
69.800	84	50-75% Grass cover, Fair, HSG D
69.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.1000	0.32		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.5	145	0.1000	5.09		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.0	5,090		12.09		**Direct Entry, Channel**
12.7	5,335	Total			

Subcatchment 1S: WD-1



Summary for Subcatchment 2S: WD-2

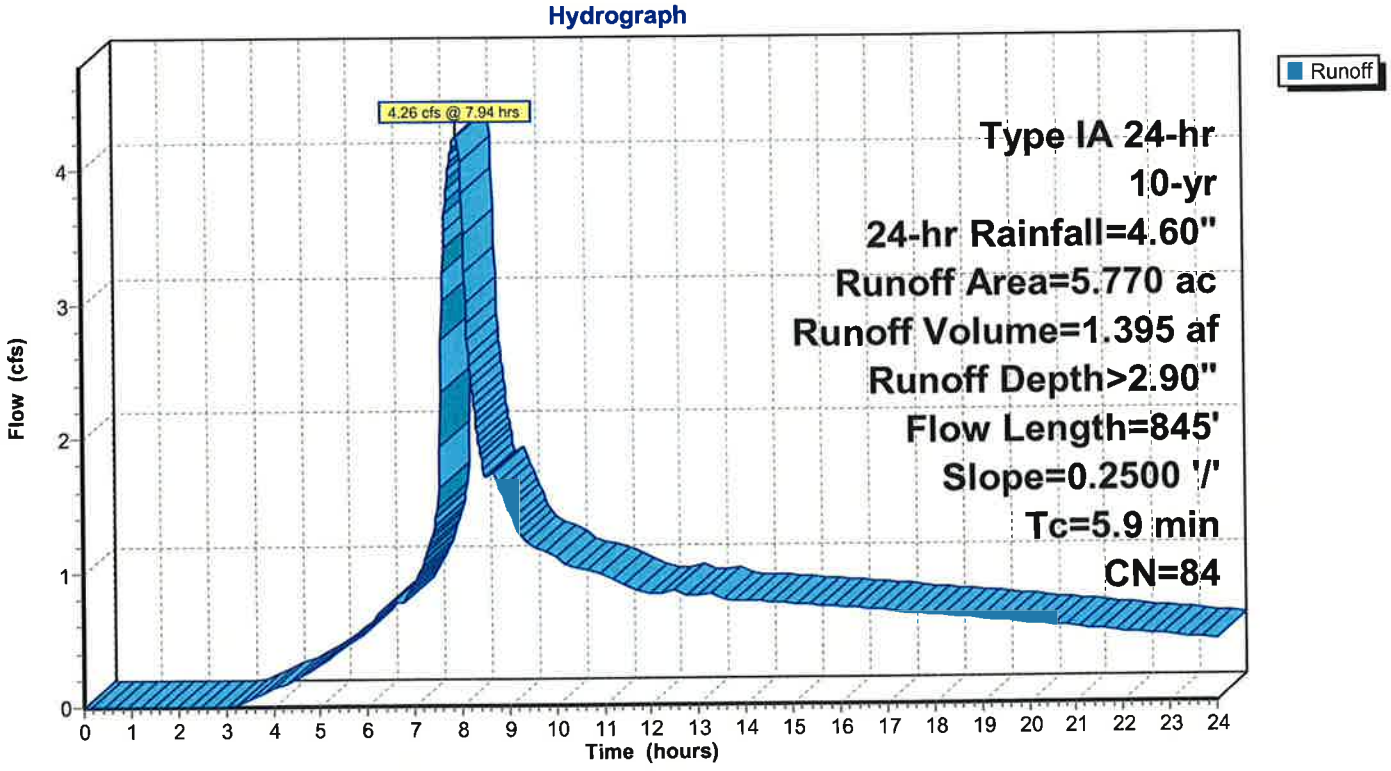
Runoff = 4.26 cfs @ 7.94 hrs, Volume= 1.395 af, Depth> 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10-yr, 24-hr Rainfall=4.60"

Area (ac)	CN	Description
5.770	84	50-75% Grass cover, Fair, HSG D
5.770		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	100	0.2500	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.2	100	0.2500	8.05		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.1	645		5.08		**Direct Entry, Channel**
5.9	845	Total			

Subcatchment 2S: WD-2



Summary for Subcatchment 3S: WD-3

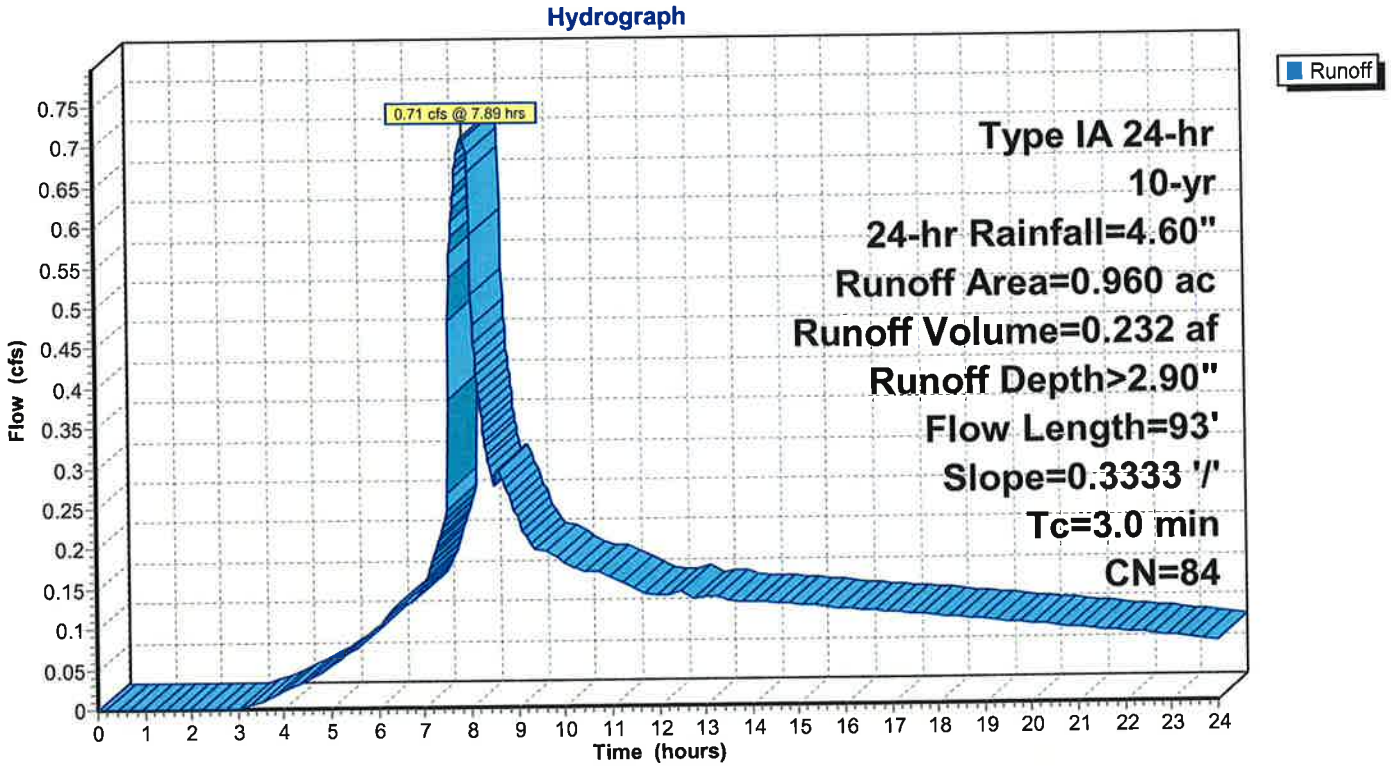
Runoff = 0.71 cfs @ 7.89 hrs, Volume= 0.232 af, Depth> 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10-yr, 24-hr Rainfall=4.60"

Area (ac)	CN	Description
0.960	84	50-75% Grass cover, Fair, HSG D
0.960		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	93	0.3333	0.51		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"

Subcatchment 3S: WD-3



Summary for Subcatchment 4S: WD-4

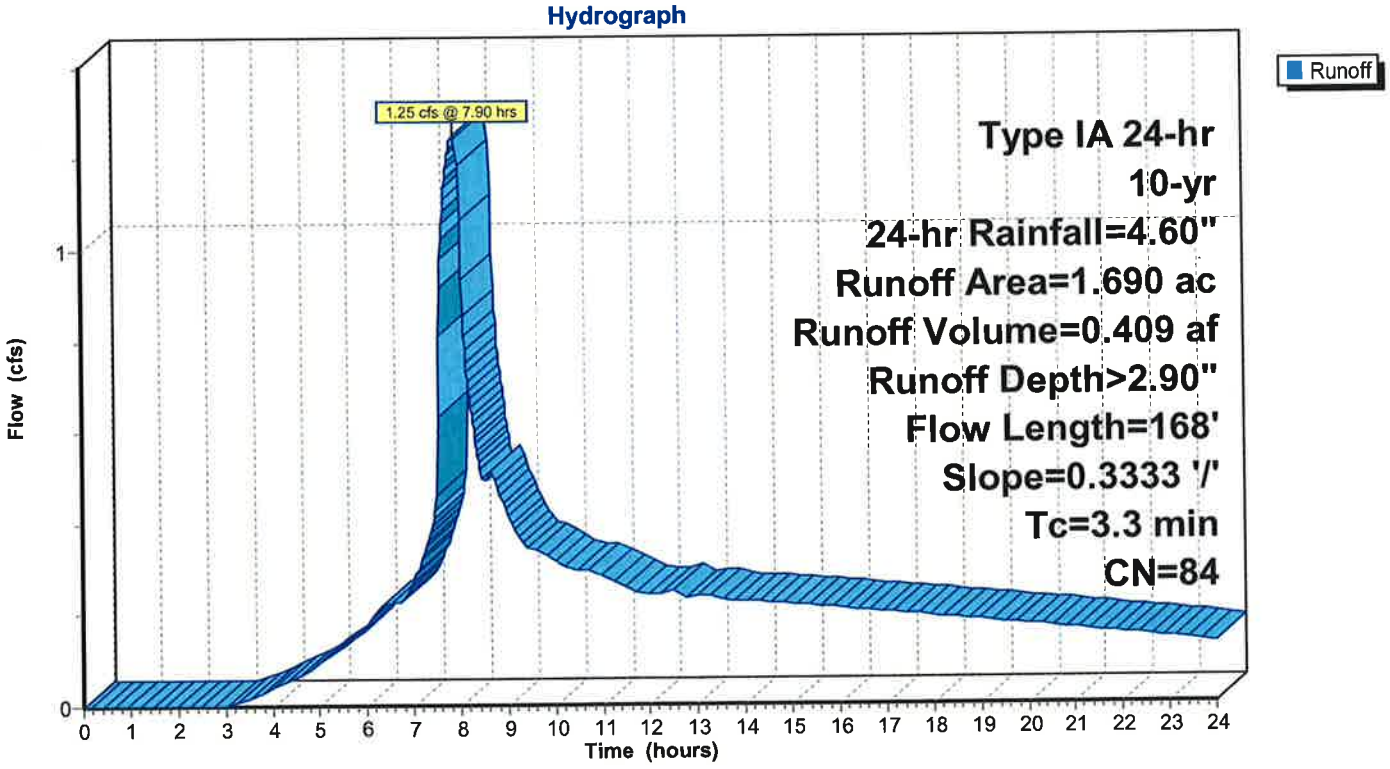
Runoff = 1.25 cfs @ 7.90 hrs, Volume= 0.409 af, Depth> 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10-yr, 24-hr Rainfall=4.60"

Area (ac)	CN	Description
1.690	84	50-75% Grass cover, Fair, HSG D
1.690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	100	0.3333	0.52		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	68	0.3333	9.29		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.3	168	Total			

Subcatchment 4S: WD-4



Summary for Subcatchment 5S: WD-5

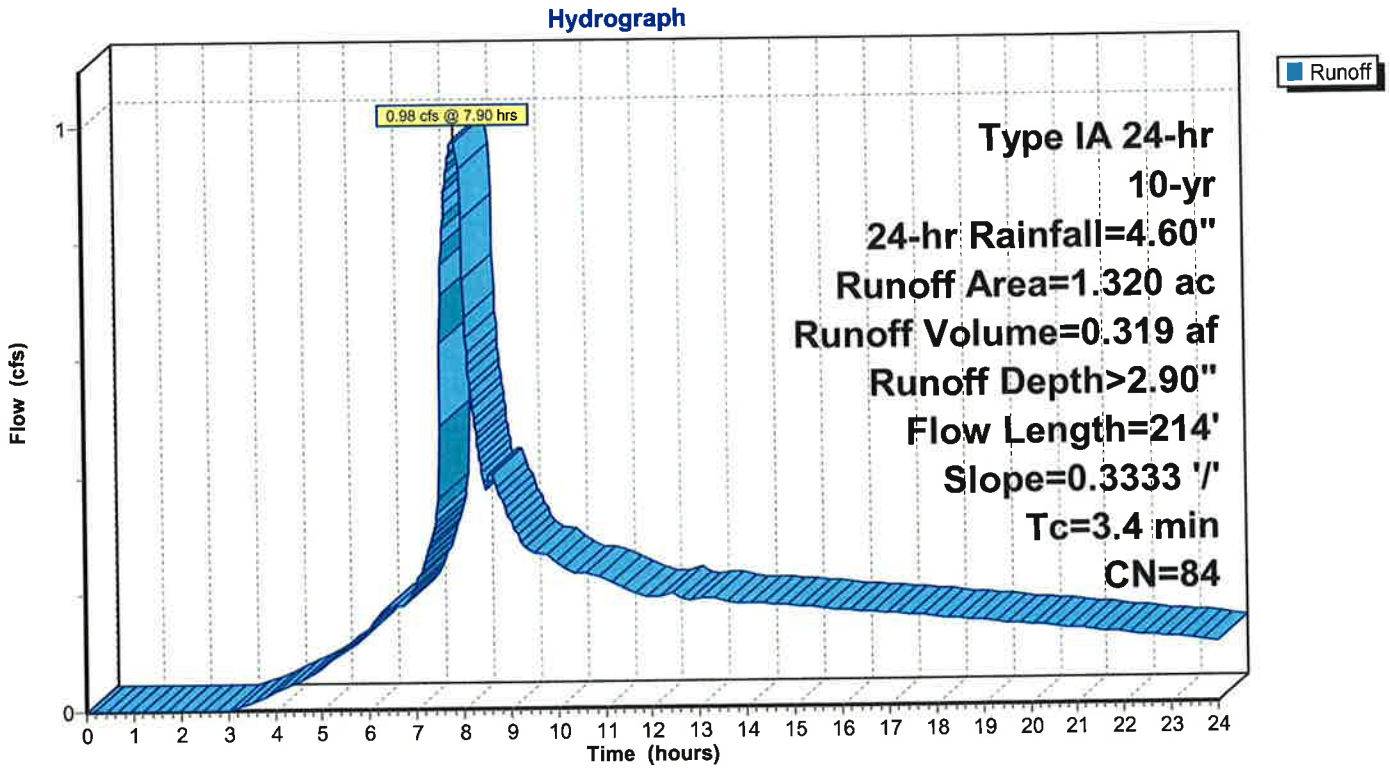
Runoff = 0.98 cfs @ 7.90 hrs, Volume= 0.319 af, Depth> 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10-yr, 24-hr Rainfall=4.60"

Area (ac)	CN	Description
1.320	84	50-75% Grass cover, Fair, HSG D
1.320		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	100	0.3333	0.52		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.2	114	0.3333	9.29		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.4	214	Total			

Subcatchment 5S: WD-5



Summary for Subcatchment 6S: WD-6

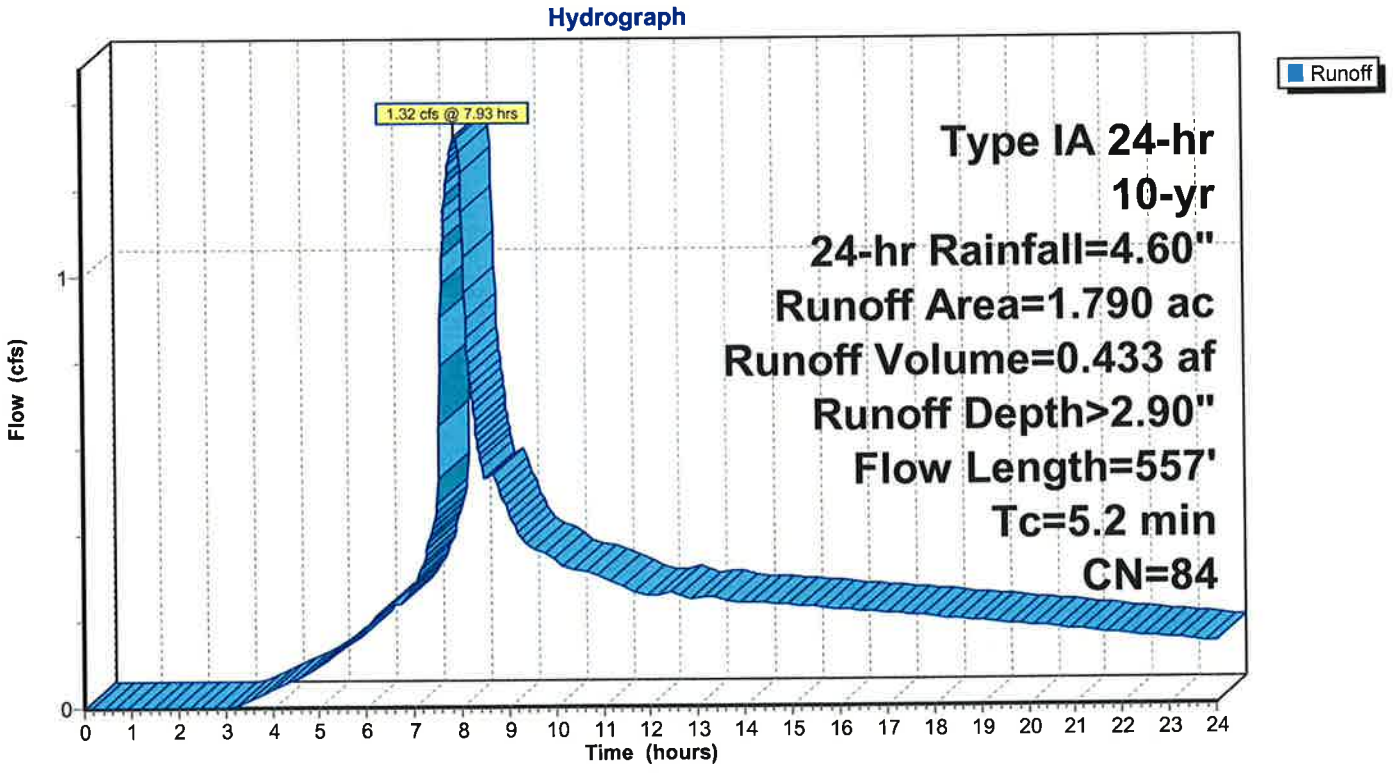
Runoff = 1.32 cfs @ 7.93 hrs, Volume= 0.433 af, Depth> 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10-yr, 24-hr Rainfall=4.60"

Area (ac)	CN	Description
1.790	84	50-75% Grass cover, Fair, HSG D
1.790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2200	0.44		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.5	172	0.1163	5.49		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	285		5.08		**Direct Entry, Channel**
5.2	557	Total			

Subcatchment 6S: WD-6



Summary for Subcatchment 7S: WD-7

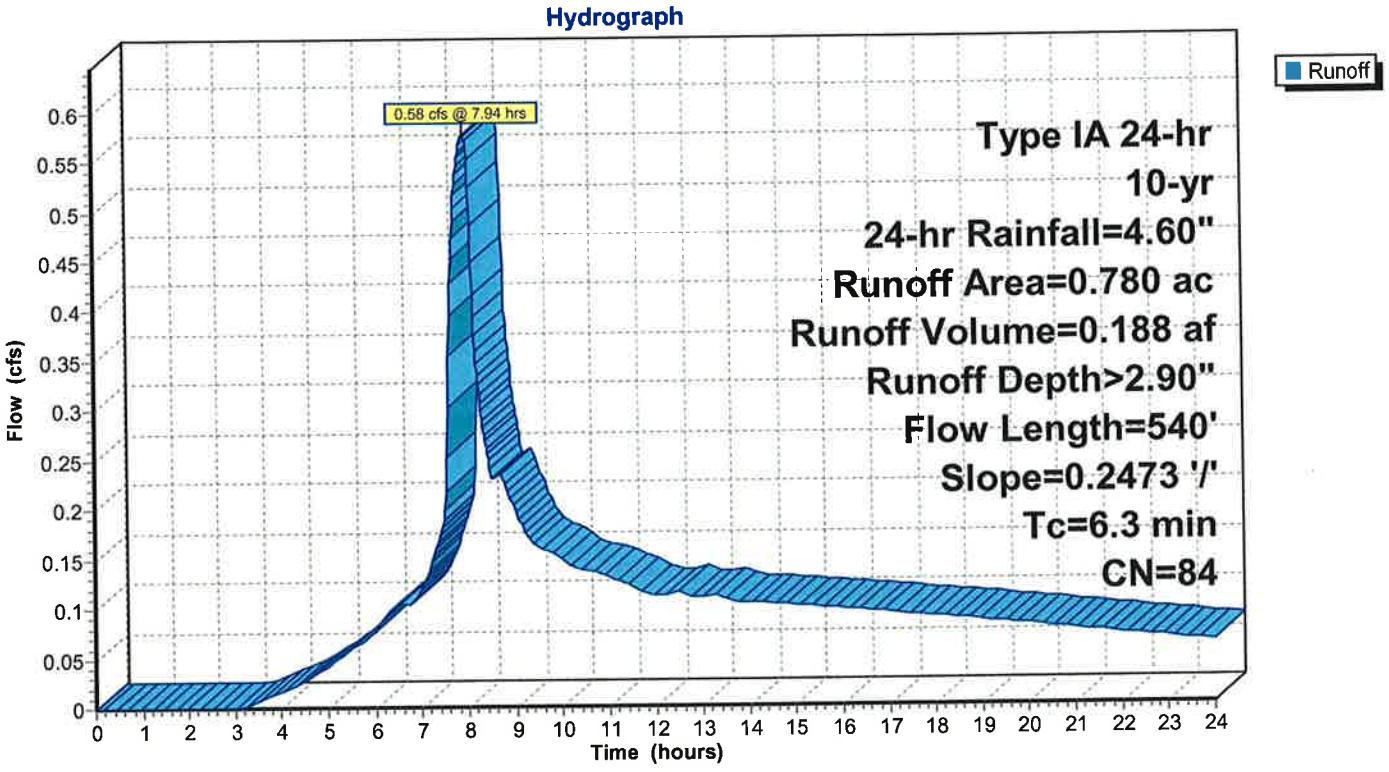
Runoff = 0.58 cfs @ 7.94 hrs, Volume= 0.188 af, Depth> 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10-yr, 24-hr Rainfall=4.60"

Area (ac)	CN	Description
0.780	84	50-75% Grass cover, Fair, HSG D
0.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	93	0.2473	0.45		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
2.9	447		2.56		**Direct Entry, Channel**
6.3	540	Total			

Subcatchment 7S: WD-7



Summary for Subcatchment 8S: WD-8

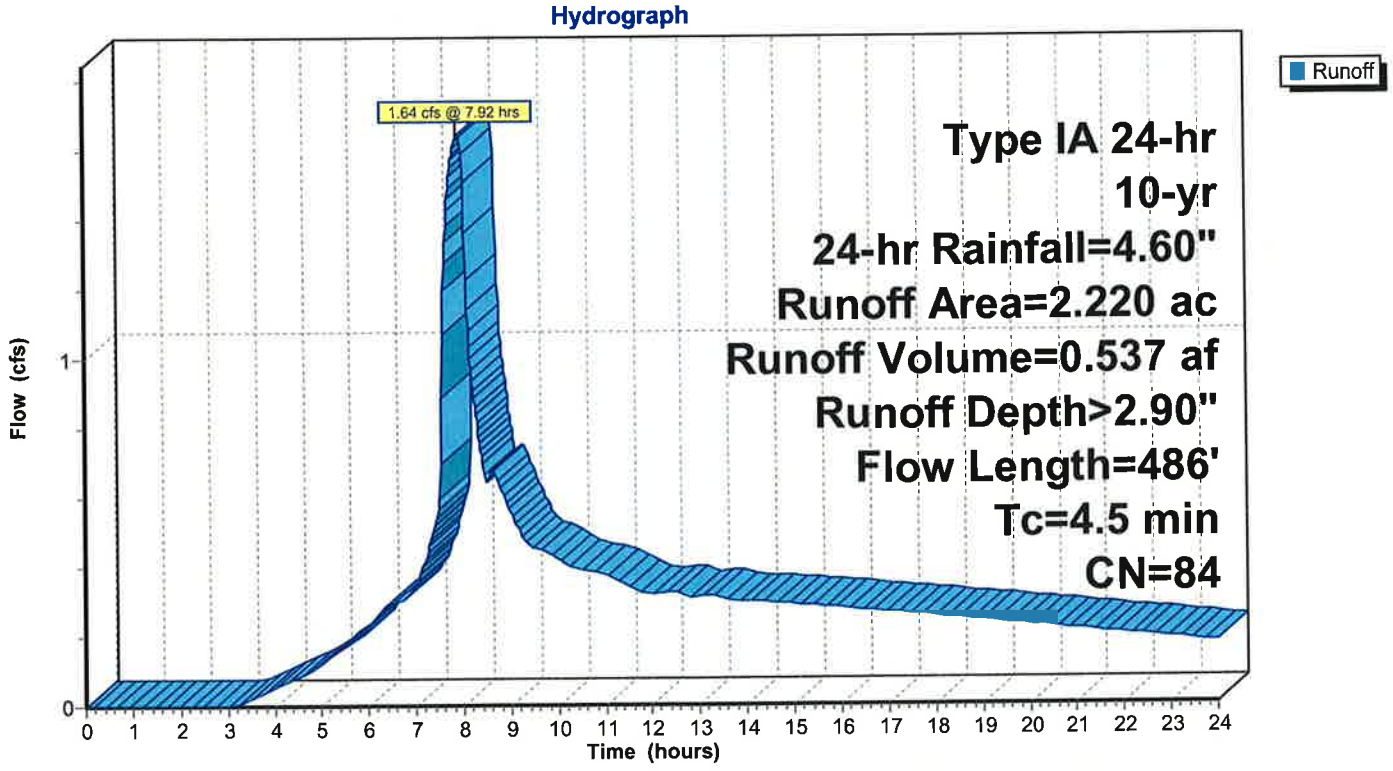
Runoff = 1.64 cfs @ 7.92 hrs, Volume= 0.537 af, Depth> 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10-yr, 24-hr Rainfall=4.60"

Area (ac)	CN	Description
2.220	84	50-75% Grass cover, Fair, HSG D
2.220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	100	0.3200	0.51		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.3	128	0.2344	7.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	258		4.91		**Direct Entry, Channel**
4.5	486	Total			

Subcatchment 8S: WD-8



Summary for Subcatchment 9S: WD-9

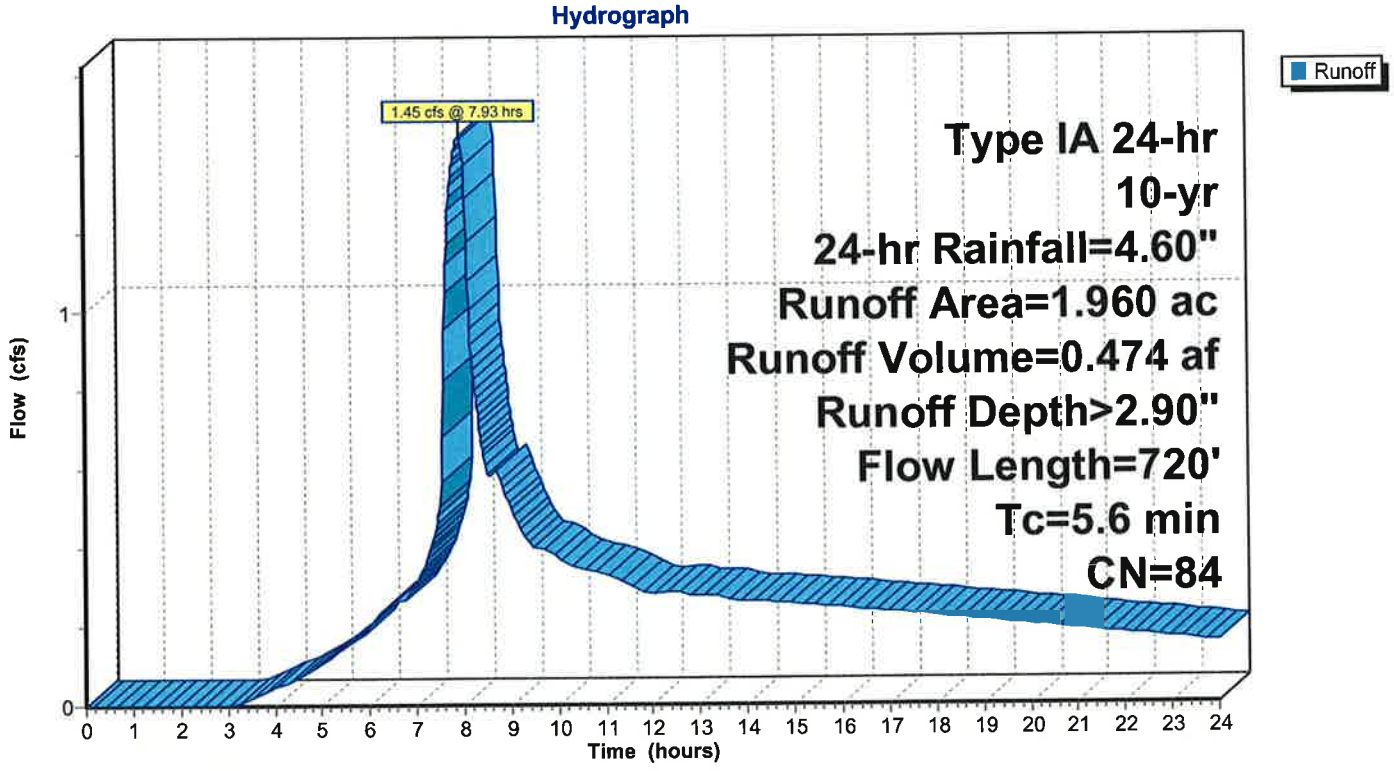
Runoff = 1.45 cfs @ 7.93 hrs, Volume= 0.474 af, Depth> 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10-yr, 24-hr Rainfall=4.60"

Area (ac)	CN	Description
1.960	84	50-75% Grass cover, Fair, HSG D
1.960		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	100	0.2600	0.47		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.6	226	0.1593	6.43		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.4	394		4.76		**Direct Entry, Channel**
5.6	720	Total			

Subcatchment 9S: WD-9



Summary for Subcatchment 10S: WD-10

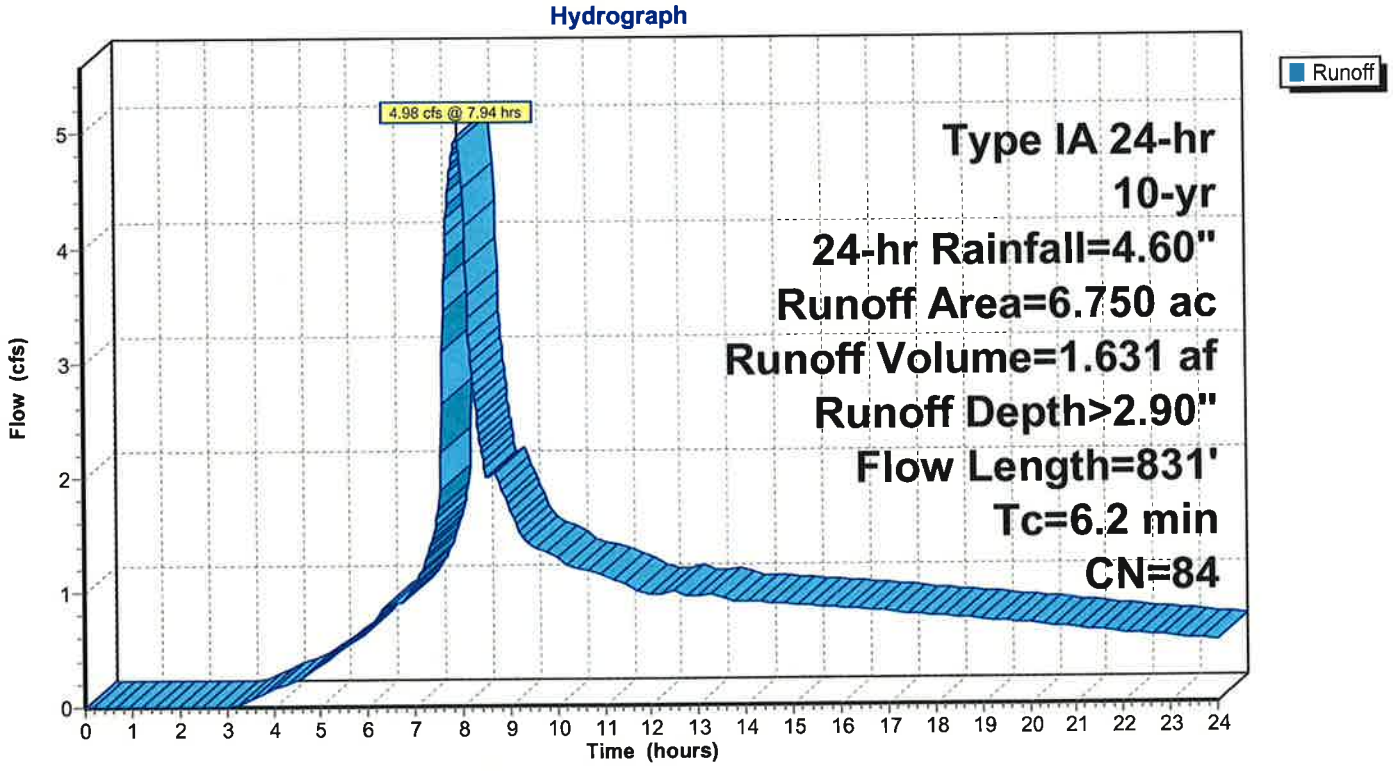
Runoff = 4.98 cfs @ 7.94 hrs, Volume= 1.631 af, Depth> 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10-yr, 24-hr Rainfall=4.60"

Area (ac)	CN	Description
6.750	84	50-75% Grass cover, Fair, HSG D
6.750		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	100	0.3100	0.50		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.4	190	0.2263	7.66		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.5	541		3.66		**Direct Entry, Channel**
6.2	831	Total			

Subcatchment 10S: WD-10



Summary for Pond 11P: Southwest Pond

Inflow Area = 93.040 ac, 0.00% Impervious, Inflow Depth > 2.89" for 10-yr, 24-hr event
Inflow = 67.26 cfs @ 8.00 hrs, Volume= 22.441 af
Outflow = 20.01 cfs @ 9.40 hrs, Volume= 21.631 af, Atten= 70%, Lag= 83.8 min
Primary = 20.01 cfs @ 9.40 hrs, Volume= 21.631 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Peak Elev= 276.78' @ 9.40 hrs Surf.Area= 0.000 ac Storage= 4.174 af

Plug-Flow detention time= 108.3 min calculated for 21.613 af (96% of inflow)
Center-of-Mass det. time= 84.4 min (846.9 - 762.5)

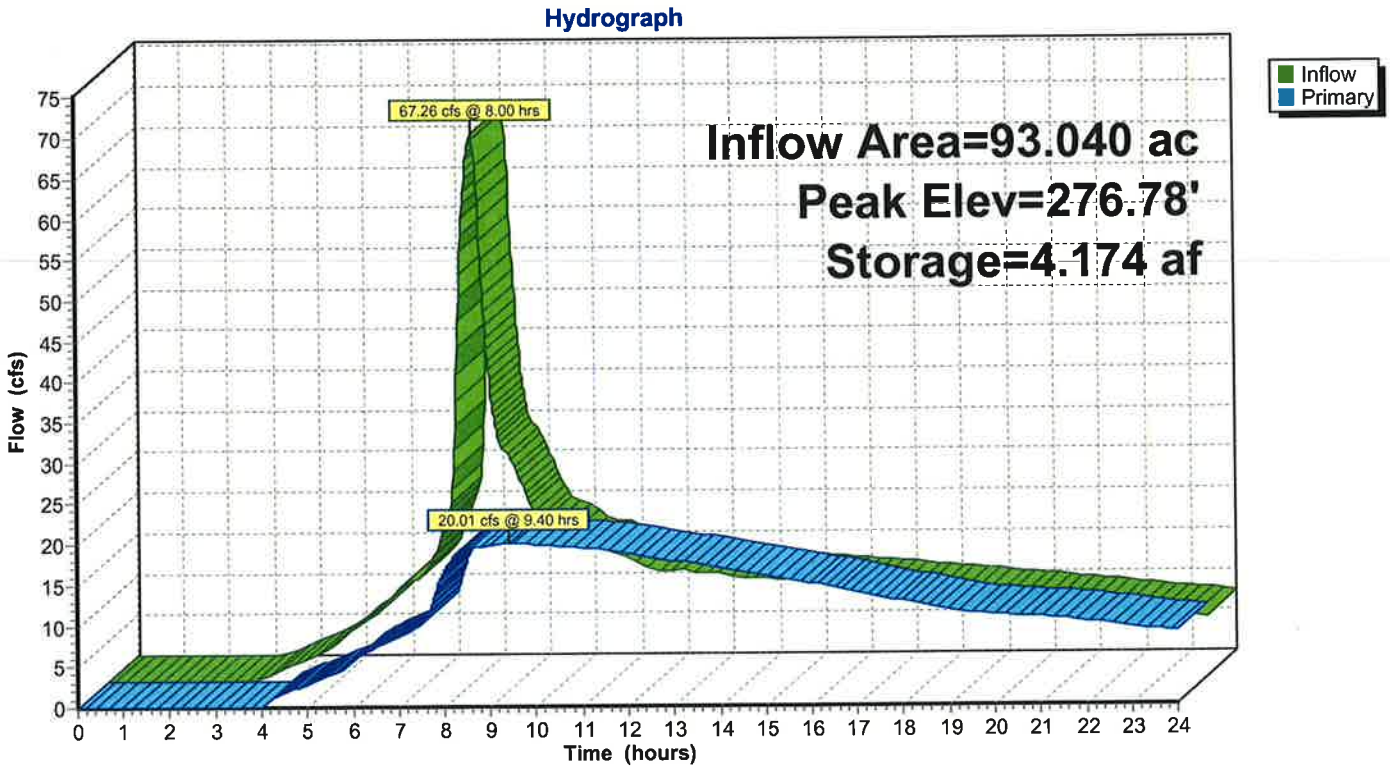
Volume	Invert	Avail.Storage	Storage Description
#1	266.50'	9.426 af	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (acre-feet)
266.50	0.000
268.00	0.085
270.00	0.438
272.00	1.103
274.00	2.121
276.00	3.510
278.00	5.214
280.00	7.179
280.50	7.713
282.00	9.426

Device	Routing	Invert	Outlet Devices
#1	Primary	267.50'	**36.0" Round Culvert** L= 104.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 267.50' / 266.50' S= 0.0096 '/' Cc= 0.900 n= 0.015 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	267.50'	**12.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	269.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#4	Device 1	272.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#5	Device 1	278.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=20.01 cfs @ 9.40 hrs HW=276.78' TW=267.00' (Fixed TW Elev= 267.00')
↑—**1=Culvert** (Passes 20.01 cfs of 94.93 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 11.21 cfs @ 14.27 fps)
—**3=Orifice/Grate** (Orifice Controls 5.01 cfs @ 12.77 fps)
—**4=Orifice/Grate** (Orifice Controls 3.80 cfs @ 9.67 fps)
—**5=Orifice/Grate** (Controls 0.00 cfs)

Pond 11P: Southwest Pond



Summary for Subcatchment 1S: WD-1

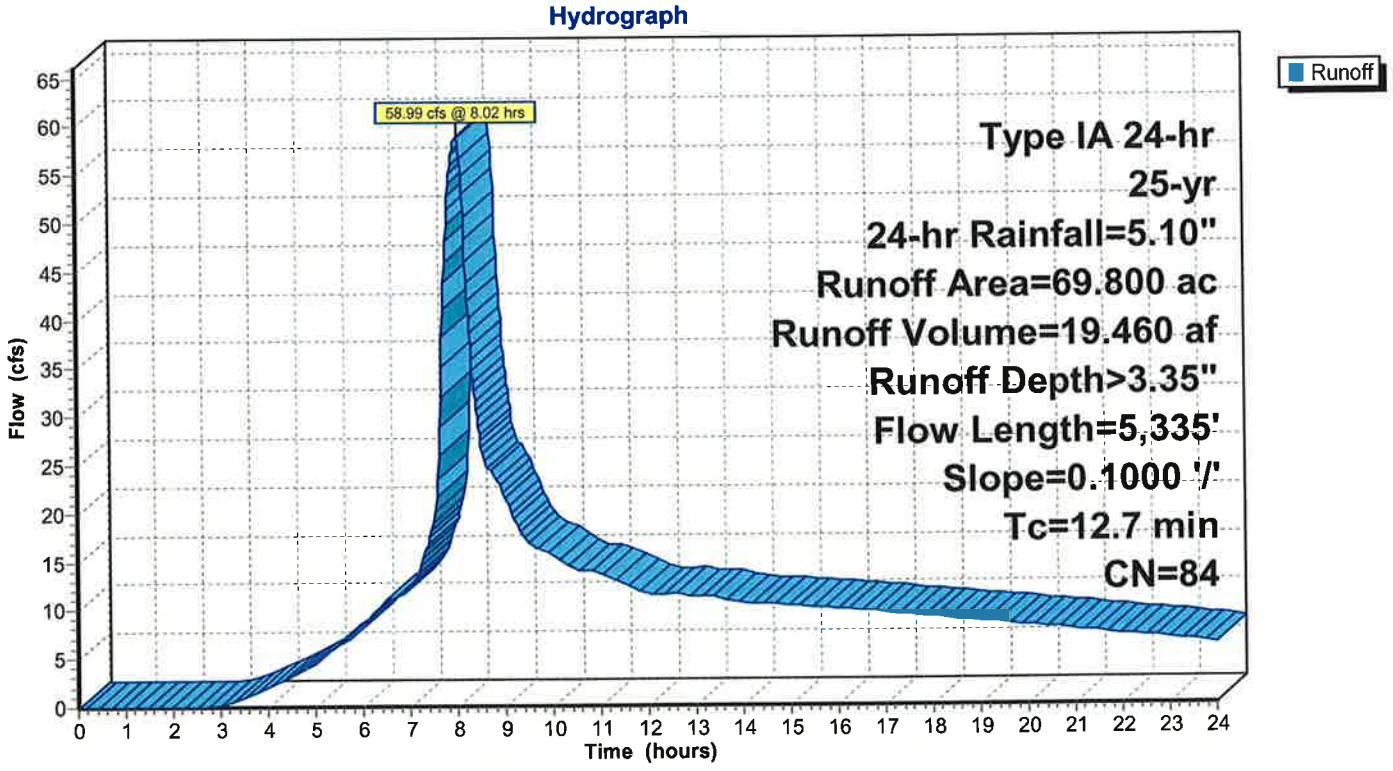
Runoff = 58.99 cfs @ 8.02 hrs, Volume= 19.460 af, Depth> 3.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25-yr, 24-hr Rainfall=5.10"

Area (ac)	CN	Description
69.800	84	50-75% Grass cover, Fair, HSG D
69.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.1000	0.32		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.5	145	0.1000	5.09		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.0	5,090		12.09		**Direct Entry, Channel**
12.7	5,335	Total			

Subcatchment 1S: WD-1



Summary for Subcatchment 2S: WD-2

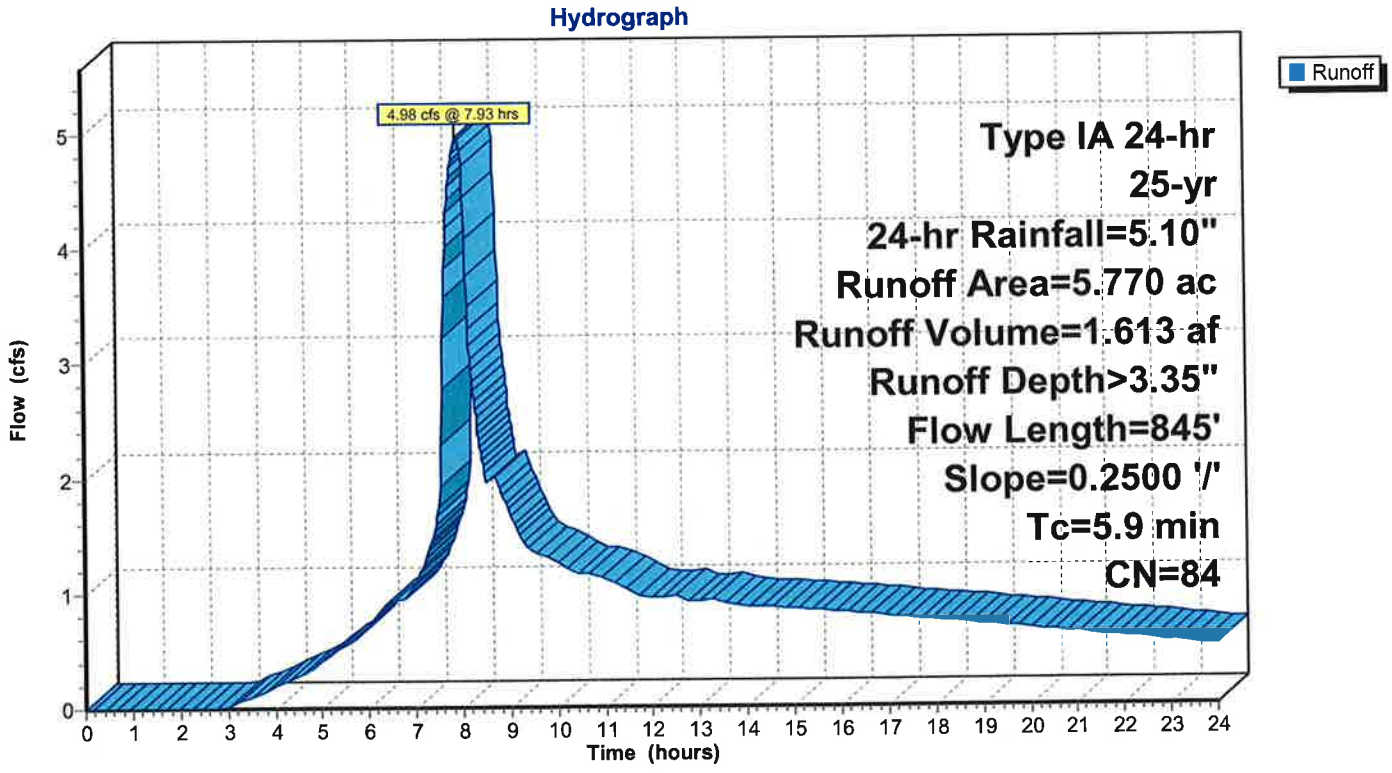
Runoff = 4.98 cfs @ 7.93 hrs, Volume= 1.613 af, Depth> 3.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25-yr, 24-hr Rainfall=5.10"

Area (ac)	CN	Description
5.770	84	50-75% Grass cover, Fair, HSG D
5.770		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	100	0.2500	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.2	100	0.2500	8.05		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.1	645		5.08		**Direct Entry, Channel**
5.9	845	Total			

Subcatchment 2S: WD-2



Summary for Subcatchment 3S: WD-3

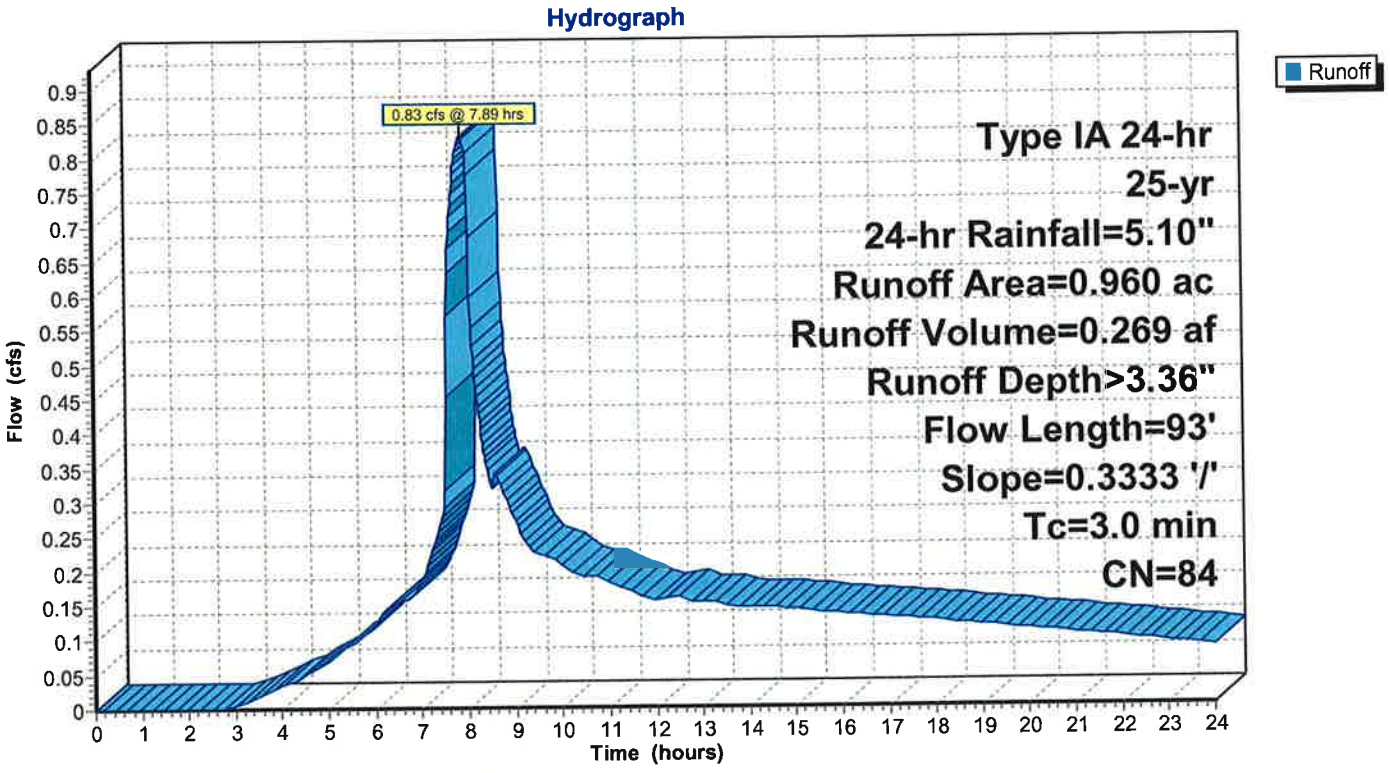
Runoff = 0.83 cfs @ 7.89 hrs, Volume= 0.269 af, Depth> 3.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25-yr, 24-hr Rainfall=5.10"

Area (ac)	CN	Description
0.960	84	50-75% Grass cover, Fair, HSG D
0.960		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	93	0.3333	0.51		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"

Subcatchment 3S: WD-3



Summary for Subcatchment 4S: WD-4

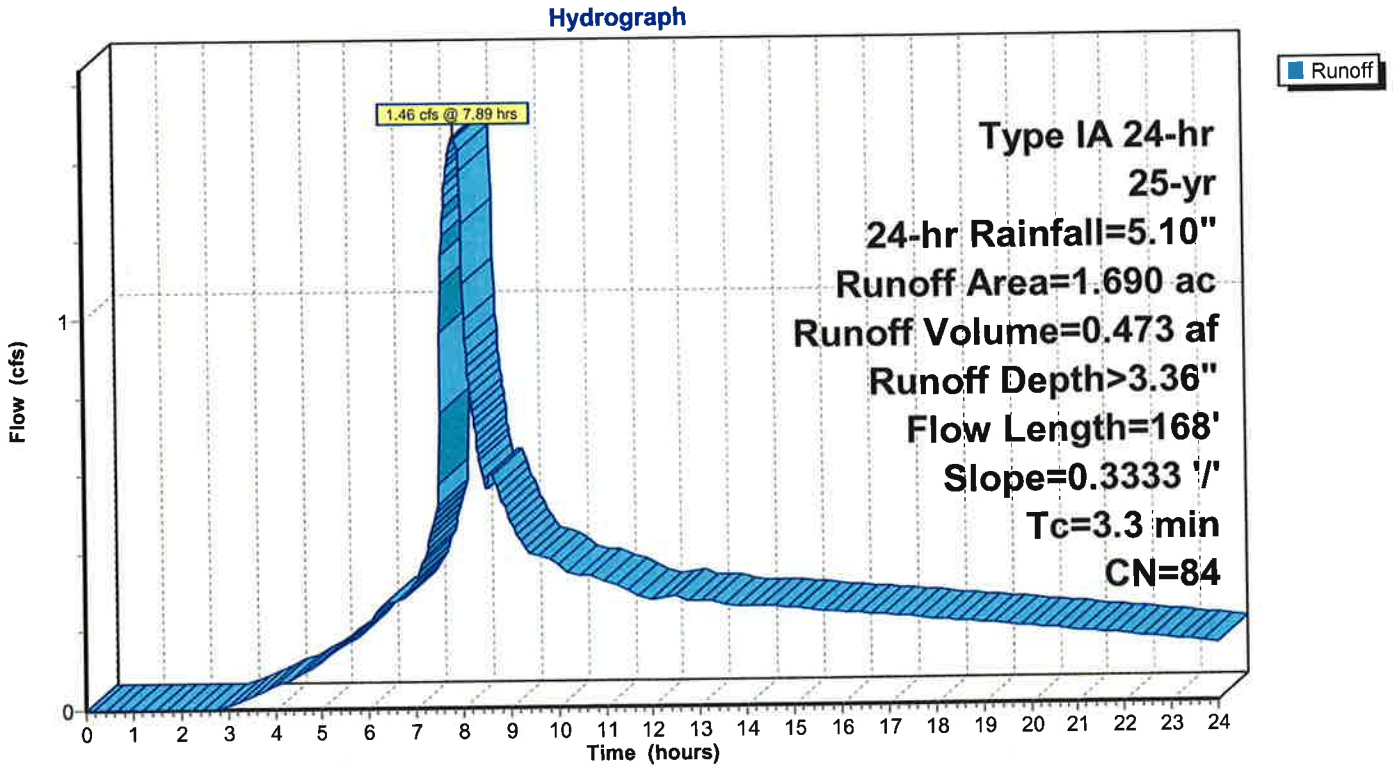
Runoff = 1.46 cfs @ 7.89 hrs, Volume= 0.473 af, Depth> 3.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25-yr, 24-hr Rainfall=5.10"

Area (ac)	CN	Description
1.690	84	50-75% Grass cover, Fair, HSG D
1.690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	100	0.3333	0.52		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	68	0.3333	9.29		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.3	168	Total			

Subcatchment 4S: WD-4



Summary for Subcatchment 5S: WD-5

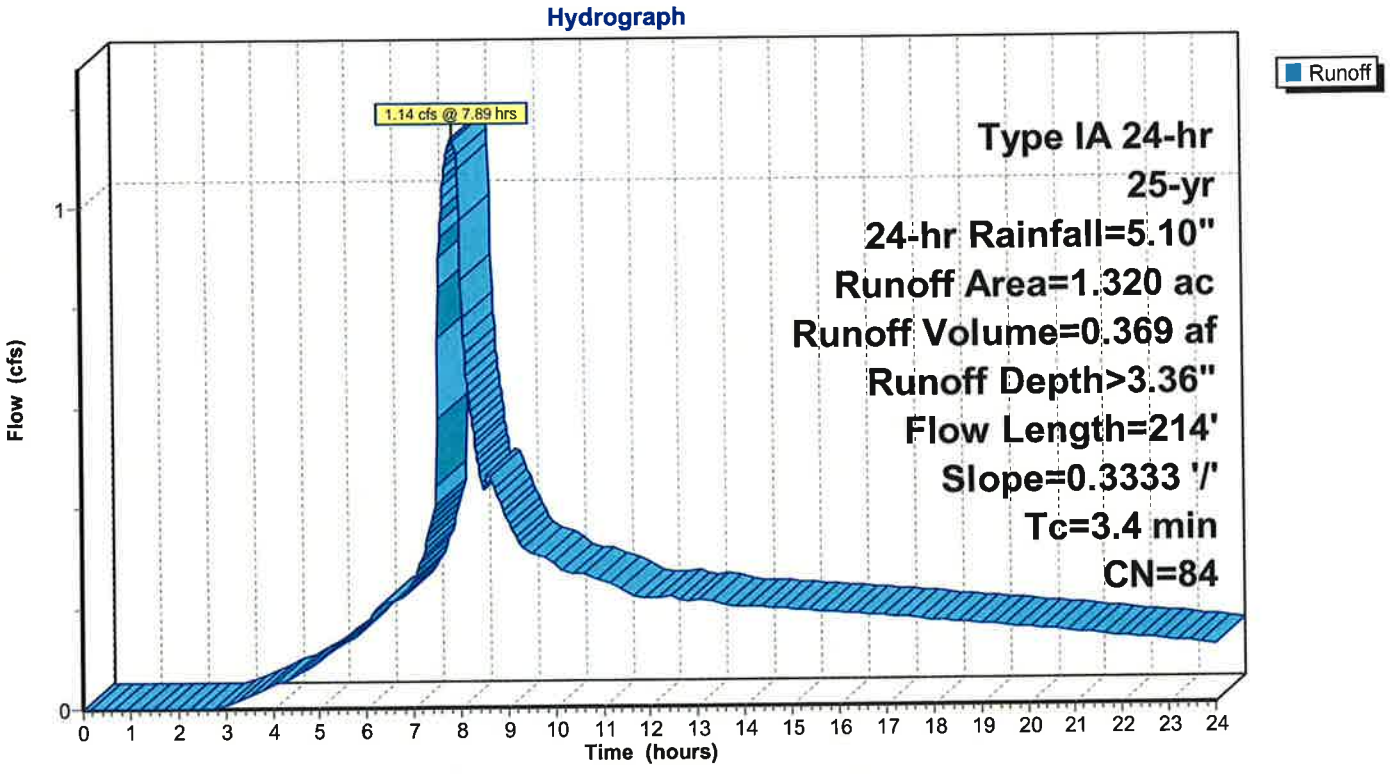
Runoff = 1.14 cfs @ 7.89 hrs, Volume= 0.369 af, Depth> 3.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25-yr, 24-hr Rainfall=5.10"

Area (ac)	CN	Description
1.320	84	50-75% Grass cover, Fair, HSG D
1.320		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	100	0.3333	0.52		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.2	114	0.3333	9.29		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.4	214	Total			

Subcatchment 5S: WD-5



Summary for Subcatchment 6S: WD-6

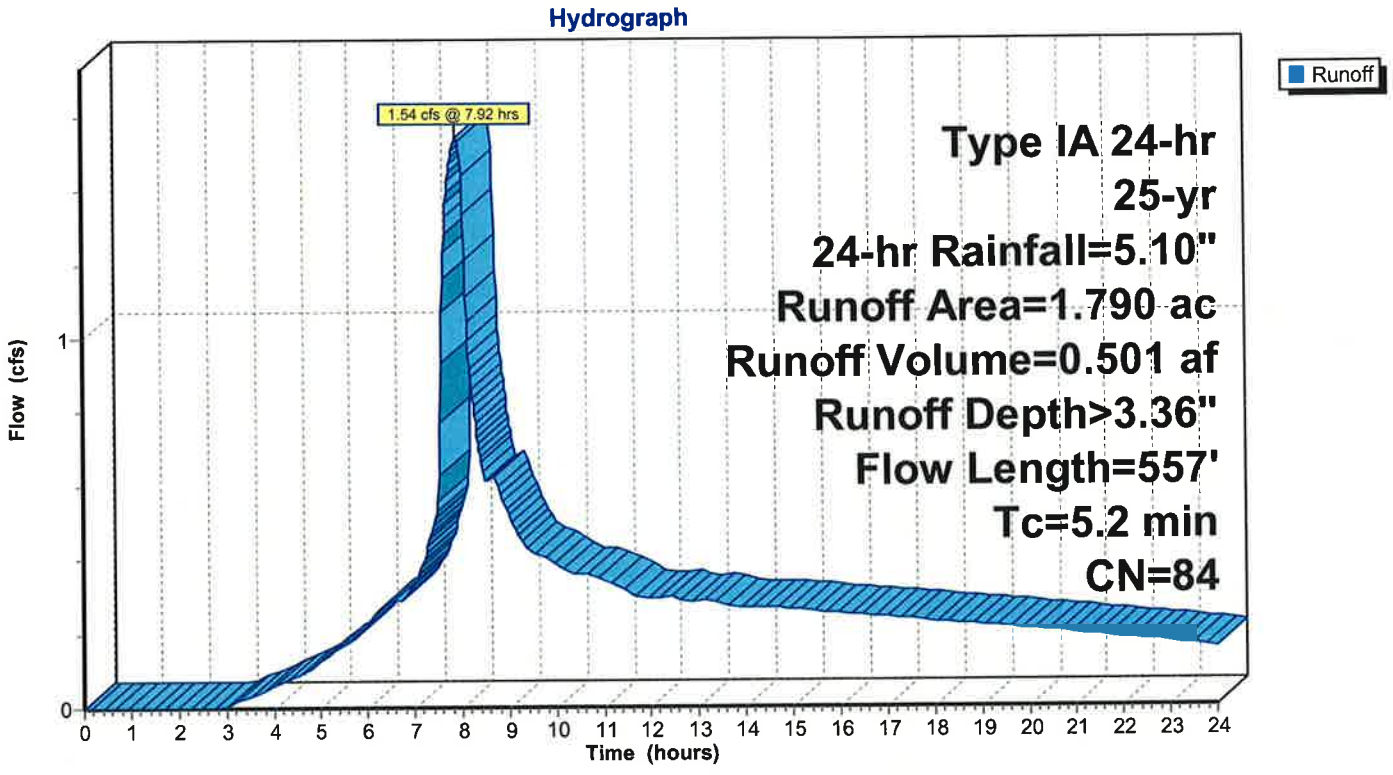
Runoff = 1.54 cfs @ 7.92 hrs, Volume= 0.501 af, Depth> 3.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25-yr, 24-hr Rainfall=5.10"

Area (ac)	CN	Description
1.790	84	50-75% Grass cover, Fair, HSG D
1.790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2200	0.44		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.5	172	0.1163	5.49		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	285		5.08		**Direct Entry, Channel**
5.2	557	Total			

Subcatchment 6S: WD-6



Summary for Subcatchment 7S: WD-7

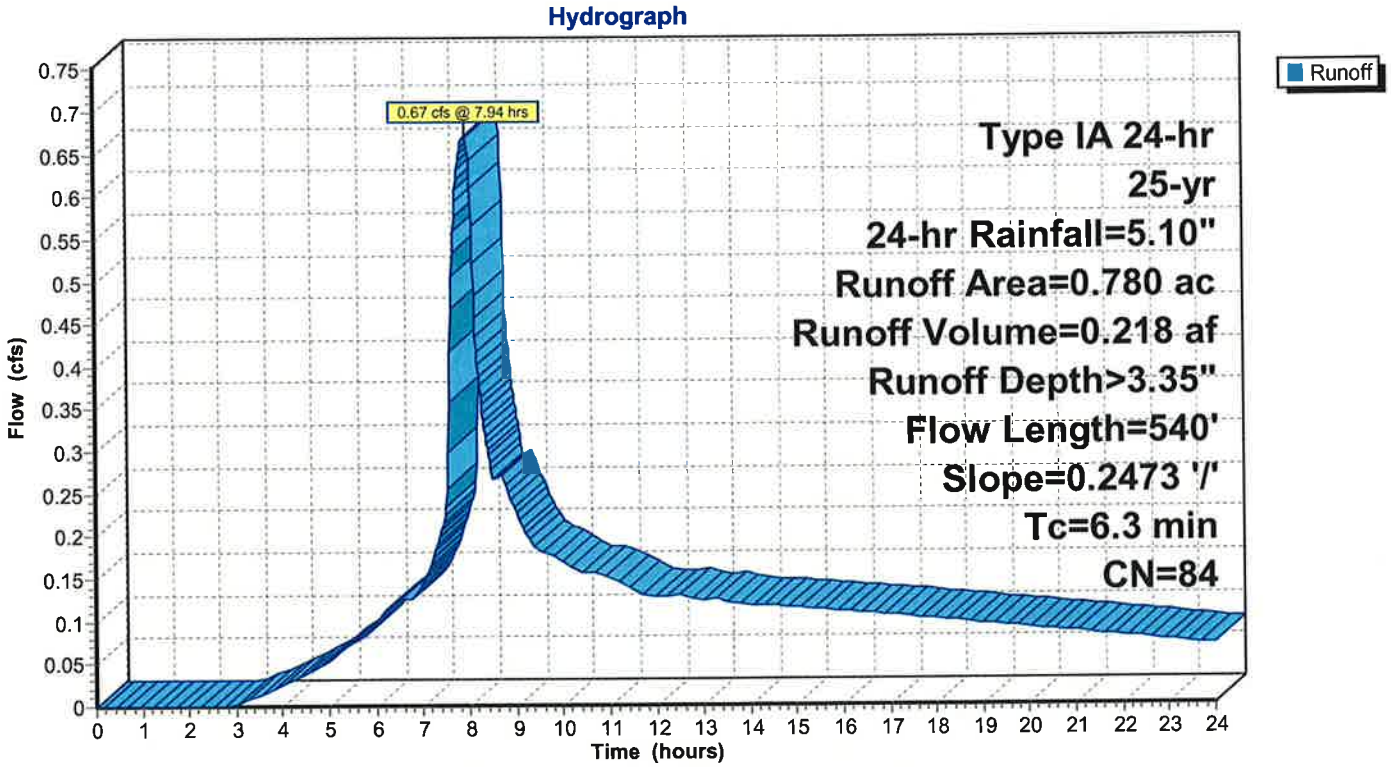
Runoff = 0.67 cfs @ 7.94 hrs, Volume= 0.218 af, Depth> 3.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25-yr, 24-hr Rainfall=5.10"

Area (ac)	CN	Description
0.780	84	50-75% Grass cover, Fair, HSG D
0.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	93	0.2473	0.45		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
2.9	447		2.56		**Direct Entry, Channel**
6.3	540	Total			

Subcatchment 7S: WD-7



Summary for Subcatchment 8S: WD-8

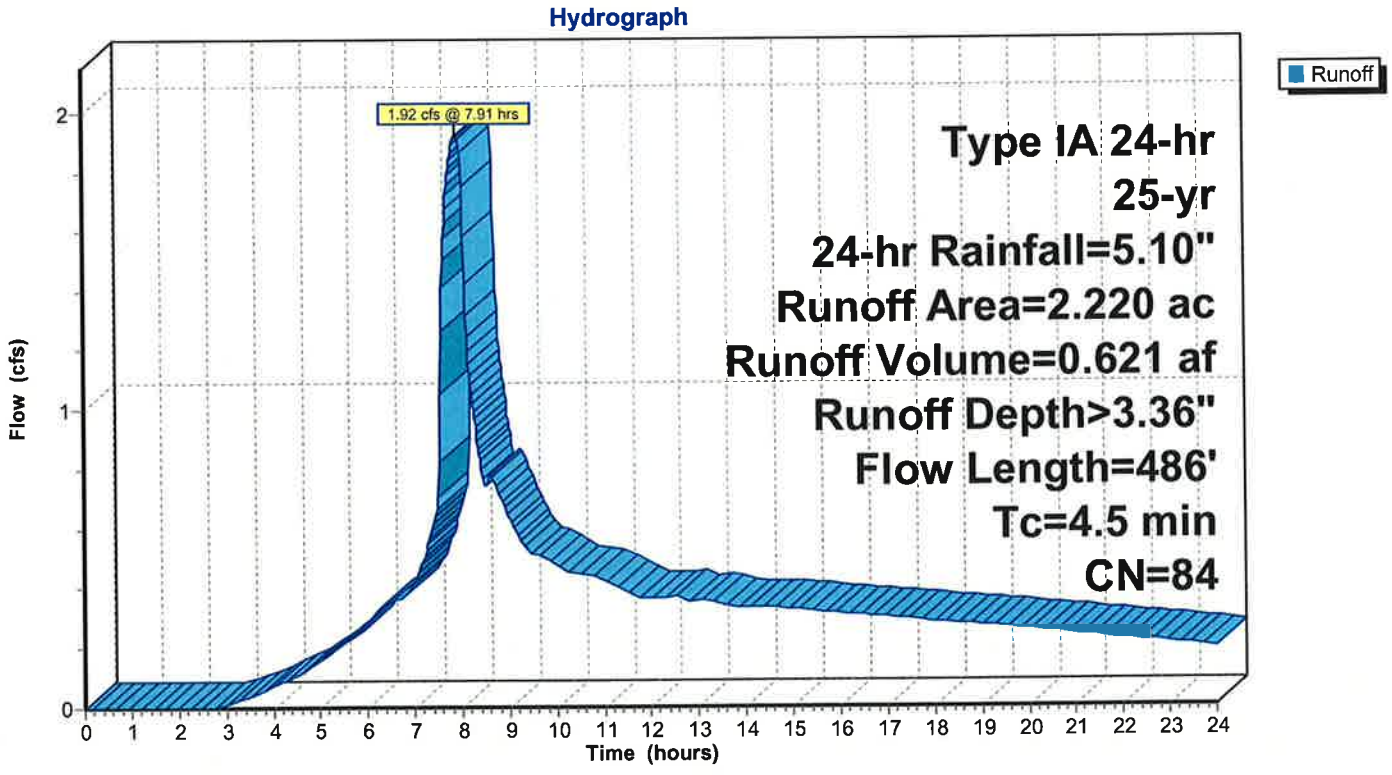
Runoff = 1.92 cfs @ 7.91 hrs, Volume= 0.621 af, Depth> 3.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25-yr, 24-hr Rainfall=5.10"

Area (ac)	CN	Description
2.220	84	50-75% Grass cover, Fair, HSG D
2.220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	100	0.3200	0.51		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.3	128	0.2344	7.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	258		4.91		**Direct Entry, Channel**
4.5	486	Total			

Subcatchment 8S: WD-8



Summary for Subcatchment 9S: WD-9

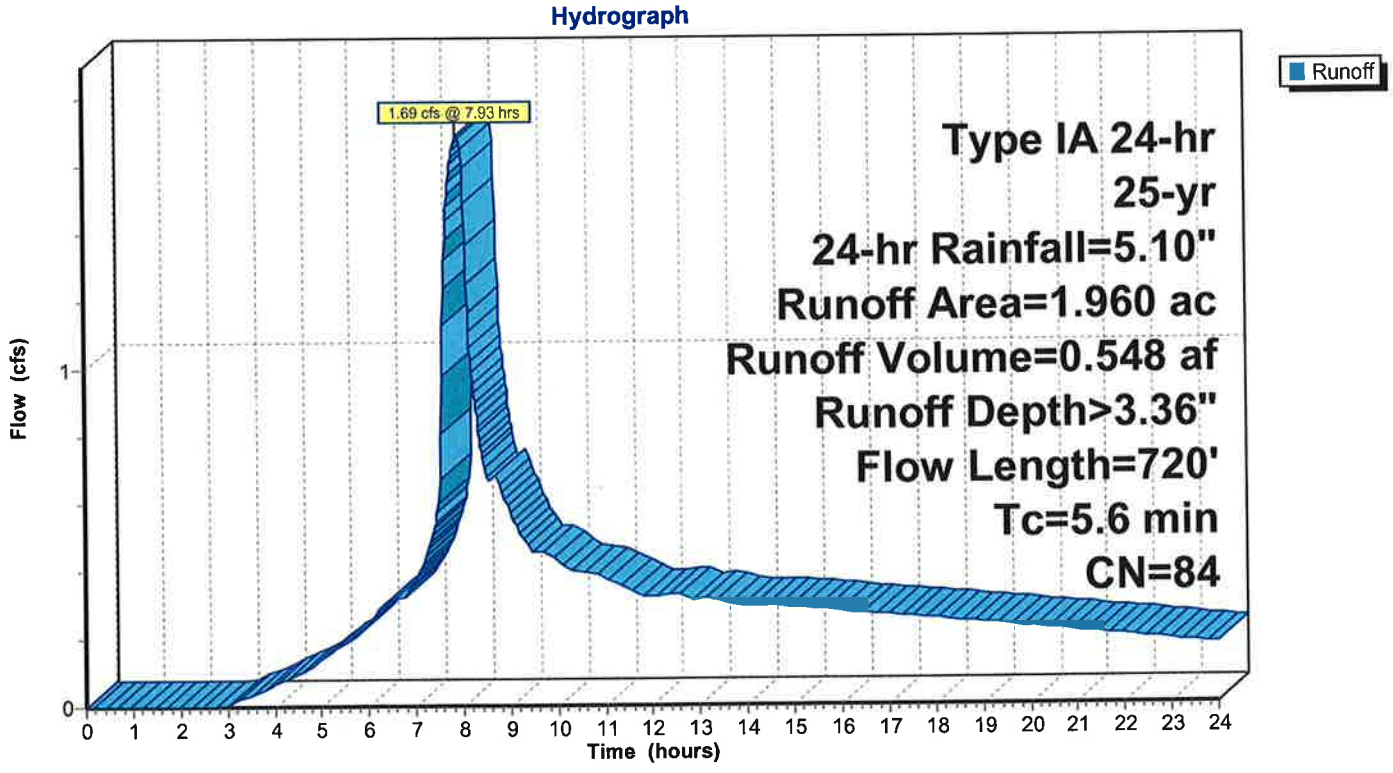
Runoff = 1.69 cfs @ 7.93 hrs, Volume= 0.548 af, Depth> 3.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25-yr, 24-hr Rainfall=5.10"

Area (ac)	CN	Description
1.960	84	50-75% Grass cover, Fair, HSG D
1.960		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	100	0.2600	0.47		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.6	226	0.1593	6.43		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.4	394		4.76		**Direct Entry, Channel**
5.6	720	Total			

Subcatchment 9S: WD-9



Summary for Subcatchment 10S: WD-10

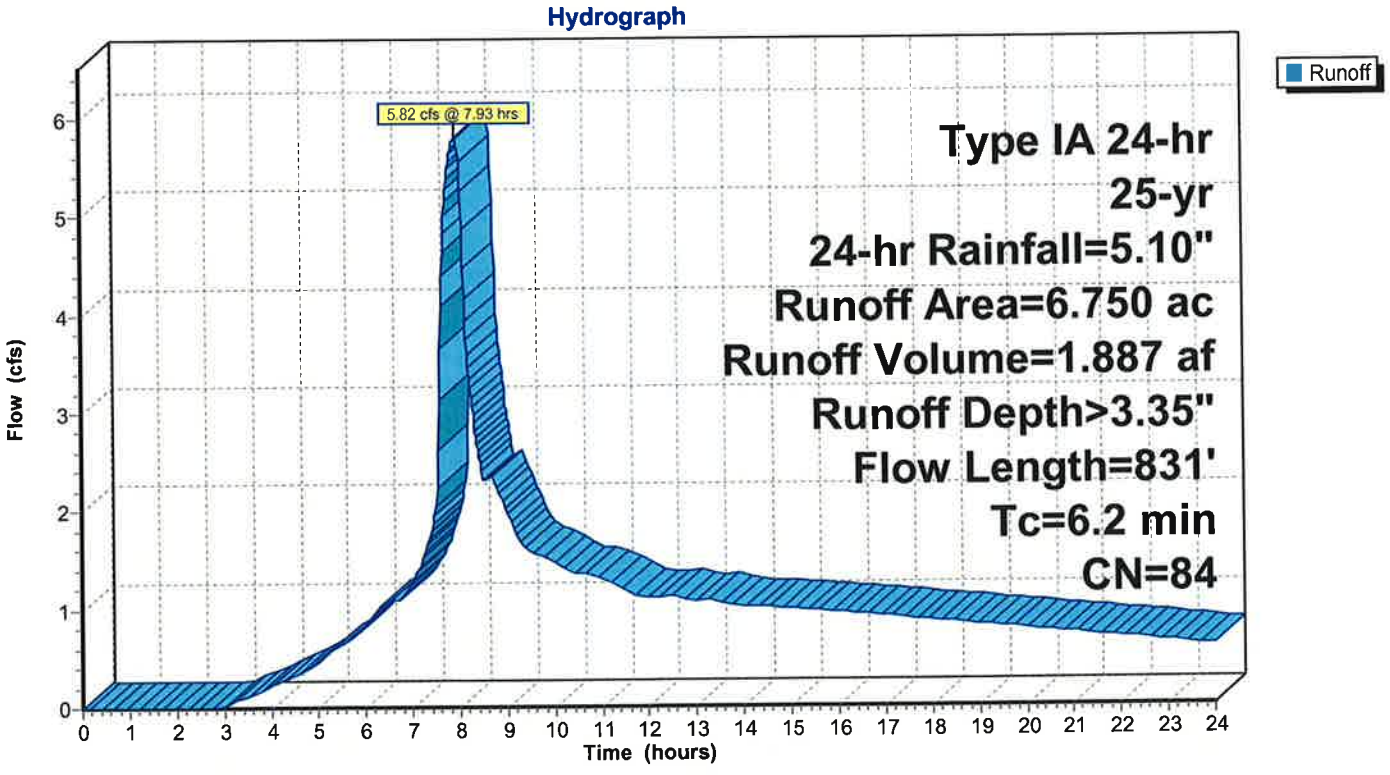
Runoff = 5.82 cfs @ 7.93 hrs, Volume= 1.887 af, Depth> 3.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25-yr, 24-hr Rainfall=5.10"

Area (ac)	CN	Description
6.750	84	50-75% Grass cover, Fair, HSG D
6.750		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	100	0.3100	0.50		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.4	190	0.2263	7.66		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.5	541		3.66		**Direct Entry, Channel**
6.2	831	Total			

Subcatchment 10S: WD-10



Summary for Pond 11P: Southwest Pond

Inflow Area = 93.040 ac, 0.00% Impervious, Inflow Depth > 3.35" for 25-yr, 24-hr event
Inflow = 78.57 cfs @ 8.00 hrs, Volume= 25.958 af
Outflow = 21.76 cfs @ 9.60 hrs, Volume= 24.865 af, Atten= 72%, Lag= 95.7 min
Primary = 21.76 cfs @ 9.60 hrs, Volume= 24.865 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Peak Elev= 278.00' @ 9.60 hrs Surf.Area= 0.000 ac Storage= 5.216 af

Plug-Flow detention time= 125.2 min calculated for 24.844 af (96% of inflow)
Center-of-Mass det. time= 97.0 min (851.4 - 754.4)

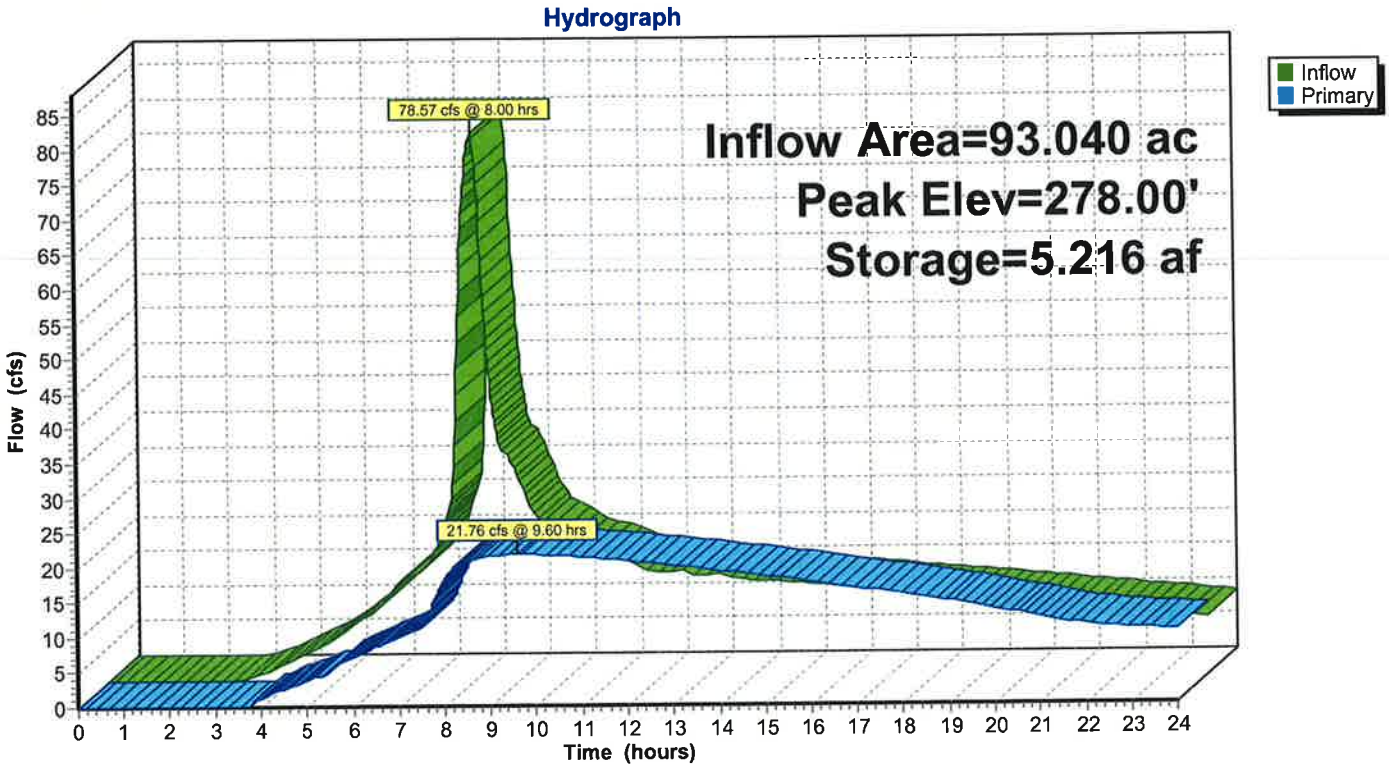
Volume	Invert	Avail.Storage	Storage Description
#1	266.50'	9.426 af	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (acre-feet)
266.50	0.000
268.00	0.085
270.00	0.438
272.00	1.103
274.00	2.121
276.00	3.510
278.00	5.214
280.00	7.179
280.50	7.713
282.00	9.426

Device	Routing	Invert	Outlet Devices
#1	Primary	267.50'	**36.0" Round Culvert** L= 104.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 267.50' / 266.50' S= 0.0096 '/' Cc= 0.900 n= 0.015 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	267.50'	**12.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	269.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#4	Device 1	272.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#5	Device 1	278.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=21.73 cfs @ 9.60 hrs HW=278.00' TW=267.00' (Fixed TW Elev= 267.00')
↑**1=Culvert** (Passes 21.73 cfs of 102.12 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 11.96 cfs @ 15.23 fps)
—**3=Orifice/Grate** (Orifice Controls 5.43 cfs @ 13.83 fps)
—**4=Orifice/Grate** (Orifice Controls 4.33 cfs @ 11.03 fps)
—**5=Orifice/Grate** (Weir Controls 0.00 cfs @ 0.16 fps)

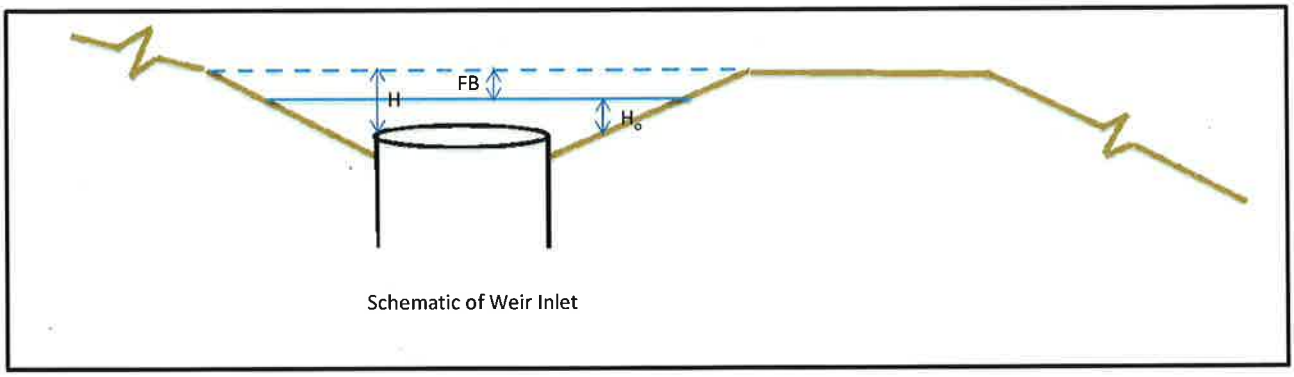
Pond 11P: Southwest Pond



DETENTION POND AND BIO-SWALE DESIGN CALCULATIONS

Project Name: *Coffin Butte Landfill - Southwest Pond Design*
Client: *Valley Landfills, Inc.*
Job No.: *2015.A021*
Date: *10/06/2015*
Calculated By: *NC*

Detention Pond Stand Pipe			
Equations:			
Circular Weir	$Q = C_o \pi D H^{1.5}$		
Q_d = Discharge	78.6	(cfs)	*25 Year - 24 Hour Peak Runoff from HydroCAD*
FB = Freeboard	-	(ft)	
H_o = Crest Height	1.43	(ft)	
D_o = Initial Diameter of Drop Inlet	4.00	(ft)	
H_o/R_s	0.36		
C_s = Weir Coefficient	3.66	($ft^{0.5}/s$)	*Estimate from Design of Small Dams*
Q_p = Weir Discharge Capacity	**78.6**	(cfs)	
H = Total Height of Water (H_o + Freeboard)	**1.43**	(ft)	
D = Design Drop Inlet Diameter	**4.00**	(ft)	



Schematic of Weir Inlet

Source:
United States Department of the Interior Bureau of Reclamation, (1987), "Design of Small Dams", United States Department of the Interior Bureau of Reclamation, pp.407-410 .

Culvert Calculator Report
Southwest Detention Pond Outlet Culvert

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	280.00 ft	Headwater Depth/Height	2.30
Computed Headwater Elev	274.41 ft	Discharge	78.57 cfs
Inlet Control HW Elev.	274.41 ft	Tailwater Elevation	267.00 ft
Outlet Control HW Elev.	273.41 ft	Control Type	Inlet Control

Grades			
Upstream Invert	267.50 ft	Downstream Invert	266.50 ft
Length	104.00 ft	Constructed Slope	0.009615 ft/ft

Hydraulic Profile			
Profile	CompositeM2PressureProfile	Depth, Downstream	2.76 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	2.76 ft
Velocity Downstream	11.56 ft/s	Critical Slope	0.010271 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.012
Section Material	HDPE (Smooth Interior)	Span	3.00 ft
Section Size	36 inch	Rise	3.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	273.41 ft	Upstream Velocity Head	1.92 ft
Ke	0.50	Entrance Loss	0.96 ft

Inlet Control Properties			
Inlet Control HW Elev.	274.41 ft	Flow Control	Submerged
Inlet Type	Square edge w/headwall	Area Full	7.1 ft²
K	0.00980	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	1
C	0.03980	Equation Form	1
Y	0.67000		

Project: Coffin Butte Landfill - Southwest Pond Design
Client: Valley Landfills, Inc.
Job No.: 2015.A021

Calc'd By: NC
Date: 10/6/2015

BROAD CRESTED WEIR WITH RECTANGULAR OR TRAPEZOIDAL SECTION

Southwest Detention Pond Overflow Weir

Equations:

Rectangular $Q = C_s b H^{1.5}$

Trapezoidal $Q = C_s (b+zH) H^{1.5}$

Q = Discharge	see below	(cfs)
C_s = Weir Coefficient	3.33	($ft^{0.5}/s$) *Conservative estimate from Lindeburg*
FB = Freeboard	0.75	(ft)
H_{max} = Height to Top of Weir	see below	(ft)
H = Total Height of Water (H_{max} - Freeboard)	see below	(ft)
z = Slope (run/rise)	see below	(ft/ft)
b = Bottom Width of Weir	15	(ft)

H_{max} (ft)	H (ft)	Q (cfs) z 0	1	2	3	4	5	6	7	8	9	10
10.00	9.25	1405.23	2271.79	3138.35	4004.91	4871.47	5738.03	6604.59	7471.15	8337.71	9204.27	10070.83
9.75	9.00	1348.65	2157.84	2967.03	3776.22	4585.41	5394.60	6203.79	7012.98	7822.17	8631.36	9440.55
9.50	8.75	1292.85	2047.01	2801.17	3555.33	4309.49	5063.66	5817.82	6571.98	7326.14	8080.30	8834.46
9.25	8.50	1237.84	1939.28	2640.72	3342.16	4043.60	4745.05	5446.49	6147.93	6849.37	7550.81	8252.25
9.00	8.25	1183.63	1834.63	2485.63	3136.62	3787.62	4438.62	5089.61	5740.61	6391.61	7042.61	7693.60
8.75	8.00	1130.24	1733.03	2335.83	2938.62	3541.42	4144.21	4747.01	5349.80	5952.59	6555.39	7158.18
8.50	7.75	1077.68	1634.47	2191.27	2748.07	3304.87	3861.67	4418.47	4975.27	5532.07	6088.87	6645.67
8.25	7.50	1025.95	1538.93	2051.91	2564.88	3077.86	3590.83	4103.81	4616.79	5129.76	5642.74	6155.72
8.00	7.25	975.09	1446.38	1917.67	2388.96	2860.25	3331.54	3802.83	4274.12	4745.41	5216.71	5688.00
7.75	7.00	925.09	1356.79	1788.50	2220.21	2651.92	3083.62	3515.33	3947.04	4378.74	4810.45	5242.16
7.50	6.75	875.97	1270.16	1664.35	2058.54	2452.73	2846.92	3241.10	3635.29	4029.48	4423.67	4817.86
7.25	6.50	827.76	1186.46	1545.16	1903.85	2262.55	2621.25	2979.94	3338.64	3697.34	4056.03	4414.73
7.00	6.25	780.47	1105.66	1430.86	1756.05	2081.25	2406.45	2731.64	3056.84	3382.03	3707.23	4032.42
6.75	6.00	734.11	1027.76	1321.40	1615.05	1908.69	2202.34	2495.98	2789.63	3083.27	3376.92	3670.56
6.50	5.75	688.71	952.72	1216.72	1480.73	1744.74	2008.74	2272.75	2536.75	2800.76	3064.77	3328.77
6.25	5.50	644.29	880.53	1116.76	1353.00	1589.24	1825.48	2061.72	2297.96	2534.20	2770.44	3006.67
6.00	5.25	600.86	811.16	1021.46	1231.77	1442.07	1652.37	1862.67	2072.97	2283.27	2493.58	2703.88
5.75	5.00	558.46	744.61	930.76	1116.92	1303.07	1489.22	1675.37	1861.53	2047.68	2233.83	2419.98
5.50	4.75	517.10	680.85	844.60	1008.35	1172.10	1335.85	1499.59	1663.34	1827.09	1990.84	2154.59
5.25	4.50	476.82	619.87	762.91	905.96	1049.00	1192.05	1335.10	1478.14	1621.19	1764.23	1907.28
5.00	4.25	437.64	561.64	685.64	809.64	933.64	1057.63	1181.63	1305.63	1429.63	1553.63	1677.63
4.75	4.00	399.60	506.16	612.72	719.28	825.84	932.40	1038.96	1145.52	1252.08	1358.64	1465.20
4.50	3.75	362.73	453.41	544.09	634.78	725.46	816.14	906.82	997.51	1088.19	1178.87	1269.55
4.25	3.50	327.07	403.38	479.70	556.01	632.33	708.65	784.96	861.28	937.59	1013.91	1090.23
4.00	3.25	292.66	356.07	419.48	482.89	546.30	609.70	673.11	736.52	799.93	863.34	926.75
3.75	3.00	259.55	311.46	363.37	415.28	467.19	519.10	571.01	622.91	674.82	726.73	778.64
3.50	2.75	227.79	269.55	311.31	353.07	394.84	436.60	478.36	520.12	561.88	603.64	645.40
3.25	2.50	197.44	230.35	263.26	296.17	329.07	361.98	394.89	427.80	460.70	493.61	526.52
3.00	2.25	168.58	193.87	219.16	244.44	269.73	295.02	320.30	345.59	370.88	396.17	421.45
2.75	2.00	141.28	160.12	178.95	197.79	216.63	235.47	254.30	273.14	291.98	310.82	329.65
2.50	1.75	115.64	129.13	142.62	156.11	169.60	183.09	196.58	210.07	223.56	237.05	250.54
2.25	1.50	91.76	100.94	110.12	119.29	128.47	137.65	146.82	156.00	165.18	174.35	183.53
2.00	1.25	69.81	75.62	81.44	87.26	93.08	98.89	104.71	110.53	116.35	122.16	127.98
1.75	1.00	49.95	53.28	56.61	59.94	63.27	66.60	69.93	73.26	76.59	79.92	83.25
1.50	0.75	32.44	34.07	35.69	37.31	38.93	40.55	42.18	43.80	45.42	47.04	48.67
1.25	0.50	17.66	18.25	18.84	19.43	20.01	20.60	21.19	21.78	22.37	22.96	23.55
1.00	0.25	6.24	6.35	6.45	6.56	6.66	6.76	6.87	6.97	7.08	7.18	7.28
0.75												
0.50												
0.25												

Source:
Lindeburg, Michael R., (2001), "Civil Engineering Reference Manual, Eighth Edition", Professional Publications Inc., pp.19-12:19-13

Southwest Detention Pond Overflow Channel

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.33300	ft/ft
Left Side Slope	5.00	ft/ft (H:V)
Right Side Slope	5.00	ft/ft (H:V)
Bottom Width	15.00	ft
Discharge	78.60	ft^3/s

Results

Normal Depth	0.22	ft
Flow Area	3.47	ft^2
Wetted Perimeter	17.20	ft
Hydraulic Radius	0.20	ft
Top Width	17.16	ft
Critical Depth	0.86	ft
Critical Slope	0.00280	ft/ft
Velocity	22.67	ft/s
Velocity Head	7.99	ft
Specific Energy	8.21	ft
Froude Number	8.89	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.22	ft
Critical Depth	0.86	ft
Channel Slope	0.33300	ft/ft
Critical Slope	0.00280	ft/ft

Biofiltration Strip (Attenuated 25-Yr, 24-Hr Flow)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.045	
Channel Slope	0.00500	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	70.00	ft
Discharge	21.80	ft^3/s

Results

Normal Depth	0.30	ft
Flow Area	21.12	ft^2
Wetted Perimeter	71.88	ft
Hydraulic Radius	0.29	ft
Top Width	71.79	ft
Critical Depth	0.14	ft
Critical Slope	0.05645	ft/ft
Velocity	1.03	ft/s
Velocity Head	0.02	ft
Specific Energy	0.31	ft
Froude Number	0.34	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.30	ft
Critical Depth	0.14	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.05645	ft/ft

Biofiltration Strip (Max 25-Yr, 24-Hr Flow)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.045	
Channel Slope	0.00500	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	70.00	ft
Discharge	78.60	ft^3/s

Results

Normal Depth	0.64	ft
Flow Area	46.13	ft^2
Wetted Perimeter	74.06	ft
Hydraulic Radius	0.62	ft
Top Width	73.85	ft
Critical Depth	0.34	ft
Critical Slope	0.04265	ft/ft
Velocity	1.70	ft/s
Velocity Head	0.05	ft
Specific Energy	0.69	ft
Froude Number	0.38	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.64	ft
Critical Depth	0.34	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.04265	ft/ft

Biofiltration Strip (Attenuated 50% 2-Yr, 24-Hr Flow)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.045	
Channel Slope	0.00500	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	70.00	ft
Discharge	8.26	ft^3/s

Results

Normal Depth	0.17	ft
Flow Area	11.75	ft^2
Wetted Perimeter	71.05	ft
Hydraulic Radius	0.17	ft
Top Width	71.00	ft
Critical Depth	0.08	ft
Critical Slope	0.06993	ft/ft
Velocity	0.70	ft/s
Velocity Head	0.01	ft
Specific Energy	0.17	ft
Froude Number	0.30	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.17	ft
Critical Depth	0.08	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.06993	ft/ft

Biofiltration Strip (Max 50% 2-Yr, 24-Hr Flow)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.045	
Channel Slope	0.00500	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	70.00	ft
Discharge	17.40	ft³/s

Results

Normal Depth	0.26	ft
Flow Area	18.43	ft²
Wetted Perimeter	71.65	ft
Hydraulic Radius	0.26	ft
Top Width	71.56	ft
Critical Depth	0.12	ft
Critical Slope	0.05930	ft/ft
Velocity	0.94	ft/s
Velocity Head	0.01	ft
Specific Energy	0.27	ft
Froude Number	0.33	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.26	ft
Critical Depth	0.12	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.05930	ft/ft

Project:	Coffin Butte Landfill - Southwest Pond Design
Applicant/Owner:	Valley Landfills, Inc.
Project No:	2015.A021
Calc'd By:	NC
Date:	11/19/15

DETENTION POND SUMMARY

Design Storm	Pre-Development Runoff (cfs)	Post-Development Runoff (cfs)	Notes
33% 2-Yr, 24-hr	11.5	6.3	Pre-development runoff = 33% of 34.7 cfs
42% 2-yr, 24-hr	14.6	7.4	Pre-development runoff = 42% of 34.7 cfs
50% 2-yr, 24-hr	17.4	8.3	Pre-development runoff = 50% of 34.7 cfs
2-yr, 24 hr	34.7	13.4	
5-yr, 24 hr	51.3	17.8	
10-yr, 24 hr	66.3	20.0	
25-yr, 24 hr	79.2	21.8	

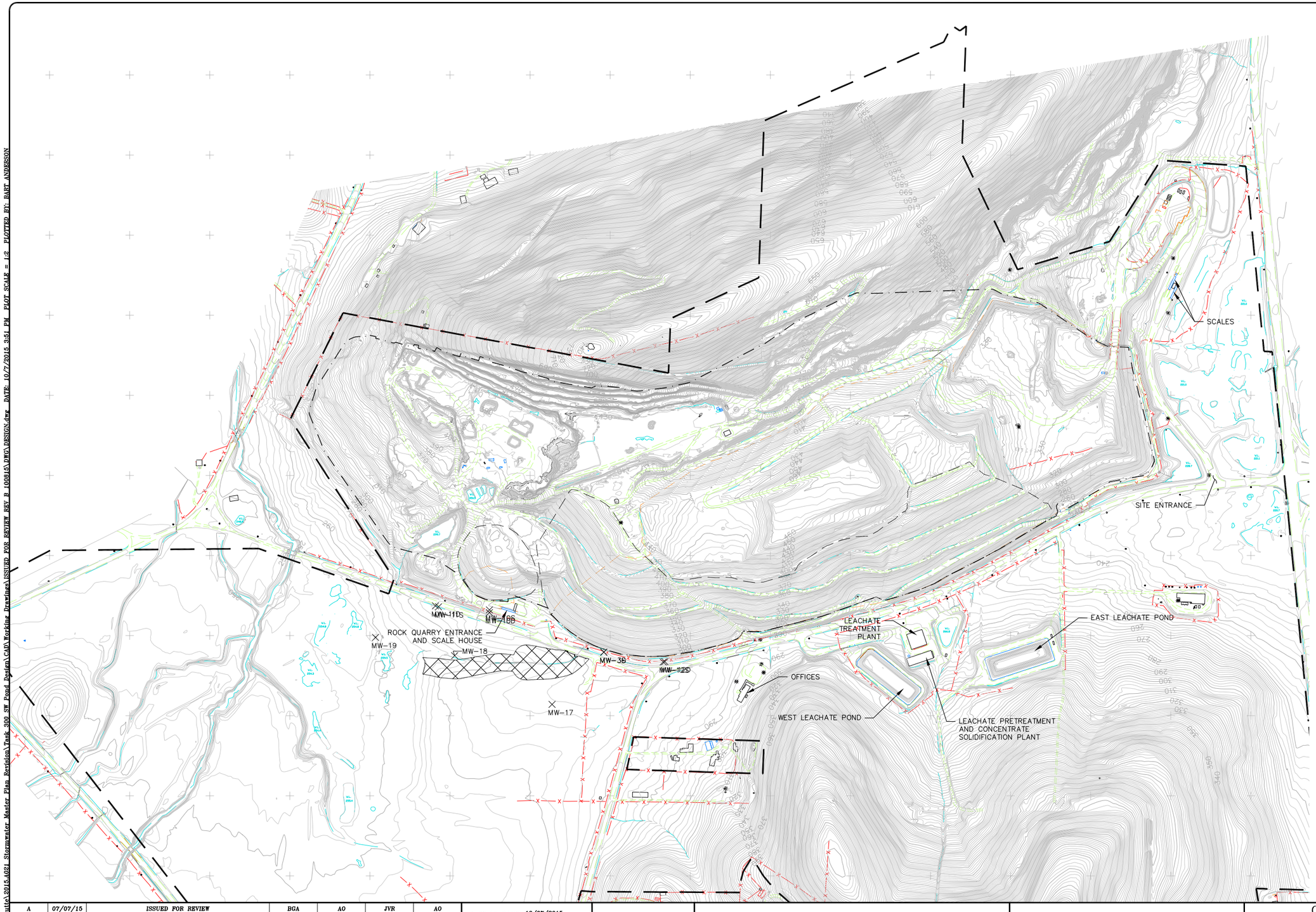
Project:	Coffin Butte Landfill - Southwest Pond Design
Applicant/Owner:	Valley Landfills, Inc.
Project No:	2015.A021
Calc'd By:	NC
Date:	11/19/15

BIO-SWALE PERFORMANCE

Parameter	Optimial Criteria	Minimum Criteria	Design Storm 50% of 2-Yr, 24-Hr	
			Peak Runoff (No Attenuation)	Attenuated Runoff
Hydraulic Residence Time (min)	9.0	>5	10.0	12.8
Average Flow Velocity (ft/s)	0.9	2-4	0.9	0.7
Swale Width (ft)	8	2	70	70
Swale Length (ft)	200	100	540	540
Swale Slope (ft/ft)	2-6	1	0.5	0.5
Side Slope (horiz:vert)	4:1	2:1	3:1	3:1

APPENDIX G

WEST SIDE STORMWATER POND DESIGN DRAWINGS



LEGEND

- EXISTING 10 FT CONTOUR
- EXISTING 2 FT CONTOUR
- LIMITS OF CONSTRUCTION
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EXISTING FENCE
- EXISTING DRAINAGE/ WATER BODY
- USED LANDFILL FOOTPRINT
- PROPERTY LIMIT
- LIMITS OF CLOSED AREAS
- FUTURE LANDFILL FOOTPRINT

NOTES:
1. EXISTING TOPOGRAPHY BASED ON AERIAL SURVEY BY COOPER AERIAL SURVEYS CO. ON MARCH 4, 2015.

REV. NO.	DATE	DESCRIPTION	DRAWN BY	DESIGNED BY	CHECKED BY	APPROVED BY
A	07/07/15	ISSUED FOR REVIEW	BGA	AO	JVR	AO
B	10/07/15	ISSUED FOR REVIEW	BGA	AO	JVR	AO

DATE OF ISSUE: 10/07/2015
DESIGNED BY: AO
DRAWN BY: BGA
CHECKED BY: JVR
APPROVED BY: AO

Geo-Logic ASSOCIATES
143E Spring Hill Dr, Grass Valley, California 95945
geo-logic.com | 530.272.2448

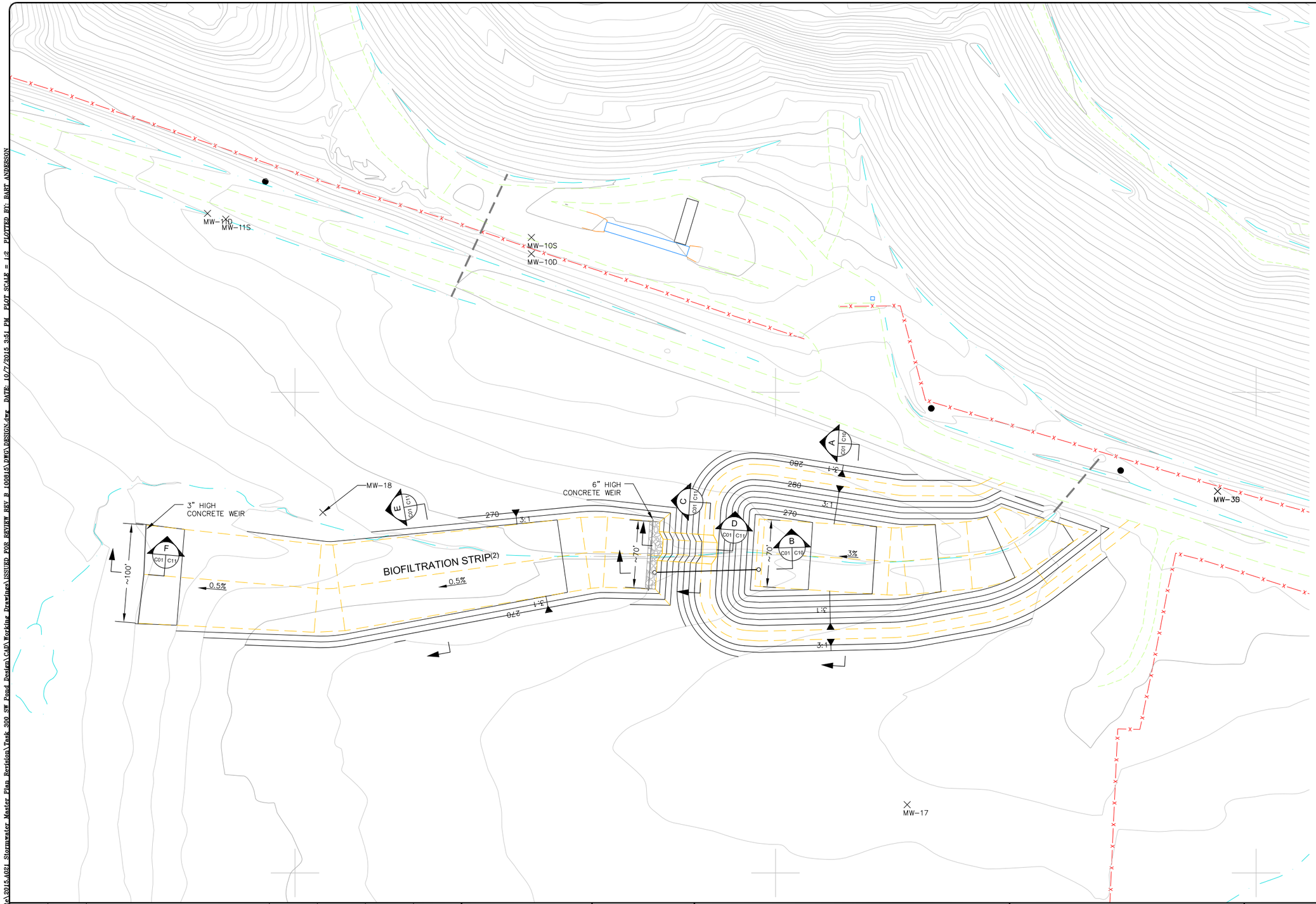
VALLEY LANDFILLS, INC.

COFFIN BUTTE LANDFILL
WEST SIDE STORMWATER POND DESIGN
BENTON COUNTY, OREGON

SITE PLAN & EXISTING CONDITIONS

DRAWING NO. G02
PROJECT NO. 2015.A021

ISSUED FOR REVIEW



NORTH

GRAPHIC SCALE

50' 0' 25' 50' 100' 200'

LEGEND

- EXISTING 10 FT CONTOUR
- EXISTING 2 FT CONTOUR
- PROPOSED 10 FT CONTOUR
- PROPOSED 2 FT CONTOUR
- PROPOSED HINGELINE
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EXISTING FENCE
- EXISTING DRAINAGE/ WATER BODY

QUANTITIES

EARTHWORK:
CUT: 12,200 CY
FILL: 5,600 CY

NOTES:
1. EXISTING TOPOGRAPHY BASED ON AERIAL SURVEY BY COOPER AERIAL SURVEYS CO. ON MARCH 4, 2015.
2. BIOFILTRATION STRIP WIDTH VARIES UNIFORMLY FROM ~70' AT INLET WEIR TO ~100' AT OUTLET WEIR.

REV. NO.	DATE	DESCRIPTION	DRAWN BY	DESIGNED BY	CHECKED BY	APPROVED BY
A	07/07/15	ISSUED FOR REVIEW	BGA	AO	JVR	AO
B	10/07/15	ISSUED FOR REVIEW	BGA	AO	JVR	AO

DATE OF ISSUE: 10/07/2015
DESIGNED BY: AO
DRAWN BY: BGA
CHECKED BY: JVR
APPROVED BY: AO

Geo-Logic ASSOCIATES
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geo-logic.com | 530.272.2448

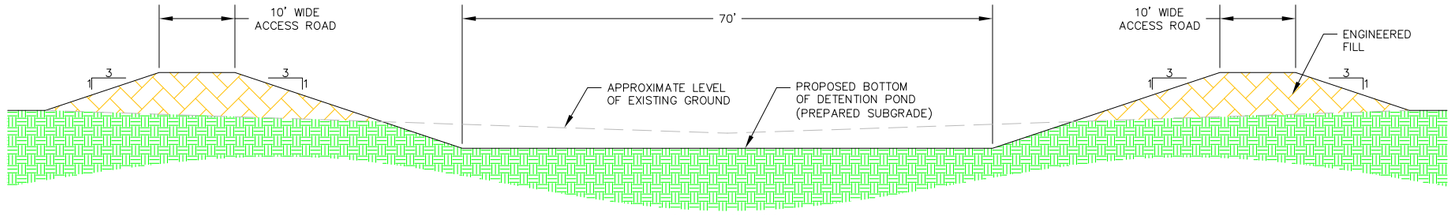
VALLEY LANDFILLS, INC.

COFFIN BUTTE LANDFILL
WEST SIDE STORMWATER POND DESIGN
BENTON COUNTY, OREGON

GRADING PLAN

DRAWING NO. C01
PROJECT NO. 2015.A021

ISSUED FOR REVIEW

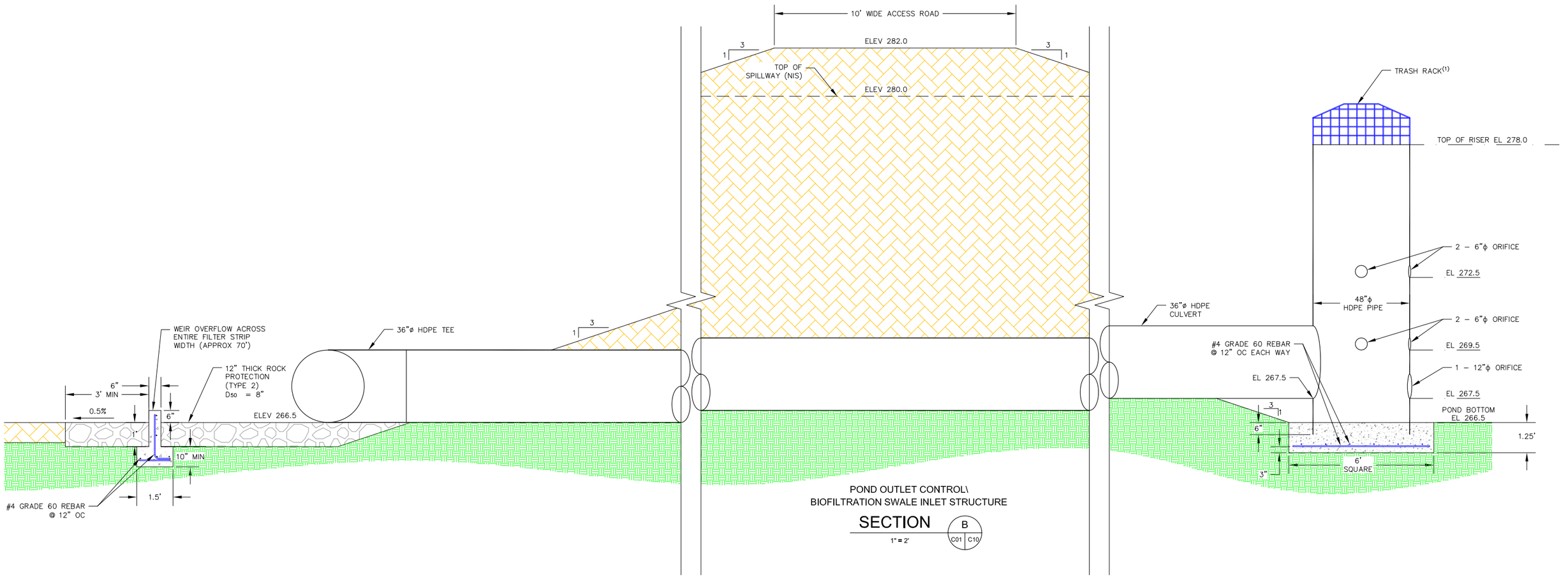


DETENTION POND

SECTION A

1" = 10'

C01 | C10



POND OUTLET CONTROL\
BIOFILTRATION SWALE INLET STRUCTURE

SECTION B

1" = 2'

C01 | C10

NOTES:
1. TRASH RACK SHALL BE CONTECH® STORMRAX™, OR ALTERNATIVE TO APPROVED BY ENGINEER/OWNER, INSTALLED PER MANUFACTURERS RECOMMENDATIONS. RACK SHALL BE CAPABLE OF SUPPORTING 300 LBS. RACK SHALL BE SECURED SUCH THAT IT CAN BE EASILY REMOVED FOR MAINTENANCE.

REV. NO.	DATE	DESCRIPTION	DRAWN BY	DESIGNED BY	CHECKED BY	APPROVED BY
A	07/07/15	ISSUED FOR REVIEW	BGA	AO	JVR	AO
B	10/07/15	ISSUED FOR REVIEW	BGA	NC	JVR	AO

DATE OF ISSUE: 10/07/2015
DESIGNED BY: NC
DRAWN BY: BGA
CHECKED BY: JVR
APPROVED BY: AO

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geo-logic.com | 530.272.2448

VALLEY LANDFILLS, INC.

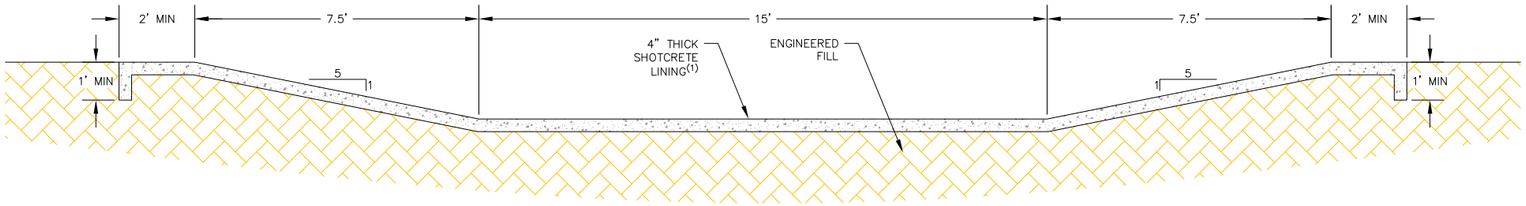
COFFIN BUTTE LANDFILL
WEST SIDE STORMWATER POND DESIGN
BENTON COUNTY, OREGON

DETAILS

DRAWING NO. C10

PROJECT NO. 2015.A021

ISSUED FOR REVIEW

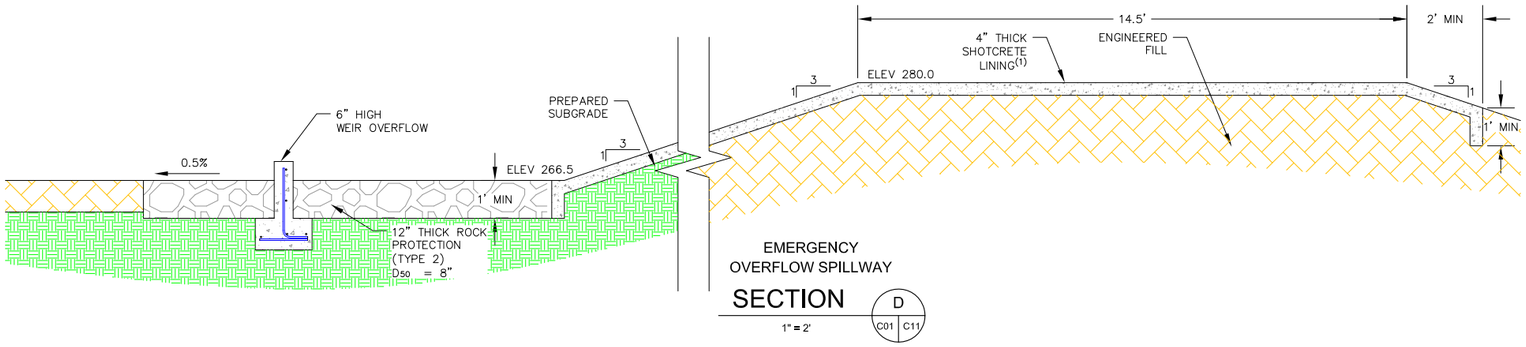


EMERGENCY OVERFLOW SPILLWAY

SECTION C

1" = 2'

C01 | C11

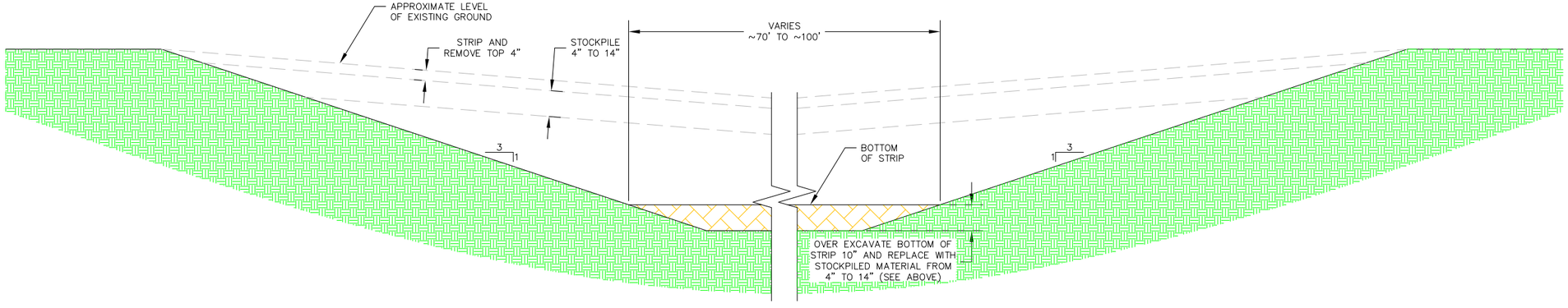


EMERGENCY OVERFLOW SPILLWAY

SECTION D

1" = 2'

C01 | C11

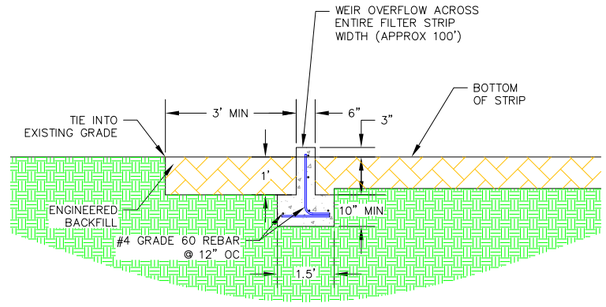


TYPICAL BIOFILTRATION STRIP

SECTION E

1" = 2'

C01 | C11



WEIR OVERFLOW

SECTION F

1" = 2'

C01 | C11

NOTES:
1. PLACE 10X10 WELDED WIRE FABRIC CONFORMING TO ASTM A185 IN THE MIDDLE OF THE SHOTCRETE.

REV. NO.	DATE	DESCRIPTION	DRAWN BY	DESIGNED BY	CHECKED BY	APPROVED BY
A	07/07/15	ISSUED FOR REVIEW	BGA	AO	JVR	AO
B	10/07/15	ISSUED FOR REVIEW	BGA	NC	JVR	AO

DATE OF ISSUE: 10/07/2015
DESIGNED BY: NC
DRAWN BY: BGA
CHECKED BY: JVR
APPROVED BY: AO

Geo-Logic ASSOCIATES
143E Spring Hill Dr, Grass Valley, California 95945
geo-logic.com | 530.272.2448

VALLEY LANDFILLS, INC.

COFFIN BUTTE LANDFILL
WEST SIDE STORMWATER POND DESIGN
BENTON COUNTY, OREGON
DETAILS

DRAWING NO. C11

PROJECT NO. 2015.A021

ISSUED FOR REVIEW

APPENDIX G

LUCS AND LOCAL SOLID WASTE MANAGEMENT PLAN

Department of Environmental Quality
811 SW Sixth Avenue
Portland, Oregon 97204

LAND USE COMPATIBILITY STATEMENT

(read page 1 before completing)

TO BE COMPLETED BY APPLICANT

1. Name: Valley Landfills, Inc. Address: P.O. Box 807 Corvallis, OR 97339 (City State Zip)

   Phone: 757-9067 Type of permit/approval: Solid Waste Disposal

2. Application to DEQ will be for: ___ New Permit/Plan Approval ___ Permit Modification ___x___ Permit Renewal ___ Authorization Letter

3. Name and address of business: Coffin Butte Regional Sanitary Landfill

4. Describe the type of business and product or service the business provides:

   Municipal Solid Waste Disposal

5. If not a new source, explain the change in circumstances that require a permit/approval:

   permit renewal

6. Describe the specific source/facility that requires a permit/approval:

   Coffin Butte Regional Sanitary Landfill

7. For permit modification/renewal only: Does the criteria in section II, page 1 apply to the proposed permit modification or renewal? ___x___ Yes ___ No
   Explain basis for determination:

   There will be expansion of landfill activities within our property boundries in next 20 years. However, (see below)

   If yes, describe how the changes may impact land uses, i.e. increased lot coverage; increased air emissions, water discharges or noise levels; impacts to transportation system, etc.:

   the relative size (volume) of the landfill will remain similar. Therefore impacts on environment will not change appreciably.

TO BE COMPLETED BY LOCAL GOVERNMENT

8. Business/facility location: ___ Inside city limits ___ Inside UGB ___✓___ Outside UGB
   What local government(s) has planning jurisdiction over this use? Benton County
   Is the local plan currently acknowledged? ___✓___ Yes ___ No If no, is this use affected by any portion of the plan which is not acknowledged? ___ Yes ___ No

9. The business/facility:

   A. ___✓___ *Is an allowed outright use.
   B. ___ Is allowed subject to siting, design, construction or operational standards.
   C. ___ Is allowed subject to conditional use or review requirements which require public notice.
   D. ___ Is prohibited by the plan.
   E. ___ Is not addressed by the plan.

* This means the use may exist without any further local planning conditions or authorizations.

If A. applies, identify or provide duplicate copy of applicable zone/provisions and state specific name of the designated allowed use applied to this business/facility.

77-105(1) Municipal Solid Waste

If applicable, have the additional requirements under B. or C. been met? N/A Yes ____ No

Date of decision or expected decision: ____

Written findings are required for determinations checked under section 9. B, C, D and E. Findings may include plan policies, criteria, conditions, standards or related regulations. (State findings below or attach separately to statement.) If the activity is not addressed in the plan, under 9. E., compatibility findings must be based on the statewide goals.

N/A

10. Is public notice and opportunity for public hearing required? ____ Yes ✓ No

If yes, date of notice: ____ Date of public hearing: ____

If a public hearing was held, attach a summary or hearing report.

11. Would the city/county like to receive a copy of DEQ's public notice regarding this source? ____ Yes ____ No

REQUIRED SIGNATURES

City land use jurisdiction: ____ Phone: ____

Signature: ____ Title: ____ Date: ____

County land use jurisdiction: Kent County Dev. Phone: 757-6819

Signature: [signature] Title: Asst Director Date: ____

Please direct questions to the Management Services Division at 800-452-4011 or 229-6408, or contact the Division responsible for processing the application (Air, Water, Solid Waste) through the above toll free number.

DEPARTMENT OF ENVIRONMENTAL QUALITY
LAND USE COMPATIBILITY REQUIREMENT FOR ENVIRONMENTAL PERMITS/APPROVALS

The Department of Environmental Quality requires regulatory source permits/approvals for facilities that discharge or release pollutants into the environment. Through these permits, specific environmental criteria or standards must be met. The criteria and standards are intended to ensure that public health, safety and the environment are protected.

Land uses that are subject to environmental regulations must also comply with local government planning regulations. Land uses are classified into land use zones, in part due to their general impact on and compatibility with other types of uses. It is the Department's policy that proof of local land use compatibility be submitted with a source permit application. This assures that the type of land use and activities in conjunction with that use have been reviewed and approved by local government before a permit is processed and issued.

I. NEW PERMITS/APPROVALS. The Department of Environmental Quality requires that a Land Use Compatibility Statement (LUCS) from the affected local government(s) be submitted with an application for the following:

1. Air Contaminant Discharge Permits (ACDP)
2. Noise Impact Boundaries for Racing Facilities
3. Airport Abatement Plan/Noise Impact Boundaries
4. Air Indirect Source Construction Permits
5. Parking and Traffic Circulation Plans
6. Solid Waste Disposal Permits/Authorization Letter
7. Waste Tire Storage Permits
8. * HW/PCB Storage, Treatment and Disposal Permits
9. Pollution Control Bond Fund Requests
10. Wastewater System Facility/Sewer System Plans
11. Water Quality Construction Grants
12. Municipal Wastewater Treatment System State Revolving Loan Requests
13. Certification of Water Quality Standards for Federal Permits
14. On-Site Sewer Permits
15. Water Discharge Permits (NPDES/WPCF/General)

II. PERMIT MODIFICATION/RENEWAL. A permit modification requires an approved LUCS if any of the following apply: (1) The permitted source or activity involves the use of additional property or a physical expansion on the existing property. The LUCS applies to physical changes on the property, not to existing permit conditions; (2) The permitted source or activity involves a significant increase in discharge to state waters or into the ground; (3) The permitted source or activity involves the relocation of an outfall outside of the source property; (4) For a major modification of an air contaminant discharge permit, which means any physical change or change of operation of a source that results in a net significant emission rate increase as defined in OAR 340-20-225(25).

A permit renewal requires an approved LUCS if the renewal is to address a modification which applies to (1), (2), (3), or (4) above, or if an approved LUCS was not provided for the existing permit.

An applicant seeking a Department permit or approval is required to submit a LUCS to the affected local government(s) for a determination of compatibility with the local comprehensive plan(s). Typically, a local compatibility review includes a determination that the use or proposed use is allowable within its given zoning designation. The local government must include written findings of fact substantiating its determination. Required findings must: 1) State the relevant criteria, standards or policies; 2) State the facts relied upon in rendering the decision; and 3) State the conclusions and reasoning, referencing applicable policies. For example, if a use is allowed outright, a copy of the zone provision or citation and summary would constitute sufficient findings. If a review of some sort is required, the findings must include the review criteria and review conclusions.

In cases where a city and county share jurisdiction, a compatibility determination, sign off, and written findings are required from both entities.

* DEQ administrative rule Division 20 requires specific findings.

CHAPTER 77

LANDFILL SITE (LS)

77.005 Purpose. The Landfill Site Zone shall establish a specific landfill area in Benton County. [Ord 26, Ord 90-0069]

77.010 Application. The Landfill Site Zone recognizes the existing site in the Coffin Butte area, and allows for its continued use pursuant to Oregon Department of Environmental Quality (DEQ) permits, Benton County Code Chapter 23, and an approved Site Development Plan. [Ord 26, Ord 90-0069]

77.105 Permitted Uses. The following uses are allowed in the Landfill Site Zone:

(1) Municipal solid waste disposal, in accordance with a Solid Waste Disposal Franchise and an approved Site Development Plan.

(2) Recycling facilities.

(3) Forestry and agricultural use as a conversion factor leading to reclamation of the site in the future.

(4) Aggregate and mineral resource use in accordance with Oregon Department of Geology and Mineral Industry Permits.

(5) Structures normally associated with the operation of a landfill.

(6) Operation of equipment in conjunction with landfill operations.

(7) Installation and operation of monitoring devices as required by DEQ such as leachate sample equipment, leachate treatment facilities, and vector control systems.

(8) Landfill gas monitoring and recovery systems. [Ord 26, Ord 90-0069]

77.205 Prohibited Uses. The following uses are prohibited in the Landfill Site Zone:

(1) Hazardous waste disposal.

(2) Disposal of materials prohibited by the Solid Waste Disposal Franchise. [Ord 26, Ord 90-0069]

77.305 Conditional Uses Approved by the Planning Commission. Any proposal to expand the area approved for a landfill within the Landfill Site Zone is allowed by conditional use permit approved by the Planning Commission. The Benton County Environmental Health Division and the Solid Waste Advisory Council shall review and make recommendations through the Planning Official to the Planning Commission regarding the Site Development Plan Map and narrative. The Oregon Department of Environmental Quality shall be given an opportunity to review and comment on any proposal which may affect this site. [Ord 26, Ord 90-0069]

77.310 Conditional Use Review. (1) The applicant for a conditional use permit shall provide a narrative which describes:

(a) Adjacent land use and impacts upon adjacent uses;

(b) Future use of site as reclaimed, and impacts of that reclamation on adjacent uses;

(c) Provisions for screening of the site from public roads and adjacent property;

(d) Egress and ingress; and

(e) Other information as required by the Planning Official.

(2) A site plan map shall accompany a conditional use permit application. The map shall contain at least a scale, north arrow, assessor map numbers, location of existing landfill, access, proposed alteration, leachate treatment or monitoring areas surface water systems, and existing and proposed screening (location and types of materials). A statement shall be placed on the map that the site plan map and narrative together are considered as the Site Development Plan. A signature block shall be included for the date the approval is given and the signature of the Planning Official indicating approval.

(3) A conditional use permit application shall contain a reclamation plan describing present efforts and future reclamation plans related to the site.

(4) The following environmental and operational considerations shall be reviewed prior to changes in the documents referenced above:

(a) Geology;

(b) Groundwater and surface water;

(c) Soil depth and classification, and erosion control factors;

(d) Slope; and

(e) Cover material availability, transportation, and use. [Ord 26, Ord 90-0069]

77.405 Review of DEQ Permits. Copies of materials submitted to the Oregon Department of Environmental Quality as a part of any permit process shall be submitted to the Planning Official. If at any time the Planning Official determines that permit application materials or conditions of DEQ permit are judged to merit public review, a Public Hearing before the Planning Commission shall be scheduled. [Ord 26, Ord 90-0069]

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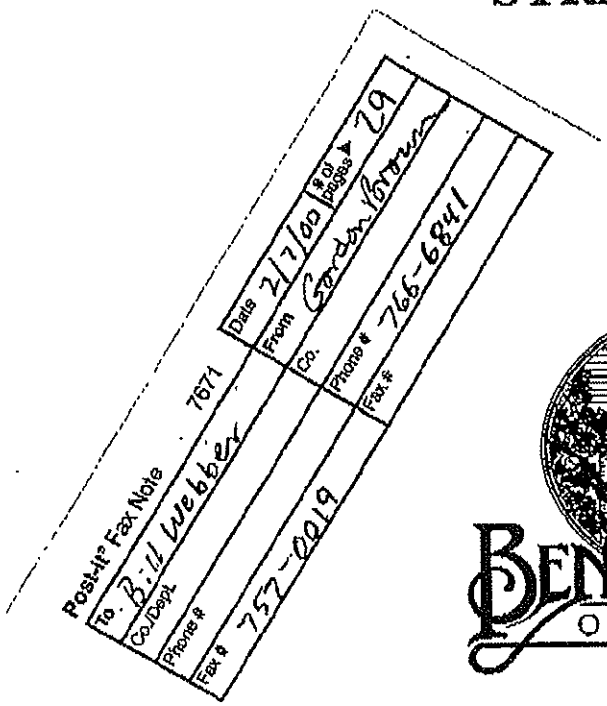
BENTON COUNTY
SOLID WASTE MANAGEMENT
STRATEGIC PLAN
1999



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L) Internet web sites pertaining to solid waste management issues.

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Definitions

(To be developed if necessary.)

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Roles, Responsibilities, and Authority

Roles in Solid Waste Management Planning

Benton County Environmental Health Division

Administer Benton County Codes (BCC) Chapter 21, Nuisance Abatement, and Chapter 23, Solid Waste Management (Appendix H).

BCC 23.005 (15): *"Solid Waste Management means the prevention of or reduction of solid waste; management of the storage, collection, transportation, utilization, processing and final disposal of solid waste; or resource recovery from solid waste; and facilities and equipment necessary or convenient to such activities."*

Franchised Haulers

Provide solid waste collection services as per BCC 23 and current franchise agreements and rate approvals.

Franchised Disposal Site Operators

Provide solid waste disposal services as per BCC 23 and current franchise agreements and rate approvals.

Solid Waste Advisory Council

Article I of the Bylaws of the Solid Waste Advisory Council (Appendix I): *"The purpose of the Solid Waste Advisory Council (SWAC) is to assist the Board of Commissioners (Board) in Planning and implementation of solid waste management, pursuant to BCC Chapter 23, the Benton County Solid Waste Management Ordinance."*

Benton County Code Chapter 23.035 Solid Waste Advisory Council Duties: *"The Council shall assist the Board in planning and implementation of solid waste management. First priority shall be given to those areas assigned by the Board and to recycling and reuse and matters related to those areas."*

Public

Fulfill responsibilities as per BCC 23.705 through 23.715.

Responsibility for Solid Waste Management Planning

Oregon Revised Statutes (ORS) 459.017: *"(1) The Legislative Assembly finds and declares that...(b) Local government units have the primary responsibility for planning for solid waste management."*

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Authority for Solid Waste Management Planning

ORS 459.015 (2): *"In the interest of the public health, safety and welfare and in order to conserve energy and natural resources, it is the policy of the State of Oregon to establish a comprehensive statewide program for solid waste management which will:*

(a) After consideration of technical and economic feasibility, establish priority in methods of managing solid waste in Oregon as follows:

(A) First, to reduce the amount of solid waste generated;

(B) Second, to reuse material for the purpose for which it was originally intended;

(C) Third, to recycle material that cannot be reused;

(D) Fourth, to compost material that cannot be reused or recycled;

(E) Fifth, to recover energy from solid waste that cannot be reused, recycled or composted so long as the energy recovery facility preserves the quality of air, water and land resources; and

(F) Sixth, to dispose of solid waste that cannot be reused, recycled, composted or from which energy cannot be recovered by landfilling or other method approved by the department.

(b) Clearly express the Legislative Assembly's previous delegation of authority to cities and counties for collection service franchising and regulation and the extension of that authority under the provisions of this section and ORS 459.125 and 459A.005 to 459A.085.

(c) Retain primary responsibility for management of adequate solid waste management programs with cities, counties or metropolitan service districts, reserving to the state those functions necessary to assure effective programs, cooperation among cities, counties or metropolitan service districts and coordination of solid waste management programs throughout the state.

(d) Promote, encourage and develop markets first for reusable material and then for recyclable material.

(e) Promote research, surveys and demonstration projects to encourage material or energy recovery.

(f) Promote research, surveys and demonstration projects to aid in developing more sanitary, efficient and economical methods of solid waste management.

(g) Provide advisory technical assistance and planning assistance to affected persons, in the planning, development and implementation of solid waste management programs.

(h) Develop, in coordination with federal, state and local agencies and other affected persons, long-range plans including regional approaches to promote reuse, to provide land reclamation in sparsely populated areas, and in urban areas necessary disposal facilities.

(i) Provide for the adoption and enforcement of recycling rates and standards as well as performance standards necessary for safe, economic and proper solid waste management.

(j) Provide authority for counties to establish a coordinated program for solid waste management, to regulate solid waste management and to license or franchise the providing of service in the field of solid waste management.

(k) Encourage utilization of the capabilities and expertise of private industry.

(l) Promote means of preventing or reducing at the source, materials which otherwise would constitute solid waste.

(m) Promote application of material or energy recovery systems which preserve and enhance the quality of air, water and land resources.

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Planning Process

A concerted effort to identify critical solid waste management planning issues began with SWAC meetings held in 1995 and 1996. To further develop and prioritize the list of critical issues, a survey of stakeholders was conducted and a public meeting was held early in 1996. Subcommittees consisting of SWAC members and other stakeholders were then formed to address the most pressing issues. A list of subcommittee participants is included in the front of this document.

The subcommittees began the process of identifying goals, objectives and action steps to address the first four issues during the remainder of 1996. Franchise holders and Benton County staff continue to implement action steps as the remaining issues are processed through SWAC.

Who is affected by this plan?

Anyone who generates, collects, disposes, transports, recovers, processes, or recycles solid waste in Benton County is a stakeholder in this plan. Input from stakeholders (citizens, industries, government agencies, businesses, and interest groups) is essential to ensure that the strategic planning best meets the needs of all involved.

Comments regarding this plan or persons interested in participating in the ongoing development of this plan should contact:

Benton County Health Department
Environmental Health Division
530 NW 27th St.
Corvallis, Oregon 97330

(541) 766-6841, (541) 766-6899 (fax)

Why is it important to conduct solid waste management planning?

The last major, solid waste management plan for this region was written in the mid-seventies. Since then there have been many changes in the way that solid waste is managed. Federal regulations enacted in the 1990's on the disposal of solid waste have greatly reduced the environmental impacts of landfill disposal. These regulations have forced the closure of many substandard landfills and increased the operating costs of those that remain.

In the Pacific Northwest there has been a shift towards larger, regional disposal sites and an abundance of landfill disposal capacity. Those sites are operated under strict environmental controls. However, the community nearest to the landfill, most readily feels those environmental and aesthetic impacts that do occur.

The State of Oregon has mandated solid waste recovery goals. Benton County met its 1995 goal two years ahead of schedule with a 1993 recovery rate of 30.13 percent. More recently, Benton County achieved a 40.92 percent rate in 1997. Appendix A contains the most current issue of the wasteshed's recovery report.

Benton County has consistently lead the rest of the state in meeting recovery goals. Typically, the Metropolitan Service District (Metro) leads the state and Benton County is a close second. Benton County set a waste recovery goal of 45 percent for the year 2000. The state has an established goal of 50 percent waste recovery for the entire state by the year 2000.

Solid waste management issues are becoming more complex. Planning for the future will allow Benton County to continue to provide for its solid waste management needs and stay in step with changing times, population shifts, environmental protection regulations, and waste recovery and reduction goals.

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What is unique about Solid Waste Management Planning in Benton County?

Benton County is unique from other counties in the state and nation in that it has...

...a Regional Sanitary Landfill that has become a model for other landfills to follow,

...a Processing and Recovery Center for turning yard debris and wood waste into secondary products,

...a system of private service providers that have done significant planning to meet local needs and provide competitive rates,

...waste haulers that are looked upon as leaders in the state for their recycling and collection programs,

...a Solid Waste Advisory Council that has a history of actively participating in all aspects of solid waste management.

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Mission Statement

Assuring an effective integrated solid waste management system for Benton County that conserves resources and protects public health and the natural environment.

Values

Beliefs and values that guide policy and direction.

Effective planning: It is desirable to identify needs and critical issues in order to plan for changes in regulations, waste flows, markets, etc., rather than to react to them when they are upon us.

Public involvement: We value public involvement in planning and decision making for solid waste management. With public involvement, decisions will be supported and meet the broadest interests of the citizenry.

Public awareness: Citizens that are well informed on solid waste issues will provide valuable input and participate more fully in solid waste management programs.

Accountability: Performance of the system and services must be monitored and evaluated against the desired results.

Private enterprise: The capabilities of private operators should be encouraged to the extent that they can contribute positively to our mission.

Good working relationships: We value good working relationships between the service providers, regulatory agencies, users of solid waste services, and neighbors of the landfill.

Innovation: We value creative approaches and new ideas to help meet the challenges of the present and future.

Competitive rates: We value well managed, efficient operations that help to maintain competitive rates. Competitive rates promote long term stability of the system.

Landfill life: Coffin Butte Landfill is a valuable resource and the core of our solid waste management system. Long term capacity of the landfill should be promoted and protected.

Regionalization: By serving the solid waste disposal needs of our neighboring counties, the high, fixed costs of landfill operation can be spread across a much larger rate base. At the same time, we recognize that this has an impact on the life of the landfill.

Conservation of resources: We value effective, proactive waste management leading to continued reduction in the use of valuable resources that would otherwise go into the landfill.

Protection of the environment and public health: Impacts on the air, soil, water, and natural environment must be managed to protect the livability of the County and the health of its citizens.

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Vision of Success

For Solid Waste Management
In Benton County

Waste Prevention

Solid waste management planning starts before the generation of solid waste. It begins with the understanding that waste generation is the result of inefficiencies in the conversion of resources and energy to products and services. A key part of solid waste management planning is developing and promoting methods that utilize natural resources in the most efficient manner available.

Integrated Solid Waste Management

Solid waste that is generated is not merely "out of sight and out of mind." Citizens and businesses alike realize the impact that the generation of solid waste has on the environment. They strive to consume wisely, to prevent the generation of waste, and to reuse materials whenever possible. When reuse of a material is no longer possible, it is diverted from the wastestream to new products through recycling and composting or as a source of energy through a suitable energy recovery facility. Materials that are no longer suitable for a higher use are landfilled.

Services

Benton County ensures that each of its citizens has access to solid waste management services. Recycling, collection, and disposal services are provided by private companies operating under franchises managed by Benton County and the incorporated cities. These franchises provide for public involvement in solid waste management decisions, resulting in a stable system that meets the needs of both the service providers and the citizens. A majority of citizens in the County subscribe to weekly curbside recycling and waste collection services because they are provided in an affordable, efficient, and convenient manner.

Disposal

Waste transported to the landfill is contained in a facility that is equipped with state of the art environmental monitoring and protection programs. Prior to the burial of waste, loads are checked to ensure that hazardous materials are not placed in the landfill. Leachate from the waste is collected and treated. Methane gas is collected and converted to electrical energy. Noise and odors are managed effectively through operational designs. The County is actively involved in reviewing the performance of the landfill and providing information to interested citizens. Effective planning and management ensures that the disposal needs of Benton County and the region are met for many decades to come.

Public Involvement

Public understanding of and involvement in the county's solid waste management system is key to its success. All solid waste management decisions involve tradeoffs, such as acceptance of a regional disposal facility in return for lower waste management costs. The citizens of Benton County must be involved in these decisions to ensure that the solid waste management system will continue to serve their needs in the long-term.

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Introduction to Strategic Planning Issues

In the strategic planning process, issues are identified which need to be addressed effectively in order to achieve the mission of the organization and move it toward its "Vision of Success." The following strategic planning issues were identified and prioritized by the Solid Waste Advisory Council with input from the public and stakeholders.

STRATEGIC PLANNING ISSUE	PLANNING ELEMENTS
Waste Prevention, Reuse of Materials, Recycling, and Composting	Achieving recycling and recovery goals. Markets for recovered materials, waste prevention measures, and public education.
Public Awareness, Education, and Involvement	Raising public awareness of impacts of and opportunities to reduce solid waste generation. Assuring open avenues for public involvement in solid waste management issues. An aspect of all solid waste issues.
Environmental Trust Fund for the Landfill	Finalization and target amount for fund.
Monroe Transfer Station	Subsidized by landfill disposal fees. Alternate solid waste services. Public involvement in decisions.
Landfill Planning	Waste flows, regionalization, host community impacts, capacity and future disposal needs, disaster planning, and alternative disposal options.
Hazardous and Special Waste	Public awareness, improper disposal and handling, collection and disposal alternatives, and waste exchanges.
Rate Structure and Review Process	Reasonable rate of return for service providers and cost-of-service/rate equity concerns.
Environmental Impacts of Landfill	Groundwater, air, noise, odors, land values, and visual impacts.
Processing and Recovery Center	Contribution towards recycling and landfill diversion, funding options, and market development.
Unlawful Dumping	Increase public awareness, evaluate extent of problem as well as the effectiveness of existing ordinances.
Service Provider Franchises	Evaluate services provided, determine compliance with federal, state, and local laws, and review legal structure of franchise agreements.

Some of the critical issues that have been identified can be addressed in a relatively short amount of time. Others may take several years to reach some conclusions. All of the critical issues, including those that will develop in the future, will be reevaluated periodically for as long as they continue to be an issue.

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PUBLIC AWARENESS, EDUCATION, and INVOLVEMENT

Statement of Issue: Citizens and other stakeholders who are informed and knowledgeable about solid waste management issues will participate more effectively and ultimately better support important decisions and strategic planning efforts. The public's involvement and support is critical for solid waste management planning to succeed

Specific Needs: The public must...

Be aware of the impact of waste generation.

Have a basic knowledge of current solid waste management practices to be involved in key solid waste management decisions.

Be aware of solid waste prevention and recovery practices that will promote conservation of resources and protection of the environment.

Be aware of their responsibility and opportunities to be informed of and respond to current and proposed solid waste management practices in Benton County.

Have an understanding of regional, statewide, and global issues that impact solid waste management decisions.

To accomplish this...

Public awareness, education, and involvement methods must be a component of strategies to address each solid waste management critical issue identified.

Effective methods and tools for reaching the public concerning solid waste management issues, as well as methods that both encourage and allow their timely response and involvement, must be developed and/or enhanced.

Strategic Goal: To improve public awareness and knowledge of Benton County's solid waste management system, to promote involvement in decision making processes, and to encourage behaviors that support the mission and values of the system.

Objective 1: To improve the communication of solid waste information by identifying good matches between methods of communication, types of information, and the audiences targeted.

Action 1.1: Prepare a list of methods and vehicles that can be used to communicate information.

Existing Methods and Vehicles:

- News Releases
- Display Adds
- Internet Web Sites
- FYI Columns
- Brochures/Pamphlets
- Visual Displays
- Direct Contact
- Participation in Related Activities and Groups

Action 1.2: Identify target audiences or stakeholders for a variety of solid waste management issues.

Target Audiences

- General Citizenry
- Business and Industry
- Special Interest Groups
- Rate Payers

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Regional Participants

Statewide Interest Groups

Action 1.3: Identify good matches between the methods listed in 1.1 and issues and audiences listed in 1.2.

Action 1.4: Develop guidelines for using each of the methods listed in 1.1 above which incorporate the matches in 1.3.

Objective 2: To develop standards for public notification for the key steps in solid waste management decision making processes.

Action 2.1: Identify and classify the types of decisions that involve a public review process, eg. franchise renewals and rate increase requests.

Coffin Butte Permit Renewals and Reviews

Disposal Site Expansion, Closure, or Siting

Franchise Agreement Decisions

Rate Change Decisions

Solid Waste Advisory Council Participation

Development or Changes to Solid Waste Management Ordinances

Code Enforcement Actions Pertaining to Solid Waste Management Issues

Action 2.2: Identify key points in the decision making process.

SWAC Meetings

BOC Meetings and Hearings

DEQ Meetings and Hearings

Planning Commission Meetings and Hearings

Action 2.3: Prepare procedures that include minimum standards for public notification for each type of decision and key point in the process identified above.

Objective 3: To develop a directory of resources and expertise relating to solid waste management in Benton County.

Note: Development of such a directory should be weighed against the availability of similar existing resources such as the Phone Directory, Internet web sites, and classified adds.

Action 3.1: Prepare a comprehensive listing of subject areas that should be included in such a directory.

Benton County Environmental Health

Corvallis Disposal and Recycling

Coffin Butte Landfill

Benton Furniture Share

Goodwill Industries

DEQ

EPA

IMEX and other waste exchange web sites

Vina Moses Center

Benton County Information and Referral

Opportunities for:

- Recycling
- Reuse
- Waste Prevention Techniques
- Alternatives to the Use of Hazardous Materials

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Action 3.2: Prepare a preliminary listing of agencies, companies, organizations, and individuals that potentially engage in activities relating to the listing in 3.1 above.

Action 3.3: Contact the agencies, companies, organizations, and individuals listed above to confirm their interest in appearing in the directory and to gather the necessary vital information about them and their activities.

Action 3.4: Assemble the directory.

Action 3.5: Distribute the directory to interested parties.

Action 3.6: Develop a plan for updating the directory periodically to keep it current.

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MONROE TRANSFER STATION FRANCHISE

Statement of Issue: The Monroe Transfer Station, located approximately one mile southeast of the City of Monroe, is operated by Valley Landfills, Inc. under a County franchise. The City of Monroe owns the property that the transfer station is located on. The transfer station operates on Saturdays and provides solid waste disposal and recycling services to Monroe and the surrounding area. For the past several years, use of the transfer station has declined. The site has historically operated at a deficit.

Note: On April 22, 1997, the Board of Commissioners approved an extension of the franchise through 2001 subject to an annual review of the operation.

Specific Needs: Users of the transfer station should be made aware of the true costs of operating the facility and their options for alternative solid waste services. Alternative services should be reasonably adequate to meet the needs of the area residents.

Strategic Goal: To determine, for the long term, the preferred method of providing solid waste services in the Monroe area.

Objective 1: To reduce or eliminate the operating deficit of the transfer station.

Action 1.1: Convene a task force annually each October with representatives of the City of Monroe, the surrounding unincorporated area, Valley Landfills, Corvallis Disposal, SWAC, and staff.

Action 1.2: Conduct a review of the usage of the transfer station.

Action 1.3: Conduct a financial review of the operation.

Action 1.4: Recommend to the BOC, through SWAC, changes to the franchise which will assist in meeting this objective while maintaining basic services as necessary.

Objective 2: To determine the solid waste service delivery system for the Monroe area that is most consistent with the Mission and Values of the Benton County Solid Waste Management System.

Action 2.1: Evaluate the data generated by the task force to identify trends in usage and financial viability of the transfer station.

Action 2.2: Use the task force to evaluate the viability of alternatives to the services currently provided at the transfer station.

Action 2.3: By November, 2001, propose a service delivery system for the Monroe area. If the proposed system includes continued operation of the Monroe Transfer Station, recommend to the BOC findings and conditions that support renewal of Valley Landfills' franchise for its operation.

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ENVIRONMENTAL TRUST FUND for the LANDFILL

Statement of Issue: With approval of a rate increase for Coffin Butte Landfill in November, 1989, the BOC authorized the establishment of a trust fund to be used as self insurance against environmental liability. It is funded at the rate of $1 per ton of waste received at the landfill. As of December 31, 1996, the fund balance was $2.3 million. The original target amount for the fund was $2.5 million, however that may be insufficient to cover the cost of an environmental cleanup if it is ever needed. Also, the trust agreement and selection of a trustee have not been finalized.

Note: The BOC and Valley Landfills have agreed on the language for the trust agreement. After a request for quotes, a tentative trustee was selected and given a copy of the agreement for review. Current language in the agreement provides for determination of the amount of the fund and the funding structure to be done outside the agreement itself.

Specific Needs: The trust agreement for this fund needs to be finalized as soon as possible.

A determination needs to be made on whether the original target amount of $2.5 million will be adequate and if a cap should be placed on the fund at all.

Strategic Goal: To have an Environmental Trust Fund that is effectively managed and sufficient in size to protect the operator and Benton County against any reasonably anticipated environmental damage caused by the landfill.

Objective 1: To finalize the agreement and select a trustee.

Action 1.1: Negotiate agreement on any changes requested by the tentative trustee.

Action 1.2: Confirm selection of the trustee.

Action 1.3: All parties sign the agreement.

Action 1.4: Transfer the fund to the trustee.

Objective 2: To determine the appropriate amount and funding structure for the fund.

Action 2.1: Review costs associated with groundwater cleanup and other environmental remediation projects associated with landfill operations around the country.

Action 2.2: Evaluate monitoring history of the landfill.

Action 2.3: Evaluate past, present, and anticipated practices at the landfill for the relative risk potential for environmental damage.

Action 2.4: Based on the findings of 2.1, 2.2, and 2.3 above, recommend to the BOC a proposed fund amount and a funding structure necessary to achieve the amount.

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WASTE PREVENTION, REUSE of MATERIALS, RECYCLING, and COMPOSTING

Statement of Issue:

The disposal of solid waste materials represents the consumption of natural resources that may not have been utilized to their fullest potential. When done so efficiently, waste prevention, reuse of materials, recycling, and composting can both conserve and better utilize resources that would otherwise be lost through disposal.

Benton County met is 30 percent recovery goal two years earlier that mandated in 1993. In 1997, Benton County achieved a 41.92 percent rate and established a new goal of 45 percent by the year 2000.

Recycling markets rely on a steady source of solid waste materials recovered out of the waste stream to turn them into new products. Markets for the new products are vital to the success of all recycling programs.

Waste prevention (reduction and reuse of materials) addresses the issue of waste generation at its source, eliminating the need to expend resources turning solid waste into new products. Waste prevention involves fewer environmental impacts than recycling and may be the focus of future mandates.

Specific Needs:

For recycling to succeed, markets for recycled products must be developed and supported.

To meet future recycling goals, mandated or otherwise, methods of collection (source separated versus commingled), materials targeted for recovery (food waste, construction and demolition, etc...), and sources of waste (e.g., residential, commercial, and industrial waste streams) will have to be continually evaluated.

The public must be kept abreast of recycling opportunities, strategies, and mandates.

The public must be made aware of the consequences and alternatives to solid waste generation.

The level of commitment of the public towards meeting specific recycling and/or waste reduction goals, mandated or otherwise, needs to be evaluated.

The benefits of waste prevention goals need to be evaluated against potential impacts on the existing recycling infrastructure.

Waste prevention measurement criteria need to be developed.

Strategic Goal: Reduce the amount of solid waste that is generated and disposed in the landfill through waste prevention, reuse of materials, recycling, and composting. Meet or exceed state mandated goals and requirements.

Objective 1: Improve Benton County residents' overall understanding of waste prevention, reuse, recycling, and composting issues through the use of educational tools. Support existing education programs and institute new ones where necessary.

Action 1.1: Use data such as Benton County's per capita waste generation, recovery, and disposal rates to give citizens a baseline point of reference.

Responsible Party: Benton County Environmental Health Division

Action Steps

1.1.a.: Produce annual report highlighting achievements and problem areas of waste generation.

1.1.b.: Publicize waste generation, recovery, and disposal rates in annual press releases.

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1.1.c.: Produce informational brochure with updates every one to two years.

Timeline: Ongoing with annual updates.

Status: Action steps 1.1.a. and 1.1.b. are on going programs. Appendix A of this document contains the annual Benton County Wasteshed Recycling Report. The report currently emphasizes waste recovery data but can be expanded to incorporate problem areas and challenges for waste prevention.

Press releases that address the county's success at recovery rates have had mixed levels of success with the local media.

An informational brochure and survey is being drafted to address action step 1.1.c.

Action 1.2: Evaluate current education programs. Update and expand where necessary to reach population groups that would benefit the most from enhanced education programs.

Responsible Party: Corvallis Disposal and Recycling Company, Albany-Lebanon Sanitation, and Benton County Environmental Health

Action Steps 1.2.a.:

1.2.b.:

1.2.c.:

Action 1.3: Use available case studies to show cost saving benefits of waste prevention.

Action 1.4: Develop "Green Liaisons" program in work places to coordinate waste prevention, reuse, recycling, and composting activities.

Status: In 1997, Corvallis Disposal, in partnership with Benton County and the Corvallis Chamber of Commerce introduced the "Resource Efficiency Award Program" and a "Recycling and Waste Reduction at Work" education program. A key component of each of these programs is the appointment of recycling coordinators or "green liaisons" at workplaces around the county.

Action 1.5: Work with local newspapers to promote waste prevention, reuse, recycling, and composting programs and strategies.

Action 1.6: Ensure that each school in the County has the opportunity to participate in education programs such as the Oregon "Green School" program.

Objective 2: Characterize existing solid waste management practices and capacity in Benton County. Plan for future solid waste management needs through the use of demographic projections and other trends.

Action 2.1: Use demographics to predict future changes in the wastestream and potential impacts on the solid waste management system.

Action 2.2: Develop a better understanding of the capacity of the existing solid waste management system with various planning assumptions.

Action 2.3: Characterize wastestream and develop waste prevention, reuse, recycling, and composting strategies to deal with target materials.

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Objective 3: Demonstrate the significance of waste prevention, reuse, recycling, and composting methods within Benton County government. Comply with mandates and take lead in supporting responsible solid waste management practices.

Status: The requirements for a recycled products procurement policy have been forwarded to Benton County Finance Department. A review of the County's purchasing policy is scheduled to begin in February 1999. It is hoped that other resource efficiency issues can be addressed in conjunction with the recycled products purchasing policy.

Action 3.1: Explore cost saving waste prevention methods for the County.

Action 3.2: Develop a recycled products procurement policy for Benton County to meet state mandates.

Action 3.3: Develop Benton County government policies that encourage waste prevention, reuse, recycling, and composting practices.

Objective 4: Board of Commissioners, Solid Waste Advisory Council, and County Staff to make solid waste management decisions with a clear understanding of the true costs and long term effects of all options.

Case In Point: The Processing and Recovery Center (PRC) is subsidized by disposal fees paid at the landfill. In this respect, it is sometimes viewed as an operational loss. This has been identified as a critical issue for solid waste management planning. However, the contributions of this operation towards materials diversion from the landfill are significant. It is doubtful that current recovery rates could be sustained without the PRC operation. Curbside recycling is subsidized by collection fees but is viewed differently. It is considered an operational cost for the hauler.

Action 4.1: Research methods that evaluate the cost savings of waste prevention.

Action 4.2: Delineate the true costs of the various recycling and composting options within the County.

Action 4.3: Examine the deferred disposal costs of alternative solid waste management methods.

Action 4.4: Utilize cost savings for further waste prevention, reuse, recycling, and composting programs.

Objective 5: Address commercial and industrial waste prevention, reuse, recycling, and composting issues.

Note: In 1998, Corvallis Disposal operated a site that sorted through 30 yard drop boxes used by industrial customers to separate out the recyclable items. They achieved a 50 percent recovery rate on these boxes. Corvallis Disposal plans to continue with this operation. (See Appendix C)

Agri Tech, Inc. of Oregon, a subsidiary of Waste Control System, Inc., has developed an alternative disposal method for James River recycled paper sludge that had been disposed of in the landfill. The material is applied at agronomic rates on farmlands. This has resulted in both a substantial cost savings for James River and a waste reduction program for the region.

Action 5.1: Identify specific barriers to recycling for industrial components.

Status: One significant barrier to recycling for industrial customers has been low tipping fees at the landfill.

Action 5.2: Develop rate structure that encourages industrial waste prevention, reuse, recycling, and composting.

Objective 6: Promote existing waste prevention, reuse, recycling, and composting programs and initiate the innovation of new methods. Maximize the use of local resources.

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Action 6.1: Develop a recognition program that acknowledges those businesses that promote waste prevention, reuse, recycling, and composting methods.

Status: Resource Efficiency Award program has been implemented.

Action 6.2: Provide waste prevention, reuse, recycling, and composting information clearinghouse for Benton County.

Status: Corvallis Disposal and DEQ websites are available. The Corvallis Disposal site has both recycling and waste reduction information (http://www.disposal.com/servicen.html). An additional site (http://www.disposal.com/swapsite/home/index.html) serves as a waste exchange. The DEQ site (http://www.deq.state.or.us/wmc/solwaste/rsw.htm) contains a wide array of menu options and can be linked to other sites including waste exchange sites.

Action 6.3: Sponsor local contests to promote innovative waste prevention, reuse, recycling, and composting methods.

Status: Resource Efficiency Awards program implemented for area businesses. No similar program exists for industry or product development companies.

Objective 7: Participate in statewide strategies for waste prevention, reuse, recycling, and composting.

Action 7.1: Support reasonable legislative attempts at waste prevention, reuse, recycling, and composting of targeted solid waste materials.

Action 7.2: Support and initiate demonstration projects whenever feasible.

Action 7.3: Support waste reduction and recovery goals for industrial, commercial and residential waste streams.

DRAFT

LANDFILL PLANNING

Statement of Issue:

A steady reduction over the last 20 years in the number of landfills in Benton County, the state, and the nation due to tighter environmental regulations has lead to an increase in the number of regional landfill facilities. While there are environmental benefits to siting landfills in the most suitable climates and locations and while there is an economies-of-scale financial benefit to regional landfills, it is the host communities that must bear the environmental and aesthetic impacts of the disposal site. The host community must also deal with a reduction in the finite capacity and longevity of the landfill. Planning for either the expansion of existing disposal sites or the development of new disposal sites is not an easy option.

Coffin Butte Regional Landfill is the primary solid waste disposal site for four counties. A lesser amount of solid waste is disposed of at Coffin Butte from other counties. The flow of solid waste going into Coffin Butte cannot be controlled by mandate. Benton County can neither require that specific waste be disposed of at Coffin Butte Landfill, nor can it prohibit out-of-county sources from using it.

A single natural disaster could consume years of landfill capacity. Benton County does not have a natural disaster solid waste management plan.

Specific Needs:

Remaining landfill capacity, both projected and immediate needs to be determined and closely monitored.

The future disposal needs of Benton County as well as adjoining counties need to be projected.

Economies-of-scale benefits of a regional landfill must be balanced against the remaining capacity and life expectancy of Coffin Butte Landfill.

The state's plans, if any, for Coffin Butte need to be assessed.

Other county solid waste management plans that identify Coffin Butte Landfill as a disposal resource need to be examined.

Regional boundaries for Coffin Butte Landfill need to be discussed.

Preparations for additional waste stemming from natural disasters need to be made not only for Benton County but also for out-of-county sources of solid waste.

The environmental impacts of landfilling need to be weighed against possible alternative disposal methods and sites.

DRAFT

HAZARDOUS and SPECIAL WASTE

Statement of Issue:

Improper handling and disposal of hazardous and special wastes by households and businesses endangers solid waste haulers and landfill workers and lead to negative impacts on the environment and increased regulatory requirements. While some special wastes, such as asbestos, require special handling at the landfill there is an increasing number of special wastes, such as tires, appliances, and infectious wastes, that are prohibited from landfill disposal. Systems for dealing with these special wastes are costly and in some cases inadequate.

A 1994 Benton County study revealed that many small quantity and conditionally exempt generators of hazardous waste are not equipped to properly manage their hazardous wastes. Some of these generators continue to improperly dispose of hazardous waste.

Specific Needs:

Increased public awareness of the magnitude of the household hazardous waste problem and the proper disposal required for hazardous household products is needed.

Continue to hold periodic household hazardous waste collection events and evaluate ways to increase their effectiveness.

Evaluate alternative programs to collection events.

Evaluate the feasibility of programs to encourage the reuse of leftover commercial products through inter-business trading.

Educate households and businesses about less hazardous alternatives to the products they use.

Evaluate ways to improve hazardous waste disposal options for small quantity and conditionally exempt generators.

Understand the programs that DEQ administers towards CEG.

DRAFT

RATE STRUCTURE and REVIEW PROCESS

Statement of Issue:

The current rate review process (BCC 23.510) for both the waste haulers and the disposal sites is somewhat unstructured. Current wording in the Solid Waste Management Ordinance (BCC 23.505 (1)) guarantees the franchisees a "reasonable rate of return" but it is not specific on what that rate should be. A fixed rate of return would give the franchisees and the county a benchmark for determining when and if a rate review was warranted but could also act as a disincentive for a franchisee to be more cost efficient.

Under the current rate structure for garbage collection, some customers are subsidizing the rates of other customers.

Specific Needs:

Establish mechanisms, specific processes and time lines, to review rate requests and define what information must be submitted and what will be publicly disclosed for review as a part of a rate increase or decrease proposal.

Examine the impacts of cost-of-service and other rate equity issues.

Determine a fair rate of return for the franchisees.

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ENVIRONMENTAL IMPACTS of the LANDFILL

Statement of Issue:

Today's environmental protection measures for landfills are highly engineered and tightly regulated. Groundwater is closely monitored for potential impacts originating from landfill releases. Air is monitored to a lesser degree but significant regulatory requirement may be imminent. These environmental protection requirements are most likely to become more restrictive and more costly with time. Environmental protection is already a major budget item for landfills.

Coffin Butte Landfill has had an impact on both groundwater and air quality near the landfill. While the opinions on the degree of these impacts will vary, the documented effects appear to be relatively minor at this time and may be diminishing.

Neighbors to the landfill are most subject to environmental and aesthetic impacts of the landfill. Their concerns include groundwater, air quality, noise; odors, land value, and visual impacts.

While the groundwater and air quality impacts are monitored to some degree, there is relatively little information on the noise, odors, land values, and visual impacts in the area.

Specific Needs:

Determine the most effective methods of communicating environmental monitoring results to concerned neighbors and other interested parties.

Develop quantitative methods of evaluating environmental and aesthetic impacts of the landfill.

Determine how the environmental and aesthetic impacts of hosting a regional landfill can be minimized.

Determine the costs of environmental monitoring and the effect this has on rates.

DRAFT

PROCESSING and RECOVERY CENTER FUNDING

Statement of Issue:

The Processing and Recovery Center (PRC) is a major contributor to Benton County's high recovery rate. It utilizes a material that was once landfilled and therefore saves landfill capacity, and provides an in-county processing facility for yard debris and wood waste materials. This saves on transportation costs and keeps the associated jobs in the county.

Although self-sufficiency is one of Valley Landfills' goals for the PRC, it has not yet been feasible. A subsidy from the disposal fees generated waste going into Coffin Butte Landfill is necessary to supplement the operation of the PRC.

While amounts vary, solid waste from several counties is disposed of at Coffin Butte Landfill. Only three counties, Benton, Linn, and Marion, use the PRC on a regular basis. All users of Coffin Butte Landfill contribute to the PRC subsidy.

Specific Needs:

Evaluate the appropriateness of the out-of-region subsidy of the PRC.

Evaluate the benefits to all users of Coffin Butte Landfill that the PRC provides through waste diversion and conservation of landfill capacity.

Evaluate marketing strategies to enhance self-sufficiency of the PRC.

DRAFT

UNLAWFUL DUMPING

Statement of Issue:

The unlawful disposal, transportation, and storage of solid waste is a reoccurring problem in Benton County, though its extent is not well known. These practices have the potential to create public health and environmental problems. Dump sites and roadside litter also cause visual impacts that detract from the beauty of the area and can lead to decreased property values. Benton County's current nuisance abatement ordinance is often ineffective in forcing property owners to clean up improper disposal areas. The covered load ordinance was instituted in November 1994 to reduce litter on roads leading to the landfill, but its effectiveness has not been documented.

Specific Needs:

Review existing nuisance abatement ordinance and make recommendations to the Board of Commissioners how to strengthen its effectiveness.

Increase public awareness of unlawful storage and disposal issues.

Evaluate effectiveness of the covered load ordinance on reducing litter on the roads leading to the landfill.

DRAFT

FRANCHISES

Statement of Issue:

State ordinances mandate that local governments are responsible for providing solid waste management services to their constituents. This can be done either by the local government directly providing the services or by contracting or franchising with private enterprise. Benton County provides the services through franchise agreements with two waste haulers, one landfill disposal site, and one transfer station disposal site.

Specific Needs:

Develop a definitive process to evaluate solid waste management services to include cost effectiveness, coverage areas, timeliness, level of customer satisfaction with service, response to customer complaints, and response to requests for service.

Determine if franchise agreements provide legal authority to require that franchisees provide specified services such as education, household hazardous waste collection events, and/or give the County the flexibility to seek out and contract with other service providers if necessary.

Determine if franchise agreements require compliance with all Federal, State, and local laws.

Review legal structure of franchise agreements. The review should include topics such as exclusive rights, performance default clauses, penalties and remedies, protection from or consent to transfer or sale franchise, protection from liability clauses, County compensation, establishment of environmental cleanup funds, and updating the agreements.

APPENDIX H

2019 OREGON MATERIAL RECOVERY AND WASTE GENERATION RATES REPORT

May 2021

2019 Oregon Material Recovery and Waste Generation Rates Report

By:

Materials Management Program
Land Quality Division
Oregon Department of Environmental Quality

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Acknowledgments

The Oregon Department of Environmental Quality's Materials Management Program conducted the 28th annual Oregon Material Recovery Survey for calendar year 2019. DEQ extends its appreciation to industry representatives, collection service providers, local governments, and landfill administrators and staff for providing recovery and disposal data for 2019, and working with DEQ staff to complete this report. The survey team also thanks DEQ personnel who contributed to the accuracy and integrity of the information contained in this report:

Michelle Shepperd, Peter Spendelow, Martin Brown, Loretta Pickerell, Cheryl Grabham and Julie Miller Materials Management, DEQ Headquarters

Cathie Rhoades, Cathy Brown, Tom Lang, Lexi Meek Materials Management, DEQ Regional Specialists

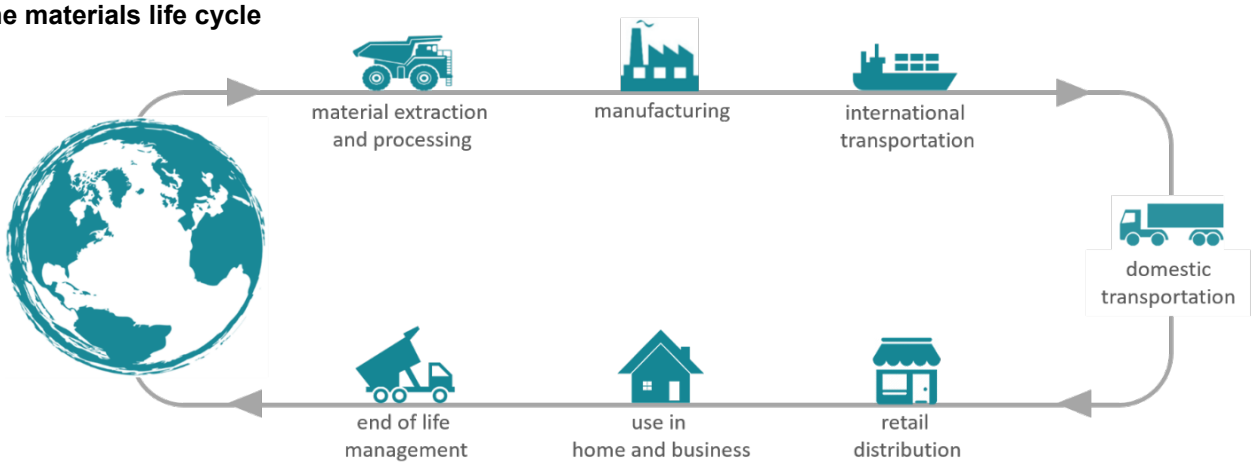
This report provides one of the most complete and accurate collections of state-level disposal and recycling data in the country.

DEQ can provide documents in an alternate format or in a language other than English upon request. Call DEQ at 800-452-4011 or email deqinfo@deq.state.or.us.

Executive Summary

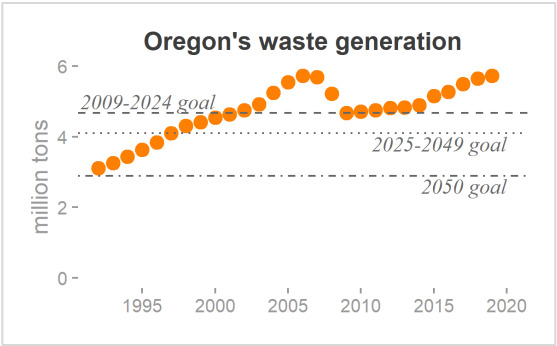
Oregon DEQ's Materials Management program takes a holistic view of environmental impacts of materials. It considers the impacts that occur across the full life cycle of materials, including resource extraction, design and production, use, and end-of-life management, including solid waste disposal and recovery.

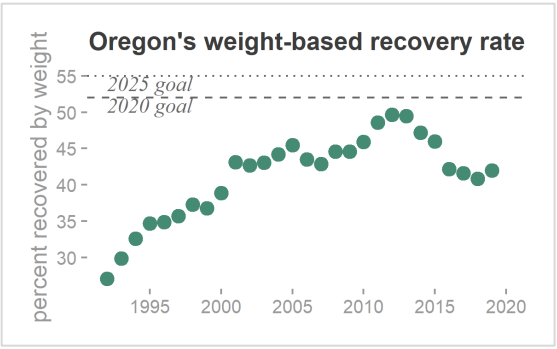
The materials life cycle



This report focuses on how Oregon manages materials at the end of their useful lives, via disposal and recovery.

- *Disposal* refers to all materials placed in landfills and many materials burned in incinerators.
- *Recovery* refers to recycling, composting and some incineration for energy recovery.
- *Generation* is the sum of disposal and recovery and represents the total tonnage of the waste stream.
- The *recovery rate* is the percentage of generation recovered.





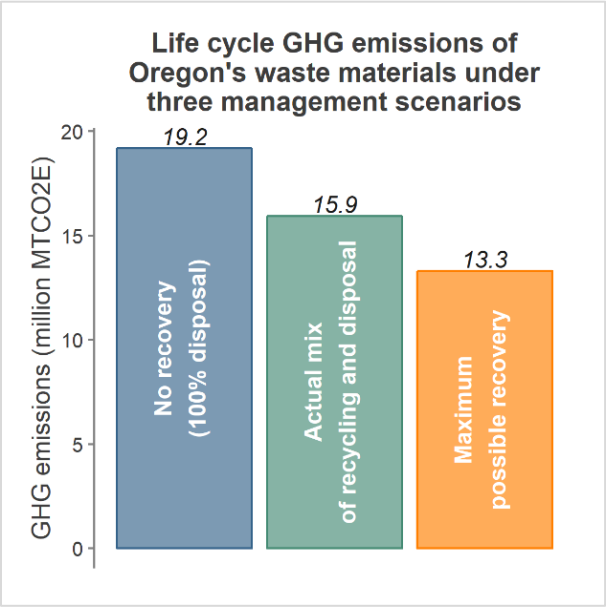
In 2019 people in Oregon:

- Generated 5,728,796 tons of waste, up 1.3 percent from 2018;
- Disposed of 3,322,700 tons into landfills and incinerators, down less than one percent from 2018; and
- Recovered 2,406,095 tons of material, 42 percent of the waste generated. This is a 1.2 percent increase from 2018's 40.8 percent.

The rise in generation was likely the result of a busy economy in 2019 with abundant construction activity and purchasing of consumer goods. Cardboard recycling increased, while the tons of other paper recycled continued its multi-year decline as people continue to move to electronic rather than paper media for communication. There was a continued increase in plastic and aluminum recycled under Oregon's Bottle Bill following the expansion of the Bottle Bill to cover juices, teas, and many other beverages in 2018. The recycling of other rigid plastic containers also increased, but film and other plastic just held steady or declined. Glass recycling tonnage declined, but that was a result of a drop in sales of beverages in glass rather than a reduction in the recycling rate. There was also a notable increase in tonnage of other scrap metal recovered, in spite of lower prices for scrap metal in 2019 as compared to 2018.

State goals for solid waste:
Waste generation remained well above the goal set for 2009-2024 by the Oregon Legislature. Weight-based recovery rates are lower than the legislated goals set for 2020 and 2025.

Recovery and environmental impacts:
Recovery via recycling and other means has environmental value. DEQ estimates that in 2019 (just as in 2018), material recovery reduced greenhouse gas emissions by 3.3 million metric tons of CO_2 equivalents, compared to a scenario where all waste was disposed. Another 2.6 million MTCO2E in reductions are possible, if recovery rates could be raised to the maximum possible level.



However, even with maximized recovery, the GHG impacts of materials in the waste system would be considerable, at around 13.3 million MTCO2E. Oregon's total GHG emissions from all sources exceeded 60 million MTCO2E in 2018.

Recovery does present an opportunity for environmental impact reductions, but only a limited one. To achieve deeper reductions in the environmental impacts of materials and waste, DEQ and its partners will need to take actions across the entire materials life cycle, for example, by redesigning products and reducing overall materials use.

Table of contents

Introduction and purpose

This report describes results and methodology for Oregon's Material Recovery Survey for calendar year 2019. "Material recovery" includes all materials collected for recycling or composting, and for a subset of materials, incineration with energy recovery. Each year, the Oregon Department of Environmental Quality compiles data on municipal post-consumer waste recovery. DEQ sends a survey to all collection service providers and private recycling companies that handle materials for recycling, composting and energy recovery. Survey data is combined with data gathered from quarterly and annual disposal site reporting forms. Together, recovery and disposal numbers make up the amount of waste generated by people in Oregon each year.

$$\frac{\textbf{\textit{Total Recovered}}\ \textbf{2,406,095 tons}}{\textbf{\textit{Total Generated}}\ \textbf{(Total Recovered + Total Disposed)}\ \textbf{5,728,796 tons}} = \textbf{\textit{Recovery Rate}}\ \textbf{42.0\%}$$

DEQ uses this information to estimate energy savings and greenhouse gas reductions, two important environmental benefits from material recovery. DEQ also uses it to calculate material recovery rates and waste generation. The recovery rate is the percentage of the total waste generated in Oregon that is recycled, composted or recovered for energy. Waste generation is the amount of waste recovered plus the amount of waste disposed. Recovery, disposal and generation data, as well as recovery rates, are calculated for the state and for each of Oregon's 35 individual wastesheds[1].

[1] A "wasteshed" is defined in Oregon law as being an area of the state that shares a common solid waste disposal system, or an appropriate area in which to develop a common recycling system. For the most part, individual Oregon counties are designated as wastesheds. Three exceptions are that:

- The greater Portland tri-county area, consisting of Clackamas, Multnomah and Washington Counties, is designated as the Metro wasteshed.
- Milton-Freewater, a city within Umatilla County, is designated as a separate wasteshed.
- For most cities such as Albany that have populations in two counties, the entire city was included in the wasteshed that included the larger portion of the city population. The exception is Salem, where most of Salem is in the Marion Wasteshed, but West Salem is included in the Polk Wasteshed.

Individual wastesheds also use this information to implement and improve their waste prevention and material recovery programs.

This is the 28th year that DEQ has used the survey to gather this data. The 1991 Oregon Legislature enacted requirements (see Oregon Revised Statute 459A) for this annual survey and set goals for state and local recovery rates. These recovery goals were amended by the Legislature in 2001, and then again in 2015 (effective 2016). Wasteshed goals range from 15 percent (Lake Wasteshed) to 64 percent (Metro and Marion Wastesheds) by 2025. The statewide recovery goals are 52 percent recovery by 2020 and 55 percent recovery by 2025.

In 2001, the Legislature also established statewide goals for reducing waste generation. These goals were revised by the Legislature in 2015. The waste generation goals require that the generation of solid waste in the years 2025 to 2049 be 15 percent below the amount of solid waste generated in 2012, and for 2050 and beyond, the generation goal is 40 percent less than the waste generated in 2012.

Requirement to report

Oregon law requires that all publicly and privately operated recycling and material recovery operations complete a Material Recovery Survey form. This includes landfills, local recycling collectors, private recycling collection companies and depots, transfer stations, material recovery facilities, composters, local governments and any other operation that handles post-consumer recoverable materials. One exception, due to the difficulty of separating post-consumer scrap metal from commercial and industrial scrap metal, are companies handling only scrap metal. These companies are not required to report on privately obtained post-consumer scrap metal, but many do report on a voluntary basis.

The survey requires that companies report all recyclable materials they handle, including the amount of each material collected, the county of origin, the company they received any transfers from, and where or to whom the materials were marketed.

Oregon law further requires DEQ to keep confidential the information reported by private recyclers. This includes customer lists and specific amounts and types of materials collected or marketed by individual companies. For private recyclers, only aggregated information may be released to the public.

Materials included in the analysis

Oregon's analysis of the environmental benefits from material recovery and the recovery rates includes only post-consumer materials generated in Oregon for recycling, composting or energy recovery. Per Oregon's recycling law (ORS 459A.010 (3)(a)), waste from manufacturing and industrial processes (pre-consumer materials), reconditioned and reused materials, material that can be disposed of as clean fill without being put in a landfill such as brick and concrete, and waste originating out of state (but handled in Oregon) are excluded. Some scrap metals,

including discarded vehicles or parts of vehicles and metal derived from major demolition activities handled by scrap metal dealers, are also excluded. Scrap metal collected at disposal sites by collection service providers, at community recycling depots or through municipally sponsored collections events counts as recovered material.

The first Material Recovery Survey for the 1992 calendar year included 30 types of materials. Since then, some new materials have been added and other materials consolidated, so that the survey now contains 33 types of material. The major materials for 2019 are:

- Yard Debris
- Metals – Tinned cans, aluminum and other scrap metals
- Cardboard
- Wood Waste
- Paper Fiber – Other paper fiber (combined high-grade paper, newsprint and mixed scrap paper) not including cardboard
- Other – Including tires, used motor oil, antifreeze, batteries of all types, gypsum, asphalt roofing materials, textiles, paint, and animal waste and grease
- Container Glass
- Plastic – Rigid plastic containers, plastic film, other plastics and composite plastic (including carpet pad)
- Food Waste – Residential and commercial food waste
- Electronics

A complete list of materials recovered is included in Table 8, at the end of this report.

Recovery and reductions in environmental impacts

Summary of analytical results

Oregon's recovery activity in 2019 can be associated with:

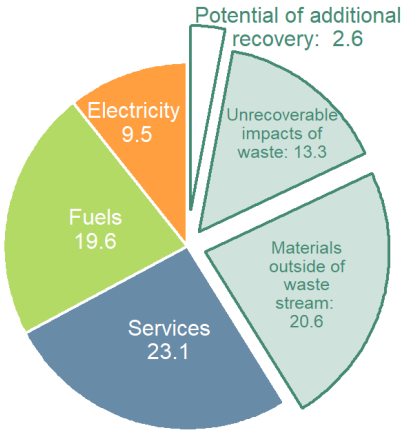
- 3.3 million metric tons CO_2 equivalents of reductions in greenhouse gas emissions; and
- 32 trillion British thermal units of savings in energy expenditures.

These savings in energy and greenhouse gas impacts are very similar to the values reported for 2018 (30 trillion BTU and 3.3 MMTCO2E).

If recovery could be increased from its current rate (about 42 percent by weight) to the currently conceivable maximum rate (80-90 percent by weight), it can be calculated that:

- GHG emissions would decline an additional 2.6 MMTCO2E; and
- Energy expenditures would decline an additional 33 trillion BTU.

Such savings must be placed within the context of the state's total environmental impacts.



Sources of GHG emissions in Oregon, in MMTCO2E, according to the state's consumption-based inventory, combined with results from a life cycle assessment of the solid waste stream. The impact of materials (in dark green) already includes the current benefits of recovery. Additional recovery (above current levels) offers 2.6 MMTCO2E in possible further impact reductions. The remaining GHG impacts of materials are either not preventable by recovery (13.3 MMTCO2E), or not represented by the solid waste stream at all (20.6 MMTCO2E).

- Oregon's total GHG emissions are more than 60 MMTCO2E. A recent DEQ report[2] gives recent yearly totals as 66.2 MMTCO2E, from a sector-based method, and 88.7 MMTCO2E, from a consumption-based method. The consumption-based results are illustrated at right.

[2] Oregon DEQ, "Oregon's Greenhouse Gas Emissions through 2015: An Assessment of Oregon's Sector-Based and Consumption-Based Greenhouse Gas Emissions," May 2018, www.oregon.gov/deq/FilterDocs/OregonGHGreport.pdf.

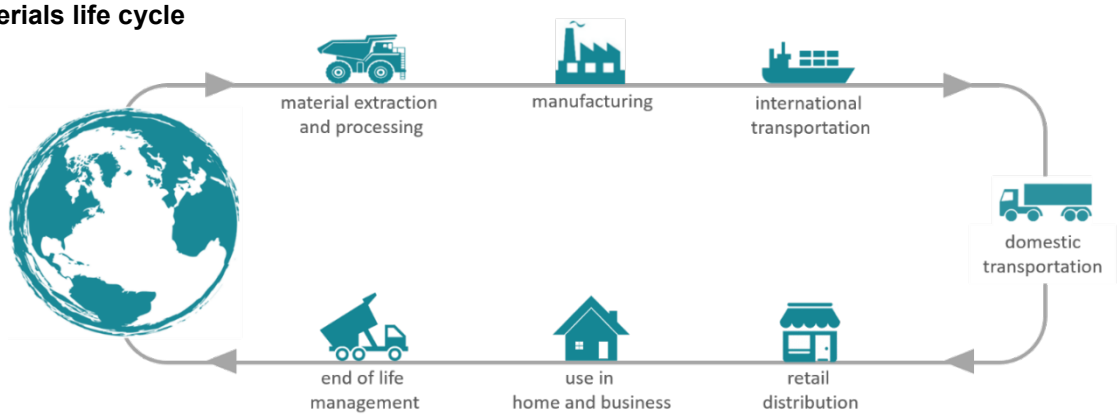
- Oregon's overall direct energy expenditures are around 1,015 trillion BTU per year, in a recent Oregon Department of Energy report.[3]

While increased recovery does present an opportunity for environmental impact reductions, the opportunity is limited. Increased recovery, by itself, cannot provide the sizeable decreases in impacts anticipated by the state's greenhouse gas reduction goals (ORS 468A.205), or the *2050 Vision*.[4] Achieving greater reductions in environmental impacts of materials will require other materials management strategies, such as the redesign of products and waste prevention.

Understanding impact reductions

All products and materials can be seen within the context of the materials life cycle. Everything people touch or use has been created somehow – usually via "extraction" from the earth or soil, followed by production, distribution, consumption and use, and "end of life" processes such as disposal or recycling. Environmental impacts occur at every stage of this life cycle. For example, extracting ore or operating a farm uses machinery that emits GHGs and expends energy. The sum total of impacts associated with the materials life cycle are called the "life cycle impacts."

The materials life cycle



Recovery activities such as recycling and composting also create impacts. For example, recycling trucks emit GHGs and expend energy as they collect material, as does processing collected recyclables to create new products.

Where, then, do the "impact reductions" or "savings" associated with recovery come from?

DEQ assumes, as is conventional in the field of life cycle assessment, that use of recovered materials prevents production from newly extracted material, or otherwise prevents some undesired environmental impact. For example, production of a metric ton of glass from recycled

[3] Oregon Department of Energy, "2020 Biennial Energy Report," November 2020, https://www.oregon.gov/energy/Data-and-Reports/Documents/2020-Biennial-Energy-Report.pdf

[4] Oregon DEQ, "Materials Management in Oregon: 2050 Vision and Framework for Action," 2012, www.oregon.gov/deq/FilterDocs/MManagementOR.pdf.

sources may save about 300 kg of GHG emissions, *compared to the emissions of production from newly extracted material*.[5] Similarly, while aerobic composting does lead to CO_2 emissions, composting may still represent a savings *compared to the methane emissions that could result from disposal in a landfill*.[6]

Accordingly, "impact reductions" or "savings" are not direct measurements, but *projections* of how impacts could differ if materials had been managed differently at end-of-life.[7]

It is important to note that these impacts may occur spread over time instead of in a single year, and may occur in areas outside of Oregon. Though we associate the materials in the waste stream with a particular place (Oregon) and time (for example, 2018), the life cycle impacts of those materials are not always so localized. An item recycled in 2018 in Oregon may have been created in another state or country in a different year. An item disposed in 2018 may decay in a landfill, but slowly over a period of many years. Environmental impacts, and "savings," are spread out over time and space.

Methodological details, in brief

DEQ calculates impact reductions through a multi-step process. First it characterizes Oregon's solid waste stream, which includes both disposed and recovered materials, by weight and end-of-life disposition (for example, recycling, composting or landfilling). Next it links those weights to "impact factors" that convert weights into environmental impacts for both production processes and end-of-life dispositions. Appropriate credits are given for recovery activities when it can be presumed that recovery has prevented some other, greater environmental impact, as described earlier. Then it sums life cycle impacts for three possible management scenarios:

- *Actual*: the life cycle impact of materials in the solid waste stream, given the current mix of recovery and disposal.
- *No recovery*: the life cycle impact of materials in the solid waste stream, if no recovery had taken place and all materials had been disposed.
- *Maximum possible recovery*: the life cycle impact of materials in the solid waste stream, if all recoverable materials had in fact been recovered.

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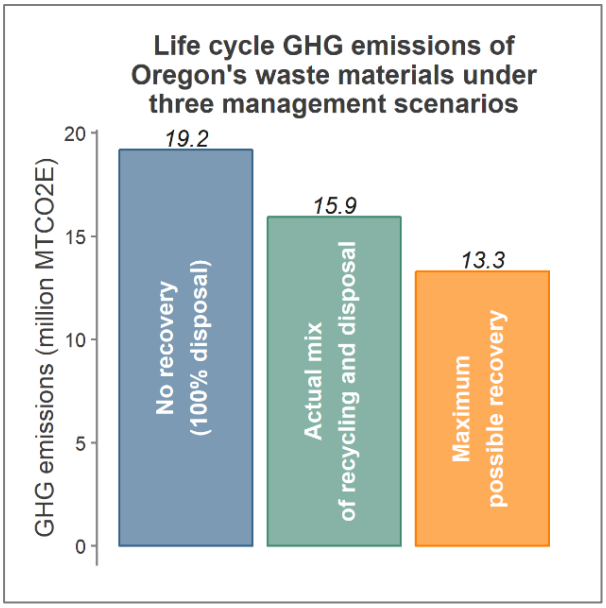
[5] David A. Turner, Ian D. Williams, and Simon Kemp, "Greenhouse Gas Emission Factors for Recycling of Source-Segregated Waste Materials," *Resources, Conservation and Recycling* 105, Part A (December 2015): 186–97, https://doi.org/10.1016/j.resconrec.2015.10.026.

[6] US EPA, "Organic Materials Chapters [Documentation for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM)]," February 2016, www.epa.gov/sites/production/files/2016-03/documents/warm_v14_organic_materials.pdf.

[7] The assumptions behind such projections are important to note. Such calculations, including DEQ's, presume that demand for materials is unaltered by the presence of recycled materials, and that collected recyclables actually replace newly extracted materials at a high rate, often 1:1. Authors such as Zink and Geyer question both these assumptions – see doi://10.1111/jiec.12545 and doi://10.1111/jiec.12355 .

Note that in all scenarios, the weights of materials are the same. The scenarios differ only in the end-of-life dispositions of those materials. The *maximum possible recovery* scenario assumes that 80-90 percent of the solid waste stream is recovered. The figure is less than 100 percent, because approximately 10-20 percent of the solid waste stream, by weight, consists of materials which have no currently viable recovery disposition.



Finally, "impact reductions" or "savings" are calculated as differences between the scenarios. The currently realized savings are the difference between the *no recovery* impact and the *actual* impact. The additional savings, which might be realized by maximizing recovery, are the difference between the *actual* impact and the *maximum possible recovery* impact.

For example, the currently realized GHG savings of 3.3 MMTCO2E, and the additional potential savings of 2.6 MMTCO2E, were calculated by comparing life cycle emissions for the three scenarios, totaling 19.2, 15.9, and 13.3 MMTCO2E.

The weight data describing Oregon's waste stream comes from several sources.

- Quantities and dispositions of recovered materials come from DEQ's Material Recovery Survey for 2019.
- Quantities of disposed materials are derived by combining the total amount of material disposed in Oregon in 2019, from DEQ's disposal records, and the Waste Composition Study[8] for 2016/17, which describes the proportions of disposed waste in various material categories.

Impact factors are copied from the EPA's WARM model,[9] version 14, with the following exceptions. DEQ staff modified WARM's impact factors for wood waste and yard debris based on their own research and analyses. For uncommon materials appearing in Oregon's waste stream that are not covered by WARM, weighted averages of WARM's impact factors were used.

For further information about how DEQ calculates impact reductions contact Martin Brown of Oregon DEQ at 503-229-5502, or martin.brown@deq.state.or.us.

[8] Oregon DEQ, "Statewide 2016 Waste Composition Study: Excel Results Files Updated June 20, 2018 [Sheet P16TOT]," 2018, www.oregon.gov/deq/FilterDocs/A01-StatewideWCS16.xlsx.

[9] US EPA, *Warm Version 14*, 2016, www.epa.gov/sites/production/files/2016-04/warm_v14.xls.

Recovery rates

The recovery rate is the percentage of total waste generation that is recovered. DEQ calculates both the statewide recovery rate and a recovery rate for each of the 35 individual wastesheds in the state.

2019 statewide recovery rate

In 2019, the state recovered 2,406,095 tons of material. This represented 42.0 percent of the municipal post-consumer waste stream, well below the statewide goal of 52 percent recovery by the year 2020. Recovered tons increased by 4.2 percent from the previous year surveyed, 2018.

From 1992 through 2005, tons of material recovered increased regularly each year. From 2006 through 2009, recovered tons declined even though recovery rates were fairly flat, as declining consumption of newspapers and magazines, followed by a general decline in overall consumption due to the recession, reduced the amount of material available to be recovered. In 2010, Oregon saw an increase in recovery, as the economy gradually recovered from the recession. In 2019 cardboard recovery saw an increase of 12,423 tons and scrap metal increased 51,482 tons over 2018 levels. Paper fibers set a new record low of 193,626 tons recovered and paint saw a decrease of 1,117 tons.

Oregon State Recovered Tons and Recovery Rates

Year	Tons Recovered	Tons Disposed	Calculated Rate[10]
1992	839,679	2,263,099	27.1
1993	974,685	2,280,513	29.9
1994	1,118,912	2,312,669	32.6
1995	1,257,204	2,362,146	34.7
1996	1,338,259	2,497,170	34.9
1997	1,462,114	2,633,017	35.7
1998	1,604,985	2,695,903	37.3
1999	1,626,271	2,788,699	36.8
2000	1,765,817	2,778,463	38.9
2001	1,999,085	2,635,072	43.1
2002	2,029,261	2,723,365	42.7
2003	2,116,880	2,796,787	43.1
2004	2,317,064	2,923,462	44.2
2005	2,523,367	3,026,457	45.5
2006	2,494,050	3,235,828	43.5
2007	2,437,569	3,248,126	42.9
2008	2,326,146	2,890,503	44.6
2009	2,082,631	2,586,721	44.6
2010	2,163,957	2,523,808	46.2
2011	2,306,124	2,437,767	48.6
2012	2,391,490	2,424,833	49.7
2013	2,390,859[1]	2,513,404[1]	48.8[1]
2014	2,307,269[1]	2,634,653[1]	46.7[1]
2015	2,369,080[1]	2,784,467[1]	46.0[1]
2016	2,225,943[1]	3,050,432	42.2[1]
2017	2,286,969[1]	3,207,448[1]	41.6[1]
2018	2,307,322	3,345,503	40.8
2019	2,406,095	3,322,700	42.0

[1] These tonnage figures are corrected from earlier published values.

[10] Between 2001 and 2015, Oregon's law specified that "credits" be provided towards the statewide recovery goal for jurisdictions that promoted programs for home composting and for material reuse - programs for which recovery is difficult to measure directly. At the state level, these credits added about 3.6 to 3.8 percent to the statewide recovery rate in those years. Changes in legislation in 2015 eliminated the recovery credits, and so they have been dropped from this table.

A total of 3,322,700 tons of municipal post-consumer waste from Oregon were disposed in 2019. With a decrease of less than one percent from 2018, this marks 2018 as the new peak in disposal. Per-capita disposal was 1,569 pounds per year, surpassing the 1992 figure of 1,513 pounds, but still staying below the 2007 per capita disposal of 1,734 pounds per year.

Total tons disposed added to total tons recovered equaled 5,728,796 tons of total waste generated in 2019 (see Waste Generation on page 12). Total generation increased by one percent, with per-capita generation increasing less than half of a percent from 2018 levels.

Waste recovery increased by 4.3 percent (+98,773 tons) and disposal decreased by less than one percent (-22,803 tons), resulting in the increase in generation (+75,970 tons). Although waste generation has increased steadily since 2010, moving us away from our waste generation goals, total generation in 2019 was just 1,083 tons less than it was at its peak in 2006. This is a slight drop of less than one-tenth percent in waste generation between 2006 and 2019, or 12.9 percent if measured on a per-capita basis.

How DEQ calculates the statewide recovery rate

DEQ combines information about quantities of material collected from privately-operated recycling and material recovery facilities with recovery information from collection service providers and disposal site collections, in a manner that eliminates double-counting of material that is passed on from collectors through processors to end-users. This determines the total weight of material recovered.

Next, DEQ adds the total weight of material recovered to the total weight of material disposed, obtained from disposal site reports. This sum is the total weight of material generated. The total weight of material recovered is divided by the total weight generated. This results in the calculated recovery rate.

How DEQ calculates individual wasteshed recovery rates

The total weight of material recovered is allocated to the wasteshed of origin. Direct collectors of materials are the primary and best information source for the collected materials' wasteshed of origin. When information from direct collectors is not available, or when a survey respondent does not know the wasteshed of origin for the collected materials, DEQ uses information from the companies receiving materials from the collectors in order to allocate material back to wastesheds. Material is allocated back to wastesheds based on population in rare cases when survey respondents and market information is insufficient.

DEQ also uses information from disposal site reporting forms to determine the total weight of material disposed to the wasteshed of origin. For each wasteshed, total weight of material disposed is added to total weight of materials recovered to ascertain the amount of waste

generated in the wasteshed. The total weight of material recovered is divided by the total weight generated to determine the calculated recovery rate for each wasteshed.

Marion County adjustment

As home to the state's only municipal waste-to-energy incinerator, Marion County's recovery and disposal tonnages are revised each year to include certain wastes burned for energy as recovered, as directed by the 2001 Legislature. For 2019, the five materials that could be counted toward the recovery rate when burned for energy were wood, yard debris, used motor oil, fuels, and paint. In 2019, 15,169 tons of these materials burned for energy in the county's incinerator were counted as recovered instead of disposed. DEQ obtained this tonnage by multiplying the quantity of non-industrial, in-county, counting solid waste processed at the facility by the percentage that those six materials make up of Marion County's municipal solid waste disposal stream. Marion County also recovered 7,913 tons of scrap metal from the incinerator ash. DEQ subtracted the scrap metal tonnage from the Marion County disposed tons so that the same tons would not be counted as being both disposed and recycled.

Wasteshed recovery rates

Oregon has 35 individual wastesheds, each with its own recovery rate and goal. Based on the new goals established by Senate Bill 263, six wastesheds are already at or above their goal for 2025.

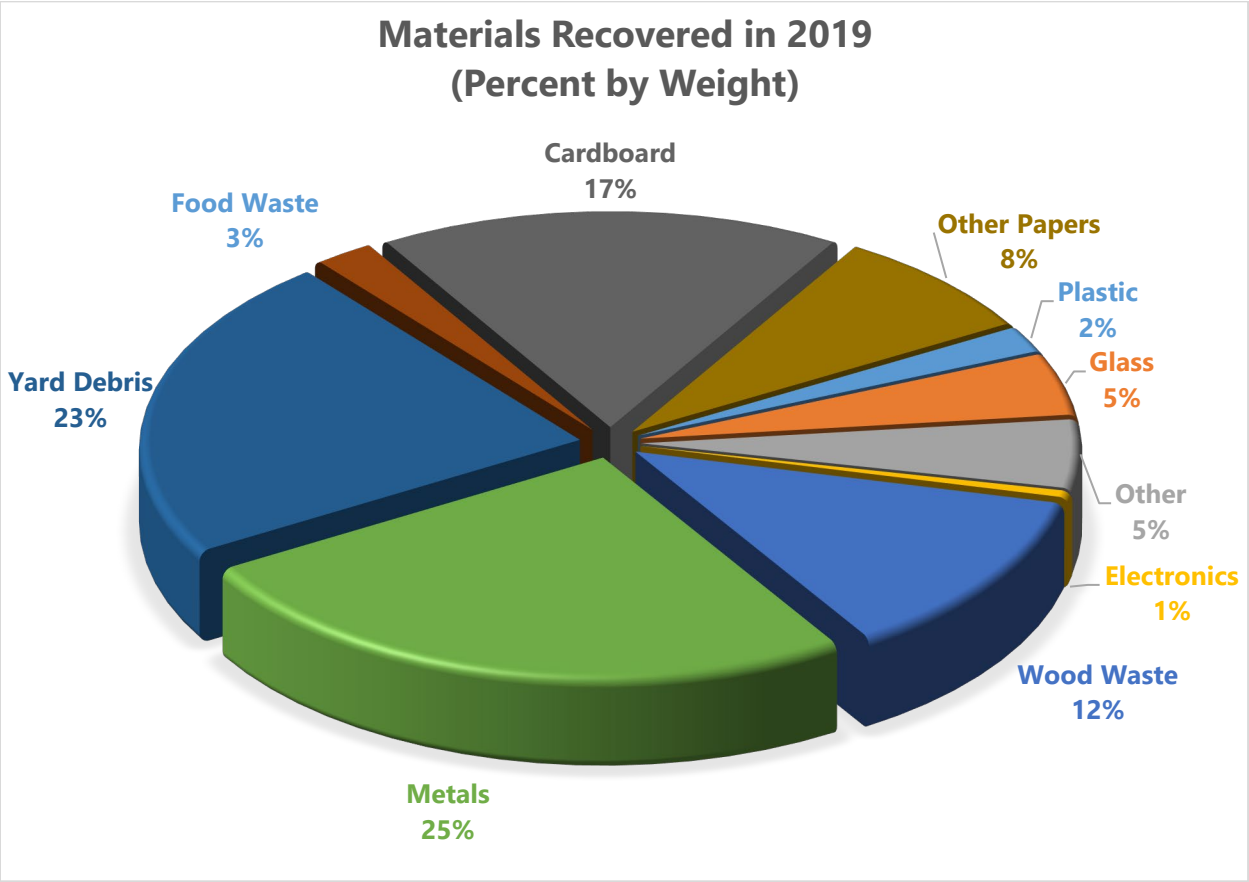
The Survey Report Tables listed on page 21 of this report show 2019 recovery rates for each wasteshed (Table 1), tons of materials recovered in 2019 by wasteshed (Table 2), and tons of solid waste disposed by wasteshed in 2019 (Table 3).

For a historical look at recovery, disposal and generation data in Oregon, see Survey Report Tables 4, 5, 6 and 7, which provide the recovery rates, recovered material tons, disposal tons, and tons of solid waste generated each year since the Material Recovery Survey began in 1992.

Materials recovered

Oregon's material recovery rate for 2019 includes materials that were recycled, composted (including yard debris, food waste and some wood waste), and burned for energy (including tires, fuels, oil-based paint, used oil, wood waste and some yard debris). Sixty-four percent of the material recovered was recycled, 23 percent was composted and 13 percent was burned for energy.

The chart below shows major categories of materials recovered in 2019 and the percentage of total recovery (by weight) for each category. Specific materials included in these categories are listed on page four.



Factors affecting material recovery in 2019

Several material recovery programs saw major changes in 2019, both by design and due to external factors. These include:

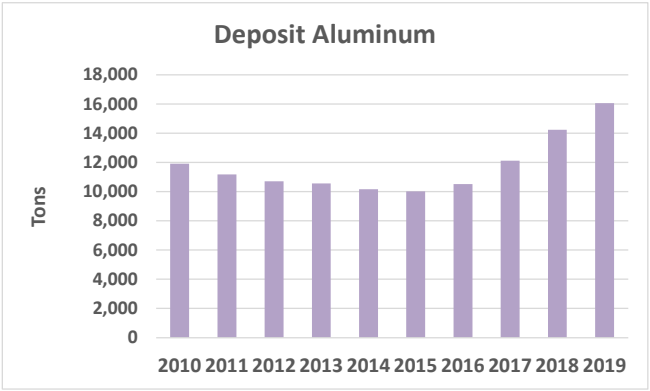
- Continued increase in recycling of beverage containers following the expansion of Oregon's beverage container redemption law ("Bottle Bill") in 2018 to cover juices, teas, sports drinks,

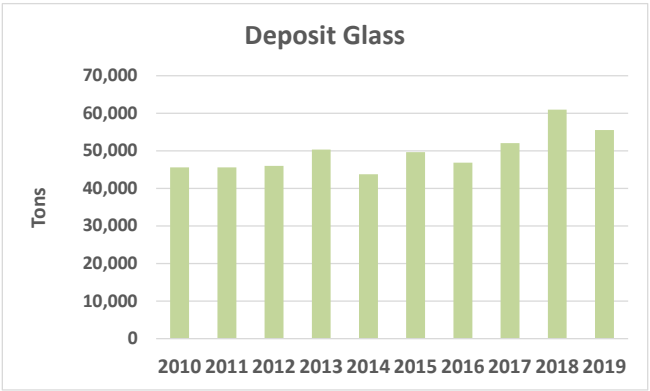
and all other beverages except wine, liquor, milk, and milk substitutes, and the doubling of the refund value to 10 cents in 2017.

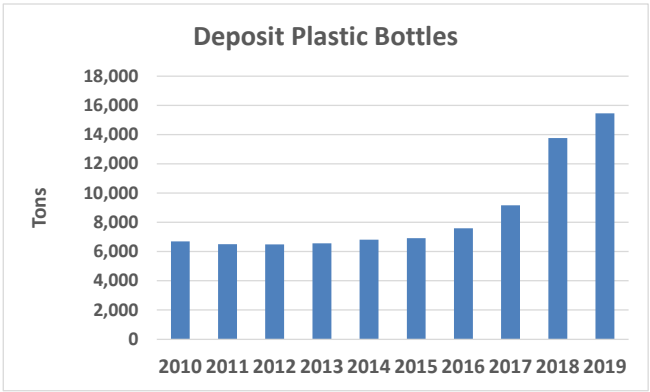
- Strong import restrictions by China in 2017 followed by complete bans on post-consumer plastics and unsorted paper in 2018, caused major disruption in recycling markets throughout the world, and have continued to have large impacts on Oregon's curbside recycling programs through 2019. With very low, and even negative, prices being paid for some major recycling commodities.

Bottle Bill expansion and refund value increase

Oregon saw continued increases in both plastic and aluminum beverage containers recycled in 2019, following the doubling of the container refund value to 10 cents in April 2017 and the expansion of the Bottle Bill to include juices, teas, sports drinks, and other beverages except wine, liquor, milk, and milk substitutes in January 2018. The tons of plastic bottles recycled increased by 12.4 percent in 2019 as compared to 2018, closely matching beverage return data compiled by the Oregon Liquor Control Commission that showed an 11.4 percent increase in the number of plastic bottles redeemed for deposit. This is in spite of the fact that the data OLCC compiled showed that the sales of plastic beverage bottles fell by 2.5 percent in 2019 compared to the previous year. Aluminum can tonnage increased by 12.8 percent in 2019, closely matching OLCC's numbers showing a 10.5 percent increase in the number of aluminum cans redeemed. Much of this increase was due to an increase of 7.1 percent in sales of beverages in aluminum cans, according to OLCC data, as many breweries switched more of their production to cans instead of glass bottles. Sales in glass bottles fell by 5.1 percent in 2019 according to OLCC data. The tons of glass recycled under the Bottle Bill fell by nine percent, while OLCC data show only a 3.5 percent drop in redemption of glass containers. The three bar charts to the







right show the tons of aluminum, glass and plastic beverage containers recycled under the Bottle Bill since 2010.

Increases in recycling under the Bottle Bill come from two sources:

- More containers being redeemed instead of being disposed or littered, and
- Containers being redeemed instead of being placed out for curbside collection or recycled at depots.

Moving containers from disposal or litter clearly has major environmental benefits. However, even moving containers from depots or on-route collection also results in a greater tonnage of material recycled, as Bottle Bill recycling is much less contaminated than is true for materials collected commingled, resulting in a higher yield of material actually recycled into new products or packaging.

Impact of China's import bans and 2017-18 recycling market disruption

As discussed in the 2018 Oregon Material Recovery Survey, China implemented a ban on importation of mixed recyclables including almost all post-consumer plastics starting in 2018. Many other Asian countries then took similar steps, strongly limiting the markets for plastics and mixed paper. With the disappearance of markets for these materials, the price of plastic and paper for recycling dropped precipitously, and instead of being paid for commingled recyclable materials, on-route collection companies were having to pay to have their materials accepted by the commingled recycling processing facilities. According to data from *RecyclingMarkets.net*, prices for most grades of paper and plastic continued to decline in 2019, with prices for mixed paper being slightly negative in 2019 compared to slightly positive (but very low) in 2018. Both recycled polyethylene and PET plastics had lower prices in 2019 compared to 2018, although in 2021 the price paid for recycled clear high density polyethylene has climbed to an all-time high. In spite of the low market prices for plastics, the tons of rigid plastic containers recycled climbed in 2019 back to the level seen in 2017, with increases in plastics recycled both under the bottle bill and through other collection programs. Other rigid plastics showed a slight rise in 2019 when compared to 2018, but film plastic continued to fall, dropping to only 8,170 tons, nearly 10 percent lower than in 2018. As recently as 2016, Oregon had recycled nearly 16,000 tons of film plastic.

In response to the market disruption, many jurisdictions dropped plastic tubs and pails, and sometimes other materials such as mixed paper, from their collection programs. Most programs that dropped material in 2018 continued to not collect those materials in 2019, although a few did add back certain items to their on-route programs. Programs in the Portland Metro area, Deschutes County, and Clatsop County did not make any changes to their on-route collection programs in spite of the market disruption, and continue to collect the same materials that they have collected for more than a decade.

Disposal concurrences ended in 2019

Although Oregon's law generally prohibits the disposal of recyclable material, disposal could be allowed if there is no market for the material collected or if the costs to recycle the material is prohibitively expensive. Responding to the market disruptions of 2017, DEQ worked with recyclers and local governments to develop a process whereby collectors or processors could provide information to DEQ to demonstrate that either there is no recycler willing to accept their material, or that the cost of recycling the material is so high that it no longer meets the definition of "recyclable material" in Oregon's statute. If the collector or processor submitted information on their attempts to market the material and the costs involved, DEQ would evaluate that information and then potentially concur if the submitted material demonstrated that DEQ could not require it to be recycled under Oregon's statue.

DEQ concurred that eight companies could dispose of 4,775 tons of material originally collected for recycling in 2017, and with 18 companies for disposal of 10,202 tons in 2018. Concurrences ended in 2019 after the disposal of 1,448 tons of material by six companies. The large majority of this material was commingled recyclables, with some mixed scrap paper and small amounts of separated plastic also included in the total tons disposed. This compares to about 377,000 tons of commingled tons collected and processed in 2017, and about 340,000 tons collected and processed in 2018. The table below shows the approximate tons of each material disposed through concurrences in 2018, had that material been accepted and processed at a material recovery facility. The percentages used to break out individual materials are based on aggregate sorting percentages from Oregon's commingled recycling processors.

Approximate composition of materials disposed through concurrences

Material	2017 Tons	2018 Tons	2019 Tons
Cardboard	1,362	2,507	419
Other paper	2,420	5,679	724
Rigid Plastic	239	566	74
Tinned cans	94	174	29
Aluminum	13	25	4
Other scrap metal	72	132	22
Plastic film*	39	71	12
Glass in commingled*	100	183	31
Residue to be disposed	435	865	133
Total	4,775	10,202	1,448

*Neither of these two materials belong in Oregon's residential commingled recycling carts and bins, but some processors separated them out for recycling while others left them in the residue to be disposed. All figures are in short tons.

Changes in other material collected

Plastics. The low price for paper and plastic also resulted in declines in private sector recycling. Film plastic prices were particularly hard-hit, curtailing many private recycling efforts. Only 8,170 tons of film plastic were collected for recycling in 2019, compared to 9,025 tons in 2018. Rigid plastic containers were also greatly affected, both in public and private recycling programs. In spite of the increase of nearly 4,600 tons of plastic bottles under the Bottle Bill between 2017 and 2018, the total tons of rigid plastic containers recycled increased by 4,001 tons, from 25,856 tons in 2018 up to 29,857 tons in 2019.

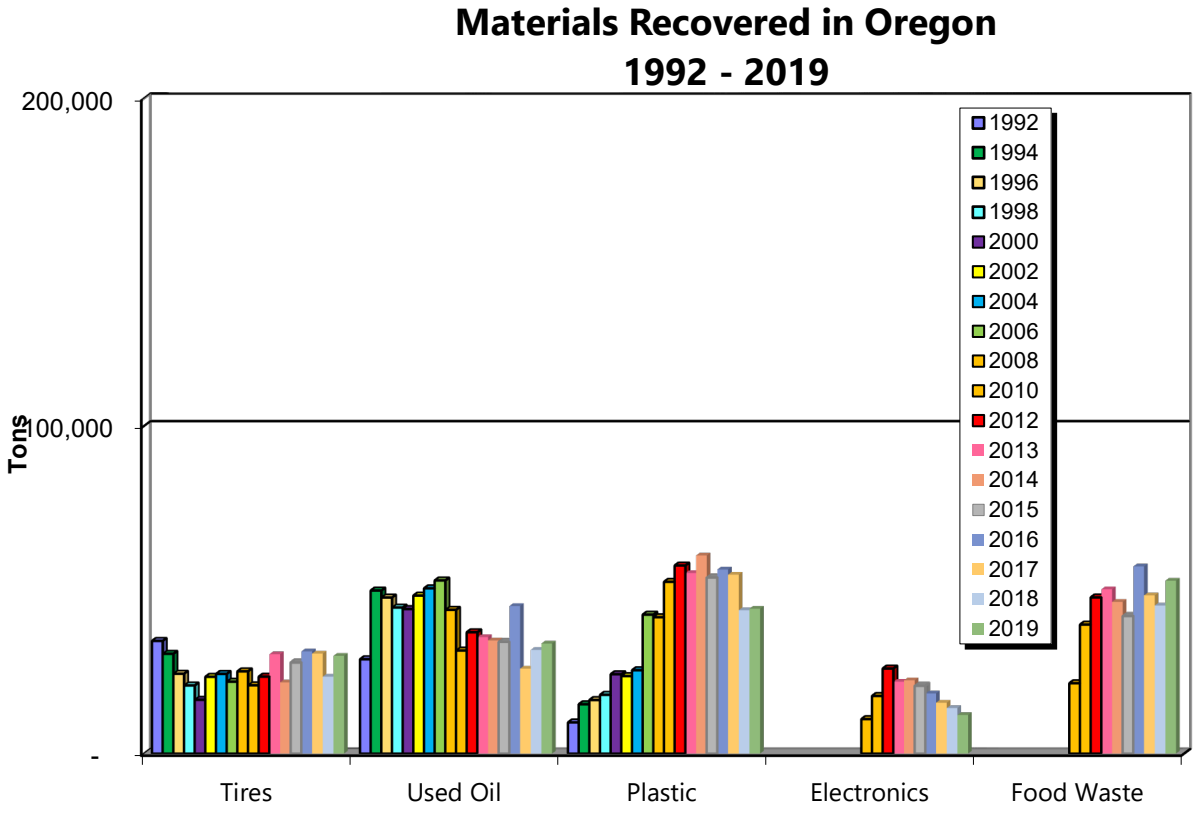
Paper (including cardboard). Although there was an overall decrease in recovery for paper fibers by two percent in 2019, cardboard recovery increased by 12,423 tons. Printing, writing, and other paper tons were the primary contributor to the overall decline with 24,426 tons less recovered compared to 2018, continuing a long-term decline as the use of electronics for news and communication increases. Part of this decline in other paper recycling also was caused by the market disruptions and low price of mixed paper for recycling, as well as some loss from concurrence disposal and changes in materials collected for certain programs.

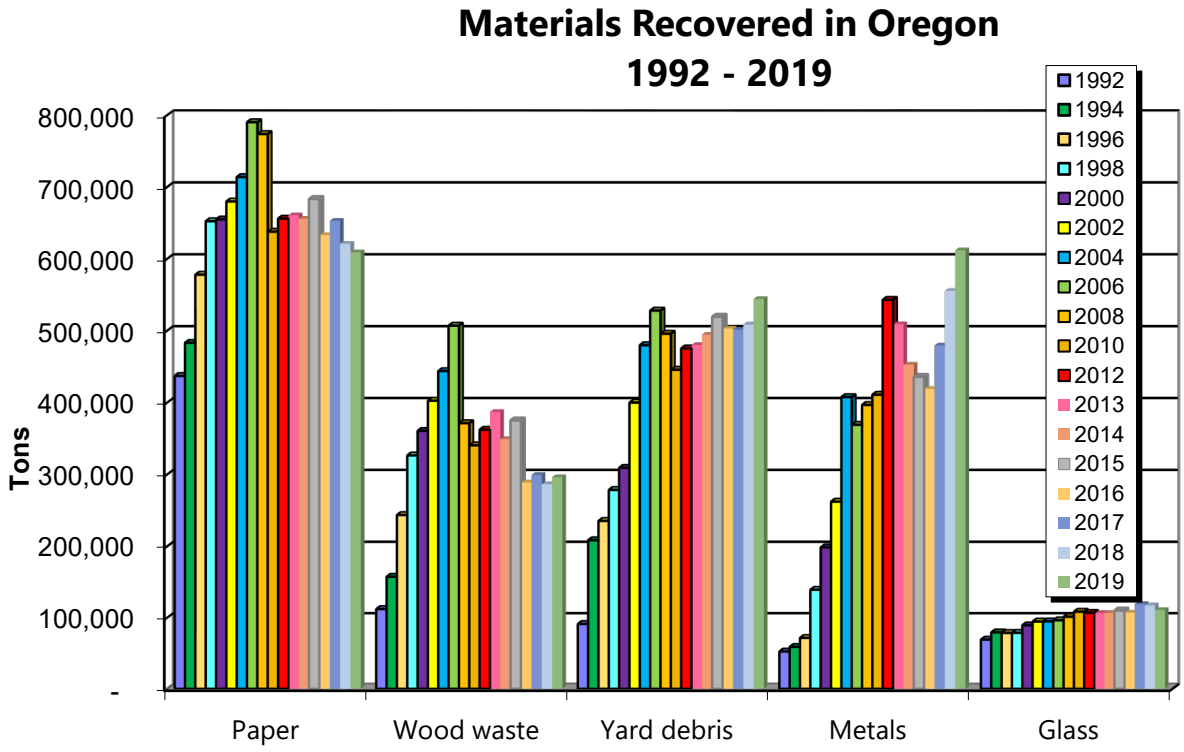
Metals. The total amount of scrap metal increased by 10 percent in 2019 compared to 2018. This increase is in spite of the fact that scrap metal prices were generally a bit lower in 2019 than they were in 2018. Tinned cans saw an increase of over 18 percent.

Electronics. Electronics recovery continued its decline showing a decrease of over 15 percent in 2019 compared to 2018. This is still partially due to the decrease in the number of cathode ray tube monitors and TVs returned for recycling as lighter flat-screen devices replace the heavier CRT devices.

Organics. The total recovery of organics (which includes animal waste/grease, wood waste, yard debris, and food waste) increased by six percent in 2019. This is mainly due to an increase of nearly 17 percent in food waste recovered.

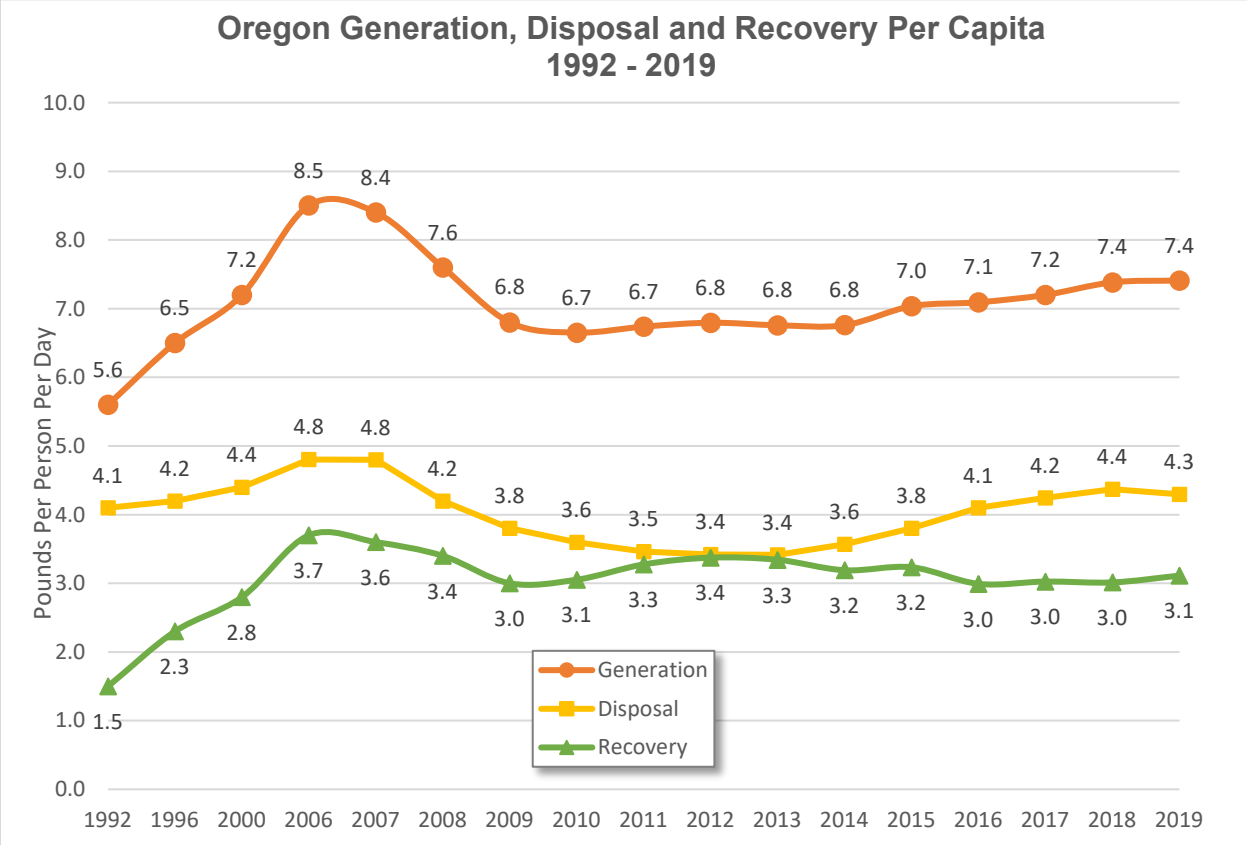
The following charts compare the materials recovered over the past 28 years.


Materials Recovered in Oregon
1992 - 2019
200,000
100,000
-
Tons
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2013
2014
2015
2016
2017
2018
2019
Tires
Used Oil
Plastic
Electronics
Food Waste


Materials Recovered in Oregon
1992 - 2019
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
-
Tons
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2013
2014
2015
2016
2017
2018
2019
Paper
Wood waste
Yard debris
Metals
Glass

Waste generation

Changes in the total amount of municipal solid waste generated (materials recovered plus waste disposed) in Oregon over time tells an interesting story. From 1992 to 2006, total waste generation increased every year, often steeply. Waste generation then declined slightly in 2007 and sharply in both 2008 and 2009, coinciding with the economic recession. Between 2009 and 2014, waste generation started growing again, but at a very slow pace, averaging less than one percent increase per year. In 2019 Oregon generated 5,728,796 tons of municipal solid waste, an increase of one percent over 2018. This equates to per-capita generation of 2,705 pounds per person (7.4 pounds per day), a less than half percent increase from 2,695 pounds per person (7.4 pounds per day) in 2018. Total waste generation in 2019 was still below (401 tons less) its peak in 2006. This is a drop of one-tenth percent in total waste generation between 2006 and 2019, or a 12.9 percent drop in the per-capita amount.



Generation can be seen as a crude measure of consumption, and for many materials, the environmental impacts of production (the corollary of consumption) are many times higher than the impacts of disposal. For example, EPA has estimated that roughly 40 percent of the country's

greenhouse gas emissions are associated with the production and transportation of goods[11]. The leveling off of waste generation in 2006, the sharp decline in 2007 through 2009, and lack of restoration to pre-recession levels since then suggests that some of the changes in waste generation that occurred during the last recession may be long-lasting, and that the reduction in use of materials is not temporary. Reduction in materials use would, in turn, likely result in a reduction of greenhouse gas emissions associated with all stages of the life cycle of materials. Many other adverse environmental impacts associated with materials likely also decreased.

The following table shows the disposition of the municipal solid waste generated in Oregon in 2019. See Table 9 for individual wasteshed dispositions.

Disposition of Waste Generated in Oregon in 2019	
Disposition	**Percent by weight**
Disposed*	58.0
Recycled	27.0
Composted	9.6
Recovered for Energy*	5.3

*For the Marion County's waste-to-energy facility only the portion of waste that counts toward the county's and state's recovery rates is included here in "recovered for energy" (see Marion County Adjustments on page 10). Other wastes burned at the facility are counted here as disposed.

[11] Figure ES-1of Opportunities to Reduce Greenhouse Gas Emissions through Materials and Land Management Practices. US Environmental Protection Agency, Sept. 2009.

Discussion

The energy savings and greenhouse gas reductions associated with materials recovered for recycling, composting and energy recovery in 2019 were notable. Energy savings were 32 trillion BTUs, and reductions in GHGs were 3.3 MMTCO2E. There is potential for further savings via recovery. If recovery were increased to the maximum possible level using current technology, another 33 trillion BTUs and 2.6 MMTCO2E in savings might be realized.

These numbers should be viewed in the context of Oregon's total environmental impacts. Oregon's total yearly energy expenditure is around 1,015 trillion BTUs, and Oregon's total yearly GHG emissions are 66.2 or 88.7 million metrics tons, depending on analytical method. Recovery can reduce impacts, but it cannot reduce them on the scale of the changes anticipated by state goals such as the *2050 Vision*.

Greater impact reductions should be achievable by other materials management strategies, such as reducing the generation of waste in the first place. Unfortunately, overall waste generation in 2019 increased. This likely indicates an overall increase in the use (and production) of materials, with associated increases in emissions across all stages of their life cycle.

In 2015, Oregon adopted new statutory goals of 52 percent recovery by 2020 and 55 percent by 2025. At the time these goals were adopted, we did not anticipate the closure of the paper mill that by far was the largest user of post-consumer wood waste as a fuel, nor the discontinuance of the use of wood by other mills, strongly impacting the ability to recover and use wood. Though much less impactful from the perspective of tonnages of material recycled, we also did not anticipate that Oregon and the world would experience disruptions in the markets for most plastics and for mixed paper, as China, the largest importer of recyclable material in the world, has restricted the importation of these materials and has banned the importation of unsorted paper and all post-consumer plastics in 2018.

Despite these challenges, Oregon recovered 2,406,095 tons of material for recycling, composting and energy recovery in 2019, giving a recovery rate of 42.0 percent, an increase from the 40.8 percent rate in 2018. Other anticipated changes in products and packaging are likely to make it even harder to achieve the state's goals in 2020 and 2025, as products and packaging become increasingly difficult to recycle due to such factors as substituting light-weight non-recyclable packaging for heavier recyclable packaging. Although these changes may make achieving a weight-based recovery goal more difficult, they can often lead to environmental benefits since less material is needed for the packaging, resulting in less energy use and greenhouse gases produced and even less solid waste generated and disposed.

Adjustments to reports from previous years

DEQ continues to review and use survey data even after publishing the final report each year. Occasionally, we encounter and correct errors in previously reported results. Thus, tonnages published in this report for previous years may not match the tonnages originally reported for that year.

DEQ made the following adjustments for the 2019 report:

- A correction to disposal tonnage, the non-reporting of some disposal tons going out-of-state – was made to the 2018 survey period.

DEQ corrected data in previous years, for the following reasons:

- A correction to recovered tonnage of some materials reported by a recycler was made to the 2017 survey period, due to some double counts discovered.
- Based on the recyclers reporting in 2018, some materials were not reported due to unknown markets. These materials will be revised during the 2019 reporting period.
- A correction to recovered tonnage of cardboard was made to the 2017 survey period, due to a double count discovered.
- A revision was made to the breakdown of food waste and yard debris mix from the curbside tons collected and composted. Prior to 2018 reporting, the breakdown was 90 percent yard debris and 10 percent food waste; the revised breakdown is split between metro area collections (89.3 percent yard debris, 9.5 percent food waste and 1.2 percent solid waste) and non-metro area collections (94.1 percent yard debris, 4.8 percent food waste and 1.2 percent solid waste). This breakdown revision resulted in an overall increase of yard debris and an overall decrease in food waste; as well as a slight decrease in overall organic tons by accounting for the 1.2 percent solid waste.
- A significant correction to disposal for several wastesheds, increased the total tons disposed in Oregon and dropped the recovery rate from 42.8 percent to 42.1 percent for 2017. This also resulted in the publishing of a revised 2017 report in March 2019.
- A correction to recovered tonnage of yard debris was made to the 2015 and 2016 survey period, due to a double count discovered.
- A correction was made to some asphalt roofing tons that were found to be used as alternative daily cover at a local landfill but that had been reported as recovered. "Alternative daily cover" - material used to cover garbage daily at a landfill instead of using soil, is

considered to be a form of disposal rather than recovery. This correction was made to 2015 and 2016 data.

- The yard debris and asphalt roofing corrections resulted in adjustments to the previous year's recovery rates; the recovery rate for 2015 dropped from 46.2 to 46.0 percent, the recovery rate for 2016 dropped from 42.6 to 42.2 percent.
- A correction to recovered tonnage of yard waste was made to the 2015 survey period, a reporting facility for 2016 sent in a missing 2015 report.
- In 2016 a correction was made to some "plastic other" and "plastic film" incorrectly converted to tons from pounds, this increased the total recovered for both materials.
- A couple of 2015 disposal reports were revised. This adjustment increased disposal tonnage for 2015; which dropped the state recovery rate from 46.5 percent to 46.2 percent for 2015.
- A correction to recovered tonnage of wood waste in two wastesheds was made to survey years 2014 and 2013, as some tonnage was determined to be pre-consumer material.
- Adjustments were made to 2014 and 2013 animal waste/grease collection amounts, as well as correctly identifying wastesheds of origin, based on revised reporting by an end-user.
- Disposal tonnage was reported for the wrong wasteshed. This adjustment increased disposal tonnage for 2014 for one wasteshed; which changed the wasteshed rate of the two wastesheds involved. This did not affect the state's recovery rate.
- An error in reporting was discovered by one of the recycling processors; a large amount of newspaper was double counted in the previously published 2004 results. The paper was counted both at the processing facility and at the paper mill.
- An enforcement action carried out by Metro showed that most of the brick reported as being recycled by one facility was falsely reported. DEQ subsequently decided that brick more closely resembled other inert materials such as cement and asphalt. Since these are not counted toward the recovery rate, brick was removed from all previous recovery tonnages.
- New information showed that corrections needed to be made to tonnages for roofing and non-container glass in 2003 and 2004, as well as other minor adjustments in other categories.
- Field visits showed that some plastic for 2005 had been reported as 'Plastic Other' and that this material was actually 'Rigid Plastic Containers.' The 2005 numbers have been adjusted for this change, along with a few other minor adjustments.
- Field visits and continued investigation showed that previously reported 'Wood Waste' collections for 2006 were actually collected in three years – 2004, 2005 and 2006. These years are now correct.
- The 2006 and 2007 plastics numbers were adjusted between grades of "Rigid Plastic Containers," "Plastic Other," and "Plastic Film." This may have led to small changes in the recovered tonnages for these materials.
- Investigation of disposal numbers at two landfills led to deductions in the amount of SW disposed – these were really Industrial Waste, non-counting for the purposes of this survey.
- Some changes were made in 2006 and 2007 to disposition of materials. Changes were made to composted, burned for energy recovery and disposed amounts.
- Adjustments were made to the 2007 collection amounts, correctly identifying the wasteshed of origin.

- For 2006 and 2007, some non-counting slaughterhouse material was deleted from the recovered tonnage.
- Sawdust material from manufacturing was deleted for 2006 and 2007.
- Beginning with 2006, material previously identified as "CD – Construction and Demolition" was separated out into individual materials.
- Textiles previously counted were determined to be re-used, which does not count for recovery. 2006, 2007, 2010 and 2011 recovered tonnage was decreased.
- Some gypsum sent for disposal was included in the 2006 and 2007 tonnage – this was removed.
- Bottle bill materials, container glass and aluminum had better reporting for 2009, and DEQ made some adjustments to those materials for 2008.
- Municipal solid wastes from another landfill were determined to be industrial and were deleted from the 2007 and 2008 counting tonnages.
- Minor disposal adjustments were made to two wastesheds for 2006 data with incorrectly reported county of origin.
- Yard debris numbers contained a large double counting for the Metro region – the correction caused a decrease in recovered tons
- Some roofing material was deleted - it was determined to be industrial material.
- Added in disposal tonnages for 2009 and 2010 for material sent out of state for disposal.
- Corrected the disposition methods for food waste and yard debris in 2011.
- Fixed the disposal tonnages originally recorded for the incorrect wasteshed in 2011.
- An error in food waste reporting discovered by DEQ showed a large amount of food waste was double counted in the 2011 and 2012 reports. The food waste was counted both by the composting facility and by the recycling collectors.
- More accurate reporting identified corrections needed in tonnages for used oil, antifreeze, solvents and used oil filters in 2011 and 2012.
- Adjustments were made to 2013 and 2012 collection amounts, as well as correctly identifying wastesheds of origin.
- Municipal solid waste from one landfill was reported incorrectly as out-of-state waste, this adjustment increased the "counting" disposal tonnage for 2013. This in turn adjusted the state recovery rate from 54 percent for 2013 to 53.4 percent.

2019 survey report tables

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Table 8: Oregon Materials Recovered, 1992-2019

Table 9: Disposition of Recovered Materials, 2019

Table 1: Wasteshed Recovery Rates, 2019

Wasteshed	Tons Disposed	Tons Recovered	Tons Generated	Calculated Recovery Rate[1]	SB 263 Goal[3] 2025
Baker	13,563	2,793	16,356	**17.1%**	25%
Benton	66,131	36,276	102,407	**35.4%**	44%
Clatsop	35,031	19,774	54,805	**36.1%**	53%
Columbia	33,924	10,255	44,179	**23.2%**	45%
Coos	53,356	16,170	69,527	**23.3%**	30%
Crook	25,247	7,156	32,403	**22.1%**	20%
Curry	20,218	6,070	26,287	**23.1%**	30%
Deschutes	183,593	84,347	267,940	**31.5%**	45%
Douglas	88,655	31,579	120,233	**26.3%**	34%
Gilliam	2,439	282	2,720	**10.4%**	25%
Grant	4,300	848	5,148	**16.5%**	25%
Harney	4,731	853	5,584	**15.3%**	25%
Hood River	23,460	7,690	31,151	**24.7%**	35%
Jackson	196,367	121,982	318,349	**38.3%**	25%
Jefferson	14,569	3,095	17,664	**17.5%**	32%
Josephine	83,623	33,785	117,408	**28.8%**	20%
Klamath	65,986	17,362	83,349	**20.8%**	20%
Lake	5,398	363	5,762	**6.3%**	15%
Lane	282,440	346,282	628,722	**55.1%**	63%
Lincoln	52,567	19,813	72,380	**27.4%**	37%
Linn	110,453	80,787	191,240	**42.2%**	45%
Malheur	24,074	5,433	29,507	**18.4%**	25%
Marion[2]	266,209	243,658	509,868	**47.8%**	64%
Metro	1,324,963	1,134,412	2,459,375	**46.1%**	64%
Milton-Freewater	4,819	821	5,640	**14.6%**	25%
Morrow	27,960	5,149	33,109	**15.6%**	20%
Polk	52,102	46,696	98,798	**47.3%**	48%
Sherman	1,269	89	1,358	**6.6%**	20%
Tillamook	29,358	10,273	39,630	**25.9%**	37%
Umatilla	77,490	43,962	121,451	**36.2%**	20%
Union	18,901	7,348	26,249	**28.0%**	25%
Wallowa	6,446	1,790	8,236	**21.7%**	25%
Wasco	24,085	4,877	28,962	**16.8%**	35%
Wheeler	385	69	454	**15.3%**	20%
Yamhill	98,590	53,955	152,545	**35.4%**	45%
OR Totals	3,322,700	2,406,095	5,728,796	**42.0%**	

[1] The recovery rate is calculated using the following formula:
1) Tons Disposed + Tons Recovered = Total Tons Generated
2) Tons Recovered / Total Generated = Calculated Recovery Rate

[2] The Marion County disposal and recovery rates reflect 15,169.06 tons of recyclable materials burned for energy in 2019 (per ORS 459A.010(3)(f)(B)).

Table 2: Amount Recovered in 2019 by Wasteshed

Wasteshed	2019 Tons Recovered	2019 Pounds Per Capita	2019 Wasteshed Population
Baker	2,793	332	16,820
Benton	36,276	843	86,105
Clatsop	19,774	1,006	39,330
Columbia	10,255	389	52,750
Coos	16,170	511	63,290
Crook	7,156	611	23,440
Curry	6,070	528	23,000
Deschutes	84,347	874	193,000
Douglas	31,579	563	112,250
Gilliam	282	283	1,990
Grant	848	230	7,360
Harney	853	232	7,360
Hood River	7,690	604	25,480
Jackson	121,982	1,102	221,290
Jefferson	3,095	260	23,840
Josephine	33,785	779	86,750
Klamath	17,362	509	68,190
Lake	363	90	8,080
Lane	346,282	1,828	378,880
Lincoln	19,813	821	48,260
Linn	80,787	1,197	135,005
Malheur	5,433	339	32,030
Marion*	243,658	1,402	347,560
Metro	1,134,412	1,221	1,858,560
Milton-Freewater	821	202	8,116
Morrow	5,149	812	12,680
Polk	46,696	1,138	82,050
Sherman	89	101	1,770
Tillamook	10,273	775	26,500
Umatilla	43,962	1,204	73,044
Union	7,348	548	26,840
Wallowa	1,790	501	7,150
Wasco	4,877	358	27,240
Wheeler	69	96	1,440
Yamhill	53,955	990	108,950
OREGON TOTALS	**2,406,095**	**1,136**	**4,236,400**

Source for population data is the Center for Population Research and Census, Portland State University, published April 2019. Wastesheds populations are not the same as County populations for the Wastesheds of Benton, Linn, Marion, Metro, Milton-Freewater, Polk, Umatilla. and Yamhill (see OAR 340-090-0050).

*Includes certain Marion County recyclable materials burned for energy (per ORS 459A.010(3)(f)(B)).

Table 3: Solid Waste Disposed in 2019 by Wasteshed

Wasteshed	2019 Tons Disposed	2019 Pounds Per Capita	2019 Wasteshed Population
Baker	13,563	1,613	16,820
Benton	66,131	1,536	86,105
Clatsop	35,031	1,781	39,330
Columbia	33,924	1,286	52,750
Coos	53,356	1,686	63,290
Crook	25,247	2,154	23,440
Curry	20,218	1,758	23,000
Deschutes	183,593	1,903	193,000
Douglas	88,655	1,580	112,250
Gilliam	2,439	2,451	1,990
Grant	4,300	1,168	7,360
Harney	4,731	1,286	7,360
Hood River	23,460	1,841	25,480
Jackson	196,367	1,775	221,290
Jefferson	14,569	1,222	23,840
Josephine	83,623	1,928	86,750
Klamath	65,986	1,935	68,190
Lake	5,398	1,336	8,080
Lane	282,440	1,491	378,880
Lincoln	52,567	2,178	48,260
Linn	110,453	1,636	135,005
Malheur	24,074	1,503	32,030
Marion*	266,209	1,532	347,560
Metro	1,324,963	1,426	1,858,560
Milton-Freewater	4,819	1,187	8,116
Morrow	27,960	4,410	12,680
Polk	52,102	1,270	82,050
Sherman	1,269	1,434	1,770
Tillamook	29,358	2,216	26,500
Umatilla	77,490	2,122	73,044
Union	18,901	1,408	26,840
Wallowa	6,446	1,803	7,150
Wasco	24,085	1,768	27,240
Wheeler	385	535	1,440
Yamhill	98,590	1,810	108,950
OREGON TOTALS	**3,322,700**	**1,569**	**4,236,400**

Source for population data is the Center for Population Research and Census, Portland State University, published April 2019. Wastesheds populations are not the same as County populations for the Wastesheds of Benton, Linn, Marion, Metro, Milton-Freewater, Polk, Umatilla, and Yamhill (see OAR 340-090-0050).

*Excludes certain Marion County recyclable materials burned for energy recovery (per ORS 459A.010(3)(f)(B)).

Table 4: Oregon Calculated Recovery Rates by Wasteshed, 1992-2019

Wasteshed	1992 Rate	1996 Rate	2000 Calc. Rate*	2006 Calc. Rate*	2007 Calc. Rate*	2008 Calc. Rate*	2009 Calc. Rate*	2010 Calc. Rate*	2011 Calc. Rate*	2012 Calc. Rate*	2013 Calc. Rate*	2014 Calc. Rate*	2015 Calc. Rate*	2016 Calc. Rate*	2017 Calc. Rate*	2018 Calc. Rate*	2019 Calc. Rate*
Baker	10%	25%	18%	16.8%	21.9%	20.6%	26.3%	21.7%	22.4%	23.2%	22.7%	28.4%	26.2%	20.0%	17.4%	16.4%	17.1%
Benton	27%	37%	35%	36.2%	38.9%	41.1%	37.9%	38.4%	38.3%	41.4%	41.5%	37.3%	35.3%	35.6%	34.0%	35.3%	35.4%
Clatsop	19%	20%	25%	33.9%	34.0%	36.5%	36.0%	36.0%	38.7%	39.9%	44.3%	37.8%	39.5%	37.8%	41.8%	39.9%	36.1%
Columbia	34%	22%	31%	30.5%	28.5%	29.9%	32.1%	35.8%	35.3%	33.3%	34.7%	28.6%	31.0%	32.5%	23.9%	24.4%	23.2%
Coos	21%	29%	23%	20.8%	19.7%	22.3%	23.0%	35.0%	47.7%	43.7%	40.3%	38.3%	23.5%	22.5%	22.4%	19.8%	23.3%
Crook	16%	23%	27%	25.6%	25.1%	33.2%	31.6%	33.6%	31.5%	34.6%	30.5%	26.1%	20.9%	20.7%	23.1%	19.7%	22.1%
Curry	21%	35%	41%	18.1%	23.7%	21.0%	19.8%	20.4%	27.2%	25.3%	22.8%	26.6%	24.1%	26.7%	21.5%	24.2%	23.1%
Deschutes	15%	23%	31%	27.0%	29.8%	31.1%	39.1%	35.1%	39.3%	38.8%	38.2%	35.8%	36.6%	33.1%	31.8%	31.7%	31.5%
Douglas	26%	26%	26%	23.7%	25.8%	34.4%	28.7%	35.9%	42.9%	41.0%	37.4%	32.8%	30.3%	27.0%	28.6%	28.2%	26.3%
Gilliam	17%	19%	14%	8.5%	12.9%	14.4%	27.0%	20.9%	18.0%	44.2%	41.8%	17.6%	35.4%	13.7%	14.8%	7.1%	10.4%
Grant	18%	16%	19%	21.2%	24.2%	25.1%	22.4%	22.1%	25.0%	21.5%	28.8%	18.4%	24.5%	27.4%	17.2%	16.3%	16.5%
Harney	18%	24%	20%	28.0%	25.2%	33.8%	23.6%	26.2%	31.1%	28.4%	27.3%	27.6%	21.8%	22.3%	23.7%	18.7%	15.3%
Hood River	16%	17%	18%	33.1%	29.5%	28.2%	29.3%	26.5%	34.4%	31.4%	32.2%	28.1%	29.5%	26.9%	21.9%	23.9%	24.7%
Jackson	15%	34%	28%	33.7%	30.4%	32.3%	35.6%	42.0%	41.6%	43.3%	43.1%	40.9%	37.2%	38.6%	35.0%	33.0%	38.3%
Jefferson	21%	24%	27%	27.7%	36.2%	33.7%	30.7%	41.3%	47.2%	44.8%	41.6%	33.2%	24.6%	31.6%	25.9%	22.3%	17.5%
Josephine	14%	38%	33%	38.9%	34.3%	38.9%	37.6%	40.1%	49.0%	49.9%	46.0%	40.3%	34.5%	35.4%	35.2%	31.7%	28.8%
Klamath	13%	15%	18%	33.6%	34.8%	45.4%	32.9%	29.2%	28.1%	33.1%	29.9%	30.9%	22.3%	25.7%	23.5%	20.6%	20.8%
Lake	6%	7%	8%	19.4%	21.8%	34.5%	25.1%	27.2%	28.5%	26.8%	26.3%	16.7%	12.5%	12.1%	8.6%	10.7%	6.3%
Lane	19%	39%	46%	46.9%	46.3%	46.4%	46.1%	51.2%	55.5%	54.7%	50.9%	53.1%	50.4%	50.0%	52.4%	53.8%	55.1%
Lincoln	20%	16%	23%	26.3%	27.6%	30.8%	29.4%	32.6%	32.4%	35.9%	29.2%	32.1%	31.2%	26.3%	22.6%	24.2%	27.4%
Linn	15%	32%	29%	40.5%	37.4%	41.3%	40.5%	43.8%	49.2%	45.0%	44.0%	42.4%	39.3%	38.2%	36.9%	40.2%	42.2%
Malheur	19%	20%	25%	22.8%	22.6%	21.9%	18.9%	23.3%	20.9%	27.3%	27.8%	24.7%	24.2%	26.4%	22.6%	16.6%	18.4%
Marion	26%	28%	38%	**51.9%	**50.4%	**52.4%	**52.2%	**50.1%	**54.7%	**54.4%	**55.2%	**53.8%	**52.2%	**49.4%	**48.8%	**49.7%	**47.9%
Metro	35%	41%	45%	49.6%	48.9%	50.2%	50.4%	51.9%	53.3%	56.3%	57.0%	53.6%	53.0%	47.0%	46.6%	44.7%	46.1%
Milton-Freewater	16%	21%	21%	32.8%	30.8%	43.0%	34.9%	35.3%	37.9%	27.0%	41.2%	39.0%	40.1%	28.7%	35.2%	39.4%	14.6%
Morrow	11%	13%	15%	21.5%	26.4%	24.8%	23.2%	22.0%	23.2%	25.1%	18.3%	20.9%	21.1%	24.4%	21.4%	22.0%	15.6%
Polk	20%	19%	33%	47.9%	46.4%	47.0%	45.9%	45.6%	47.7%	44.2%	43.6%	46.0%	45.1%	45.9%	47.3%	41.5%	47.3%
Sherman	24%	21%	17%	18.5%	16.4%	14.8%	14.3%	11.5%	13.9%	21.9%	14.2%	15.9%	15.9%	11.5%	11.1%	13.5%	6.6%
Tillamook	31%	26%	26%	33.4%	30.6%	31.5%	29.1%	31.2%	33.7%	33.0%	31.9%	29.6%	28.9%	26.1%	27.8%	27.8%	25.9%
Umatilla	14%	20%	26%	35.0%	36.5%	37.9%	31.7%	29.3%	29.3%	31.1%	28.6%	28.1%	29.5%	25.0%	26.9%	28.8%	36.2%
Union	16%	26%	22%	33.7%	31.5%	29.8%	29.3%	28.6%	30.7%	30.5%	30.4%	25.2%	24.8%	25.1%	22.1%	26.9%	28.0%
Wallowa	6%	11%	21%	22.2%	27.4%	24.1%	23.5%	19.4%	23.5%	22.4%	23.7%	26.6%	22.4%	27.0%	24.3%	21.3%	21.7%
Wasco	25%	30%	34%	18.8%	23.0%	23.4%	32.7%	28.0%	31.3%	27.8%	32.0%	28.0%	28.1%	26.2%	19.6%	19.2%	16.8%
Wheeler	7%	20%	14%	23.9%	26.9%	27.1%	20.0%	8.1%	12.9%	8.8%	8.7%	7.3%	15.6%	12.8%	17.5%	26.9%	15.3%
Yamhill	19%	35%	44%	39.0%	35.7%	35.6%	39.7%	34.2%	40.2%	32.8%	38.1%	37.1%	38.3%	30.0%	28.9%	27.9%	35.4%
OREGON TOTALS	**27.1%**	**34.9%**	**38.9%**	**43.5%**	**42.9%**	**44.6%**	**44.6%**	**45.9%**	**48.6%**	**49.7%**	**49.5%**	**47.2%**	**46.0%**	**42.2%**	**41.6%**	**40.8%**	**42.0%**

*does not include 2% credits
**does include certain Marion County recyclable materials burned for energy

Table 5: Oregon Amount Recovered by Wasteshed, 1992-2019

Wasteshed	1992 Rvd (tons)	Per Capita (lbs.)	1996 Rvd (tons)	Per Capita (lbs.)	2000 Rvd (tons)	Per Capita (lbs.)	2006 Rvd (tons)	Per Capita (lbs.)	2007 Rvd (tons)	Per Capita (lbs.)	2008 Rvd (tons)	Per Capita (lbs.)	2009 Rvd (tons)	Per Capita (lbs.)	2010 Rvd (tons)	Per Capita (lbs.)	2011 Rvd (tons)	Per Capita (lbs.)	2012 Rvd (tons)	Per Capita (lbs.)	2013 Rvd (tons)	Per Capita (lbs.)	2014 Rvd (tons)	Per Capita (lbs.)	2015 Rvd (tons)	Per Capita (lbs.)	2016 Rvd (tons)	Per Capita (lbs.)	2017 Rvd (tons)	Per Capita (lbs.)	2018 Rvd (tons)	Per Capita (lbs.)	2019 Rvd (tons)	Per Capita (lbs.)	Change in Per Capita 2019-18
Baker	982	124	3,644	438	2,849	340	2,782	338	3,565	434	3,366	409	4,067	494	3,793	469	3,402	420	3,200	395	3,325	408	4,071	499	4,122	502	3,111	377	2,957	353	2,624	313	2,793	332	6.1%
Benton	21,480	626	30,352	830	28,488	779	35,728	921	36,292	922	38,210	966	31,438	789	32,938	832	33,775	852	38,226	955	37,953	939	33,959	832	33,394	807	34,311	820	32,591	768	35,073	819	36,276	843	2.9%
Clatsop	5,148	300	7,118	403	10,586	593	19,576	1,057	19,029	1,017	20,984	1,113	17,584	929	17,440	941	18,366	989	19,465	1,047	23,013	1,235	19,025	1,015	20,973	1,111	20,671	1,082	23,962	1,235	24,443	1,247	19,774	1,006	-19.4%
Columbia	7,894	407	6,258	302	10,361	474	12,940	551	13,647	574	12,968	539	12,001	496	13,729	555	13,386	539	12,703	511	13,254	532	10,273	410	11,730	466	13,786	543	10,032	391	10,443	402	10,255	389	-3.4%
Coos	10,035	323	14,972	472	11,754	374	13,364	425	12,162	386	13,529	428	12,666	402	22,551	716	36,368	1,155	31,613	1,005	27,146	864	26,190	833	13,024	414	13,215	418	14,030	443	12,603	398	16,170	511	28.3%
Crook	1,581	206	3,156	363	5,215	540	7,075	577	7,004	541	7,871	586	6,273	462	7,006	667	7,535	723	6,328	613	6,182	598	5,209	501	4,459	423	5,302	491	6,189	560	5,618	495	7,156	611	23.4%
Curry	2,863	288	6,011	572	10,387	980	4,830	452	6,632	618	5,161	480	4,223	396	4,349	389	6,235	558	5,557	499	4,798	430	5,748	514	5,424	483	6,989	618	5,548	487	6,444	562	6,070	528	-6.2%
Deschutes	12,858	305	30,222	605	49,993	858	69,443	910	75,346	937	64,276	770	75,362	883	62,077	786	72,635	914	72,065	900	74,062	911	72,965	877	83,271	975	79,755	903	84,809	927	83,472	883	84,347	874	-1.1%
Douglas	29,467	614	30,945	621	31,390	625	31,980	616	36,158	691	44,082	838	30,846	585	41,949	779	55,220	1,025	50,342	931	42,333	778	36,263	663	32,335	588	27,725	502	31,635	569	33,216	595	31,579	563	-5.4%
Gilliam	177	205	284	306	266	280	225	239	301	319	370	393	768	815	596	637	462	491	1,684	1,773	1,395	1,434	488	495	1,070	1,084	358	361	354	355	301	303	282	283	-6.6%
Grant	911	232	687	171	791	199	1,055	277	1,342	354	1,325	352	1,098	292	1,105	296	1,338	359	954	256	1,386	373	838	226	1,235	332	1,457	393	852	230	827	223	848	230	3.1%
Harney	600	171	678	188	806	212	1,165	304	1,203	313	1,573	408	944	245	1,122	301	1,327	360	1,414	387	1,307	360	1,360	374	1,084	297	1,156	316	1,285	349	1,056	286	853	232	-19.0%
Hood River	1,855	212	3,333	345	3,403	332	9,200	862	8,365	779	7,479	692	7,466	687	6,404	572	9,541	843	7,785	681	7,847	674	6,701	565	7,783	642	7,437	601	6,502	517	7,214	570	7,690	604	5.9%
Jackson	17,134	221	60,292	707	63,872	701	92,807	935	80,422	795	76,330	744	79,275	766	102,539	1,009	99,579	977	108,893	1,064	105,705	1,025	108,992	1,046	97,326	923	110,460	1,033	101,570	937	96,147	877	121,982	1,102	25.7%
Jefferson	1,269	170	2,667	307	3,661	382	5,506	514	8,132	738	6,217	554	4,475	394	7,300	671	8,641	791	8,244	752	7,305	663	5,400	486	4,046	361	6,161	541	5,296	457	4,610	391	3,095	260	-33.6%
Josephine	7,826	239	21,688	600	26,534	698	42,005	1,036	32,943	800	35,957	863	29,510	705	32,992	797	47,045	1,136	48,567	1,173	43,614	1,053	39,387	948	32,725	782	38,476	909	41,783	976	37,386	865	33,785	779	-10.0%
Klamath	8,827	301	11,171	360	14,070	440	36,650	1,120	34,502	1,048	48,819	1,475	26,256	791	20,571	619	20,751	623	23,432	702	19,793	593	22,134	662	15,183	452	20,055	595	18,157	536	17,442	513	17,362	509	-0.8%
Lake	269	74	601	161	369	99	1,360	361	1,691	447	2,950	778	1,754	461	2,215	561	2,656	674	1,843	465	2,177	548	1,145	287	847	211	897	224	606	149	774	191	363	90	-52.8%
Lane	72,072	493	153,843	992	216,532	1,337	248,599	1,463	237,578	1,385	217,537	1,258	190,877	1,098	237,493	1,349	269,100	1,524	268,429	1,516	229,818	1,291	264,472	1,474	242,830	1,341	258,360	1,412	302,490	1,632	318,392	1,698	346,282	1,828	7.7%
Lincoln	6,886	338	7,823	352	12,192	547	18,030	810	20,035	898	21,355	955	17,010	761	18,810	815	18,520	803	22,104	955	16,915	727	19,940	850	19,827	840	17,012	713	14,868	620	18,511	768	19,813	821	6.9%
Linn	17,232	352	33,201	634	33,830	623	60,754	1,057	51,543	888	54,219	924	56,125	950	62,832	1,016	76,150	1,226	65,299	1,045	61,833	983	60,159	947	59,426	926	60,100	923	62,465	947	74,442	1,113	80,787	1,197	7.5%
Malheur	3,283	237	4,808	319	7,212	454	6,862	433	7,045	446	6,437	406	4,909	310	6,289	401	5,309	338	7,470	476	7,699	490	6,621	421	6,703	426	7,973	503	6,791	426	5,216	327	5,433	339	3.8%
Marion	55,834	462	85,731	645	134,032	937	264,168	1,724	251,673	1,619	239,441	1,522	218,787	1,376	206,398	1,308	235,584	1,482	228,708	1,428	232,540	1,441	238,422	1,463	240,544	1,460	237,150	1,421	248,038	1,463	262,552	1,527	243,658	1,402	-8.2%
Metro	514,747	825	752,470	1,106	970,850	1,338	1,337,848	1,705	1,325,112	1,663	1,234,180	1,529	1,106,279	1,356	1,110,443	1,350	1,122,542	1,355	1,222,024	1,461	1,278,987	1,510	1,182,294	1,377	1,285,248	1,473	1,116,712	1,255	1,116,870	1,233	1,108,857	1,206	1,134,412	1,221	1.2%
Milton-Freew.	908	323	1,186	392	1,317	406	2,612	793	2,351	718	3,598	994	2,319	640	2,346	617	2,567	670	1,615	419	3,103	797	2,674	683	2,846	719	1,884	472	1,375	341	1,147	284	821	202	-28.8%
Morrow	930	227	842	181	1,428	257	2,874	474	3,967	643	3,868	620	3,548	566	3,020	541	3,269	580	3,680	651	2,944	515	4,047	702	4,466	768	5,635	960	5,989	1,007	5,383	906	5,149	812	-10.3%
Polk	4,873	187	6,787	237	18,000	581	38,074	1,155	33,838	1,013	34,828	1,032	32,201	946	33,134	888	34,439	917	30,505	805	29,953	786	34,580	899	35,114	904	39,526	1,002	45,872	1,145	35,972	886	46,696	1,138	28.5%
Sherman	270	278	264	275	217	223	232	249	239	258	256	278	204	222	154	174	194	220	319	362	181	203	219	246	251	281	158	176	151	168	193	216	89	101	-53.4%
Tillamook	4,518	406	5,246	438	6,174	508	12,554	983	11,435	885	11,994	921	9,271	710	10,159	804	10,407	824	10,606	838	9,698	764	9,078	713	9,424	734	9,331	720	10,504	803	10,858	823	10,273	775	-5.8%
Umatilla	6,641	236	12,454	414	20,115	625	35,495	1,082	38,402	1,169	40,616	1,247	30,306	930	27,461	803	27,610	801	28,990	835	26,066	744	26,990	766	29,813	837	24,276	675	28,955	799	33,572	924	43,962	1,204	30.3%
Union	2,525	210	5,203	419	5,062	412	7,518	599	9,180	727	8,102	639	7,119	559	7,159	555	7,823	602	7,991	611	8,031	610	6,350	480	6,691	503	6,916	517	6,375	474	6,979	519	7,348	548	5.5%
Wallowa	433	119	503	135	1,219	336	1,431	401	1,767	496	1,339	376	1,211	341	719	205	954	273	923	263	1,058	300	904	256	1,122	316	1,513	424	1,425	396	1,386	386	1,790	501	29.6%
Wasco	5,443	485	7,519	648	9,194	771	5,131	426	6,650	551	6,545	542	9,236	762	7,089	562	7,682	607	6,688	525	8,158	632	7,062	541	6,863	520	6,892	516	5,416	400	5,435	400	4,877	358	-10.4%
Wheeler	59	82	185	226	100	129	161	206	204	260	166	211	102	129	38	52	62	86	37	52	45	63	29	40	77	107	55	74	80	108	138	191	69	96	-49.5%
Yamhill	11,850	338	26,116	663	53,548	1,242	64,017	1,386	57,816	1,233	50,200	1,056	47,122	982	49,737	992	45,653	907	43,787	864	51,237	1,002	43,277	837	47,808	915	41,125	777	41,147	768	38,599	713	53,955	990	39.0%
OR. TOTALS	**839,679**	**562**	**1,338,259**	**825**	**1,765,817**	**1,028**	**2,494,050**	**1,352**	**2,437,569**	**1,302**	**2,326,146**	**1,227**	**2,082,631**	**1,089**	**2,163,957**	**1,128**	**2,306,124**	**1,196**	**2,391,490**	**1,232**	**2,390,859**	**1,220**	**2,307,269**	**1,164**	**2,369,080**	**1,180**	**2,225,943**	**1,092**	**2,286,969**	**1,105**	**2,307,322**	**1,100**	**2,406,095**	**1,136**	**3.27%**
change in total from previous year		6.45%		8.58%		-1.16%		-2.26%		-4.57%		-10.47%		3.90%		6.57%		3.70%		-0.03%		-3.50%		2.68%		-6.04%		2.74%		0.89%		4.28%			
change in per capita from previous year		4.40%		7.25%		-2.74%		-3.70%		-5.72%		-11.23%		3.53%		6.01%		3.04%		-0.97%		-4.59%		1.41%		-7.48%		1.14%		-0.41%		3.27%		

Data from some years is not shown due to page formatting. Please contact DEQ directly for data from these years.

Certain recoverable materials in mixed waste burned at the waste-to-energy facility in Brooks are excluded from Marion County and Statewide recovery in years prior to 2001 but included in 2001 and subsequent years (per ORS 459A.010(3)(f)(B)).

Table 6: Oregon Solid Waste Disposed by Wasteshed, 1992-2019

Wasteshed	1992 Disposed (tons)	Per Capita (lbs.)	1996 Disposed (tons)	Per Capita (lbs.)	2000 Disposed (tons)	Per Capita (lbs.)	2006 Disposed (tons)	Per Capita (lbs.)	2007 Disposed (tons)	Per Capita (lbs.)	2008 Disposed (tons)	Per Capita (lbs.)	2009 Disposed (tons)	Per Capita (lbs.)	2010 Disposed (tons)	Per Capita (lbs.)	2011 Disposed (tons)	Per Capita (lbs.)	2012 Disposed (tons)	Per Capita (lbs.)	2013 Disposed (tons)	Per Capita (lbs.)	2014 Disposed (tons)	Per Capita (lbs.)	2015 Disposed (tons)	Per Capita (lbs.)	2016 Disposed (tons)	Per Capita (lbs.)	2017 Disposed (tons)	Per Capita (lbs.)	2018 Disposed (tons)	Per Capita (lbs.)	2019 Disposed (tons)	Per Capita (lbs.)	Change in Per Capita 2019-18
Baker	8,419	1,062	10,897	1,310	12,617	1,507	13,770	1,672	12,730	1,549	12,973	1,577	11,391	1,385	13,693	1,692	11,926	1,471	10,610	1,309	11,309	1,389	10,251	1,256	11,585	1,411	12,432	1,506	14,078	1,681	13,420	1,601	13,563	1,613	0.74%
Benton	58,761	1,713	50,840	1,390	53,835	1,472	62,940	1,622	57,109	1,451	54,675	1,382	51,470	1,292	52,945	1,338	54,525	1,375	54,062	1,351	53,516	1,324	57,050	1,398	61,331	1,483	61,999	1,482	63,214	1,490	64,165	1,498	66,131	1,536	2.51%
Clatsop	22,263	1,299	28,671	1,623	31,489	1,764	38,125	2,058	36,874	1,970	36,529	1,938	31,293	1,654	31,036	1,674	29,266	1,576	29,291	1,575	28,969	1,555	31,314	1,670	32,170	1,704	34,076	1,783	33,381	1,720	36,784	1,877	35,031	1,781	-5.08%
Columbia	15,131	780	22,650	1,095	23,201	1,062	29,541	1,258	34,317*	1,443*	30,412	1,265	25,365	1,048	24,616	996	24,614	992	25,400	1,023	24,970	1,002	25,697	1,026	26,130	1,037	28,657	1,128	31,937	1,244	32,376	1,248	33,924	1,286	3.09%
Coos	37,596	1,211	36,436	1,148	39,329	1,253	50,868	1,617	49,459	1,569	47,266	1,496	42,305	1,342	41,862	1,328	39,987	1,270	40,733	1,295	40,287	1,282	42,222	1,343	42,362	1,345	45,445	1,438	48,728	1,539	51,175	1,618	53,356	1,686	4.24%
Crook	8,378	1,091	10,646	1,224	13,841	1,434	20,566	1,677	20,867	1,612	15,827	1,179	13,566	998	13,860	1,319	16,415	1,574	11,978	1,160	14,082	1,361	14,736	1,418	16,902	1,603	20,340	1,885	20,558	1,860	22,949	2,021	25,247	2,154	6.59%
Curry	10,555	1,062	11,121	1,059	14,644	1,382	21,834	2,044	21,404	1,993	19,470	1,810	17,093	1,602	16,982	1,519	16,661	1,492	16,419	1,473	16,289	1,461	15,885	1,421	17,103	1,522	19,222	1,701	20,287	1,779	20,133	1,757	20,218	1,758	0.05%
Deschutes	72,529	1,720	103,397	2,070	111,013	1,904	188,146	2,466	177,543	2,208	142,400	1,705	117,292	1,374	115,030	1,457	112,751	1,419	113,611	1,419	119,682	1,473	130,956	1,574	144,067	1,688	161,087	1,824	182,110	1,991	179,991	1,905	183,593	1,903	-0.12%
Douglas	85,040	1,772	87,325	1,751	89,451	1,780	103,061	1,985	103,772	1,983	84,164	1,599	76,578	1,453	75,047	1,394	73,716	1,368	72,583	1,342	70,763	1,300	74,219	1,357	74,436	1,354	75,054	1,360	79,114	1,423	84,736	1,517	88,655	1,580	4.14%
Gilliam	872	1,008	1,176	1,271	1,663	1,751	2,429	2,577	2,026	2,150	2,197	2,333	2,074	2,201	2,255	2,411	2,108	2,243	2,126	2,238	1,943	1,998	2,285	2,314	1,955	1,980	2,247	2,270	2,038	2,043	3,946	3,976	2,439	2,451	-38.35%
Grant	4,178	1,063	3,492	869	3,441	866	3,918	1,027	4,205	1,109	3,944	1,048	3,798	1,010	3,896	1,044	4,010	1,076	3,473	932	3,421	920	3,730	1,005	3,809	1,025	3,868	1,044	4,089	1,103	4,256	1,150	4,300	1,168	1.58%
Harney	2,650	756	2,126	591	3,160	832	2,999	782	3,578	932	3,080	799	3,058	793	3,153	847	3,043	825	3,563	974	3,484	960	3,576	984	3,886	1,065	4,036	1,103	4,137	1,124	4,582	1,242	4,731	1,286	3.55%
Hood River	9,959	1,139	16,016	1,659	15,741	1,536	18,620	1,745	19,965	1,860	19,035	1,760	17,972	1,655	17,782	1,589	18,221	1,611	17,046	1,490	16,530	1,419	17,175	1,448	18,607	1,535	20,187	1,632	23,135	1,840	23,004	1,818	23,460	1,841	1.31%
Jackson	98,002	1,265	115,011	1,348	165,129	1,813	182,404	1,837	184,062	1,820	159,636	1,555	143,484	1,386	141,765	1,394	139,973	1,373	142,338	1,391	139,677	1,354	157,217	1,509	164,031	1,555	175,856	1,645	188,627	1,739	195,192	1,781	196,367	1,775	-0.35%
Jefferson	4,813	645	8,380	965	9,889	1,033	14,385	1,344	14,248	1,294	12,243	1,091	10,118	891	10,387	955	9,714	889	10,148	925	10,250	930	10,883	980	12,394	1,104	13,348	1,171	15,157	1,307	16,036	1,361	14,569	1,222	-10.22%
Josephine	47,687	1,457	35,873	992	54,033	1,421	66,105	1,630	63,004	1,529	56,445	1,355	49,054	1,173	49,268	1,190	49,130	1,186	48,812	1,179	51,156	1,235	58,277	1,402	62,132	1,484	70,076	1,655	76,898	1,796	80,597	1,866	83,623	1,928	3.33%
Klamath	57,247	1,950	66,874	2,153	64,619	2,023	72,315	2,210	64,641	1,964	58,740	1,775	53,652	1,617	49,933	1,502	53,361	1,603	47,284	1,417	46,506	1,392	49,603	1,483	52,858	1,575	58,112	1,724	59,154	1,748	67,382	1,983	65,986	1,935	-2.40%
Lake	4,364	1,196	7,468	2,002	4,057	1,089	5,651	1,499	6,051	1,600	5,599	1,476	5,244	1,380	5,925	1,502	6,773	1,718	5,025	1,269	6,110	1,539	5,698	1,426	5,926	1,480	6,496	1,621	6,428	1,583	6,467	1,594	5,398	1,336	-16.16%
Lane	302,695	2,072	239,310	1,542	256,205	1,582	281,347	1,656	275,032	1,603	251,260	1,453	223,028	1,283	225,988	1,284	215,728	1,222	222,486	1,256	221,532	1,244	233,477	1,301	239,016	1,320	258,041	1,410	274,805	1,483	273,543	1,458	282,440	1,491	2.23%
Lincoln	27,601	1,355	42,443	1,908	40,406	1,812	50,537	2,270	52,580	2,356	47,876	2,141	40,801	1,826	38,932	1,688	38,810	1,682	39,388	1,702	40,968	1,760	42,098	1,796	43,698	1,851	47,700	1,999	50,903	2,123	58,084	2,410	52,567	2,178	-9.59%
Linn	94,644	1,931	69,506	1,328	83,701	1,540	89,163	1,551	86,370	1,488	76,961	1,312	82,520	1,397	80,589	1,303	78,919	1,270	79,746	1,276	78,590	1,249	81,869	1,289	91,837	1,431	97,379	1,496	106,750	1,618	110,534	1,653	110,453	1,636	-1.03%
Malheur	13,815	996	18,776	1,246	21,338	1,344	23,292	1,468	24,152	1,528	23,008	1,453	21,134	1,333	20,713	1,322	20,176	1,283	19,920	1,269	20,043	1,275	20,201	1,284	20,956	1,331	22,205	1,401	23,262	1,461	26,136	1,637	24,074	1,503	-8.19%
Marion	158,109	1,307	219,182	1,648	222,098	1,552	245,214	1,600	247,331	1,591	217,172	1,380	200,420	1,261	205,923	1,305	195,332	1,229	191,947	1,199	193,571	1,200	204,991	1,258	220,237	1,336	243,107	1,457	263,789	1,556	264,973	1,541	266,209	1,532	-0.61%
Metro	945,634	1,516	1,097,246	1,613	1,207,348	1,663	1,356,955	1,730	1,385,870	1,740	1,223,706	1,516	1,088,580	1,334	1,029,314	1,252	977,769	1,180	946,915	1,132	963,041	1,137	1,022,371	1,190	1,138,552	1,305	1,259,663	1,416	1,281,034	1,414	1,373,608	1,494	1,324,963	1,426	-4.56%
Milton-Freew.	4,642	1,649	4,332	1,431	5,029	1,549	5,349	1,625	5,280	1,612	4,770	1,318	4,321	1,193	4,303	1,132	4,051	1,058	4,367	1,133	4,429	1,137	4,189	1,069	4,242	1,072	4,670	1,169	2,527	628	1,765	437	4,819	1,187	171.71%
Morrow	7,221	1,763	5,883	1,264	8,253	1,487	10,506	1,733	11,024	1,788	11,749	1,882	11,777	1,878	10,734	1,921	10,885	1,932	10,976	1,943	13,146	2,301	15,285	2,653	16,661	2,865	17,477	2,976	22,055	3,710	19,095	3,213	27,960	4,410	37.24%
Polk	19,036	729	28,655	1,000	37,322	1,204	41,453	1,257	39,129	1,172	39,340	1,165	37,985	1,116	39,552	1,060	37,817	1,007	38,564	1,018	38,774	1,017	40,516	1,054	42,734	1,100	46,533	1,180	51,177	1,277	50,788	1,251	52,102	1,270	1.54%
Sherman	876	903	987	1,028	1,031	1,057	1,021	1,095	1,219	1,314	1,478	1,604	1,222	1,335	1,190	1,349	1,203	1,363	1,135	1,286	1,091	1,226	1,160	1,300	1,330	1,486	1,219	1,358	1,213	1,347	1,233	1,382	1,269	1,434	3.77%
Tillamook	9,940	893	15,212	1,271	17,807	1,466	24,988	1,958	25,952	2,008	26,046	1,999	22,600	1,730	22,373	1,771	20,559	1,628	21,556	1,704	20,712	1,632	21,590	1,695	23,130	1,801	26,403	2,037	27,325	2,088	28,233	2,139	29,358	2,216	3.57%
Umatilla	41,059	1,461	51,388	1,709	57,952	1,801	65,980	2,011	66,763	2,033	66,601	2,045	65,260	2,002	66,345	1,940	67,354	1,955	64,341	1,854	65,129	1,858	69,030	1,958	71,374	2,004	72,808	2,025	78,725	2,173	83,104	2,287	77,490	2,122	-7.21%
Union	12,866	1,069	14,676	1,181	18,311	1,492	14,801	1,179	19,923	1,578	19,055	1,503	17,207	1,351	17,841	1,382	17,785	1,369	18,237	1,393	18,425	1,400	18,872	1,425	20,289	1,524	20,625	1,542	22,504	1,673	18,944	1,409	18,901	1,408	-0.06%
Wallowa	6,801	1,876	4,024	1,076	4,655	1,284	5,009	1,403	4,692	1,316	4,221	1,187	3,953	1,114	2,990	854	3,250	929	3,197	912	3,402	966	2,495	706	3,881	1,093	4,091	1,146	4,434	1,232	5,105	1,423	6,446	1,803	26.70%
Wasco	16,760	1,494	17,480	1,508	18,118	1,519	22,089	1,835	22,250	1,845	21,387	1,770	19,033	1,571	18,196	1,442	17,005	1,344	17,368	1,363	17,324	1,342	18,175	1,392	17,527	1,329	19,419	1,455	22,233	1,641	22,910	1,685	24,085	1,768	4.97%
Wheeler	758	1,053	763	930	596	769	512	655	555	707	446	567	409	517	427	593	417	582	384	540	468	655	368	511	418	579	371	507	378	511	376	519	385	535	3.06%
Yamhill	52,199	1,490	48,909	1,241	67,141	1,558	99,934	2,163	104,150	2,221	90,790	1,910	71,663	1,493	95,662	1,908	64,513	1,281	89,805	1,771	83,241	1,628	73,473	1,422	76,900	1,472	96,181	1,817	101,265	1,890	99,882	1,845	98,590	1,810	-1.88%
Rounding adj.																																			
OR. TOTALS	**2,263,099**	**1,513**	**2,497,170**	**1,539**	**2,778,463**	**1,617**	**3,235,828**	**1,754**	**3,248,126**	**1,734**	**2,890,503**	**1,525**	**2,586,721**	**1,353**	**2,550,509**	**1,329**	**2,437,767**	**1,264**	**2,424,833**	**1,249**	**2,442,827**	**1,247**	**2,580,933**	**1,303**	**2,784,467**	**1,387**	**3,050,432**	**1,497**	**3,207,448**	**1,549**	**3,345,503**	**1,595**	**3,322,700**	**1,569**	**-1.65%**
change in total from previous year			5.72%		-0.37%		6.92%		0.38%		-11.01%		-10.51%		-1.40%		-4.42%		-0.53%		0.74%		5.65%		7.89%		9.55%		5.15%		4.30%		-0.68%		
change in per capita from previous year			3.68%		-1.62%		5.21%		-1.09%		-12.08%		-11.27%		-1.76%		-4.92%		-1.18%		-0.16%		4.49%		6.48%		7.87%		3.50%		2.96%		-1.65%	

*includes flood debris

Data from some years is not shown due to page formatting. Please contact DEQ directly for data from these years.

Certain recoverable materials in mixed waste burned at the waste-to-energy facility in Brooks are included in Marion County and Statewide disposal in years prior to 2001 but excluded in 2001 and subsequent years (per ORS 459A.010(3)(f)(B)).

Table 7: Oregon Solid Waste Generated by Wasteshed, 1992-2019

Wasteshed	1992 Generated (tons)	Per Capita (lbs.)	1996 Generated (tons)	Per Capita (lbs.)	2000 Generated (tons)	Per Capita (lbs.)	2006 Generated (tons)	Per Capita (lbs.)	2007 Generated (tons)	Per Capita (lbs.)	2008 Generated (tons)	Per Capita (lbs.)	2009 Generated (tons)	Per Capita (lbs.)	2010 Generated (tons)	Per Capita (lbs.)	2011 Generated (tons)	Per Capita (lbs.)	2012 Generated (tons)	Per Capita (lbs.)	2013 Generated (tons)	Per Capita (lbs.)	2014 Generated (tons)	Per Capita (lbs.)	2015 Generated (tons)	Per Capita (lbs.)	2016 Generated (tons)	Per Capita (lbs.)	2017 Generated (tons)	Per Capita (lbs.)	2018 Generated (tons)	Per Capita (lbs.)	2019 Generated (tons)	Per Capita (lbs.)	Change in Per Capita 2019-18
Baker	9,401	1,186	14,540	1,748	15,466	1,847	16,552	2,010	16,295	1,983	16,339	1,986	15,457	1,879	17,486	2,161	15,328	1,891	13,810	1,704	14,634	1,798	14,322	1,755	15,707	1,913	15,543	1,883	17,035	2,034	16,044	1,914	16,356	1,945	1.61%
Benton	80,241	2,339	81,192	2,220	82,323	2,250	98,668	2,543	93,400	2,374	92,885	2,347	82,908	2,081	85,883	2,170	88,300	2,227	92,288	2,307	91,469	2,264	91,009	2,231	94,724	2,290	96,311	2,302	95,805	2,258	99,237	2,317	102,407	2,379	2.64%
Clatsop	27,411	1,600	35,789	2,027	42,075	2,357	57,701	3,115	55,903	2,986	57,513	3,051	48,877	2,583	48,476	2,615	47,632	2,565	48,757	2,622	51,982	2,789	50,339	2,685	53,143	2,816	54,747	2,864	57,344	2,954	61,226	3,124	54,805	2,787	-10.78%
Columbia	23,025	1,187	28,908	1,397	33,562	1,536	42,482	1,809	47,964	2,017	43,381	1,804	37,366	1,544	38,345	1,551	38,000	1,531	38,103	1,534	38,224	1,534	35,970	1,437	37,860	1,503	42,442	1,671	41,969	1,635	42,818	1,650	44,179	1,675	1.52%
Coos	47,631	1,534	51,409	1,620	51,083	1,627	64,232	2,042	61,621	1,955	60,794	1,924	54,971	1,743	64,414	2,044	76,354	2,425	72,346	2,301	67,432	2,145	68,412	2,175	55,386	1,759	58,660	1,857	62,757	1,983	63,779	2,016	69,527	2,197	8.99%
Crook	9,959	1,297	13,802	1,586	19,056	1,975	27,642	2,254	27,871	2,153	23,697	1,765	19,839	1,460	20,866	1,985	23,950	2,297	18,305	1,773	20,263	1,959	19,945	1,920	21,361	2,026	25,642	2,376	26,747	2,420	28,567	2,516	32,403	2,765	9.90%
Curry	13,418	1,350	17,132	1,632	25,031	2,361	26,663	2,496	28,036	2,611	24,631	2,290	21,317	1,998	21,332	1,908	22,896	2,050	21,977	1,971	21,087	1,891	21,633	1,935	22,526	2,005	26,211	2,320	25,835	2,266	26,577	2,320	26,287	2,286	-1.46%
Deschutes	85,387	2,025	133,618	2,676	161,006	2,762	257,589	3,376	252,889	3,145	206,676	2,475	192,654	2,257	177,107	2,243	185,386	2,334	185,676	2,319	193,744	2,384	203,921	2,451	227,338	2,663	240,842	2,727	266,920	2,918	263,464	2,788	267,940	2,777	-0.42%
Douglas	114,507	2,386	118,269	2,372	120,841	2,405	135,041	2,602	139,929	2,674	128,246	2,437	107,424	2,039	116,996	2,173	128,936	2,392	122,925	2,272	113,095	2,078	110,482	2,020	106,771	1,943	102,779	1,862	110,749	1,992	117,952	2,111	120,233	2,142	1.47%
Gilliam	1,049	1,213	1,459	1,577	1,929	2,031	2,654	2,816	2,327	2,469	2,567	2,725	2,842	3,015	2,851	3,049	2,570	2,734	3,810	4,011	3,338	3,432	2,774	2,809	3,026	3,064	2,605	2,631	2,392	2,398	4,247	4,279	2,720	2,734	-36.10%
Grant	5,089	1,295	4,179	1,040	4,232	1,065	4,973	1,304	5,546	1,463	5,269	1,400	4,896	1,301	5,001	1,341	5,347	1,436	4,427	1,189	4,807	1,293	4,568	1,230	5,043	1,358	5,324	1,437	4,941	1,333	5,083	1,374	5,148	1,399	1.83%
Harney	3,249	927	2,804	779	3,966	1,044	4,163	1,086	4,782	1,245	4,653	1,208	4,002	1,038	4,274	1,148	4,370	1,185	4,977	1,361	4,791	1,320	4,936	1,359	4,970	1,363	5,191	1,418	5,422	1,473	5,638	1,528	5,584	1,517	-0.68%
Hood River	11,814	1,352	19,349	2,004	19,144	1,868	27,820	2,608	28,330	2,639	26,514	2,452	25,438	2,342	24,186	2,161	27,761	2,454	24,831	2,171	24,377	2,093	23,876	2,012	26,389	2,177	27,625	2,234	29,637	2,357	30,217	2,388	31,151	2,445	2.40%
Jackson	115,135	1,486	175,303	2,054	229,001	2,514	275,210	2,771	264,484	2,615	235,967	2,299	222,759	2,152	244,304	2,403	239,552	2,349	251,230	2,455	245,382	2,379	266,209	2,555	261,357	2,478	286,316	2,679	290,197	2,676	291,340	2,658	318,349	2,877	8.24%
Jefferson	6,082	815	11,047	1,272	13,550	1,415	19,892	1,858	22,380	2,032	18,460	1,644	14,593	1,285	17,688	1,626	18,356	1,681	18,393	1,677	17,554	1,593	16,284	1,467	16,440	1,465	19,509	1,712	20,453	1,764	20,646	1,753	17,664	1,482	-15.45%
Josephine	55,513	1,696	57,560	1,592	80,567	2,119	108,110	2,665	95,947	2,329	92,402	2,219	78,564	1,878	82,261	1,988	96,175	2,323	97,379	2,353	94,770	2,289	97,664	2,350	94,857	2,266	108,552	2,564	118,681	2,771	117,983	2,731	117,408	2,707	-0.89%
Klamath	66,074	2,251	78,044	2,512	78,689	2,463	108,965	3,329	99,143	3,013	107,559	3,251	79,908	2,409	70,504	2,120	74,112	2,226	70,715	2,119	66,299	1,985	71,737	2,144	68,042	2,028	78,167	2,319	77,310	2,284	84,824	2,496	83,349	2,445	-2.07%
Lake	4,633	1,269	8,069	2,163	4,426	1,188	7,011	1,860	7,742	2,047	8,549	2,254	6,998	1,841	8,140	2,063	9,428	2,391	6,868	1,734	8,287	2,087	6,844	1,713	6,773	1,691	7,394	1,845	7,034	1,732	7,240	1,784	5,762	1,426	-20.08%
Lane	374,767	2,565	393,153	2,534	472,737	2,919	529,946	3,120	512,611	2,988	468,797	2,711	413,905	2,381	463,480	2,633	484,827	2,746	490,915	2,772	451,350	2,535	497,949	2,776	481,845	2,661	516,401	2,822	577,295	3,115	591,935	3,156	628,722	3,319	5.16%
Lincoln	34,487	1,693	50,266	2,259	52,598	2,359	68,566	3,080	72,615	3,254	69,231	3,097	57,810	2,587	57,742	2,503	57,331	2,484	61,492	2,657	57,883	2,486	62,038	2,646	63,525	2,690	64,713	2,711	65,771	2,743	76,595	3,178	72,380	3,000	-5.60%
Linn	111,875	2,282	102,707	1,962	117,531	2,163	149,917	2,608	137,913	2,375	131,181	2,236	138,645	2,347	143,420	2,320	155,069	2,496	145,045	2,320	140,423	2,232	142,028	2,235	151,264	2,358	157,480	2,420	169,215	2,565	184,976	2,767	191,240	2,833	2.40%
Malheur	17,098	1,233	23,583	1,565	28,550	1,798	30,155	1,901	31,197	1,973	29,445	1,859	26,044	1,642	27,002	1,723	25,485	1,621	27,390	1,745	27,742	1,765	26,822	1,705	27,660	1,757	30,177	1,904	30,053	1,887	31,352	1,964	29,507	1,842	-6.19%
Marion	213,943	1,768	304,913	2,293	356,130	2,489	509,383	3,324	499,004	3,210	456,613	2,902	419,207	2,637	412,321	2,612	430,916	2,711	420,655	2,627	426,111	2,641	443,413	2,721	460,780	2,796	480,258	2,878	511,827	3,020	527,525	3,068	509,868	2,934	-4.38%
Metro	1,460,380	2,341	1,849,716	2,719	2,178,198	3,001	2,694,802	3,435	2,710,982	3,403	2,457,886	3,045	2,194,860	2,690	2,139,757	2,602	2,100,311	2,535	2,168,939	2,593	2,242,027	2,648	2,204,665	2,567	2,423,800	2,777	2,376,376	2,671	2,397,904	2,647	2,482,465	2,700	2,459,375	2,647	-1.97%
Milton-Freew.	5,551	1,972	5,518	1,823	6,346	1,954	7,961	2,418	7,631	2,330	8,368	2,312	6,640	1,834	6,648	1,750	6,618	1,728	5,982	1,551	7,533	1,934	6,863	1,752	7,088	1,791	6,554	1,641	3,901	969	2,912	721	5,640	1,390	92.74%
Morrow	8,151	1,990	6,725	1,445	9,681	1,744	13,380	2,207	14,992	2,431	15,618	2,502	15,325	2,444	13,754	2,462	14,154	2,512	14,656	2,594	16,090	2,817	19,333	3,355	21,126	3,633	23,112	3,936	28,044	4,717	24,479	4,119	33,109	5,222	26.78%
Polk	23,909	916	35,442	1,237	55,322	1,785	79,527	2,412	72,967	2,185	74,168	2,197	70,186	2,062	72,686	1,947	72,256	1,924	69,068	1,823	68,726	1,803	75,095	1,953	77,848	2,003	86,059	2,183	97,049	2,422	86,760	2,137	98,798	2,408	12.72%
Sherman	1,146	1,181	1,252	1,304	1,248	1,280	1,254	1,344	1,458	1,572	1,734	1,882	1,425	1,558	1,344	1,523	1,397	1,583	1,454	1,647	1,271	1,429	1,379	1,545	1,582	1,767	1,378	1,535	1,364	1,515	1,426	1,598	1,358	1,535	-3.97%
Tillamook	14,458	1,300	20,458	1,709	23,981	1,974	37,542	2,941	37,387	2,893	38,040	2,920	31,870	2,439	32,532	2,576	30,967	2,452	32,162	2,542	30,410	2,397	30,669	2,407	32,554	2,534	35,735	2,757	37,829	2,890	39,091	2,962	39,630	2,991	0.98%
Umatilla	47,700	1,698	63,843	2,123	78,067	2,426	101,475	3,094	105,165	3,202	107,218	3,292	95,566	2,932	93,806	2,743	94,964	2,756	93,331	2,689	91,195	2,602	96,020	2,724	101,186	2,841	97,084	2,701	107,680	2,973	116,676	3,210	121,451	3,325	3.59%
Union	15,391	1,279	19,879	1,599	23,373	1,904	22,319	1,778	29,102	2,305	27,157	2,142	24,327	1,910	25,000	1,937	25,607	1,971	26,228	2,004	26,456	2,010	25,222	1,905	26,979	2,027	27,541	2,059	28,880	2,147	25,923	1,928	26,249	1,956	1.43%
Wallowa	7,234	1,996	4,528	1,211	5,874	1,620	6,440	1,804	6,459	1,812	5,559	1,563	5,164	1,455	3,709	1,059	4,204	1,202	4,121	1,175	4,460	1,266	3,399	962	5,004	1,409	5,605	1,570	5,858	1,628	6,491	1,809	8,236	2,304	27.33%
Wasco	22,202	1,980	24,999	2,156	27,312	2,290	27,220	2,262	28,900	2,396	27,932	2,311	28,269	2,333	25,285	2,004	24,687	1,952	24,057	1,888	25,482	1,975	25,237	1,933	24,390	1,850	26,311	1,971	27,649	2,041	28,345	2,084	28,962	2,126	2.03%
Wheeler	817	1,135	948	1,156	696	898	673	860	759	967	611	777	512	646	465	646	479	668	422	592	513	718	397	551	495	686	426	582	459	620	514	709	454	631	-11.05%
Yamhill	64,049	1,829	75,024	1,904	120,689	2,800	163,951	3,549	161,965	3,453	140,989	2,967	118,785	2,475	145,400	2,901	110,166	2,188	133,592	2,635	134,478	2,630	116,749	2,259	124,708	2,387	137,306	2,594	142,412	2,658	138,480	2,557	152,545	2,800	9.50%
OR. TOTALS	**3,102,776**	**2,075**	**3,835,427**	**2,364**	**4,544,280**	**2,645**	**5,729,878**	**3,105**	**5,685,695**	**3,036**	**5,216,649**	**2,752**	**4,669,352**	**2,442**	**4,714,467**	**2,457**	**4,743,891**	**2,459**	**4,816,323**	**2,481**	**4,833,686**	**2,467**	**4,888,202**	**2,467**	**5,153,547**	**2,568**	**5,276,375**	**2,589**	**5,494,418**	**2,654**	**5,652,826**	**2,695**	**5,728,796**	**2,705**	**0.36%**
change in total from previous year			5.84%		2.93%		3.24%		-0.77%		-8.25%		-10.49%		0.97%		0.62%		1.53%		0.36%		1.13%		5.43%		2.38%		4.13%		2.88%		1.34%		
change in per capita from previous year			3.81%		1.65%		1.59%		-2.23%		-9.35%		-11.25%		0.60%		0.09%		0.87%		-0.56%		0.00%		4.09%		0.81%		2.50%		1.55%		0.36%		

Data from some years is not shown due to page formatting. Please contact DEQ directly for data from these years.

Table 8: Oregon Materials Recovered, 1992-2019

Material Type	1992 Tons	1996 Tons	2000 Tons	2006 Tons	2007 Tons	2008 Tons	2009 Tons	2010 Tons	2011 Tons	2012 Tons	2013 Tons	2014 Tons	2015 Tons	2016 Tons	2017 Tons	2018 Tons	2019 Tons
Container glass	69,284	77,231	87,889	95,946	96,926	100,496	108,084	107,830	114,982	107,042	106,840	106,853	110,101	107,100	119,562	117,572	109,488
Other glass	41	1,557	1,578	673	901	999	709	867	840	21	28	32	186	232	1	-	1,531
Total glass	**69,325**	**78,788**	**89,467**	**96,619**	**97,827**	**101,496**	**108,793**	**108,697**	**115,822**	**107,062**	**106,868**	**106,885**	**110,287**	**107,333**	**119,562**	**117,572**	**111,019**
Aluminum	18,245	17,815	18,209	21,521	26,932	32,888	30,673	38,495	19,985	23,733	23,176	21,318	19,310	21,566	25,499	30,583	33,861
Scrap metal	26,927	45,271	165,728	339,723	361,152	354,908	332,781	363,805	550,158	511,026	477,097	422,845	408,326	389,347	444,487	516,109	567,591
Tinned cans/aluminum			14,779	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tinned cans	7,400	8,635	-	8,399	10,174	9,177	9,003	8,890	9,298	8,398	8,944	8,747	8,327	8,363	9,611	8,844	10,450
Aerosol cans	0	0	-	1	1	1	1	0	1	0	1	2	1	1	1	1	1
Total metals	**52,572**	**71,722**	**198,716**	**369,644**	**398,260**	**396,975**	**372,458**	**411,190**	**579,442**	**543,158**	**509,217**	**452,912**	**435,963**	**419,276**	**479,599**	**555,537**	**611,903**
Cardboard/kraft paper	204,729	304,093	310,776	440,813	444,449	429,703	367,536	368,604	320,162	356,906	361,735	375,097	409,082	365,903	403,392	403,136	415,560
Paper Fiber[6]	-	-	-	-	348,250	344,119	259,626	269,353	277,353	299,224	299,004	280,888	274,318	267,205	249,753	218,052	193,626
High-grade paper[6]	67,077	49,298	54,358	47,324	-	-	-	-	-	-	-	-	-	-	-	-	-
Magazines	11,246	17,250	8,375	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phone books[1]	-	3,103	2,881	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mixed waste paper[6]	24,012	53,771	91,559	39,347	-	-	-	-	-	-	-	-	-	-	-	-	-
Newspaper[6]	130,181	141,412	187,108	263,193	-	-	-	-	-	-	-	-	-	-	-	-	-
Fiber-based fuel		9,235	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total papers	**437,245**	**578,161**	**655,057**	**790,677**	**792,699**	**773,822**	**627,162**	**637,957**	**597,515**	**656,130**	**660,739**	**655,985**	**683,400**	**633,109**	**653,145**	**621,189**	**609,186**
#1 PET beverage	3,329	5,803	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
#1 other	58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
#2 milk jugs	1,940	3,049	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
#2 other	1,841	1,331	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
#3 PVC	25	144	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
#4 LDPE	1,196	2,501	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
#5	360	283	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
#6	471	430	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Composite plastic	-	1,077	863	2,004	1,539	1,784	1,823	1,964	2,594	2,311	2,222	2,426	2,346	2,369	1,305	1,182	715
Mixed plastic	300	1,708	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other plastic (P7)	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plastic bottles[2]			-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Plastic film			3,969	11,594	9,625	10,739	11,327	12,839	11,747	14,886	14,583	14,831	13,680	15,873	14,755	9,025	8,170
Plastic other			3,718	9,426	9,500	9,302	9,299	9,019	10,167	10,720	9,562	12,507	13,348	13,232	8,761	7,691	8,010
Rigid plastic containers			15,672	19,439	21,990	19,790	23,377	28,599	30,100	29,485	28,740	30,692	24,613	24,697	29,773	25,856	29,857
Total plastic	**9,520**	**16,338**	**24,222**	**42,463**	**42,655**	**41,615**	**45,826**	**52,421**	**54,608**	**57,401**	**55,107**	**60,455**	**53,988**	**56,171**	**54,593**	**43,754**	**46,752**
Antifreeze	5	52	424	3,085	2,683	2,720	2,515	6,762	3,060	2,598	2,680	2,719	2,916	2,472	2,545	2,676	2,366
C & D -- roofing[7]			25,162	10,072	5,980	3,885	7,830	15,803	12,998	18,223	15,895	18,568	21,410	19,769	18,661	14,047	9,219
Carpeting -- used			919	-	645	300	515	1,641	1,807	1,837	1,409	1,355	654	0	-	-	-
Diesel				151	156	152	145	33	32	33	32	33	34	33	-	-	-
Electronics			617	6,345	9,813	10,513	15,174	17,587	19,586	25,957	21,929	22,344	20,696	18,349	15,513	13,881	11,752
Fluorescent lamps	-	7	21	453	514	451	400	620	673	662	600	422	172	364	343	374	311

Table 8: Oregon Materials Recovered, 1992-2019 (cont'd)

Material Type	1992 Tons	1996 Tons	2000 Tons	2006 Tons	2007 Tons	2008 Tons	2009 Tons	2010 Tons	2011 Tons	2012 Tons	2013 Tons	2014 Tons	2015 Tons	2016 Tons	2017 Tons	2018 Tons	2019 Tons
Gypsum wallboard	3,695	9,419	5,300	4,174	2,655	3,126	3,338	2,138	3,364	5,025	4,057	3,819	3,630	4,225	3,862	5,823	8,460
Household Haz Waste			14	143	157	305	436	452	295	338	323	246	276	326	273	264	276
Mixed batteries				120	204	188	218	247	336	436	375	301	259	333	172	265	360
Lead acid batteries[3]	176	559	1,184	15,509	12,906	14,602	13,794	15,305	14,467	14,036	14,637	12,562	16,750	17,537	16,758	14,674	19,667
Paint[5]	120	489	555	1,434	1,730	1,141	1,308	1,931	3,015	3,396	3,652	3,826	4,414	4,263	4,201	4,623	3,506
Porcelain	-	5	-	307	1,258	553	590	327	203	551	960	1,071	840	366	85	258	201
Rubber tire buffings[4]	-	2,935	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scrap film (X-ray)	42	68	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solvents[5]	16	110	188	261	274	526	237	312	406	444	369	480	454	457	475	450	280
Textiles		508	4,033	1,819	1,519	1,244	958	216	232	872	948	1,157	1,186	1,054	681	816	317
Tires[5]	34,392	24,360	16,420	21,931	20,045	25,091	23,264	20,834	23,361	23,470	30,326	21,711	27,793	31,175	30,504	23,471	29,820
Used Motor Oil[5]	28,796	47,632	44,114	52,837	43,123	43,871	40,513	31,443	30,052	37,032	35,544	34,516	34,103	45,015	25,916	31,644	33,582
Total other	**67,243**	**86,145**	**98,969**	**118,640**	**103,662**	**108,668**	**111,235**	**115,648**	**113,885**	**134,909**	**133,736**	**125,129**	**135,586**	**145,739**	**119,989**	**113,266**	**120,117**
Animal waste/grease	-	22,957	25,670	15,928	13,783	14,512	12,853	11,942	7,680	7,148	7,621	10,491	13,009	15,002	10,923	15,541	13,862
Food waste	-	5,000	3,486	12,430	16,407	21,475	21,949	39,367	42,741	47,665	50,143	46,289	41,991	57,118	48,276	45,174	52,758
Wood waste[5]	112,425	243,773	360,819	503,967	460,896	371,531	307,005	340,794	368,356	362,448	387,196	349,139	375,462	289,022	299,359	286,561	296,312
Yard debris[5]	91,348	235,562	309,407	543,683	511,380	496,052	475,351	445,944	426,095	475,578	480,238	492,035	519,561	503,171	501,528	508,709	544,198
Total organics	**203,773**	**507,292**	**699,382**	**1,076,008**	**1,002,466**	**903,570**	**817,157**	**838,047**	**844,872**	**892,839**	**925,198**	**897,954**	**950,024**	**864,312**	**860,086**	**855,985**	**907,131**
Adj. rounding/unspecified		2	1														
OREGON TOTALS	**839,678**	**1,338,446**	**1,765,814**	**2,494,050**	**2,437,569**	**2,326,146**	**2,082,631**	**2,163,959**	**2,306,144**	**2,391,499**	**2,390,865**	**2,299,320**	**2,369,248**	**2,225,940**	**2,286,974**	**2,307,302**	**2,406,107**

[1]Phone books included in mixed waste paper in 1992, 1993 and 2001 and subsequent years.

[2]About 900 tons of plastic bottles was included with mixed plastics in the 1995 survey.

[3]Includes only batteries collected at household hazardous waste collection events until 2001.

[4]From 1998 rubber tire buffings were included with tires.

[5]Includes Marion Co. materials in 2001 and subsequent years burned for energy.

[6]In 2007 and subsequent years, Mixed Waste Paper, Hi Grade & Newspaper was combined into Paper Fiber

[7]Asphalt Roofing was included as burned for energy only in years 2001-2006

Data from some years is not shown due to page formatting. Please contact DEQ directly for data from these years.

Table 9: Disposition of Recovered Materials, 2019

Wasteshed	Total Recovered	Recycled	% of Total	Energy Recovery	% of Total	Compost	% of Total	Stock
Baker	2,793	1,374	49%	89	3%	1,190	43%	140
Benton	36,276	21,429	59%	406	1%	14,441	40%	-
Clatsop	19,774	14,207	72%	4,400	22%	1,166	6%	-
Columbia	10,255	8,759	85%	55	1%	1,441	14%	-
Coos	16,170	15,907	98%	31	0%	232	1%	-
Crook	7,156	6,210	87%	422	6%	524	7%	-
Curry	6,070	5,841	96%	109	2%	119	2%	-
Deschutes	84,347	52,461	62%	226	0%	31,660	38%	-
Douglas	31,579	20,082	64%	8,779	28%	2,718	9%	-
Gilliam	282	282	100%	-	0%	-	0%	-
Grant	848	747	88%	39	5%	40	5%	23
Harney	858	766	89%	57	7%	-	0%	36
Hood River	7,690	5,714	74%	48	1%	1,929	25%	-
Jackson	121,982	72,479	59%	19,819	16%	29,684	24%	-
Jefferson	3,095	2,644	85%	286	9%	166	5%	-
Josephine	33,785	18,501	55%	4,676	14%	10,608	31%	-
Klamath	17,362	12,140	70%	3,436	20%	1,786	10%	-
Lake	363	359	99%	4	1%	-	0%	0
Lane	346,282	198,254	57%	56,207	16%	91,821	27%	-
Lincoln	19,813	13,657	69%	2,183	11%	3,973	20%	0
Linn	80,787	65,885	82%	981	1%	13,921	17%	-
Malheur	5,433	4,892	90%	24	0%	515	9%	2
Marion	243,658	139,482	57%	53,995	22%	50,181	21%	-
Metro	1,134,412	761,452	67%	127,771	11%	245,152	22%	37
Milton-Freewater	821	788	96%	9	1%	23	3%	-
Morrow	5,149	5,017	97%	132	3%	-	0%	-
Polk	46,696	19,871	43%	16,360	35%	10,465	22%	-
Sherman	89	84	94%	6	6%	-	0%	-
Tillamook	10,273	8,409	82%	508	5%	1,347	13%	9
Umatilla	43,962	42,169	96%	1,473	3%	316	1%	3
Union	7,348	4,712	64%	493	7%	2,135	29%	8
Wallowa	1,790	552	31%	12	1%	1,000	56%	226
Wasco	4,877	3,748	77%	167	3%	963	20%	-
Wheeler	69	69	99%	0	1%	-	0%	-
Yamhill	53,955	20,978	39%	311	1%	32,666	61%	-
Total	**2,406,101**	**1,549,920**	**64%**	**303,513**	**13%**	**552,183**	**23%**	**484**

APPENDIX I

SITE PERMITS

APPENDIX I.1

STATE SOLID WASTE PERMIT # 306

State of Oregon Department of Environmental Quality

SOLID WASTE DISPOSAL SITE PERMIT:

Municipal Solid Waste Landfill

Oregon Department of Environmental Quality
165 E. Seventh Ave., Suite 100
Eugene, OR 97401-3049
541-687-7465

Issued as authorized by ORS 459.245 and in accordance with the provisions of Oregon Revised Statutes Chapter 459, 459A, Oregon Administrative Rules 340 Divisions 64, 90, 93, 95, 96 and 97 and subject to the Land Use Compatibility Statement referenced below.

ISSUED TO:

Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330

541-745-5792

FACILITY NAME AND LOCATION:

Coffin Butte Landfill
28972 Coffin Butte Road
Corvallis, OR 97330

Section 13&18, T10S, R5&4W, Benton County

OWNER:

Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330

541-745-5792

OPERATOR:

Coffin Butte Landfill
28972 Coffin Butte Road
Corvallis, OR 97330

541-230-5546

ISSUED IN RESPONSE TO:

- Solid waste permit renewal application received Dec 6, 2019
- Land Use Compatibility Statement from Benton County dated Dec. 20, 2000.

The determination to issue this permit is based on findings and technical information included in the permit record.

ISSUED BY THE OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

Brian Fuller
Material Management Manager
Western Region

July 28, 2020
Date

Permitted Activities

Until this permit expires or is modified or revoked, the permittee is authorized to establish, operate, and maintain a solid waste land disposal site in conformance with the requirements, limitations, and conditions set forth in this document, including all attachments.

TABLE OF CONTENTS

INTRODUCTION

This document is a solid waste permit issued by the Oregon Department of Environmental Quality in accordance with Oregon Revised Statutes (ORS) 459 and Oregon Administrative Rules (OAR), Chapter 340.

PERMIT ADMINISTRATION

1.0 PERMIT ISSUANCE

1.1 Permittee

This permit is issued to Valley Landfills, Inc.

1.2 Permit number

This permit is DEQ Solid Waste Permit Number 306.

1.3 Permit term

The permit is issued on the date it is signed. The permit's expiration date is June 30, 2030.

1.4 Facility type

The facility is permitted as a municipal solid waste landfill.

1.5 Facility owner/ operator

The owner of this facility is:

Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330

The operator of this facility is:

Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330

1.6 Basis for permit issuance:

This permit is issued based upon the following documents submitted by the permittee:

- Solid waste permit application received Dec. 6, 2019
- Land Use Compatibility Statements from Benton County dated Dec. 20, 2000

1.7 Definitions

Unless otherwise specified, all terms are as defined in OAR 340-093-0030.

1.8 Legal control of property

The permittee shall at all times maintain legal control of the disposal site property; including maintaining a current permit, contract or agreement that allows the operation of the facility if the site is not owned by the permittee.

1.9 Submittal & notification address

Unless otherwise specified, all submittals and notifications to DEQ under this permit must be sent to:

Oregon Department of Environmental Quality
Manager, Materials Management Program
165 E Seventh Ave., Suite 100
Eugene, OR 97401-3049

Telephone: 541-687-7465

All submittals must include, at a minimum, one paper copy and one electronic copy in a format that is approved by the DEQ project manager. Note that some submittals may require more paper copies. Therefore, the permittee must confirm with the permit manager how many copies are necessary prior to submittal of a document.

Note: Whenever possible, the permittee should submit two-sided paper copies of all reports. DEQ may accept electronic submittals for portions of some reports, as approved in the Environmental Monitoring Plan or by DEQ.

2.0 DISCLAIMERS

2.1 Property rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights.

2.2 Department liability

DEQ, its officers, agents or employees do not sustain any liability on account of the issuance of this permit or on account of the construction, maintenance or operation of facilities pursuant to this permit.

3.0 AUTHORITY

3.1 Ten year permit

This permit is issued for a maximum of 10 years as authorized by Oregon Revised Statutes 459.245 (2).

3.2 Documents superseded

This document is the primary solid waste permit for the facility, superseding all of other solid waste permits issued for Coffin Butte Landfill by DEQ.

3.3 Permittee responsibility and liability

Conditions of this permit are binding upon the permittee. The permittee must conduct all facility activities in compliance with the provisions of the permit. The permittee is liable for all acts and omissions of the permittee's contractors and agents in carrying out the operations and other responsibilities pursuant to this permit.

3.4 Other compliance

This permit's issuance does not relieve the permittee from the responsibility to comply with all other applicable federal, state, or local laws or regulations, including the following solid waste requirements, and any future updates or additions to these requirements:

- Solid waste permit application received Dec. 6, 2019
- Oregon Revised Statutes, Chapters 459 and 459A
- Oregon Administrative Rules Chapter 340
- Any documents submitted by the permittee and approved by DEQ

3.5 DEQ access to disposal site

The permittee shall allow representatives of DEQ access to the disposal facility at all reasonable times for the purpose of making inspections, surveys, collecting samples, obtaining data and carrying out other necessary functions related to this permit.

Reference: OAR 340-093-0050(6).

3.6 Penalties

Violation of permit conditions will subject the permittee to civil penalties of up to $25,000 for each day of each violation.

Reference: ORS 459.995(1)(a)

4.0 PERMIT MODIFICATION

4.1 Five year review

In the permit's 4th to 6th year, DEQ will review the permit and amend it if necessary. DEQ will consider the following factors in making this determination:

- Compliance history of the facility
- Changes in volume, waste composition, or operations at the facility
- Changes in state or federal rules which should be incorporated into the permit

- A significant release of leachate or landfill gas to the environment from the facility
- Significant changes to a DEQ-approved site development plan, and/or conceptual design
- Other significant information or events

4.2 Permit modification

DEQ or the permittee may, at any time during the permit's term, propose to change the permit.

Once approved by DEQ, any permit-required plans become part of the permit by reference. DEQ may provide notice and opportunity for review of permit-required plans.

4.3 Modification and revocation by DEQ

DEQ may, at any time before the expiration date, modify, suspend or revoke this permit in whole or in part, in accordance with Oregon Revised Statutes 459.255, for reasons including but not limited to the following:

- Violation of any terms or conditions of this permit or any applicable statute, rule, standard or order of the Commission;
- Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts
- A significant change in the quantity or character of solid waste received or in the operation of the disposal site

4.4 Modification by permittee

The permittee must apply for a modification to this permit if there is a significant change in facility operations or a deviation from permitted activities.

4.5 Public participation

DEQ will issue a public notice to inform the public of any significant changes to the permit.

4.6 Changes in ownership or address

At least 10 days in advance, the permittee must report to DEQ any change in the facility's ownership or the permittee's or operator's name and/or address.

Reference: OAR 340-093-0070(6)(a)(A)

ALLOWABLE ACTIVITIES

5.0 AUTHORIZATIONS

5.1 Wastes authorized for receipt

This permit authorizes the facility to accept:

- Solid waste as defined in OAR 340-093-0030(91)
- The following waste, when special handling and management requirements for their disposal are included in a special waste management plan approved by DEQ:
    - Cleanup Materials Contaminated with Hazardous Substances as defined in OAR 340-093-0030(19), in accordance with OAR 340-093-0170
    - Waste requiring special management as defined in OAR 340-093-0190
    - Industrial solid wastes as defined in OAR 340-093-0030(53)

5.2 Authorization of other wastes

DEQ may authorize the permittee to accept other waste if:

- The permittee develops a Special Waste Management Plan and submits it to DEQ for review and approval;
- DEQ approves the Special Waste Management Plan
- The permittee can demonstrate that the materials are not hazardous waste, as defined by state and federal regulations or otherwise a threat to human health or waters of the state.

5.3 Tires for recycling

This permit authorizes the permittee to accept up to 100 whole tires at this facility for storage and removal.

This permit authorizes the permittee to accept up to 2,000 whole tires at this facility for storage and removal if the permittee maintains a continuous contract with a waste tire carrier to remove the tires from the site.

5.4 Salvaging and recycling

This permit authorizes the permittee to conduct salvaging and recycling in a controlled and orderly manner. The permittee must notify DEQ prior to changing salvaging and recycling operations. These operations must be described in the site Operations Plan.

6.0 PROHIBITIONS

6.1 Hazardous waste disposal

The permittee must not accept any regulated hazardous waste.

Reference: 40 CFR 258.20 (b).

In the event discovered waste is hazardous or suspected to be hazardous, the permittee must, within 24 hours, notify DEQ and initiate procedures to identify and remove the waste. Hazardous waste must be removed within 90 days, unless DEQ approves otherwise. The permittee's temporary storage and transportation practices must comply with DEQ rules.

6.2 Liquid waste disposal

The permittee must not accept liquid waste for disposal.

Definition: Liquid waste is waste that does not pass the paint filter test performed in accordance with EPA Method 9095B.

6.3 Vehicle disposal

The permittee must not accept discarded or abandoned motor vehicles, including trailers or mobile homes, for disposal.

6.4 Used oil disposal

The permittee must not accept used oil for disposal.

6.5 Battery disposal

The permittee must not accept lead-acid batteries for disposal.

6.6 Tire disposal

The permittee must not accept waste tires for disposal.

6.7 Recyclable material disposal

The permittee must not landfill or dispose of any source separated recyclable material brought to the disposal site.

Exception: If the source separated material is unusable or not recyclable it may be landfilled. DEQ must agree to such disposal and pre-approve the identified sources of unusable source separated material prior to its disposal.

6.8 Open burning

The permittee must not conduct any open burning at the site.

6.9 Electronic waste disposal

The permittee must not knowingly accept the following covered electronic devices for disposal:

- Computer monitors having a viewable area greater than four inches diagonally
- Televisions having a viewable area greater than four inches diagonally

- Desktop computers
- Portable computers

Reference: Oregon Revised Statutes 459.247 and 459A.300-365.

OPERATIONS AND DESIGN

7.0 OPERATIONS PLAN

7.1 Operations plan submittal

Within 270 days of the permit issue date, the permittee must review and submit any necessary updates to the site Operations Plan to DEQ for review and approval. The updated plan must be consistent with the conditions of this permit. A DEQ-approved plan becomes an integral part of the permit.

7.2 Plan content

The Operations Plan must describe facility operations, including the elements listed below, and demonstrate how the facility will comply with all regulatory and permit requirements:

General Topics	Describe plans or procedures for:
General operations	• Screening incoming waste to detect unauthorized or prohibited waste as required by 40 CFR 258.20(a) • Handling and removing unauthorized wastes discovered at the facility • Managing landfill gas • Managing landfill leachate in compliance with Subsection 9.15 • Recirculating landfill leachate & gas condensate in compliance with Subsections 5.5 and 9.15 • Monitoring landslide stability in compliance with Subsection 9.22 • Designing surface water and erosion control structures • Responding to non-compliance events or situations
Disposal operations	• Placing daily and interim cover • Detecting and preventing the disposal of regulated hazardous waste, and any other DEQ-prohibited waste • Disposing of putrescible waste • Disposal, handling and recordkeeping of cleanup materials contaminated with hazardous substances • Waste unloading and handling • Disposing of special waste • Using, stockpiling and tracking the receipt and use of waste approved for use as alternative daily cover • Reducing and controlling the risk of a landfill fire • Fill progression and phasing that is consistent with landslide stability recommendations, and takes into account other operational considerations
Special Waste Management Plan	• Identifying and characterizing special waste (i.e., waste which requires special management or waste streams not otherwise authorized by this permit) • Identifying the source of all special waste • Determining appropriate handling and disposal procedures • Documenting plan implementation, including waste characterization and location of waste disposition References: OAR 340-093-0190, OAR 340-094-0040[11][b][J]
Ancillary operations	• Waste unloading and handling • Solidifying liquid waste prior to disposal

General Topics	Describe plans or procedures for:
	• Handling and removal of waste tires • Placing and maintaining interim cover over inactive landfill areas • Managing transfer containers
Inspection and maintenance	• Washing equipment • Maintaining leachate and gas collection systems • Maintaining monitoring stations and devices • Periodically inspecting the continuity and integrity of primary leachate collection pipes • Maintaining surface water control structures
Operating record	• Establishing and maintaining the operating record
Contingency	• Backup methods for storing and/or disposing of leachate • Providing fire protection equipment, and arrangements made with local fire control agency • Notifying DEQ about emergencies and fires

7.3 Operations and maintenance manual

Within 60 days of the Operations Plan's approval the permittee must prepare and submit an updated Operations and Maintenance Manual which includes detailed inspection and maintenance procedures and an associated schedule for all facility components that require periodic inspection. The manual must include specific procedures for routine preventative maintenance and repairs and for response to emergency situations. The preventative inspection and maintenance program should address the following equipment and facilities: personnel safety equipment, operating equipment, support facilities, environmental control systems, environmental monitoring systems, and the transportation system. The permittee must keep a copy of the Operations and Maintenance Manual with the Operating Record, readily available for DEQ inspection and review.

7.4 Plan and manual updates

The permittee must update and revise both the Operations Plan and the Operations and Maintenance Manual as necessary to reflect current and future facility conditions and procedures.

The permittee must submit any associated revisions or updates to DEQ for review and approval.

7.5 Plan and manual compliance

The permittee must operate the facility in accordance with the approved Operations Plan and Operations and Maintenance Manual, and any amendments to these documents.

8.0 RECORDKEEPING AND REPORTING – OPERATIONS

8.1 Non-compliance reporting

The permittee must take immediate corrective action for any violations of permit conditions or DEQ rules and notify DEQ.

DEQ response: DEQ may investigate the nature and extent of the compliance problem and evaluate the adequacy of the permittee's corrective action plans.

8.2 Permit display

The permittee must display this permit where operating personnel can easily refer to it.

8.3 Access to records

DEQ must have access, when requested, to all records and reports related to the permitted facility.

8.4 Procedures

The permittee's recordkeeping and reporting procedures are as follows:

Step	Action
1	Keep the Operating Record at the facility or at another DEQ-approved location.
2	Place information required by 40 CFR 258.29 and this permit in the Operating Record.
3	During facility operations, record the daily amount of each waste type received and approved alternative daily cover - qualified waste used for daily cover. Record 0 if the waste is not received. *Identify the following waste types received and categorize them as either in- or out-of-state waste:* • Domestic solid waste and construction and demolition waste • Industrial solid waste • Asbestos • Contaminated cleanup materials (except materials counted as alternative daily cover qualified waste) • Approved alternative daily cover qualified waste received • Other (i.e., specify any waste type not included in the above list).
4	If applicable, every quarter, record the amount of each material recovered for recycling or other beneficial purpose.
5	Submit the information collected in Step 3 above on the Solid Waste Disposal Report/Fee Calculation form provided by DEQ. Pay solid waste fees as required by OAR 340-097. Date due: last day of the month following the end of the calendar quarter.
6	Submit the information collected in Steps 3 & 4 above to the Wasteshed Representative on DEQ provided or approved form. Date due: Jan. 25 of each year.
7	Retain copies of all records and reports for 10 years after their creation.
8	Update all records to reflect current conditions at the facility.

8.5 Submittal address

Send required submittals to:

Oregon Department of Environmental Quality
Materials Management Section
Environmental Solutions Division
700 NE Multnomah St., Suite 600
Portland OR 97232

503-229-5913

9.0 SPECIFIC OPERATING CONDITIONS

9.1 Discovery of prohibited waste

If the permittee discovers prohibited wastes, the permittee must notify DEQ within 24 hours and begin to isolate or remove the waste. In addition, the permittee must take digital photos of the prohibited waste to document its quantity, nature, identity and source.

Within 60 days following the discovery, the permittee must transport non-putrescible, non-hazardous prohibited waste to a disposal or recycling facility authorized to accept such waste, unless otherwise approved or restricted by DEQ. The permittee must obtain DEQ's written approval to store putrescible, non-hazardous, prohibited waste.

9.2 Spills notification

Oregon Revised Statue 466.635 and Oil and Hazardous Materials Emergency Response Requirements, Chapter 340, Division 142 require immediate notification to Oregon Emergency Response System (OERS) after taking any required emergency actions to protect human health and the environment when

oil or hazardous materials are spilled. The spill must be immediately reported to OERS at 1-800-452-0311 if the spill is of a reportable quantity. Reportable quantities include:

- *Any* amount of oil spilled to waters of the state
- Oil spills on land in excess of 42 gallons
- Two hundred pounds (25 gallons) or more of spilled pesticide residue
- Spills of hazardous materials that are equal to, or greater than, the quantity listed in the Code of Federal Regulations, 40 CFR Part 302 (List of Hazardous Substances and Reportable Quantities), and amendments adopted before July 1, 2002.

For a complete list of hazardous materials required to be reported, please refer to OAR 340-142-0050.

9.3 Access roads

The permittee must provide all-weather access roads from the landfill property line to the active operational area and the environmental monitoring stations, and maintain them in a manner that prevents traffic hazards, dust and mud.

The permittee must use appropriate means, including truck washing, as needed to prevent haul trucks from tracking mud on external roadways outside the landfill boundaries. Any truck washing activities must be conducted on a hard surface and any disposal of wastewater must be accomplished in a manner approved by DEQ.

9.4 Unloading area

The area(s) for unloading incoming waste must be clearly defined by signs, fences, barriers or other devices. The permittee must minimize width of the unloading area to the maximum extent practicable.

9.5 Daily cover

At the end of each working day the permittee must cover all solid waste with a six inch, or thicker, layer of compacted soil or with a DEQ-approved, alternative daily cover.

9.6 Interim cover

As specified in DEQ-approved design and operations plans, the permittee must place and maintain interim cover over fill areas that will not receive additional waste for an extended period of time [i.e., greater than 120 days] and actively revegetate, in a DEQ-approved manner, any interim cover that will remain exposed for more than two years.

9.7 Surface water structures

The permittee must maintain all stormwater drainage structures in good functional condition, report to DEQ any significant malfunctions or damage and complete repairs within 60 days of discovery the problem.

9.8 Stormwater pollution control plan

The permittee must update and implement the Storm Water Pollution Control Plan consistent with site conditions and the stormwater permit requirements. Refer to the National Pollutant Discharge Elimination System Stormwater Discharge Permit No. 1200-Z. In addition, the permittee must keep a current copy of the permit in the facility Operating Record.

9.9 Asbestos waste management

The permittee must offload and dispose of friable asbestos-containing solid waste as specified in DEQ-approved Operations Plan, Operations & Maintenance Manual, and in OAR 340-248.

9.10 Leachate management systems

The permittee must operate the disposal site in a manner that deters leachate production to the maximum extent practicable, and construct, operate and maintain in good functional condition all DEQ-approved leachate containment, collection, detection, removal, storage and treatment systems. The permittee must remove leachate continuously from all landfill leachate collection systems, to minimize fluid buildup on the bottom liner and prevent the hydraulic head (fluid depth) from exceeding one foot.

9.11 Leachate surface impoundments

The permittee must: 1) completely contain leachate stored within lined surface impoundments; 2) maintain a minimum dike freeboard of two (2) feet above the maximum leachate level in those impoundments unless otherwise approved by DEQ; 3) fence the impoundments to control public access; and 4) lock all gates when no attendant is on duty. In addition, the permittee must post clearly legible, visible signs that describe the surface impoundment's contents and display the words "no trespassing".

9.12 Litter control

The permittee must at all times minimize windblown litter and collect it quickly and effectively to prevent scattering, nuisance conditions and unsightliness.

9.13 Vector control

The permittee must minimize vectors in the active disposal area, including insects, rodents and birds.

9.14 Air emissions

The permittee must control air emissions, including dust, malodors, air toxics, etc. related to disposal site construction, operation and other activities, and comply with DEQ air quality standards.

9.15 Access control

The permittee must control public access to the landfill as necessary to prevent unauthorized entry and dumping.

9.16 Landfill entrance sign

A prominently displayed sign must indicate the following:

- The name of facility
- The emergency telephone number
- The days and hours of operation
- The authorized and prohibited waste
- The Solid Waste Permit number
- The operator's address
- The consequences to haulers if they attempt to dispose of prohibited materials
- Any other information critical to the safe and efficient operation of the facility.

9.17 Fire protection and reporting

The permittee must provide complete and sufficient protection equipment and facilities in accordance with DEQ-approved Operations Plan.

Arrangements must be made with the local fire control agency to immediately acquire their services when needed. The permittee must implement preventative measures to ensure adequate on-site fire control, as determined by the local fire control agency. Fires must be immediately and thoroughly extinguished.

Fires shall be reported to DEQ within 24 hours.

9.18 Water supply

The permittee must provide water in sufficient quantities for fire protection, dust suppression, establishment of vegetation, and other site operations requiring water.

9.19 Landfill gas management

The permittee must control landfill gas in accordance with the requirements of 40 CFR Parts 51, 52 and 60 and OAR 340-094-0060(4).

9.20 Landfill gas control system operation and maintenance

The permittee must operate and maintain the landfill gas control and monitoring systems in good working order as required to prevent nuisance odors, air emissions and landfill gas migration (see methane compliance limits in Section 18).

If critical landfill gas equipment is significantly damaged or compromised, the permittee must replace or repair that equipment, within 60 days of discovering the problem, and submit a written inspection report to DEQ.

10.0 SITE DEVELOPMENT AND DESIGN

10.1 Site development plan

Within 360 days of the permit issue date, the permittee must submit any necessary update to the long-term Site Development Plan to DEQ for review and approval. Once approved, the plan becomes an integral part of this permit.

Reference: The *Solid Waste Landfill Guidance, September 1996,* describes the basic elements of a Site Development Plan. Organizing the plan in accordance with the Guidance will expedite DEQ's review.

10.2 Baseline design criteria

New municipal landfill waste landfill disposal units must include the following engineering controls:

- A composite liner system, including a DEQ-approved geomembrane liner (at least 60 mils thick for high density polyethylene, and at least 30 mils thick for approved alternative geomembranes) and at least two feet of compacted soil with an in-place permeability of 1 X 10^{-7} cm/sec or less, or a DEQ-approved alternative liner pursuant to 40 CFR Part 258.40(a)(1);
- A primary leachate collection and removal system (LCRS) which fully covers the liner system and maintains a leachate depth of less than a one foot above the liner, per 40 CFR 258.40(a)(2). All leachate collection pipes must be serviceable by clean outs;
- A secondary leachate collection and removal system(s) designed to effectively monitor the overlying composite-liner system's performance and (1) detect and collect leachate at locations of maximum leak probability; and (2) prevent groundwater intrusion and related monitoring biases;
- A leachate collection sump(s) with a double composite liner system and a leak detection and removal system. Each composite liner must meet the minimum design criteria previously cited in this subsection;
- An operations layer that covers and protects the primary LCRS and liner system from physical damage; and
- A leachate surface impoundment (if applicable) with a double liner and leak detection and removal system. One liner must meet the minimum composite liner criteria described above.

10.3 Design plans

At least six months prior to the anticipated construction date for new disposal units, closure of existing units, or development of other ancillary facilities, the permittee must submit engineering design plans to DEQ for review and approval. The design plans must be prepared and stamped by a qualified Professional Engineer with current Oregon registration and specify and/or provide the following:

- All applicable performance criteria, construction material properties and characteristics, dimensions and slopes
- The design basis and all relevant engineering analyses and calculations

10.4 Construction requirements

The permittee must construct all improvements in accordance with:

- The approved plans and specifications
- Any DEQ imposed conditions of approval
- Any future DEQ approved amendments to the plans and specifications
- Construction work must begin within 18 months of plan approval

10.5 Construction documents

Prior to constructing any landfill engineering controls (e.g., final cover, new disposal unit, or other waste containment facilities or improvements), the permittee must submit complete construction documents and receive DEQ's written approval. The construction documents must:

- Define the construction project team
- Specify material and workmanship requirements to guide the constructor in executing work and furnishing products
- Include a Construction Quality Assurance Plan that describes how the project team will monitor the quality of materials and the constructor's work performance and assure compliance with project specifications and contract requirements.

Reference: Follow the current *Solid Waste Guidance* to expedite DEQ review of the construction documents.

10.6 Construction inspection

During construction of a new landfill disposal unit, final cover system, or any other landfill controls or engineered features, the permittee must provide DEQ with a summary and schedule of planned construction activities to facilitate DEQ's inspection and oversight.

10.7 Construction report submittal

Within 90 days of completing construction of a new landfill disposal unit, a final cover system, or other engineering controls, the permittee must submit to DEQ a Construction Certification Report prepared by a qualified independent party. The report must document and certify that the construction of all required components and structures complies with this permit and DEQ-approved design specifications.

10.8 Construction report content

The construction report must include:

- An executive summary describing the construction project and any major problems encountered
- A list of the governing construction documents
- A summary of all construction and construction quality assurance activities
- The manufacturer's written certifications that all geosynthetic materials conform with project specifications
- Test data documenting that soil materials conform with project specifications
- A summary of all construction quality assurance observations, including daily inspection records and test data sheets documenting that materials deployment and installation conform with project specifications
- A description of the problems encountered and the corrective measures implemented
- The designer's acceptance reports for errors and inconsistencies
- A list/description of any deviations from the design and material specifications, including justification for the deviations, copies of change orders and recorded field adjustments, and copies of DEQ's written approvals for deviations and change orders
- Signed certificates for subgrade acceptance prior to placement of soil liner and for acceptance of the soil liner prior to deployment of geomembrane liner
- Photographs and as-constructed drawings, including record surveys of the subgrade, soil liner, granular drainage layer and protective soil layer
- The certification statement(s) and signatures of the construction quality assurance consultant, designer, and facility owner. One of these representatives must be a professional engineer with current Oregon registration.

10.9 Approval to use new disposal units

The permittee must not dispose of solid waste in newly constructed disposal units until DEQ has accepted the Construction Certification. If DEQ does not respond to the Construction Certification Report within 30 days of its receipt, the permittee may place waste in the unit.

11.0 RECYCLING REQUIREMENTS

11.1 Materials

The permittee must provide a place for receiving the following recyclable materials:

☒	ferrous scrap metal	☒	mixed paper
☒	motor oil	☒	non-ferrous scrap metal (including aluminum)

☒	newspaper	☒	corrugated cardboard and kraft paper (brown paper bags)
☒	container glass	☒	tin cans

11.2 Receiving location

The place for receiving recyclable material must be located at the disposal site or at another location more convenient to the population served by the disposal site. The recycling center must be available to every person whose solid waste enters the disposal site.

11.3 Material use

All source separated recyclable materials must be reused or recycled.

11.4 Recycling information

The permittee must provide, to disposal site users, the following recycling information on printed handbills:

- The on-site or off-site location of the recycling center
- The recycling center's hours of operation
- A list of acceptable materials for recycling
- Instructions for preparing source separated recyclable material
- Reasons why people should recycle

11.5 Sign

A prominently displayed sign must indicate the following:

- The availability of recycling at the disposal site or another location

Note: The sign must indicate the recycling center location, if not at the disposal site

- The materials accepted at the recycling center
- The recycling center's hours of operation (if different than disposal site hours)

11.6 Storage

Unless DEQ approves otherwise, all recyclable materials, except car bodies, white goods and other bulky items must be stored in containers.

SITE CLOSURE

12.0 CLOSURE CONSTRUCTION AND MAINTENANCE

12.1 Worst-case closure plan development

Within 90 days of permit issuance, the permittee must develop a conceptual "worst-case" closure plan and a conceptual post-closure plan(s), obtain DEQ approval of the plan(s), and maintain up-to-date copies of these plan(s) in the facility file.

Reference: The plans must comply with 40 CFR, Part 258, Subpart F, and OAR 340-094-0110.

12.2 Notification

The permittee must notify DEQ and receive DEQ approval when the conceptual "worst-case" closure and conceptual post-closure care plans are updated and placed in the file.

12.3 Closure permit

In accordance with OAR 340-094-0100, the permittee must apply for a closure permit at least five years prior to the landfill's anticipated final closure.

12.4 Closure plan approval

At least six months prior to final closure of any portion of the landfill, the permittee must submit detailed engineering plans, specifications, and a closure schedule to DEQ for review and approval.

The design plans must be prepared and stamped by a qualified professional engineer with a current Oregon registration and specify and/or provide the following:

- All applicable performance criteria, construction material properties and characteristics, dimensions and slopes
- The design basis and all relevant engineering analyses and calculations

Reference: The *Solid Waste Landfill Guidance, September 1996,* describes Closure Plan preparation. Following that format will expedite DEQ review of the plan.

12.5 Closure schedule

The permittee must initiate and complete closure of each landfill disposal unit in accordance with 40 CFR 258.60(f)&(g), or an alternate schedule approved by DEQ.

12.6 Final cover

Unless DEQ approves otherwise, the final landfill cover must be:

- At least three feet thick {OAR 340-094-0120(2)(a)}
- Designed to minimize infiltration of precipitation as required by 40 CFR Part 258.60
- Graded to compensate for estimated differential settlement and maintain positive drainage. Final (post-settlement) slopes must range between two percent and 30 percent.

12.7 Vegetation

The permittee must establish and maintain a dense, healthy growth of native vegetation over the closed areas of the landfill consistent with the proposed final use.

12.8 Final cover maintenance.

The permittee must maintain the final surface contours of the landfill cover such that:

- Erosion is minimized and ponding of water is prevented
- The integrity of the cover system is preserved in accordance with the approved plans

The permittee must reconstruct the cover system with approved materials and grade and seed all areas that have settled or where water ponds, and all areas where the cover soil has been damaged or thinned by cracking or erosion. Areas where vegetation has not been fully established shall be fertilized, re-seeded and maintained. Any damage repair or other reconstruction of a geomembrane barrier component in the final cover system shall be conducted in accordance with a construction quality assurance plan approved by the DEQ.

12.9 Slope stability

The permittee must maintain the stability of the landfill slopes and the overall structural integrity of the landfill.

12.10 Deed record

Within 30 days after the disposal site's final closure, the permittee must record a notation on the deed to the facility property as required by 40 CFR 258.60(i) and OAR 340-094-0130(1)(a), and submit a copy of the notation on the deed to DEQ.

13.0 FINANCIAL ASSURANCE

13.1 Financial assurance plan

The permittee must submit an updated financial assurance plan to the DEQ for review and approval and provide financial assurance for the costs of site closure, post-closure care, and potential corrective action. In addition, the permittee must place the plan in the facility file.

Reference: The plan must be prepared in accordance with OAR 340-094-0140. Acceptable mechanisms are described in OAR 340-094-0145.

13.2 Financial assurance required.

The permittee must comply with applicable financial assurance criteria requirements prescribed by OAR 340-094-0140. The permittee must maintain an up-to-date Financial Assurance Plan in the facility Operating Record, and provide financial assurance for landfill closure, post-closure care and, if required, corrective action. The financial assurance provided must:

- Be in the amount required by OAR 340-094-0140(5)
- Be updated, annually, in accordance with OAR 340-094-0140(6)(e)
- Consist of a financial assurance mechanism complying with OAR 340-094-0145

13.3 Recertification of financial assurance.

The permittee must annually review and update their financial assurance in accordance with OAR 340-094-0140(6)(e).

By April 1 of each year, a notarized annual recertification of financial assurance must be submitted to DEQ demonstrating that this review has been completed. If a discount rate is used to estimate costs, the annual update must also include the certifications listed in OAR 340-094-0140(6)(d).

13.4 Use of financial assurance

The permittee must not use the financial assurance for any purpose other than to finance the permitted facility's approved closure, post-closure, and corrective action activities or to guarantee that those activities will be completed.

13.5 Continuous nature

The permittee must continuously maintain financial assurance for the facility until the permittee or other person owning or controlling the site is no longer required by DEQ to demonstrate financial responsibility for closure, post-closure care or corrective action.

ENVIRONMENTAL MONITORING

14.0 SITE CHARACTERIZATION

14.1 Workplan

At least 270 days prior to any new landfill construction or expansion beyond the currently characterized and approved footprint, the permittee must submit two (or more) copies of a detailed workplan to DEQ for review and approval. The workplan must summarize all site characterization completed to date, describe further site characterization that will be accomplished and include at least the following elements:

- A description of the landfill expansion
- A proposal for monitoring all relevant media within the expansion area
- An update to the Environmental Monitoring Plan that reflects all approved changes to the facility
- A detailed description of the planned investigation
- A detailed project schedule

14.2 Site characterization report

Within 180 days of DEQ's approval of the workplan, the permittee must submit at least two copies of the report to DEQ for review and approval. This report must be based on DEQ-approved workplan and any conditions of the approval. The report must be prepared and stamped an Oregon registered geologist or an Oregon registered engineering geologist. The permittee must submit the report and receive DEQ's approval before starting construction or operation of the new landfill area. Once approved, this report and any conditions of approval become an integral part of the permit.

Reference: The *Solid Waste Landfill Guidance, September 1996,* describes the applicable elements of a Site Characterization Report. Organizing the report in that manner will expedite DEQ's review of the plan.

15.0 ENVIRONMENTAL MONITORING PLAN

15.1 Environmental Monitoring Plan Submittal

Within 120 days when requested by DEQ, the permittee must submit an updated Environmental Monitoring Plan to DEQ for approval.

Major changes in updates to the original plan require that the entire plan be submitted as a stand-alone document; at a minimum, this must be done at least once every 10 years. The plan, or any updates to the plan, must be prepared and stamped by an Oregon registered geologist or an Oregon registered engineering geologist. Upon approval, this plan is incorporated into this permit by reference.

15.2 Environmental Monitoring Plan contents

The updated plan must include plans (other than monitoring that is already handled by an NPDES permit) implementing an environmental monitoring program that will characterize potential facility impacts, including leachate collection, containment, treatment and disposal. The updated plan may incorporate parts of the previous approved plan with any changes or additions since that time (i.e., approved permit-specific concentration limits, revised parameter lists, revised schedules and new wells).

The updated plan must include the following contents, as well as applicable elements from the reference document:

- Monitoring Network Design and Construction
- Sampling and Analysis Plan
- Field QA/QC Procedures
- Lab QA/QC Procedures
- Data Analysis and Evaluation
- Report Format and Executive Summary

Reference: The *Solid Waste Landfill Guidance, September 1996,* provides information on applicable elements of an Environmental Monitoring Plan. Following the organizational format provided in the Guidance will expedite DEQ review of the plan.

15.3 Environmental Monitoring Plan revisions and updates

The permittee must revise the current plan as necessary to reflect current and future environmental conditions, facility development and regulatory requirements. A geologist or certified engineering geologist, with current Oregon registration, must prepare and stamp the plan revisions and submit two copies (one printed and one electronic) to DEQ for review and approval.

15.4 Environmental Monitoring Plan public comment period

Plan changes may require a public comment period.

15.5 Long-term monitoring plan

After DEQ approves any Risk-Based Concentration Limits (RBCs), Permit-Specific Concentration Limits (PSCLs), Concentration Limit Variances (CLVs), Action Limits (ALs), or Site-Specific Limits (SSLs), the permittee must update the EMP to reflect the long-term monitoring program and submit the updated plan for DEQ review and approval.

Note: Also see this permit's requirements for establishing PSCLs, ALs, or SSLs and OAR 340-040-0030(4) for procedures to establish CLVs.

15.6 Leak Detection System

Any significant increase in flow rate in the leak detection system (or degradation of water quality) that have not been corrected (or significant progress made) within two years, also require an updated plan submittal. This plan update is required if a statistical analysis indicates that normal monitoring of detection and compliance sampling points have shown a degradation of water quality. The analysis should cover the period of time from before the changes to after the increased leakage (or degradation of water quality) occurred. The updated plan submittal must detail any proposed increases in frequency or parameter monitoring, as well as any additional monitoring points.

15.7 Additional monitoring points

The permittee must incorporate any new or replacement monitoring point or device into the Environmental Monitoring Plan and submit the updated plan to DEQ for review and approval.

15.8 Environmental Monitoring Plan Compliance

The permittee must conduct all environmental monitoring at the facility in accordance with the approved plan, including any conditions of approval, amendments and updates.

16.0 ENVIRONMENTAL SAMPLING REQUIREMENTS

16.1 Notification of sampling events

The permittee must notify DEQ, in writing, at least 10 working days prior to a scheduled sampling event.

16.2 Split sampling events

The permittee must split samples with DEQ at DEQ's request, and schedule split-sampling events with DEQ's laboratory at least 45 days ahead of time.

Oregon Department of Environmental Quality
Laboratory, Groundwater Monitoring Section
7202 NE Evergreen Parkway, Suite 150
Hillsboro, OR 97124
Phone: 503-693-5700 Fax: 503-693-4999

The permittee must conduct the following split sampling events with DEQ:

Fall or Spring 2024 (TBD)
Fall or Spring 2029 (TBD)
Other sampling events if requested by DEQ

16.3 Monitoring schedule

The permittee must refer to the approved EMP for environmental monitoring procedures. Quarterly monitoring benchmarks are defined below:

If sampling in the...	Schedule the sampling event	
	On, or after....	But on, or before...
Winter	Jan. 1	Feb. 28
Spring	April 1	May 31
Summer	July 1	Aug. 31
Fall	Oct. 1	Nov. 30

16.4 Monitoring after Environmental Monitoring Plan approval

The permittee must monitor the facility in accordance with: 1) the approved plan; 2) any conditions of DEQ's approval; and 3) any DEQ-approved amendments and updates.

16.5 Changes in sampling or split sampling

The permittee must submit a written request and obtain DEQ's written approval before changing the sampling program, including sampling frequency, parameters, or locations. Approved changes will become an integral part of the plan.

DEQ reserves the right to add to or delete from the list of scheduled sampling events, sampling locations, and sampling parameters, and to conduct unscheduled sampling or split sampling events.

If the split-sampling schedule changes, DEQ will try to notify the permittee at least 30 days prior to the next scheduled event.

17.0 ESTABLISHING PERMIT-SPECIFIC CONCENTRATION LIMITS (PSCLs), ACTION LIMITS (ALs), CONCENTRATION LIMIT VARIANCES (CLVs) AND SITE-SPECIFIC LIMITS (SSLs)

17.1 Gathering data

The permittee must monitor the designated background wells in accordance with the approved Environmental Monitoring Plan or propose an alternative intrawell approach. Site specific limits (SSLs) exist for several parameters at two wells and remedial action concentration limits exist for additional parameters at some other wells. Background monitoring shall continue until all necessary data sets have been collected, and may be used for creation of additional PSCLs, ALs and/or SSLs for parameters of concern. The permittee then must demonstrate to DEQ's satisfaction that the selected background-data set is valid and unaffected by facility releases.

17.2 Future disposal units or cells

Before using a new landfill unit or cell for waste disposal, the permittee must collect enough samples to determine background groundwater quality. Alternatively, the permittee may develop a program, to be approved by DEQ, for determining background groundwater quality with wells installed at the time of landfill cell construction.

17.3 Statistical analysis

To establish compliance concentration limits (PSCLs, ALs, and SSLs), the permittee must perform statistical evaluations of the monitoring results for each sampling event.

Use methods outlined in 40 CFR 258.53 or other DEQ accepted statistical methods.

References:

The permittee should use methods outlined in Environmental Protection Agency's "Statistical Analysis of Groundwater Monitoring at RCRA facilities" (March 2009) or other DEQ accepted statistical methods. DEQ's 2011 Guidance Document "Developing Concentration Limits at Permitted Solid Waste Facilities" provides some examples of acceptable methods.

17.4 Proposing PSCLs, ALs, and/or SSLs

The permittee must propose for DEQ's review and approval, a PSCL, AL or SSL pursuant to the guidelines specified in OAR 340-040. The proposal must address all required parameters. Once a statistically valid data set (at least nine acceptable data points) are established from the appropriate background well(s), the permittee may generate a PSCL, AL, or SSL for each designated, long-term monitoring parameter.

17.5 Changing PSCLs, ALs, and/or SSLs

If the permittee demonstrates to DEQ's satisfaction that background groundwater quality has significantly changed since the PSCL, AL or SSL was established, and if the change is unrelated to the permitted facility's influence, the permittee can propose to DEQ a revised level for the affected PSCL(s), AL(s) or SSL(s).

17.6 Establishing and changing CLVs

The permittee should refer to DEQ's Groundwater Quality Protection Rules [OAR 340-040-0030(4)] for guidance in establishing and changing Concentration Limit Variances (CLVs).

18.0 ENVIRONMENTAL MONITORING STANDARDS

18.1 Applicable regulatory standard

The permittee must not allow the release of any substance from the landfill into groundwater, surface water, or any other media which will result in a violation of any applicable federal or state air or water limit, drinking water rules, or regulations, beyond the solid waste boundary of the disposal site or an alternative boundary specified by DEQ. Refer to OAR 340-094-0080.

18.2 Compliance points

Compliance wells are defined in the most current site Environmental Monitoring Plan.

18.3 Review of results

The permittee must review the analytical results after each monitoring event according to the protocols established in the most currently approved site-specific Environmental Monitoring Plan.

18.4 Resampling results

Upon receipt of data from resampling, the permittee must review the analytical results according to the protocols established in the most currently approved site-specific Environmental Monitoring Plan.

18.5 Secondary leachate collection system (SLCS)

If the permittee observes liquids in the leak detection system, the permittee must respond in accordance with the approved plan procedures for sampling, analysis and reporting. If testing confirms landfill impacts

in the leak detection or secondary leachate collection system, and that system is compromised as a compliance point, DEQ may require the permittee to install additional detection or compliance wells and conduct further investigations.

The permittee must design each secondary leachate collection system-equipped landfill cell or sub-unit to allow for discrete sampling of the secondary leachate collection system without mixing, co-mingling or compositing of samples with other leachate sources.

18.6 Methane limits

The methane concentration must not exceed:

- Twenty-five percent of methane's Lower Explosive Limit in onsite structures (excluding gas control structures or gas recovery system components)
- Methane's Lower Explosive Limit at the facility property boundary

Note: Methane's Lower Explosive Limit is equal to a concentration of five percent by volume in air.

18.7 Methane exceedance

If methane levels exceed the specified limits, the permittee must:

1. Take immediate steps to protect human health and safety and notify DEQ within 24 hours
2. Within seven days of detection, confirm the measures taken to protect human health and safety (unless DEQ approves an alternative schedule), and describe the methane test results and response measures in the facility operating record
3. Within 60 days of the methane exceedance, develop and implement a remediation plan, incorporate the plan into the monitoring records, and submit a progress report to DEQ.

18.8 Certified environmental laboratory data

To assure the best possible data quality, DEQ requests that the permittee contract with environmental labs certified under the Oregon Environmental Laboratory Accredited Program (ORELAP) or the National Environmental Laboratory Accreditation Program (NELAP). The permittee should include a copy of the lab's certification with every data submittal. Use of an ORELAP or NELAP approved lab will facilitate DEQ's future review of Environmental Monitoring Plan updates, Annual Environmental Monitoring Reports, and RI/FS documents.

19.0 RECORDKEEPING AND REPORTING – ENVIRONMENTAL MONITORING

19.1 Annual Environmental Monitoring Report (AEMR)

Prior to March 31 of each year, the permittee must submit to DEQ two copies (one paper copy and one electronic copy) of an annual monitoring report for the previous calendar year's monitoring period. The report must conform to the format detailed in the approved plan and be prepared and stamped by a geologist or a certified engineering geologist, with current Oregon registration. Extensive ancillary information such as laboratory reports, and the historical analytical database, may be provided only in the electronic copy and not in the printed copy.

Note: The permittee should submit two-sided copies of all reports and may submit electronic submittals of reports.

19.2 Statement of compliance

The Annual Environmental Monitoring Report must include a brief (approximately one-page) cover letter that:

- Compares the analytical results with the relevant monitoring standards (RBCs, PSCLs, CLVs, ALs, or SSLs)
- Documents any exceedances of or federal or state standards for relevant media
- Documents any significant change in water quality, land quality, air quality or methane levels in monitored media

19.3 Annual Environmental Monitoring Report contents

The Annual Environmental Monitoring Report must reflect the facility's current conditions, present accurate data that correspond with the original field and lab data, and include the elements presented in the most recently approved plan.

19.4 Annual leachate treatment report

Prior to March 31 of each year, the permittee must submit an annual leachate monitoring report.

Reference: The report format should reflect DEQ's guidance: *Solid Waste Landfill Guidance*, September 1996, or the format presented in the most recently approved plan.

19.5 Annual leachate treatment report contents

This annual report must include the elements presented in the most recently approved plan.

Reference: The report format should reflect DEQ's guidance: *Solid Waste Landfill Guidance*, September 1996, or the format presented in the most recently approved plan.

19.6 Split sampling submittal

Within 90 days of any split sampling event, the permittee must submit the following information to DEQ's laboratory:

- A copy of all information pertinent to the sample collection handling, transport and storage, including field notes
- Copies of all laboratory analytical reports
- Copies of all laboratory Quality Assurance Quality Control reports
- A copy of the lab certification (ORLAP or NVLAP, see Certified Environmental Lab Data condition above)
- A hydrogeologic map of the site showing groundwater flow directions and water table contours
- Any other data or reports requested by DEQ

19.7 Lab address

Report all required split sampling information to:

Oregon Department of Environmental Quality
Laboratory, Groundwater Monitoring Section
7202 NE Evergreen Parkway, Suite 150
Hillsboro, OR 97124

Phone: 503-693-5700 Fax: 503-693-4999

19.8 DEQ response to split samples

If the permittee submits all required split sampling data and requests DEQ's results, DEQ's lab may provide, to the permittee, copies of the following information:

- DEQ's analysis of the split sample
- The QA/QC report
- The analytical report
- The field data sheets

20.0 ENVIRONMENTAL MONITORING NETWORK

20.1 Monitoring device installation

For future disposal units or cells, the permittee must install DEQ-approved background and detection and/or compliance wells at least 12 months before refuse disposal occurs in the new cells. A Site Characterization Report may also be required for any proposed new cell. DEQ may waive or modify this requirement if the permittee provides adequate justification for an alternative approach.

20.2 Monitoring stations and equipment

To assure that every sample is representative of the site's environmental conditions, the permittee must protect, operate, and maintain all environmental monitoring stations and equipment in accordance with DEQ's requirements.

20.3 Access to monitoring stations and equipment

To facilitate sample collection and/or inspection and maintenance activities, the permittee must maintain reasonable all-weather access to all monitoring stations and associated equipment.

20.4 Reporting equipment damage

Within 14 days of discovering any damaged monitoring equipment or station, the permittee must submit to DEQ a report describing the damage, the proposed repair or replacement measures, and the schedule to complete this work.

Example: a well's impaired function or altered position/location.

20.5 Monitoring well construction

The permittee must complete any monitoring well or gas monitoring probe abandonment (decommissioning), replacement, repair, or installation in a manner that complies with the Water Resources Rules, OAR 690-240, and with DEQ's *Guidelines for Groundwater Monitoring Well Drilling, Construction, and Decommissioning*, dated August 1992.

20.6 Reporting well construction and repairs

The permittee must document all monitoring well or gas probe repair and construction activities, including driller's logs, well location information, and construction information in a report prepared and stamped by a geologist or certified engineering geologist, with current Oregon registration. The permittee must submit the report to DEQ within 30 days of the action and include this documentation in the next Annual Environmental Monitoring Report.

20.7 Well decommissioning or replacement

The permittee must submit a written recommendation to DEQ prior to decommissioning or replacing any well or gas monitoring probe in the monitoring network. After receiving DEQ's approval, the permittee must decommission or replace any well or gas probe that meets the following criteria:

- The well or gas probe was installed in a borehole that hydraulically intersects two saturated stratas
- The permittee lacks supporting documentation demonstrating that the well or gas probe was properly installed and constructed
- The well or gas probe was damaged beyond repair or destroyed
- Other reasons as determined by either the permittee or DEQ

COMPLIANCE SCHEDULE

21.0 SUMMARY OF DUE DATES

21.1 Summary

The permittee must comply with the event-driven schedule shown below. This compliance schedule does not apply to many of the routine reporting requirements specified in other sections of the permit.

Due Date	Activity	See section...
120 days prior to new landfill construction or expansion	Submit updated Environmental Monitoring Plan	15.1 Environmental Monitoring Plan submittal
Within 90 days of permit issuance	Review and submit conceptual "worst-case" closure and post closure plan	12.1 Worst case closure plan development

April 1st of each year	Submit financial assurance plan and mechanism	13.3 Recertification of financial assurance
Within 360 days of permit issuance	Review and submit site development plan update	10.1 Site development plan
Within 270 days of permit issuance	Submit updated Operations Plan	7.1 Operations plan submittal
Within 60 days of Operations Plan approval	Submit updated Operations and Maintenance Manual	7.3 Operations and Maintenance Manual
By March 31 for each year	Submit an Annual Environmental Monitoring Report	19.1 Annual Environmental Monitoring Plan
By March 31 for each year	Submit an Annual Leachate Treatment Report	19.4 Annual leachate treatment report
SAMPLING:		
At least 10 working days prior to scheduled sampling event	Notify DEQ	16.1 Notification of sampling events
At least 45 days prior to split sampling event	Schedule split sampling event with DEQ laboratory	16.2 Split sampling events
Within 90 days of split sampling event	Submit required data/documents to DEQ laboratory	19.6 Split sampling submittal
EVENTS:		
Within 30 days of DEQ notification of need to install monitoring well or probe	Install groundwater monitoring well and/or probe	20.1 Monitoring device Installation
Within 30 days of any well construction	Submit well construction report	20.6 Reporting well construction and repairs
At least 6 months before any new disposal unit and/or closure construction	Submit engineering design plans and, if applicable, closure schedule	10.3 Design plans 12.4 Closure plan approval
At least 270 days prior to new construction or expansion	Submit a Site Characterization Report Workplan	14.1 Workplan
Within 180 days of DEQ approval of SCR workplan	Submit a Site Characterization Report	14.2 Site characterization report
Within 90 days after completion of any major construction	Submit Construction Certification Report	10.7 Construction report submittal
Within 18 months of plan approval	Begin construction	10.4 Construction requirements

ATTACHMENTS

22.0 ATTACHMENT

Attachments to the permit include:

Number	Description
1	Parameter Groups
2	Permit-specific concentration limits

22.1 Attachment 1: Parameter Groups

Overview

This attachment describes the environmental-monitoring parameter groups and associated requirements

Due to the duration of this permit, suggested analytical methods may change. If that is the case, use the most currently promulgated EPA method or DEQ-approved equivalent.

Note: Method means EPA SW 846 Method [suggested methods are in square brackets].

Group 1a: Field indicators

The field indicators parameter group includes the following parameters:

Elevation of water level	Specific Conductance
pH	Dissolved Oxygen
Temperature	Eh

With instruments calibrated to relevant standards, measure these parameters in the field when collecting samples. Acceptable methods include:

- Down-hole in situ
- In a flow-through well
- Immediately following sample recovery

Group 1b: Leachate indicators

The laboratory indicators parameter group includes the following parameters:

Total Dissolved Solids (TDS)
Total Suspended Solids (TSS)
Total Organic Carbon (TOC)
Chemical Oxygen Demand (COD)

Proper techniques for sample handling, preservation, and analysis are specific to each individual analyte: Follow appropriate EPA techniques or AWWA Standard Methods.

Group 2a: Common anions and cations

The common anions and cations parameter group includes the following parameters:

Calcium (Ca)	Manganese (Mn)
Sulfate (SO_4)	Magnesium (Mg)
Total Ammonia (NH_3+NH_4)	Chloride (Cl)
Sodium (Na)	Carbonate (CO_3)
Nitrate (NO_3)	Potassium (K)
Silicon (Si)	Bicarbonate (HCO_3)
Iron (Fe)	

Dissolved concentrations must be measured. Field-filter and field-preserve samples according to standard DEQ and/or EPA guidelines and analyze by appropriate EPA or AWWA Standard Methods techniques. Report results in mg/L and meq/L.

Group 2b: Trace metals

The trace metals parameter group includes the following parameters:

Antimony (Sb)	Chromium (Cr)	Selenium (Se)
Arsenic (As)	Cobalt (Co)	Silver (Ag)
Barium (Ba)	Copper (Cu)	Thallium (Tl)
Beryllium (Be)	Lead (Pb)	Vanadium (V)
Cadmium (Cd)	Nickel (Ni)	Zinc (Zn)

If the Total Suspended Solids concentration is...	analyze for...
less than or equal to 100.0 mg/L in the sample	total concentrations (unfiltered)
Greater than 100.0 mg/L in the sample	both total (unfiltered) and dissolved (field-filtered)

Field-preserve samples according to standard DEQ and/or EPA guidelines and analyze by EPA Method 6010C or DEQ-approved equivalent.

Group 3: Volatile organic constituents

Analyze for all compounds detectable by EPA Method 8260B (C- other method 8/06) or EPA Method 524.2, include a library search to identify any unknown compounds present. The volatile-organic-compounds parameter group is equivalent to the EPA Method 8260B list.

DEQ must pre-approve alternative methods like EPA Method 8021B

Group 4: Assessment monitoring

The assessment monitoring parameter group includes the following parameters:

Semi-volatile Organic Constituents, including Phenols, EPA Method 8270D
Mercury, EPA Method 7470A
Cyanide, EPA Method 9010C (manual distillation) or 9012B (automated distillation)
Nitrite

All Method 8270D analyses must include a library search to identify any unknown compounds present.

Group 5: Surface water and leachate

The surface water parameter group includes the following parameters:

Total Kjeldahl Nitrogen (TKN)	Total Coliform Bacteria [EPA Method 9131]
Total Phosphorus (P)	Fecal Coliform Bacteria [EPA Method 9131]
Orthophosphate (PO_4)	E. Coli
Biological Oxygen Demand (BOD)	

22.2 Attachment 2: Remedial Action Concentration Limits and Permit Specific Concentration Limits

In accordance with OAR 340-040-0050(2) and as defined in the site Record of Decision (dated October 2004); Remedial Action Concentration Limits are established for the "west side" monitoring points specified in Section 18.2 of this permit as follows:

Compound	RACL	Basis	COPC
Volatile Organic Compounds (µg/L)			
1,4-Dichlorobenzene (1,4-DCB)	75	MCL/RL	Yes
Tetrachloroethene (PCE)	5	MCL	Yes
Trichloroethene (TCE)	5	MCL/RL	Yes
Vinyl chloride	2	MCL/RL	Yes
Trace Metals (µg/L)			
Antimony	6	MCL	No
Arsenic	10	MCL	Yes
Barium	1,000	RL	No
Beryllium	4	MCL	No
Cadmium	5	MCL	Yes
Chromium	50	RL	No
Lead	50	RL	No
Nickel	100	MCL	No
Selenium	10	RL	No
Silver	50	RL	No
Thallium	2	MCL	No
Dissolved Metals (µg/L)			
Iron	300	SMCL	Yes
Manganese	50	SMCL	Yes
Inorganic Compounds (mg/L)			
Chloride	250	SMCL	Yes
Total Dissolved Solids (TDS)	500	SMCL	Yes

RACL: Remedial Action Concentration Limit

Basis: The lower of either Federal primary Maximum Contaminant Level (MCL) or State Reference Level (OAR 340-040-0020, Tables 1 through 3).

SMCL: Secondary MCL

COPC: Chemical of Potential Concern

In accordance with Section 17 of this permit, Permit-Specific Concentration Limits are established for the "east side" monitoring points specified in Section 18.2 of this permit as follows:

Site Specific Limits for MW 26 and 27
Assumes 2 Compliance Wells, 7 or 8 COCs, Semiannual Sampling

Indicator Parameters (Date set: 2011-2018)	Statistical Distribution	Prediction Limits (mg/L)		Retesting
		MW-26	MW-27	
Bicarbonate	Normal	175[a]	495	1 of 2
Chloride	Normal	6.2	15.0	1 of 2
TDS	Normal	246[a]	499	1 of 2
Calcium	Normal	32.0[a]	100	1 of 2
Iron	NP/Normal	4.5	17.6	1 of 2
Magnesium	Normal	10.1	46.0	1 of 2
Manganese	Normal	0.74	8.9	1 of 2
Sodium	Normal	30.0	44.4	1 of 2

Note: [a] surrogate value calculated from MW-22.
Retesting scenario achieves annual site wide false positive rate of 10% per EPA Unified guidance.

APPENDIX I.2

NPDES WASTE DISCHARGE PERMIT # 101545

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
WASTE DISCHARGE PERMIT

Oregon Department of Environmental Quality
Western Region - Salem Office
750 Front St. NE, Suite 120, Salem, OR 97301-1039
Telephone: (503) 378-8240

Issued pursuant to ORS 468B.050 and The Federal Water Pollution Control Act (The Clean Water Act)

ISSUED TO:

Valley Landfills, Inc.
28972 Coffin Butte Rd.
Corvallis, OR 97330

SOURCES COVERED BY THIS PERMIT:

Type of Wastewater	Outfall Number	Outfall Location
Treated landfill leachate and gas plant condensate	001	Internal outfall at reverse osmosis system
	002	Internal outfall at permeate storage pond
	003	Roadside ditch to Soap Creek Tributary RM 4.4

FACILITY TYPE AND LOCATION:

Municipal Landfill

Coffin Butte Landfill
28972 Coffin Butte Rd.
Corvallis, OR 97330

RECEIVING STREAM INFORMATION:

WRD Basin: Willamette
USGS Sub-Basin: Upper Willamette
Stream: Soap Creek Tributary
LLID: 1231642447264 - 4.4 - I
County: Benton

EPA REFERENCE #: OR004363-0

Issued in response to Application No. 973361 received April 1, 2008. This permit is issued based on the land use findings in the permit record.

Steve Schnurbusch, Acting Water Quality Manager
Western Region North

10/17/12
Issuance Date

11/6/12
Effective Date

PERMITTED ACTIVITIES

Until this permit expires or is modified or revoked, the permittee is authorized to: 1) construct, install, modify, or operate a wastewater collection, treatment, control and disposal system; and 2) discharge treated wastewater to waters of the state only from the authorized discharge point or points in Schedule A in conformance with the requirements, limits, and conditions set forth in this permit.

Unless specifically authorized by this permit, by another NPDES or WPCF permit, or by Oregon statute or administrative rule, any other direct or indirect discharge of pollutants to waters of the state is prohibited.

SCHEDULE A
Waste Discharge Limits

1. The permittee must comply with the effluent limits as indicated in the following tables.

a. **Table A1** - Outfall Number 001 (Discharge From Polishing Reverse Osmosis System)

Parameter	Monthly Average (mg/L)	Daily Maximum (mg/L)
BOD_5	37	140
TSS	27	88
Alpha Terpineol	0.016	0.033
Benzoic Acid	0.071	0.12
P-Cresol	0.014	0.025
Phenol	0.015	0.0026
E. coli. Bacteria[1]	Monthly geometric mean may not exceed 126 organisms per 100 ml. No single sample may exceed 406 organisms per 100 ml.	
[1]No single sample may exceed 406 organisms per 100 ml; however, no violation has occurred if the permittee takes at least 5 consecutive re-samples at 4-hour intervals beginning within 48 hours after the original sample was taken and the log mean of the 5 re-samples is less than or equal to 126 *E. coli* organisms per 100 ml.		

b. **Table A2** - Outfall Number 002 (Permeate Storage Pond Discharge)

Parameter	Monthly Average (µg/l)	Daily Maximum (µg/l)
Cadmium	0.38	0.65
Chromium VI	9.2[1]	16
Copper	2.8[1]	4.8[1]
Lead	0.54[1]	0.93[1]
Zinc	21	36
pH	Must be within the range 6.5 - 8.5 S.U.	
[1]When the copper limitation is lower than 10 µg/l, the DEQ will use 10 µg/l as the compliance evaluation level; that is, daily maximum concentrations and monthly average concentrations at or below 10 µg/l will be considered in compliance with the limit. When the chromium monthly average limitation is lower than 10 µg/l, the DEQ will use 10 µg/l as the compliance evaluation level. When the lead limitation is lower than 5 µg/l, the DEQ will use 5 µg/l as the compliance evaluation level.		

c. **Table A3** - Outfall Number 003 (Discharge to roadside ditch)

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Ammonia-N	1.7	2.5
TDS	100	150
TSS	30	45
Chloride	230	380

2. **Effect of a permit**
No wastes may be discharged or activities conducted that cause or contribute to a violation of water quality standards in OAR 340 Division 41 applicable to the Willamette Basin except as provided for in OAR 340-045-0080.

3. **Groundwater Protection**
The permittee may not conduct any activities that could cause an adverse impact on existing or potential beneficial uses of groundwater. All wastewater and process related residuals must be managed and disposed of in a manner that will prevent a violation of the Groundwater Quality Protection Rules (OAR Chapter 340, Division 40).

4. **Septage Requirements**
Septage may not be accepted at this facility for treatment or processing without written approval from DEQ.

SCHEDULE B
Minimum Monitoring and Reporting Requirements

1. **Monitoring and Reporting Protocols**

a. Quality Assurance and Quality Control (QA/QC)

See Schedule F, Section C, Monitoring and Records for further instruction on proper sampling techniques and test methods and the use of laboratories with QA/QC procedures.

b. Re-analysis and Re-sampling if QA/QC Requirements Not Met

If QA/QC requirements are not met for any analysis, the permittee must have the sample re-analyzed. If the sample cannot be re-analyzed, the permittee must re-sample at the earliest available opportunity.

c. Reporting Procedures

i. Quantitation Limits (QL)

The QL must be reported along with any resulted reported as "nondetect" or "ND". The QL is the Method Reporting Limit (MRL) or Limit of Quantitation (LOQ). It is the lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration for the analyte. It is equivalent to the concentration of the lowest calibration standard assuming that all method-specified sample weights, volumes, and cleanup procedures have been employed

2. **Effluent Monitoring Requirements**

The permittee must monitor effluent for Outfalls 001, 002, and 003 as listed below.

a. **Table B1** - Outfall Number 001 (Discharge From Polishing Reverse Osmosis System)

Item or Parameter	Minimum Frequency	Sample Type
E. coli Bacteria (#/100 mL)	2/month	Grab
BOD_5 (mg/l)	Monthly	Grab
TSS (mg/l)	Monthly	Grab
Alpha Terpineol (mg/l)	Monthly	Grab
Benzoic Acid (mg/l)	Monthly	Grab
P-Cresol (mg/l)	Monthly	Grab
Phenol (mg/l)	Monthly	Grab

b. **Table B2** - Outfall Number 002 (Permeate Storage Pond Discharge)

Item or Parameter	Minimum Frequency	Sample Type
Cadmium (µg/l)	Monthly	Grab
Chromium VI (µg/l)	Monthly	Grab
Copper (µg/l)	Monthly	Grab
Lead (µg/l)	Monthly	Grab
Zinc (µg/l)	Monthly	Grab
pH (S.U.)	Daily	Grab
Specific Conductance	Daily	Grab
Dioxin (2,3,7,8-TCDD)	Annual	Grab

c. **Table B3** - Outfall Number 003 (Discharge to roadside ditch)

Item or Parameter	Minimum Frequency	Sample Type
Total Flow (MGD)	Daily	Measurement
Flow Meter Calibration	Daily	Verification
Ammonia-N (NH3-N)	Monthly	Grab
Chloride (mg/l)	Monthly	Grab
TSS (mg/l)	2/month	24-hour composite
TDS (mg/l)	2/month	24-hour composite
TKN	Monthly	Grab
Temperature (°C)	Weekly	Grab

3. **Minimum Reporting Requirements**

The permittee must report monitoring results as listed below.

Table B4 – Reporting Requirements and Due Dates

Reporting Requirement	Frequency	Due Date	Report Form	Submit to:
1. Table B1, B2, & B3: Effluent Monitoring, p. 5	Monthly	15th day of the month following data collection	DEQ-approved discharge monitoring report (DMR) form.	DEQ Regional Office

4. **Reopener**

a. After one year of operation, the DEQ will reevaluate the monitoring requirements, and may modify this permit to include new limitations, increase or decrease monitoring requirements, and/or conditions as determined by the DEQ to be appropriate, and in accordance with procedures outlined in Oregon Administrative Rules, Chapter 340, Division 45.

SCHEDULE D
Special Conditions

1. **Wastewater Solids**
   a. Transfers
      i. *Within state.* The permittee may transfer wastewater solids to another facility permitted to process or dispose of wastewater solids, including but not limited to, another wastewater treatment facility, landfill, or incinerator. The permittee must monitor, report, and dispose of solids as required under the permit of the receiving facility.
      ii. *Out of state.* If wastewater solids, including Class A and Class B biosolids, are transferred out of state for use or disposal, the permittee must obtain written authorization from DEQ, meet Oregon requirements for the use or disposal of wastewater solids, notify in writing the receiving state of the proposed use or disposal of wastewater solids, and satisfy the requirements of the receiving state.

   b. Acceptance
      i. *Within state.* The permittee may accept wastewater solids from another wastewater treatment facility. The permittee must monitor, report, and dispose of solids as required by this permit.
      ii. *Out of state.* The permittee may accept wastewater solids from out-of-state facilities for treatment and land application when authorized in writing by DEQ provided the pollutant concentrations in the out-of-state solids do not exceed the ceiling concentration limits.

2. **Spill Response Plan**
   The permittee must have an up-to-date spill response plan for prevention and handling of spills and unplanned discharges. The spill response plan must include the following:
   a. A description of the reporting system that will be used to alert responsible managers and legal authorities in the event of a spill.
   b. A description of preventive measures and facilities (including an overall facility plot showing drainage patterns) to prevent, contain, or treat spills of these materials.
   c. A description of the permittee's training program to ensure that employees are properly trained at all times to respond to unplanned and emergency incidents.
   d. A description of the applicable reporting requirements. These must be consistent with the reporting requirements found in Schedule F, condition D.5.

3. Prior to constructing or modifying any wastewater control facilities, detailed plans and specifications shall be approved in writing by the DEQ. After approval of the plans, all construction shall be in strict conformance with the plans unless otherwise approved in writing by the DEQ.

4. An environmental supervisor shall be designated to coordinate and carry out all necessary functions related to maintenance and operation of waste collection, treatment, and disposal facilities. This person must have access to all information pertaining to the generation of wastes in the various process areas.

5. The permittee will conduct weekly inspections of the land application site during application. The system will be checked for proper operation of sprinklers, and the application area will be checked for evidence of erosion. Problems will be corrected immediately. The findings will be recorded along with any remedial actions taken. The inspection log will be kept at the site and made available to the DEQ upon request.

6. Prior to initial discharge of effluent through irrigation to the ditch, a pilot test will be conducted to ensure that the treatment system is capable of producing effluent that will meet discharge limitations and a copy of the report will be submitted to the DEQ for approval and no discharge shall occur until final approval occurs. By no later than ninety days prior to commencement of operation of the system, the permittee must submit to the DEQ a copy of the pilot test for DEQ approval.

7. By no later than ninety days prior to commencement of operation of the system, the permittee must submit to the DEQ for approval a final Operation and Maintenance Manual for the leachate treatment facility.

SCHEDULE F
General Conditions

SECTION A. STANDARD CONDITIONS

A1. Duty to Comply with Permit

The permittee must comply with all conditions of this permit. Failure to comply with any permit condition is a violation of Oregon Revised Statutes (ORS) 468B.025 and the federal Clean Water Act and is grounds for an enforcement action. Failure to comply is also grounds for DEQ to terminate, modify and reissue, revoke, or deny renewal of a permit.

A2. Penalties for Water Pollution and Permit Condition Violations

The permit is enforceable by DEQ or EPA, and in some circumstances also by third-parties under the citizen suit provisions 33 USC § 1365. DEQ enforcement is generally based on provisions of state statutes and Environmental Quality Commission (EQC) rules, and EPA enforcement is generally based on provisions of federal statutes and EPA regulations.

ORS 468.140 allows DEQ to impose civil penalties up to $10,000 per day for violation of a term, condition, or requirement of a permit. The federal Clean Water Act provides for civil penalties not to exceed $32,500 and administrative penalties not to exceed $11,000 per day for each violation of any condition or limitation of this permit.

Under ORS 468.943, unlawful water pollution, if committed by a person with criminal negligence, is punishable by a fine of up to $25,000, imprisonment for not more than one year, or both. Each day on which a violation occurs or continues is a separately punishable offense. The federal Clean Water Act provides for criminal penalties of not more than $50,000 per day of violation, or imprisonment of not more than 2 years, or both for second or subsequent negligent violations of this permit.

Under ORS 468.946, a person who knowingly discharges, places, or causes to be placed any waste into the waters of the state or in a location where the waste is likely to escape into the waters of the state is subject to a Class B felony punishable by a fine not to exceed $250,000 and up to 10 years in prison per ORS chapter 161. The federal Clean Water Act provides for criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment of not more than 3 years, or both for knowing violations of the permit. In the case of a second or subsequent conviction for knowing violation, a person is subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both.

A3. Duty to Mitigate

The permittee must take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment. In addition, upon request of DEQ, the permittee must correct any adverse impact on the environment or human health resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

A4. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and have the permit renewed. The application must be submitted at least 180 days before the expiration date of this permit.

DEQ may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date.

A5. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause including, but not limited to, the following:

a. Violation of any term, condition, or requirement of this permit, a rule, or a statute.
b. Obtaining this permit by misrepresentation or failure to disclose fully all material facts.

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.
d. The permittee is identified as a Designated Management Agency or allocated a wasteload under a total maximum daily load (TMDL).
e. New information or regulations.
f. Modification of compliance schedules.
g. Requirements of permit reopener conditions.
h. Correction of technical mistakes made in determining permit conditions.
i. Determination that the permitted activity endangers human health or the environment.
j. Other causes as specified in 40 CFR §§ 122.62, 122.64, and 124.5.

The filing of a request by the permittee for a permit modification, revocation or reissuance, termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

A6. Toxic Pollutants
The permittee must comply with any applicable effluent standards or prohibitions established under Oregon Administrative Rules (OAR) 340-041-0033 and 307(a) of the federal Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the federal Clean Water Act within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

A7. Property Rights and Other Legal Requirements
The issuance of this permit does not convey any property rights of any sort, or any exclusive privilege, or authorize any injury to persons or property or invasion of any other private rights, or any infringement of federal, tribal, state, or local laws or regulations.

A8. Permit References
Except for effluent standards or prohibitions established under section 307(a) of the federal Clean Water Act and OAR 340-041-0033 for toxic pollutants, and standards for sewage sludge use or disposal established under section 405(d) of the federal Clean Water Act, all rules and statutes referred to in this permit are those in effect on the date this permit is issued.

A9. Permit Fees
The permittee must pay the fees required by OAR.

SECTION B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

B1. Proper Operation and Maintenance
The permittee must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

B2. Need to Halt or Reduce Activity Not a Defense
For industrial or commercial facilities, upon reduction, loss, or failure of the treatment facility, the permittee must, to the extent necessary to maintain compliance with its permit, control production or all discharges or both until the facility is restored or an alternative method of treatment is provided. This requirement applies, for example, when the primary source of power of the treatment facility fails or is reduced or lost. It is not a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

B3. Bypass of Treatment Facilities
a. Definitions

(1) "Bypass" means intentional diversion of waste streams from any portion of the treatment facility. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, provided the diversion is to allow essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs b and c of this section.

(2) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Prohibition of bypass.

(1) Bypass is prohibited and DEQ may take enforcement action against a permittee for bypass unless:

i. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

ii. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventative maintenance; and

iii. The permittee submitted notices and requests as required under General Condition B3.c.

(2) DEQ may approve an anticipated bypass, after considering its adverse effects and any alternatives to bypassing, when DEQ determines that it will meet the three conditions listed above in General Condition B3.b(1).

c. Notice and request for bypass.

(1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, a written notice must be submitted to DEQ at least ten days before the date of the bypass.

(2) Unanticipated bypass. The permittee must submit notice of an unanticipated bypass as required in General Condition D5.

B4. Upset

a. Definition. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operation error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation.

b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of General Condition B4.c are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1) An upset occurred and that the permittee can identify the causes(s) of the upset;

(2) The permitted facility was at the time being properly operated;

(3) The permittee submitted notice of the upset as required in General Condition D5, hereof (24-hour notice); and

(4) The permittee complied with any remedial measures required under General Condition A3 hereof.

d. Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

B5. Treatment of Single Operational Upset

For purposes of this permit, a single operational upset that leads to simultaneous violations of more than one pollutant parameter will be treated as a single violation. A single operational upset is an exceptional incident that causes simultaneous, unintentional, unknowing (not the result of a knowing act or omission), temporary noncompliance with more than one federal Clean Water Act effluent discharge pollutant parameter. A single operational upset does not include federal Clean Water Act violations involving discharge without a NPDES

permit or noncompliance to the extent caused by improperly designed or inadequate treatment facilities. Each day of a single operational upset is a violation.

B6. Public Notification of Effluent Violation

If effluent limitations specified in this permit are exceeded or an overflow occurs that threatens public health, the permittee must take such steps as are necessary to alert the public, health agencies and other affected entities (for example, public water systems) about the extent and nature of the discharge in accordance with the notification procedures developed under General Condition B7. Such steps may include, but are not limited to, posting of the river at access points and other places, news releases, and paid announcements on radio and television.

B7. Emergency Response and Public Notification Plan

The permittee must develop and implement an emergency response and public notification plan that identifies measures to protect public health from bypasses or upsets that may endanger public health. At a minimum the plan must include mechanisms to:

a. Ensure that the permittee is aware (to the greatest extent possible) of such events;
b. Ensure notification of appropriate personnel and ensure that they are immediately dispatched for investigation and response;
c. Ensure immediate notification to the public, health agencies, and other affected entities (including public water systems). The response plan must identify the public health and other officials who will receive immediate notification;
d. Ensure that appropriate personnel are aware of and follow the plan and are appropriately trained;
e. Provide emergency operations; and
f. Ensure that DEQ is notified of the public notification steps taken.

B8. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters must be disposed of in such a manner as to prevent any pollutant from such materials from entering waters of the state, causing nuisance conditions, or creating a public health hazard.

SECTION C. MONITORING AND RECORDS

C1. Representative Sampling

Sampling and measurements taken as required herein must be representative of the volume and nature of the monitored discharge. All samples must be taken at the monitoring points specified in this permit, and must be taken, unless otherwise specified, before the effluent joins or is diluted by any other waste stream, body of water, or substance. Monitoring points must not be changed without notification to and the approval of DEQ.

C2. Flow Measurements

Appropriate flow measurement devices and methods consistent with accepted scientific practices must be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices must be installed, calibrated and maintained to insure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected must be capable of measuring flows with a maximum deviation of less than ± 10 percent from true discharge rates throughout the range of expected discharge volumes.

C3. Monitoring Procedures

Monitoring must be conducted according to test procedures approved under 40 CFR part 136 or, in the case of sludge use and disposal, approved under 40 CFR part 503 unless other test procedures have been specified in this permit.

C4. Penalties of Tampering

The federal Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit may, upon conviction, be punished by a fine of not more than $10,000 per violation, imprisonment for not more than two years, or both.

If a conviction of a person is for a violation committed after a first conviction of such person, punishment is a fine not more than $20,000 per day of violation, or by imprisonment of not more than four years, or both.

C5. Reporting of Monitoring Results

Monitoring results must be summarized each month on a discharge monitoring report form approved by DEQ. The reports must be submitted monthly and are to be mailed, delivered or otherwise transmitted by the 15th day of the following month unless specifically approved otherwise in Schedule B of this permit.

C6. Additional Monitoring by the Permittee

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR part 136 or, in the case of sludge use and disposal, approved under 40 CFR part 503 or as specified in this permit, the results of this monitoring must be included in the calculation and reporting of the data submitted in the discharge monitoring report. Such increased frequency must also be indicated. For a pollutant parameter that may be sampled more than once per day (for example, total residual chlorine), only the average daily value must be recorded unless otherwise specified in this permit.

C7. Averaging of Measurements

Calculations for all limitations that require averaging of measurements must utilize an arithmetic mean, except for bacteria which must be averaged as specified in this permit.

C8. Retention of Records

Records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities must be retained for a period of at least 5 years (or longer as required by 40 CFR part 503). Records of all monitoring information including all calibration and maintenance records, all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit and records of all data used to complete the application for this permit must be retained for a period of at least 3 years from the date of the sample, measurement, report, or application. This period may be extended by request of DEQ at any time.

C9. Records Contents

Records of monitoring information must include:

a. The date, exact place, time, and methods of sampling or measurements;
b. The individual(s) who performed the sampling or measurements;
c. The date(s) analyses were performed;
d. The individual(s) who performed the analyses;
e. The analytical techniques or methods used; and
f. The results of such analyses.

C10. Inspection and Entry

The permittee must allow DEQ or EPA upon the presentation of credentials to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
d. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by state law, any substances or parameters at any location.

C11. Confidentiality of Information

Any information relating to this permit that is submitted to or obtained by DEQ is available to the public unless classified as confidential by the Director of DEQ under ORS 468.095. The permittee may request that information be classified as confidential if it is a trade secret as defined by that statute. The name and address of

the permittee, permit applications, permits, effluent data, and information required by NPDES application forms under 40 CFR § 122.21 are not classified as confidential [40 CFR § 122.7(b)].

SECTION D. REPORTING REQUIREMENTS

D1. Planned Changes

The permittee must comply with OAR 340-052, "Review of Plans and Specifications" and 40 CFR § 122.41(l)(1). Except where exempted under OAR 340-052, no construction, installation, or modification involving disposal systems, treatment works, sewerage systems, or common sewers may be commenced until the plans and specifications are submitted to and approved by DEQ. The permittee must give notice to DEQ as soon as possible of any planned physical alternations or additions to the permitted facility.

D2. Anticipated Noncompliance

The permittee must give advance notice to DEQ of any planned changes in the permitted facility or activity that may result in noncompliance with permit requirements.

D3. Transfers

This permit may be transferred to a new permittee provided the transferee acquires a property interest in the permitted activity and agrees in writing to fully comply with all the terms and conditions of the permit and EQC rules. No permit may be transferred to a third party without prior written approval from DEQ. DEQ may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under 40 CFR § 122.61. The permittee must notify DEQ when a transfer of property interest takes place.

D4. Compliance Schedule

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any compliance schedule of this permit must be submitted no later than 14 days following each schedule date. Any reports of noncompliance must include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirements.

D5. Twenty-Four Hour Reporting

The permittee must report any noncompliance that may endanger health or the environment. Any information must be provided orally (by telephone) within 24 hours from the time the permittee becomes aware of the circumstances, unless a shorter time is specified in the permit. During normal business hours, the DEQ regional office must be called. Outside of normal business hours, DEQ must be contacted at 1-800-452-0311 (Oregon Emergency Response System).

The following must be included as information that must be reported within 24 hours under this paragraph:

a. Any unanticipated bypass that exceeds any effluent limitation in this permit;
b. Any upset that exceeds any effluent limitation in this permit;
c. Violation of maximum daily discharge limitation for any of the pollutants listed by DEQ in this permit; and
d. Any noncompliance that may endanger human health or the environment.

A written submission must also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission must contain:

e. A description of noncompliance and its cause;
f. The period of noncompliance, including exact dates and times;
g. The estimated time noncompliance is expected to continue if it has not been corrected;
h. Steps taken or planned to reduce, eliminate and prevent reoccurrence of the noncompliance; and
i. Public notification steps taken, pursuant to General Condition B7.

DEQ may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

D6. Other Noncompliance

The permittee must report all instances of noncompliance not reported under General Condition D4 or D5, at the time monitoring reports are submitted. The reports must contain:

a. A description of the noncompliance and its cause;
b. The period of noncompliance, including exact dates and times;
c. The estimated time noncompliance is expected to continue if it has not been corrected; and
d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

D7. Duty to Provide Information

The permittee must furnish to DEQ within a reasonable time any information that DEQ may request to determine compliance with the permit or to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit. The permittee must also furnish to DEQ, upon request, copies of records required to be kept by this permit.

Other Information: When the permittee becomes aware that it has failed to submit any relevant facts or has submitted incorrect information in a permit application or any report to DEQ, it must promptly submit such facts or information.

D8. Signatory Requirements

All applications, reports or information submitted to DEQ must be signed and certified in accordance with 40 CFR § 122.22.

D9. Falsification of Information

Under ORS 468.953, any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance, is subject to a Class C felony punishable by a fine not to exceed $125,000 per violation and up to 5 years in prison per ORS chapter 161. Additionally, according to 40 CFR § 122.41(k)(2), any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit including monitoring reports or reports of compliance or non-compliance will, upon conviction, be punished by a federal civil penalty not to exceed $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

D10. Changes to Discharges of Toxic Pollutant

The permittee must notify DEQ as soon as it knows or has reason to believe the following:

a. That any activity has occurred or will occur that would result in the discharge, on a routine or frequent basis, of any toxic pollutant that is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:
   (1) One hundred micrograms per liter (100 µg/l);
   (2) Two hundred micrograms per liter (200 µg/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/l) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/l) for antimony;
   (3) Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR § 122.21(g)(7); or
   (4) The level established by DEQ in accordance with 40 CFR § 122.44(f).
b. That any activity has occurred or will occur that would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant that is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":
   (1) Five hundred micrograms per liter (500 µg/l);
   (2) One milligram per liter (1 mg/l) for antimony;
   (3) Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR § 122.21(g)(7); or
   (4) The level established by DEQ in accordance with 40 CFR § 122.44(f).

SECTION E. DEFINITIONS

E1. *BOD or BOD_5* means five-day biochemical oxygen demand.
E2. *CBOD or $CBOD_5$* means five-day carbonaceous biochemical oxygen demand.
E3. *TSS* means total suspended solids.
E4. *Bacteria* means but is not limited to fecal coliform bacteria, total coliform bacteria, *Escherichia coli* (*E. coli*) bacteria, and *Enterococcus* bacteria.
E5. *FC* means fecal coliform bacteria.
E6. *Total residual chlorine* means combined chlorine forms plus free residual chlorine
E7. *Technology based permit effluent limitations* means technology-based treatment requirements as defined in 40 CFR § 125.3, and concentration and mass load effluent limitations that are based on minimum design criteria specified in OAR 340-041.
E8. *mg/l* means milligrams per liter.
E9. *µg/l* means microgram per liter.
E10. *kg* means kilograms.
E11. *m^3/d* means cubic meters per day.
E12. *MGD* means million gallons per day.
E13. *Average monthly effluent limitation* as defined at 40 CFR § 122.2 means the highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.
E14. *Average weekly effluent limitation* as defined at 40 CFR § 122.2 means the highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.
E15. *Daily discharge* as defined at 40 CFR § 122.2 means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the daily discharge must be calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the daily discharge must be calculated as the average measurement of the pollutant over the day.
E16. *24-hour composite sample* means a combination of at least six discrete sample aliquots of at least 100 milliliters, collected at periodic intervals from the same location, during the operating hours of the facility over a 24 hour period. Four (rather than six) aliquots should be collected for volatile organics analyses. The composite must be flow or time proportional, whichever is more appropriate. The sample aliquots must be collected and stored in accordance with procedures prescribed in the most recent edition of *Standard Methods for the Examination of Water and Wastewater*.
E17. *Grab sample* means an individual discrete sample collected over a period of time not to exceed 15 minutes.
E18. *Quarter* means January through March, April through June, July through September, or October through December.
E19. *Month* means calendar month.
E20. *Week* means a calendar week of Sunday through Saturday.

APPENDIX I.3

NPDES STORMWATER DISCHARGE PERMIT # 1200-Z

Oregon
Kate Brown, Governor

Department of Environmental Quality
Western Region Eugene Office
165 East 7th Avenue, Suite 100
Eugene, OR 97401
(541) 686-7838
FAX (541) 686-7551
TTY 711

May 17, 2021

Shawn Edmonds
Valley Landfills, Inc.
28972 Coffin Butte Rd.
Corvallis, OR 97330-9592

Issued by email: sedmonds@republicservices.com
imacnab@republicservices.com

RE: Reissuance NPDES Permit Number 1200-Z
File Number: 104176 EPA Number: ORR501175
Facility: Coffin Butte Landfill, 29175 Coffin Butte Rd, Corvallis
Benton County
SIC Code(s): 4953

Dear Permit Registrant,

The Oregon Department of Environmental Quality (DEQ) has reissued the 1200-Z, effective July 1, 2021. Attached is your revised monitoring requirements under the reissued permit, starting July, 1, 2021. All monitoring waivers expire on July 1, 2021. Please review the information closely. If you identify any discrepancies in the tables, please contact me as soon as possible.

It is your responsibility to comply with the new permit conditions and monitoring requirements starting July 1, 2021. DEQ will be transitioning to electronic Discharge Monitoring Reports during this permit cycle. As such, you will not receive the first page of the permit identifying your facility as registered under the renewed permit. Please visit our industrial stormwater permits webpage to find a copy of the permit and associated documents. https://www.oregon.gov/deq/wq/wqpermits/Pages/Stormwater-Industrial.aspx Thank you.

If you have any questions about this permit, contact the Stormwater Permit Coordinator at 541-686-7930.

Respectfully,

LeeAnn Gates

LeeAnn Gates
Western Region Permit Coordinator – Eugene Office
Gates.leeann@deq.state.or.us

1200-Z NPDES Monitoring Requirements

You must monitor for the pollutants in the table below. If discharge to a Category 5: 303(d) listed receiving water for pH, total copper, total lead, total zinc and/or E. coli, the table below will not include statewide or sector-specific benchmarks for those pollutants. Exceedance of impairment monitoring may escalate to a water quality-based effluent limit during this permit cycle. Please read Schedule A.13 and Schedule C carefully. Tier 2 geometric mean evaluations are required annually. Please read Schedule A.12 carefully.

Georegion	**Pollutant**	**Statewide Benchmark**	**Units**	**Frequency**
Willamette Valley	Total Copper	0.015	mg/L	Four times per year
Willamette Valley	Total Lead	0.11	mg/L	Four times per year
Willamette Valley	Total Zinc	0.14	mg/L	Four times per year
Willamette Valley	pH	5.5-9.0	s.u.	Four times per year
Willamette Valley	TSS	100	mg/L	Four times per year
SIC code of Industrial Activity	**Pollutant**	**Sector-specific Benchmark**	**Units**	**Frequency**
4953	E. coli	406	organisms/100 mL	Four times per year
Receiving Water **LLID: 1231642447260** **AUID: 104285** **River Mile: 4**	**Pollutant**	**Impairment Concentration**	**Units**	**Frequency**
Soap Creek Tributary	N/A	N/A	N/A	N/A
Technology-based Effluent Limit	**Pollutant**	**Effluent Limit**	**Units**	**Frequency**
Non-hazardous waste landfills	BOD	140 mg/L, daily maximum 37 mg/L, monthly avg. maximum		Per Schedule E.L.7
Non-hazardous waste landfills	TSS	88 mg/L, daily maximum 27 mg/L, monthly avg. maximum		Per Schedule E.L.7
Non-hazardous waste landfills	Ammonia	10 mg/L, daily maximum 4.9 mg/L, monthly avg. maximum		Per Schedule E.L.7
Non-hazardous waste landfills	Alpha Terpineol	0.033 mg/L, daily maximum 0.016 mg/L, monthly avg. maximum		Per Schedule E.L.7
Non-hazardous waste landfills	Benzoic Acid	0.12 mg/L, daily maximum 0.071 mg/L, monthly avg. maximum		Per Schedule E.L.7
Non-hazardous waste landfills	p-Cresol	0.025 mg/L, daily maximum 0.014 mg/L, monthly avg. maximum		Per Schedule E.L.7
Non-hazardous waste landfills	Phenol	0.026 mg/L, daily maximum 0.015 mg/L, monthly avg. maximum		Per Schedule E.L.7
Non-hazardous waste landfills	Total Zinc	0.20 mg/L, daily maximum 0.11 mg/L, monthly avg. maximum		Per Schedule E.L.7
Non-hazardous waste landfills	pH	6.0-9.0	s.u.	Per Schedule E.L.7

APPENDIX I.4

FEDERAL FISH AND WILDLIFE DEPREDATION PERMIT # MB005399-0

DEPREDATION
Permit Number: MB005399
Version Number: 1
Effective: 2021-02-08 **Expires:** 2022-01-31

Issuing Office:

Department of the Interior

U.S. FISH AND WILDLIFE SERVICE

MB Portland Permit Office
911 NE 11th Ave.
Portland, Oregon 97232
permitsR1MB@fws.gov
Tel: 503-872-2715

Digitally signed by

Permit Specialist

Permittee:

VALLEY LANDFILLS INC

28972 COFFIN BUTTE RD

CORVALLIS, OR 97330

PRINCIPAL OFFICER NAME AND TITLE:
SHAWN EDMONDS, GENERAL
MANAGER

Authority: Statutes and Regulations: 16 U.S.C 703-712 50 CFR Part 13, 50 CFR 21.41

Location where authorized activity may be conducted:

Activity conducted: Coffin Butte Landfill (Mailing Address Above) and Pacific Region Compost Facility (29969 Camp Adair Rd.; Monmouth, OR 97361)
Records Kept: Mailing Address Above
BENTON COUNTY

Reporting requirements:

ANNUAL REPORT DUE: 01/31
Report Take Jan 1 - Dec 31
Report take by species (i.e. herring gull, california gull)

Authorizations and Conditions:

A. To protect Human Health and Safety at Landfill and Compost Facilities, you are authorized to take:

50 Gulls

Lethal take is not to be the primary means of control. Active hazing, harassment or other non-lethal techniques must continue in conjunction with any lethal take of migratory birds.

B. You may use the following method(s) of take: shotgun, in accordance with Standard Condition #2. Use of paint ball guns is prohibited.

C. Anyone who takes birds under the authority of this permit must follow the American Veterinary Medical Association Guidelines on Euthanasia (https://www.avma.org/resources-tools/avma-policies/avma-guidelines-euthanasia-animals). (http://www.avma.org/issues/animal_welfare/euthanasia.pdf%29.)

D. The following subpermittees are authorized: None listed.

In addition, any other person who is (1) employed by or under contract to you for the activities specified in this permit, or (2) otherwise designated a subpermittee by you in writing, may exercise the authority of this permit.

E. You and any subpermittees must comply with the below Standard Conditions.

These standard conditions are a continuation of your permit conditions and must remain with your permit. These standard conditions are nationwide and may not be modified for individual permits.

1. All of the provisions and conditions of the governing regulations at 50 CFR part 13 and 50 CFR part 21.41 are conditions of your permit. Failure to comply with the conditions of your permit could be cause for suspension of the permit. If you have questions regarding these conditions, refer to the regulations or, if necessary, contact your migratory bird permit issuing office. For copies of the regulations and forms, or to obtain contact information for your issuing office, visit: https://fwsepermits.servicenowservices.com/.

2. General conditions set out in Subpart B of 50 CFR 13, and specific conditions contained in Federal regulations cited above, are hereby made a part of this permit. All activities authorized herein must be carried out in accord with and for the purposes described in the application submitted. Continued validity, or renewal of this permit is subject to complete and timely compliance with all applicable conditions, including the filing of all required information and reports.

3. The validity of this permit is also conditioned upon strict observance of all applicable foreign, state, local tribal, or other federal law.

4. Valid for use by permittee named above.

5. To minimize the lethal take of migratory birds, you are required to continually apply non-lethal methods of harassment in conjunction with lethal control. Note: Explosive Pest Control Devices (EPCDs) are regulated by the Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF). If you plan to use EPCDs, you require a Federal explosives permit, unless you are exempt under 27 CFR 555.141. Information and contacts may be found at https://www.atf.gov/explosives.

6. Shotguns used to take migratory birds can be no larger than 10-gauge and must be fired from the shoulder. You must use nontoxic shot listed in 50 CFR 20.21(j).

7. You may not use blinds, pits, or other means of concealment, decoys, duck calls, or other devices to lure or entice migratory birds into gun range.

8. You are not authorized to take, capture, harass, or disturb bald eagles or golden eagles, or species listed as threatened or endangered under the Endangered Species Act found in 50 CFR 17, without additional authorization. For a list of threatened and endangered species in your state, visit the U.S. Fish and Wildlife Service's Threatened and Endangered Species System (TESS) at: http://www.fws.gov/endangered.

9. If you encounter a migratory bird with a Federal band issued by the U.S. Geological Survey Bird Banding Laboratory, Laurel, MD, report the band number to http://www.reportband.gov.

10. This permit does not authorize take or release of any migratory birds, nests, or eggs on Federal lands without additional prior written authorization from the applicable Federal agency, or on State lands or other public or private property without prior written permission or permits from the landowner or custodian.

11. Unless otherwise specified on the face of the permit, migratory birds, nests, or eggs taken under this permit must be:
(a) turned over to the U.S. Department of Agriculture for official purposes, or
(b) donated to a public educational or scientific institution as defined by 50 CFR 10, or
(c) completely destroyed by burial or incineration, or
(d) with prior approval from the permit issuing office, donated to persons authorized by permit or regulation to possess them.

12. A subpermittee is an individual to whom you have provided written authorization to conduct some or all of the permitted activities in your absence. Subpermittees must be at least 18 years of age. As the permittee, you are legally responsible for ensuring that your subpermittees are adequately trained and adhere to the terms of your permit. You are responsible for maintaining current records of who you have designated as a subpermittee, including copies of designation letters you have provided.

13. You and any subpermittees must carry a legible copy of this permit, including these Standard Conditions, and display it upon request whenever you are exercising its authority.

14. You must maintain records as required in 50 CFR 13.46 and 50 CFR 21.41. All records relating to the permitted activities must be kept at the location indicated in writing by you to the migratory bird permit issuing office.

15. Acceptance of this permit authorizes the U.S. Fish and Wildlife Service to inspect any wildlife held, and to audit or copy any permits, books, or records required to be kept by the permit and governing regulations.

16. You may not conduct the activities authorized by this permit if doing so would violate the laws of the applicable State, county, municipal or tribal government or any other applicable law.

For suspected illegal activity, immediately contact USFWS Law Enforcement 1-844-FWS-TIPS (397-8477)

https://www.fws.gov/le/regional-law-enforcement-offices.html

APPENDIX I.5

OREGON TITLE V OPERATING PERMIT FOR SITE AIR EMISSIONS

Oregon
Theodore R. Kulongoski, Governor

Department of Environmental Quality
Western Region - Salem Office
750 Front St. NE, Ste. 120
Salem, OR 97301-1039
(503)378-8240
(503) 378-3684 TTY

OCT 3 0 2009

Valley Landfills, Inc.
Attn: Brian May, General Manager
28972 Coffin Butte Road
Corvallis, OR 97330

Re: Issuance of Oregon Title V
Operating Permit Renewal
Permit No. 02-9502-TV-01
Application No. 23594
Benton County

The Department of Environmental Quality has completed processing your Oregon Title V Operating Permit Renewal application and has issued the enclosed new permit. The permit became effective the date it was signed. If you wish to appeal any of the conditions or limitations contained in the attached permit, or if you have any questions, please contact me at (503) 378-5316. If issues related to the permit conditions cannot be resolved to your satisfaction, you may request a hearing before the Environmental Quality Commission or its authorized representative. Any such requests shall be made in writing within 20 days of the date of this letter, and shall clearly specify which permit conditions are being challenged and why, including each alleged or factual or legal objection. Permit conditions that are not contested shall be in effect upon the date the permit was signed (OAR 340-218-0220). Once effective, the new Title V Operating Permit will replace your existing permit.

You are urged to carefully read the permit and take all possible steps to ensure compliance with the conditions established.

Sincerely,

Gary Andes
Natural Resource Specialist

\pah

Enclosure

Cc: AQ Division w/enclosure
EPA Region X w/enclosure

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
OREGON TITLE V OPERATING PERMIT

Western Region-Salem Office
750 Front Street NE, Suite 120
Salem, OR 97301-1039
Telephone (503) 378-8240

Issued in accordance with the provisions of ORS 468A.040
and based on the land use compatibility findings included in the permit record.

ISSUED TO:

Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330

INFORMATION RELIED UPON:

Application Number: 23594
Received: 01/30/09

PLANT SITE LOCATION:

Coffin Butte Landfill
Highway 99 & Coffin Butte Road
Corvallis, OR 97330

LAND USE COMPATIBILITY STATEMENT:

Issued by: Benton County
Dated: 03/06/97

ISSUED BY THE DEPARTEMENT OF ENVIRONMENTAL QUALITY

Claudia Davis

Claudia Davis, Western Region Air Quality Manager

OCT 3 0 2009

Date

Nature of Business: Municipal Solid Waste Landfill

SIC: 4953

RESPONSIBLE OFFICIAL

Title: General Manager
Alternate: Vice President

FACILITY CONTACT PERSON

Name: Brian May
Title: General Manager
Phone: (541) 745-2018

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LIST OF ABBREVIATIONS THAT MAY BE USED IN THIS PERMIT

ACDP	Air Contaminant Discharge Permit	NA	Not applicable
Act	Federal Clean Air Act	NESHAP	National Emission Standard for Hazardous Air Pollutants
ASTM	American Society of Testing and Materials	NMOC	Nonmethane organic compounds
Btu	British thermal unit	NO_x	Nitrogen oxides
CFR	Code of Federal Regulations	NSPS	New Source Performance Standards
CO	Carbon monoxide	O_2	Oxygen
CPMS	Continuous parameter monitoring system	OAR	Oregon Administrative Rules
DEQ	Department of Environmental Quality	ODEQ	Oregon Department of Environmental Quality
dscf	Dry standard cubic feet	ORS	Oregon Revised Statutes
EF	Emission factor	O&M	Operation and maintenance
EPA	US Environmental Protection Agency	Pb	Lead
		PCD	Pollution control device
EU	Emissions unit	PM	Particulate matter
FCAA	Federal Clean Air Act	PM_{10}	Particulate matter less than 10 microns in size
FSA	Fuel sampling and analysis		
gr/dscf	Grain per dry standard cubic feet (1 pound = 7000 grains)	ppm	Parts per million
		PSEL	Plant Site Emission Limit
HAP	Hazardous Air Pollutant as defined by OAR 340-244-0040	SIP	State Implementation Plan
		SO_2	Sulfur dioxide
HCFC	Halogenated Chloro-Fluoro-Carbons	SSM	Startup, shutdown, malfunction
		ST	Source test
H_2S	Hydrogen sulfide	VE	Visible emissions
ID	Identification number or label	VMT	Vehicle miles traveled
I&M	Inspection and maintenance	VOC	Volatile organic compounds
LFG	Landfill gas		

Modified EPA Method 9: As used in this permit "Modified EPA Method 9" is defined as follows:

> Opacity must be measured in accordance with EPA Method 9. For all standards, the minimum observation period must be six minutes, though longer periods may be required by a specific rule or permit condition. Aggregate times (e.g., 3 minutes in any one hour) consist of the total duration of all readings during the observation period that are equal to or greater than the opacity percentage in the standard, whether or not the readings are consecutive. Each EPA Method 9 reading represents 15 seconds of time. [See also the definition of "Opacity" in OAR 340-208-0010]

PERMITTED ACTIVITIES

1. Until such time as this permit expires or is modified or revoked, the permittee is allowed to discharge air contaminants from those processes and activities directly related to or associated with air contaminant source(s) in accordance with the requirements, limitations, and conditions of this permit. [OAR 340-218-0010 and 340-218-0120(2)]

2. All conditions in this permit are federally enforceable except as specified below:

   2.a. Conditions 6 through 12, G5, and G9 (OAR 340-248-0005 through 0180) are only enforceable by the state. [OAR 340-218-0060]

EMISSIONS UNIT (EU) AND POLLUTION CONTROL DEVICE (PCD) IDENTIFICATION

3. The emissions units regulated by this permit are the following [OAR 340-218-0040(3)]:

Table 1. EU and PCD IDENTIFICATION

Emission Unit Description	EU ID	Pollution Control Device Description	PCD ID
Landfill Gas Control System	Control	Open Flare	FL
Fugitive Landfill Gas, Cell 0	F-LFG1	None	NA
Fugitive Landfill Gas, Cells 1 to 4	F-LFG2	Landfill gas collection and extraction system	LFGCES-1
Vehicle traffic on paved roads	PIR	Water application	NA
Vehicle traffic on unpaved roads	UPR	Chemical suppressant and water application	NA
Tipper	TIP	None	NA
Petroleum contaminated soils	PCS	None	NA
Aggregate Insignificant activities:	AI		
Cell development, operation, and closing		None	NA
Wastewater treatment system operation		Baghouse	DC-1
Leachate collection and wastewater treatment		None	NA
Portable light plant		None	NA
Trash pumps		None	NA
Generator		None	NA

EMISSION LIMITS AND STANDARDS, TESTING, MONITORING, AND RECORDKEEPING REQUIREMENTS

The following tables and conditions contain the applicable requirements along with the testing, monitoring, and recordkeeping requirements for the emissions units to which those requirements apply.

Facility-wide Requirements

Table 2. Facility wide emission limits and standards

Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Averaging Time	Testing Condition	Monitoring Condition
340-208-0210(2)	4	Fugitive emissions	Minimize	NA	NA	5
340-208-0300	6	Air contaminants	No nuisance	NA	NA	8
340-208-0450	7	PM >250μ	No fallout	NA	NA	8
340-248-0280(10)	9	Asbestos disposal	Handling procedures	Recordkeeping	NA	10
340-248-0280(11)	11	Asbestos cover	Maintain cover	Recordkeeping	NA	12

Fugitive Emissions

4. Applicable Requirement: The permittee must not allow or permit any materials to be handled, transported, or stored; or a building, its appurtenances, or a road to be used, constructed, altered, repaired, or demolished; or any equipment to be operated, without taking reasonable precautions to prevent particulate matter from becoming airborne. Such reasonable precautions must include, but not be limited to the following: [OAR 340-208-0210(2)]

   4.a. use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads or the clearing of land;
   4.b. application of asphalt, oil, water, or other suitable chemicals on unpaved roads, materials stockpiles, and other surfaces which can create airborne dusts;
   4.c. full or partial enclosure of materials stockpiles in cases where application of oil, water, or chemicals are not sufficient to prevent particulate matter from becoming airborne;
   4.d. installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials;
   4.e. adequate containment during sandblasting or other similar operations; and,
   4.f. covering, at all times when in motion, open bodied trucks transporting materials likely to become airborne.

5. Monitoring Requirement: At least once each week for a minimum period of 30 minutes, the permittee must visually survey the plant for any sources of excess fugitive emissions using EPA Method 22. For the purpose of this survey, excess fugitive emissions are considered to be any visible emissions generated by fugitive sources that leave the plant site boundaries. The person conducting the observation does not have to be EPA Method 9 certified. However, the individual should be familiar with the procedures of EPA Method 9, including using the proper location to observe visible emissions. If sources of visible emissions are identified, the permittee must: [OAR 340-218-0050(3)(a)]

   5.a. immediately take corrective action to minimize the fugitive emissions, including but not limited to those actions identified in Condition 4; or,
   5.b. conduct a Modified EPA Method 9 test within 24 hours;
   5.c. Recordkeeping: The permittee must maintain records of the fugitive emissions surveys, corrective actions (if necessary), and/or the results of any modified EPA Method 9 tests.

Nuisance Conditions

6. Applicable Requirement: The permittee must not cause or allow air contaminants from any source to cause a nuisance. Nuisance conditions will be verified by Department personnel. [OAR 340-208-0300] This condition is enforceable only by the State.

7. Applicable Requirement: The permittee must not cause or permit the emission of any particulate matter larger than 250 microns in size at sufficient duration or quantity, as to create an observable deposition upon the real property of another person. The Department will verify that the deposition exists and will notify the permittee that the deposition must be controlled. [OAR 340-208-0450] This condition is enforceable only by the State.

8. Monitoring Requirement: The permittee must maintain a log of each air quality complaint received by the permittee during the operation of the facility and must provide the Western Region-Salem Office of the Department with written notification within 5 days of all nuisance complaints regarding fugitive dust, odors, or particulate deposition received. Documentation shall include date of contact, time of observed nuisance condition, description of nuisance condition, location of receptor, status of plant operation during the observed period, and time of response to complainant. A plant representative must immediately investigate the condition following the receipt of the nuisance complaint and a plant representative must provide a response to the complainant within 24 hours, if possible. This condition is only enforceable by the State. [OAR 340-218-0050(3)(a)]

Asbestos Disposal and Cover

9. Applicable Requirement: The permittee must meet the asbestos-containing material handling and disposal requirements and procedures specified in OAR 340-248-0280(10) for active waste disposal sites. This condition is only enforceable by the state.

10. Monitoring Requirement: The permittee must monitor the asbestos-containing material handling and disposal procedures, provide notifications, and record the information required as specified in OAR 340-248-0280(10) for active waste disposal sites. This condition is only enforceable by the State.

11. Applicable Requirement: The permittee must meet the asbestos-containing material disposal and cover standards specified in OAR 340-248-0280(11) for inactive waste disposal sites. This condition is only enforceable by the State.

12. Monitoring Requirement: The permittee must monitor the asbestos-containing disposal and cover requirements and provide notifications as specified in OAR 340-248-0280(11) for inactive waste disposal sites. This condition is only enforceable by the State.

Facility Wide Requirements

13. The following requirements apply facility wide, including, but not limited to, the solid municipal waste landfill, unless an alternate requirement is specifically stated for a particular emissions unit.

Table 3. Summary of NSPS and NESHAP requirements:

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.1	40 CFR 60.7(a)(4); 40 CFR 60.7(b); 40 CFR 60.7(f)	Notification and recordkeeping.	Maintain records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of the affected facility. Maintain a file of all measurements and performance testing measurements and all other information required by this part recorded in a permanent form suitable for inspection.	Permittee shall furnish prior written or e-mail notification of any physical or operational change which may increase the emission rate of any air pollutant (such as taking operating gas collection wells off line) to which a standard applies to: ODEQ, Western Region – Salem Office 750 Front Street NE, Suite 120 Salem, OR 97301-1039 [40 CFR 60.4(a)]
13.2	40 CFR 60.11(d)	Maintain and operate any affected emission unit with good air pollution control practice for minimizing emissions.	None specified.	No additional monitoring required.
13.3	40 CFR 60.12	Circumvention.	None specified.	No additional monitoring required.
13.4	40 CFR 60.752(b)(2)(ii)(A); 40 CFR 60.753(a); 40 CFR 60.755(b) (Landfill NSPS Subpart WWW)	Install, within 60 days, and operate active collection system wells that collect gas from each area, cell, or group of cells in the landfill in which solid waste has been placed for: (1) 5 years or more if active, OR (2) 2 years or more if closed or at final grade.	None specified.	No additional monitoring required.

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.5	40 CFR 60.752(b)(2)(iii)(A) (Landfill NSPS Subpart WWW)	Install an active collection system that is designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control or treatment system equipment.	To calculate maximum expected gas flow rate: $Q_m = \sum_{i=1}^{n} 2kL_oM_i\left(e^{-kt_i}\right)$ where, Q_m=maximum expected gas generation flow rate, m^3/yr k=methane generation rate constant, $year^{-1}$ L_o=methane generation potential, m^3/Mg solid waste M_i=mass of solid waste in the i^{th} section, Mg t_i=age of the i^{th} section, years [40 CFR 60.755(a)(1)(ii)]	Submit monthly report to: ODEQ, Western Region – Salem Office 750 Front Street NE, Suite 120 Salem, OR 97301-1039 Monthly report shall include the date of installation and the location of each well or collection system expansion added. [40 CFR 60.757(f)]
13.6	40 CFR 60.752(b); 40 CFR 60.754(a); 40 CFR 60.757(b); 40 CFR 60.4(a) (Landfill NSPS Subpart WWW)	Calculate the NMOC emission rate for the landfill. If the calculated NMOC emission rate is less than 50 Mg/yr, the permittee shall recalculate the NMOC emission rate and submit emission reports to the Department until such time as the calculated NMOC emission rate is ≥ 50 Mg/yr, or the landfill is closed.	Calculate the NMOC emission rate: $M_{NMOC} = \sum_{i=1}^{n} 2kL_oM_i(e^{-kti})(C_{NMOC})(3.6x10^{-9})$ where, M_{NMOC}=Total NMOC emission rate from the landfill (Mg/yr) k=methane generation rate constant=0.05 yr^{-1} or as determined using Tier 3 per 40 CFR 60.754 (a)(4) L_o=methane generation potential=170 m^3/Mg solid waste M_i=mass of solid waste in the i^{th} section (Mg) t_i=age of the i^{th} section (yr) C_{NMOC}=4000 ppm per 40 CFR 60.754(a)(3) $3.6x10^{-9}$=conversion factor The mass of the nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value for M_i if properly documented. [40 CFR 60.754(a)(1)(i)]	The permittee shall submit an NMOC emission rate report to: ODEQ, Western Region – Salem Office 750 Front Street NE, Suite 120 Salem, OR 97301-1039 (1) annually, OR (2) if the estimated NMOC emission rate as reported in the annual report is less than 50 Mg/yr in each of the next 5 consecutive years, the permittee may elect to submit an estimate of the NMOC emission rate for the next 5-year period in lieu of the annual report. If option (2) is chosen, this estimate shall be revised at least once every 5 years. If the actual waste acceptance rate exceeds the estimated waste acceptance rate in any year reported in the 5-year estimate, a revised 5-year estimate shall be submitted to ODEQ at the address given above. The revised estimate shall cover the 5-year period beginning with the year in which the actual waste acceptance rate exceeded the estimated waste acceptance rate. The NMOC emission rate report shall include the current amount of solid waste-in-place and the estimated waste acceptance rate for each year of the 5 years for which an NMOC emission rate is estimated. The NMOC emission rate report shall include all the data, calculations, sample reports and measurements used to estimate the annual or 5-year emissions. ODEQ may request such additional information as may be necessary to verify the reported NMOC emission rate. [40 CFR 60.4(a); 40 CFR 60.757(b)]
13.7	40 CFR 60.752(b)(2)(iii)(A); 40 CFR 60.759(a); 40 CFR 60.759(b) (Landfill NSPS Subpart WWW)	Install an active collection system that is designed to collect gas at a sufficient extraction rate, sited at a sufficient density throughout all gas producing areas, and designed to minimize off-site migration of subsurface gas.	None specified.	Keep for the life of the collection system an up-to-date, readily accessible plot map showing each existing and planned collector in the system and providing a unique identification location label for each collector. Keep up-to-date, readily accessible records of the installation date and location of all newly installed collectors. [40 CFR 60.758(d)]

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.8	40 CFR 60.753(b) (Landfill NSPS Subpart WWW)	Operate the LFG control system with negative pressure at each well-head except under the following conditions: (1) fire or increased well temperature; OR, (2) use of a geomembrane or synthetic cover; OR, (3) a decommissioned well. Passive gas collection wells do not have to meet this condition when approved in writing by the Department. Gas collection wells operating under an Alternative Operating and Monitoring Plan approved in writing by the Department do not have to meet this condition.	None specified.	Measure gauge pressure in the gas collection header at each individual well, monthly. If a positive pressure exists, action shall be initiated to correct the exceedance within 5 calendar days. If negative pressure cannot be achieved without excess air infiltration within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial measurement of positive pressure. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. [40 CFR 60.755(a)(3)] The annual report shall include record of instances when positive pressure occurred. [40 CFR 60.753(b)(1)]
13.9	40 CFR 60.753(c) (Landfill NSPS Subpart WWW)	Operate each interior wellhead in the LFG collection system with: (1) LFG temperature <55°C; AND, (2) either: (a) N_2 < 20%; OR, (b) O_2 < 5%. Passive gas collection wells do not have to meet this condition when approved in writing by the Department. Gas collection wells receiving a variance in writing from the Department concerning temperature do not have to meet this condition. Gas collection wells operating under an Alternative Operating and Monitoring Plan approved in writing by the Department do not have to meet this condition.	N_2 by RM 3C; O_2 by RM 3A, except that: (1) regulatory limit is between 20% and 50% of the span; AND, (2) data recorder not required; AND, (3) only 2 calibration gases are required; AND, (4) calibration error check not required; AND, (5) allowable sample bias, zero drift, and calibration draft are ±10%. Install a sampling port and a thermometer or other temperature measuring device at each wellhead. [40 CFR 60.756(a)]	Measure the N_2 or O_2 concentration in the LFG, and the temperature of the LFG at each individual well, on a monthly basis. If a well exceeds one of the operating parameters, action shall be initiated to correct the exceedance within 5 calendar days. If correction of the exceedance cannot be achieved within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial exceedance. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. [40 CFR 60.756(a); 40 CFR 60.755(a)(5)]

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.10	40 CFR 60.753(d) (Landfill NSPS Subpart WWW)	Operate LFG collection system so that the methane concentration is <500 ppm above background at the surface of the landfill.	Conduct surface testing around the perimeter of the collection area along a pattern that traverses the landfill at 30 meter intervals and where visual observations indicate elevated concentrations of LFG, such as distressed vegetation and cracks or seeps in the cover per the surface monitoring design plan and topographical map of the monitoring route. Instrument specifications and procedures for surface monitoring devices: (1) portable analyzer shall meet the instrument specifications provided in section 3 of RM 21, except that "methane" shall replace all references to VOC; AND, (2) calibration gas shall be methane, diluted to a nominal concentration of 500 ppm in air; AND, (3) instrument evaluation procedures of section 4.4 of RM 21 shall be used; AND, (4) calibration procedures provided in section 4.2 of RM 21 shall be followed immediately before commencing a surface monitoring survey. [40 CFR 60.755(d)] Conduct surface monitoring with a portable monitor meeting the specifications provided. The background concentration shall be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least 30 meters from the perimeter wells. Surface emission monitoring shall be performed in accordance with section 4.3.1 of RM 21, except that the probe inlet shall be placed within 5 to 10 cm of the ground. Monitoring shall be performed during typical meteorological conditions. [40 CFR 60.755(c)]	Monitor for cover integrity on a monthly basis. Implement cover repairs as necessary. [40 CFR 60.755(c)(5)] Conduct surface monitoring on a quarterly basis. Any reading of ≥500 ppm above background at any location shall be recorded as a monitored exceedance and actions below taken. As long as the specified actions are taken, the exceedance is not a violation of these operational requirements. The location of each monitored exceedance shall be marked and the location recorded. Cover maintenance or adjustments to the vacuum of the adjacent wells to increase the gas collection in the vicinity of each exceedance shall be made and the location shall be re-monitored within 10 calendar days of detecting the exceedance. Any location that initially showed an exceedance but has a methane concentration <500 ppm methane above background at the 10-day re-monitoring, shall be re-monitored 1 month from the initial exceedance. If the 1-month re-monitoring shows a concentration <500 ppm above background, no further monitoring of that location is required until the next quarterly monitoring period. If the re-monitoring of the location shows a second exceedance, additional corrective action shall be taken and the location shall be monitored again within 10 days of the second exceedance. If the re-monitoring shows a third exceedance for the same location, a new well or other collection device shall be installed within 120 calendar days of the initial exceedance, OR an alternative remedy to the exceedance, such as upgrading the blower, header pipes or control device, and a corresponding timeline for installation may be submitted to the Administrator for approval. No further monitoring of that location is required until remedy has been taken. [40 CFR 60.755(c)] Submit monthly report to: ODEQ, Western Region – Salem Office 750 Front Street NE, Suite 120 Salem, OR 97301-1039 Monthly report shall include the location of each exceedance of the 500 ppm methane concentration and the concentration recorded at each location for which an exceedance was recorded in the previous month. [40 CFR 60.757(f)]
13.11	40 CFR 60.753(e) (Landfill NSPS Subpart WWW)	Operate the collection system such that all collected gases are vented to the control system. In the event the LFG collection and control is inoperable, the gas mover system shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within 1 hour.	None specified.	Records shall be kept of all periods when the LFG collection and control system is inoperable, the gas mover system is shut down, or the valves in the collection and control system are closed.

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.12	40 CFR 60.753(f) (Landfill NSPS Subpart WWW)	Operate the LFG control and treatment system at all times when the collected gas is routed to the system.	None specified.	No additional monitoring required.
13.13	40 CFR 60.755(e) (Landfill NSPS Subpart WWW)	The provisions of the NSPS apply at all times, except during periods of start-up, shutdown, or malfunction, provided that the duration of start-up, shutdown, or malfunction shall not exceed 5 days for collection systems.	None specified.	No additional monitoring required.
13.14	40 CFR 60.757(a)(3); 40 CFR 60.4(a) (Landfill NSPS Subpart WWW)	An amended design capacity report shall be submitted to the Department providing notification of any increase in the design capacity of the landfill.	None specified.	If triggered, the permittee shall submit an amended design capacity report to: ODEQ, Western Region – Salem Office 750 Front Street NE, Suite 120 Salem, OR 97301-1039 [40 CFR 60.4(a)]
13.15	40 CFR 60.758(a) (Landfill NSPS Subpart WWW)	Keep, for at least 5 years, up-to-date, readily accessible, on-site records of: (1) the maximum design capacity; AND, (2) the current amount of solid waste in-place; AND, (3) the year-by-year waste acceptance rate. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.	None specified.	No additional monitoring required.
13.16	40 CFR 60.758(b) (Landfill NSPS Subpart WWW)	Keep up-to-date, readily accessible records for the life of the control equipment of the following data, as measured during the initial performance test or compliance determination: (1) maximum expected gas generation flow rate as calculated in condition 15.5, AND, (2) the density of wells, horizontal collectors, surface collectors, or other gas extraction devices; And, (3) the average combustion temperature measured at least every 15 minutes and averaged over the same time period of the performance test; AND, (4) the percent reduction of NMOC determined as specified in conditions 16 and 17. Records of subsequent tests or monitoring shall be maintained for a minimum of 5 years. Records of the control device vendor specifications shall be maintained until removed.	None specified.	No additional monitoring required.
13.17	40 CFR 60.758(c) (Landfill NSPS Subpart WWW)	Keep for 5 years, up-to-date, readily accessible continuous records of the equipment operating parameters specified to be monitored in the NSPS as well as up-to-date, readily accessible records for periods of operation during which the parameter boundaries established during the most recent performance test are exceeded.	None specified.	No additional monitoring required.

<table>
<tr><th>Condition</th><th>Applicable Requirement</th><th>Description (for clarification purposes only, enforceable as listed under 'applicable requirement')</th><th>Monitoring and Analysis Procedure or Test Method</th><th>Monitoring, Recordkeeping, and Reporting Requirement</th></tr>
<tr><td>13.18</td><td>40 CFR 61.154(a), (c), (d)

(Asbestos NESHAP Subpart M)</td><td>In any active waste disposal site where asbestos-containing waste material has been deposited: (1) no visible emissions to the outside air; OR, (2) cover with ≥6 inches of compacted nonasbestos-containing material at the end of each operating day; OR, (3) cover with a chemical dust suppression agent (not to include any used, spent, or other waste oil) at the end of each operating day.</td><td>None specified.</td><td>No additional monitoring required.</td></tr>
<tr><td>13.19</td><td>40 CFR 61.154(b)

(Asbestos NESHAP Subpart M)</td><td>Areas of disposal of asbestos-containing waste material must: (1) have a natural barrier that adequately deters access by the general public; OR, (2) cover with ≥6 inches of compacted nonasbestos-containing material at the end of each operating day; OR, (3) install warning signs and fencing that meet the following: (a) display signs at all entrances and at intervals of ≤330 feet; AND, (b) signs posted such that legend is easily read; AND, (c) 20" x 14" upright format signs; AND, (d) sign legend, size, and style at least equal to (spacing between lines must be at least equal to the height of the upper text line):
<table>
<tr><th>Legend</th><th>Notation</th></tr>
<tr><td>Asbestos Waste Disposal Site.</td><td>1 inch Sans Serif, Gothic, or Block</td></tr>
<tr><td>Do Not Create Dust</td><td>¾ inch Sans Serif, Gothic, or Block</td></tr>
<tr><td>Breathing Asbestos is Hazardous to Your Health.</td><td>14 point Gothic</td></tr>
</table>
AND, (e) fenced in a manner adequate to deter access by the general public.</td><td>None specified.</td><td>No additional monitoring required.</td></tr>
</table>

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.20	40 CFR 61.154(e) (Asbestos NESHAP Subpart M)	Maintain waste shipment records for all asbestos-containing waste material received.	None specified.	Waste shipment records shall include: (1) name, address, and telephone number of the waste generator; AND, (2) name, address, and telephone number of the transporter(s); AND, (3) volume of waste; AND, (4) presence of improperly enclosed (leak-tight containers) or uncovered; AND, (5) date of waste receipt. Send a copy of the signed waste shipment record to the waste generator within 30 days of receipt of the waste. If significant amount of improperly enclosed or uncovered waste, report in writing (with copy of waste shipment record) to the Department for the waste generator (as indicated in the waste shipment record), ODEQ, Western Region – Salem Office 750 Front Street NE, Suite 120 Salem, OR 97301-1039 by the following working day. Submit reports (with copy of waste shipment record) of unreconciled waste quantity discrepancies within 15 days of waste receipt to ODEQ, at the address listed above. [40 CFR 61.154(e)(1), (2)]
13.21	40 CFR 61.154(f) (Asbestos NESHAP Subpart M)	Maintain, until closure, records of the location, depth and area, and quantity in cubic meters (cubic yards) of asbestos-containing waste material within the disposal area on a map or diagram of the disposal area.	None specified.	No additional monitoring required.
13.22	40 CFR 61.154(i) (Asbestos NESHAP Subpart M)	Furnish upon request, and make available during normal business hours for inspection by ODEQ, all records required by the Asbestos NESHAP.	None specified.	No additional monitoring required.
13.23	40 CFR 61.154(j) (Asbestos NESHAP Subpart M)	Notify ODEQ in writing at least 45 days prior to excavating or otherwise disturbing any asbestos-containing waste material that has been deposited at the site and is covered.	None specified.	Notification shall include: (1) scheduled starting and completion dates; AND, (2) reason for disturbing waste; AND, (3) emission control procedures to be implemented; AND, (4) location of any temporary storage site and the final disposal site. [40 CFR 61.154(j)]

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.24	40 CFR 60.752(b)(2)(iii)(A) and 40 CFR 60.18 (Landfill NSPS Subpart WWW)	1. Route excess landfill gas not utilized by IC engines to an open flare (Emissions Unit Control) designed and operated in accordance with 40 CFR 60.18. 2. The flare shall be designed for and operated with no visible emissions except for periods not to exceed a total of 5 minutes during any 2 consecutive hours. [40 CFR 60.18(c)(1)] 3. The flare shall be operated with a flame present at all times. [40 CFR 60.18(c)(2)] 4. The flare shall be designed for and operated with an exit velocity less than 60 ft/sec. [40 CFR 60.18(c)(4)(i)] 5. The flare shall be operated at all times when excess landfill gas not utilized by IC engines is being vented to it. [40 CFR 60.18(e)]	Install, calibrate, maintain, and operate according to the manufacturer's specifications the following equipment: (1) a heat sensing device, such as an ultraviolet beam sensor or thermocouple, at the pilot light or the flame itself to indicate the continuous presence of a flame; and (2) a device that records flow to or bypass of the flare. The owner or operator shall either: (i) install, calibrate, and maintain a gas flow measuring device that shall record the flow to the flare at least every 15 minutes; or (ii) secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. [40 CFR 60.756(c)] Reference Method 22 shall be used to determine the compliance with the visible emissions standard. The observation period is 2 hours. [40 CFR 60.18(f)(1)] The net heating value of the gas being combusted in the flare shall be calculated by the equation in 40 CFR 60.18 (f)(3). The actual exit velocity of the flare shall be determined by dividing the volumetric flowrate (in units of standard temperature and pressure) as determined by Reference Methods 2, 2A, 2C,or 2D as appropriate by the unobstructed (free) cross sectional area of the flare tip. [40 CFR 60.18(f)(4)]	Monitoring 1. Operate the heat sensing device or thermocouple. [40 CFR 60.756(c)(1)] 2. Record the gas flow to the flare at least every 15 minutes or visually inspect the seal or closure mechanism at least monthly. [40 CFR 60.756(c)(2)] Recordkeeping 1. Records of the flare vendor specifications until removal of the flare. [40 CFR 60.758(b)] 2. Up-to-date, readily accessible records for the life of the flare of: a. visible emissions readings b. heat content determinations c. flow rate or bypass flow rate measurements d. exit velocity determinations e. continuous records of the flare pilot flame or flare flame monitoring f. all periods of operations during which the pilot flame or the flare flame is absent [40 CFR 60.758(b((4) and (c)(4)]

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.25	40 CFR 63.6(e)(3) (Landfill NESHAP Subpart AAAA)	Develop and implement a written Startup, Shutdown, and Malfunction Plan (SSM Plan) by no later than January 16, 2004.	None specified.	Maintain written SSM Plan on site. If the SSM Plan fails to address, or inadequately addresses, a malfunction, revise the SSM Plan within 45 days after the event to include procedures for operating and maintaining the source during similar malfunctions, and a program of corrective actions for similar malfunctions. [40 CFR 63.6(e)((3)(viii)] Recordkeeping 1. Maintain records for each SSM Plan event which occurs. [40 CFR 63.10(b)(2)(i)] 2. Retain a copy of each previous (superceded) version of the SSM Plan for at least 5 years. [40 CFR 63.6(e)(3)(v)] Reporting 1. Report semiannually all SSM Plan actions that are consistent with the SSM Plan. [40 CFR 63.10(d)(5)(i)] 2. Notify DEQ within 2 days if an SSM event is not consistent with the SSM Plan and follow up with a letter within 7 days of the event. [40 CFR 63.6(e)(3)iv)]

EMISSIONS UNITS PIR AND UPR

Table 4. Summary of requirements for Emissions Units PIR and UPR:

Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Averaging Time	Testing Condition	Monitoring Condition
340-208-0110(2)	14	Visible emissions	20% opacity	3 min. aggregate in 60 minutes	NA	15

14. Applicable Requirement: The permittee must not cause or allow the emissions of any air contaminant into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is equal to or greater than 20% opacity, excluding uncombined water, from emissions units PIR and UPR. [OAR 340-208-0110(2) and 340-208-0110(3)(a)]

15. Monitoring Requirement: At least weekly, the permittee must visually survey the facility using EPA Method 22 for any sources of excess fugitive emissions. For the purpose of this survey, excess fugitive emissions are considered to be any visible emissions that leave the down wind plant site boundaries. The person conducting this survey does not have to be EPA Method 9 certified. However, the individual should be familiar with the procedures of EPA Method 9, including using the proper location to observe visible emissions. If sources of excess fugitive emissions are identified during the survey, the permittee shall perform one of the following:

15.a. immediately take corrective action to minimize the fugitive emissions; or,

15.b. conduct a modified EPA Method 9 test on the device(s) causing the opacity problem within 24 hours.

15.c. Recordkeeping: The permittee must maintain records of all inspections and any corrective action performed.

EMISSIONS UNIT TIP

Table 5. Summary of requirements for Emissions Unit TIP:

Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Averaging Time	Testing Condition	Monitoring Condition
340-208-0110(2)	16	Visible emissions	20% opacity	3 min. aggregate in 60 minutes	NA	20
340-226-0210(1)(b)	17	PM/PM_{10}	0.1 gr/dscf	Avg. of 3 test runs	NA	20

16. Applicable Requirement: The permittee must not cause or allow the emissions of any air contaminant into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is equal to or greater than 20% opacity, excluding uncombined water, from emissions unit TIP. [OAR 340-208-0110(2) and 340-208-0110(3)(a)]

17. Applicable Requirement: The permittee must not cause or allow the emission of particulate matter in excess of 0.1 grain per standard cubic foot from emissions unit TIP. [OAR 340-226-0210(1)(b)]

Insignificant Activities Requirements

18. The Department acknowledges that insignificant emissions units (IEUs) identified by rule as either categorically insignificant activities or aggregate insignificant emissions as defined in OAR 340-200-0020 exist at facilities required to obtain an Oregon Title V Operating Permit. IEUs must comply with all applicable requirements. In general, the requirements that could apply to IEUs are incorporated as follows:

18.a. OAR 340-208-0110 (20% opacity)
18.b. OAR 340-228-0210 (0.1 gr/dscf corrected to 12% CO_2 or 50% excess air for fuel burning equipment)
18.c. OAR 340-226-0210 (0.1 gr/dscf for non-fugitive, non-fuel burning equipment)
18.d. OAR 340-226-0310 (process weight limit for non-fugitive, non-fuel burning process equipment).

Unless otherwise specified in this permit or an applicable requirement, the Department is not requiring any testing, monitoring, recordkeeping, or reporting for the applicable emissions limits and standards that apply to IEUs. However, if testing were performed for compliance purposes, the permittee would be required to use the test methods identified in the definitions of "opacity" and "particulate matter" in OAR 340-208-0010 and perform the testing in accordance with the Department's Source Sampling Manual.

PLANT SITE EMISSION LIMITS

19. Applicable Requirement: The plant site emissions must not exceed the following limits for any 12 consecutive calendar month period: [OAR 340-222-0040 through OAR 340-222-0043]

Pollutant	Plant Site Emission Limit (Tons/yr)
PM	24
PM_{10}	14
CO	99
NO_x	39
SO_2	39
VOC	39
NMOC	49

19.a. The PSEL is based on the actual predicted emissions for the current operating conditions at the facility. A permit modification is required before the PSEL may be increased.

20. Monitoring Requirement: The permittee must determine compliance with the Plant Site Emission Limits established in Condition 19 of this permit by conducting monitoring in accordance with the following procedures, test methods, and frequencies: [OAR 340-218-0050(3)]

20.a. The permittee must monitor and maintain records of the following process parameters:

Table 6. PSEL Monitoring

Emissions Unit(s)	Process Parameter	Units	Measurement Frequency	Measurement Method
F-LFG1	Municipal solid waste in place in Cell 0	Mg or tons	Annually	Records
F-LFG2	Municipal solid waste in place in Cells 1, 2A/2B, 2C/2D, and 3	Mg or tons	Annually	Records
Landfill	Municipal solid waste accepted at landfill	Mg or tons	Annually	Records
F-LFG1 & F-LFG2	Landfill gas generated in each system	$MMft^3$/month, $MMft^3$/yr	Annually using EPA model calculation	Records
F-LFG2	Landfill gas collected and sent to IC engines and % methane	$MMft^3$/month, $MMft^3$/yr	Monthly/Annually	Records
PIR	Number of total vehicles on paved roads	Number	Monthly/Annually	Records
UPR 1	Number of total vehicles on unpaved road 1	Number	Monthly/Annually	Records
UPR 2	Number of commercial vehicles on unpaved road 2	Number	Monthly/Annually	Records
TIP	Number of hours operated	Hours	Monthly/Annually	Records
PCS	Petroleum contaminated soil received	Tons	Monthly/Annually	Records
Open Flare	Landfill gas collected and sent to open flare and % methane	$MMft^3$/month, $MMft^3$/yr	Monthly/Annually	Records

20.b. Emission factors for calculating pollutant emissions:

Table 7. Emission Factors

Emission Units(s)	Pollutant	Emission Factor	Emission Factor Units	Emission Factor Verification Testing	
				Yes/no	Test Method
F-LFG1	CO	10.3	lb/MMft^3 fugitive landfill gas	No	NA
	VOC	51.9	lb/MMft^3 fugitive landfill gas	No	NA
	NMOC	133.2	lb/MMft^3 fugitive landfill gas	No	NA
F-LFG2	CO	10.3	lb/MMft^3 fugitive landfill gas	No	NA
	VOC	51.9	lb/MMft^3 fugitive landfill gas	No	NA
	NMOC	133.2	lb/MMft^3 fugitive landfill gas	No	NA
PIR	PM	0.140	lb/vehicle	No	NA
	PM_{10}	0.027	lb/vehicle	No	NA
UPR 1	PM	0.010	lb/vehicle	No	NA
	PM_{10}	0.004	lb/vehicle	No	NA
UPR 2	PM	0.098	lb/vehicle	No	NA
	PM_{10}	0.021	lb/vehicle	No	NA
Open Flare	PM/PM_{10}	8.5	lb/MMft^3 combusted landfill gas	No	NA
	CO	110.0	lb/MMft^3 combusted landfill gas	No	NA
	NO_x	20.0	lb/MMft^3 combusted landfill gas	No	NA
	SO_2	8.4	lb/MMft^3 combusted landfill gas	No	NA
	VOC	1.16	lb/MMft^3 combusted landfill gas	No	NA
	NMOC	2.71	lb/MMft^3 combusted landfill gas	No	NA
TIP	PM/PM_{10}	0.253	lb/hr	No	NA
	CO	0.768	lb/hr	No	NA
	NO_x	3.57	lb/hr	No	NA
	SO_2	0.236	lb/hr	No	NA
	VOC/ NMOC	0.289	lb/hr	No	NA
PCS	VOC/ NMOC	0.033	lb/ton PCS	No	NA

20.c. For the emissions unit F-LFG1 listed in Table 8, the permittee must determine monthly and 12-month rolling emissions by multiplying the Process Parameter by the emission factor listed above for each pollutant. Calculations must be completed within 30 days of the end of each month.

E = (F-LFG1 generated) * EF *K

where:

E = Emissions, tons
EF = Emission factor, pounds/units
K = conversion constant: 1 ton/2000 lbs

20.d. For the emissions unit F-LFG2 listed in Table 8, the permittee must determine monthly and 12-month rolling emissions by multiplying the Process Parameter by the emission factor listed above for each pollutant. Calculations must be completed within 30 days of the end of each month.

E = (F-LFG2 generated – F-LFG2 collected to IC engines and flare) * EF * K

where:

E = Emissions, tons
EF = Emission factor, pounds/units
K = conversion constant: 1 ton/2000 lbs

20.e. For the emissions unit Open Flare listed in Table 7, the permittee must determine monthly and 12-month rolling emissions by multiplying the Process Parameter by the emission factor listed above for each pollutant. Calculations must be completed within 30 days of the end of each month.

E = (Open flare collected) * EF *K

where:

E = Emissions, tons
EF = Emission factor, pounds/units
K = conversion constant: 1 ton/2000 lbs

20.f. For the emissions units PIR, UPR 1, UPR 2, TIP, and PCS listed in Table 7, the permittee must calculate monthly and 12-month rolling emission by multiplying the Process Parameter by the emission factor listed above for each pollutant. Calculations must be completed within 30 days of the end of each month.

E = MP * EF * K

where:

E = Emissions, tons
MP = Monitored parameter, units/month or units/year
EF = Emission factor, pounds/units
K = conversion constant: 1 ton/2000 lbs

20.g. The emission factors listed in Condition 20.b. are not enforceable limits unless otherwise specified in this permit. Compliance with PSELs must only be determined by the calculations contained in Conditions 20.c. through 20.f of this permit using the measured process parameters recorded during the reporting period and the emission factors contained in Condition 20.b.

21. The permittee must determine compliance with Condition 19 (Plant Site Emission Limits) by summing the emissions calculated in Condition 20 for each emissions unit for each month and each 12-month rolling period, and adding the Aggregate Insignificant emissions of 1 ton per year by pollutant, and comparing the resulting emissions to the Plant Site Emission Limits in Condition 19.

GENERAL TESTING REQUIREMENTS

22. Unless otherwise specified in this permit, the permittee must conduct all testing in accordance with the Department's Source Sampling Manual. [OAR 340-212-0120 and 40 CFR 60.8]

22.a. Unless otherwise specified by a state or federal regulation, the permittee must submit a source test plan to the Department at least 30 days prior to the date of the test. The test plan must be prepared in accordance with the Source Sampling Manual and address any planned variations or alternatives to prescribed test methods. The permittee should be aware that if significant variations are requested, it may require more than 30 days for the Department to grant approval and may require EPA approval in addition to approval by the Department.

22.b. Only regular operating staff may adjust the processes or emission control device parameters during a compliance source test and within two (2) hours prior to the tests. Any operating adjustments made during a compliance source test, which are a result of consultation during the tests with source testing personnel, equipment vendors, or consultants, may render the source test invalid.

22.c. Unless otherwise specified by permit condition or Department approved source test plan, all compliance source tests must be performed as follows:

22.c.i. at least 90% of the design capacity for new or modified equipment;
22.c.ii at least 90% of the maximum operating rate for existing equipment; or
22.c.iii. at 90 to 110% of the normal maximum operating rate for existing equipment. For purposes of this permit, the normal maximum operating rate is defined as the 90th percentile of the average hourly operating rates during a 12 month period immediately preceding the source test. Data supporting the normal maximum operating rate must be included with the source test report.

22.d. Each source test must consist of at least three (3) test runs and the emissions results must be reported as the arithmetic average of all valid test runs. If for reasons beyond the control of the permittee a test run is invalid, the Department may accept two (2) test runs for demonstrating compliance with the emission limit or standard.

22.e. Source test reports prepared in accordance with the Department's Source Sampling Manual must be submitted to the Department within 45 days of completing any required source test, unless a different time period is approved in the source test plan submitted prior to the source test.

GENERAL MONITORING AND RECORDKEEPING REQUIREMENTS

General Monitoring Requirements:

23. The permittee must not knowingly render inaccurate any required monitoring device or method. [OAR 340-218-0050(3)(a)(E)]

24. Methods used to determine actual emissions for fee purposes must also be used for compliance determination and can be no less rigorous than the requirements of OAR 340-218-0080. [OAR 340-218-0050(3)(a)(F)]

25. Monitoring requirements must commence on the date of permit issuance unless otherwise specified in the permit or an applicable requirement. [OAR 340-218-0050(3)(a)(G)]

General Recordkeeping Requirements

26. The permittee must maintain the following general records of testing and monitoring required by this permit: [OAR 340-218-0050(3)(b)(A)]

26.a. the date, place as defined in the permit, and time of sampling or measurements;
26.b. the date(s) analyses were performed;
26.c. the company or entity that performed the analyses;
26.d. the analytical techniques or methods used;
26.e. the results of such analyses;
26.f. the operating conditions as existing at the time of sampling or measurement; and
26.g. the records of quality assurance for continuous monitoring systems (including but not limited to quality control activities, audits, calibration drift checks).

27. Unless otherwise specified by permit condition, the permittee must make every effort to maintain 100 percent of the records required by the permit. If information is not obtained or recorded for legitimate reasons (e.g., the monitor or data acquisition system malfunctions due to a power outage), the missing record(s) will not be considered a permit deviation provided the amount of data lost does not exceed 10% of the averaging periods in a reporting period or 10% of the total operating hours in a reporting period, if no averaging time is specified. Upon discovering that a required record is missing, the permittee must document the reason for the missing record. In addition, any missing record that can be recovered from other available information will not be considered a missing record. [OAR 340-214-0110, 340-212-0160, and 340-218-0050(3)(b)]

28. Recordkeeping requirements must commence on the date of permit issuance unless otherwise specified in the permit or an applicable requirement. [OAR 340-218-0050(3)(b)(C)]

29. Unless otherwise specified, the permittee must retain records of all required monitoring data and support information for a period of at least five (5) years from the date of the monitoring sample, measurement, report, or application. Support information includes all calibration and maintenance records and all original strip-chart recordings (or other original data) for continuous monitoring instrumentation, and copies of all reports required by the permit. All existing records required by the previous Oregon Title V Operating Permit must also be retained for five (5) years from the date of the monitoring sample, measurement, report, or application. [OAR 340-218-0050(b)(B)]

REPORTING REQUIREMENTS

General Reporting Requirements

30. Excess Emissions Reporting The permittee must report all excess emissions as follows: [OAR 340-214-0300 through 340-214-0360]

30.a. Immediately (within 1 hour of the event) notify the Department of an excess emission event by phone, e-mail, or facsimile; and

30.b. Within 15 days of the excess emissions event, submit a written report that contains the following information: [OAR 340-214-0340(1)]

30.b.i. The date and time of the beginning of the excess emissions event and the duration or best estimate of the time until return to normal operation;

30.b.ii. The date and time the owner or operator notified the Department of the event;

30.b.iii. The equipment involved;

30.b.iv. Whether the event occurred during planned startup, planned shutdown, scheduled maintenance, or as a result of a breakdown, malfunction, or emergency;

30.b.v. Steps taken to mitigate emissions and corrective action taken, including whether the approved procedures for a planned startup, shutdown, or maintenance activity were followed;

30.b.vi. The magnitude and duration of each occurrence of excess emissions during the course of an event and the increase over normal rates or concentrations as determined by continuous monitoring or best estimate (supported by operating data and calculations);

30.b.vii. The final resolution of the cause of the excess emissions; and

30.b.viii. Where applicable, evidence supporting any claim that emissions in excess of technology-based limits were due to any emergency pursuant to OAR 340-214-0360.

30.c. In the event of any excess emissions which are of a nature that could endanger public health and occur during non-business hours, weekends, or holidays, the permittee must immediately notify the Department by calling the Oregon Accident Response System (OARS). The current number is 1-800-452-0311.

30.d. If startups, shutdowns, or scheduled maintenance may result in excess emissions, the permittee must submit startup, shutdown, or scheduled maintenance procedures used to minimize excess

emissions to the Department for prior authorization, as required in OAR 340-214-0310 and 340-214-0320. New or modified procedures must be received by the Department in writing at least 72 hours prior to the first occurrence of the excess emission event. The permittee must abide by the approved procedures and have a copy available at all times.

30.e. The permittee must notify the Department of planned startup/shutdown or scheduled maintenance events.

30.f. The permittee must continue to maintain a log of all excess emissions in accordance with OAR 340-214-0340(3). However, the permittee is not required to submit the detailed log with the semi-annual and annual monitoring reports. The permittee is only required to submit a brief summary listing the date, time, and the affected emissions units for each excess emission that occurred during the reporting period. [OAR 340-218-0050(3)(c)]

31. Permit Deviations Reporting: The permittee must promptly report deviations from permit requirements that do not cause excess emissions, including those attributable to upset conditions, as defined in the permit, the probable cause of such deviations, and any corrective actions or preventive measures taken. "Prompt" means within 15 days of the deviation. Deviations that cause excess emissions, as specified in OAR 340-214-0300 through 340-214-0360 must be reported in accordance with Condition 23.

32. All required reports must be certified by a responsible official consistent with OAR 340-218-0040(5);[OAR 340-218-0050(3)(c)(D)]

33. Reporting requirements must commence on the date of permit issuance unless otherwise specified in the permit. [OAR 340-218-0050(3)(c)(E)]

Addresses of regulatory agencies are the following, unless otherwise instructed:

DEQ – Western Region
750 Front Street NE, Suite 120
Salem, OR 97310
(503) 378-8240

DEQ – Air Quality Division
811 SW Sixth Avenue
Portland, OR 97204
(503) 229-5359

Air Operating Permits
US Environmental Protection Agency
Mail Stop OAQ-108
1200 Sixth Avenue
Seattle, WA 98101

Semi-annual and Annual Reports

34. The permittee must submit three (3) copies of reports of any required mon ring at least every 6 months, completed on forms approved by the Department. Six month periods are uary 1 to June 30, and July 1 to December 31. One copy of the report must be submitted to the EPA a two copies to the DEQ regional office. All instances of deviations from permit requirements must be cl rly identified in such reports: [OAR 340-218-0050(3)(c)(A) and 340-218-0080(6)(d)]]

34.a. The first semi-annual report is be due on July 30 and must include the semi-annual compliance certification, OAR 340-218-0080.

34.b. The annual report is due on February 15 and must consist of the following:

34.b.i. the emission fee report; [OAR 340-220-0100]
34.b.ii. a summary of the excess emissions upset log; [OAR 340-214-0340]
34.b.iii. the second semi-annual compliance certification; [OAR 340-218-0080]
34.b.iv. the annual emission inventory report for the prior calendar year;
34.b.v. greenhouse gas emissions in accordance with Division 215 of OAR Chapter 340. [OAR 340-215-0040(3)(a)]

35. The semi-annual compliance certification must include the following (provided that the identification of applicable information may cross-reference the permit or previous reports, as applicable): [OAR 340-218-0080(6)(c)]

35.a. The identification of each term or condition of the permit that is the basis of the certification;

35.b. The identification of the method(s) or other means used by the owner or operator for determining the compliance status with each term and condition during the certification period, and whether such methods or other means provide continuous or intermittent data. Such methods and other means must include, at a minimum, the methods and means required under OAR 340-218-0050(3). *Note: Certification of compliance with the monitoring conditions in the permit is sufficient to meet this requirement, except when the permittee must certify compliance with new applicable requirements that are incorporated by reference into the permit. When certifying compliance with new applicable requirements that are not yet in the permit, the permittee must provide the information required by this condition.* If necessary, the owner or operator also must identify any other material information that must be included in the certification to comply with section 113(c)(2) of the FCAA, which prohibits knowingly making a false certification or omitting material information;

35.c. The status of compliance with terms and conditions of the permit for the period covered by the certification, including whether compliance during the period was continuous or intermittent. The certification must be based on the method or means designated in OAR 340-218-0040(6)(c)(B). The certification must identify each deviation and take it into account in the compliance certification. The certification must also identify as possible exceptions to compliance any periods during which compliance is required and in which an excursion or exceedance, as defined under OAR 340-200-0020, occurred; and

35.d. Such other facts as the Department may require to determine the compliance status of the source.

36. Notwithstanding any other provision contained in any applicable requirement, the owner or operator may use monitoring as required under OAR 340-218-0050(3) and incorporated into the permit, in addition to any specified compliance methods, for the purpose of submitting compliance certifications. [OAR 340-218-0080(6)(e)]

Monthly Reports

37. The permittee must report the following information for the preceding month within 30 days of the end of each calendar month to the Western Region-Salem office of the Department:

37.a. The cover integrity monitoring results and repairs, if necessary, as required by Condition 13.10;

37.b. The results of the quarterly surface methane monitoring, if conducted during the month, and corrective actions taken as required by Condition 13.10;

37.c. Any other information regarding upsets, maintenance required, or operational problems encountered during the month on the landfill gas collection or control systems;

37.d. Information concerning the installation date and location of any newly installed wells or expansion of the landfill gas collection system as required by Condition 13.7;

37.e. The amount of landfill gas collected and treated in both the IC engines and the flare;

37.f. The total operating hours of the IC engines and flare during the month; and,

37.g. Log of air quality complaints received during the month under Condition 8.

EMISSION FEES

38. Emission fees will be based on the Plant Site Emission Limits in Condition 19, unless the permittee elects to report actual emissions for one or more permitted processes/pollutants using the procedures in OAR 340 Division 220. If the permittee reports actual emissions for one or more permitted processes/pollutants, the permitted emissions for the remaining permitted processes/pollutants will be based on the following table: [OAR 340-220-0090]

Emission Source Description	Permitted Process Code (DEQ Codes)	PM_{10} (tons)	SO_2 (tons)	NO_x (tons)	VOC (tons
Roads	FS-1	3.1			
Open Flare	GS-1	2.2	2.2	5.2	0.3
Fugitive LFG	FS-2				11.0
Petroleum Cont. Soil	FS-2				0.8
Tipper	GS-1	0.3	0.2	3.6	0.3
AI	GS-1	1.0	1.0	1.0	1.0

NON-APPLICABLE REQUIREMENTS

39. State and Federal air quality requirements (e.g., rules and regulations) currently determined not applicable to the permittee are listed below along with the reason for the non-applicability: [OAR 340-218-0110]

Applicable Requirement	Reason Code
OAR Chapter 340:	
Division 202	
All rules	I
Division 204	
All rules	I
Division 206	
0050	C
0060 through 0070	I
Division 208	
0500 through 0610	D
Division 210	
0100 through 0120	B
Division 212	
0200 through 0280	J
Division 214	
0200 and 0220	C
0400 through 0430	B
Division 218	
0050(4)	B
0050(8)	H
0060	I
0070	I
0090	B
0100	B
0250	I
Division 222	
0042	C
0060	H
Division 224	
0050	C
0060	C
Division 225	
0045	C
Division 226	
0400	H
Division 228	
0100 through 0130	F
0300 through 0530	B
0600 through 0678	B
Division 230	
All rules	E
Division 232	
All rules	C
Division 234	
All rules	B
Division 236	
All rules	B
Division 240	
All rules	C
Division 242	
All rules	C
Division 248	
0210 through 0230	B
Division 250	
All rules	I
Division 252	
All rules	I
Division 254	
All rules	E
Division 256	
All rules	B
Division 257	
All rules	E
Division 258	
All rules	B
Division 260	
All rules	B
Division 262	
All rules	B
Division 264	
0100	D
0120 through 0170	D
0190	E
Division 266	
All rules	B
40 CFR	
Part 55	B
Part 57	B
Part 60, except subparts A, WWW, and appendixes	B
Part 61, except subparts A, M, and appendices	B
Part 63, except subparts A, AAAA, and appendices	B
Part 68	B
Part 72 through 76	B
Part 77	B
Part 78	B
Part 82, except subpart F	B
Part 85 through 89	B

Reason code definitions:

A this pollutant is not emitted by the facility
B the facility is not in this source category
C the facility is not in a special control/nonattainment area
D the facility is not in this county
E the facility does not have this emissions unit
F the facility does not use this fuel type

G the rule does not apply because no changes have been made at the facility that would trigger these procedural requirements
H this method/procedure is not used by the facility
I this rule applies only to DEQ and regional authorities
J there are no emissions units with add-on control devices or the pre-controlled potential emissions are less than 100 tons per year or the emissions units with add-on control devices and pre-controlled emissions greater than 100 tons per year are subject to emissions standards promulgated after November of 1990

GENERAL CONDITIONS

G1. General Provision

Terms not otherwise defined in this permit have the meaning assigned to such terms in the referenced regulation.

G2. Reference materials

Where referenced in this permit, the versions of the following materials are effective as of the dates noted unless otherwise specified in this permit:

a. Source Sampling Manual; January 23, 1992 - State Implementation Plan Volume 3, Appendix A4;
b. Continuous Monitoring Manual; January 23, 1992 - State Implementation Plan Volume 3, Appendix A6; and
c. All state and federal regulations as in effect on the date of issuance of this permit.

G3. Applicable Requirements [OAR 340-218-0010(3)(b)]

Oregon Title V Operating Permits do not replace requirements in Air Contaminant Discharge Permits (ACDP) issued to the source even if the ACDP(s) have expired. For a source operating under a Title V permit, requirements established in an earlier ACDP remain in effect notwithstanding expiration of the ACDP or Title V permit, unless a provision expires by its terms or unless a provision is modified or terminated following the procedures used to establish the requirement initially. Source specific requirements, including, but not limited to TACT, RACT, BACT, and LAER requirements, established in an ACDP must be incorporated into the Oregon Title V Operating Permit and any revisions to those requirements must follow the procedures used to establish the requirement initially.

G4. Compliance [OAR 340-218-0040(3)(n)(C), 340-218-0050(6), and 340-218-0080(4)]

a. The permittee must comply with all conditions of this permit. Any permit condition noncompliance constitutes a violation of the Federal Clean Air Act and/or state rules and is grounds for enforcement action; for permit termination, revocation and re-issuance, or modification; or for denial of a permit renewal application. Any noncompliance with a permit condition specifically designated as enforceable only by the state constitutes a violation of state rules only and is grounds for enforcement action; for permit termination, revocation and re-issuance, or modification; or for denial of a permit renewal application.
b. Any schedule of compliance for applicable requirements with which the source is not in compliance at the time of permit issuance is supplemental to, and does not sanction noncompliance with the applicable requirements on which it is based.
c. For applicable requirements that will become effective during the permit term, the source must meet such requirements on a timely basis unless a more detailed schedule is expressly required by the applicable requirement.

G5. Masking Emissions:

The permittee must not install or use any device or other means designed to mask the emission of an air contaminant that causes or is likely to cause detriment to health, safety, or welfare of any person or otherwise violate any other regulation or requirement. [OAR 340-208-0400] This condition is enforceable only by the State.

G6. Credible Evidence:

Notwithstanding any other provisions contained in any applicable requirement, any credible evidence may be used for the purpose of establishing whether a person has violated or is in violation of any such applicable requirements. [OAR 340-214-0120]

G7. Certification [OAR 340-214-0110, 340-218-0040(5), 340-218-0050(3)(c)(D), and 340-218-0080(2)]

Any document submitted to the Department or EPA pursuant to this permit must contain certification by a responsible official of truth, accuracy and completeness. All certifications must state that based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and, complete. The permittee must promptly, upon discovery, report to the Department a material error or omission in these records, reports, plans, or other documents.

G8. Open Burning [OAR Chapter 340, Division 264]

The permittee is prohibited from conducting open burning, except as may be allowed by OAR 340-264-0020 through 340-264-0200.

G9. Asbestos [40 CFR Part 61, Subpart M (federally enforceable), OAR Chapter 340-248-0005 through 340-248-0180 (state-only enforceable) and 340-248-0205 through 340-248-0280]

The permittee must comply with OAR Chapter 340, Division 248, and 40 CFR Part 61, Subpart M when conducting any renovation or demolition activities at the facility.

G10. Stratospheric Ozone and Climate Protection [40 CFR 82 Subpart F, OAR 340-260-0040]

The permittee must comply with the standards for recycling and emissions reduction pursuant to 40 CFR Part 82, Subpart F, Recycling and Emissions Reduction.

G11. Permit Shield [OAR 340-218-0110]

a. Compliance with the conditions of the permit is deemed compliance with any applicable requirements as of the date of permit issuance provided that:

i. such applicable requirements are included and are specifically identified in the permit, or
ii. the Department, in acting on the permit application or revision, determines in writing that other requirements specifically identified are not applicable to the source, and the permit includes the determination or a concise summary thereof.

b. Nothing in this rule or in any federal operating permit alters or affects the following:

i. the provisions of ORS 468.115 (enforcement in cases of emergency) and ORS 468.035 (function of department);
ii. the liability of an owner or operator of a source for any violation of applicable requirements prior to or at the time of permit issuance;

iii. the applicable requirements of the national acid rain program, consistent with section 408(a) of the FCAA; or
iv. the ability of the Department to obtain information from a source pursuant to ORS 468.095 (investigatory authority, entry on premises, status of records).

c. Sources are not shielded from applicable requirements that are enacted during the permit term, unless such applicable requirements are incorporated into the permit by administrative amendment, as provided in OAR 340-218-0150(1)(h), significant permit modification, or reopening for cause by the Department.

G12. Inspection and Entry [OAR 340-218-0080(3)]

Upon presentation of credentials and other documents as may be required by law, the permittee must allow the Department of Environmental Quality, or an authorized representative (including an authorized contractor acting as a representative of the EPA Administrator), to perform the following:

a. enter upon the permittee's premises where an Oregon Title V Operating Permit program source is located or emissions-related activity is conducted, or where records must be kept under the conditions of the permit;
b. have access to and copy, at reasonable times, any records that must be kept under conditions of the permit;
c. inspect, at reasonable times, any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit; and
d. as authorized by the FCAA or state rules, sample or monitor, at reasonable times, substances or parameters, for the purposes of assuring compliance with the permit or applicable requirements.

G13. Fee Payment [OAR 340-220-0010, and 340-220-0030 through 340-220-0190]

The permittee must pay an annual base fee and an annual emission fee for particulates, sulfur dioxide, nitrogen oxides, and volatile organic compounds. The permittee must submit payment to the Department of Environmental Quality, Business Office, 811 SW 6th Avenue, Portland, OR 97204, within 30 days of the date the Department mails the fee invoice or August 1 of the year following the calendar year for which emission fees are paid, whichever is later. Disputes must be submitted in writing to the Department of Environmental Quality. Payment must be made regardless of the dispute. User-based fees will be charged for specific activities (e.g., computer modeling review, ambient monitoring review, etc.) requested by the permittee.

G14. Off-Permit Changes to the Source [OAR 340-218-0140(2)]

a. The permittee must monitor for, and record, any off-permit change to the source that:

i. is not addressed or prohibited by the permit;
ii. is not a Title I modification;
iii. is not subject to any requirements under Title IV of the FCAA;
iv. meets all applicable requirements;
v. does not violate any existing permit term or condition; and
vi. may result in emissions of regulated air pollutants subject to an applicable requirement but not otherwise regulated under this permit or may result in insignificant changes as defined in OAR 340-200-0020.

b. A contemporaneous notification, if required under OAR 340-218-0140(2)(b), must be submitted to the Department and the EPA.

c. The permittee must keep a record describing off-permit changes made at the facility that result in emissions of a regulated air pollutant subject to an applicable requirement, but not otherwise regulated under the permit, and the emissions resulting from those off-permit changes.
d. The permit shield of Condition G9 does not extend to off-permit changes.

G15. Section 502(b)(10) Changes to the Source [OAR 340-218-0140(3)]

a. The permittee must monitor for, and record, any section 502(b)(10) change to the source, which is defined as a change that would contravene an express permit term but would not:

i. violate an applicable requirement;
ii. contravene a federally enforceable permit term or condition that is a monitoring, recordkeeping, reporting, or compliance certification requirement; or
iii. be a Title I modification.

b. A minimum 7-day advance notification must be submitted to the Department and the EPA in accordance with OAR 340-218-0140(3)(b).
c. The permit shield of Condition G9 does not extend to section 502(b)(10) changes.

G16. Administrative Amendment [OAR 340-218-0150]

Administrative amendments to this permit must be requested and granted in accordance with OAR 340-218-0150. The permittee must promptly submit an application for the following types of administrative amendments upon becoming aware of the need for one, but no later than 60 days of such event:

a. legal change of the registered name of the company with the Corporations Division of the State of Oregon, or
b. sale or exchange of the activity or facility.

G17. Minor Permit Modification [OAR 340-218-0170]

The permittee must submit an application for a minor permit modification in accordance with OAR 340-218-0170.

G18. Significant Permit Modification [OAR 340-218-0180]

The permittee must submit an application for a significant permit modification in accordance with OAR 340-218-0180

G19. Staying Permit Conditions [OAR 340-218-0050(6)(c)]

Notwithstanding conditions G16 and G17, the filing of a request by the permittee for a permit modification, revocation and re-issuance, or termination, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.

G20. Construction/Operation Modification [OAR 340-218-0190]

The permittee must obtain approval from the Department prior to construction or modification of any stationary source or air pollution control equipment in accordance with OAR 340-210-0200 through OAR 340-210-0250.

G21. New Source Review Modification [OAR 340-224-0010]

The permittee may not begin construction of a major source or a major modification of any stationary source without having received an air contaminant discharge permit (ACDP) from the Department and having satisfied the requirements of OAR 340, Division 224.

G22. Need to Halt or Reduce Activity Not a Defense [OAR 340-218-0050(6)(b)]

The need to halt or reduce activity will not be a defense. It will not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

G23. Duty to Provide Information [OAR 340-218-0050(6)(e) and OAR 340-214-0110]

The permittee must furnish to the Department, within a reasonable time, any information that the Department may request in writing to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit, or to determine compliance with the permit. Upon request, the permittee must also furnish to the Department copies of records required to be retained by the permit or, for information claimed to be confidential, the permittee may furnish such records to the Department along with a claim of confidentiality.

G24. Reopening for Cause [OAR 340-218-0050(6)(c) and 340-218-0200]

a. The permit may be modified, revoked, reopened and reissued, or terminated for cause as determined by the Department.
b. A permit must be reopened and revised under any of the circumstances listed in OAR 340-218-0200(1)(a).
c. Proceedings to reopen and reissue a permit must follow the same procedures as apply to initial permit issuance and affect only those parts of the permit for which cause to reopen exists.

G25. Severability Clause [OAR 340-218-0050(5)]

Upon any administrative or judicial challenge, all the emission limits, specific and general conditions, monitoring, recordkeeping, and reporting requirements of this permit, except those being challenged, remain valid and must be complied with.

G26. Permit Renewal and Expiration [OAR 340-218-0040(1)(a)(D) and 340-218-0130]

a. This permit expires at the end of its term, unless a timely and complete renewal application is submitted as described below. Permit expiration terminates the permittee's right to operate.
b. Applications for renewal must be submitted at least 12 months before the expiration of this permit, unless the Department requests an earlier submittal. If more than 12 months is required to process a permit renewal application, the Department must provide no less than six (6) months for the owner or operator to prepare an application.
c. Provided the permittee submits a timely and complete renewal application, this permit will remain in effect until final action has been taken on the renewal application to issue or deny the permit.

G27. Permit Transference [OAR 340-218-0150(1)(d)]

The permit is not transferable to any person except as provided in OAR 340-218-0150(1)(d).

G28. Property Rights [OAR 340-200-0020 and 340-218-0050(6)(d)]

The permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations, except as provided in OAR 340-218-0110.

G29. Permit Availability [OAR 340-200-0020 and 340-218-0120(2)]

The permittee must have available at the facility at all times a copy of the Oregon Title V Operating Permit and must provide a copy of the permit to the Department or an authorized representative upon request.

ALL INQUIRIES SHOULD BE DIRECTED TO:

Department of Environmental Quality
Air Quality Division
Western Region-Salem Office
750 Front Street NE, Suite 120
Salem, OR 97301-1039
(503) 378-8240

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
OREGON TITLE V OPERATING PERMIT
REVIEW REPORT for Valley Landfills, Inc.

Western Region
750 Front Street NE
Salem, OR 97301-1039

Source Information:

SIC	4953
NAICS	562212

Source Categories (Part and code)	

Compliance and Emissions Monitoring Requirements:

Unassigned emissions	
Emission credits	
Compliance schedule	
Source test	

COMS	
CEMS	
Ambient monitoring	

Reporting Requirements

Annual report (due date)	February 15
Emission fee report (due date)	February 15
SACC (due date)	July 30

Excess emissions report	X
Other reports	Monthly

Air Programs

NSPS (list subparts)	WWW
NESHAP (list subparts)	AAAA
CAM	
Regional Haze (RH)	
Part 68 Risk Management	
CFC	
RACT	
TACT	

Title V	X
Major HAP source	
Federal major source	
NSR	
PSD	
Acid Rain	
GHG	X

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LIST OF ABBREVIATIONS USED IN THIS REVIEW REPORT

ACM	asbestos containing material	Mg	megagram
AQMA	Air Quality Management Area	MM	million
ASTM	American Society of Testing and Materials	MSW	municipal solid waste
		NA	not applicable
BDT	bone dry ton	NESHAP	National Emission Standard for Hazardous Air Pollutants
CEMS	continuous emissions monitoring system		
		NMOC	nonmethane organic compounds
CFR	Code of Federal Regulations	NO_x	oxides of nitrogen
CMS	continuous monitoring system	NSPS	New Source Performance Standard
CO	carbon monoxide	NSR	New Source Review
COMS	continuous opacity monitoring system	O_2	oxygen
		OAR	Oregon Administrative Rules
DEQ	Oregon Department of Environmental Quality	ORS	Oregon Revised Statutes
		O&M	operation and maintenance
dscf	dry standard cubic feet	Pb	lead
EF	emission factor	PCD	pollution control device
EPA	United State Environmental Protection Agency	PM	particulate matter
		PM_{10}	particulate matter less than 10 microns in size
EU	emissions unit		
FCAA	Federal Clean Air Act	Ppm	parts per million
gr/dscf	grains per dry standard cubic feet	PSD	Prevention of Significant Deterioration
HAP	hazardous air pollutant		
H_2S	hydrogen sulfide	PSEL	Plant Site Emission Limit
ID	identification code	SO_2	sulfur dioxide
I&M	inspection and maintenance	ST	source test
LFG	landfill gas	VE	visible emissions
MB	material balance	VMT	vehicle mile traveled
Mlb	1000 pounds	VOC	volatile organic compound

INTRODUCTION

1. The proposed permit is a renewal of an existing Title V permit which was issued on 07/27/05 and is scheduled to expire on 02/01/10. The following changes are being made to the permit:

   1.a. Deleting the requirements for semiannual public meetings.
   1.b. Deleting the requirements for monthly submittal of wellhead pressures, temperatures, and oxygen concentrations. Other monitoring data will continue to be submitted monthly concerning landfill operations and gas collection rates.
   1.c. Allowing certain passive gas collection wells to not meet the requirements of Conditions 13.8 and 13.9 regarding negative pressure and oxygen concentrations (previously approved by letter).
   1.d. Allowing certain gas collection wells to meet a higher operating temperature requirement than that in Condition 13.9 (previously approved by letters).
   1.e. Allowing certain gas collection wells to operate under an Alternative Operating and Monitoring Plan (previously approved by letter).
   1.f. Updating the permit to reflect the current Title V template used by the Department.

2. In accordance with OAR 340-218-0120(1)(f), this review report is intended to provide the legal and factual basis for the draft permit conditions. In most cases, the legal basis for a permit condition is included in the permit by citing the applicable regulation. In addition, the factual basis for the requirement may be the same as the legal basis. However, when the regulation is not specific and only provides general requirements, this review report is used to provide a more thorough explanation of the factual basis for the draft permit conditions.

3. Since the original Title V permit issuance, the following permit changes have occurred and will also be incorporated into the renewal permit:

Date	Permit revision or notification	Brief explanation
06/12/08	Administrative amendment	Updated the excess emission reporting requirements to coincide with rule changes
08/05/08	Minor permit modification	Removed requirements regarding the IC engines owned and operated by Power Resources

PERMITTEE IDENTIFICATION

4. Valley Landfills, Inc., owns and operates the Coffin Butte Landfill in Benton County near Corvallis, Oregon. The landfill began accepting municipal solid wastes in 1953 into Cell 0, which closed in 1977 with 657,000 tons (0.60 Mg), in place. At that time Cell 1 was activated and operated until 1993 when it was closed with 1.659 million tons (1.50 Mg) in place. Cell 2A/2B was opened in 1993 and closed in 1995 with 0.525 million tons (0.48 Mg) in place. Cell 2C/2D, which was opened in 1995, reached capacity (1.668 million tons or 1.51 Mg) in 2002. Cell 3 is currently being filled. Future landfill expansions (Cells 4 and 5) would increase capacity. During the term of this Title V permit, Cells 3 and 4 will continue to be developed and operated.

FACILITY DESCRIPTION

5. The Coffin Butte Landfill accepts municipal solid waste (MSW) for disposal, asbestos-containing materials (ACM) for disposal, petroleum contaminated soils, and recyclable materials for storage and transfer. The major activities at the facility include the receipt, disposal, and management of MSW. Although the total contiguous area owned by Valley Landfills is approximately 700 acres, only about 85 acres encompass the closed and active portions of the MSW landfill. Another 5 acres comprise the closed and active ACM disposal area. Approximately 500,000-600,000 tons of municipal solid waste is disposed of annually at the

landfill, primarily from Benton, Linn, and Polk counties although some material is also accepted from Marion, Tillamook, Lane, and Lincoln counties.

Landfill gas (LFG) generated from the decomposition of the MSW is actively collected (except from Cell 0) by a series of horizontal or vertical gas extraction wells, piping, and control valves and routed to the adjacent Power Resources, Inc., facility as a fuel to operate a power generation plant. Power Resources, Inc. is not affiliated, owned, or operated by Valley Landfills, Inc. The Power Resources facility is operated under a separate Title V Permit (No. 02-9503) issued by the Department. Power Resources may add additional engines or other power generating technology in the future in order to handle any excess landfill gas generated. Valley Landfills installed a new larger flare in 2004 under their permit and supervision in order to combust any excess landfill gas.

Leachate developed in the landfill and condensates from the gas collection system are collected in leachate ponds and disposed of via tanker truck to the City of Corvallis WWTP. The facility originally had constructed a wastewater treatment on site using direct osmosis and reverse osmosis on the leachate, and discharging treated water under an NPDES permit issued by the Department. However, the treatment plant did not work as envisioned and the facility has been mothballed along with all the associated equipment.

A rock quarry and crusher is also situated on Valley Landfill property but the mineral rights have been sold to the company operating the quarry and crusher. The quarry and crusher operation provide a very small quantity of rock and soil (only about 1% of quarry production) for use by the landfill in road construction and capping of closed cells.

EMISSIONS UNIT AND POLLUTION CONTROL DEVICE IDENTIFICATION

6. The emissions units at this facility are the following:

Control: Any excess landfill gas generated and collected which cannot be sent to the Power Resources' IC engines is routed to the large open flare.

F-LFG1: This emissions unit includes fugitive landfill gas emissions from Cell 0, which does not have an active landfill gas collection system.

F-LFG2: This emissions unit includes fugitive landfill gas emissions from Cells 1to 4 which have an active and expanding landfill gas collection and extraction system (LFGCES-1).

PIR: This emissions unit includes vehicle traffic emissions on paved roads in the facility, which are controlled by water application.

UPR: This emissions unit includes vehicle traffic emissions on two sections of unpaved roads (UPR-1 and UPR-2) in the facility, which are controlled by chemical dust suppressant agent and water application.

TIP: This emissions unit includes the diesel fueled tipper emissions.

PCS: This emissions unit includes the petroleum contaminated soils received at the facility.

Aggregate Insignificant: This emissions unit includes emissions of PM/PM_{10} (from cell development, operation, and closing, wastewater treatment system operation, portable light plant, four trash pumps, and one generator); CO, NO_x, and SO_2 (from portable light plant, four trash pumps, and one generator); and VOCs and NMOCs (from leachate collection and wastewater treatment system operation, portable light plant, four trash pumps, and one generator).

Aggregate Insignificant Emissions

Pollutant	Activity	Emissions (tons/yr)
PM/PM_{10}	Cement handling	0.001
	Cell development and closure	0.875
	Portable light plant	0.003
	Trash pumps	-0-
	Generator	.001
	Total	0.88
CO	Portable light plant	0.008
	Trash pumps	0.059
	Generator	0.362
	Total	0.429
SO_2	Portable light plant	0.003
	Trash pumps	-0-
	Generator	-0-
	Total	0.003
NO_x	Portable light plant	0.471
	Trash pumps	0.002
	Generator	0.009
	Total	0.482
VOC/NMOC	Leachate collection pond	0.230
	Portable light plant	0.003
	Trash pumps	0.003
	Generator	0.018
	Total	0.254

7. Categorically insignificant activities at the facility include the following

- Constituents of a chemical mixture present at less than 1% by weight of any chemical or compound regulated under OAR Chapter 340, Divisions 200 through 268, excluding Divisions 248 and 262, or less than 0.1% by weight of any carcinogen listed in the U.S. Department of Health and Human Service's Annual Report on Carcinogens when usage of the chemical mixture is less than 100,000 pounds/year
- Evaporative and tail pipe emissions from on-site motor vehicle operation
- Distillate oil, kerosene, and gasoline fuel burning equipment rated at less than or equal to 0.4 million Btu/hr
- Natural gas and propane burning equipment rated at less than or equal to 2.0 million Btu/hr
- Office activities
- Janitorial activities
- Personal care activities
- Groundskeeping activities including, but not limited to building painting and road and parking lot maintenance
- On-site recreation facilities
- Maintenance and repair shop
- Air cooling or ventilating equipment not designed to remove air contaminants generated by or released from associated equipment

- Refrigeration systems with less than 50 pounds of charge of ozone depleting substances regulated under Title VI, including pressure tanks used in refrigeration systems but excluding any combustion equipment associated with such systems
- Temporary construction activities
- Accidental fires
- Air vents from air compressors
- Routine maintenance, repair, and replacement such as anticipated activities most often associated with and performed during regularly scheduled equipment outages to maintain a plant and its equipment in good operating condition, including but not limited to steam cleaning, abrasive use, and woodworking
- Electric motors
- Storage tanks, reservoirs, transfer and lubricating equipment used for ASTM grade distillate or residual fuels, lubricants, and hydraulic fluids
- On-site storage tanks not subject to any New Source Performance Standards (NSPS), including underground storage tanks (UST), storing gasoline or diesel used exclusively for fueling of the facility's fleet of vehicles
- Pressurized tanks containing gaseous compounds
- Storm water settling basins
- Fire suppression and training
- Emergency generators and pumps used only during loss of primary equipment or utility service due to circumstances beyond the reasonable control of the owner or operator, or to address a power emergency as determined by the Department
- Ash piles maintained in a wetted condition and associated handling systems and activities

EMISSION LIMITS AND STANDARDS, TESTING, MONITORING, AND RECORDKEEPING

8. All applicable state and federal requirements have been previously placed in the permit. Federal and state enforceable conditions regarding fugitive dust, visible emissions, and grain loading have been placed in the permit, as well as state only enforceable limits and standards for odors, particulate deposition, and asbestos-containing material disposal and cover.

The facility is subject to New Source Performance Standards (40 CFR Part 60, Subpart WWW) for municipal solid waste disposal facilities and is considered a "modified existing" facility under these rules. Oregon has delegated authority to enforce these rules.

This facility is also subject to the MACT standards and requirements of 40 CFR Part 63 Subpart AAAA because this regulation also covers HAPs from area source landfills as well as major source landfills.

PLANT SITE EMISSION LIMITS

9. Provided below is a summary of the baseline emissions rate, netting basis, and plant site emission limits.

Pollutant	Baseline Emission Rate (tons/yr)	Netting Basis		Plant Site Emission Limit (PSEL)		
		Previous (tons/yr)	Proposed (tons/yr)	Previous PSEL (tons/yr)	Proposed PSEL (tons/yr)	PSEL Increase (tons/yr)
PM	0.4	1	-0-	24	24	-0-
PM_{10}	0.1	-0-	-0-	14	14	-0-
CO	0.9	2	1	99	99	-0-
NO_x	-0-	-0-	-0-	39	39	-0-
SO_2	-0-	-0-	-0-	39	39	-0-
VOC	4.4	4	4	39	39	-0-
NMOC	11.1	11	11	49	49	-0-
H_2S	0.3	-0-	-0-	NA	NA	NA

9.a. The baseline period is 1978 for all pollutants. The baseline emission rates for PM and CO were recalculated in the last permitting action using the latest AP-42 and DEQ factors. In accordance with OAR 340-200-0020(71), the baseline emission rate was "frozen" during the 4/04 permitting action since that was the first permitting action to occur after 7/1/02.

9.b. The proposed netting basis is equal to the revised baseline values (after rounding) for all pollutants since the facility has not had any Prevention of Significant Deterioration approvals under OAR 340-224-0070 and no rule reductions have been required since baseline.

9.c. In accordance with OAR 340-222-0041(1), the proposed PSELs for all pollutants reflect the Generic PSEL levels since anticipated emissions are greater than the Department's de minimis levels but less than the Significant Emission Rate. No PSEL is being established for H_2S since anticipated emissions are less than the de minimis level.

SIGNIFICANT EMISSION RATE

10. The proposed PSELs are greater than the netting basis but less than the SER for all pollutants as shown below and no further air quality analysis is required.

Pollutant	SER	Requested increase over netting basis
PM	25	24
PM_{10}	15	14
CO	100	98
NO_x	40	39
SO_2	40	39
VOC	40	35
NMOC	50	38

HAZARDOUS AIR POLLUTANTS

11. The estimated total HAP emissions for this facility are less than 25 tons/year with no single HAP emission being greater than 10 tons/year. A listing of Hazardous Air Pollutants emitted by this facility is given below:

Pollutant	**Fugitives (tons/yr)**	**Open Flare (tons/yr)**	**Total (tons/yr)**
1,1,1-Trichloroethane	0.032	0.004	0.036
1,1,2,2-Tetrachloroethane	0.093	0.011	0.104
1,1-Dichloroethane	0.116	0.014	0.130
1,1-Dichloroethene	0.010	0.001	0.011
1,2-Dichloroethane	0.020	0.002	0.022
1,2-Dichloropropane	0.010	0.001	0.011
Acrylonitrile	0.167	0.141	0.308
Benzene	0.074	0.063	0.137
Carbon disulfide	0.022	Negl.	0.022
Carbon tetrachloride	0.001	Negl.	0.001
Carbonyl sulfide	0.015	Negl.	0.015
Chlorobenzene	0.014	0.002	0.016
Chloroethane	0.040	0.005	0.045
Chloroform	0.002	Negl.	0.002
Dichlorobenzene	0.015	0.002	0.017

Pollutant	Fugitives (tons/yr)	Open Flare (tons/yr)	Total (tons/yr)
Dichloromethane	0.604	0.074	0.678
Ethylbenzene	0.243	0.206	0.449
Hexane	0.281	0.239	0.520
Hydrogen chloride	---	1.041	1.041
Mercury	Negl.	Negl.	Negl.
Methyl ethyl ketone	0.254	0.216	0.470
Methyl isobutyl ketone	0.093	0.079	0.172
Perchlorethylene	0.307	0.038	0.345
Toluene	1.800	1.527	3.327
Trichloroethene	0.184	0.023	0.207
Vinyl chloride	0.228	0.028	0.256
Xylene	0.639	0.540	1.179
TOTAL	5.26	4.26	9.52

Although the facility is not a major source of HAPs, it is still subject to the 40 CFR Part 63 Subpart AAAA requirements issued on 11/26/02 by EPA because this regulation also covers HAPs from area source landfills as well as major source landfills. As such it was required to develop and implement a Startup, Shutdown, and Malfunction Plan.

GENERAL BACKGROUND INFORMATION

12. The source is located in an area that is in attainment with all National Ambient Air Quality Standards (NAAQS) and is not located within 100 km (62 miles) of any Class I area. The facility is located within 30 km of the Salem SKATS.

13. A Land Use Compatibility Statement signed by Benton County on March 6, 1997, granted unconditional approval.

14. Other permits issued by the Department of Environmental Quality for this source include an NPDES Permit and a Solid Waste Disposal Permit.

COMPLIANCE HISTORY

15. The facility was inspected in 2009, 2007, 2005, and 2003 and was found to be in compliance with permit conditions.

16. Although reduced considerably in frequency from past years, complaints are still being received regarding odors from the facility. The complaints have been investigated and are being resolved through additional collection well installations and collection piping changes and improvements.

17. No enforcement actions have been taken against the source under air quality rules.

SOURCE TEST RESULTS

18. Source tests were done on the Power Resources internal combustion engines in 2001, 2004, and 2008 which showed compliance with the emission limit standards of the NSPS. No source tests have been done on the open flare.

PUBLIC NOTICE

19. Because this is a renewal of a Title V permit which is a Category III permitting action, the permit was placed on a 35-day public notice period from September 1, 2009, to October 5, 2009. One set of comments was received and is shown in Appendix C. The Department's response to the comments is given in Appendix B.

The EPA had no objection to the issuance of this permit.

EMISSION DETAIL SHEETS

20. Emission detail sheets for the baseline period and projected operations are shown in Appendix A to this review report.

APPENDIX A

Baseline 1978 Emissions

PM

Emission Unit	Operating Parameter	Emission Factor		Emissions (tons/yr)
		Rate	Reference	
Unpaved Roads	7630 VMT/year	0.098 lb/VMT	AP-42 13.2.2 (12/03)	0.4

PM_{10}

Emission Unit	Operating Parameter	Emission Factor		Emissions (tons/yr)
		Rate	Reference	
Unpaved Roads	7630 VMT/year	0.021 lb/VMT	AP-42 13.2.2 (12/03)	0.1

CO

Emission Unit	Operating Parameter	Emission Factor		Emissions (tons/yr)
		Rate	Reference	
FLFG-1	133 MM ft^3 LFG/yr	10.3 lb/MM ft^3 LFG	EPA Landfill Air Emissions Estimation Model (@141 ppm)	0.7
FLFG-2	33 MM ft^3 LFG/yr	10.3 lb/MM ft^3 LFG	EPA Landfill Air Emissions Estimation Model (@141 ppm)	0.2
			TOTAL	0.9

VOC

Emission Unit	Operating Parameter	Emission Factor		Emissions (tons/yr)
		Rate	Reference	
FLFG-1	133 MM ft^3 LFG/yr	51.9 lb/MM ft^3 LFG	EPA Landfill Air Emissions Estimation Model & 39% of NMOC (@232 ppm)	3.5
FLFG-2	33 MM ft^3 LFG/yr	51.9 lb/MM ft^3 LFG	EPA Landfill Air Emissions Estimation Model & 39% of NMOC (@232 ppm)	0.9
			TOTAL	4.4

NMOC

Emission Unit	Operating Parameter	Emission Factor		Emissions (tons/yr)
		Rate	Reference	
FLFG-1	133 MM ft^3 LFG/yr	133.2 lb/MM ft^3 LFG	EPA Landfill Air Emissions Estimation Model (@595 ppm)	8.9
FLFG-2	33 MM ft^3 LFG/yr	133.2 lb/MM ft^3 LFG	EPA Landfill Air Emissions Estimation Model (@595 ppm)	2.2
			TOTAL	11.1

H_2S

Emission Unit	Operating Parameter	Emission Factor		Emissions (tons/yr)
		Rate	Reference	
FLFG-1	133 MM ft^3 LFG/yr	3.1 lb/MM ft^3 LFG	EPA Landfill Air Emissions Estimation Model (@35.5 ppm)	0.2
FLFG-2	33 MM ft^3 LFG/yr	3.1 lb/MM ft^3 LFG	EPA Landfill Air Emissions Estimation Model (@35.5 ppm)	0.1
			TOTAL	0.3

Projected Emissions

PM

Emission Unit	Operating Parameter	Emission Factor		Emissions (tons/yr)
		Rate	Reference	
Unpaved Road 1	150,000 vehicles/year; 0.8 miles RT	0.013 lb/VMT	AP-42 13.2.2 (12/03)	0.8
Unpaved Road 2	73,500 vehicles/year; 1.0 miles RT	0.098 lb/VMT	AP-42 13.2.2 (12/03)	3.6
Paved Roads	150,000 vehicles/yr; 0.6 miles RT	0.233 lb/VMT	AP-42 13.2.1 (12/03)	10.5
Open Flare	258 MM ft^3 methane/yr	17 lb/MM ft^3 methane	AP-42 2.4 (11/98)	2.2
Tipper	2000 hours/yr; 115 hp	0.0022 lb/hp-hr	AP-42 3.3 (10/96)	0.3
AI	---	---	---	1.0
			TOTAL	18.4

PM_{10}

Emission Unit	Operating Parameter	Emission Factor		Emissions (tons/yr)
		Rate	Reference	
Unpaved Road 1	150,000 vehicles/year; 0.8 miles RT	0.0044 lb/VMT	AP-42 13.2.2 (12/03)	0.3
Unpaved Road 2	73,500 vehicles/year; 1.0 miles RT	0.021 lb/VMT	AP-42 13.2.2 (12/03)	0.8
Paved Roads	150,000 vehicles/yr; 0.6 miles RT	0.045 lb/VMT	AP-42 13.2.1 (12/03)	2.0
Open Flare	258 MM ft^3 methane/yr	17 lb/MM ft^3 methane	AP-42 2.4 (11/98)	2.2
Tipper	2000 hours/yr; 115 hp	0.0022 lb/hp-hr	AP-42 3.3 (10/96)	0.3
AI	---	---	---	1.0
			TOTAL	6.6

CO

Emission Unit	Operating Parameter	Emission Factor		Emissions (tons/yr)
		Rate	Reference	
FLFG-1	45 MM ft^3 LFG/yr	10.3 lb/MM ft^3 LFG	EPA Landfill Air Emissions Estimation Model (@141 ppm)	0.2
FLFG-2	338 MM ft^3 LFG/yr	10.3 lb/MM ft^3 LFG	EPA Landfill Air Emissions Estimation Model (@141 ppm)	1.7
Open Flare	516 MM ft^3 LFG/yr	0.2 lb/MM Btu @ 550 Btu/ft^3	Manufacturer guarantee	28.4
Tipper	2000 hours/yr; 115 hp	0.00668 lb/hp-hr	AP-42 3.3 (10/96)	0.8
AI	---	---	---	1.0
			TOTAL	32.1

VOC

Emission Unit	Operating Parameter	Emission Factor		Emissions (tons/yr)
		Rate	Reference	
FLFG-1	45 MM ft^3 LFG/yr	51.9 lb/MM ft^3 LFG	EPA Landfill Air Emissions Estimation Model & 39% of NMOC (@232 ppm)	1.2
FLFG-2	338 MM ft^3 LFG/yr	51.9 lb/MM ft^3 LFG	EPA Landfill Air Emissions Estimation Model & 39% of NMOC (@232 ppm)	8.8
Open Flare	516 MM ft^3 LFG/yr	232 ppm inlet & 98% destruction	EPA Landfill Air Emissions Estimation Model & AP-42 2.4 (11/98)	0.3
Tipper	2000 hours/yr; 115 hp	0.0025141 lb/hp-hr	AP-42 3.3 (10/96)	0.3
Pet. Cont. Soil	49,100 T/Y PCS	3% gasoline PCS; 525 ppm VOC	Company estimate	0.8
AI	---	---	---	1.0
			TOTAL	12.4

NMOC

Emission Unit	Operating Parameter	Emission Factor		Emissions (tons/yr)
		Rate	Reference	
FLFG-1	45 MM ft^3 LFG/yr	133.2 lb/MM ft^3 LFG	EPA Landfill Air Emissions Estimation Model (@595 ppm)	3.0
FLFG-2	338 MM ft^3 LFG/yr	133.2 lb/MM ft^3 LFG	EPA Landfill Air Emissions Estimation Model (@595 ppm)	22.5
Open Flare	516 MM ft^3 LFG/yr	595 ppm inlet & 98% destruction	EPA Landfill Air Emissions Estimation Model & AP-42 2.4 (11/98)	0.7
Tipper	2000 hours/yr; 115 hp	0.0025141 lb/hp-hr	AP-42 3.3 (10/96)	0.3
Pet. Cont. Soil	49,100 T/Y PCS	3% gasoline PCS; 525 ppm VOC	Company estimate	0.8
AI	---	---	---	1.0
			TOTAL	28.3

H_2S

Emission Unit	Operating Parameter	Emission Factor		Emissions (tons/yr)
		Rate	Reference	
FLFG-1	45 MM ft^3 LFG/yr	3.1 lb/MM ft^3 LFG	EPA Landfill Air Emissions Estimation Model (@35.5 ppm)	0.1
FLFG-2	338 MM ft^3 LFG/yr	3.1 lb/MM ft^3 LFG	EPA Landfill Air Emissions Estimation Model (@35.5 ppm)	0.5
Open Flare	516 MM ft^3 LFG/yr	35.5 ppm inlet & 99.7% conversion to SO_2	AP-42 2.4 (11/98)	0.002
			TOTAL	0.6

SO_2

Emission Unit	Operating Parameter	Emission Factor		Emissions (tons/yr)
		Rate	Reference	
Open Flare	516 MM ft^3 LFG/yr	49.6 ppm inlet S & 99.7% conversion to SO_2	AP-42 2.4 (11/98)	2.2
Tipper	2000 hours/yr; 115 hp	0.00205 lb/hp-hr	AP-42 3.3 (10/96)	0.2
AI	---	---	---	1.0
			TOTAL	3.4

NO_x

Emission Unit	Operating Parameter	Emission Factor		Emissions (tons/yr)
		Rate	Reference	
Open Flare	258 MM ft^3 methane/yr	40 lb/MM ft^3 methane	AP-42 2.4 (11/98)	5.2
Tipper	2000 hours/yr; 115 hp	0.031 lb/hp-hr	AP-42 3.3 (10/96)	3.6
AI	---	---	---	1.0
			TOTAL	9.8

APPENDIX B

Response to Comments

Comment 1: The permit does not contain emission factor testing requirements for the tipper or gas flare.

Response: Emissions from an open flare cannot be reliably tested. EPA recognizes this by not requiring testing under the NSPS but only requires that the open flare operate in accordance with 40 CFR 60.18 (as outlined in permit condition 13.24). EPA does require testing for compliance purposes for enclosed combustors such as enclosed flares or internal combustion engines, both of which are amenable to source testing. The emission factors used for estimating emissions from the open flare, except for CO, are from the latest edition of AP-42 wherein EPA states that the factors used came from enclosed flare data which was assumed representative for open flares. The CO emission factor came from the flare manufacturer guarantee.

Except for NO_x, all estimated emissions from the tipper are less than half a ton per year. NO_x emissions were estimated at 3.6 tons/year. All emission factors used came from AP-42 Chapter 3.3 for diesel industrial engines. The Title V Monitoring and Testing Guidance document developed by the Department and reviewed and approved in the past by EPA does not require an emission factor verification test on the tipper based on the low level of anticipated emissions. Rather, the guidance requires only the use of emission factors which was done in this case.

The Department does not agree with the request for emission factor verification tests on the tipper or open flare and, therefore, will not be modifying the permit in this regard.

Comment 2: The letters that approved certain variances to the NSPS rules should be included in the review report.

Response: The variances that were previously approved for operation of certain gas collection wells were approved under the authority of the NSPS at 40 CFR 60.753(b) and (c). These sections of the NSPS allow for variances from the negative pressure, temperature, N_2, and O_2 limits for collection wells which meet certain requirements. The landfill had previously applied for variances under these rules and the Department granted them by letter similar to numerous EPA determinations and variance approvals to other landfills.

In order to provide better information to the public, these approval letters will be attached to the review report as Appendix D.

Comment 3: Emission factors for paved roads are unreliable and site specific data should be used to calculate the emission factor for PM_{10} emissions from vehicle traffic on paved roads.

Response: The Department used the default silt contents shown in AP-42 for municipal solid waste landfills for both the paved and unpaved road emission calculations, as has been done numerous times in previous permits for this source and other permits. However, the Department agrees with the commenter that these default silt loadings may not be representative of the on-site loading at this landfill. Therefore, the Department will request that Valley Landfills perform a silt loading analysis for both the paved and unpaved roads. The Department does not wish to delay issuance of the renewal Title V permit, however, and will allow the company to make this analysis outside of any permit requirements but will require by letter that the study be done within the next calendar year.

Based on the above responses, no changes will be made to the proposed Title V permit at this time.

APPENDIX C

NORTHWEST ENVIRONMENTAL DEFENSE CENTER
10015 SW Terwilliger Blvd, Portland, Oregon 97219
Phone: (503) 768-6673 / Fax: (503) 768-6671
www.nedc.org

October 5, 2009

Patricia Hamman-Permit coordinator
750 Front Street NE
Suite 120
Salem, OR 97301-1039

Re: Public Comment Submission Regarding the proposed renewal of a Title V Permit for Valley Landfills Inc.

The Northwest Environmental Defense Center (NEDC) respectfully submits the following comments for the proposed renewal of a Title V permit for Valley Landfills, Inc.. NEDC's mission is to preserve and protect the environment and natural resources of the Pacific Northwest. NEDC's membership includes individuals who visit, recreate near or live in the vicinity of Coffin Butte Landfill and its pollution. NEDC requests a response to comments, as well as notification when the permit renewal is approved.

Introduction

DEQ is proposing to renew Title V permit for a Coffin Butte landfill. NEDC understands contends that the permit is missing certain aspects.

The Permit Does Not Contain Emission Factor Testing Requirements

The Coffin Butte Landfill Plant Site Emission Limits (PSELs) are derived from various emission factors used to estimate the average emissions from typical emission sources in the landfill such as diesel fueled tippers and open landfill gas flares. These emission factors are then used to calculate operational limits for such sources in order for the landfill to comply with the PSELs. Unlike most Title V permit holders that use emission factors, this landfill is not required to test emissions from its sources to make sure that the emission estimates are close enough to the sources' actual emissions. Thus, there is no way to ensure that the landfill actually complies with its PSELs. NEDC requests that the Title V permit for Coffin Butte Landfill require Valley Landfills Inc. to test emissions from the tipper and gas flare to insure that the emissions factors used to develop the PSELs are adequately representative of actual emissions.

DEQ Should Include the Letter that Approved Separate Requirements for Certain Passive Gas Collection Wells in the Review Report.

In section 1(c) and 1(d), DEQ states that the new Title V permit will no longer require certain passive landfill gas collection wells to meet specified negative pressure and oxygen concentrations. DEQ states that the authority for this change comes from a letter. However, the letter is not included in the Review Report. This makes it difficult for the public to determine whether such permit changes are lawful.

Emission Factors for Paved Roads are unreliable.

Finally, NEDC contends that the emission factor used for vehicle emissions from paved roads, AP-42 13.2.1, is not a reliable estimate for the amount of particulate matter actually emitted from vehicles driven on paved roads. For PM 10 emissions, AP-42 13.2.1, calculates emissions based on a silt content of 8.2 g/m^2. The silt level used in AP-42 is inappropriate for this source. Actual dust emissions from paved roads vary with the amount of silt on road surfaces, referred to as "silt loading." Silt loading values of industrial roads vary greatly. Even AP-42 recommends the collection and use of site-specific silt loading data because the use of a tabulated default value for silt loading results in only an order-of-magnitude estimate of the emission factor for fugitive dust from truck traffic on paved roads. Thus, NEDC requests that DEQ use site specific data to calculate the emission factor for PM 10 emitted from paved roads.

Thank you in advance for consideration of these comments.

Sincerely,

Lyndsey Bechtel
Air Project Coordinator, NEDC

APPENDIX D

Oregon
Theodore R. Kulongoski, Governor

Department of Environmental Quality
Western Region - Salem Office
750 Front St. NE, Ste. 120
Salem, OR 97301-1039
(503)378-8240
(503) 378-3684 TTY

May 13, 2009

Brian May
Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330

RE: Valley Landfills, Inc.
Title V Permit No. 02-9502
Benton County
Alternative Operating and Monitoring Plan

Dear Mr. May:

Part of the Title V renewal application submitted on 1/30/09 by Cornerstone Environmental Group on behalf of Valley Landfills, Inc. for your Coffin Butte Landfill facility contained a proposed Alternative Operating and Monitoring Plan. This Plan would allow for operation of LFG wells that are unable to meet the requirements of the New Source Performance Standards in 40 CFR Part 60 Subpart WWW due to poor gas production or composition.

You had requested that this Plan be incorporated into the Title V renewal permit. Because it may be some time yet until the renewal is issued, the Department has decided to review this Plan now. After review of the Plan and the reasons and rationale behind the need for such a Plan, the Department is approving the Plan as proposed in the Title V renewal application. The Department will later incorporate this Plan into the Title V renewal permit.

If you have any questions regarding this Alternative Operating and Monitoring Plan approval, please do not hesitate to call me at 503/378-5316.

Sincerely,

Gary Andes
Natural Resource Specialist

Oregon
Theodore R. Kulongoski, Governor

Department of Environmental Quality
Western Region - Salem Office
750 Front St. NE, Ste. 120
Salem, OR 97301-1039
(503) 378-8240
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June 29, 2009

Brian May
Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330

RE: Valley Landfills, Inc.
Title V Permit No. 02-9502
Benton County
Variance from Temperature Requirements

Dear Mr. May:

The Department has reviewed the letter submitted on June 10, 2009, by Farallon Consulting on behalf of Valley Landfills, Inc. regarding a request for a variance from the wellhead temperature requirements of the New Source Performance Standards in 40 CFR Part 60 Subpart WWW. The purpose of temperature monitoring under the NSPS is to identify whether excess air infiltration into the landfill is occurring and to ensure that elevated temperatures do not cause fires or significantly inhibit anaerobic decomposition by killing the methanogenic bacteria. Although the NSPS requires that each wellhead be operated at less than 55 degrees Celsius, it also allows for the setting of higher values upon a demonstration by the landfill that such a higher value will not cause fires or inhibit anaerobic decomposition.

Valley Landfills previously identified (in July 30, 2007, June 27, 2008, and December 4, 2008 requests) forty nine wells which were operating above or near the 55 degree Celsius limit. The company also presented convincing evidence at those times, based on observations and measurements of methane, carbon dioxide, and carbon monoxide at the wells, that no subsurface fires existed and that the bacteria were robust and were the natural cause of the elevated decomposition temperatures. Based on the information and data present in the previous three requests the Department (in letters dated October 4, 2007, June 30, 2008, and December 9, 2008) granted variances to the NSPS temperature requirement and made the new temperature requirement for the forty nine wells listed in the submittals to be to operate at less than 71 degrees Celsius.

The current June 10, 2009, variance request letter presented information regarding six additional wells which are operating near or at elevated temperatures above 55 degrees Celsius. For the additional six wells, the company also presented convincing evidence, based on observations of methane, carbon dioxide, and carbon monoxide at the wells, that no subsurface fires exist and that the bacteria are robust and are the natural cause of the elevated decomposition temperatures. The variance request also amended an identification number for one of the previous approved wells.

Based on the information and data presented in the latest variance request, the Department is granting a variance to the NSPS temperature requirements and the new

temperature requirement for the 55 wells listed below shall be to operate at less that 71 degrees Celsius:

3C0V0323	3C0V0324	3C0V0325	3C0V0326	3C0V0327
3C0V0328	3C0V0329	3C0V0 331	2B0V0L02	2B0V0U02
2B0V0U03	2B0V0U04	2B0V0U05	2B0V0U06	3A0N0H21
3A0N0H22	3A0N0H23	3A0S0H14	3A0S0H17	3A0S0H18
3A0S0H19	3A0S0H20	3A0S0H21	3A0S0H22	3A0S0H29
3A0S0H30	2B000V06	3A0S0H12	2B000H10	3A0S0H16
3A0V000N	3A0V0042	3A0V0044	3A0V0046	3A0V0047
3A0V0048	3A0V0049	3A0V0050	3B0V0332	3B0V0333
3B0V0334	3B0V0335	3B0V0338	3C0V0006	3C0V0008
3C0V0009	3C0V0010	3C0V0011	3D0V0017	3B0NMD08
3B0V0336	3C0V0007	3C0V0009	3D0V0016	3D0V0018

If you have any questions regarding this variance approval, please do not hesitate to call me at 503/378-5316.

Sincerely,

Gary Andes
Natural Resource Specialist

Oregon
Theodore R. Kulongoski, Governor

Department of Environmental Quality
Western Region - Salem Office
750 Front St. NE, Ste. 120
Salem, OR 97301-1039
(503) 378-8240
(503) 378-3684 TTY

December 9, 2008

Brian May
Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330

RE: Valley Landfills, Inc.
Title V Permit No. 02-9502
Benton County
Variance from Temperature Requirements

Dear Mr. May:

The Department has reviewed the letter submitted on December 4, 2008, by Farallon Consulting on behalf of Valley Landfills, Inc. regarding a request for a variance from the wellhead temperature requirements of the New Source Performance Standards in 40 CFR Part 60 Subpart WWW. The purpose of temperature monitoring under the NSPS is to identify whether excess air infiltration into the landfill is occurring and to ensure that elevated temperatures do not cause fires or significantly inhibit anaerobic decomposition by killing the methanogenic bacteria. Although the NSPS requires that each wellhead be operated at less than 55 degrees Celsius, it also allows for the setting of higher values upon a demonstration by the landfill that such a higher value will not cause fires or inhibit anaerobic decomposition.

Valley Landfills previously identified (in July 30, 2007 and June 27, 2008 requests) twenty seven wells which were operating above or near the 55 degree Celsius limit. The company also presented convincing evidence at those times, based on observations and measurements of methane, carbon dioxide, and carbon monoxide at the wells, that no subsurface fires existed and that the bacteria were robust and were the natural cause of the elevated decomposition temperatures. Based on the information and data present in the previous two requests the Department (in letters dated October 4, 2007 and June 30, 2008) granted variances to the NSPS temperature requirement and made the new temperature requirement for the twenty seven wells listed in the submittals to be to operate at less than 71 degrees Celsius.

The current December 4, 2008, variance request letter presented information regarding twenty two additional wells which are operating near or at elevated temperatures above 55 degrees Celsius. For the additional twenty two wells, the company also presented convincing evidence, based on observations of methane, carbon dioxide, and carbon monoxide at the wells, that no subsurface fires exist and that the bacteria are robust and are the natural cause of the elevated decomposition temperatures.

Based on the information and data presented in the latest variance request, the Department is granting a variance to the NSPS temperature requirements and the new

temperature requirement for the 49 wells listed below shall be to operate at less that 71 degrees Celsius:

3C0V0323	3C0V0324	3C0V0325	3C0V0326	3C0V0327
3C0V0328	3C0V0329	3C0V0 331	2B0V0L02	2B0V0U02
2B0V0U03	2B0V0U04	2B0V0U05	2B0V0U06	3A0N0H21
3A0N0H22	3A0N0H23	3A0S0H14	3A0S0H17	3A0S0H18
3A0S0H19	3A0S0H20	3A0S0H21	3A0S0H22	3A0S0H29
3A0S0H30	2B000V06	3A0S0H12	3A0S0H10	3A0S0H16
3A0V000N	3A0V0042	3A0V0044	3A0V0046	3A0V0047
3A0V0048	3A0V0049	3A0V0050	3B0V0332	3B0V0333
3B0V0334	3B0V0335	3B0V0338	3C0V0006	3C0V0008
3C0V0009	3C0V0010	3C0V0011	3D0V0017	

If you have any questions regarding this variance approval, please do not hesitate to call me at 503/378-5316.

Sincerely,

Gary Andes

Gary Andes
Natural Resource Specialist

Oregon
Theodore R. Kulongoski, Governor

Department of Environmental Quality
Western Region - Salem Office
750 Front St. NE, Ste. 120
Salem, OR 97301-1039
(503) 378-8240
(503) 378-3684 TTY

June 30, 2008

Melissa Green
Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330

RE: Valley Landfills, Inc.
Title V Permit No. 02-9502
Benton County
Variance from Temperature Requirements

Dear Mrs. Green:

The Department has reviewed the revised letter submitted on June 27, 2008, by Farallon Consulting on behalf of Valley Landfills, Inc. regarding a request for a variance from the wellhead temperature requirements of the New Source Performance Standards in 40 CFR Part 60 Subpart WWW. The purpose of temperature monitoring under the NSPS is to identify whether excess air infiltration into the landfill is occurring and to ensure that elevated temperatures do not cause fires or significantly inhibit anaerobic decomposition by killing the methanogenic bacteria. Although the NSPS requires that each wellhead be operated at less than 55 degrees Celsius, it also allows for the setting of higher values upon a demonstration by the landfill that such a higher value will not cause fires or inhibit anaerobic decomposition.

Valley Landfills previously identified (in a July 30, 2007 request) eight well which were operating at or near the 55 decree Celsius limit. The company also presented convincing evidence at that time, based on observations and measurements of methane, carbon dioxide, and carbon monoxide at the wells, that no subsurface fires existed and that the bacteria were robust and were the natural cause of the elevated decomposition temperatures. Based on the information and data present in that request the Department (in a October 4, 2007 letter) granted a variance to the NSPS temperature requirement and made the new temperature requirement for the eight wells listed in the submittal to be to operate at less than 65 degrees Celsius.

The June 27, 2008, variance request letter presented additional information regarding the eight wells which indicated that they continue to operate at elevated temperatures, sometimes even in excess of the original 65 degrees Celsius approval without any evidence of subsurface fire or methanogenic bacteria death. Based on the more recent monitoring data, the company is now requesting a new operating temperature level for these eight well of 71 degrees Celsius.

In addition to the original eight wells, the company also presented data regarding nineteen other vertical wells which also have elevated temperatures above 55 degrees Celsius. For the additional eighteen wells, the company also presented convincing evidence, based on observations of methane, carbon dioxide, and carbon monoxide at the

wells, that no subsurface fires exist and that the bacteria are robust and are the natural cause of the elevated decomposition temperatures.

Based on the information and data presented in the latest variance request, the Department is granting a variance to the NSPS temperature requirements and the new temperature requirement for the 27 wells listed below shall be to operate at less that 71 degrees Celsius:

3C0V0323
3C0V0324
3C0V0325
3C0V0326
3C0V0327
3C0V0328
3C0V0329
3C0V0 331
2B0V0L02
2B0V0U02
2B0V0U03
2B0V0U04
2B0V0U05
2B0V0U06
3A0N0H21
3A0N0H22
3A0N0H23
3A0S0H14
3A0S0H17
3A0S0H18
3A0S0H19
3A0S0H20
3A0S0H21
3A0S0H22
3A0S0H29
3A0S0H30
2B000V06

If you have any questions regarding this variance approval, please do not hesitate to call me at 503/378-5316.

Sincerely,

Gary Andes
Natural Resource Specialist

Oregon
Theodore R. Kulongoski, Governor

Department of Environmental Quality
Western Region - Salem Office
750 Front St. NE, Ste. 120
Salem, OR 97301-1039
(503)378-8240
(503) 378-3684 TTY

October 4, 2007

Melissa Green
Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330

RE: Valley Landfills, Inc.
Title V Permit No. 02-9502
Benton County
Variance from Temperature Requirements

Dear Mrs. Green:

The Department has reviewed the letter submitted on July 30, 2007 by Farallon Consulting on behalf of Valley Landfills, Inc. regarding a request for a variance from the wellhead temperature requirements of the New Source Performance Standards in 40 CFR Part 60 Subpart WWW. The purpose of temperature monitoring under the NSPS is to identify whether excess air infiltration into the landfill is occurring and to ensure that elevated temperatures do not cause fires or significantly inhibit anaerobic decomposition by killing the methanogenic bacteria. Although the NSPS requires that each wellhead be operated at less than 55 degrees Celsius, it also allows for the setting of higher values upon a demonstration by the landfill that such a higher value will not cause fires or inhibit anaerobic decomposition.

Valley Landfill has identified eight wells which have been operating at or near the 55 degrees Celsius limit (Table 1 of the submittal) since their installation. The company also presented convincing evidence, based on observations and measurements of methane, carbon dioxide, and carbon monoxide at the wells, that no subsurface fires exist and that the bacteria are robust and are the natural cause of the elevated decomposition temperatures.

Based on the information and data presented in the request, the Department is granting a variance to the NSPS temperature requirements and the new temperature requirement for the eight wells listed in the submittal shall be to operate at less than 65 degrees Celsius.

If you have any questions regarding this variance approval, please do not hesitate to call me at 503/378-5316.

Sincerely,

Gary Andes
Natural Resource Specialist