

DETENTION ALLOWABLE RELEASE RATE CALCULATIONS

THE DETENTION POND FOR PHASE 1 ALSO PROVIDES DETENTION FOR PHASES 2 AND 3 AND AREA OS6 BY OVERTAINING RUNOFF FROM DRAINAGE AREAS 8, 9, AND OS2-OS6 SO THAT THE PEAK RUNOFF WILL NOT BE INCREASED WHEN AREA OS6 IS DEVELOPED AND DRAINS INTO THE DETENTION POND AND PHASES 2 AND 3 ARE CONSTRUCTED AND DRAIN DIRECTLY INTO BUFFALO CREEK. THIS ANALYSIS ASSUMES OS1-OS5 WILL PROVIDE THEIR OWN DETENTION

Rockwall Downs
2-Year Storm
Pre-Project Runoff Calculations

Area #	Area (sf)	Area (acres)	Runoff Coefficient	Tc (min)	Rainfall Intensity (in/hr)	Q (cfs)
Phase 1	334983	7.69	0.5	10	5.3	20.4
Phase 2	264179	6.06	0.35	20	3.9	15.9
Phase 3	252067	5.79	0.35	20	3.9	15.2
OS6	138840	3.19	0.35	20	3.9	4.4
Total=						47.1
Allowed Release=						31.0

Post-Project Runoff Calculations

Area #	Area (sf)	Area (acres)	Runoff Coefficient	Tc (min)	Rainfall Intensity (in/hr)	Q (cfs)
Phase 1	334983	7.69	0.5	10	5.3	20.4
Phase 2	264179	6.06	0.5	10	5.3	18.1
Phase 3	252067	5.79	0.5	10	5.3	16.3
OS6	138840	3.19	0.9	10	5.3	15.2
Total=						67.0
Allowed Release=						36.0

10-Year Storm
Pre-Project Runoff Calculations

Area #	Area (sf)	Area (acres)	Runoff Coefficient	Tc (min)	Rainfall Intensity (in/hr)	Q (cfs)
Phase 1	334983	7.69	0.35	20	5.9	12.9
Phase 2	264179	6.06	0.35	20	5.9	15.9
Phase 3	252067	5.79	0.35	20	5.9	15.2
OS6	138840	3.19	0.35	20	5.9	6.6
Total=						46.9
Allowed Release=						28.5

Post-Project Runoff Calculations

Area #	Area (sf)	Area (acres)	Runoff Coefficient	Tc (min)	Rainfall Intensity (in/hr)	Q (cfs)
Phase 1	334983	7.69	0.5	10	7.1	27.3
Phase 2	264179	6.06	0.5	10	7.1	21.5
Phase 3	252067	5.79	0.5	10	7.1	20.5
OS6	138840	3.19	0.9	10	7.1	20.4
Total=						89.7
Allowed Release=						42.8

25-Year Storm
Pre-Project Runoff Calculations

Area #	Area (sf)	Area (acres)	Runoff Coefficient	Tc (min)	Rainfall Intensity (in/hr)	Q (cfs)
Phase 1	334983	7.69	0.35	20	6.6	17.8
Phase 2	264179	6.06	0.35	20	6.6	14.0
Phase 3	252067	5.79	0.35	20	6.6	13.4
OS6	138840	3.19	0.35	20	6.6	7.4
Total=						52.6
Allowed Release=						32.5

Post-Project Runoff Calculations

Area #	Area (sf)	Area (acres)	Runoff Coefficient	Tc (min)	Rainfall Intensity (in/hr)	Q (cfs)
Phase 1	334983	7.69	0.5	10	8.3	31.9
Phase 2	264179	6.06	0.5	10	8.3	25.2
Phase 3	252067	5.79	0.5	10	8.3	23.8
OS6	138840	3.19	0.9	10	8.3	23.8
Total=						104.9
Allowed Release=						62.4

50-Year Storm
Pre-Project Runoff Calculations

Area #	Area (sf)	Area (acres)	Runoff Coefficient	Tc (min)	Rainfall Intensity (in/hr)	Q (cfs)
Phase 1	334983	7.69	0.35	20	7.5	20.2
Phase 2	264179	6.06	0.35	20	7.5	15.9
Phase 3	252067	5.79	0.35	20	7.5	15.2
OS6	138840	3.19	0.35	20	7.5	8.4
Total=						59.7
Allowed Release=						37.7

Post-Project Runoff Calculations

Area #	Area (sf)	Area (acres)	Runoff Coefficient	Tc (min)	Rainfall Intensity (in/hr)	Q (cfs)
Phase 1	334983	7.69	0.5	10	9	34.6
Phase 2	264179	6.06	0.5	10	9	27.3
Phase 3	252067	5.79	0.5	10	9	26.0
OS6	138840	3.19	0.9	10	9	25.8
Total=						113.8
Allowed Release=						64.1

100-Year Storm
Pre-Project Runoff Calculations

Area #	Area (sf)	Area (acres)	Runoff Coefficient	Tc (min)	Rainfall Intensity (in/hr)	Q (cfs)
Phase 1	334983	7.69	0.35	20	8.3	22.3
Phase 2	264179	6.06	0.35	20	8.3	17.8
Phase 3	252067	5.79	0.35	20	8.3	16.8
OS6	138840	3.19	0.35	20	8.3	9.3
Total=						66.0
Allowed Release=						42.8

Post-Project Runoff Calculations

Area #	Area (sf)	Area (acres)	Runoff Coefficient	Tc (min)	Rainfall Intensity (in/hr)	Q (cfs)
Phase 1	334983	7.69	0.5	10	9.8	37.7
Phase 2	264179	6.06	0.5	10	9.8	29.7
Phase 3	252067	5.79	0.5	10	9.8	28.4
OS6	138840	3.19	0.9	10	9.8	28.1
Total=						123.9
Allowed Release=						67.8

Elevation-Storage Table

Elevation (cf)	Volume (cfs)
545	0
546	612
547	1113
548	14330
549	30321
550	56171
551	91574
552	124107
553	163795

Stage-Discharge Table

Stage	H	Area	Discharge	Weir Length	Depth of Flow Over Weir	Weir Discharge	Total Discharge	Allowable Discharge	Above (Below)
545.00	0	1.00	3.7	20.0	0.0	0.0	3.7		
546.00	0.60	0.92	5.6	20.0	0.0	0.0	5.6		
547.00	1.60	0.92	7.1	20.0	0.0	0.0	7.1		
548.00	2.60	0.92	8.4	20.0	0.0	0.0	8.4		
549.00	3.60	0.92	9.5	20.0	0.0	0.0	9.5		
550.00	4.60	0.92	9.5	20.0	0.0	0.0	9.5		
550.22	4.82	0.92	9.7	20.0	0.0	0.0	9.7	11.3	(1.6)
550.98	5.58	0.92	10.4	20.0	0.27	7.6	18.0	25.8	(7.7)
551.00	5.60	0.92	10.4	20.0	0.30	8.6	19.1		
551.10	5.70	0.92	10.6	20.0	0.39	13.1	23.6	25.4	(1.8)
551.21	5.81	0.92	10.6	20.0	0.51	19.1	29.7	33.0	(3.2)
551.27	5.87	0.92	10.7	20.0	0.58	22.3	33.0	38.0	(5.0)
552.00	6.60	0.92	11.3	20.0	1.30	78.0	89.3		
553.00	7.60	0.92	12.2	20.0	2.30	183.5	195.6		

Rockwall Downs
2-Year Storm
Regional Pond Release Rate Calculations

Area #	Area (sf)	Area (acres)	Runoff Coefficient	Tc (min)	Rainfall Intensity (in/hr)	Q (cfs)
OS2-OS5, 8	963163	22.11	0.35	20	3.9	30.2
9	28463	0.65	0.5	10	5.3	1.7
OS6	138840	3.19	0.9	10	5.3	15.2
Total=						47.1
Allowed Release=						36.0

10-Year Storm
Regional Pond Release Rate Calculations

Area #	Area (sf)	Area (acres)	Runoff Coefficient	Tc (min)	Rainfall Intensity (in/hr)	Q (cfs)
OS2-OS5, 8	963163	22.11	0.35	20	5.9	45.7
9	28463	0.65	0.5	10	7.1	2.3
OS6	138840	3.19	0.9	10	7.1	20.4
Total=						68.3
Allowed Release=						42.8

25-Year Storm
Regional Pond Release Rate Calculations

Area #	Area (sf)	Area (acres)	Runoff Coefficient	Tc (min)	Rainfall Intensity (in/hr)	Q (cfs)
OS2-OS5, 8	963163	22.11	0.35	20	6.6	51.1
9	28463	0.65	0.5	10	8.3	2.7
OS6	138840	3.19	0.9	10	8.3	23.8
Total=						77.6
Allowed Release=						52.6

50-Year Storm
Regional Pond Release Rate Calculations

Area #	Area (sf)	Area (acres)	Runoff Coefficient	Tc (min)	Rainfall Intensity (in/hr)	Q (cfs)
OS2-OS5, 8	963163	22.11	0.35	20	7.5	58.0
9	28463	0.65	0.5	10	9	2.9
OS6	138840	3.19	0.9	10	9	25.8
Total=						86.8
Allowed Release=						59.7

100-Year Storm
Regional Pond Release Rate Calculations

Area #	Area (sf)	Area (acres)	Runoff Coefficient	Tc (min)	Rainfall Intensity (in/hr)	Q (cfs)
OS2-OS5, 8	963163	22.11	0.35	20	8.3	64.2
9	28463	0.65	0.5	10	9.8	3.2
OS6	138840	3.19	0.9	10	9.8	28.1
Total=						95.6
Allowed Release=						67.8

DETENTION STORAGE REQUIREMENT CALCULATIONS

DETENTION CALCULATIONS - 2 Year

Storm Duration	Outflow Duration	Area (AC.)	Future "C"	Future "K"	Future "CA"	Rainfall Intensity	Inflow (cfs)	Volume (cubic ft.)	Volume (cubic ft.)	Volume (cubic ft.)	Volume (cubic ft.)	Outflow (cfs)
10	20	26.05	0.41	1.00	10.64	5.30	56.4	33846	5811	28635	0.64	9.7
20	30	26.05	0.41	1.00	10.64	3.90	41.5	49811	8717	41095	0.84	9.7
30	40	26.05	0.41	1.00	10.64	3.30	35.1	63222	11622	51600	1.16	9.7
40	50	26.05	0.41	1.00	10.64	2.90	27.7	66415	14528	51887	1.19	9.7
50	60	26.05	0.41	1.00	10.64	2.60	23.0	73439	17433	56036	1.29	9.7
60	70	26.05	0.41	1.00	10.64	1.90	20.2	72901	20339	62462	1.20	9.7
70	80	26.05	0.41	1.00	10.64	1.80	18.2	80464	23244	67220	1.31	9.7
80	90	26.05	0.41	1.00	10.64	1.70	18.1	86850	26150	69700	1.39	9.7
90	100	26.05	0.41	1.00	10.64	1.60	17.0	91659	29055	62904	1.44	9.7
100	110	26.05	0.41	1.00	10.64	1.50	16.0	95791	31961	63300	1.47	9.7
110	120	26.05	0.41	1.00	10.64	1.40	14.9	98466	34866	63479	1.46	9.7
120	130	26.05	0.41	1.00	10.64	1.30	13.8	99622	37772	61850	1.42	9.7
130	140	26.05	0.41	1.00	10.64	1.20	12.8	99622	40677	58945	1.36	9.7
140	150	26.05	0.41	1.00	10.64	1.10	11.7	98345	43583	54762	1.26	9.7

DETENTION CALCULATIONS - 10 Year

Storm Duration	Outflow Duration	Area (AC.)	Future "C"	Future "K"	Future "CA"	Rainfall Intensity	Inflow (cfs)	Volume (cubic ft.)	Volume (cubic ft.)	Volume (cubic ft.)	Volume (cubic ft.)	Outflow (cfs)
10	20	26.05	0.41	1.00	10.64	7.10	75.6	45341	10804	34637	0.79	18.0
20	30	26.05	0.41	1.00	10.64	5.90	62.8	73353	16236	59149	1.36	18.0
30	40	26.05	0.41	1.00	10.64	4.90	51.1	91959	21608	70351	1.62	18.0
40	50	26.05	0.41	1.00	10.64	4.00	42.6	102177	27010	78166	1.73	18.0
50	60	26.05	0.41	1.00	10.64	3.50	37.3	111756	32413	79343	1.82	18.0
60	70	26.05	0.41	1.00	10.64	3.00	31.9	119549	37815	77134	1.77	18.0
70	80	26.05	0.41	1.00	10.64	2.60	28.0	125169	43217	81550	1.80	18.0
80	90	26.05	0.41	1.00	10.64	2.50	27.7	132830	48619	84211	1.93	18.0
90	100	26.05	0.41									