POND 2 DETENTION & OUTFALL CALCULATIONS

Graphical Hydrograph Method for Stormwater Detention
Seniors - Rockwall, Texas
2 Year Detention Calculations - Pond 2

Purpose: Use the graphical hydrograph method to determine the volume of stormwater storage needed to compensate for increased runoff due to development.

Method: Use the Rational Method to determine maximum rate of runoff

Q = c*I*A Where: c = Runoff Coefficient; I = Rainfall Intensity (in/hr); A = Drainage Area (acres)

Assumptions: Rainfall Intensity determined from attached graph given Time of Concentration (Tc) or Duration and the Return Period of the storm.

For Existing Conditions: Allowable release rate is based upon 20 minute, 2 year storm event for undeveloped flows where c = 0.35, I = 3.90 in./hr.

For Proposed Conditions: Use c = 0.75 for multi-family development

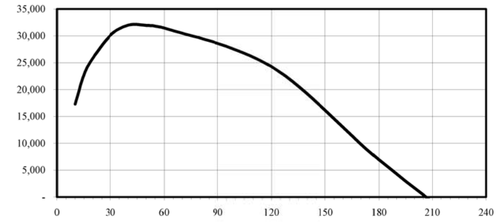
I. Determination of Allowable Release Rate - Existing Site

Total site area	10.68	acres
Detained Time of Concentration (T_c)	20	minutes
Rainfall intensity for two year storm (T_c=20 min)	3.90	inches/hr
Detained runoff coefficient	0.35	
Max. Allowable release rate	14.58	cfs
Area of site draining through detention pond	10.42	acres
Area of site draining undetained	0.26	acres
Undetained Time of Concentration (T_c)	10	minutes
Rainfall intensity for two year storm (T_c=10 min)	5.20	inches/hr
Runoff coefficient for developed conditions	0.75	
Runoff from undetained area	1.01	cfs
Total off-site area passed through	0.00	acres
Time of Concentration (T_c)	20	minutes
Rainfall intensity for two year storm (T_c=20 min)	3.90	inches/hr
Runoff coefficient	0.35	
Off-site pass-through rate	0.00	cfs
On-site total bypass rate from Pond 1	4.82	cfs
On-site allowed bypass rate from Pond 1	2.67	cfs
On-site excess bypass rate from Pond 1	1.75	cfs
Total release rate from detention pond	11.81	cfs
Metered release rate from detention pond	11.81	cfs

II. Required Storage Calculations, Return Period = 2 years

Duration (hours)	Duration (min)	Rainfall Intensity (in/hr)	Inflow Rate (cfs)	Inflow Volume (cf)	Outflow Rate (cfs)	Outflow Volume (cf)	Inflow - Outflow Volume (cf)	Required Storage (ac-ft)
0.17	10	5.20	40.6	24,383	11.81	7,089	17,294	0.397
0.25	15	4.50	35.2	31,651	11.81	8,861	22,790	0.523
0.33	20	3.90	30.5	36,574	11.81	10,633	25,941	0.596
0.50	30	3.15	24.6	44,314	11.81	14,177	30,134	0.692
0.67	40	2.65	20.7	49,703	11.81	17,721	31,982	0.734
0.83	**50**	**2.27**	**17.7**	**53,220**	**11.81**	**21,266**	**31,955**	**0.734**
1.00	60	2.00	15.6	56,268	11.81	24,810	31,458	0.722
2.00	120	1.25	9.8	70,335	11.81	46,075	24,260	0.557
3.00	180	0.88	6.9	74,274	11.81	67,341	6,933	0.159
4.00	240	0.71	5.5	79,901	11.81	88,607	-8,706	-0.200
5.00	300	0.60	4.7	84,402	11.81	109,872	-25,470	-0.585
6.00	360	0.52	4.1	87,778	11.81	131,138	-43,360	-0.995
12.00	720	0.30	2.3	101,282	11.81	258,731	-157,449	-3.615

Stormwater Detention Calculations - Pond 2
Required Storage versus Time



Graphical Hydrograph Method for Stormwater Detention
Seniors - Rockwall, Texas
10 Year Detention Calculations - Pond 2

Purpose: Use the graphical hydrograph method to determine the volume of stormwater storage needed to compensate for increased runoff due to development.

Method: Use the Rational Method to determine maximum rate of runoff

Q = c*I*A Where: c = Runoff Coefficient; I = Rainfall Intensity (in/hr); A = Drainage Area (acres)

Assumptions: Rainfall Intensity determined from attached graph given Time of Concentration (Tc) or Duration and the Return Period of the storm.

For Existing Conditions: Allowable release rate is based upon 20 minute, 10 year storm event for undeveloped flows where c = 0.35, I = 5.80 in./hr.

For Proposed Conditions: Use c = 0.75 for multi-family development

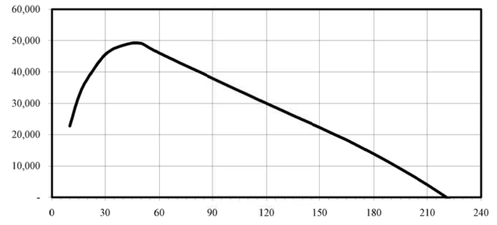
I. Determination of Allowable Release Rate - Existing Site

Total site area	10.68	acres
Detained Time of Concentration (T_c)	20	minutes
Rainfall intensity for ten year storm (T_c=20 min)	5.80	inches/hr
Detained runoff coefficient	0.35	
Max. Allowable release rate	21.68	cfs
Area of site draining through detention pond	10.42	acres
Area of site draining undetained	0.26	acres
Undetained Time of Concentration (T_c)	10	minutes
Rainfall intensity for ten year storm (T_c=10 min)	7.20	inches/hr
Runoff coefficient for developed conditions	0.75	
Runoff from undetained area	1.40	cfs
Total off-site area passed through	0.00	acres
Time of Concentration (T_c)	20	minutes
Rainfall intensity for ten year storm (T_c=20 min)	5.80	inches/hr
Runoff coefficient	0.35	
Off-site pass-through rate	0.00	cfs
On-site total bypass rate from Pond 1	6.55	cfs
On-site allowed bypass rate from Pond 1	4.57	cfs
On-site excess bypass rate from Pond 1	1.98	cfs
Total release rate from detention pond	18.30	cfs
Metered release rate from detention pond	18.30	cfs

II. Required Storage Calculations, Return Period = 10 years

Duration (hours)	Duration (min)	Rainfall Intensity (in/hr)	Inflow Rate (cfs)	Inflow Volume (cf)	Outflow Rate (cfs)	Outflow Volume (cf)	Inflow - Outflow Volume (cf)	Required Storage (ac-ft)
0.17	10	7.20	56.3	33,761	18.30	10,978	22,783	0.523
0.25	15	6.50	50.8	45,718	18.30	13,722	31,995	0.735
0.33	20	5.80	45.3	54,392	18.30	16,467	37,926	0.871
0.50	30	4.80	37.5	67,522	18.30	21,956	45,566	1.046
0.67	40	4.05	31.7	75,962	18.30	27,445	48,517	1.114
0.83	**50**	**3.50**	**27.4**	**82,058**	**18.30**	**32,934**	**49,124**	**1.128**
1.00	60	3.00	23.4	84,402	18.30	38,423	45,980	1.056
2.00	120	1.80	14.1	101,282	18.30	71,356	29,926	0.687
3.00	180	1.40	10.9	118,163	18.30	104,289	13,873	0.318
4.00	240	1.15	9.0	129,416	18.30	137,223	-7,807	-0.179
5.00	300	0.93	7.3	130,823	18.30	170,157	-39,333	-0.903
6.00	360	0.80	6.3	135,043	18.30	203,090	-68,047	-1.562
12.00	720	0.47	3.7	158,676	18.30	400,691	-242,015	-5.556

Stormwater Detention Calculations - Pond 2
Required Storage versus Time



Graphical Hydrograph Method for Stormwater Detention
Seniors - Rockwall, Texas
25 Year Detention Calculations - Pond 2

Purpose: Use the graphical hydrograph method to determine the volume of stormwater storage needed to compensate for increased runoff due to development.

Method: Use the Rational Method to determine maximum rate of runoff

Q = c*I*A Where: c = Runoff Coefficient; I = Rainfall Intensity (in/hr); A = Drainage Area (acres)

Assumptions: Rainfall Intensity determined from attached graph given Time of Concentration (Tc) or Duration and the Return Period of the storm.

For Existing Conditions: Allowable release rate is based upon 20 minute, 25 year storm event for undeveloped flows where c = 0.35, I = 6.75 in./hr.

For Proposed Conditions: Use c = 0.75 for multi-family development

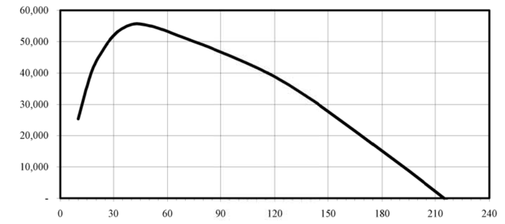
I. Determination of Allowable Release Rate - Existing Site

Total site area	10.68	acres
Detained Time of Concentration (T_c)	20	minutes
Rainfall intensity for twenty-five year storm (T_c=20 min)	6.75	inches/hr
Detained runoff coefficient	0.35	
Max. Allowable release rate	25.23	cfs
Area of site draining through detention pond	10.42	acres
Area of site draining undetained	0.26	acres
Undetained Time of Concentration (T_c)	10	minutes
Rainfall intensity for twenty-five year storm (T_c=10 min)	8.20	inches/hr
Runoff coefficient for developed conditions	0.75	
Runoff from undetained area	1.60	cfs
Total off-site area passed through	0.00	acres
Time of Concentration (T_c)	20	minutes
Rainfall intensity for twenty-five year storm (T_c=20 min)	6.75	inches/hr
Runoff coefficient	0.35	
Off-site pass-through rate	0.00	cfs
On-site total bypass rate from Pond 1	7.17	cfs
On-site allowed bypass rate from Pond 1	5.32	cfs
On-site excess bypass rate from Pond 1	1.85	cfs
Total release rate from detention pond	21.78	cfs
Metered release rate from detention pond	21.78	cfs

II. Required Storage Calculations, Return Period = 25 years

Duration (hours)	Duration (min)	Rainfall Intensity (in/hr)	Inflow Rate (cfs)	Inflow Volume (cf)	Outflow Rate (cfs)	Outflow Volume (cf)	Inflow - Outflow Volume (cf)	Required Storage (ac-ft)
0.17	10	8.20	64.1	38,450	21.78	13,070	25,380	0.583
0.25	15	7.40	57.8	52,048	21.78	16,337	35,711	0.820
0.33	20	6.75	52.8	63,302	21.78	19,604	43,697	1.003
0.50	30	5.55	43.4	78,072	21.78	26,139	51,933	1.192
0.67	**40**	**4.70**	**36.7**	**88,153**	**21.78**	**32,674**	**55,479**	**1.274**
0.83	50	4.02	31.4	94,249	21.78	39,209	55,040	1.264
1.00	60	3.52	27.5	99,032	21.78	45,743	53,288	1.223
2.00	120	2.20	17.2	123,790	21.78	84,952	38,838	0.892
3.00	180	1.65	12.9	139,263	21.78	124,160	15,103	0.347
4.00	240	1.35	10.6	151,924	21.78	163,369	-11,445	-0.263
5.00	300	1.15	9.0	161,771	21.78	202,577	-40,807	-0.937
6.00	360	0.96	7.5	162,052	21.78	241,786	-79,734	-1.830
12.00	720	0.55	4.3	185,684	21.78	477,037	-291,352	-6.689

Stormwater Detention Calculations - Pond 2
Required Storage versus Time



Graphical Hydrograph Method for Stormwater Detention
Seniors - Rockwall, Texas
50 Year Detention Calculations - Pond 2

Purpose: Use the graphical hydrograph method to determine the volume of stormwater storage needed to compensate for increased runoff due to development.

Method: Use the Rational Method to determine maximum rate of runoff

Q = c*I*A Where: c = Runoff Coefficient; I = Rainfall Intensity (in/hr); A = Drainage Area (acres)

Assumptions: Rainfall Intensity determined from attached graph given Time of Concentration (Tc) or Duration and the Return Period of the storm.

For Existing Conditions: Allowable release rate is based upon 20 minute, 50 year storm event for undeveloped flows where c = 0.35, I = 7.40 in./hr.

For Proposed Conditions: Use c = 0.75 for multi-family development

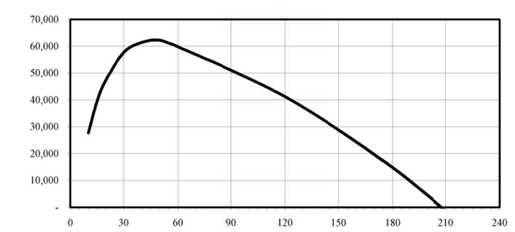
I. Determination of Allowable Release Rate - Existing Site

Total site area	10.68	acres
Detained Time of Concentration (T_c)	20	minutes
Rainfall intensity for fifty year storm (T_c=20 min)	7.40	inches/hr
Detained runoff coefficient	0.35	
Max. Allowable release rate	27.66	cfs
Area of site draining through detention pond	10.42	acres
Area of site draining undetained	0.26	acres
Undetained Time of Concentration (T_c)	10	minutes
Rainfall intensity for fifty year storm (T_c=10 min)	9.00	inches/hr
Runoff coefficient for developed conditions	0.75	
Runoff from undetained area	1.76	cfs
Total off-site area passed through	0.00	acres
Time of Concentration (T_c)	20	minutes
Rainfall intensity for fifty year storm (T_c=20 min)	7.40	inches/hr
Runoff coefficient	0.35	
Off-site pass-through rate	0.00	cfs
On-site total bypass rate from Pond 1	7.68	cfs
On-site allowed bypass rate from Pond 1	5.83	cfs
On-site excess bypass rate from Pond 1	1.85	cfs
Total release rate from detention pond	24.06	cfs
Metered release rate from detention pond	24.06	cfs

II. Required Storage Calculations, Return Period = 50 years

Duration (hours)	Duration (min)	Rainfall Intensity (in/hr)	Inflow Rate (cfs)	Inflow Volume (cf)	Outflow Rate (cfs)	Outflow Volume (cf)	Inflow - Outflow Volume (cf)	Required Storage (ac-ft)
0.17	10	9.00	70.3	42,201	24.06	14,434	27,767	0.637
0.25	15	8.20	64.1	57,675	24.06	18,042	39,633	0.910
0.33	20	7.40	57.8	69,397	24.06	21,651	47,747	1.096
0.50	30	6.15	48.1	86,512	24.06	28,867	57,645	1.323
0.67	40	5.20	40.6	97,531	24.06	36,084	61,447	1.411
0.83	**50**	**4.50**	**35.2**	**105,503**	**24.06**	**43,301**	**62,201**	**1.428**
1.00	60	3.92	30.6	110,285	24.06	50,518	59,767	1.372
2.00	120	2.40	18.8	135,043	24.06	93,819	41,224	0.946
3.00	180	1.80	14.1	151,924	24.06	137,120	14,803	0.340
4.00	240	1.45	11.3	163,177	24.06	180,422	-17,244	-0.396
5.00	300	1.30	10.2	182,871	24.06	223,723	-40,852	-0.938
6.00	360	1.15	9.0	194,125	24.06	267,024	-72,899	-1.674
12.00	720	0.63	4.9	212,693	24.06	526,831	-314,138	-7.212

Stormwater Detention Calculations - Pond 2
Required Storage versus Time



Graphical Hydrograph Method for Stormwater Detention
Seniors - Rockwall, Texas
100 Year Detention Calculations - Pond 2

Purpose: Use the graphical hydrograph method to determine the volume of stormwater storage needed to compensate for increased runoff due to development.

Method: Use the Rational Method to determine maximum rate of runoff

Q = c*I*A Where: c = Runoff Coefficient; I = Rainfall Intensity (in/hr); A = Drainage Area (acres)

Assumptions: Rainfall Intensity determined from attached graph given Time of Concentration (Tc) or Duration and the Return Period of the storm.

For Existing Conditions: Allowable release rate is based upon 20 minute, 100 year storm event for undeveloped flows where c = 0.35, I = 8.30 in./hr.

For Proposed Conditions: Use c = 0.75 for multi-family development

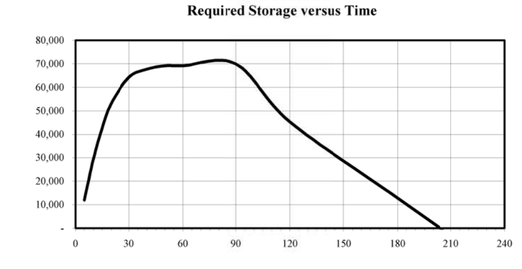
I. Determination of Allowable Release Rate - Existing Site

Total site area	10.68	acres
Detained Time of Concentration (T_c)	20	minutes
Rainfall intensity for one-hundred year storm (T_c=20 min)	8.30	inches/hr
Detained runoff coefficient	0.35	
Max. Allowable release rate	31.03	cfs
Area of site draining through detention pond	10.42	acres
Area of site draining undetained	0.26	acres
Undetained Time of Concentration (T_c)	10	minutes
Rainfall intensity for one-hundred year storm (T_c=10 min)	9.80	inches/hr
Runoff coefficient for developed conditions	0.75	
Runoff from undetained area	1.91	cfs
Total off-site area passed through	0.00	acres
Time of Concentration (T_c)	20	minutes
Rainfall intensity for one-hundred year storm (T_c=20 min)	8.30	inches/hr
Runoff coefficient	0.35	
Off-site pass-through rate	0.00	cfs
On-site total bypass rate from Pond 1	8.29	cfs
On-site allowed bypass rate from Pond 1	6.54	cfs
On-site excess bypass rate from Pond 1	1.75	cfs
Total release rate from detention pond	27.36	cfs
Metered release rate from detention pond	27.36	cfs

II. Required Storage Calculations, Return Period = 100 years

Duration (hours)	Duration (min)	Rainfall Intensity (in/hr)	Inflow Rate (cfs)	Inflow Volume (cf)	Outflow Rate (cfs)	Outflow Volume (cf)	Inflow - Outflow Volume (cf)	Required Storage (ac-ft)
0.08	5	10.37	81.0	24,312	27.36	12,312	12,000	0.275
0.17	10	9.80	76.6	45,952	27.36	16,416	29,536	0.678
0.25	15	9.00	70.3	63,302	27.36	20,520	42,781	0.982
0.33	20	8.30	64.9	77,837	27.36	24,625	53,213	1.222
0.50	30	6.90	53.9	97,062	27.36	32,833	64,230	1.475
0.67	40	5.80	45.3	108,785	27.36	41,041	67,744	1.555
0.83	50	5.05	39.5	118,397	27.36	49,249	69,148	1.587
1.00	60	4.50	35.2	126,603	27.36	57,457	69,146	1.587
1.50	**90**	**3.60**	**28.1**	**151,924**	**27.36**	**82,082**	**69,842**	**1.603**
2.00	120	2.70	21.1	151,924	27.36	106,707	45,217	1.038
3.00	180	2.00	15.6	168,804	27.36	155,956	12,848	0.295
4.00	240	1.65	12.9	185,684	27.36	205,205	-19,520	-0.448

Stormwater Detention Calculations - Pond 2
Required Storage versus Time



Pond #2 - Outfall Calculations

Purpose: Provide metered flow that meets multiple storm event release rate restrictions.
Method: Use multiple plate openings and utilize weir flow and orifice flow calculations to determine total outflow as a product of pond depth.
Goal: Water surface elevation based upon volume required

2-yr storm requires	31,982	cf of storage, which occurs at elev	543.00
10-yr storm requires	49,124	cf of storage, which occurs at elev	543.95
25-yr storm requires	55,479	cf of storage, which occurs at elev	544.25
50-yr storm requires	62,201	cf of storage, which occurs at elev	544.40
100-yr storm requires	69,842	cf of storage, which occurs at elev	544.70

Where: Use weir equation to determine flow until opening is submerged.
Q = C*b*H^(3/2)
C = discharge coefficient = 2.68
b = weir base width
H = water level height above base of weir

Use orifice equation to determine flow once opening is submerged.
Q = A*C*(2g*h)^(1/2)
A = area of opening
C = discharge coefficient = 0.8 0.6 0.6 (1st Orifice, 2nd Orifice, 3rd Orifice)
h = water level height above center of opening

Opening 1		Opening 2		Opening 3	
b =	1.00 ft	b =	1.75 ft	b =	0 ft
Height =	1.000 ft	Height =	1.700 ft	Height =	0.000 ft
A =	1.00 SF	A =	2.98 SF	A =	0.00 SF
Invert=	539.50 ft	Invert=	543.00 ft	Orifice elev =	547.00 ft

	Weir		Orifice		Weir		Orifice						
WSEL	H1	Q1	h1	Q1	H2	Q2	h2	Q2	Qtotal	Event	Q allow	Qtotal
539.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
539.55	0.05	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03			
539.60	0.10	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.08			
539.70	0.20	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.24			
539.80	0.30	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.44			
539.90	0.40	0.68	0.00	0.00	0.00	0.00	0.00	0.00	0.68			
540.00	0.50	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.95			
540.10	0.60	1.25	0.00	0.00	0.00	0.00	0.00	0.00	1.25			
540.20	0.70	1.57	0.00	0.00	0.00	0.00	0.00	0.00	1.57			
540.30	0.80	1.92	0.00	0.00	0.00	0.00	0.00	0.00	1.92			
540.40	0.90	2.29	0.00	0.00	0.00	0.00	0.00	0.00	2.29			
540.50	0.00	0.00	0.50	4.54	0.00	0.00	0.00	0.00	4.54			
540.60	0.00	0.00	0.60	4.97	0.00	0.00	0.00	0.00	4.97			
540.70	0.00	0.00	0.70	5.37	0.00	0.00	0.00	0.00	5.37			
540.80	0.00	0.00	0.80	5.74	0.00	0.00	0.00	0.00	5.74			
540.90	0.00	0.00	0.90	6.09	0.00	0.00	0.00	0.00	6.09			
541.00	0.00	0.00	1.00	6.42	0.00	0.00	0.00	0.00	6.42			
541.10	0.00	0.00	1.10	6.73	0.00	0.00	0.00	0.00	6.73			
541.20	0.00	0.00	1.20	7.03	0.00	0.00	0.00	0.00	7.03			
541.30	0.00	0.00	1.30	7.32	0.00	0.00	0.00	0.00	7.32			
541.40	0.00	0.00	1.40	7.60	0.00	0.00	0.00	0.00	7.60			
541.50	0.00	0.00	1.50	7.86	0.00	0.00	0.00	0.00	7.86			
541.60	0.00	0.00	1.60	8.12	0.00	0.00	0.00	0.00	8.12			
541.70	0.00	0.00	1.70	8.37	0.00	0.00	0.00	0.00	8.37			
541.80	0.00	0.00	1.80	8.61	0.00	0.00	0.00	0.00	8.61			
541.90	0.00	0.00	1.90	8.85	0.00	0.00	0.00	0.00	8.85			
542.00	0.00	0.00	2.00	9.08	0.00	0.00	0.00	0.00	9.08			
542.10	0.00	0.00	2.10	9.30	0.00	0.00	0.00	0.00	9.30			
542.20	0.00	0.00	2.20	9.52	0.00	0.00	0.00	0.00	9.52			
542.30	0.00	0.00	2.30	9.74	0.00	0.00	0.00	0.00	9.74			
542.40	0.00	0.00	2.40	9.95	0.00	0.00	0.00	0.00	9.95			
542.50	0.00	0.00	2.50	10.15	0.00	0.00	0.00	0.00	10.15			
542.60	0.00	0.00	2.60	10.35	0.00	0.00	0.00	0.00	10.35			
542.70	0.00	0.00	2.70	10.55	0.00	0.00	0.00	0.00	10.55			
542.80	0.00	0.00	2.80	10.74	0.00	0.00	0.00	0.00	10.74			
542.90	0.00	0.00	2.90	10.93	0.00	0.00	0.00	0.00	10.93			
543.00	0.00	0.00	3.00	11.12	0.00	0.00	0.00	0.00	11.12	2-Year	11.81	11.12
543.10	0.00	0.00	3.10	11.30	0.10	0.15	0.00	0.00	11.45			
543.20	0.00	0.00	3.20	11.48	0.20	0.42	0.00	0.00	11.90			
543.30	0.00	0.00	3.30	11.66	0.30	0.77	0.00	0.00	12.43			
543.40	0.00	0.00	3.40	11.84	0.40	1.19	0.00	0.00	13.02			
543.50	0.00	0.00	3.50	12.01	0.50	1.66	0.00	0.00	13.67			
543.60	0.00	0.00	3.60	12.18	0.60	2.18	0.00	0.00	14.36			
543.70	0.00	0.00	3.70	12.35	0.70	2.75	0.00	0.00	15.10			
543.80	0.00	0.00	3.80	12.51	0.80	3.36	0.00	0.00	15.87			
543.90	0.00	0.00	3.90	12.68	0.90	4.00	0.00	0.00	16.68			
543.95	0.00	0.00	3.95	12.76	0.95	4.34	0.00	0.00	17.10	10-Year	18.30	17.10
544.00	0.00	0.00	4.00	12.84	1.00	4.69	0.00	0.00	17.53			
544.10	0.00	0.00	4.10	13.00	1.10	5.41	0.00	0.00	18.41			
544.20	0.00	0.00	4.20	13.16	1.20	6.17	0.00	0.00	19.32			
544.25	0.00	0.00	4.25	13.24	1.25	6.55	0.00	0.00	19.79	25-Year	21.78	19.79
544.30	0.00	0.00	4.30	13.31	1.30	6.95	0.00	0.00	20.26			
544.40	0.00	0.00	4.40	13.47	1.40	7.77	0.00	0.00	21.24	50-Year	24.06	21.24
544.50	0.00	0.00	4.50	13.62	1.50	8.62	0.00	0.00	22.23			
544.60	0.00	0.00	4.60	13.77	1.60	9.49	0.00	0.00	23.26			
544.70	0.00	0.00	4.70	13.92	0.00	0.00	0.85	13.21	27.12	100-Year	27.36	27.12
544.80	0.00	0.00	4.80	14.07	0.00	0.00	0.95	13.96	28.03			

Pond 2 Volume Calculations

Method: Use the average-end area method to determine volume of storage of the pond and determine the 100-year storm high water level

Where: Volume = (1/2)*(Area of top contour + Area of bottom contour)*depth increment

High Water Elevation	544.70	feet
High Water Elevation + 1' freeboard	545.70	feet
Invert elevation of outlet structure	540.25	feet
100 Year WSEL of Creek	540.25	
Goal: Required 100-yr storage	69,842	cubic feet

Calculations:

Elevation (feet)	Area (sq. ft.)	Incremental Volume (cubic ft.)	Incremental Volume (ac. ft.)	Total Volume (ac. ft.)	Total Volume (cubic ft.)
540.25	2,434.0	0	0	0	0
541.00	4,398.0	2,562.0	0.059	0.059	2,562
541.50	10,354.5	3,688.1	0.085	0.143	6,250
542.00	16,311.3	6,666.4	0.153	0.297	12,917
542.50	18,001.5	8,578.1	0.197	0.493	21,495
543.00	19,692.3	9,423.4	0.216	0.710	30,918
543.50	21,475.3	10,291.8	0.236	0.946	41,210
544.00	23,258.3	11,183.3	0.257	1.203	52,393
544.50	25,260.2	12,129.6	0.278	1.481	64,523
545.00	**27,262.1**	**13,130.7**	**0.301**	**1.783**	**77,653**
545.50	30,757.2	14,504.9	0.333	2.116	92,158
546.00	34,252.3	16,252.3	0.373	2.489	108,410

RECORD DRAWING
RECORD INFORMATION PROVIDED BY
CONASTER CONSTRUCTION, FORT WORTH, TEXAS
ELEVATION VERIFICATION PERFORMED BY
SURVEY CONSULTANTS, INC., PLANO, TEXAS

STATE OF TEXAS
ROBERT K. MANAOIS
86508
LICENSED
PROFESSIONAL ENGINEER

REV.	DATE	REMARKS	BY

DETENTION POND CALCULATIONS

MANSIONS SENIOR

CITY of ROCKWALL, TEXAS

RKM Consulting Engineers, Inc.
7616 LBJ Freeway, Suite 530
Dallas, Texas 75251
phone (214) 432-8070
fax (214) 432-8069

Copyright © 2009 RKM Consulting Engineers, Inc.

CHECKED	DESIGN	DRAWN	JOB	DATE	SCALE	SHEET
RKM	JRY	JRY	1026-005	02/18/09	N/A	8b OF 20

MANSIONS SENIOR, RKMCE PROJECT # 1026-005