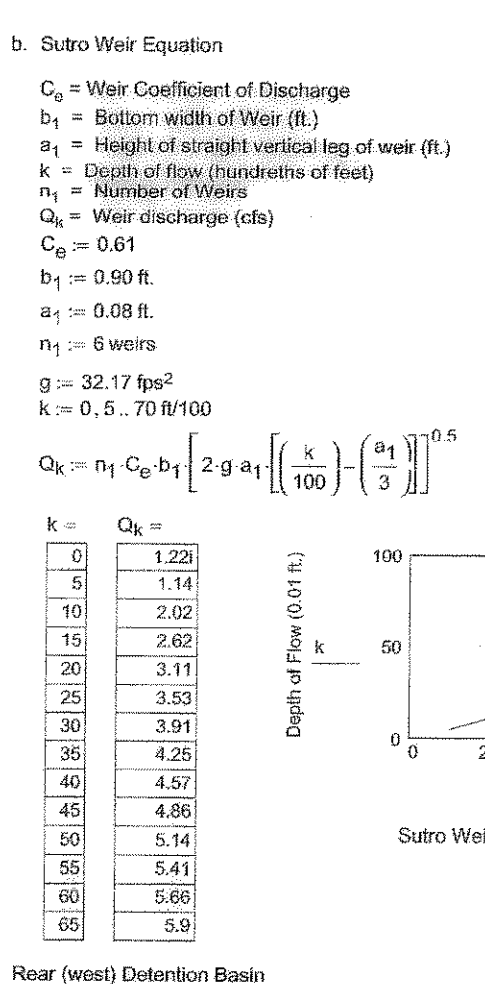


1 PROFILE - LINES 'A' & 'B' & WEST DETENTION BASIN
1"=20' HORIZONTAL 1"=5' VERTICAL

- Runoff Coefficients
 - a. Undeveloped $C_u = 0.35$
 - b. Developed - Church $C_d = 0.80$
- Rainfall Intensity
 - a. $T_c = 20$ minutes - Undeveloped $I_u = 8.2$ inches per hour
 - b. $T_c = 10$ minutes - Developed $I_d = 9.6$ inches per hour
- Determine Required Volume
 - V_i = Inflow Volume
 - V_o = Outflow Volume
 - V_s = Volume Stored
 - $A_p = 8.36$ acres (total)



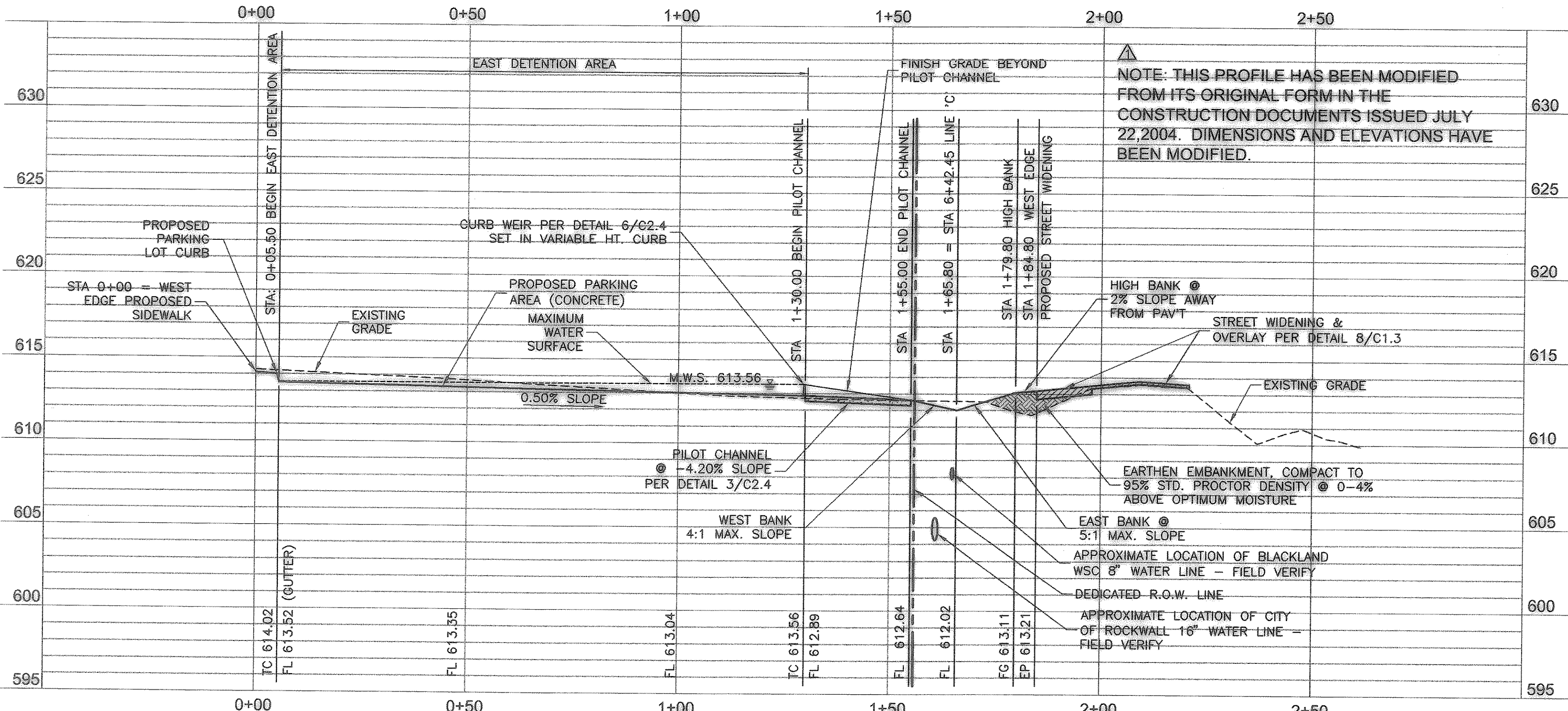
Rockwall Lakeside Church of Christ
Detention Basin Design
Detention Basin Discharge Tables - 60 min. Storm
11-Jun-04

1. East Detention Basin - Drainage Area No. 1

Time (min)	Q Inflow (cfs)	Volume Inflow (cu. ft.)	Depth (ft.)	Q Outflow (cfs)	Volume Outflow (cu. ft.)	V stored (cu. ft.)
6	0.73	283.09	0.04	0.80	207.20	55.89
12	1.46	566.18	0.08	1.73	414.41	151.77
18	2.19	849.27	0.12	2.33	581.61	267.66
24	2.92	1132.36	0.17	2.85	708.49	423.87
30	3.65	1415.44	0.22	3.31	794.10	621.34
36	4.38	1698.53	0.28	3.73	884.86	819.67
42	5.12	1981.62	0.33	4.12	987.71	1017.91
48	5.85	2264.71	0.39	4.48	1075.29	1216.42
54	6.58	2547.79	0.44	4.82	1155.73	1415.14
60	7.31	2830.88	0.50	5.14	1232.83	1614.05
66	8.04	3113.97	0.54	5.35	1284.21	1813.76
72	8.78	3397.06	0.57	5.49	1318.09	2014.67
78	9.51	3680.15	0.58	5.58	1336.49	2215.78
84	10.24	3963.24	0.59	5.61	1347.57	2417.09
90	10.98	4246.33	0.59	5.61	1346.36	2618.60
96	11.71	4529.42	0.58	5.58	1335.20	2820.31
102	12.44	4812.51	0.56	5.47	1313.75	3022.22
108	13.18	5095.60	0.54	5.34	1286.96	3224.33
114	13.91	5378.69	0.50	5.15	1234.81	3426.64
120	-	-	0.45	4.88	1171.55	3629.15

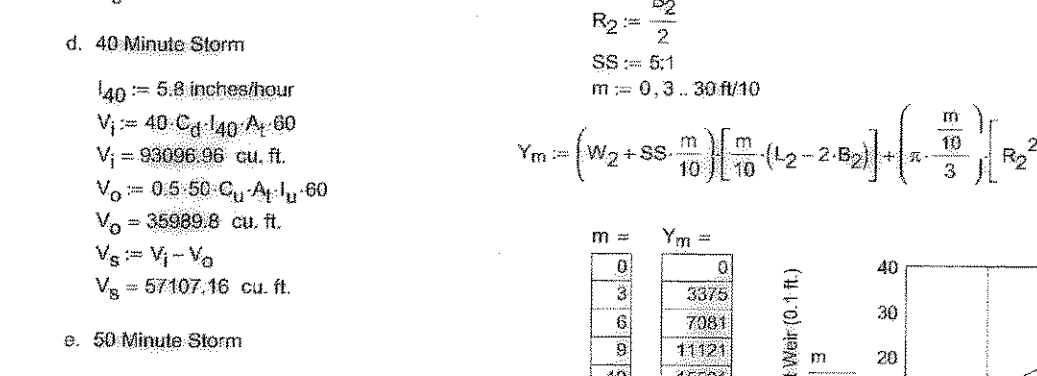
2. West Detention Basin - Drainage Area No. 2

Time (min)	Q Inflow (cfs)	Volume Inflow (cu. ft.)	Depth (ft.)	Q Outflow (cfs)	Volume Outflow (cu. ft.)	V stored (cu. ft.)
6	1.79	880.54	0.17	0.25	119.91	760.64
12	3.59	1761.09	0.18	0.60	317.25	1443.84
18	5.38	2641.63	0.24	1.80	864.67	1776.96
24	7.17	3522.18	0.52	2.57	1234.53	2287.65
30	8.96	4402.72	0.73	3.25	1558.83	2843.89
36	10.75	5283.27	0.97	3.88	1861.47	3405.80
42	12.55	6163.81	1.23	4.46	2141.63	3974.18
48	14.34	7044.35	1.51	5.01	2407.14	4548.21
54	16.14	7924.89	1.82	5.56	2670.48	5127.41
60	17.93	8805.43	2.13	6.06	2910.09	5711.34
66	19.72	9685.97	2.37	6.42	3082.83	6299.14
72	21.51	10566.51	2.55	6.69	3208.09	6891.44
78	23.30	11447.05	2.69	6.87	3289.11	7488.94
84	25.09	12327.59	2.77	6.96	3351.00	8091.54
90	26.88	13208.13	2.81	7.03	3376.64	8699.90
96	28.67	14088.67	2.82	7.05	3383.02	9314.88
102	30.46	14969.21	2.79	7.01	3363.84	9936.04
108	32.25	15849.75	2.70	6.89	3305.84	10563.20
114	34.04	16730.29	2.60	6.75	3239.74	11196.45
120	-	-	2.44	6.52	3131.41	11835.04



2 PROFILE - EAST DETENTION AREA
1"=20' HORIZONTAL 1"=5' VERTICAL

- 15 Minute Storm
 - $I_{15} = 9.2$ inches/hour
 - $V_i = 15 C_d I_{15} A_p = 60$
 - $V_o = 55376.64$ cu. ft.
 - $V_s = 0.5 \cdot 25 C_u A_p I_{15} = 60$
 - $V_o = 17984.9$ cu. ft.
 - $V_s = V_i - V_o$
 - $V_s = 37381.74$ cu. ft.
- 20 Minute Storm
 - $I_{20} = 8.2$ inches/hour
 - $V_i = 20 C_d I_{20} A_p = 60$
 - $V_o = 65899.92$ cu. ft.
 - $V_s = 0.5 \cdot 20 C_u A_p I_{20} = 60$
 - $V_o = 21593.88$ cu. ft.
 - $V_s = V_i - V_o$
 - $V_s = 44216.04$ cu. ft.
- 30 Minute Storm
 - $I_{30} = 6.9$ inches/hour
 - $V_i = 30 C_d I_{30} A_p = 60$
 - $V_o = 83264.96$ cu. ft.
 - $V_s = 0.5 \cdot 20 C_u A_p I_{30} = 60$
 - $V_o = 28791.84$ cu. ft.
 - $V_s = V_i - V_o$
 - $V_s = 54473.12$ cu. ft.
- 40 Minute Storm
 - $I_{40} = 5.8$ inches/hour
 - $V_i = 40 C_d I_{40} A_p = 60$
 - $V_o = 93096.96$ cu. ft.
 - $V_s = 0.5 \cdot 20 C_u A_p I_{40} = 60$
 - $V_o = 35889.8$ cu. ft.
 - $V_s = V_i - V_o$
 - $V_s = 57107.16$ cu. ft.
- 50 Minute Storm
 - $I_{50} = 5.0$ inches/hour
 - $V_i = 50 C_d I_{50} A_p = 60$
 - $V_o = 100320$ cu. ft.
 - $V_s = 0.5 \cdot 20 C_u A_p I_{50} = 60$
 - $V_o = 43187.76$ cu. ft.
 - $V_s = V_i - V_o$
 - $V_s = 57132.24$ cu. ft.
- 60 Minute Storm
 - $I_{60} = 4.5$ inches/hour
 - $V_i = 60 C_d I_{60} A_p = 60$
 - $V_o = 108345.6$ cu. ft.
 - $V_s = 0.5 \cdot 20 C_u A_p I_{60} = 60$
 - $V_o = 53385.72$ cu. ft.
 - $V_s = V_i - V_o$
 - $V_s = 57959.88$ cu. ft.
- 70 Minute Storm
 - $I_{70} = 4.0$ inches/hour
 - $V_i = 70 C_d I_{70} A_p = 60$
 - $V_o = 112358.4$ cu. ft.
 - $V_s = 0.5 \cdot 20 C_u A_p I_{70} = 60$
 - $V_o = 57583.68$ cu. ft.
 - $V_s = V_i - V_o$
 - $V_s = 54774.72$ cu. ft.



- Depth vs. Volume (Trapezoidal Section)
 - W_2 = Bottom Width of Detention Basin (ft.)
 - V_2 = Bottom Length of Detention Basin (ft.)
 - SS = Basin Side Slopes (SS:1)
 - m = Depth of Water in Basin (tenths of ft.)
 - Y_m = Volume Stored in Basin

$$Y_m = \left(W_2 + SS \cdot \frac{m}{10} \right) \left[\frac{1}{10} (1 - 2 \cdot R_2) + \left(\frac{m}{3} \right) \left[R_2^2 + R_2 \left(R_2 + SS \left(\frac{m}{10} \right) \right) + R_2 + SS \left(\frac{m}{10} \right)^2 \right] + B_2 SS \left(\frac{m}{10} \right)^2 \right]$$

- Front (east) Detention Basin
 - a. Depth vs. Volume (Triangular Section)
 - S_p = Parking Lot Cross Slope (ft./ft.)
 - W = Width of Water in Basin (ft.)
 - L_p = Length of Parking Lot (ft.)
 - X = Volume Stored in Parking Lot (cu. ft.)

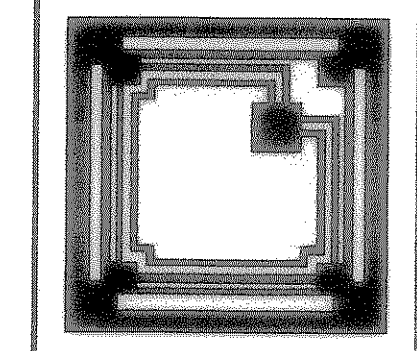
$$X = \frac{W^2 L_p}{2}$$

- For:
 - $S_p = 0.005$
 - $L_p = 200$ ft.
 - $W = 0.5 \cdot 70 \cdot 0.100$

$$X = \frac{W^2 L_p}{2} = \frac{(0.5 \cdot 70 \cdot 0.100)^2 \cdot 200}{2} = 2345$$



Revisions:
A REGRADE LINE "C"
ISSUED 04/26/2005



HALLUM ARCHITECTS, INC.
2501 PARKVIEW DRIVE SUITE 430
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Rockwall Lakeside Church of Christ
New Auditorium and Education Facilities
485 North FM 549, Rockwall, Texas 75087

DRAINAGE PROFILES
RECORD DRAWING
(ALL REVISIONS ARE BASED UPON FRANK DALE CONSTRUCTION CO., LTD)

Date: 8-4-2005
Scale: AS NOTED
Drawn: FMI
Job: 2002-10
Sheet Number:
C2.3