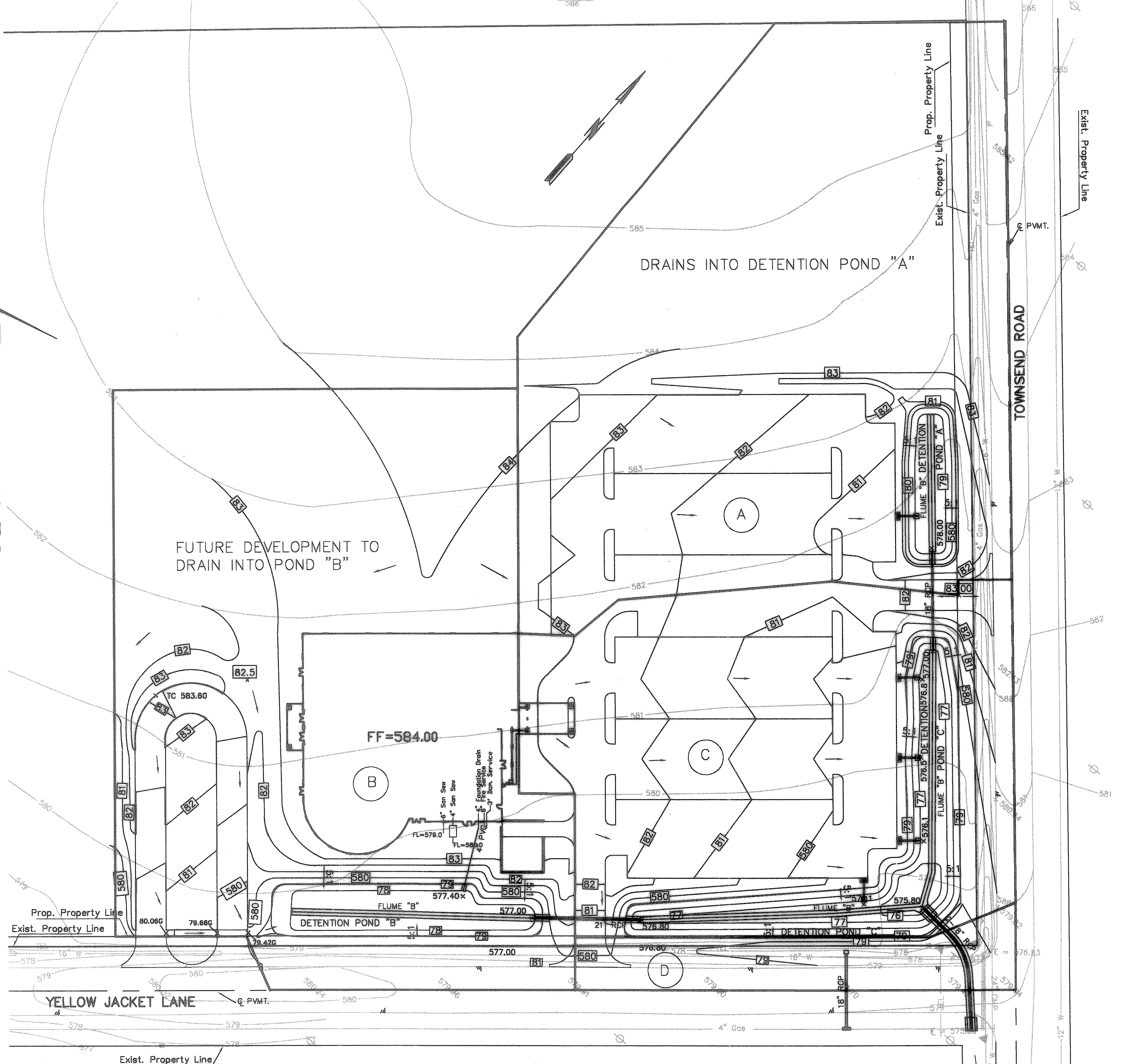
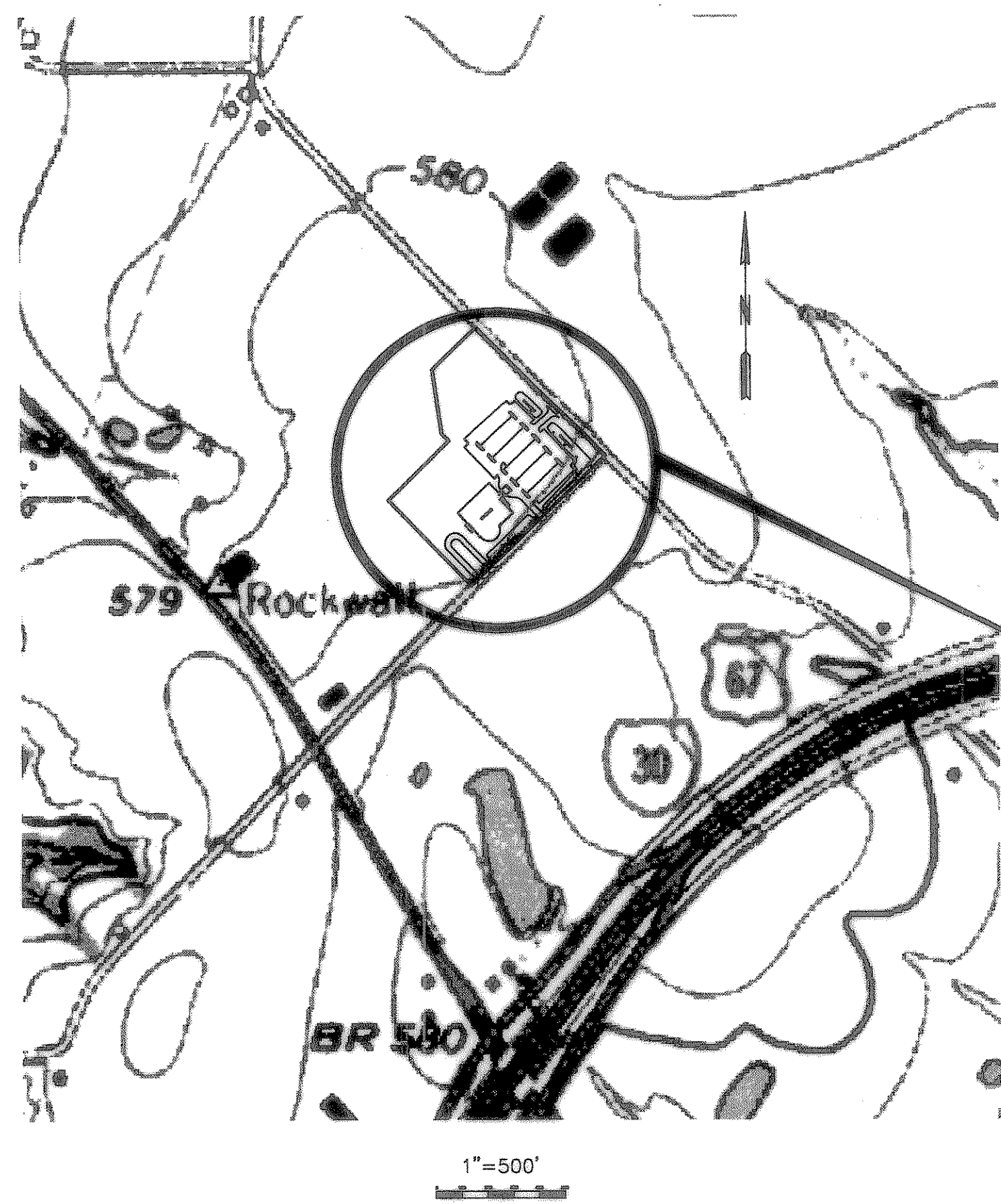


Modified Rational Method

DETENTION POND DESIGN
 WITH SIMULATED ROUTING PROCEDURE
 Prepared by: BSM Engineers
 4111 E. US Hwy 80, Suite 405
 Mesquite, TX 75150
 (972) 681-4680

Project Name : First United Methodist Church, Rockwall
 Storm Frequency (Years) : 100
 Drainage Area (Acres) : 9.18
 Existing Runoff Factor (C) : .35
 Existing Time of Concentration (min) : 20
 Existing Rainfall Intensity at Time of Concentration (in/hr) : 8.3
 Existing Discharge (cfs) : 26.67
 Future Runoff Factor (C) : .8
 Future Time of Concentration (min) : 10
 Future Rainfall Intensity at Future Time of Concentration (in/hr) : 9.8
 Future Discharge at Future Time of Concentration (cfs) : 71.97

Duration (min)	C	I (in/hr)	A (acre)	Q (cfs)	Volume Inflow (cu ft)	Volume Outflow (cu ft)	Volume Storage (cu ft)	REMARKS
10	.8	9.80	9.18	71.97	40,218	13,035	27,182	
20	.8	6.98	9.18	51.25	57,351	19,839	37,512	
30	.8	5.80	9.18	42.62	71,663	25,993	44,670	
40	.8	4.97	9.18	36.53	81,754	31,157	47,597	
50	.8	4.37	9.18	32.03	89,632	41,354	48,278	
60	.8	3.96	9.18	29.03	97,360	49,665	48,693	MAX STORAGE
70	.8	3.54	9.18	26.03	100,984	55,795	45,188	
80	.8	3.24	9.18	23.73	105,247	63,037	42,211	
90	.8	2.98	9.18	21.83	108,431	70,255	38,176	



TOTAL AREA FLOWING TO DETENTION PONDS

Area "A" = 3.40 Ac.
 Area "B" = 3.55 Ac.
 Area "C" = 2.23 Ac.
 TOTAL 9.18 Ac.
 Detention Pond Storage Provided = 51,494 Cu. Ft.
 Detention Pond Storage Required = 48,693 Cu. Ft.

DETENTION POND OUTLET SIZING

$Q_{100} = 26.67/2 = 13.50$ cfs/pipe
 Pipes = 2 @ 18" Dia.
 Depth of Uniform Flow = 1.5'
 Depth of Critical Flow = $.90 \times 1.5 = 1.35'$
 Tailwater Depth = 1.15'
 Headwater Depth = 3.2'
 Type 4 Operation
 Capacity/Pipe = 13 cfs
 Total Capacity in 2 pipes = 26 cfs
 Estimated Time to drain Ponds from end of storm = 1 hour

OUTLET RATING for 2-18" RCP

DEPTH	OUTFLOW
0.75'	4.0 cfs
1.0'	6.8 cfs
1.5'	12.4 cfs
2.0'	18.0 cfs
2.5'	22.0 cfs
3.0'	25.8 cfs
3.2'	26.0 cfs

INLET DESIGN

AREA	Time of Concentration Minutes	Intensity I ₁₀₀ in/hr	Area Acres	Runoff C	Q ₁₀₀ cfs	REMARKS
A	10	9.8	1.0	.9	8.82	1-5' Curb Inlet(Sag)*
C	10	9.8	1.46	.9	12.88	4-5' Curb Inlets (Sag) 2.71 cfs/inlet*
D	10	9.8	.31	.9	2.73	Y-Type Inlet Cap. = 10.0 cfs

*MAX. INLET CAPACITY WHEN WATER IS AT TOP OF CURB, Y = 6", Orifice Flow = 10 cfs.

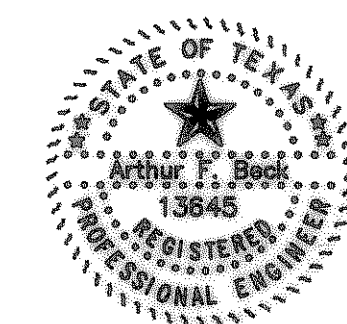
Parts of Townsend Rd. and Yellow Jacket Ln. Drain into detention ponds. This is because ditches are not well defined and to improve street drainage until streets are reconstructed.

EXIT CHANNEL (Road Ditch)
 V Bottom with 5.7:1 side slopes
 Bottom slope = 1.51%
 n = 0.35
 Q = 26.67 cfs
 V = 3.56 ft/sec
 Depth = 1.15'

AS BUILT

NOV. 19, 2001

DRAINAGE AREA MAP					
FIRST UNITED METHODIST CHURCH, ROCKWALL					
CITY OF ROCKWALL, TEXAS					
F&S PARTNERS and BSM ENGINEERS					
DESIGN	DRAWN	DATE	SCALE	NOTES	FILE NO
F&S	BSM	11-01	As Noted	BSM	103



Arthur D. Beck

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