

DRAINAGE AREA 1 = 9.65 ACRES

STORAGE IN POND = 158,000 CU-FT
STORAGE IN PARKING LOT = 55,575 CU-FT
TOTAL STORAGE = 213,575 CU-FT

DRAINAGE AREA 2 = 5.42 ACRES

STORAGE IN DITCHES = 116,500 CU-FT
STORAGE IN PARKING LOT = 33,053 CU-FT
TOTAL STORAGE = 149,553 CU-FT

PARKING LOT STORAGE ASSUMPTION

DRAINAGE AREA 1:

APPROX. PARKING LOT AREA = 277,877 SQ-FT
ASSUME 0.2' OF STORAGE OVER PARKING LOT
ASSUMED STORAGE = 55,575 CU-FT

DRAINAGE AREA 2:

APPROX. PARKING LOT AREA = 165,267
ASSUME 0.2' OF STORAGE OVER PARKING LOT
ASSUMED STORAGE = 33,053 CU-FT

The equation for the Site Runoff Curve is:

$$Q = b A^m$$

Where: Q = peak discharge (cfs)

A = drainage area (acres)

m = 1.0 for 1 to 20 acres &

0.786 for more than 20 acres up to 640 acres

b = variable dependent on impervious cover.

Impervious Cover	b, 100-year	
	≤ 20 acres	> 20 acres
0%	2.4	4.6
10%	2.9	5.5
20%	3.4	6.5
30%	4.1	7.7
40%	4.7	8.9
50%	4.9	9.3
60%	5.1	9.8
70%	5.4	10.2
80%	5.6	10.7
90%	5.8	10.9

Required Pond Size - AREA 1

Drainage Area	A (ac.)	9.65
Required Pond Size	V_S (ac-ft)	5.499
	V_S (cu-ft)	239,528.03
Storage, ac-ft/ac		0.57
	Q_{100y}	55.01
	Q_{0100y}	27.99
	XS (ft)	1.16
	V_R	11.1940
	B	17,729.68

Drainage Area Computations - AREA 1

	Total Area (acres)	Impervious Area (acres)	Impervious %	b	m	Q_{100} (cfs)
Existing Site	9.65	0.98	10%	2.90	1.00	27.99
Proposed Site	9.65	8.2	85%	5.70	1.00	55.01

Drainage Area Computations - AREA 2

	Total Area (acres)	Impervious Area (acres)	Impervious %	b	m	Q_{100} (cfs)
Existing Site	5.42	0.54	10%	2.90	1.00	15.72
Proposed Site	5.42	4.61	85%	5.70	1.00	30.89

Detention Analysis for Drainage Up to 200 Acres (JC DD7 Drainage Criteria Manual)

Equation 8-2

$$B = \frac{43,560 V_R}{0.5 Q_T}$$

Equation 8-3

$$V_R = A(XS)$$

Equation 8-4

$$V_S = \frac{0.5B(Q_T - Q_0)}{43,560}$$

B = time base of the triangular inflow hydrograph (seconds)
 V_R = the detention inflow volume in (acre-ft)
 Q_T = the proposed 100-year peak inflow rate (cubic feet per second)
A = drainage area served by detention basin (acres)
XS = rainfall excess, from Table 8-1 (feet)
 V_S = detention storage requirement (acre-feet)
 Q_0 = maximum allowable peak discharge rate (cubic feet per second)

Jefferson County Drainage District No. 7 Manual - Table 7-1

% Imper. Cover	Rainfall Excess Values for Jefferson County, Tx			
	A	B	C	D
0	0.03	0.43	0.81	0.95
10	0.14	0.51	0.85	0.98
20	0.26	0.58	0.89	1.00
30	0.37	0.66	0.92	1.02
40	0.49	0.73	0.96	1.04
50	0.61	0.81	1.00	1.07
60	0.72	0.88	1.04	1.09
70	0.84	0.96	1.07	1.11
80	0.95	1.03	1.11	1.14
90	1.07	1.11	1.15	1.16
100	1.18	1.18	1.18	1.18

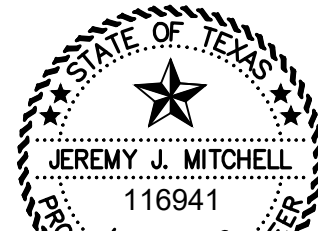
Required Pond Size - AREA 2

Drainage Area	A (ac.)	5.42
Required Pond Size	V_S (ac-ft)	3.088
	V_S (cu-ft)	134,532.84
Storage, ac-ft/ac		0.57
	Q_{100y}	30.89
	Q_{0100y}	15.72
	XS (ft)	1.16
	V_R	6.2872
	B	17,729.68

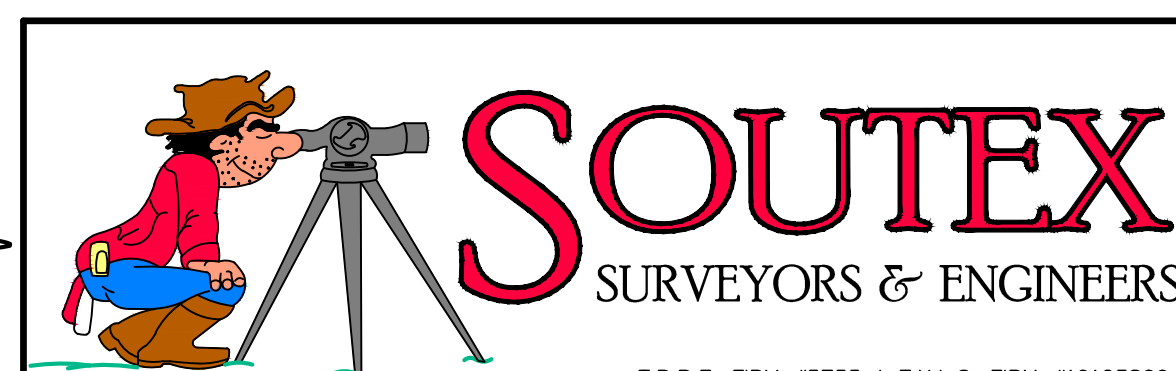
LEGEND

OVERHEAD ELECTRIC — OHE — OHE — OHE —	STORM SEWER LINE — STM — STM — STM —	⊕ = FIRE HYDRANT	☐ = STORM INLET	→ = DRAINAGE ARROW
EXISTING SANITARY SEWER — ESS —	GAS LINE — GAS — GAS — GAS —	⊗ = WATER METER	⊙ = EXISTING CLEANOUT	TOP = TOP OF PIPE
PROPOSED WATER LINE — PWS —	UNDERGROUND CABLE — UGC — UGC — UGC —	⊕ = GUY ANCHOR	⊙ = SIGN	FL = FLOWLINE
EXISTING WATER LINE — EW — EW — EW —	⊕ = WATER VALVE	⊕ = POWER POLE	⊙ = HANDICAP PARKING	TOD = TOP OF DITCH
		EM = ELECTRIC METER		EG = EXISTING GROUND
				CLD = CENTER LINE OF DITCH

FOR PERMITTING & REVIEW



12/16/21
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JEREMY J. MITCHELL, P.E. 116941



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SHEET TITLE		PROJ. NO: 21-0194 SCALE: 1" = 80' PRINT DATE: 12/16/21 DRAWN BY: SM CHECKED BY: JM APPROVED BY: JM
MASTER DRAINAGE PLAN		
STORAGE REQUIREMENT		
PROJECT		
JG REALTY AND INVESTMENT LLC 2301 HWY 365 PORT ARTHUR, TEXAS 77640		C1

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