

**PROJECT:** STORMWATER RUN-OFF CALCULATIONS

**TABERNACLE CHURCH**

Formulas used:

[1] RATIONAL METHOD:  $Q=Aci$

where: Q= Peak discharge of watershed in cubic feet per second (cfs) due to maximum storm assumed.  
 A= Area of watershed in acres.  
 c= Coefficient of run-off [2].  
 i= Intensity of rainfall in inches per hour based on concentration time. [3]

[4]  $TC = \left( L^{0.8} \left( \frac{1000}{s} - 9 \right)^{0.7} \right) (1140)^{(0.5)}$

where: TC= Time of concentration= time required for rain falling at most remote point to reach discharge point.  
 c= Site run-off coefficient based on conditions shown.  
 s= Percent slope of overland flow.

**PRIOR DEVELOPMENT**  
25 Year Frequency

<b>Q<sub>1</sub> = Aci</b>				
Watertight Surfaces	0.9	5824	sqft =	0.134 Acres
Gravel Surface	0.25	0	sqft =	0.000 Acres
Green Space	0.15	22963	sqft =	0.527 Acres
Summary	0.30	28787	sqft =	0.661 Acres

Duration (D) = Time of concentration (TC)  
 where L = 60 run-off length ft  
 c = 0.30 run-off coeff  
 S = 1.6667 percent slope  
 TC = D = 8.71 minutes  
 Expected rainfall intensity i = 2.33 in/hr

**POST DEVELOPMENT**  
25 Year Frequency

<b>Q<sub>2</sub> = CIA</b>				
Watertight Surfaces	0.9	14805	sqft =	0.340 Acres
Gravel Surface	0.14	13962	sqft =	0.000 Acres
Green Space	0.2	28787	sqft =	0.321 Acres
Summary	0.56	28787	sqft =	0.661 Acres

**RESULTS**

DETENTION REQUI ONE HOUR DETENTION	Q <sub>2</sub> -Q <sub>1</sub>	0.398 cfs	1431.7 cuft	62 feet
DETENTION DIMENSIONS	WIDTH	1431.7	LENGTH	100 feet
	DEPTH	0.23	DEPTH	0.23 feet

**DISCHARGE END AREA REQUIREMENTS**  
10 Year Frequency

Area requirements for pipe servicing swale located in Zone #1 of the corresponding Key Plan

[5]  $A = \frac{Q}{(c\sqrt{(2gH)})}$

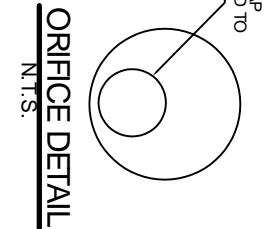
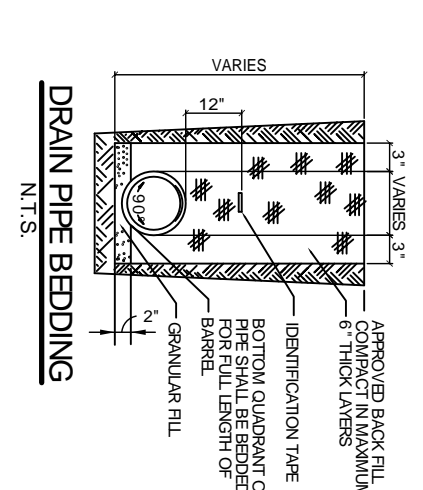
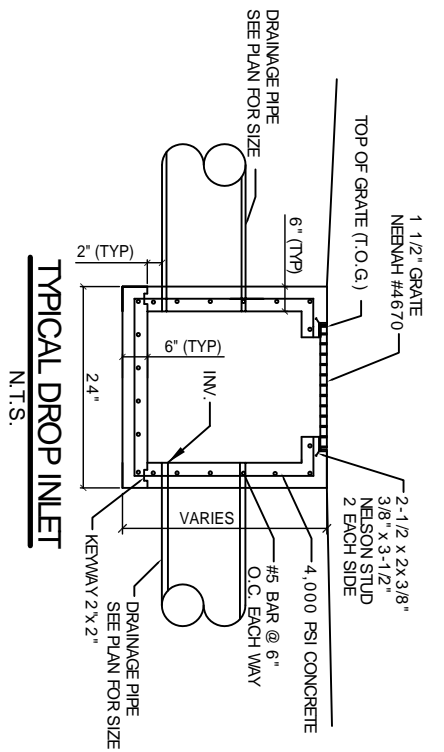
where: A= Discharge Area required  
 g= Acceleration of gravity  
 c= Discharge coefficient  
 H= Hydraulic head  
 Q= Flow volume from run-off

Pipe Servicing Site Drainage	Q = 0.862 cfs	H = 7.00 feet
	c = 0.62 coefficient	A = 0.07 sqft
	g = 32.16 ft/ft/sec	

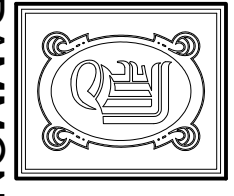
**REQUIRED CONDUIT = 3.47 inch diameter**  
Use 4" orifice

**References:**

1. Chen, W.F. The Civil Engineering Handbook. 1995. Eq # 31.1. Pg. 1036
2. Seelye, Elwyn E. Data Book for Civil Engineers. Vol. 1. 1960. Tbl. B. Pg. 18-02
3. Seelye, Elwyn E. Data Book for Civil Engineers. Vol. 1. 1960. Fig. B. Pg. 18-01
4. Chen, W.F. The Civil Engineering Handbook. 1995. Tbl. 31.2 Regan Equation (r=0.013)
5. Chen, W.F. The Civil Engineering Handbook. 1995. Eq # 28.32. Pg. 969



- NOTES:**
- 1) DRAIN PIPE & FITTINGS WITHIN PROPERTY LINE SHALL BE POLYVINYL CHLORIDE PLASTIC PIPE, MEETING CLASS 100 C-900 PVC.
  - 2) ELEVATIONS SHOWN ARE M.S.L.
  - 3) FIELD VERIFY ALL ELEVATIONS AND DRAINAGE SYSTEM PLACEMENT PRIOR TO START OF WORK.
  - 4) MUCK OUT FOR FOUNDATION PAD.
  - 5) TO UNDISTURBED SOIL CAPABLE OF 1500 PSF BEARING.
  - 6) DOWN SPOUTS SHALL FLOW INTO SUB-SURFACE DRAINAGE.
  - 7) THERE IS NO EVIDENCE OF EXISTING OFF-SITE FLOW CROSSING THE PROPERTY. NEW DRAINAGE CALCULATIONS ARE DETERMINED ACCORDINGLY.
  - 8) THERE IS NO EVIDENCE OF EXISTING OFF-SITE FLOW CROSSING THE



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**NEW CHURCH**

TABERNACLE  
 BAPTIST CHURCH  
 2445 FOURTH ST.  
 SUDELL, LA

**DRAINAGE DETAILS AND CALCULATIONS**

SCALE: AS NOTED  
 JOB#: 2050  
 DATE 2-8-10  
 SHEET 7

**C-6**