

# SEPTIC SYSTEM COMPUTATIONS

**GOURD SPRINGS BAPTIST CHURCH**  
4575 RAY ROAD  
HARNETT COUNTY, NORTH CAROLINA

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(BASED ON SOILS EVALUATION REPORT BY S.S.E.A.)

→ ESTIMATED DAILY FLOW:

$$551 \text{ SEATS} \times 5 \text{ GAL/SEAT} = 2,755 \text{ GPD}$$

→ SEPTIC FIELD L.T.A.R.: 0.5 GPD/FT<sup>2</sup>

→ LENGTH OF NITRIFICATION LINE:

From 15A NCAC 18A 0.1955 (c):

$$\frac{\text{DESIGN DAILY FLOW}}{\text{L.T.A.R.}} = \text{MIN. AREA OF NITRIFICATION TRENCH}$$

$$\frac{2,755 \text{ GPD}}{0.5 \text{ GPD/FT}^2} = 5,510 \text{ SF}$$

$$\frac{\text{MIN. AREA OF TRENCH}}{\text{TRENCH WIDTH}} = \text{REQ'D LENGTH OF NITRIFICATION LINE}$$

$$\frac{5,510 \text{ SF}}{3 \text{ FT}} = 1,836 \text{ FT}$$

25% REDUCTION ALLOWED FOR INNOVATIVE CHAMBER

$$1,836 \text{ FT} \times 0.75 = 1,377 \text{ FT ADJUSTED}$$

$$\text{From S.S.E.A: } 4 \text{ ROWS} \times 350 \text{ FT} = 1,400 \text{ FT} \checkmark$$

→ SEPTIC TANK VOLUME

From 15A NCAC 18A 0.1952 (b)(2)(c)

$$\text{VOLUME REQ'D: } 0.75Q + 1,125$$

$$= 0.75(2,755) + 1,125$$

$$= 3,191 \text{ GAL}$$

LOCAL PRECAST MAKES 3,141 GAL TANK AND IS CLOSE ENOUGH TO REQ'D VOLUME TO BE CONSIDERED SUFFICIENT

Pump Station / Forcemain:

DETERMINE EQUIV. LENGTH OF F.M.:

$$6 \text{ Bends} \times 2.5 = 15'$$

$$\text{BERKOWITZ MANIFOLD} = 25'$$

$$\text{EQUIV LENGTH} = 1,200 \text{ FT (ACTUAL)} + 15' + 25' = 1,240 \text{ FT}$$

DETERMINE PRESSURE LOSS FOR 30 GPM - 1,240 FT OF 2" PVC

$$H_L = 26'$$

DETERMINE ELEV. DIFFERENCE:

$$\text{NEW PUMP CL ELEV} = 299.5$$

$$\text{DISCHARGE ELEV (BERKOWITZ MANIFOLD)} = 318.5$$

$$\Delta = 318.5 - 299.5 = 19 \text{ FT}$$

$$\text{T.D.H.} = 26' + 19' = 45 \text{ FT}$$

VELOCITY IN 2" F.M FOR 30 GPM = 3 FPS

DETERMINE CAPACITY OF PUMP STATION:

$$2,755 \text{ GPD} \times \frac{1 \text{ DAY}}{24 \text{ HR}} \times \frac{1 \text{ HR}}{60 \text{ MIN}} = 2 \text{ GPM}$$

USING P.F. OF 3 MIN. CAPACITY:

$$2 \text{ GPM} \times 3 = 6 \text{ GPM}$$

SPECIFY 30 GPM FOR SUFFICIENT VELOCITY  
IN FORCEMAIN

SPECIFY LIBERTY ZABALSGY SIMPLEX GRINDER STATION

PUMP CYCLE CAPACITY OF STATION = 43 GAL

$$\frac{43 \text{ GAL}}{2 \text{ GPM}} \approx 22 \text{ MIN PUMP CYCLE}$$

# GROUD SPRINGS CHURCH

Table 1: Pressure Distribution Manifolds for Conventional Septic Systems; Manifold and Lateral Tap Size Criteria<sup>a</sup>

Tap Separation Distance (feet)	Manifold Size (Inches)	Lateral Taps out of One Side of Manifold			Lateral Taps out of Both Sides of Manifold		
		3/4	1	1 1/2	3/4	1	1 1/2
		Maximum Number of Taps			Maximum Number of Tap Pairs		
0.5 <sup>b</sup>	2	4	2	2	2	2	2
	3	9	3	2	4	4	2
	4	16	5	3	7	10	6
	6	40+	21	7	5	17	10
	8		38	12	9	5	4
				22	5		2
3.0 <sup>c</sup>	2	8	2	2	2	2	2
	3	14	12	3	6	5	3
	4	21	18	6	3	19	7
	6	38	30	26	8	20+	3
				5	3		2
				3	2		2
6.0 <sup>c</sup>	2	5	4	2	4	3	2
	3	9	7	6	7	9	3
	4	14	11	9	4	10	3
	6	27	20	17	14	19	13
				7	3		4
				3	2		3
9.0 <sup>c</sup>	2	4	3	3	3	5	2
	3	7	6	5	6	7	6
	4	12	9	7	6	8	7
	6	22	16	13	11	15	12
				10	4		10
				4	3		5

<sup>a</sup> Assumptions: 1 to 4 feet (.3 to 1.2 meters) head at lateral outlets; 5% maximum flow differential maintained between laterals; Hazen-Williams "C" factor of 140; taps are of Schedule 40 PVC and manifolds are of Schedule 80 PVC, with the following actual inside diameters: nominal pipe size (inches) -----  
 1/2 ----- 1 actual 1/2 inside diameter: 2 inches (millimeters) ----- 4  
 3/4 ----- 1 actual 3/4 inside diameter: 2 inches (millimeters) ----- 4  
 1 ----- 1 actual 1 inside diameter: 2 inches (millimeters) ----- 4  
 .622(19) .824(25) 1.049(32) 1.38(42) 1.61(49) 2.067(63) 1.939(59) 2.90(88) 3.826(117) 5.761(176) 7.625(232)

<sup>b</sup> Use for pressure manifold distribution box designed for sloping lots, located above highest field line.  
<sup>c</sup> Use for pressure manifold on flat lots, located adjacent to end of each field line.