$Q = VA$

$\frac{ft^3}{sec} = \frac{ft}{sec} ft^2$

$0.001045 = \frac{(\pi)(49)}{(1024)(144)} = \frac{154.1}{147,4}$

Area of 1/16" diameter tube

$(\pi)\left(\frac{1}{16}\right)^2\left(\frac{1}{144}\right) = A$

$(3.1416)\left(\frac{1}{256}\right)\left(\frac{1}{144}\right) = A$

$\frac{3.1416}{36,864} = A = 0.00008522\ ft^2$

Area of 1/4" diameter tube

$(\pi)\left(\frac{1}{8}\right)^2\left(\frac{1}{144}\right) = A$

$(3.1416)\left(\frac{1}{64}\right)\left(\frac{1}{144}\right) = A$

$\frac{3.1416}{9,216} = A = 0.0003409\ ft^2$

Area of 3/8 diameter tube

$(\pi)\left(\frac{3}{16}\right)^2\left(\frac{1}{144}\right) = A$

$(3.1416)\left(\frac{9}{256}\right)\left(\frac{1}{144}\right) = A$

$\frac{28.2744}{36,864} = A = 0.000767\ ft^2$

Area of 1/2" diameter tube

$(\pi)\left(\frac{1}{4}\right)^2\left(\frac{1}{144}\right)$

$(3.1416)\left(\frac{1}{16}\right)\left(\frac{1}{144}\right)$

$\frac{3.1416}{2,304} = A = 0.001364\ ft^2$

Area 1/16

$(\pi)\left(\frac{1}{32}\right)^2\left(\frac{1}{144}\right)$

Area 1/8

$(\pi)\left(\frac{1}{16}\right)^2\left(\frac{1}{144}\right)$

$\frac{(\pi)(25)}{(256)(144)} =$

$\frac{78.54}{76,864} = 0.00$

Area 3/4

$(\pi)\left(\frac{3}{8}\right)^2\left(\frac{1}{144}\right)$

$\frac{(\pi)(9)}{(64)(144)} = A$

$\frac{28.2744}{9,216} = 0.00$

Area 3/8

$(\pi)\left(\frac{3}{16}\right)^2\left(\frac{1}{144}\right)$

$\frac{(\pi)(49)}{(256)(144)} = A$

$\frac{153.9384}{36,864} = 0.004$

Area 1"

$(\pi)\left(\frac{1}{2}\right)^2\left(\frac{1}{144}\right)$

$\frac{\pi}{(4)(144)} = A$

$\frac{\pi}{576} = 0.00545$

DSW 296203

STLCOPCB4066147

$$(28\ gal/hr)\left(\frac{1}{60\ min/hr}\right)\left(\frac{1}{7.4805\ gal/ft^3}\right)\left(\frac{1}{60\ sec/min}\right)$$

$$\frac{28}{26,929.8} = Q = 0.00104\ ft^3/sec$$

$$\frac{60\ gal/hr}{26,929.8} = Q = 0.002228\ ft^3/sec$$

$$\frac{170\ gal/hr}{26929.8} = Q = 0.006313\ ft^3/sec$$

$$\frac{290\ gal/hr}{26,929.8} = Q = 0.01077\ ft^3/sec$$

$V = Q/A$

$$\frac{0.00104\ ft^3/sec}{0.0000852\ ft^2} = 12.2\ ft/sec$$

$$\frac{0.002228}{0.0003409} = 6.5\ ft/sec$$

$$\frac{0.006313}{0.000767} = 8.2\ ft/sec$$

$$\frac{0.01077}{0.001364} = 7.9\ ft/sec$$

DSW 296204

Area of 24" sewer

$(\pi)(r)^2 = A_{24}$

$(\pi)(1)^2 = 3.14$ ft²

Area of 30" sewer

$(\pi)(1.25)^2 = A_{30}$

$(3.1416)(1.5625) = 4.91$ ft²

24" $(4000 \text{ gpm})\left(\frac{1}{60 \text{ sec/min}}\right)\left(\frac{1}{7.4805 \text{ gal/ft}^3}\right) = Q$

$\frac{(4000)}{448.83} = Q_{24} = 8.91 \text{ ft}^3/\text{sec}$

30" $\frac{3940 \text{ gpm}}{448.83} = Q_{30} = 8.78 \text{ ft}^3/\text{sec}$

$Q = VA$

$A = Q/V$

1/8	$A = (8.91 \text{ ft}^3/\text{sec}) / 12.2 \text{ ft/sec} = 0.73 \text{ ft}^2$	$(8.78)/12.2 = 0.72$
1/4	$A = (8.91)/6.5 = 1.37 \text{ ft}^2$	$(8.78)/6.5 = 1.35$
3/8	$A = (8.91)/8.2 = 1.09 \text{ ft}^2$	$(8.78)/8.2 = 1.07$
1/2	$A = (8.91)/7.9 = 1.12 \text{ ft}^2$	$(8.78)/7.9 = 1.11$

DSW 296205

STLCOPCB4066149

24" - $A = 3.14\ ft^2$

$Q = 4000\ gpm = 8.91\ ft^3/sec$

$V = (8.91\ ft^3/sec) / 3.14\ ft^2 = 2.8\ ft/sec$

If 1/2 full

$A = 3.14/2 = 1.57\ ft^2$

$V = (8.91\ ft^3/sec) / 1.57\ ft^2 = 5.7\ ft/sec$

30" $A = 4.91\ ft^2$

$Q = 3940\ gpm = 8.78\ ft^3/sec$

$V = (8.78\ ft^3/sec) / 4.91\ ft^2 = 1.8\ ft/sec$

If 1/2 full

$A = 4.91/2 = 2.455\ ft^2$

$V = (8.78\ ft^3/sec) / 2.455\ ft^2 = 3.6\ ft/sec$

DSW 296206

$\frac{1}{8}/\frac{1}{4}$ $\frac{0.00104 \text{ ft}^3/\text{sec}}{0.000\,3409} = 3.1 \text{ ft/sec}$

$\frac{1}{8}/\frac{3}{8}$ $\frac{0.00104}{0.000767} = 1.4 \text{ ft/sec}$

$\frac{1}{8}/\frac{1}{2}$ $\frac{0.00104}{0.001364} = 0.8 \text{ ft/sec}$

$\frac{1}{4}/\frac{3}{8}$ $\frac{0.002228 \text{ ft}^3/\text{sec}}{0.000767} = 2.9 \text{ ft/sec}$

$\frac{1}{4}/\frac{1}{2}$ $\frac{0.002228}{0.001364} = 1.6 \text{ ft/sec}$ $\frac{1}{4}/\frac{5}{8} = \frac{0.002228}{0.00213} =$

$\frac{3}{8}/\frac{1}{2}$ $\frac{0.00621 \text{ ft}^3/\text{sec}}{0.001364} = 4.6 \text{ ft/sec}$

$\frac{1}{4}/\frac{9}{16} = \frac{0.002228}{0.001045} = 2.1 \text{ ft/sec}$

DSW 296207

$\frac{60 \text{ Gals/hr}}{60} = \frac{1 \text{ gal}}{60} \text{ min} = 0.0167 \text{ gal}$

0.0167 gal/sec
× 5 sec
.0835 gal/5 sec
× 2
0.1670 gal/hr
× 24
6680
3340
40080 gal/day

DSW 296208

STLCOPCB4066152