WASTEWATER COLLECTION FORMULA SHEET

CONVERSIONS

Multiply		Divide
1 ft^3 water	=	7.48 gallons
1 ft^3 water	=	62.4 lbs.
1 gallon	=	8.34 lbs
1 yd^3	=	27 ft^3
1 ft^3/sec	=	448.8 gpm
1 MGD	=	694.5 gpm
1 MGD	=	1.55 ft^3/sec
1 mile	=	5,280 feet
1 HP	=	0.746 kilowatt
1 ppm	=	1 mg/L
1 %	=	10,000 mg/L
1 g water		1 ml water
1 lb		435.6 g of water

FLOW AND VELOCITY

Q = FLOW, units in cubic feet per second (ft^3/s)

V = VELOCITY, units in feet per second (ft/s)

A = AREA, units in square feet (ft^2)

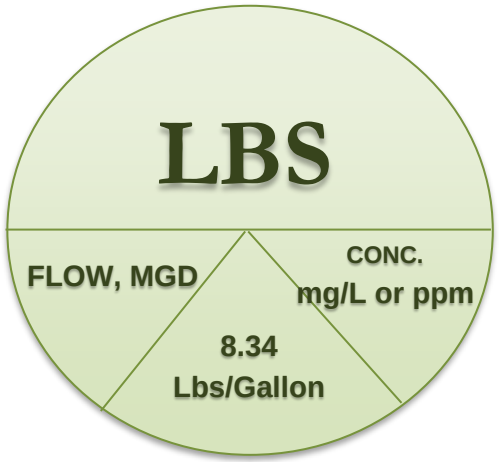
$$Q = A \times V \qquad V = \frac{Q}{A} \qquad A = \frac{Q}{V}$$

POUNDS CHART FORMULAS

Pounds = $flow\ MGD \times 8.34 \times concentration\ ppm$

$$ppm = \frac{lbs}{flow\ MGD \times 8.34}$$

$$Flow = \frac{lbs}{8.34 \times concentration\ ppm}$$



BASIC FORMULAS

$$Slope = \frac{fall, ft}{length, ft} \times 100$$

$$Grade = \frac{rise, ft}{length, ft} \times 100$$

Change in Elevation = $\%\ grade \times pipe\ run, ft$

Velocity = $\frac{distance, ft}{time, sec}$

Pump Rate (gpm) = $influent\ rate - rise\ rate$

Pump Rate (gpm) = $\frac{volume, gallons}{time, minute}$

Percent Inflow = $\frac{actual\ flow}{average\ flow} \times 100$

Detention Time = $\frac{volume, gallons}{flow, gpm}$

Horsepower = *kilowatts ÷ 0.746*

Kilowatts = $horsepower \times 0.746$

Kilowatt Hours = $kilowatts\ used \times hrs\ operated$

Power Cost = $kilowatt\ hrs\ used \times cost/kilowatt$

OBJECT	AREA (ft^2)	VOLUME (ft^3)
Rectangle	$length\ ft \times width\ ft$	$length\ ft\ x\ width\ ft\ x\ height\ ft$
Circle	$0.785\ x\ diameter\ ft \times diamter\ ft$	
Cylinder		$0.785\ x\ diameter\ ft \times diameter\ ft \times\ length\ ft$