WASTEWATER TREATMENT CONVERSION FACTORS AND FORMULAS

	WASTEWATER TREATMENT CONVERSION FACTORS AND FORMULAS									
CONVERSION TABLE		ON TABLE	BASIC FORMULAS	BASIC FORMULAS (SLUDGE & SOLIDS)						
			Pounds of BOD or TSS = Flow, MGD x Concentration, mg/l x 8.34	Suspended Solids, mg/l = $(W2) - (W1)$ x 1000 x 1000						
	<u>AREA</u>	TEMPERATURE		ml Sample						
1 Acre = $43,560 \text{ Sq Ft}$ °F = (°C x 1.8) + 32		· · · · · · · · · · · · · · · · · · ·	BOD, $mg/l = (Initial DO-Final DO) \times BOD Bottle Vol, ml$							
1 Sq Ft = 144 Sq Inches $^{\circ}$ C = $(^{\circ}$ F - 32 $) \div 1.8$		$^{\circ}$ C = $(^{\circ}$ F - 32 $) \div 1.8$	Sample, ml	Volatile Suspended Solids, mg/l = $(\underline{W2}) - (\underline{W3})$ x 1000 x 1000						
				ml Sample						
<u>FLOW</u> <u>TIME</u>			Population Equivalent = $\underline{\text{Flow}}$, $\underline{\text{MGD}}$ x $\underline{\text{BOD}}$, $\underline{\text{mg}}/\underline{1}$ x $\underline{8.34}$							
1 MGD = 694.5 GPM		1 Minute = 60 Seconds	0.17 Lbs, BOD/Person/Day	Where W1 (Dish), W2 (Dish & Dry Solids), W3 (Dish & Ash)						
1 MGD = 11.57 GPM		1 Hour = 60 Minutes								
1 MGD = 1.55 CFS		1 Day = 24 Hours	Detention Time (Hours) = (Tank Volume, Cu Ft) (7.48 Gal/Cu Ft) 24 Hrs/Day	Volatile Solids, Lbs = <u>Dry Solids, Lbs x Raw Sludge, % VS</u>						
1 Day = $1,440$ Minutes		1 Day = 1,440 Minutes	Flow, Gal Per Day	100%						
LENGTH 1. F. A. D. L. D. WOLLIME		VOLUME		A						
1 Foot = 12 Inches		<u>VOLUME</u>	Detention Time (Days) = $\frac{\text{Volume, MG}}{\text{Volume, MG}}$	Aerator Solids, Lbs = Tank Vol, MG x MLSS, mg/l x 8.34						
1 Yard = 3 Ft		1 Cu Ft = 7.48 Gallons $1 Cu Vd = 27 Cu Ft$	Flow, MGD							
,		1 Cu Yd = 27 Cu Ft	EM D (- EL MOD DOD /1 024	Solids Applied, Lbs/Day = (Flow, MGD + RSF, MGD)(MLSS, mg/l x 8.34)						
1 1	Mile = 1,760 Yds	WEIGHT	FM Ratio = Flow, MGD x BOD, mg/l x 8.34 Lbs MLVSS in A system Trade	$C_{-1}U_{-$						
WEIGHT 1 1 W 1 = 1 C		1 ml Water = 1 Gram	Lbs MLVSS in Aeration Tank	Solids Loading, Lbs/Day/Sq Ft = Solids Applied, Lbs/Day Synfage Area Sg Ft						
		1 Gal. Water = 8.34 Pounds	$or = BOD, mg/l \times Flow, MGD \times 8.34$	Surface Area, Sq Ft						
1	hp = 0.746 Kilowatts	1 Cu Ft Water $= 62.4$ Pounds	MLVSS, mg/l x Vol in Aeration Tank, MG x 8.34	Sludge Volume Index (SVI), = \underline{SSV}_{30} , ml/l x 1000 mg/g						
	PRESSURE	1 Ton = 2,000 Pounds	IVIL V SS, IIIg/TX VOI III /ACTAUOII TAIIK, IVIG X 6.54	ml/gm MLSS, mg/l						
		1 1011 – 2,000 1 0unus	Hydraulic Loading or Surface = Flow, GPD	mii/giii iviL55, mg/ i						
1 psi = 2.31 Feet 1 Ft Water = 0.433 psi			Loading, GPD/Sq Ft Surface Area, Sq Ft	Sludge Age = <u>Lbs TSS in Aeration Basin</u>						
1 14 water = 0.433 psi			Bounding, OID/oq1t outlinee Titem, oq1t	Lbs/Day TSS in Influent						
			Aerator Loading, Lbs/BOD, Day = Flow, MGD x BOD, mg/l x 8.34	155/ Day 155 III IIIIdelle						
			Figure 1 and	Reduction on Volatile Solids, % = ((In – Out)/(In-(In x Out))) x 100						
AREA (SQ FT)		VOLUME (CU FT)	Organic Loading, Activated Sludge = Flow, MGD x BOD, mg/l x 8.34	((= = = = = = = = = = = = = = = = = =						
	(-)		Volume in A.T., 1,000 Cu Ft							
Circle	$(\pi)(\text{Radius})^2$ or	n/a		Percent Removal = ((Inf – Eff) / Inf) x 100						
	(0.785)(Diameter) ²		Organic Loading, Tr. Filter = Flow, MGD x BOD, mg/l x 8.34							
			Volume of Filter Media, 1,000 Cu Ft							
Cube	n/a	(Length)(Width)(Height)		Dry Solids, Lbs = <u>Raw Sludge, Gal x Raw Sludge, % x 8.34</u>						
			Organic Loading, RBC = Soluble BOD, Applied Lbs/Day	100%						
Cylinder	n/a	$(\pi)(\text{Radius})^2(\text{Height}) \text{ or }$	Surface Area of Media, 1,000 Sq Ft							
		(0.785) (Diameter) 2 (Height)		Return Sludge Rate, MGD = (Total Flow, MGD)(Settleable Solids, %)						
D 1	(T 1) (TTT' 1 1)	(T. 1) (TYP 11) (T. 1)	M.C.R.T., Days = <u>Lbs</u> , <u>MLSS in Secondary System</u>	100%						
Rectangle	e (Length)(Width)	(Length)(Width)(Height)	Lbs/Day SS Wasted + Lbs/Day SS in Effluent	N 1 2 0 1 1 1 1 NO A 11 1 1 1 /D						
Constant	(I are atla) (Width)	(I anoth) (Width) (I laight)	W. O. d. B. CDD/G - Flow CDD	Volatile Solids Loading, = <u>VS Added, Lbs/Day</u> Lbs/Day/Cu Ft Digester Vol, Cu Ft						
Square	(Length)(Width)	(Length)(Width)(Height)	Weir Overflow Rate, GPD/ft = Flow, GPD Longth of Weir, Et	Los/Day/Cu Pt Digester Vol, Cu Pt						
$C_{\text{insum forms as } = \langle \tau \rangle}$ (Diameter) $\tau = 2.14$		$\pi = 3.14$	Length of Weir, Ft	CONCENTRATIONS & SOLUTIONS						
Circumference = (π) (Diameter) $\pi = 3.14$		n = 3.14	O H + 1 P + (OHP) = (DO1 /1 DO2 /1) (OM5 /H	T D C						
DACIC FORMILI AC (DONIDO)		II AC (DONIDC)	Oxygen Uptake Rate (OUR) = (DO1, mg/l – DO2, mg/l) x 60 Min/Hour Mg O ₂ /1/Hour (Time2, Min) – (Time1, Min)	LBS 1 mg/l = 1 ppm						
BASIC FORMULAS (PONDS)			$Mg O_2/1/Hour$ (Time2, Min) – (Time1, Min)							
Population Loading, Person/Acre = Population Served, Persons			Specific Ovygon Hately Pete = O Hately mg/1/Houry 1000 mg/cm	Lbs, Chemical = Desired ppm x Flow, MGD x 8.34						
Population Loading, Person/Acre – <u>Population Served, Persons</u> Pond Surface Area, Acres			Specific Oxygen Uptake Rate = O_2 Uptake, mg/l/Hour x 1000 mg/gm (SOUR)Mg O_2 /Hour/Gm MLSS, mg/l FLOW	CONCEN Purity of Chemical						
		1 Ond ourrace Mea, Meres	(SOUR)IVIG C2/ FIOUR/ GHI WILSS, HIG/T MGI	2 21 11011						
	Organic Loading The	= (Flow, MGD)(BOD, mg/l)(8.34)		$\frac{\text{DS}}{\text{LBS}} \frac{\text{Mg/L}}{\text{Mg/L}} = \frac{\text{Lbs Chemical Fed}}{\text{MGD x 8.34}}$						
		Area, Acres		GAL						
	= , = w _j , 11010			1% Solution = 10,000 mg/l						
			1	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,						