LAMPIRAN III – HITUNGAN DESAIN IDEAL IPLT

1. **Kolam Anaerobik 1**

Konsentrasi BOD lumpur tinja yang akan masuk adalah 1280 mg/L

$$\text{Va (Volume)} = \frac{L_I \times Q}{\lambda_V}$$

λ_V = volumetric kolam anaerobic

$$\lambda_V > 100 \; g/m^3 < 400 \; g/m^3$$

$$\text{Va} = \frac{1280 \; mg/L \times 60 \; m^3/hari}{350}$$

$$\text{Va} = 219{,}4 \; m^3$$

Waktu retensi

$$\theta_a = \frac{Va}{Q}$$

$$\theta_a = \frac{219{,}4 \; m^3}{60 \; m^3/hari} = 3{,}6 \text{ hari} = 4 \text{ hari}$$

Luasan kolam anaerobik

$$A = \frac{Q \; x \; \theta_a}{D_a}$$

D = kedalaman kolam (1,5-2,5 : SNI)

$$A = \frac{60\frac{m^3}{hari} \times 4 \; hari}{1.5 \; m} = 146 \; m2$$

Dipakai kriteria P : L = 2 : 1

$$A = P \; x \; L$$
$$A = 2L \; x \; L$$
$$A = 2L^2$$
$$146 \; m^2 = 2L^2$$
$$73 \; m = L^2$$
$$L = 8.5 \; m = 9 \; m$$
$$P = 8.5 \; m \; x \; 2$$
$$= 17 \; m$$

Performance alat kolam anaerobik 1 = 60%, maka BOD keluar dari kolam anaerobik 1 = 512 mg/L

2. Kolam Anaerobik 2

Konsentrasi BOD lumpur tinja yang akan diolah pada bak anaerobik 2 adalah 512 mg/L

Va (Volume) $= \frac{L_I \times Q}{\lambda_V}$ 　　　　　　　λ_V = volumetric kolam anaerobic

$$\lambda_V > 100 \ g/m^3 < 400 \ g/m^3$$

$Va = \frac{512 \ mg/L \times 60 \ m^3/hari}{350}$

Va = 87.7 m^3

Waktu retensi:

$$\theta_a = \frac{87,7 m^3}{60 \ m^3/hari} = 1.5 \ \text{hari} = 2 \ \text{hari}$$

Luasan kolam anaerobik 2

$A = \frac{Q \ x \ \theta_a}{D}$ 　　　　　　　D = kedalaman kolam (1,5-2,5 : SNI)

$A = \frac{60 \frac{m^3}{hari} \times 2 \ hari}{1.5 \ m} = 80 \ \text{m2}$

Dipakai kriteria P : L = 2 : 1

　　A = P x L

　　A = 2L x L

　　A = 2L^2

　　80 m^2 = 2L^2

　　40 m = L^2

　　L = 6.3 m = 6 m

P = 6.3 m x 2

    = 12.6 m = 13m

Performance alat kolam anaerobik 1 = 60%, maka BOD keluar dari kolam anaerobik 2 = 204,8 mg/L

3. Kolam Fakultatif

BOD masuk dari kolam fakultatif adalah 204,8 mg/L

$$Af = \frac{Q\ (Li - Le)}{18D\ (1,05)^{T-20}}$$

$$= \frac{60\ x (204,8 - 40.96)}{18\ x\ 2\ (1.05)^{30-20}} = 167,6\ m^2$$

Dipakai kriteria P : L = 2 : 1

    A = P x L

    A = 2L x L

    A = 2L^2

    167,6 m^2 = 2L^2

    83,8 m = L^2

    L = 9 m

    P = 9 m x 2

     = 18 m

Waktu retensi =

$$\theta_f = \frac{Af\ x\ D}{Q}$$

$$\theta_f = \frac{167,6\ m^2\ \ x\ 2\ m}{60\ m^3/hari} = 5.6 = 6\ hari$$

Performance alat kolam fakultatif = 80%, maka BOD keluar dari kolam fakultatif = 40,96 mg/L

4. **Kolam Maturasi**

$Kb_{(T)} = 2,6 \ (1,19)^{20-20}$

$\qquad = 2,6 \ (1,19)^{202-20}$

$\qquad = 2.6$ dibulatkan 3 hari

$Ne = \dfrac{Ni}{[1+(Kb \ x \theta \ )]}$

$Ne = \dfrac{4 \ x \ 10^7}{[1+(3,68 \ x \ 8 \ )]}$

Ne= 13 FC /100 ml

$A_m = \dfrac{Q \ x \ t}{D}$

$\qquad = \dfrac{60\frac{m^3}{hari}x \ 3 hari}{1.5 \ m} = 120 \ \ m^2$

A = P x L

120 = 2L x L

$120 \ m^2 = 2L^2$

$60 \ m = L^2$

$L = 7.7 \ m = 8 \ m$

P = 8 m x 2

$\quad = 16$ m

Performance alat kolam maturasi = 60%, maka BOD keluar dari kolam
fakultatif = 16,4 mg/L