## *7.3*

## *Mechanical Equipment*

# I Mechanical Calculation of Master plan

This chapter does a calculation about the capacity of the machine.

## 1.1 Lift pump

### 1.1.1 Necessary condition

Design maximum daily wastewater flow

- 512,000 $m^3$/day

### 1.1.2 Necessary pumps units and capacity

It as same as sewage pumping station

## 1.2 Raw sludge pump

### 1.2.1 Necessary condition

Design maximum daily wastewater flow

- 512,000 $m^3$/day

Design raw sludge generation volume

- Solids volume 53.76 t/day
- Moisture content 98 %
- Sludge volume 2,688 $m^3$/day

### 1.2.2 Necessary pump units

Facilitate 2(1) pumps per train. 8 trains are total. Therefore,

8trains * 2(1) unit/1train = 16(8) units

### 1.2.3 Necessary pump capacity (Q)

Operation time is 12 hours per day.

Q = Vo / (units * 12 * 60)

= 2,688 / (8 * 12 * 60)

= 0.46 → 0.5 $m^3$/min

- Q : Necessary pump capacity ($m^3$/min)
- Vo : Sludge volume = 2,688 $m^3$/day

### 1.2.4 Pump diameter (D)

$D = 146\sqrt{(Q / Ve)}$

$= 146\sqrt{(0.5 / 2.5)}$

= 65.29 → 80 mm

- D : Pump diameter (mm)
- Q : Pump capacity = 0.5 $m^3$/min
- Ve : Suction flow velocity = 2.5 m/s

### 1.2.5 Pump head (H)

H = h1 + h2 + h3
= 2 + 11 + 1
= 14 m

- H : Pump head (m)
- h1 : Static head. = 2 m
- h2 : Pipe loss head. = 11 m
- h3 : Residual velocity head. = 1 m

### 1.2.6 Pump input power (P)

$P = (0.163 * Q * \gamma * H * \alpha) / \rho$
$= (0.163 * 1.0 * 1.05 * 14 * 1.2) / 0.65$
$= 4.4 \rightarrow 5.5$ kw

- Q : Pump capacity = 0.5 $m^3$/min * 2units
- $\gamma$ : Fluid density = 1.05
- H : Pump head = 14 m
- $\alpha$ : Allowance = 1.2
- $\rho$ : Pump efficiency = 0.65

### 1.2.7 Spec

- $\phi$ 80 mm * 0.5 $m^3$/min * 14 m * 5.5 kw

## 1.3 Return sludge pump

### 1.3.1 Necessary condition

Design maximum daily wastewater flow

- 512,000 $m^3$/day

Design return sludge volume

- return sludge ratio 50～100 %
- 512,000 $m^3$/day * 50～100 % = 256,000 ～ 512,000 $m^3$/day
- 64,000 $m^3$/day * 50～100 % = 32,000 ～ 64,000 $m^3$/day

### 1.3.2 Necessary pump units

Facilitate { 25 % * 4 units / 50 % * 2 units } pumps per train.

32,000～64,000 $m^3$/day
25 % * 4 units = 32,000 $m^3$/day
50 % * 2 units = 32,000 $m^3$/day
= 64,000 $m^3$/day

### 1.3.3 Necessary pump capacity (Q)

(25%)Q = Vo / (units * 24 * 60)
= 32,000 / (4 * 24 * 60)
= 5.55 → 5.6 $m^3$/min

- Q : Necessary pump capacity ($m^3$/min)

- Vo : Sludge volume = 32,000 $m^3$/day

(50%)Q = Vo / (units * 24 * 60)
= 32,000 / (2 * 24 * 60)
= 11.11 → 11.2 $m^3$/min

- Q : Necessary pump capacity ($m^3$/min)
- Vo : Sludge volume = 32,000 $m^3$/day

### 1.3.4 Pump diameter (D)

(25%)D = $146\sqrt{(Q / Ve)}$
= $146\sqrt{(5.6 / 2.5)}$
= 218 → 250 mm

- D : Pump diameter (mm)
- Q : Pump capacity = 5.6 $m^3$/min
- Ve : Suction flow velocity = 2.5 m/s

(50%)D = $146\sqrt{(Q / Ve)}$
= $146\sqrt{(11.2 / 2.5)}$
= 309 → 300 mm

- D : Pump diameter (mm)
- Q : Pump capacity = 11.2 $m^3$/min
- Ve : Suction flow velocity = 2.5 m/s

### 1.3.5 Pump head (H)

(25%)H = h1 + h2 + h3
= 1.5 + 3.5 + 1
= 6 m

- H : Pump head (m)
- h1 : Static head = 1.5 m
- h2 : Pipe loss head = 3.5 m
- h3 : Residual velocity head = 1 m

(50%)H = h1 + h2 + h3
= 1.5 + 4.5 + 1
= 7 m

- H : Pump head (m)
- h1 : Static head = 1.5 m
- h2 : Pipe loss head = 4.5 m
- h3 : residual velocity head = 1 m

### 1.3.6 Pump input power (P)

(25%)P = (0.163 * Q * $\gamma$ * H * $\alpha$) / $\rho$
= (0.163 * 5.6 * 1.05 * 6 * 1.2) / 0.65
= 10.61 → 11 kw

- Q : Pump capacity = 5.6 $m^3$/min
- $\gamma$ : Fluid density = 1.05
- H : Pump head = 6 m
- $\alpha$ : Allowance = 1.2
- $\rho$ : Pump efficiency = 0.65

(50%)P = (0.163 * Q * $\gamma$ * H * $\alpha$) / $\rho$
= (0.163 * 11.2 * 1.05 * 7 * 1.2) / 0.65
= 24.77 → 30kw

- Q : Pump capacity = 11.2 $m^3$/min
- $\gamma$ : Fluid density = 1.05
- H : Pump head = 7m
- $\alpha$ : Allowance = 1.2
- $\rho$ : Pump efficiency = 0.65

1.3.7 Spec

- (25%) $\phi$ 200 mm * 5.6 $m^3$/min * 6 m * 11 kw
- (50%) $\phi$ 300 mm * 11.2 $m^3$/min * 7 m * 30 kw

## 1.4 Excess sludge pump

### 1.4.1 Necessary condition

Design maximum daily wastewater flow

- 512,000 $m^3$/day

Design excess sludge generation volume

- Solids volume 38.39 t/day
- Moisture content 99.4 %
- Sludge volume 6,397.5 $m^3$/day

### 1.4.2 Necessary pump units

Facilitate 2(1) pumps per train. 8 trains are total. Therefore
8train * 2(1) unit / 1train = 16(8)units

### 1.4.3 Necessary pump capacity (Q)

Operation time is 12hours per day.
Q = Vo / (units * 12 * 60)
= 6,397.5 / (8 * 12 * 60)
= 1.11 → 1.2 $m^3$/min

- Q : Necessary pump capacity ($m^3$/min)
- Vo : Sludge volume = 6,397.5 $m^3$/day

### 1.4.4 Pump diameter (D)

D = 146$\sqrt{}$(Q / Ve)
= 146$\sqrt{}$(1.2 / 2.5)

= 101.15 → 100 mm

- D : Pump diameter (mm)
- Q : Pump capacity = 1.2 $m^3$/min
- Ve : Suction flow velocity = 2.5 m/s

### 1.4.5 Pump head (H)

H = h1 + h2 + h3

= 2 + 10 + 1

= 13 m

- H : Pump head (m)
- h1 : Static head = 2 m
- h2 : Pipe loss head = 10 m
- h3 : Residual velocity head = 1 m

### 1.4.6 Pump input power (P)

P = (0.163 * Q * $\gamma$ * H * $\alpha$) / $\rho$

= (0.163 * 2.4 * 1.05 * 13 * 1.2) / 0.65

= 9.8 → 11 kw

- Q : Pump capacity = 1.2 $m^3$/min * 2units
- $\gamma$ : Fluid density = 1.05
- H : Pump head = 13 (m)
- $\alpha$ : Allowance = 1.2
- $\rho$ : Pump efficiency = 0.65

### 1.4.7 Spec

- $\phi$ 100mm * 1.2 $m^3$/min * 13 m * 11 kw

## 1.5 Blower equipment

### 1.5.1 Necessary condition

Design maximum daily wastewater flow

- 512,000 $m^3$/day

Influx water quality

- BOD : 120 mg
- S-BOD : 80 mg
- SS : 105 mg
- kj - N : 30 mg

| | |
|---|---|
| Water temp | 33 ℃ (River average Water temp 30℃) |
| Temp | 26 ℃ |
| MLSS | 2,000 mg/l |
| HRT | 6 hr |
| E-S-C | 38,385 kgSS/day |
| Nitrogen content. | 0.08 kgN/kgSS |

### 1.5.2 Actual oxygen requirements (AOR)

AOR=Od1 + Od2 + Od3 + Od4

=36,864 + 17,386 + 56,160 + 0

=110,410 ($kgO_2$/day)

- Od1 : Amount of oxygen. That oxidizes BOD (kgO2/day)
- Od2 : Amount of oxygen. That endogenous respiration (kgO2/day)
- Od3 : Amount of oxygen. That nitrification (kgO2/day)
- Od4 : Oxygen in A/T outflow.($kgO_2$/day)

① Od1 = A * (Removal BOD – nitrification * K)

= 0.6 * (512,000 * 120 * $10^{-3}$)

= 36,864 ($kgO_2$/day)

- A : Amount of oxygen. That removal BOD = 0.6
- K : BOD consumption by nitrifications = 2.86

※This plan is not nitrification. Therefore

② Od2 = B * VA * MLVSS

= 0.1 * 129,360 * (0.84 * 2,000) * 0.8 * $10^{-3}$

= 17,386 ($kgO_2$/day)

- B : Amount of oxygen. That endogenous respiration per An MLVSS = 0.1
- VA : aerobics volume part of aeration tank = (1,617$m^3$ * 80 = 129,360 $m^3$)
- MLVSS / MLSS : 0.8

③ Od3 = C * (kj - N volume nitrified)

= 4.57 * (512,000 * 30 * $10^{-3}$ – 0 - 3,071)

= 56,160 ($kgO_2$/day)

- C : Amount of oxygen. That nitrification = 4.57
- kj-N volume nitrified : (kj-N inflow volume) - (kj-N outflow volume) - (kj-N removal volume at excess sludge)
- kj-N inflow volume = 30mg
- kj-N outflow volume = 0mg
- kj-N removal volume at excess sludge

= Excess sludge volume * nitrogen content

= 38,385 kgSS/day * 0.08 kgN/kgSS

= 3,071 kgN/day

④ Od4 = 0 (※As it miss out, it extremely little)

### 1.5.3 Standard oxygen requirements (SOR)

$SOR = ((AOR * C_{sw} * \gamma) / (1.024^{(T-20)} * \alpha(\beta * C_s * \gamma - C_A)) * 760 / P$

$= ((110,410 * 8.84 * 1.27) / (1.024^{(33-20)} * 0.83(0.95 * 7.23 * 1.27 - 2))) * 760 / 760$

= 163,339 ($kgO_2$/day)

- $C_{sw}$ : Density saturated oxygen at 20℃ = 8.84
- $\gamma$ : Aeration depth by correction of Cs.

= 1 + (H / 2) / 10.24
= 1 + (5.5 / 2) / 10.24
= 1.27

- H : Aeration depth = 5.5 m
- T : Mixed sewage (Waste water and Activated sludge) temp = 33℃
- α : Correction of Kla = 0.83
- β : Correction of Density saturated oxygen.= 0.95
- $C_s$ : Density saturated oxygen at T℃ = 7.23
- $C_A$ : Average DO of mixed sewage. = 2 mg/l
- P : Atmospheric pressure. = 760 mmHg

= ((110,410 * 8.84 * 1.27) / ($1.024^{(33-20)}$
* 0.83(0.95 * 7.23 * 1.27 - 2))) * 760 / 760
= 163,339 ($kgO_2$/day)

### 1.5.4 Arithmetic of necessary air content

$Q = SOR/E_A * 10^{-2} * \rho * O_W$
= 163,339 / 10 * $10^{-2}$ * 1.293 * 0.233
= 5,421,699 ($Nm^3$/day)

- SOR : Standard oxygen requirements. = 163,339($kgO_2$/day)
- $E_A$ : Oxygen transfer efficiency at mixed sewage. = 7.5 % ~ 15 %
- $\rho$ : Atmospheric density. = 1.293 (kgAir/$Nm^3$)
- $O_W$ : Oxygen weight per atmospheric. = 0.233 ($kgO_2$/kgAir)

Air content / 1train = 5,421,699 / 8 = 677,712 ($Nm^3$/day)

### 1.5.5 1-Blower capacity = Air content /1train

Q1 = 677,712 ($Nm^3$/day)
= 470.3 → 470 ($Nm^3$/min)
Q2 = Q1 * (273 + T) / 273 * α
= 470 * (273 + 33) / 273 * 1.15
= 605 → 600 ($m^3$/min)
T : 33℃
α : Allowance = 15%

### 1.5.6 Spec

- φ 700 * φ 600 * 600($m^3$/min) * 6,800mmAq * 810kw * 9(1)units

## 1.6 Diffuser

### 1.6.1 Necessary condition

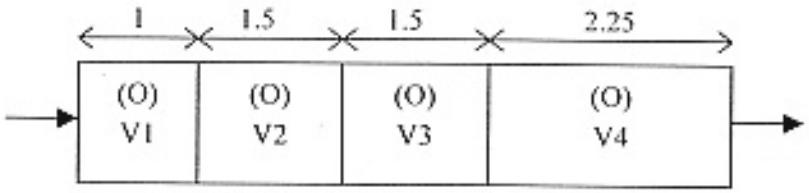
1-Blower capacity = Air content / 1train

- Q1 = 600 $m^3$/min

Air content /1units

- Q2 = 600 / 10
= 60 $m^3$/min

Aeration tank volume




- V1 = W10.5m * L (28m / 6.25) * 1 * H5.5m = 258.72 $m^3$
- V2 = W10.5m * L (28m / 6.25) * 1.5 * H5.5m = 388.08 $m^3$
- V3 = W10.5m * L (28m / 6.25) * 1.5 * H5.5m = 388.08 $m^3$
- V4 = W10.5m * L (28m / 6.25) * 2.25 * H5.5m = 582.12 $m^3$
- $V_{all}$ = V1 + V2 + V3 + V4 = 1617 $m^3$

### 1.6.2 Air content / Vx

- Air content / V1 = 60 $m^3$/min * 258.72 $m^3$ / 1617 $m^3$ = 9.6 $m^3$/min
- Air content / V2 = 60 $m^3$/min * 388.08 $m^3$ / 1617 $m^3$ = 14.4 $m^3$/min
- Air content / V3 = 60 $m^3$/min * 388.08 $m^3$ / 1617 $m^3$ = 14.4 $m^3$/min
- Air content / V4 = 60 $m^3$/min * 582.12 $m^3$ / 1617 $m^3$ = 21.6 $m^3$/min

### 1.6.3 Diffuser air content

- Diffuser = 120 l/min/unit

### 1.6.4 Necessary Diffuser units

- V1 = 9.6 / 0.12 = 80 units
- V2 = 14.4 / 0.12 = 120 units
- V3 = 14.4 / 0.12 = 120 units
- V4 = 21.6 / 0.12 = 180 units
- Sum = 80 + 120 + 120 + 180
  = 500 units
- Total = 500units * 10units * 8trains
  = 40,000 units

### 1.6.5 Spec

- 120 (l/min) * 40,000 units

## 1.7 Chlorination

### 1.7.1 Necessary condition

Design maximum daily wastewater flow

- 512,000 $m^3$/day

Chemical infuse rate.

- 2~4 ppm ( Usually 3 ppm )

### 1.7.2 Necessary chemical volume (Q1) and tank capacity (Q2)

$Q1 = Q * R * 10^{-6} * (100 / \alpha) * (1 / \beta)$

$= 512{,}000 * 3\text{ppm} * 10^{-6} * (100 / 10) * (1 / 1.1)$

$= 13.9\ m^3/day$

- Q : 512,000 $m^3$/day
- R : Chemical infuse rate. = 3 ppm
- $\alpha$ : Effective chlorine density. = 10 %
- $\beta$ : Density = 1.1 ( at 10%)

Storage days of chemical are a one-week.

Units are 8 units

$Q2 = 13.9\ m^3/day * 7\ days * (1 / 8)$

$= 12.16 \rightarrow 13\ m^3$

### 1.7.3 Necessary pump capacity (Q3)

$Q3 = Q * R * 10^{-6} * (1 / 24) * (100 / \alpha) * (1 / \beta) * (1 / unit)$

$= 512{,}000 * 2 \sim 4\ ppm * 10^{-6} * (1 / 24) * (100 / 10) * (1 / 1.1) * (1 / 8)$

$= 0.049 \sim 0.097\ m^3/h \rightarrow 0.81 \sim 1.62$ l/min

- Q : 512,000 $m^3$/day
- R : Chemical infuse rate. = 2 ~ 4 ppm ( Usually 3 ppm )
- $\alpha$ : Effective chlorine density. = 10 %
- $\beta$ : Density = 1.1 ( at 10 % )
- Unit : 8units

### 1.7.4 Spec

- Sodium Hypochlorite tank : 13 $m^3$
- Sodium hypo chlorite pump : $\phi$ 25 * 0.81 ~ 1.62 l/min

## 1.8 Sand filtration

### 1.8.1 Necessary condition

Secondary effluent.

| Name | Use pressure (Mpa) | Use volume (L/min) |
|---|---|---|
| Sprinkling nozzle | 1.96 | 1,000 |
| Antifoaming nozzle: | 1.96 | 320 |
| (Gravity type thickened) | | |
| Antifoaming nozzle | 0.98 | 26,320 |
| (Aeration tank) | | |
| Cyclone separator: 6units | | |
| (Washing) 1units | 1.47 | 500 |
| Centrifugal: 6units | | |
| (Washing) 1units | 1.47 | 500 |
| Total | | 28,640 |

Sand filtration effluent

| Name | Use pressure (Mpa) | Use volume (L/min) |
|---|---|---|
| Sprinkling nozzle | 1.96 | (1,000) |
| Main pump: 6units | 1.96 | 105 |
| Blower: 9units | | |
| (Coolant): 8units | 0.98 | 774 |
| Cyclone separator: 6units | | |
| (Coolant) 4units | 0.98 | 400 |
| Centrifugal: 6units | | |
| (Coolant) 4units | 0.98 | 400 |
| Chemical dissolution water | 0.98 | 670 |
| Total | | 2,349 (3,349) |

Design of sand filtration effluent volume

Q = 2.4 $m^3$/min (2,349 l / min) * 24 * 60

= 3,456 $m^3$/day

Filtration rate

V = 200 m/day

Filtration area.

D = Q / V

= 3,456 / 200

= 17.28 → 20 $m^2$

### 1.8.2 Necessary sand filtration units

A one unit is Maximum filtration area of 5$m^2$.

20$m^2$ / 5$m^2$ = 4 units

- 4 units

### 1.8.3 Sand filtration charges pump capacity.

5$m^2$ * 200 m/day = 1,000 $m^3$/day

- 0.7 $m^3$/min

**1.8.4 Spec**

- Sand filtration : 5 $m^2$ * 4 units
- Charge pump : $\phi$ 80 * 0.7 $m^3$/min * 4 units

## 1.9 Thickened sludge pump

### 1.9.1 Necessary condition

Design maximum daily wastewater flow

- 512,000 $m^3$/day

Design thickened sludge generation volume

- Solids volume 53.76 t/day
- Moisture content 97 %
- Sludge volume 1,792 $m^3$/day

### 1.9.2 Necessary pump units

Facilitate 2(1) pumps per a thickened tank.
4 Thickened tank are total. Therefore

- 4 tank * 2(1) pumps = 8(4) units

### 1.9.3 Necessary pump capacity (Q)

Operation time is 12 hours per day.

$Q = Vo / (units * 12 * 60)$
$= 1,792 / (4 * 12 * 60)$
$= 0.62 \rightarrow 0.7$ $m^3$/min

- Q : Necessary pump capacity ($m^3$/min)
- Vo : Sludge volume = 1,792 $m^3$/day

### 1.9.4 Pump diameter (D)

$D = 146\sqrt{(Q / Ve)}$
$= 146\sqrt{(0.2 / 2.5)}$
$= 77.2 \rightarrow 80$ mm

- D : Pump diameter mm
- Q : Pump capacity = 0.7 $m^3$/min
- Ve : Suction flow velocity = 2.5 m/s

### 1.9.5 Pump head (H)

$H = h1 + h2 + h3$
$= 1 + 8 + 1$
$= 10$ m

- H : Pump head (m)
- h1 : Static head = 1 m
- h2 : Pipe loss head = 8 m
- h3 : Residual velocity head = 1 m

### 1.9.6 Pump input power (P)

$P = (0.163 * Q * \gamma * H * \alpha) / \rho$

$= (0.163 * 1.4 * 1.05 * 10 * 1.2) / 0.65$

$= 4.4 \rightarrow 5.5$ kw

- Q : Pump capacity = 0.7 $m^3$/min * 2units
- $\gamma$ : Fluid density = 1.05
- H : Pump head = 10 m
- $\alpha$ : Allowance = 1.2
- $\rho$ : Pump efficiency = 0.65

### 1.9.7 Spec

- $\phi$ 80 mm * 0.7 $m^3$/min * 10 m * 5.5 kw

## 1.10 Centrifugal thickener

### 1.10.1 Necessary condition

Design maximum daily wastewater flow

- 512,000$m^3$/day

Design excess sludge generation volume

- Solids volume 38.39 t/day
- Moisture content 99.4 %
- Sludge volume 6,397.5 $m^3$/day

### 1.10.2 Necessary Centrifugal thickener units

Facilitate (2trains of WWTP = 1trains of STP)

8 trains / 2 trains = 4 trains

1 train = 1unit, + 2 unit stand-by

4 trains * 1 unit = 4 units + 2 units stand-by.

### 1.10.3 Necessary Centrifugal thickener capacity (Q)

Operation time is 24hours per day.

Q = Vo / (units * 24)

= 6,397.5 / (4 * 24)

$= 66.6 \rightarrow 70$ $m^3$/h

- Q : Necessary Centrifugal thickener capacity ($m^3$/h)
- Vo : Sludge volume = 6,397.5 $m^3$/day

### 1.10.4 spec

- 70 $m^3$/h * 112.75 kw

## 1.11 Centrifugal thickener charge pump

### 1.11.1 Necessary condition

Design maximum daily wastewater flow

- 512,000 $m^3$/day

Design thickened sludge generation volume

- Solids volume 38.39 t/day
- Moisture content 99.4 %
- Sludge volume 6,387.5 $m^3$/day

### 1.11.2 Necessary pump units

Take into consideration centrifugal thickener 1unit = charge pump 1unit

- Centrifugal thickener 6(2) units = Charge pump 6(2) units

### 1.11.3 Necessary pump capacity (Q)

Centrifugal thickener 70$m^3$/h

Facilitate pump capacity is 0.5～1.5 times as Centrifugal thickener capacity.

Q = Vo * 0.5～1.5

= 70 * 0.5～1.5

= 35 ～ 105 $m^3$/min (70 $m^3$/h)

- Q : Necessary pump capacity ($m^3$/min)
- Vo : Centrifugal thickener capacity = 70 $m^3$/h

### 1.11.4 Spec

- $\phi$ 250 mm * 35 ～ 105 $m^3$/min * 10 m * 30 kw

## 1.12 Centrifugal dehydrator

### 1.12.1 Necessary condition

Design maximum daily wastewater flow

- 512,000 $m^3$/day

Design thickened sludge generation volume

- Solids volume 92.16 t/day
- Moisture content 96.65 %
- Sludge volume 2,752 $m^3$/day

Operation days / week

- 7days / 1week

Operation hours / day

- 24hours / 1day

### 1.12.2 Necessary centrifugal dehydrator units

- 4 units

### 1.12.3 Necessary centrifugal dehydrator capacity (Q)

Operation days are 7days / week.

Operation hours are 24h / day.

Q = (Vo * 7 / 7) / (U * T)

= (2,752 * 7 / 7) / (4 * 24)
= 28.6 → 30 $m^3$/h

- Q : Necessary centrifugal dehydrator ($m^3$/h)
- Vo : Sludge volume = 2,752$m^3$/day
- T : Operation hours = 24h
- U : units = 4

### 1.12.4 spec

- 30 $m^3$/h * 147.4 kw

## 1.13 Centrifugal dehydrator charge pump

### 1.13.1 Necessary condition

Design maximum daily wastewater flow

- 512,000 $m^3$/day

Design thickened sludge generation volume

- Solids volume 92.16 t/day
- Moisture content 96.65 %
- Sludge volume 2,752 $m^3$/day

### 1.13.2 Necessary pump units

Take into consideration centrifugal dehydrator 1unit = charge pump 1 unit

- Centrifugal dehydrator 6(2)units = Charge pump 6(2) units

### 1.13.3 Necessary pump capacity (Q)

Centrifugal dehydrator 30 $m^3$/h
Facilitate pump capacity is 0.5～1.5 times as centrifugal dehydrator capacity.
Q = Vo * 0.5 ～ 1.5
= 30 * 0.5 ～ 1.5
= 15 ～ 45 $m^3$/h (10 $m^3$/h)

- Q : Necessary pump capacity ($m^3$/h)
- Vo : Centrifugal dehydrator capacity = 30 $m^3$/h

### 1.13.4 Spec

- φ 125 mm * 15 ～ 45 $m^3$/min * 10 m * 11 kw

## 1.14 Drainage pump

### 1.14.1 Necessary condition

Design maximum daily wastewater flow

- 512,000 $m^3$/day

Flow rate of extracted

- From Cyclone Separators : about 5,200 $m^3$/day
- From Centrifugal Separators : about 2,100 $m^3$/day

- Grand total : 7,300 $m^3$/day

### 1.14.2 Necessary pump units

Facilitate 2(1) pumps for 1 Drainage Tank; there are 2 Tanks in total, therefore:
2 tanks * 2(1) unit/1tanks = 4(2) units

### 1.14.3 Necessary pump capacity (Q)

Operation time is 24 hours per day.

Q = Vo / (24 * 60)
= 7,300 / (24 * 60)
= 5.06 → 5.1 $m^3$/min

- Q : Necessary pump capacity ($m^3$/min)
- Vo : Total amount of Drainage Water = 7,300 $m^3$/day

### 1.14.4 Pump diameter (D)

$D = 146\sqrt{(Q / Ve)}$
$= 146\sqrt{(5.1 / 2.5)}$
= 208 → 200 mm

- D : Pump diameter (mm)
- Q : Pump capacity = 5.1 $m^3$/min
- Ve : Suction flow velocity = 2.5 m/s

### 1.14.5 Pump head (H)

H = h1 + h2 + h3
= 1 + 13 + 1
= 15 m

- H : Pump head (m)
- h1 : Static head. = 1 m
- h2 : Pipe loss head. =13 m
- h3 : Residual velocity head. = 1 m

### 1.14.6 Pump input power (P)

$P = (0.163 * Q * H * \alpha) / \rho$
$= (0.163 * 5.1 * 1.05 * 15 * 1.2) / 0.65$
= 24.17 → 30 kw

- Q : Pump capacity = 5.1 $m^3$/min
- $\gamma$ : Fluid density = 1.05
- H : Pump head = 15 m
- $\alpha$ : Allowance = 1.2
- $\rho$ : Pump efficiency = 0.65

### 1.14.7 Spec

- $\phi$200 mm * 5.1 $m^3$/min * 15 m * 30 kw

## 2 Mechanical calculation of Phase 1

This chapter does a calculation about the capacity of the machine.

### 2.1 Lift pump

#### 2.1.1 Necessary condition

Design maximum daily wastewater flow of Phase1.

- 141,000 $m^3$/day

#### 2.1.2 Necessary pumps units and capacity

This pump equipment is as same as intermediate pumping station.

### 2.2 Raw sludge pump

#### 2.2.1 Necessary condition

Design maximum daily wastewater flow

- 141,000 $m^3$/day

Design raw sludge generation volume

- Solids volume 10.36 t/day
- Moisture content 98 %
- Sludge volume 518.2 $m^3$/day

#### 2.2.2 Necessary pump units

Facilitate 2 pumps per train. Phase1 are 1 train. Therefore,
1trains * 2 unit / 1train = 2 units+1stand-by

#### 2.2.3 Necessary pump capacity (Q)

Operation time is 12 hours per day.

Q = Vo / (units * 12 * 60)
= 518.2 / (2 * 12 * 60)
= 0.36 → 0.5 $m^3$/min

- Q : Necessary pump capacity ($m^3$/min)
- Vo : Sludge volume = 518.2 $m^3$/day

#### 2.2.4 Pump diameter (D)

$D = 146\sqrt{(Q / Ve)}$
$= 146\sqrt{(0.5 / 2.5)}$
= 65.29 → 80 mm

- D : Pump diameter (mm)
- Q : Pump capacity = 0.5 $m^3$/min
- Ve : Suction flow velocity = 2.5 m/s

#### 2.2.5 Pump head (H)

h1 : Static head. = 2m

h2 : Pipe loss head. = 11m
h3 : Residual velocity head = 1m
H = h1 + h2 + h3
= 2 +11 + 1
= 14 → 14 m

### 2.2.6 Pump input power (P)

P = (0.163 * Q * γ * H * α ) / ρ
= (0.163 * 0.5 * 1.05 * 14 * 1.2) / 0.3
= 4.79 → 5.5 kw

- Q : Pump capacity = 0.5 $m^3$/min
- γ : Fluid density = 1.05
- H : Pump head = 14 m
- α : Allowance = 1.2
- ρ : Pump efficiency = 0.3

### 2.2.7 Spec

- φ80 mm * 0.5 $m^3$/min * 14 m * 5.5 kw
- 2units+1stand-by

## 2.3 Return sludge pump

### 2.3.1 Necessary condition

Design maximum daily wastewater flow

- 141,000 $m^3$/day

Design return sludge volume

- return sludge ratio 5～10 %
- 141,000 $m^3$/day * 5～10 % = 7,050 ～ 14,100 $m^3$/day

### 2.3.2 Necessary pump units

Facilitate 10 % * 2 units pumps per train.
7,050 $m^3$ * 2units = 14,100 $m^3$

### 2.3.3 Necessary pump capacity (Q)

Q = Vo / (units * 24 * 60)
= 7,050 / (1 * 24 * 60)
= 4.89 → 5.6 $m^3$/min

∴ It is made the thing of the capacity which is the same as the pump for the future so that it can use it in the future.

- Q : Necessary pump capacity ($m^3$/min)
- Vo : Sludge volume = 7,050 $m^3$/day

### 2.3.4 Pump diameter (D)

D = 146$\sqrt{}$ (Q / Ve)

$= 146\sqrt{(5.6 / 2.5)}$

$= 218 \rightarrow 250$ mm

- D : Pump diameter (mm)
- Q : Pump capacity = 5.6 $m^3$/min
- Ve : Suction flow velocity = 2.5 m/s

### 2.3.5 Pump head (H)

h1 : Static head. = 1.5m

h2 : Pipe loss head. = 3.5m

h3 : Residual velocity head = 1m

H = h1 + h2 + h3

= 1.5 + 3.5 + 1

= 6 m

### 2.3.6 Pump input power (P)

$P = (0.163 * Q * \gamma * H * \alpha) / \rho$

$= (0.163 * 5.6 * 1.05 * 6 * 1.2) / 0.65$

$= 10.61 \rightarrow 11$ kw

- Q : Pump capacity = 5.6 $m^3$/min
- $\gamma$ : Fluid density = 1.5
- H : Pump head = 6 m
- $\alpha$ : Allowance = 1.2
- $\rho$ : Pump efficiency = 0.65

### 2.3.7 Spec

- $\phi$ 200 mm * 5.6 $m^3$/min * 6 m * 11 kw
- 2units+2stand-by

## 2.4 Excess sludge pump

### 2.4.1 Necessary condition

Design maximum daily wastewater flow

- 141,000 $m^3$/day

Design excess sludge generation volume

- Solids volume 10.778 t/day
- Moisture content 99.4 %
- Sludge volume 1,796.3 $m^3$/day

### 2.4.2 Necessary pump units

Facilitate 2 pumps per train. Phase1 are 1 train. Therefore

1 train * 2 unit / 1train = 2 units

### 2.4.3 Necessary pump capacity (Q)

Operation time is 12hours per day.

Q = Vo / (units * 12 * 60)
= 1,796.3 / (2 * 12 * 60)
= 1.24 → 1.2 $m^3$/min

- Q : Necessary pump capacity ($m^3$/min)
- Vo : Sludge volume = 1,796.3 $m^3$/day

### 2.4.4 Pump diameter (D)

D = 146$\sqrt{}$ (Q / Ve)
= 146$\sqrt{}$ (1.2 / 2.5)
= 101.15 → 100 mm

- D : Pump diameter (mm)
- Q : Pump capacity = 1.2 $m^3$/min
- Ve : Suction flow velocity = 2.5 m/s

### 2.4.5 Pump head (H)

h1 : Static head. = 2m
h2 : Pipe loss head. = 10m
h3 : Residual velocity head = 1m
H = h1 + h2 + h3
= 2 + 10 + 1
= 13 m

### 2.4.6 Pump input power (P)

P = (0.163 * Q * $\gamma$ * H * $\alpha$) / $\rho$
= (0.163 * 2.4 * 1.05 * 13 * 1.2) / 0.65
= 9.8 → 11 kw

- Q : Pump capacity = 1.2 $m^3$/min*2units
- $\gamma$ : Fluid density = 1.05
- H : Pump head = 13 (m)
- $\alpha$ : Allowance = 1.2
- $\rho$ : Pump efficiency = 0.65

### 2.4.7 Spec

- $\phi$ 100mm * 1.2 $m^3$/min * 13 m * 11 kw
- 2units+1stand-by

## 2.5 Blower equipment

### 2.5.1 Necessary condition

Design maximum daily wastewater flow

- 141,000 $m^3$/day

Air Feeding rate

- 2 ~ 4 times of wastewater volume

### 2.5.2 1-Blower capacity = Air content /1train

Q1 = 141,000 * 2 ~ 4 times
= 282,000 ~ 564,000
= 195.8 ~ 391.6 → 360 m3/min

### 2.5.3 Spec

- ϕ 600 * 360($m^3$/min) * 6.800mmAq * 480kw
- 1units+1stand-by

## 2.6 Diffuser

### 2.6.1 Necessary condition

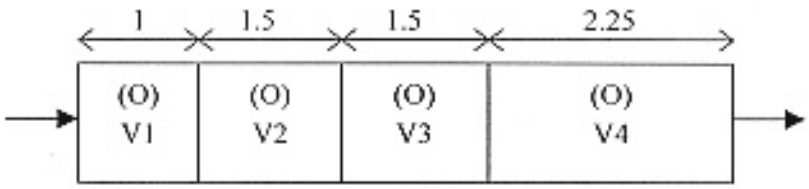
1-Blower capacity = Air content / 1train

- Q1 = 360 $m^3$/min

Air content /1units

- Q2 = 360 / 10
  = 36 $m^3$/min

Aeration tank volume




- V1 = W10.5m * L (28m / 6.25) * 1 * H5.5m = 258.72 $m^3$
- V2 = W10.5m * L (28m / 6.25) * 1.5 * H5.5m = 388.08 $m^3$
- V3 = W10.5m * L (28m / 6.25) * 1.5 * H5.5m = 388.08 $m^3$
- V4 = W10.5m * L (28m / 6.25) * 2.25 * H5.5m = 582.12 $m^3$
- $V_{all}$ = V1 + V2 + V3 + V4 = 1617 $m^3$

### 2.6.2 Air content / Vx

- Air content / V1 = 36 $m^3$/min * 258.72 $m^3$ / 1617 $m^3$ = 5.76 $m^3$/min
- Air content / V2 = 36 $m^3$/min * 388.08 $m^3$ / 1617 $m^3$ = 8.64 $m^3$/min
- Air content / V3 = 36 $m^3$/min * 388.08 $m^3$ / 1617 $m^3$ = 8.64 $m^3$/min
- Air content / V4 = 36 $m^3$/min * 582.12 $m^3$ / 1617 $m^3$ = 12.96 $m^3$/min

### 2.6.3 Diffuser air content

- Diffuser = 120 l/min/unit

### 2.6.4 Necessary Diffuser units

- V1 = 5.76 / 0.12 = 48 units
- V2 = 8.64 / 0.12 = 72 units
- V3 = 8.64 / 0.12 = 72 units

- V4 = 12.96 / 0.12 = 108 units
- Sum = 48 + 72 + 72 + 108
  = 300 units
- Total = 300units * 10units * 1trains
  = 3,000 units

**2.6.5** Spec

- 120 (l/min) * 3,000 units

## 2.7 Chlorination

### 2.7.1 Necessary condition

Design maximum daily wastewater flow

- 141,000 $m^3$/day

Chemical infuse rate.

- 2～4 ppm ( Usually 3 ppm )

### 2.7.2 Necessary chemical volume (Q1) and tank capacity (Q2)

$Q1 = Q * R * 10^{-6} * (100 / \alpha) * (1 / \beta)$

$= 141,000 * 3ppm * 10^{-6} * (100 / 10) * (1 / 1.1)$

$= 3.85\ m^3$/day

- Q : 141,000 $m^3$/day
- R : Chemical infuse rate. = 3 ppm
- $\alpha$ : Effective chlorine density. = 10 %
- $\beta$ : Density = 1.1 ( at 10%)

Storage days of chemical are a one-week.

Units are 8 units

$Q2 = 3.85\ m^3$/day * 7 days

$= 26.9 \rightarrow 13\ m^3$ * 2units

### 2.7.3 Necessary pump capacity (Q3)

$Q3 = Q * R * 10^{-6} * (1 / 24) * (100 / \alpha) * (1 / \beta) * (1 / unit)$

$= 141,000 * 2 \sim 4\ ppm * 10^{-6} * (1 / 24) * (100 / 10) * (1 / 1.1) * (1 / 2)$

$= 0.054 \sim 0.107\ m^3/h \rightarrow 0.92 \sim 1.78$ l/min

∴ It is made the thing of the capacity which is the same as the pump for the future so that it can use it in the future. Therefore, 0.82 ～ 1.62 l/min

- Q : 141,000 $m^3$/day
- R : Chemical infuse rate. = 2 ～ 4 ppm ( Usually 3 ppm )
- $\alpha$ : Effective chlorine density. = 10 %
- $\beta$ : Density = 1.1 ( at 10 % )
- Unit : 2 units

**2.7.4** Spec

- Sodium hypochlorite tank: 13 $m^3$ * 2units

- Sodium hypochlorite pump
  : $\phi$ 25 * 0.82 ~ 1.62 l/min * 2units+2 stand-by

## 2.8 Sand filtration

### 2.8.1 Necessary condition

Secondary effluent.

| Name | Use pressure (Mpa) | Use volume (L/min) |
|---|---|---|
| Sprinkling nozzle | 1.96 | (1,000) |
| Antifoaming nozzle: | 1.96 | 440 |
| (Gravity type thickened) | | |
| Antifoaming nozzle | 0.98 | 1,600 |
| (Aeration tank) | | |
| Centrifugal type thickener: 2 units | | |
| (Washing) 1units | 1.47 | 850 |
| Centrifugal type dehydrator: 2 units | | |
| (Washing) 1units | 1.47 | 460 |
| Total | | 3,350(4,350) |

Sand filtration effluent

| Name | Use pressure (Mpa) | Use volume (L/min) |
|---|---|---|
| Sprinkling nozzle | 1.96 | (1,000) |
| Blower: 2 units | | |
| (Coolant): 1 units | 0.98 | 230 |
| Chemical dissolution water | 0.98 | 230 |
| Total | | 460 (1,460) |

Design of sand filtration effluent volume

Q = 0.46 $m^3$/min (460 l / min) * 24 * 60

= 662 $m^3$/day

Filtration rate

V = 200 m/day

Filtration area.

D = Q / V

= 662 / 200

= 3.31 → 4 $m^2$

### 2.8.2 Necessary sand filtration units

Though this necessary treatment area is 4m2, it is made 5m2 based on the plan in the future.

- 2 units (include 1 stand-by)

**2.8.3 Sand filtration charges pump capacity.**

$5m^2$ * 200 m/day = 1,000 $m^3$/day

- 0.7 $m^3$/min

**2.8.4 Spec**

- Sand filtration: 5 $m^2$ *
  : 1 units+1stand-by
- Charge pump : $\phi$ 80 * 0.7 $m^3$/min * 10m
  : 1 units+1stand-by

**2.9 Thickened sludge pump**

**2.9.1 Necessary condition**

Design maximum daily wastewater flow

- 141,000 $m^3$/day

Design thickened sludge generation volume

- Solids volume 10.364 t/day
- Moisture content 97 %
- Sludge volume 345.5 $m^3$/day

**2.9.2 Necessary pump units**

Facilitate 2(1) pumps per a thickened tank.

1 Thickened tank are this time.

- 1 tank * 2(1) pumps = 2(1) units

**2.9.3 Necessary pump capacity (Q)**

Operation time is 12 hours per day.

Q = Vo / (units * 12 * 60)

= 345.5 / (1 * 12 * 60)

= 0.48 → 0.7 $m^3$/min

∴ It is made the thing of the capacity which is the same as the pump for the future so that it can use it in the future. Therefore, 0.7 m3/min

- Q : Necessary pump capacity ($m^3$/min)
- Vo : Sludge volume = 345.5 $m^3$/day

**2.9.4 Pump diameter (D)**

$D = 146\sqrt{(Q / Ve)}$

$= 146\sqrt{(0.2 / 2.5)}$

= 77.2 → 80 mm

- D : Pump diameter mm
- Q : Pump capacity = 0.7 $m^3$/min
- Ve : Suction flow velocity = 2.5 m/s

**2.9.5 Pump head (H)**

h1 : Static head.

h1 = (+8,000)-(+3,200)
= 4.8 m
h2 : Pipe loss head.
h2' = (10.666 * Q^1.85) * L / (110^1.85 * D^4.87)
= (10.666 * 0.011^1.85) *60 / (110^1.85 * 0.10^4.87)
= 1.88 m

- h2' : Pipe loss in the clear water
- Q : The amount of total flow = 0.7 m3/min * 1units
  = 0.7 m3/min → 0.011 m3/sec
- L : length of pipe = 60 m
- D : Diameter of pipe = 100 mm

h2 = α *h2'
= 1.9 * 1.88
= 3.58 → 4 m

- α : Sludge factor = 1.9

h3 : Residual velocity head
h3 = 1m
H = h1 + h2 + h3
= 4.8 + 4 + 1
= 9.8 → 10 m

### 2.9.6 Pump input power (P)

P = (0.163 * Q * γ * H * α) / ρ
= (0.163 * 1.4 * 1.05 * 10 * 1.2) / 0.65
= 4.4 → 5.5 kw

- Q : Pump capacity = 0.7 $m^3$/min*2units
- γ : Fluid density = 1.05
- H : Pump head = 10 m
- α : Allowance = 1.2
- ρ : Pump efficiency = 0.65

### 2.9.7 Spec

- ϕ 80 mm * 0.7 $m^3$/min * 10 m * 5.5 kw

## 2.10 Centrifugal thickener

### 2.10.1 Necessary condition

Design maximum daily wastewater flow

- 141,000 $m^3$/day

Design excess sludge generation volume

- Solids volume 10.778 t/day
- Moisture content 99.4 %
- Sludge volume 1,796.3 $m^3$/day

### 2.10.2 Necessary centrifugal thickener units

Facilitate (2trains of WWTP = 1trains of STP)

8 trains / 2 trains = 4 trains

2 trains = 3 units, (include 1 stand-by) Therefore,

4 trains = 6 units, (Include 2 stand-by)

### 2.10.3 Necessary centrifugal thickener capacity (Q)

Operation time is 24hours per day.

Q = Vo / (units * 24)

= 1,796.3 / (1 * 24)

= 74.8 → 70 $m^3$/h

- Q : Necessary centrifugal thickener capacity ($m^3$/h)
- Vo : Sludge volume = 1,796.3 $m^3$/day

### 2.10.4 spec

- 70 $m^3$/h * 112.75 kw * 2units (Include 1 stand-by)

## 2.11 centrifugal thickener charge pump

### 2.11.1 Necessary condition

Design maximum daily wastewater flow

- 141,000 $m^3$/day

Design thickened sludge generation volume

- Solids volume 10.778 t/day
- Moisture content 99.4 %
- Sludge volume 1,796.3 $m^3$/day

### 2.11.2 Necessary pump units

Take into consideration centrifugal thickener 1unit = charge pump 1unit

- Centrifugal thickener 6(2) units = Charge pump 6(2) units

### 2.11.3 Necessary pump capacity (Q)

Centrifugal thickener 70$m^3$/h

Facilitate pump capacity is 0.5～1.5 times as cyclone separator capacity.

Q = Vo * 0.5～1.5

= 70 * 0.5～1.5

= 35 ～ 105 $m^3$/h

- Q : Necessary pump capacity ($m^3$/min)
- Vo : Cyclone separator capacity = 70 $m^3$/h

### 2.11.4 Pump spec

Spec of Progress cavity pump is no calculation. So had to refer to Product catalog. Therefore,

- $\phi$ 250 mm * 35 ~ 105 $m^3$/h * 10mAq * 30 kw

## 2.12 Centrifugal dehydrator

### 2.12.1 Necessary condition

Design maximum daily wastewater flow

- 141,000 $m^3$/day

Design thickened sludge generation volume

- Solids volume 21.142 t/day
- Moisture content 96.56 %
- Sludge volume 615 $m^3$/day

Operation days / week

- 7 days / 1week

Operation hours / day

- 24 hours / 1day

### 2.12.2 Necessary Centrifugal dehydrator units

- 1 unit

### 2.12.3 Necessary centrifugal separator capacity (Q)

Operation days are 7 days / week.

Operation hours are 24 h / day.

Q = (Vo * 7 / 7) / (U * T)

= (615 * 7 / 7) / (1 * 24)

= 25.6 → 30 $m^3$/h

- Q : Necessary Centrifugal dehydrator capacity ($m^3$/h)
- Vo : Sludge volume = 615 $m^3$/day
- T : Operation hours = 24 h
- U : units = 1

### 2.12.4 spec

- 30 $m^3$/h * 147.4 kw * 2 units (Include 1 stand-by)

## 2.13 Centrifugal dehydrator charge pump

### 2.13.1 Necessary condition

Design maximum daily wastewater flow

- 141,000 $m^3$/day

Design thickened sludge generation volume

- Solids volume 21.142 t/day
- Moisture content 96.56 %
- Sludge volume 615 $m^3$/day

### 2.13.2 Necessary pump units

Take into consideration centrifugal separator 1unit = charge pumps 1 unit

- Centrifugal dehydrator 6(2)units = Charge pump 6(2) units

### 2.13.3 Necessary pump capacity (Q)

Centrifugal dehydrator 30 $m^3/h$

Facilitate pump capacity is 0.5～1.5 times as Centrifugal dehydrator capacity.

Q = Vo * 0.5 ～ 1.5

= 30 * 0.5 ～ 1.5

= 15 ～ 45 $m^3/h$

- Q : Necessary pump capacity ($m^3/min$)
- Vo : Centrifugal dehydrator capacity = 30 $m^3/h$

### 2.13.4 Pump spec

Spec of Progress cavity pump is not calculation. So had to refer to Product catalog. Therefore,

- $\phi$ 125 mm * 15 ～ 45 $m^3/h$ * 10mAq * 11 kw

## 2.14 Drainage pump

### 2.14.1 Necessary condition

Design maximum daily wastewater flow

- 141,000 $m^3/day$

Flow rate of extracted

- From Centrifugal thickener 5,200 $m^3/day$
- From Centrifugal dehydrator 2,100 $m^3/day$
- Grand total : 7,300 $m^3/day$

### 2.14.2 Necessary pump units

Facilitate 2(1) pumps for 1 Drainage Tank; there are 2 Tanks in total, therefore:

2 tanks * 2(1) unit/1tanks = 4(2) units

### 2.14.3 Necessary pump capacity (Q)

Operation time is 24 hours per day.

Q = Vo / (24 * 60)

= 7,300 / (24 * 60)

= 5.06 → 5.1 $m^3/min$

- Q : Necessary pump capacity ($m^3/min$)
- Vo : Total amount of Drainage Water =7,300 $m^3/day$

### 2.14.4 Pump diameter (D)

$D = 146\sqrt{(Q / Ve)}$

$= 146\sqrt{(5.1 / 2.5)}$

= 208 → 200 mm

- D : Pump diameter (mm)
- Q : Pump capacity = 5.1 $m^3$/min
- Ve : Suction flow velocity = 2.5 m/s

### 2.14.5 Pump head (H)

H = h1 + h2 + h3
= 1 + 13 + 1
= 15 m

- H : Pump head (m)
- h1 : Static head. = 1 m
- h2 : Pipe loss head. = 13 m
- h3 : Residual velocity head. = 1 m

### 2.14.6 Pump input power (P)

$P = (0.163 * Q * H * \alpha) / \rho$
$= (0.163 * 5.1 * 1.05 * 15 * 1.2) / 0.65$
$= 24.17 \rightarrow 30$ kw

- Q : Pump capacity = 5.1 $m^3$/min
- $\gamma$ : Fluid density = 1.05
- H : Pump head = 15 m
- $\alpha$ : Allowance = 1.2
- $\rho$ : Pump efficiency = 0.65

### 2.14.7 Spec

- $\phi$200mm * 5.1 $m^3$/min * 15 m * 30 kw

## *7.4*

## *Electrical Equipment*

HO CHI MINH CITY, VIETNAM
WATER ENVIRONMENT IMPROVEMENT PROJECT

# Calculation Sheet

for

# MCCB Capacity

Package : E

Plant : Wastewater Treatment Plant

# WWTP MCCB SIZE

| | | | |
|---|---|---|---|
| 100 | Lift Pump | | |
| 200 | Blower | D | Direct start |
| 300 | Sediments | C | Aux. Auto TR start |
| 400-500 | Chlorinatio | SR | Secondary Resistor |
| 600 | Dewatering | SD | Star-Delta |
| 700 | Compost | | |
| 800 | Ventilation | | |

E - 99H0057

CUSTOMER VIETNAM/HCMC

MOTORS AND AUXILIARIES LIST

Current Calc. Ratio 3

| No. | EQUIPMENT NAME | Q'TY Phase-1 DUTY | Q'TY Phase-1 STAND BY | Q'TY Phase-2 DUTY | Q'TY Phase-2 STAND BY | TOTAL | POWER (kW) | VOLTAGE (V) | Reversible Operation | STARTING METHOD | POLE | GENERATOR REQ. LOAD | Required Capacity Phase-1 Duty (KW) | Phase-1 Stand-by (kW) | Phase-2 Duty (kW) | Phase-2 Stand-by (kW) | TOTAL Duty (kW) | TOTAL Stand-by (kW) | Rated Current (A) | MCCB Size (AT) | Control Center Unit Size (mm) | Ph-1 CC Unit (unit) | Ph-2 CC Unit (unit) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <LIFT PUMP EQUIPMENT> | | | | | | | | | | | | | | | | | | | | | | |
| 121 | LIFT PUMP (1) | 2 | 1 | | | 3 | 220 | 380 | - | C | | 1 | 440.00 | 220.00 | | | 440.00 | 220.00 | | | | | |
| 122 | LIFT PUMP (2) | | | 3 | | 3 | 460 | 380 | - | C | | 1 | | | 1,380.00 | | 1,380.00 | | | | | | |
| 124 | HOIST | 1 | | | | 1 | 6.55 | 380 | R | D | | | 6.55 | | | | 6.55 | | 65 | 100 | 350 | 1 | |
| 125 | FLOOR DRAINAGE PUMP | 5 | 6 | 1 | 1 | 14 | 2.2 | 380 | - | D | | | 39.30 | 39.30 | 6.55 | 6.55 | 45.85 | 45.85 | 22 | 30 | 180 | 12 | 2 |
| | *LIFT PUMP EQUIPMENT TOTAL* | | | | | | | | | | | | 485.85 | 259.30 | 1,386.55 | 6.55 | 1,872.40 | 265.85 | | | | 13 | 2 |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | <BLOWER EQUIPMENT> | | | | | | | | | | | | | | | | | | | | | | |
| 211 | BLOWER (1) | 1 | 1 | | | 2 | 480 | 3300 | - | SR | | | 480.00 | 480.00 | | | 480.00 | 480.00 | 545 | 600 | | | |
| 211A | BLOWER (1) Aux Equipment | 1 | 1 | | | 2 | 4.15 | 380 | - | D | | | 4.15 | 4.15 | | | 4.15 | 4.15 | 41 | 50 | 240 | 2 | |
| 212 | BLOWER (2) | | | 2 | | 2 | 810 | 3300 | - | SR | | | | | 1,620.00 | | 1,620.00 | | 920 | 1000 | 180 | | 2 |

# WWTP MCCB SIZE

| | | | |
|---|---|---|---|
| 100 | Lift Pump | | |
| 200 | Blower | D | Direct start |
| 300 | Sedimenta | C | Aux. Auto TR start |
| 400~500 | Chlorinatio | SR | Secondary Resistor |
| 600 | Dewatering | SD | Star-Delta |
| 700 | Compost | | |
| 800 | Ventilation | | |

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MOTORS AND AUXILIARIES LIST

| No. | EQUIPMENT NAME | Q'TY Phase-1 DUTY | Q'TY Phase-1 STAND BY | Q'TY Phase-2 DUTY | Q'TY Phase-2 STAND BY | Q'TY TOTAL | POWER (kW) | VOLTAGE (V) | Reversible Operation | STARTING METHOD | POLE | GENERATOR REQ LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 212A | BLOWER (2)Aux.Equipment | | | 2 | | 2 | 5.0 | 380 | - | D | | |
| 213 | DISCHARGE VALVE (1) | 1 | 1 | | | 2 | 0.75 | 380 | R | D | | |
| 214 | DISCHARGE VALVE (2) | | | 2 | | 2 | 0.75 | 380 | R | D | | |
| 215 | AIR FILTER | 1 | 1 | 2 | | 4 | 0.2 | 360 | - | D | | |
| 216 | FLOOR DRAINAGE PUMP | 1 | 1 | | | 2 | 2.2 | 380 | - | D | | |
| 217 | CRANE | 1 | | | | 1 | 8.05 | 380 | R | D | | |
| | *BLOWER EQUIPMENT TOTAL* | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | <WATER TREATMENT FACILITY> PRIMARY SEDIMENTATION TANK | | | | | | | | | | | |
| 312 | SLUDGE SCRAPER | 10 | | 30 | | 40 | 1.5 | 380 | R | D | | |
| 314 | SCUM PUMP | 1 | 1 | 3 | 3 | 8 | 5.5 | 380 | - | D | | |

Current Calc. Ratio 3

| Required Capacity Phase-1 Duty (KW) | Phase-1 Stand-by (kW) | Phase-2 Duty (kW) | Phase-2 Stand-by (kW) | TOTAL Duty (kW) | TOTAL Stand-by (kW) | Rated Current (A) | MCCB Size (AT) | Control Center Unit Size (mm) | Ph-1 CC Unit (unit) | Ph-2 CC Unit (unit) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 12.00 | | 12.00 | | 59 | 100 | 360 | | 2 |
| 0.75 | 0.75 | | | 0.75 | 0.75 | 7 | 30 | 240 | 2 | |
| | | 1.50 | | 1.50 | | 7 | 30 | 240 | | 2 |
| 0.20 | 0.20 | 0.40 | | 0.60 | 0.20 | 2 | 30 | 150 | 2 | 2 |
| 2.20 | 2.20 | | | 2.20 | 2.20 | 22 | 30 | 180 | 2 | |
| 8.05 | | | | 8.05 | | 79 | 100 | 360 | 1 | |
| 495.35 | 487.30 | 1,633.90 | | 2,129.25 | 487.30 | | | | 9 | 8 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| 15.00 | | 45.00 | | 60.00 | | 15 | 30 | 240 | 10 | 30 |
| 5.50 | 5.50 | 16.50 | 16.50 | 22.00 | 22.00 | 54 | 100 | 360 | 2 | 6 |

# WWTP MCCB SIZE

| | | | |
|---|---|---|---|
| 100 | Lift Pump | | |
| 200 | Blower | D | Direct start |
| 300 | Sedimenta | C | Aux. Auto TR start |
| 400-500 | Chlorinatio | SR | Secondary Resistor |
| 600 | Dewatering | SD | Star-Delta |
| 700 | Compost | | |
| 800 | Ventilation | | |

E - 99H0087

CUSTOMER VIETNAM/HCMC

MOTORS AND AUXILIARIES LIST

| No. | EQUIPMENT NAME | Q'TY Phase-1 DUTY | Q'TY Phase-1 STAND BY | Q'TY Phase-2 DUTY | Q'TY Phase-2 STAND BY | TOTAL | POWER (kW) | VOLTAGE (V) | Reversible Operation | STARTING METHOD | POLE | GENERATOR REQ. LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 315 | RAW SLUDGE PUMP | 2 | 1 | 6 | 3 | 12 | 5.5 | 380 | - | D | | |
| 316 | RAW SLUDGE VALVE | 10 | | 30 | | 40 | 0.2 | 380 | R | D | | |
| 317 | COMMINUTER | 1 | | 1 | | 2 | 0.75 | 380 | R | D | | |
| | AERATION TANK | | | | | | | | | | | |
| 324 | AIR FLOW CONTROL VALVE | 10 | | 30 | | 40 | 0.4 | 380 | R | D | | |
| | FINAL SEDIMENTATION TANK | | | | | | | | | | | |
| 332 | SLUDGE SCRAPER | 10 | | 30 | | 40 | 2.2 | 380 | R | D | | |
| 334 | SCUM PUMP | 1 | 1 | 3 | 3 | 8 | 5.5 | 380 | - | D | | |
| 335 | RETURN SLUDGE PUMP (25%) | 4 | | 12 | | 16 | 11 | 380 | - | D | | |
| 336 | RETURN SLUDGE PUMP (50%) | | | | | | 30 | 380 | - | SD | | |
| | FINAL SEDIMENTATION TANK | | | | | | | | | | | |

Current Calc. Ratio 3

| Required Capacity Phase-1 Duty (KW) | Phase-1 Stand-by (kW) | Phase-2 Duty (kW) | Phase-2 Stand-by (kW) | TOTAL Duty (kW) | TOTAL Stand-by (kW) | Rated Current (A) | MCCB Size (AT) | Control Center Unit Size (mm) | Ph-1 CC Unit (unit) | Ph-2 CC Unit (unit) |
|---|---|---|---|---|---|---|---|---|---|---|
| 11.00 | 5.50 | 33.00 | 16.50 | 44.00 | 22.00 | 54 | 100 | 360 | 3 | 9 |
| 2.00 | | 6.00 | | 8.00 | | 2 | 30 | 240 | 10 | 30 |
| 0.75 | | 0.75 | | 1.50 | | 7 | 30 | 240 | 1 | 1 |
| | | | | | | | | | | |
| 4.00 | | 12.00 | | 16.00 | | 4 | 30 | 240 | 10 | 30 |
| | | | | | | | | | | |
| 22.00 | | 66.00 | | 88.00 | | 22 | 30 | 240 | 10 | 30 |
| 5.50 | 5.50 | 16.50 | 16.50 | 22.00 | 22.00 | 54 | 100 | 360 | 2 | 6 |
| 44.00 | | 132.00 | | 176.00 | | 109 | 150 | 480 | 4 | 12 |
| | | | | | | 296 | 400 | 1200 | | |
| | | | | | | | | | | |

# WWTP MCCB SIZE

| | | | |
|---|---|---|---|
| 100 | Lift Pump | | |
| 200 | Blower | D | Direct start |
| 300 | Sedimenta | C | Aux. Auto TR start |
| 400-500 | Chlorinatio | SR | Secondary Resistor |
| 600 | Dewatering | SD | Star-Delta |
| 700 | Compost | | |
| 800 | Ventilation | | |

E - 99H0057

CUSTOMER VIETNAM/HCMC

MOTORS AND AUXILIARIES LIST

| No. | EQUIPMENT NAME | Q'TY Phase-1 DUTY | Q'TY Phase-1 STAND BY | Q'TY Phase-2 DUTY | Q'TY Phase-2 STAND BY | Q'TY TOTAL | POWER (kW) | VOLTAGE (V) | Reversible Operation | STARTING METHOD | POLE | GENERATOR REQ. LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 337 | RETURN SLUDGE VALVE | 10 | | 30 | | 40 | 0.4 | 380 | R | D | | |
| 336 | EXCESS SLUDGE PUMP | 2 | 1 | 6 | 3 | 12 | 11 | 380 | - | D | | |
| 339 | EXCESS SLUDGE VALVE | 10 | | 30 | | 40 | 0.2 | 380 | R | D | | |
| 340 | COMMINUTER | 1 | | 1 | | 2 | 3.7 | 380 | R | D | | |
| 351 | FLOOR DRAINAGE PUMP | 14 | | 30 | | 44 | 2.2 | 380 | - | D | | |
| | *WATER TREATMENT FACILITY TOTAL* | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | <DISINFECTION FACILITY> | | | | | | | | | | | |
| 414 | SODIUM HYPOCHLORITE PUMP | 2 | 1 | 6 | 3 | 12 | 0.4 | 380 | - | D | | |
| | <WATER SUPPLY FACILITY> | | | | | | | | | | | |
| 512 | TREATED WATER SUPPLY PUMP(1) | 1 | 1 | 3 | | 5 | 30 | 380 | - | SD | | |

Current Calc. Ratio 3

| Required Capacity Phase-1 Duty (KW) | Phase-1 Stand-by (KW) | Phase-2 Duty (kW) | Phase-2 Stand-by (kW) | TOTAL Duty (kW) | TOTAL Stand-by (kW) | Rated Current (A) | MCCB Size (AT) | Control Center Unit Size (mm) | Ph-1 CC Unit (unit) | Ph-2 CC Unit (unit) |
|---|---|---|---|---|---|---|---|---|---|---|
| 4.00 | | 12.00 | | 16.00 | | 4 | 30 | 240 | 10 | 30 |
| 22.00 | 11.00 | 66.00 | 33.00 | 88.00 | 44.00 | 109 | 150 | 480 | 3 | 9 |
| 2.00 | | 6.00 | | 8.00 | | 2 | 30 | 240 | 10 | 30 |
| 3.70 | | 3.70 | | 7.40 | | 37 | 50 | 240 | 1 | 1 |
| 30.80 | | 66.00 | | 96.80 | | 22 | 30 | 180 | 14 | 30 |
| 122.25 | 27.50 | 481.45 | 82.50 | 653.70 | 110.00 | | | 180 | 90 | 254 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| 0.80 | 0.40 | 2.40 | 1.20 | 3.20 | 1.60 | 4 | 30 | 180 | 3 | 9 |
| | | | | | | | | | | |
| 30.00 | 30.00 | 90.00 | | 120.00 | 30.00 | 99 | 100 | 600 | 2 | 3 |

# WWTP MCCB SIZE

| | | | |
|---|---|---|---|
| 100 | Lift Pump | | |
| 200 | Blower | D | Direct start |
| 300 | Sedimenta | C | Aux. Auto TR start |
| 400-500 | Chlorinatio | SR | Secondary Resistor |
| 600 | Dewatering | SD | Star-Delta |
| 700 | Compost | | |
| 800 | Ventilation | | |

E - 99H0067

CUSTOMER VIETNAM/HCMC

MOTORS AND AUXILIARIES LIST

| No. | EQUIPMENT NAME | Q'TY Phase-1 DUTY | Q'TY Phase-1 STAND BY | Q'TY Phase-2 DUTY | Q'TY Phase-2 STAND BY | Q'TY TOTAL | POWER (kW) | VOLTAGE (V) | Reversible Operation | STARTING METHOD | POLE | GENERATOR REQ. LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 513 | TREATED WATER STRAINER(1) | 1 | | 1 | | 2 | 0.4 | 380 | - | D | | |
| 514 | FLOOR DRAINAGE PUMP | 4 | 4 | | | 8 | 2.2 | 380 | - | D | | |
| 516 | TREATED WATER SUPPLY PUMP(2) | 1 | 1 | 2 | | 4 | 22 | 380 | - | D | | |
| 517 | TREATED WATER STRAINER(2) | 1 | | | | 1 | 0.4 | 380 | - | D | | |
| 521 | FILTRATION SUPPLY PUMP | 1 | 1 | | | 2 | 3.7 | 380 | - | D | | |
| 522 | FILTRATION SUPPLY STRAINER | 1 | 1 | | | 2 | 0.4 | 380 | - | D | | |
| 523 | SAND FILTER | 1 | 1 | | | 2 | | 220 | - | - | | |
| 524 | FILTERED WATER SUPPLY PUMP | 1 | 1 | 1 | | 3 | 11 | 380 | - | D | | |
| 525 | BACKWASH PUMP | 1 | 1 | | | 2 | 7.5 | 380 | - | D | | |
| 526 | AIR WASH BLOWER | 1 | 1 | | | 2 | 7.5 | 380 | - | D | | |
| 527 | BACKWASH WASTEWATER PUMP | 1 | 1 | | | 2 | 3.7 | 380 | - | D | | |

Current Calc. Ratio: 3

| Required Capacity Phase-1 Duty (KW) | Phase-1 Stand-by (KW) | Phase-2 Duty (KW) | Phase-2 Stand-by (KW) | TOTAL Duty (KW) | TOTAL Stand-by (KW) | Rated Current (A) | MCCB Size (AT) | Control Center Unit Size (mm) | Ph-1 CC Unit (unit) | Ph-2 CC Unit (unit) |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.40 | | 0.40 | | 0.80 | | 4 | 30 | 180 | 1 | 1 |
| 8.80 | 8.80 | | | 8.80 | 8.80 | 22 | 30 | 180 | 8 | |
| 22.00 | 22.00 | 44.00 | | 66.00 | 22.00 | 217 | 225 | 600 | 2 | 2 |
| 0.40 | | | | 0.40 | | 4 | 30 | 180 | 1 | |
| 3.70 | 3.70 | | | 3.70 | 3.70 | 37 | 50 | 240 | 2 | |
| 0.40 | 0.40 | | | 0.40 | 0.40 | 4 | 30 | 180 | 2 | |
| | | | | | | - | 30 | 180 | 2 | |
| 11.00 | 11.00 | 11.00 | | 22.00 | 11.00 | 109 | 150 | 480 | 2 | 1 |
| 7.50 | 7.50 | | | 7.50 | 7.50 | 74 | 100 | 360 | 2 | |
| 7.50 | 7.50 | | | 7.50 | 7.50 | 74 | 100 | 360 | 2 | |
| 3.70 | 3.70 | | | 3.70 | 3.70 | 37 | 50 | 240 | 2 | |

# WWTP MCCB SIZE

E - 99110097

CUSTOMER VIETNAM/HCMC

| | | | |
|---|---|---|---|
| 100 | Lift Pump | | |
| 200 | Blower | D | Direct start |
| 300 | Sedimenta | C | Aux. Auto TR start |
| 400-500 | Chlorinatio | SR | Secondary Resistor |
| 600 | Dewatering | SD | Star-Delta |
| 700 | Compost | | |
| 800 | Ventilation | | |

MOTORS AND AUXILIARIES LIST

| No | EQUIPMENT NAME | Q'TY Phase-1 DUTY | Q'TY Phase-1 STAND BY | Q'TY Phase-2 DUTY | Q'TY Phase-2 STAND BY | Q'TY TOTAL | POWER (kW) | VOLTAGE (V) | Reversible Operation | STARTING METHOD | POLE | GENERATOR REQ. LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 528 | AIR COMPRESSOR | 1 | 1 | | | 2 | 3.7 | 380 | - | D | | |
| 529 | DEHUMIDIFIER | 1 | | | | 1 | 0.25 | 220 | - | - | | |
| 530 | SOLENOID VALVE BOX | 1 | 1 | | | 2 | 2 | 220 | - | - | | |
| | *DISINFECTION FACILITY TOTAL* | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | <SLUDGE TREATMENT FACILITY> | | | | | | | | | | | |
| 611 | GRAVITY THICKENER | 1 | | 3 | | 4 | 1.5 | 380 | R | D | | |
| 613 | THICKENED SLUDGE PUMP | 1 | 1 | 3 | 3 | 8 | 5.5 | 380 | - | D | | |
| 614 | THICKENER EFFLUENT PUMP | 1 | 1 | 3 | 3 | 8 | 5.5 | 380 | - | D | | |
| 615 | FLOOR DRAINAGE PUMP | 1 | 1 | 3 | 3 | 8 | 2.2 | 380 | - | D | | |
| 621 | EXCESS SLUDGE MIXER | 1 | | 1 | | 2 | 11 | 380 | - | D | | |

Current Calc. Ratio: 3

| Required Capacity Phase-1 Duty (KW) | Phase-1 Stand-by (KW) | Phase-2 Duty (KW) | Phase-2 Stand-by (KW) | TOTAL Duty (KW) | TOTAL Stand-by (KW) | Rated Current (A) | MCCB Size (AT) | Control Center Unit Size (mm) | Ph-1 CC Unit (unit) | Ph-2 CC Unit (unit) |
|---|---|---|---|---|---|---|---|---|---|---|
| 3.70 | 3.70 | | | 3.70 | 3.70 | 37 | 50 | 240 | 2 | |
| 0.25 | | | | 0.25 | | 4 | 30 | 180 | 1 | |
| 2.00 | 2.00 | | | 2.00 | 2.00 | 34 | 50 | 180 | 2 | |
| 102.15 | 100.70 | 147.80 | 1.20 | 249.95 | 101.90 | | | | 36 | 16 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| 1.50 | | 4.50 | | 6.00 | | 15 | 30 | 240 | 1 | 3 |
| 5.50 | 5.50 | 16.50 | 16.50 | 22.00 | 22.00 | 54 | 100 | 360 | 2 | 6 |
| 5.50 | 5.50 | 16.50 | 16.50 | 22.00 | 22.00 | 54 | 100 | 360 | 2 | 6 |
| 2.20 | 2.20 | 6.60 | 6.60 | 8.80 | 8.80 | 22 | 30 | 150 | 2 | 6 |
| 11.00 | | 11.00 | | 22.00 | | 109 | 150 | 480 | 1 | 1 |

# WWTP MCCB SIZE

| | | | |
|---|---|---|---|
| 100 | Lift Pump | | |
| 200 | Blower | D | Direct start |
| 300 | Sedimenta | C | Aux. Auto TR start |
| 400-500 | Chlorinatio | SR | Secondary Resistor |
| 600 | Dewaterin | SD | Star-Delta |
| 700 | Compost | | |
| 800 | Ventilation | | |

E - 99H0067

CUSTOMER VIETNAM/HCMC

MOTORS AND AUXILIARIES LIST

| No. | EQUIPMENT NAME | Q'TY Phase-1 DUTY | Q'TY Phase-1 STAND BY | Q'TY Phase-2 DUTY | Q'TY Phase-2 STAND BY | Q'TY TOTAL | POWER (kW) | VOLTAGE (V) | Reversible Operation | STARTING METHOD | POLE | GENERATOR REQ. LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 622 | EXCESS SLUDGE FEED PUMP | 1 | 1 | 3 | 1 | 6 | 30 | 380 | - | SD | | |
| 623A | CENTRIFUGAL THICKENER DRIVE MOTOR | 1 | 1 | 3 | 1 | 6 | 90 | 380 | R | SD | | |
| 623B | CENTRIFUGAL THICKENER BACKDRIVE MOTOR | 1 | 1 | 3 | 1 | 6 | 22 | 380 | R | D | | |
| 623C | CENTRIFUGAL THICKENER LUBRICATION PUMP | 1 | 1 | 3 | 1 | 6 | 0.75 | 380 | - | D | | |
| 624 | CRANE (20t) | 1 | | | | 1 | 15.25 | 380 | - | D | | |
| 631 | MIXED SLUDGE MIXER | 2 | | 6 | | 8 | 11 | 380 | - | D | | |
| 632 | MIXED SLUDGE FEED PUMP | 1 | 1 | 3 | 1 | 6 | 11 | 380 | - | D | | |
| 633A | CENTRIFUGAL DEHYDRATOR DRIVE MOTOR | 1 | 1 | 3 | 1 | 6 | 110 | 380 | R | SD | | |
| 633B | CENTRIFUGAL DEHYDRATOR BACK DRIVE MOTOR | 1 | 1 | 3 | 1 | 6 | 37 | 380 | R | SD | | |
| 633C | CENTRIFUGAL DEHYDRATOR LUBRICATION PUMP | 1 | 1 | 3 | 1 | 6 | 0.4 | 380 | - | D | | |
| 634A | CAKE HOPPER | 1 | 1 | 3 | 1 | 6 | 1.5 | 380 | R | D | | |

Current Calc. Ratio: 3

| Required Capacity Phase-1 Duty (KW) | Phase-1 Stand-by (kW) | Phase-2 Duty (kW) | Phase-2 Stand-by (kW) | TOTAL Duty (kW) | TOTAL Stand-by (kW) | Rated Current (A) | MCCB Size (AT) | Control Center Unit Size (mm) | Ph-1 CC Unit (unit) | Ph-2 CC Unit (unit) |
|---|---|---|---|---|---|---|---|---|---|---|
| 30.00 | 30.00 | 90.00 | 30.00 | 120.00 | 60.00 | 55 | 100 | 600 | 2 | 4 |
| 90.00 | 90.00 | 270.00 | 90.00 | 360.00 | 180.00 | 255 | 400 | 1200 | 2 | 4 |
| 22.00 | 22.00 | 66.00 | 22.00 | 88.00 | 44.00 | 217 | 225 | 840 | 2 | 4 |
| 0.75 | 0.75 | 2.25 | 0.75 | 3.00 | 1.50 | 7 | 30 | 180 | 2 | 4 |
| 15.25 | | | | 15.25 | | 150 | 200 | 600 | 1 | |
| 22.00 | | 66.00 | | 88.00 | | 109 | 150 | 480 | 2 | 6 |
| 11.00 | 11.00 | 33.00 | 11.00 | 44.00 | 22.00 | 109 | 150 | 480 | 2 | 4 |
| 110.00 | 110.00 | 330.00 | 110.00 | 440.00 | 220.00 | 362 | 400 | 1200 | 2 | 4 |
| 37.00 | 37.00 | 111.00 | 37.00 | 148.00 | 74.00 | 122 | 150 | 480 | 2 | 4 |
| 0.40 | 0.40 | 1.20 | 0.40 | 1.60 | 0.80 | 4 | 30 | 180 | 2 | 4 |
| 1.50 | 1.50 | 4.50 | 1.50 | 6.00 | 3.00 | 15 | 30 | 240 | 2 | 4 |

# WWTP MCCB SIZE

| | | | |
|---|---|---|---|
| 100 | Lift Pump | | |
| 200 | Blower | D | Direct start |
| 300 | Sedimenta | C | Aux. Auto TR start |
| 400-500 | Chlorinatio | SR | Secondary Resistor |
| 600 | Dewatering | SD | Star-Delta |
| 700 | Compost | | |
| 800 | Ventilation | | |

E - 99H0067

CUSTOMER VIETNAM/HCMC

MOTORS AND AUXILIARIES LIST

| No. | EQUIPMENT NAME | Q'TY Phase-1 DUTY | Q'TY Phase-1 STAND BY | Q'TY Phase-2 DUTY | Q'TY Phase-2 STAND BY | Q'TY TOTAL | POWER (kW) | VOLTAGE (V) | Reversible Operation | STARTING METHOD | POLE | GENERATOR REQ. LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 634B | CAKE HOPPER | 1 | 1 | 3 | 1 | 6 | 1.5 | 380 | R | D | | |
| 635 | POLYMER FEEDER | 1 | 1 | 3 | 1 | 6 | 0.4 | 380 | - | D | | |
| 636 | POLYMER DISSOLUTION TANK | 1 | 1 | 3 | 1 | 6 | 5.5 | 380 | - | D | | |
| 637 | POLYMER FEED PUMP | 1 | 1 | 3 | 1 | 6 | 3.7 | 380 | - | D | | |
| 638A | WATER SUPPLY PUMP UNIT | 1 | | 1 | | 2 | 18.5 | 380 | - | D | | |
| 638B | WATER SUPPLY PUMP UNIT | 1 | | 1 | | 2 | 18.5 | 380 | - | D | | |
| 639 | AIR COMPRESSOR | 1 | 1 | 1 | | 3 | 5.5 | 380 | - | D | | |
| 640 | DEHUMIDIFIER | 1 | | 1 | | 2 | 0.25 | 220 | - | - | | |
| 641 | CRANE (20t) | 1 | | | | 1 | 15.25 | 380 | R | D | | |
| 643 | TREATED WATER INFLOW VALVE | 1 | | | | 1 | 0.1 | 380 | R | D | | |
| 651 | RECYCLE FLOW MIXER | 1 | | 1 | | 2 | 11 | 380 | - | D | | |

Current Calc. Ratio 3

| Required Capacity Phase-1 Duty (KW) | Phase-1 Stand-by (KW) | Phase-2 Duty (KW) | Phase-2 Stand-by (KW) | TOTAL Duty (KW) | TOTAL Stand-by (KW) | Rated Current (A) | MCCB Size (AT) | Control Center Unit Size (mm) | Ph-1 CC Unit (unit) | Ph-2 CC Unit (unit) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.50 | 1.50 | 4.50 | 1.50 | 6.00 | 3.00 | 15 | 30 | 240 | 2 | 4 |
| 0.40 | 0.40 | 1.20 | 0.40 | 1.60 | 0.80 | 4 | 30 | 150 | 2 | 4 |
| 5.50 | 5.50 | 16.50 | 5.50 | 22.00 | 11.00 | 54 | 100 | 360 | 2 | 4 |
| 3.70 | 3.70 | 11.10 | 3.70 | 14.80 | 7.40 | 37 | 50 | 240 | 2 | 4 |
| 18.50 | | 18.50 | | 37.00 | | 183 | 200 | 600 | 1 | 1 |
| 18.50 | | 18.50 | | 37.00 | | 183 | 200 | 600 | 1 | 1 |
| 5.50 | 5.50 | 5.50 | | 11.00 | 5.50 | 54 | 100 | 360 | 2 | 1 |
| 0.25 | | 0.25 | | 0.50 | | 4 | 30 | 180 | 1 | 1 |
| 15.25 | | | | 15.25 | | 150 | 200 | 840 | 1 | |
| 0.10 | | | | 0.10 | | 1 | 30 | 240 | 1 | |
| 11.00 | | 11.00 | | 22.00 | | 109 | 150 | 480 | 1 | 1 |

# WWTP MCCB SIZE

| | | | |
|---|---|---|---|
| 100 | Lift Pump | | |
| 200 | Blower | D | Direct start |
| 300 | Sedimenta | C | Aux. Auto TR start |
| 400-500 | Chlorinatio | SR | Secondary Resistor |
| 600 | Dewatering | SD | Star-Delta |
| 700 | Compost | | |
| 800 | Ventilation | | |

E - 99H006)

CUSTOMER VIETNAM/HCMC

MOTORS AND AUXILIARIES LIST

Current Calc. Ratio: 3

| No. | EQUIPMENT NAME | Q'TY Phase-1 DUTY | Q'TY Phase-1 STAND BY | Q'TY Phase-2 DUTY | Q'TY Phase-2 STAND BY | Q'TY TOTAL | POWER (kW) | VOLTAGE (V) | Reversible Operation | STARTING METHOD | POLE | GENERATOR REQ. LOAD | Required Capacity Phase-1 Duty (KW) | Required Capacity Phase-1 Stand-by (KW) | Required Capacity Phase-2 Duty (KW) | Required Capacity Phase-2 Stand-by (kW) | Required Capacity TOTAL Duty (kW) | Required Capacity TOTAL Stand-by (kW) | Rated Current (A) | MCCB Size (AT) | Control Center Unit Size (mm) | Ph-1 CC Unit (unit) | Ph-2 CC Unit (unit) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 652 | RECYCLE FLOW PUMP | 1 | 1 | 1 | 1 | 4 | 30 | 380 | - | SD | | | 30.00 | 30.00 | 30.00 | 30.00 | 60.00 | 60.00 | 296 | 400 | 1200 | 2 | 2 |
| 662 | DEODORIZATION FAN | | | 1 | | 1 | 7.5 | 380 | | | | | | | 7.50 | | 7.50 | | 74 | 100 | 380 | | 1 |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | SLUDGE TREATMENT FACILITY TOTAL | | | | | | | | | | | | 475.80 | 352.45 | 1,153.60 | 380.35 | 1,629.40 | 745.80 | | | 180 | 47 | 88 |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | <COMPOST FACILITY> | | | | | | | | | | | | | | | | | | | | | | |
| 711 | MIXING MACHINE | 2 | | | | 2 | 90 | 380 | - | SD | | | 180.00 | | | | 180.00 | | 296 | 400 | 1200 | 2 | |
| 712 | SUCKING FAN | 4 | | | | 4 | 5.5 | 380 | - | D | | | 22.00 | | | | 22.00 | | 54 | 100 | 360 | 4 | |
| 713 | HUMIDFING PUMP | 2 | | | | 2 | 1.5 | 380 | - | D | | | 3.00 | | | | 3.00 | | 15 | 30 | 160 | 2 | |
| 732 | DEODORIZATION FAN | 2 | | | | 2 | 30 | 380 | - | SD | | | 60.00 | | | | 60.00 | | 99 | 100 | 500 | 2 | |
| 733 | SPRAY WATER PUMP | 1 | | | | 1 | 3.7 | 380 | - | D | | | 3.70 | | | | 3.70 | | 37 | 50 | 240 | 1 | |

# WWTP MCCB SIZE

| | | | |
|---|---|---|---|
| 100 | Lift Pump | | |
| 200 | Blower | D | Direct start |
| 300 | Sedimenta | C | Aux. Auto TR start |
| 400-500 | Chlorinatio | SR | Secondary Resistor |
| 600 | Dewatering | SD | Star-Delta |
| 700 | Compost | | |
| 800 | Ventilation | | |

E - 99IC087

CUSTOMER VIETNAM/HCMC

MOTORS AND AUXILIARIES LIST

| No. | EQUIPMENT NAME | Q'TY Phase-1 DUTY | Q'TY Phase-1 STAND BY | Q'TY Phase-2 DUTY | Q'TY Phase-2 STAND BY | Q'TY TOTAL | POWER (kW) | VOLTAGE (V) | Reversible Operation | STARTING METHOD | POLE | GENERATOR REQ. LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 734 | FLOOR DRAINAGE PUMP | 1 | | | | 1 | 3.7 | 380 | - | D | | |
| | *COMPOST FACILITY TOTAL* | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | <VENTILATION FACILITY> | | | | | | | | | | | |
| 801 | AIR EXHAUST FAN | 4 | | 4 | | 8 | 0.4 | 380 | - | D | | |
| 802 | AIR EXHAUST FAN | 4 | | 4 | | 8 | 0.4 | 380 | - | D | | |
| 803 | AIR EXHAUST FAN | 3 | | 9 | | 12 | 0.4 | 380 | - | D | | |
| 804 | AIR EXHAUST FAN | 3 | | 9 | | 12 | 0.4 | 380 | - | D | | |
| 805 | AIR EXHAUST FAN | 4 | | 12 | | 16 | 0.3 | 380 | - | D | | |
| 806 | AIR EXHAUST FAN | 4 | | 12 | | 16 | 0.3 | 380 | - | D | | |
| 807 | AIR EXHAUST FAN | 1 | | 3 | | 4 | 0.3 | 380 | - | D | | |

Current Calc. Ratio: 3

| Required Capacity Phase-1 Duty (KW) | Phase-1 Stand-by (KW) | Phase-2 Duty (KW) | Phase-2 Stand-by (KW) | TOTAL Duty (kW) | TOTAL Stand-by (kW) | Rated Current (A) | MCCB Size (AT) | Control Center Unit Size (mm) | Ph-1 CC Unit (unit) | Ph-2 CC Unit (unit) |
|---|---|---|---|---|---|---|---|---|---|---|
| 3.70 | | | | 3.70 | | 37 | 50 | 240 | 1 | |
| 272.40 | | | | 272.40 | | | | | 12 | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| 1.60 | | 1.60 | | 3.20 | | 4 | 30 | 180 | 4 | 4 |
| 1.60 | | 1.60 | | 3.20 | | 4 | 30 | 180 | 4 | 4 |
| 1.20 | | 3.60 | | 4.80 | | 4 | 30 | 180 | 3 | 9 |
| 1.20 | | 3.60 | | 4.80 | | 4 | 30 | 180 | 3 | 9 |
| 1.20 | | 3.60 | | 4.80 | | 3 | 30 | 180 | 4 | 12 |
| 1.20 | | 3.60 | | 4.80 | | 3 | 30 | 180 | 4 | 12 |
| 0.30 | | 0.90 | | 1.20 | | 3 | 30 | 180 | 1 | 3 |

# WWTP MCCB SIZE

| | | | |
|---|---|---|---|
| 100 | Lift Pump | | |
| 200 | Blower | D | Direct start |
| 300 | Sedimenta | C | Aux. Auto TR start |
| 400-500 | Chlorinatio | SR | Secondary Resistor |
| 600 | Dewatering | SD | Star-Delta |
| 700 | Compost | | |
| 800 | Ventilation | | |

E - 99H0067

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MOTORS AND AUXILIARIES LIST

| No. | EQUIPMENT NAME | Q'TY Phase-1 DUTY | Q'TY Phase-1 STAND BY | Q'TY Phase-2 DUTY | Q'TY Phase-2 STAND BY | Q'TY TOTAL | POWER (kW) | VOLTAGE (V) | Reversible Operation | STARTING METHOD | POLE | GENERATOR REQ. LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 808 | AIR EXHAUST FAN | 1 | | 3 | | 4 | 0.3 | 380 | - | D | | |
| 809 | AIR INTAKE FAN | 2 | | 2 | | 4 | 7.5 | 380 | - | D | | |
| 810 | AIR INTAKE FAN | 1 | | 1 | | 2 | 15 | 380 | - | D | | |
| 811 | AIR EXHAUST FAN | 1 | | | | 1 | 0.75 | 380 | - | D | | |
| 812 | AIR INTAKE FAN | 1 | | -1 | | | 0.75 | 380 | - | D | | |
| 812 | AIR INTAKE FAN | | | 1 | | 1 | 1.5 | 380 | - | D | | |
| 813 | AIR INTAKE FAN | 4 | | | | 4 | 0.9 | 380 | - | D | | |
| 814 | AIR EXHAUST FAN | 5 | | | | 5 | 0.3 | 380 | - | D | | |
| 815 | AIR EXHAUST FAN | 1 | | | | 1 | 11 | 380 | - | D | | |
| 816 | AIR INTAKE FAN | 1 | | | | 1 | 1.5 | 380 | - | D | | |
| 817 | AIR EXHAUST FAN | 1 | | | | 1 | 2.2 | 380 | - | D | | |

Current Calc. Ratio 3

| Required Capacity Phase-1 Duty (KW) | Phase-1 Stand-by (KW) | Phase-2 Duty (KW) | Phase-2 Stand-by (KW) | TOTAL Duty (kW) | TOTAL Stand-by (kW) | Rated Current (A) | MCCB Size (AT) | Control Center Unit Size (mm) | Ph-1 CC Unit (unit) | Ph-2 CC Unit (unit) |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.30 | | 0.90 | | 1.20 | | 3 | 30 | 180 | 1 | 3 |
| 15.00 | | 15.00 | | 30.00 | | 74 | 100 | 380 | 2 | 2 |
| 15.00 | | 15.00 | | 30.00 | | 146 | 150 | 480 | 1 | 1 |
| 0.75 | | | | 0.75 | | 7 | 30 | 180 | 1 | |
| 0.75 | | -0.75 | | | | 7 | 30 | 180 | 1 | -1 |
| | | 0.75 | | 0.75 | | 15 | 30 | 180 | | 1 |
| 3.60 | | | | 3.60 | | 9 | 30 | 180 | 4 | |
| 1.50 | | | | 1.50 | | 3 | 30 | 180 | 5 | |
| 11.00 | | | | 11.00 | | 109 | 150 | 480 | 1 | |
| 1.50 | | | | 1.50 | | 15 | 30 | 180 | 1 | |
| 2.20 | | | | 2.20 | | 22 | 30 | 180 | 1 | |

# WWTP MCCB SIZE

| | | | |
|---|---|---|---|
| 100 | Lift Pump | | |
| 200 | Blower | D | Direct start |
| 300 | Sediments | C | Aux. Auto TR start |
| 400~500 | Chlorinatio | SR | Secondary Resistor |
| 600 | Dewatering | SD | Star-Delta |
| 700 | Compost | | |
| 800 | Ventilation | | |

E = 99H0057

CUSTOMER VIETNAM/HCMC

MOTORS AND AUXILIARIES LIST

| No. | EQUIPMENT NAME | Q'TY Phase-1 DUTY | Q'TY Phase-1 STAND BY | Q'TY Phase-2 DUTY | Q'TY Phase-2 STAND BY | Q'TY TOTAL | POWER (kW) | VOLTAGE (V) | Reversible Operation | STARTING METHOD | POLE | GENERATOR REQ LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 818 | AIR INTAKE FAN | 1 | | | | 1 | 0.75 | 380 | - | D | | |
| 819 | AIR INTAKE FAN | 1 | | | | 1 | 3.75 | 380 | - | D | | |
| 820 | AIR EXHAUST FAN | 1 | | 1 | | 2 | 5.5 | 380 | - | D | | |
| 821 | AIR EXHAUST FAN | 1 | | | | 1 | 0.4 | 380 | - | D | | |
| 822 | AIR EXHAUST FAN | 2 | | | | 2 | 0.75 | 380 | - | D | | |
| 823 | AIR EXHAUST FAN | 1 | | | | 1 | 0.3 | 380 | - | D | | |
| 824 | AIR INTAKE FAN | 1 | | | | 1 | 3.7 | 380 | - | D | | |
| 825 | AIR INTAKE FAN | 2 | | | | 2 | 0.28 | 380 | - | D | | |
| 826 | AIR EXHAUST FAN | 2 | | | | 2 | 0.75 | 380 | - | D | | |
| 827 | AIR INTAKE FAN | 1 | | | | 1 | 0.25 | 380 | - | D | | |
| 828 | AIR EXHAUST FAN | 2 | | | | 2 | 0.4 | 380 | - | D | | |

Current Calc. Ratio: 3

| Required Capacity Phase-1 Duty (kW) | Phase-1 Stand-by (kW) | Phase-2 Duty (kW) | Phase-2 Stand-by (kW) | TOTAL Duty (kW) | TOTAL Stand-by (kW) | Rated Current (A) | MCCB Size (AT) | Control Center Unit Size (mm) | Ph-1 CC Unit (unit) | Ph-2 CC Unit (unit) |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.75 | | | | 0.75 | | 7 | 30 | 180 | 1 | |
| 3.75 | | | | 3.75 | | 37 | 50 | 240 | 1 | |
| 5.50 | | 5.50 | | 11.00 | | 54 | 100 | 360 | 1 | 1 |
| 5.50 | | | | 5.50 | | 4 | 30 | 180 | 1 | |
| 11.00 | | | | 11.00 | | 7 | 30 | 180 | 2 | |
| 5.50 | | | | 5.50 | | 3 | 30 | 180 | 1 | |
| 5.50 | | | | 5.50 | | 37 | 50 | 180 | 1 | |
| 11.00 | | | | 11.00 | | 3 | 30 | 180 | 2 | |
| 11.00 | | | | 11.00 | | 7 | 30 | 180 | 2 | |
| 5.50 | | | | 5.50 | | 3 | 30 | 180 | 1 | |
| 11.00 | | | | 11.00 | | 4 | 30 | 180 | 2 | |

# WWTP MCCB SIZE

| | | | |
|---|---|---|---|
| 100 | Lift Pump | | |
| 200 | Blower | D | Direct start |
| 300 | Sedimenta | C | Aux. Auto TR start |
| 400~500 | Chlorinatio | SR | Secondary Resistor |
| 600 | Dewatering | SD | Star-Delta |
| 700 | Compost | | |
| 800 | Ventilation | | |

E - 99H0067

CUSTOMER VIETNAM/HCMC

| No. | MOTORS AND AUXILIARIES LIST | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EQUIPMENT NAME | Q'TY | | | | | POWER (kW) | VOLTAGE (V) | Reversible Operation | STARTING METHOD | POLE | GENERATOR REQ. LOAD |
| | | Phase-1 | | Phase-2 | | TOTAL | | | | | | |
| | | DUTY | STAND BY | DUTY | STAND BY | | | | | | | |
| | *VENTILATION FACILITY TOTAL* | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

Current Calc. Ratio: 3

| Required Capacity | | | | | | Rated Current | MCCB Size | Control Center | Ph-1 | Ph-2 |
|---|---|---|---|---|---|---|---|---|---|---|
| Phase-1 | | Phase-2 | | TOTAL | | | | | | |
| Duty | Stand-by | Duty | Stand-by | Duty | Stand-by | | | Unit Size | CC Unit | CC Unit |
| (KW) | (kW) | (kW) | (kW) | (kW) | (kW) | (A) | (AT) | (mm) | (unit) | (unit) |
| 135.90 | | 54.90 | | 190.80 | | | | | 56 | 60 |
| | | | | | | | | | | |
| | | | | | | | | | | |

HO CHI MINH CITY, VIETNAM
WATER ENVIRONMENT IMPROVEMENT PROJECT

# Calculation Sheet

for

# Power Cable Capacity

Package : E

Plant : Wastewater Treatment Plant

Vietnam / Ho Chi Minh City Water Environment Improvement Project

[Pacage E] Wastewater Treatment Plant Phase-1

| 区分 Location | Motor No. Motor No. | 機器名称 Name of Equipment | 数量 Q'ty | 容量 kW | 電圧 V | 起動方式 Starting Method | 起動電流 Starting Current | Pf | 電圧降下 V/drop Cable Size | 起動電流 S/current Cable Size | Final Cable Size |
|---|---|---|---|---|---|---|---|---|---|---|---|
| <LIFT PUMP EQUIPMENT> | | | | | | | | | | | |
| | 121-1 | LIFT PUMP (1-1) | 1 | 220 | 380 | C | 4342.10 | 0.8 | | 800.0 | 800.0 |
| | 121-2 | LIFT PUMP (1-2) | 1 | 220 | 380 | C | 4342.10 | 0.8 | | 800.0 | 800.0 |
| | 121-3 | LIFT PUMP (1-3) | 1 | 220 | 380 | C | 4342.10 | 0.8 | | 800.0 | 800.0 |
| | 124-1 | HOIST | 1 | 6.55 | 380 | D | 21.50 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 125-1 | FLOOR DRAINAGE PUMP(D-1) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 8.0 | 5.5 | 8.0 |
| | 125-2 | FLOOR DRAINAGE PUMP(D-2) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 14.0 | 5.5 | 14.0 |
| | 125-3 | FLOOR DRAINAGE PUMP(D-3) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 22.0 | 5.5 | 22.0 |
| | 125-4 | FLOOR DRAINAGE PUMP(D-4) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 38.0 | 5.5 | 38.0 |
| | 125-5 | FLOOR DRAINAGE PUMP(D-5) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 38.0 | 5.5 | 38.0 |
| | 125-6 | FLOOR DRAINAGE PUMP(D-6) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 38.0 | 5.5 | 38.0 |
| | 125-7 | FLOOR DRAINAGE PUMP(S-1) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 8.0 | 5.5 | 8.0 |
| | 125-8 | FLOOR DRAINAGE PUMP(S-2) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 14.0 | 5.5 | 14.0 |
| | 125-9 | FLOOR DRAINAGE PUMP(S-3) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 22.0 | 5.5 | 22.0 |
| | 125-10 | FLOOR DRAINAGE PUMP(S-4) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 38.0 | 5.5 | 38.0 |
| | 125-11 | FLOOR DRAINAGE PUMP(S-5) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 38.0 | 5.5 | 38.0 |
| | 125-12 | FLOOR DRAINAGE PUMP(S-6) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 38.0 | 5.5 | 38.0 |
| <BLOWER EQUIPMENT> | | | | | | | | | | | |
| | 211-1 | BLOWER (1-1) | 1 | 480 | 3300 | SR | 150.00 | 0.8 | 22.0 | 60.0 | 60.0 |
| | 211-2 | BLOWER (1-2) | 1 | 480 | 3300 | SR | 150.00 | 0.8 | 22.0 | 60.0 | 60.0 |
| | 211A-1 | BLOWER (1-1) Aux. Equipment | 1 | 4.15 | 380 | D | 81.90 | 0.8 | 100.0 | 22.0 | 100.0 |
| | 211A-2 | BLOWER (1-2) Aux. Equipment | 1 | 4.15 | 380 | D | 81.90 | 0.8 | 100.0 | 22.0 | 100.0 |
| | 213-1 | DISCHARGE VALVE (1-1) | 1 | 0.75 | 380 | D | 14.80 | 0.8 | 14.0 | 3.5 | 14.0 |
| | 213-2 | DISCHARGE VALVE (1-2) | 1 | 0.75 | 380 | D | 14.80 | 0.8 | 14.0 | 3.5 | 14.0 |
| | 215-1 | AIR FILTER | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| | 215-2 | AIR FILTER | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 216-1 | FLOOR DRAINAGE PUMP | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 60.0 | 5.5 | 60.0 |
| | 216-2 | FLOOR DRAINAGE PUMP | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 60.0 | 5.5 | 60.0 |
| | 217-1 | CRANE | 1 | 8.05 | 380 | D | 26.50 | 0.8 | 38.0 | 3.5 | 38.0 |
| <WATER TREATMENT FACILITY> | | | | | | | | | | | |
| PRIMARY SEDIMENTATION TANK | | | | | | | | | | | |
| | 312-1 | SLUDGE SCRAPER | 1 | 1.5 | 380 | D | 29.60 | 0.8 | 38.0 | 3.5 | 38.0 |
| | 312-2 | SLUDGE SCRAPER | 1 | 1.5 | 380 | D | 29.60 | 0.8 | 38.0 | 3.5 | 38.0 |
| | 312-3 | SLUDGE SCRAPER | 1 | 1.5 | 380 | D | 29.60 | 0.8 | 38.0 | 3.5 | 38.0 |
| | 312-4 | SLUDGE SCRAPER | 1 | 1.5 | 380 | D | 29.60 | 0.8 | 38.0 | 3.5 | 38.0 |

Vietnam / Ho Chi Minh City Water Environment Improvement Project

[Pacage E] Wastewater Treatment Plant Phase-1

| 区分 Location | Motor No. Motor No. | 機器名称 Name of Equipment | 数量 Q'ty | 容量 kW | 電圧 V | 起動方式 Starting Method | 起動電流 Starting Current | Pf | 電圧降下 V/drop Cable Size | 起動電流 S/current Cable Size | Final Cable Size |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 312-5 | SLUDGE SCRAPER | 1 | 1.5 | 380 | D | 29.60 | 0.8 | 38.0 | 3.5 | 38.0 |
| | 312-6 | SLUDGE SCRAPER | 1 | 1.5 | 380 | D | 29.60 | 0.8 | 38.0 | 3.5 | 38.0 |
| | 312-7 | SLUDGE SCRAPER | 1 | 1.5 | 380 | D | 29.60 | 0.8 | 38.0 | 3.5 | 38.0 |
| | 312-8 | SLUDGE SCRAPER | 1 | 1.5 | 380 | D | 29.60 | 0.8 | 38.0 | 3.5 | 38.0 |
| | 312-9 | SLUDGE SCRAPER | 1 | 1.5 | 380 | D | 29.60 | 0.8 | 22.0 | 3.5 | 22.0 |
| | 312-10 | SLUDGE SCRAPER | 1 | 1.5 | 380 | D | 29.60 | 0.8 | 22.0 | 3.5 | 22.0 |
| | 314-1 | SCUM PUMP | 1 | 5.5 | 380 | D | 106.60 | 0.8 | 150.0 | 38.0 | 150.0 |
| | 314-2 | SCUM PUMP | 1 | 5.5 | 380 | D | 106.60 | 0.8 | 150.0 | 38.0 | 150.0 |
| | 315-1 | RAW SLUDGE PUMP | 1 | 5.5 | 380 | D | 106.60 | 0.8 | 150.0 | 38.0 | 150.0 |
| | 315-2 | RAW SLUDGE PUMP | 1 | 5.5 | 380 | D | 106.60 | 0.8 | 150.0 | 38.0 | 150.0 |
| | 315-3 | RAW SLUDGE PUMP | 1 | 5.5 | 380 | D | 106.60 | 0.8 | 150.0 | 38.0 | 150.0 |
| | 316-1 | RAW SLUDGE VALVE | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| | 316-2 | RAW SLUDGE VALVE | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| | 316-3 | RAW SLUDGE VALVE | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| | 316-4 | RAW SLUDGE VALVE | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| | 316-5 | RAW SLUDGE VALVE | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 316-6 | RAW SLUDGE VALVE | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 316-7 | RAW SLUDGE VALVE | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 316-8 | RAW SLUDGE VALVE | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 316-9 | RAW SLUDGE VALVE | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 316-10 | RAW SLUDGE VALVE | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 317-1 | COMMINUTER | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| AERATION TANK | | | | | | | | | | | |
| | 324-1 | AIR FLOW CONTROL VALVE | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 14.0 | 3.5 | 14.0 |
| | 324-2 | AIR FLOW CONTROL VALVE | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 324-3 | AIR FLOW CONTROL VALVE | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 324-4 | AIR FLOW CONTROL VALVE | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 324-5 | AIR FLOW CONTROL VALVE | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 324-6 | AIR FLOW CONTROL VALVE | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 324-7 | AIR FLOW CONTROL VALVE | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 324-8 | AIR FLOW CONTROL VALVE | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 324-9 | AIR FLOW CONTROL VALVE | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 324-10 | AIR FLOW CONTROL VALVE | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| FINAL SEDIMENTATION TANK | | | | | | | | | | | |
| | 332-1 | SLUDGE SCRAPER | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 60.0 | 5.5 | 60.0 |

| Vietnam / Ho Chi Minh City Water Environment Improvement Project | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [Pacage E] | | Wastewater Treatment Plant Phase-1 | | | | | | | | | | |
| 区分 | Motor No. | 機器名称 | 数量 | 容量 | 電圧 | 起動方式 | 起動電流 | | 電圧降下 | 起動電流 | |
| Location | Motor No. | Name of Equipment | Q'ty | kW | V | Starting Method | Starting Current | Pf | V/drop Cable Size | S/current Cable Size | Final Cable Size |
| | 332-2 | SLUDGE SCRAPER | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 38.0 | 5.5 | 38.0 |
| | 332-3 | SLUDGE SCRAPER | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 38.0 | 5.5 | 38.0 |
| | 332-4 | SLUDGE SCRAPER | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 38.0 | 5.5 | 38.0 |
| | 332-5 | SLUDGE SCRAPER | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 38.0 | 5.5 | 38.0 |
| | 332-6 | SLUDGE SCRAPER | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 38.0 | 5.5 | 38.0 |
| | 332-7 | SLUDGE SCRAPER | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 38.0 | 5.5 | 38.0 |
| | 332-8 | SLUDGE SCRAPER | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 38.0 | 5.5 | 38.0 |
| | 332-9 | SLUDGE SCRAPER | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 38.0 | 5.5 | 38.0 |
| | 332-10 | SLUDGE SCRAPER | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 38.0 | 5.5 | 38.0 |
| | 334-1 | SCUM PUMP | 1 | 5.5 | 380 | D | 108.60 | 0.8 | 22.0 | 5.5 | 22.0 |
| | 334-2 | SCUM PUMP | 1 | 5.5 | 380 | D | 108.60 | 0.8 | 100.0 | 38.0 | 100.0 |
| | 335-1 | RETURN SLUDGE PUMP (25%) | 1 | 11 | 380 | D | 217.10 | 0.8 | 100.0 | 38.0 | 100.0 |
| | 335-2 | RETURN SLUDGE PUMP (25%) | 1 | 11 | 380 | D | 217.10 | 0.8 | 400.0 | 100.0 | 400.0 |
| | 335-3 | RETURN SLUDGE PUMP (25%) | 1 | 11 | 380 | D | 217.10 | 0.8 | 400.0 | 100.0 | 400.0 |
| | 335-4 | RETURN SLUDGE PUMP (25%) | 1 | 11 | 380 | D | 217.10 | 0.8 | 200.0 | 100.0 | 200.0 |
| | 337-1 | RETURN SLUDGE VALVE | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 200.0 | 100.0 | 200.0 |
| | 337-2 | RETURN SLUDGE VALVE | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 337-3 | RETURN SLUDGE VALVE | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 337-4 | RETURN SLUDGE VALVE | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 337-5 | RETURN SLUDGE VALVE | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 337-6 | RETURN SLUDGE VALVE | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 337-7 | RETURN SLUDGE VALVE | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| | 337-8 | RETURN SLUDGE VALVE | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| | 337-9 | RETURN SLUDGE VALVE | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| | 337-10 | RETURN SLUDGE VALVE | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| | 338-1 | EXCESS SLUDGE PUMP | 1 | 11 | 380 | D | 217.10 | 0.8 | 5.5 | 3.5 | 5.5 |
| | 338-2 | EXCESS SLUDGE PUMP | 1 | 11 | 380 | D | 217.10 | 0.8 | 250.0 | 100.0 | 250.0 |
| | 338-3 | EXCESS SLUDGE PUMP | 1 | 11 | 380 | D | 217.10 | 0.8 | 250.0 | 100.0 | 250.0 |
| | 339-1 | EXCESS SLUDGE VALVE | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 250.0 | 100.0 | 250.0 |
| | 339-2 | EXCESS SLUDGE VALVE | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 339-3 | EXCESS SLUDGE VALVE | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 339-4 | EXCESS SLUDGE VALVE | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 339-5 | EXCESS SLUDGE VALVE | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 339-6 | EXCESS SLUDGE VALVE | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 339-7 | EXCESS SLUDGE VALVE | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 339-8 | EXCESS SLUDGE VALVE | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 339-9 | EXCESS SLUDGE VALVE | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 3.5 | 3.5 | 3.5 |

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(Pacage E) Wastewater Treatment Plant Phase-I

| 区分 Location | Motor No. Motor No. | 機器名称 Name of Equipment | 数量 Q'ty | 容量 kW | 電圧 V | 起動方式 Starting Method | 起動電流 Starting Current | Pf | 電圧降下 V/drop Cable Size | 起動電流 S/current Cable Size | Final Cable Size |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 339-10 | EXCESS SLUDGE VALVE | 1 | 0.2 | 380 | D | 3.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 340-1 | COMMINUTER | 1 | 3.7 | 380 | D | 73.00 | 0.8 | 38.0 | 14.0 | 38.0 |
| | 351-1 | FLOOR DRAINAGE PUMP(D-1) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 60.0 | 5.5 | 60.0 |
| | 351-2 | FLOOR DRAINAGE PUMP(D-2) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 60.0 | 5.5 | 60.0 |
| | 351-3 | FLOOR DRAINAGE PUMP(D-3) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 60.0 | 5.5 | 60.0 |
| | 351-4 | FLOOR DRAINAGE PUMP(D-4) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 60.0 | 5.5 | 60.0 |
| | 351-5 | FLOOR DRAINAGE PUMP(D-5) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 60.0 | 5.5 | 60.0 |
| | 351-6 | FLOOR DRAINAGE PUMP(D-6) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 60.0 | 5.5 | 60.0 |
| | 351-7 | FLOOR DRAINAGE PUMP(D-7) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 60.0 | 5.5 | 60.0 |
| | 351-8 | FLOOR DRAINAGE PUMP(D-8) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 60.0 | 5.5 | 60.0 |
| | 351-9 | FLOOR DRAINAGE PUMP(D-9) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 60.0 | 5.5 | 60.0 |
| | 351-10 | FLOOR DRAINAGE PUMP(D-10) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 60.0 | 5.5 | 60.0 |
| | 351-11 | FLOOR DRAINAGE PUMP(D-11) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 60.0 | 5.5 | 60.0 |
| | 351-12 | FLOOR DRAINAGE PUMP(D-12) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 60.0 | 5.5 | 60.0 |
| | 351-13 | FLOOR DRAINAGE PUMP(D-13) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 60.0 | 5.5 | 60.0 |
| | 351-14 | FLOOR DRAINAGE PUMP(D-14) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 60.0 | 5.5 | 60.0 |
| <DISINFECTION FACILITY> | | | | | | | | | | | |
| | 414-1 | SODIUM HYPOCHLORITE PUMP | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 414-2 | SODIUM HYPOCHLORITE PUMP | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 414-3 | SODIUM HYPOCHLORITE PUMP | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| <WATER SUPPLY FACILITY> | | | | | | | | | | | |
| | 512-1 | TREATED WATER SUPPLY PUMP (1) | 1 | 30 | 380 | SD | 197.40 | 0.8 | 38.0 | 100.0 | 100.0 |
| | 512-2 | TREATED WATER SUPPLY PUMP (1) | 1 | 30 | 380 | SD | 197.40 | 0.8 | 38.0 | 100.0 | 100.0 |
| | 513-1 | TREATED WATER STRAINER (1) | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 514-1 | FLOOR DRAINAGE PUMP(D-1) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 5.5 | 5.5 | 5.5 |
| | 514-2 | FLOOR DRAINAGE PUMP(D-2) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 5.5 | 5.5 | 5.5 |
| | 514-3 | FLOOR DRAINAGE PUMP(D-3) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 5.5 | 5.5 | 5.5 |
| | 514-4 | FLOOR DRAINAGE PUMP(D-4) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 5.5 | 5.5 | 5.5 |
| | 514-5 | FLOOR DRAINAGE PUMP(S-1) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 5.5 | 5.5 | 5.5 |
| | 514-6 | FLOOR DRAINAGE PUMP(S-2) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 5.5 | 5.5 | 5.5 |
| | 514-7 | FLOOR DRAINAGE PUMP(S-3) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 5.5 | 5.5 | 5.5 |
| | 514-8 | FLOOR DRAINAGE PUMP(S-4) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 5.5 | 5.5 | 5.5 |
| | 516-1 | TREATED WATER SUPPLY PUMP (2) | 1 | 22 | 380 | D | 434.20 | 0.8 | 100.0 | 250.0 | 250.0 |
| | 516-2 | TREATED WATER SUPPLY PUMP (2) | 1 | 22 | 380 | D | 434.20 | 0.8 | 100.0 | 250.0 | 250.0 |
| | 517-1 | TREATED WATER STRAINER (2) | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 3.5 | 3.5 | 3.5 |

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[Pacage E] Wastewater Treatment Plant Phase-1

| 区分 Location | Motor No. Motor No. | 機器名称 Name of Equipment | 数量 Q'ty | 容量 kW | 電圧 V | 起動方式 Starting Method | 起動電流 Starting Current | Pf | 電圧降下 V/drop Cable Size | 起動電流 S/current Cable Size | Final Cable Size |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 521-1 | FILTRATION SUPPLY PUMP | 1 | 3.7 | 380 | D | 73.00 | 0.8 | 8.0 | 14.0 | 14.0 |
| | 521-2 | FILTRATION SUPPLY PUMP | 1 | 3.7 | 380 | D | 73.00 | 0.8 | 8.0 | 14.0 | 14.0 |
| | 522-1 | FILTRATION SUPPLY STRAINER | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 522-2 | FILTRATION SUPPLY STRAINER | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 523-1 | SAND FILTER | 1 | 2 | 220 | - | 11.40 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 523-2 | SAND FILTER | 1 | 2 | 220 | - | 11.40 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 524-1 | FILTERED WATER SUPPLY PUMP | 1 | 11 | 380 | D | 217.10 | 0.8 | 22.0 | 100.0 | 100.0 |
| | 524-2 | FILTERED WATER SUPPLY PUMP | 1 | 11 | 380 | D | 217.10 | 0.8 | 22.0 | 100.0 | 100.0 |
| | 525-1 | BACKWASH PUMP | 1 | 7.5 | 380 | D | 148.00 | 0.8 | 22.0 | 60.0 | 60.0 |
| | 525-2 | BACKWASH PUMP | 1 | 7.5 | 380 | D | 148.00 | 0.8 | 22.0 | 60.0 | 60.0 |
| | 526-1 | AIR WASH BLOWER | 1 | 7.5 | 380 | D | 148.00 | 0.8 | 22.0 | 60.0 | 60.0 |
| | 526-2 | AIR WASH BLOWER | 1 | 7.5 | 380 | D | 148.00 | 0.8 | 22.0 | 60.0 | 60.0 |
| | 527-1 | BACKWASH WASTEWATER PUMP | 1 | 3.7 | 380 | D | 73.00 | 0.8 | 14.0 | 14.0 | 14.0 |
| | 527-2 | BACKWASH WASTEWATER PUMP | 1 | 3.7 | 380 | D | 73.00 | 0.8 | 14.0 | 14.0 | 14.0 |
| | 528-1 | AIR COMPRESSOR | 1 | 3.7 | 380 | D | 73.00 | 0.8 | 14.0 | 14.0 | 14.0 |
| | 528-2 | AIR COMPRESSOR | 1 | 3.7 | 380 | D | 73.00 | 0.8 | 14.0 | 14.0 | 14.0 |
| | 529-1 | DEHUMIDIFIER | 1 | 0.25 | 220 | - | 6.50 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 530-1 | SOLENOID VALVE BOX | 1 | 2 | 220 | - | 11.40 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 530-2 | SOLENOID VALVE BOX | 1 | 2 | 220 | - | 11.40 | 0.8 | 3.5 | 3.5 | 3.5 |
| <SLUDGE TREATMENT FACILITY> | | | | | | | | | | | |
| | 611-1 | GRAVITY THICKENER | 1 | 1.5 | 380 | D | 29.60 | 0.8 | 14.0 | 3.5 | 14.0 |
| | 613-1 | THICKENED SLUDGE PUMP | 1 | 5.5 | 380 | D | 108.60 | 0.8 | 60.0 | 38.0 | 60.0 |
| | 613-2 | THICKENED SLUDGE PUMP | 1 | 5.5 | 380 | D | 108.60 | 0.8 | 60.0 | 38.0 | 60.0 |
| | 614-1 | THICKENER EFFLUENT PUMP | 1 | 5.5 | 380 | D | 108.60 | 0.8 | 60.0 | 38.0 | 60.0 |
| | 614-2 | THICKENER EFFLUENT PUMP | 1 | 5.5 | 380 | D | 108.60 | 0.8 | 60.0 | 38.0 | 60.0 |
| | 615-1 | FLOOR DRAINAGE PUMP(D-1) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 22.0 | 5.5 | 22.0 |
| | 615-2 | FLOOR DRAINAGE PUMP(S-1) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 22.0 | 5.5 | 22.0 |
| | 621-1 | EXCESS SLUDGE MIXER | 1 | 11 | 380 | D | 217.10 | 0.8 | 38.0 | 100.0 | 100.0 |
| | 622-1 | EXCESS SLUDGE FEED PUMP | 1 | 30 | 380 | SD | 197.40 | 0.8 | 38.0 | 100.0 | 100.0 |
| | 622-2 | EXCESS SLUDGE FEED PUMP | 1 | 30 | 380 | SD | 197.40 | 0.8 | 38.0 | 100.0 | 100.0 |
| | 623A-1 | CENTRIFUGAL THICKENER· DRIVE MOTOR | 1 | 90 | 380 | SD | 592.10 | 0.8 | 325.0 | 325.0 | 325.0 |
| | 623A-2 | CENTRIFUGAL THICKENER· DRIVE MOTOR | 1 | 90 | 380 | SD | 592.10 | 0.8 | 400.0 | 325.0 | 400.0 |
| | 623B-1 | CENTRIFUGAL THICKENER· BACKDRIVE MOTOR | 1 | 22 | 380 | D | 434.20 | 0.8 | 200.0 | 250.0 | 250.0 |
| | 623B-2 | CENTRIFUGAL THICKENER· BACKDRIVE MOTOR | 1 | 22 | 380 | D | 434.20 | 0.8 | 250.0 | 250.0 | 250.0 |
| | 623C-1 | CENTRIFUGAL THICKENER· LUBRICATION PUMP | 1 | 0.75 | 380 | D | 14.80 | 0.8 | 5.5 | 3.5 | 5.5 |
| | 623C-2 | CENTRIFUGAL THICKENER· LUBRICATION PUMP | 1 | 0.75 | 380 | D | 14.80 | 0.8 | 5.5 | 3.5 | 5.5 |

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[Pacage E] Wastewater Treatment Plant Phase-1

| 区分 Location | Motor No. Motor No. | 機器名称 Name of Equipment | 数量 Q'ty | 容量 kW | 電圧 V | 起動方式 Starting Method | 起動電流 Starting Current | Pf | 電圧降下 V/drop Cable Size | 起動電流 S/current Cable Size | Final Cable Size |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 624-1 | CRANE (20t) | 1 | 15.25 | 380 | D | 301.00 | 0.8 | 150.0 | 150.0 | 150.0 |
| | 631-1 | MIXED SLUDGE MIXER | 1 | 11 | 380 | D | 217.10 | 0.8 | 100.0 | 100.0 | 100.0 |
| | 631-2 | MIXED SLUDGE MIXER | 1 | 11 | 380 | D | 217.10 | 0.8 | 100.0 | 100.0 | 100.0 |
| | 632-1 | MIXED SLUDGE FEED PUMP | 1 | 11 | 380 | D | 217.10 | 0.8 | 100.0 | 100.0 | 100.0 |
| | 632-2 | MIXED SLUDGE FEED PUMP | 1 | 11 | 380 | D | 217.10 | 0.8 | 100.0 | 100.0 | 100.0 |
| | 633A-1 | CENTRIFUGAL DEHYDRATOR· DRIVE MOTOR | 1 | 110 | 380 | SD | 723.70 | 0.8 | 400.0 | 325.0 | 400.0 |
| | 633A-2 | CENTRIFUGAL DEHYDRATOR· DRIVE MOTOR | 1 | 110 | 380 | SD | 723.70 | 0.8 | 400.0 | 325.0 | 400.0 |
| | 633B-1 | CENTRIFUGAL DEHYDRATOR· BACK DRIVE MOTOR | 1 | 37 | 380 | SD | 243.40 | 0.8 | 100.0 | 100.0 | 100.0 |
| | 633B-2 | CENTRIFUGAL DEHYDRATOR· BACK DRIVE MOTOR | 1 | 37 | 380 | SD | 243.40 | 0.8 | 100.0 | 100.0 | 100.0 |
| | 633C-1 | CENTRIFUGAL DEHYDRATOR· LUBRICATION PUMP | 1 | 0.4 | 380 | D | 7.90 | 0.6 | 3.5 | 3.5 | 3.5 |
| | 633C-2 | CENTRIFUGAL DEHYDRATOR· LUBRICATION PUMP | 1 | 0.4 | 380 | D | 7.90 | 0.6 | 3.5 | 3.5 | 3.5 |
| | 634A-1 | CAKE HOPPER | 1 | 1.5 | 380 | D | 29.60 | 0.8 | 14.0 | 3.5 | 14.0 |
| | 634A-2 | CAKE HOPPER | 1 | 1.5 | 380 | D | 29.60 | 0.8 | 14.0 | 3.5 | 14.0 |
| | 634B-1 | CAKE HOPPER | 1 | 1.5 | 380 | D | 29.60 | 0.8 | 14.0 | 3.5 | 14.0 |
| | 634B-2 | CAKE HOPPER | 1 | 1.5 | 380 | D | 29.60 | 0.8 | 14.0 | 3.5 | 14.0 |
| | 635-1 | POLYMER FEEDER | 1 | 0.4 | 380 | D | 7.90 | 0.6 | 3.5 | 3.5 | 3.5 |
| | 635-2 | POLYMER FEEDER | 1 | 0.4 | 380 | D | 7.90 | 0.6 | 3.5 | 3.5 | 3.5 |
| | 636-1 | POLYMER DISSOLUTION TANK | 1 | 5.5 | 380 | D | 108.60 | 0.8 | 38.0 | 38.0 | 38.0 |
| | 636-2 | POLYMER DISSOLUTION TANK | 1 | 5.5 | 380 | D | 108.60 | 0.8 | 38.0 | 38.0 | 38.0 |
| | 637-1 | POLYMER FEED PUMP | 1 | 3.7 | 380 | D | 73.00 | 0.8 | 22.0 | 14.0 | 22.0 |
| | 637-2 | POLYMER FEED PUMP | 1 | 3.7 | 380 | D | 73.00 | 0.8 | 22.0 | 14.0 | 22.0 |
| | 638A-1 | WATER SUPPLY PUMP UNIT | 1 | 18.5 | 380 | D | 365.10 | 0.8 | 100.0 | 200.0 | 200.0 |
| | 638B-1 | WATER SUPPLY PUMP UNIT | 1 | 18.5 | 380 | D | 365.10 | 0.8 | 100.0 | 200.0 | 200.0 |
| | 639-1 | AIR COMPRESSOR | 1 | 5.5 | 380 | D | 108.60 | 0.8 | 38.0 | 38.0 | 38.0 |
| | 639-2 | AIR COMPRESSOR | 1 | 5.5 | 380 | D | 108.60 | 0.8 | 38.0 | 38.0 | 38.0 |
| | 640-1 | DEHUMIDIFIER | 1 | 0.25 | 220 | - | 8.50 | 0.8 | 5.5 | 3.5 | 5.5 |
| | 641-1 | CRANE (20t) | 1 | 15.25 | 380 | D | 301.00 | 0.8 | 150.0 | 150.0 | 150.0 |
| | 643-1 | TREATED WATER INFLOW VALVE | 1 | 0.1 | 380 | D | 2.00 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 651-1 | RECYCLE FLOW MIXER | 1 | 11 | 380 | D | 217.10 | 0.8 | 38.0 | 100.0 | 100.0 |
| | 652-1 | RECYCLE FLOW PUMP | 1 | 30 | 380 | SD | 197.40 | 0.8 | 38.0 | 100.0 | 100.0 |
| | 652-2 | RECYCLE FLOW PUMP | 1 | 30 | 380 | SD | 197.40 | 0.8 | 38.0 | 100.0 | 100.0 |
| <COMPOST FACILITY> | | | | | | | | | | | |
| | 711-1 | MIXING MACHINE | 1 | 90 | 380 | SD | 592.10 | 0.8 | 400.0 | 325.0 | 400.0 |
| | 711-2 | MIXING MACHINE | 1 | 90 | 380 | SD | 592.10 | 0.8 | 400.0 | 325.0 | 400.0 |
| | 712-1 | SUCKING FAN | 1 | 5.5 | 380 | D | 108.60 | 0.8 | 38.0 | 38.0 | 38.0 |
| | 712-2 | SUCKING FAN | 1 | 5.5 | 380 | D | 108.60 | 0.8 | 38.0 | 38.0 | 38.0 |

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[Pacage E] Wastewater Treatment Plant Phase-I

| 区分 Location | Motor No. Motor No. | 機器名称 Name of Equipment | 数量 Q'ty | 容量 kW | 電圧 V | 起動方式 Starting Method | 起動電流 Starting Current | PF | 電圧降下 V/drop Cable Size | 起動電流 S/current Cable Size | Final Cable Size |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 712-3 | SUCKING FAN | 1 | 5.5 | 380 | D | 106.60 | 0.8 | 38.0 | 38.0 | 38.0 |
| | 712-4 | SUCKING FAN | 1 | 5.5 | 380 | D | 106.60 | 0.8 | 38.0 | 38.0 | 38.0 |
| | 713-1 | HUMIDIFING PUMP | 1 | 1.5 | 380 | D | 29.60 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 713-2 | HUMIDIFING PUMP | 1 | 1.5 | 380 | D | 29.60 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 732-1 | DEODORIZATION FAN | 1 | 30 | 380 | D | 592.10 | 0.8 | 400.0 | 325.0 | 400.0 |
| | 732-2 | DEODORIZATION FAN | 1 | 30 | 380 | D | 592.10 | 0.8 | 400.0 | 325.0 | 400.0 |
| | 733-1 | SPRAY WATER PUMP | 1 | 3.7 | 380 | D | 73.00 | 0.8 | 38.0 | 14.0 | 38.0 |
| | 734-1 | FLOOR DRAINAGE PUMP | 1 | 3.7 | 380 | D | 73.00 | 0.8 | 38.0 | 14.0 | 38.0 |
| <VENTILATION FACILITY> | | | | | | | | | | | |
| | 801-1 | AIR EXHAUST FAN (B E/R) | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 14.0 | 3.5 | 14.0 |
| | 801-2 | AIR EXHAUST FAN (B E/R) | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 801-3 | AIR EXHAUST FAN (B E/R) | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 801-4 | AIR EXHAUST FAN (B E/R) | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 802-1 | AIR EXHAUST FAN (B E/R) | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 802-2 | AIR EXHAUST FAN (B E/R) | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 802-3 | AIR EXHAUST FAN (B E/R) | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 802-4 | AIR EXHAUST FAN (B E/R) | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| | 803-1 | AIR EXHAUST FAN (B E/R) | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 803-2 | AIR EXHAUST FAN (B E/R) | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 803-3 | AIR EXHAUST FAN (B E/R) | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 804-1 | AIR EXHAUST FAN (B E/R) | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| | 804-2 | AIR EXHAUST FAN (B E/R) | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 804-3 | AIR EXHAUST FAN (B E/R) | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 805-1 | AIR EXHAUST FAN (B E/R) | 1 | 0.3 | 380 | D | 5.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| | 805-2 | AIR EXHAUST FAN (B E/R) | 1 | 0.3 | 380 | D | 5.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| | 805-3 | AIR EXHAUST FAN (B E/R) | 1 | 0.3 | 380 | D | 5.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| | 805-4 | AIR EXHAUST FAN (B E/R) | 1 | 0.3 | 380 | D | 5.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| | 806-1 | AIR EXHAUST FAN (C E/R) | 1 | 0.3 | 380 | D | 5.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 806-2 | AIR EXHAUST FAN (C E/R) | 1 | 0.3 | 380 | D | 5.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 806-3 | AIR EXHAUST FAN (C E/R) | 1 | 0.3 | 380 | D | 5.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 806-4 | AIR EXHAUST FAN (C E/R) | 1 | 0.3 | 380 | D | 5.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 807-1 | AIR EXHAUST FAN (C E/R) | 1 | 0.3 | 380 | D | 5.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 808-1 | AIR EXHAUST FAN (C E/R) | 1 | 0.3 | 380 | D | 5.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | 809-1 | AIR INTAKE FAN (B E/R) | 1 | 7.5 | 380 | D | 148.00 | 0.8 | 3.5 | 3.5 | 3.5 |
| | 809-2 | AIR INTAKE FAN (B E/R) | 1 | 7.5 | 380 | D | 148.00 | 0.8 | 38.0 | 60.0 | 60.0 |
| | 810-1 | AIR INTAKE FAN (C E/R) | 1 | 15 | 380 | D | 296.10 | 0.8 | 100.0 | 150.0 | 150.0 |

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[Pacage E] Wastewater Treatment Plant Phase-1

| 区分 Location | Motor No. Motor No. | 機器名称 Name of Equipment | 数量 Q'ty | 容量 kW | 電圧 V | 起動方式 Starting Method | 起動電流 Starting Current | Pf | 電圧降下 V/drop Cable Size | 起動電流 S/current Cable Size | Final Cable Size |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | B11-1 | AIR INTAKE FAN (C E/R) | 1 | 0.75 | 380 | D | 14.80 | 0.8 | 5.5 | 3.5 | 5.5 |
| | B12-1 | AIR INTAKE FAN (A E/R) | 1 | 0.75 | 380 | D | 14.80 | 0.8 | 14.0 | 3.5 | 14.0 |
| | B13-1 | AIR INTAKE FAN (A E/R) | 1 | 0.9 | 380 | D | 17.80 | 0.8 | 22.0 | 3.5 | 22.0 |
| | B13-2 | AIR INTAKE FAN (A E/R) | 1 | 0.9 | 380 | D | 17.80 | 0.8 | 14.0 | 3.5 | 14.0 |
| | B13-3 | AIR INTAKE FAN (A E/R) | 1 | 0.9 | 380 | D | 17.80 | 0.8 | 14.0 | 3.5 | 14.0 |
| | B13-4 | AIR INTAKE FAN (A E/R) | 1 | 0.9 | 380 | D | 17.80 | 0.8 | 14.0 | 3.5 | 14.0 |
| | B14-1 | AIR EXHAUST FAN (C E/R) | 1 | 0.3 | 380 | D | 5.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | B14-2 | AIR EXHAUST FAN (C E/R) | 1 | 0.3 | 380 | D | 5.90 | 0.8 | 3.5 | 3.5 | 3.5 |
| | B14-3 | AIR EXHAUST FAN (C E/R) | 1 | 0.3 | 380 | D | 5.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| | B14-4 | AIR EXHAUST FAN (C E/R) | 1 | 0.3 | 380 | D | 5.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| | B14-5 | AIR EXHAUST FAN (C E/R) | 1 | 0.3 | 380 | D | 5.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| | B15-1 | AIR EXHAUST FAN (A E/R) | 1 | 11 | 380 | D | 217.10 | 0.8 | 150.0 | 100.0 | 150.0 |
| | B16-1 | AIR INTAKE FAN (A E/R) | 1 | 1.5 | 380 | D | 29.60 | 0.8 | 22.0 | 3.5 | 22.0 |
| | B17-1 | AIR EXHAUST FAN (A E/R) | 1 | 2.2 | 380 | D | 43.40 | 0.8 | 22.0 | 5.5 | 22.0 |
| | B18-1 | AIR INTAKE FAN (D E/R) | 1 | 0.75 | 380 | D | 14.80 | 0.8 | 5.5 | 3.5 | 5.5 |
| | B19-1 | AIR INTAKE FAN (E E/R) | 1 | 3.75 | 380 | D | 74.00 | 0.8 | 38.0 | 14.0 | 38.0 |
| | B20-1 | AIR EXHAUST FAN (D E/R) | 1 | 5.5 | 380 | D | 108.60 | 0.8 | 60.0 | 38.0 | 60.0 |
| | B21-1 | AIR EXHAUST FAN (D E/R) | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| | B22-1 | AIR EXHAUST FAN (D E/R) | 1 | 0.75 | 380 | D | 14.80 | 0.8 | 8.0 | 3.5 | 8.0 |
| | B22-2 | AIR EXHAUST FAN (D E/R) | 1 | 0.75 | 380 | D | 14.80 | 0.8 | 14.0 | 3.5 | 14.0 |
| | B23-1 | AIR EXHAUST FAN (E E/R) | 1 | 0.3 | 380 | D | 5.90 | 0.8 | 5.5 | 3.5 | 5.5 |
| | B24-1 | AIR EXHAUST FAN (E E/R) | 1 | 3.7 | 380 | D | 73.00 | 0.8 | 100.0 | 14.0 | 100.0 |
| | B25-1 | AIR EXHAUST FAN (E E/R) | 1 | 0.28 | 380 | D | 5.50 | 0.8 | 8.0 | 3.5 | 8.0 |
| | B25-2 | AIR EXHAUST FAN (E E/R) | 1 | 0.28 | 380 | D | 5.50 | 0.8 | 5.5 | 3.5 | 5.5 |
| | B26-1 | AIR EXHAUST FAN (E E/R) | 1 | 0.75 | 380 | D | 14.80 | 0.8 | 22.0 | 3.5 | 22.0 |
| | B26-2 | AIR EXHAUST FAN (E E/R) | 1 | 0.75 | 380 | D | 14.80 | 0.8 | 22.0 | 3.5 | 22.0 |
| | B27-1 | AIR EXHAUST FAN (A E/R) | 1 | 0.28 | 380 | D | 5.50 | 0.8 | 5.5 | 3.5 | 5.5 |
| | B28-1 | AIR EXHAUST FAN (A E/R) | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | B28-2 | AIR EXHAUST FAN (A E/R) | 1 | 0.4 | 380 | D | 7.90 | 0.8 | 8.0 | 3.5 | 8.0 |
| | | | 268 | | | | | | | | |

# Calculation Sheet

for

# Receiving Power Capacity for WWTP

1. Introduction ;

The receiving power capacity of the plant is decided from the result of the following study.

1) The classification of all electrical equipments and a character are examined.

2) Total electrical capacity is computed in search of rated capacity of every item.

3) Maximum demand power is calculated by using demand factor of each electrical equipments.

2. Calculation ;

1) The result of the above item 1) and 2) is shown in the Table: WWTP Ph-1 & 2.

2) Total maximum demand power can be looked for by using rated capacity and demand factor from the following formula;

(Receiving power capaci = (Maximum demand power) / ( Efficency x Power factor)

[Unit : kW]

| | Rated capacity | Demand factor | Max. demand power |
|---|---|---|---|
| Phase-1 | 2,301.3 | 0.8 | 1,841.0 |
| Phase-2 | 5,964.7 | 0.8 | 4,771.8 |
| Total | 8,266.0 | 0.8 | 6,612.8 |

3. Selection ;

Receiving power capacity was decided from the above result from the following reason.

1) When the operation which become stable is done, paralell operation of receiving transformer is necessary.

2) Future expansion shall be cosidered.

4. Attachment ;

1) Electrical Equipment List for WWTP Phase-1

2) Electrical Equipment List for WWTP Phase-2

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# ELECTRICAL EQUIPMENT LIST

Name of electric consumer : Wastewater Treatment Plant (WWTP) - Phase 1
Address :
Working table-time :
Schedule of electric consumer: Issue date Rev.1 13-Jan-01

| No. | Electrical equipment name | Q'ty | Capacity | | Total | Remarks |
|---|---|---|---|---|---|---|
| | | | (HB) | (kW) | (kW) | (Demand Factor) |
| | LIFT PUMP EQUIPMENT | | | | | |
| 121 | Lift pump (1) | 2 | - | 220.00 | 440.00 | 0.6 |
| 123 | Floor drainage pump | 1 | - | 2.20 | 2.20 | 0.6 |
| 124 | Crane | 1 | - | 16.00 | 16.00 | 0.3 |
| | | | | | | |
| | BLOWER EQUIPMENT | | | | | |
| 211 | Blower (1) | 1 | - | 480.00 | 480.00 | 1.0 |
| 211A | Aux. Equipment for Blower (1) | 1 | - | 4.15 | 4.15 | 1.0 |
| 213 | Discharge valve (1) | 1 | - | 0.75 | 0.75 | 0.6 |
| 215 | Air filter | 1 | - | 3.70 | 3.70 | 0.6 |
| 216 | Floor drainage pump | 1 | - | 2.20 | 2.20 | 0.6 |
| 217 | Crane | 1 | - | 8.25 | 8.25 | 0.3 |
| | | | | | | |
| | WATER TREATMENT FACILITY | | | | | |
| | (Primary sedimentation tank) | | | | | |
| 312 | Sludge scraper | 10 | - | 1.50 | 15.00 | 1.0 |
| 314 | Scum pump | 1 | - | 5.50 | 5.50 | 0.6 |
| 315 | Raw sludge pump | 2 | - | 5.50 | 11.00 | 0.6 |
| 316 | Raw sludge valve | 10 | - | 0.20 | 2.00 | 0.6 |
| 317 | Comminuter | 1 | - | 0.75 | 0.75 | 1.0 |
| | (Aeration tank) | | | | | |
| 324 | Air flow control valve | 10 | - | 0.40 | 4.00 | 0.6 |
| | (Final sedimentation tank) | | | | | |
| 332 | Sludge scraper | 10 | - | 2.20 | 22.00 | 1.0 |
| 334 | Scum pump | 1 | - | 5.50 | 5.50 | 0.6 |
| 335 | Return sludge pump (25%) | 4 | - | 11.00 | 44.00 | 1.0 |
| 337 | Return sludge valve | 10 | - | 0.40 | 4.00 | 0.6 |
| 338 | Excess sludge pump | 2 | - | 11.00 | 22.00 | 0.6 |
| 339 | Excess sludge valve | 10 | - | 0.20 | 2.00 | 0.6 |
| 340 | Comminuter | 1 | - | 3.70 | 3.70 | 1.0 |
| 351 | Floor drainage pump | 10 | - | 2.20 | 22.00 | 0.6 |
| | | | | | | |
| | DISINFECTION FACILITY | | | | | |
| 411 | Sodium hypochlorite pump | 2 | - | 0.40 | 0.80 | 1.0 |
| | | | | | | |
| | WATER SUPPLY FACILITY | | | | | |
| 512 | Treated water supply pump (1) | 1 | - | 30.00 | 30.00 | 1.0 |
| 513 | Treated water strainer | 1 | - | 0.40 | 0.40 | 0.6 |

# ELECTRICAL EQUIPMENT LIST

Name of electric consumer : Wastewater Treatment Plant (WWTP) - Phase 1
Address :
Working table-time :
Schedule of electric consumer: Issue date Rev.1 13-Jan-01

| No. | Electrical equipment name | Q'ty | Capacity | | Total | Remarks |
|---|---|---|---|---|---|---|
| | | | (HB) | (kW) | (kW) | (Demand Factor) |
| 514 | Floor drainage pump | 1 | - | 2.20 | 2.20 | 0.6 |
| 516 | Treated water supply pump (2) | 1 | - | 22.00 | 22.00 | 0.8 |
| 517 | Treated water strainer (2) | 1 | - | 0.40 | 0.40 | 0.6 |
| | | | | | | |
| 521 | Filtration supply pump | 1 | - | 3.70 | 3.70 | 0.6 |
| 522 | Filtration supply strainer | 1 | - | 0.40 | 0.40 | 0.6 |
| 523 | Sand filter | 1 | - | 2.20 | 2.20 | 0.4 |
| 524 | Fitered water supply pump | 1 | - | 11.00 | 11.00 | 1.0 |
| 525 | Backwash pump | 1 | - | 7.50 | 7.50 | 0.4 |
| 526 | Air wash blower | 1 | - | 7.50 | 7.50 | 0.4 |
| 527 | Backwash wastewater pump | 1 | - | 3.70 | 3.70 | 0.4 |
| 528 | Air compressor | 1 | - | 3.70 | 3.70 | 0.5 |
| 529 | Dehumidifier | 1 | - | 0.25 | 0.25 | 0.5 |
| 530 | Solenoid valve box | 1 | - | 1.50 | 1.50 | 0.5 |
| | | | | | | |
| | SLUDGE TREATMENT FACILITY | | | | | |
| 611 | Gravity thickener | 1 | - | 1.50 | 1.50 | 1.0 |
| 613 | Thickened sludge pump | 1 | - | 5.50 | 5.50 | 0.6 |
| 614 | Thickened sffiuent pump | 1 | - | 5.50 | 5.50 | 0.6 |
| 615 | Floor drainage pump | 1 | - | 2.20 | 2.20 | 0.6 |
| | | | | | | |
| 621 | Excess sludge mixer | 1 | - | 11.00 | 11.00 | 1.0 |
| 622 | Excess sludge feed pump | 1 | - | 30.00 | 30.00 | 1.0 |
| 623A | Centrifugal thickener drive motor | 1 | - | 90.00 | 90.00 | 1.0 |
| 623B | Centrifugal thickener backdrive moto | 1 | - | 22.00 | 22.00 | 1.0 |
| 623C | Centrifugal thickener lubrication pum | 1 | - | 0.75 | 0.75 | 1.0 |
| 624 | Crane (20t) | 1 | - | 16.00 | 16.00 | 0.3 |
| | | | | | | |
| 631 | Mixed sludge mixer | 2 | - | 11.00 | 22.00 | 1.0 |
| 632 | Mixed sludge feed pump | 1 | - | 11.00 | 11.00 | 1.0 |
| 633A | Centrifugal thickener drive motor | 1 | - | 110.00 | 110.00 | 1.0 |
| 633B | Centrifugal thickener backdrive moto | 1 | - | 37.00 | 37.00 | 1.0 |
| 633C | Centrifugal thickener lubrication pum | 1 | - | 0.40 | 0.40 | 1.0 |
| 634A | Cake hopper | 1 | - | 1.50 | 1.50 | 0.3 |
| 634B | Cake hopper | 1 | - | 1.50 | 1.50 | 0.3 |
| 635 | Polymer feeder | 1 | - | 0.40 | 0.40 | 1.0 |
| 636 | Polymer dissolution tank | 1 | - | 5.50 | 5.50 | 1.0 |
| 637 | Polymer feed pump | 1 | - | 3.70 | 3.70 | 1.0 |

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# ELECTRICAL EQUIPMENT LIST

Name of electric consumer : Wastewater Treatment Plant (WWTP) - Phase 1
Address :
Working table-time :
Schedule of electric consumer: Issue date Rev.1 13-Jan-01

| No. | Electrical equipment name | Q'ty | Capacity | | Total | Remarks |
|---|---|---|---|---|---|---|
| | | | (HB) | (kW) | (kW) | (Demand Factor) |
| 638A | Water supply pump unit | 1 | - | 18.50 | 18.50 | 0.6 |
| 638B | Water supply pump unit | 1 | - | 18.50 | 18.50 | 0.6 |
| 639 | Air compressor | 1 | - | 5.50 | 5.50 | 0.5 |
| 640 | Dehumidifier | 1 | - | 0.25 | 0.25 | 0.5 |
| 641 | Crane (20t) | 1 | - | 16.00 | 16.00 | 0.3 |
| 643 | Treatment water inflow valve | 1 | - | 0.10 | 0.10 | 0.6 |
| | | | | | | |
| 651 | Recycle flow mixer | 1 | - | 11.00 | 11.00 | 1.0 |
| 652 | Recycle flow pump | 1 | - | 30.00 | 30.00 | 0.6 |
| | | | | | | |
| 671 | Floor drainage pump | 3 | - | 2.20 | 6.60 | 0.6 |
| | | | | | | |
| | COMPOST FACILITY | | | | | |
| 721 | Mixing machine | 2 | - | 90.00 | 180.00 | 1.0 |
| 722 | Sucking fan | 2 | - | 5.50 | 11.00 | 1.0 |
| 723 | Mumidifing pump | 2 | - | 1.50 | 3.00 | 1.0 |
| | | | | | | |
| 742 | Deodorization fan | 5 | - | 22.00 | 110.00 | 1.0 |
| 744 | Spray water pump | 1 | - | 2.20 | 2.20 | 0.5 |
| 745 | Floor drainage pump | 2 | - | 2.20 | 4.40 | 0.5 |
| | | | | | | |
| | VENTILATION FACILITY | | | | | |
| 801 | Air exhaust fan | 8 | - | 0.40 | 3.20 | 1.0 |
| 802 | Air exhaust fan | 6 | - | 0.40 | 2.40 | 1.0 |
| 803 | Air exhaust fan | 8 | - | 0.30 | 2.40 | 1.0 |
| 804 | Air exhaust fan | 1 | - | 0.30 | 0.30 | 1.0 |
| 805 | Air exhaust fan | 1 | - | 0.30 | 0.30 | 1.0 |
| 806 | Air exhaust fan | 2 | - | 15.00 | 30.00 | 1.0 |
| 807 | Air exhaust fan | 2 | - | 7.50 | 15.00 | 1.0 |
| 808 | Air exhaust fan | 2 | - | 2.20 | 4.40 | 1.0 |
| 809 | Air exhaust fan | 3 | - | 0.40 | 1.20 | 1.0 |
| 810 | Air exhaust fan | 2 | - | 0.75 | 1.50 | 1.0 |
| 811 | Air exhaust fan | 1 | - | 7.50 | 7.50 | 1.0 |
| 812 | Air exhaust fan | 3 | - | 0.75 | 2.25 | 1.0 |
| 813 | Air exhaust fan | 1 | - | 0.25 | 0.25 | 1.0 |
| 814 | Air exhaust fan | 1 | - | 7.50 | 7.50 | 1.0 |
| 815 | Air exhaust fan | 1 | - | 2.20 | 2.20 | 1.0 |
| 816 | Air exhaust fan | 2 | - | 0.60 | 1.20 | 1.0 |

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# ELECTRICAL EQUIPMENT LIST

Name of electric consumer : Wastewater Treatment Plant (WWTP) - Phase 1
Address :
Working table-time :
Schedule of electric consumer: Issue date Rev.1 13-Jan-01

| No. | Electrical equipment name | Q'ty | Capacity | | Total | Remarks |
|---|---|---|---|---|---|---|
| | | | (HB) | (kW) | (kW) | (Demand Factor) |
| 817 | Air exhaust fan | 1 | - | 0.30 | 0.30 | 1.0 |
| 818 | Air exhaust fan | 1 | - | 3.70 | 3.70 | 1.0 |
| 819 | Air exhaust fan | 1 | - | 0.30 | 0.30 | 1.0 |
| 820 | Air exhaust fan | 3 | - | 0.30 | 0.90 | 1.0 |
| | | | | | | |
| 901 | Miscellaneous | 1 | - | 20.00 | 20.00 | 0.6 |
| 902 | Lighting | 1 | - | 70.00 | 70.00 | 0.9 |
| 903 | Ventilation | 1 | - | 82.00 | 82.00 | 1.0 |
| 904 | Air conditioning unit | 1 | - | 30.00 | 30.00 | 1.0 |
| | TOTAL | | | | 2,301.25 | 0.8 |

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# ELECTRICAL EQUIPMENT LIST

Name of electric consumer : Wastewater Treatment Plant (WWTP) - Phase 2
Address :
Working table-time :
Schedule of electric consumer: Issue date Rev.1 13-Jan-01

| No. | Electrical equipment name | Q'ty | Capacity | | Total | Remarks |
|---|---|---|---|---|---|---|
| | | | (HB) | (kW) | (kW) | (Demand Factor) |
| | LIFT PUMP EQUIPMENT | | | | | |
| 122 | Lift pump (2) | 3 | - | 460.00 | 1,380.00 | 0.6 |
| | | | | | | |
| | BLOWER EQUIPMENT | | | | | |
| 212 | Blower (1) | 2 | - | 810.00 | 1,620.00 | 1.0 |
| 212A | Aux. Equipment for Blower (1) | 2 | - | 6.00 | 12.00 | 1.0 |
| 214 | Discharge valve (1) | 2 | - | 0.75 | 1.50 | 0.6 |
| 215 | Air filter | 2 | - | 3.70 | 7.40 | 0.6 |
| 216 | Floor drainage pump | 3 | - | 2.20 | 6.60 | 0.6 |
| | | | | | | |
| | WATER TREATMENT FACILITY | | | | | |
| | (Primary sedimentation tank) | | | | | |
| 312 | Sludge scraper | 30 | - | 1.50 | 45.00 | 1.0 |
| 314 | Scum pump | 3 | - | 5.50 | 16.50 | 0.6 |
| 315 | Raw sludge pump | 6 | - | 5.50 | 33.00 | 0.6 |
| 316 | Raw sludge valve | 30 | - | 0.20 | 6.00 | 0.6 |
| 317 | Comminuter | 1 | - | 0.75 | 0.75 | 1.0 |
| | (Aeration tank) | | | | | |
| 324 | Air flow control valve | 30 | - | 0.40 | 12.00 | 0.6 |
| | (Final sedimentation tank) | | | | | |
| 332 | Sludge scraper | 30 | - | 2.20 | 66.00 | 1.0 |
| 334 | Scum pump | 3 | - | 5.50 | 16.50 | 0.6 |
| 335 | Return sludge pump (25%) | 12 | - | 11.00 | 132.00 | 1.0 |
| 337 | Return sludge valve | 30 | - | 0.40 | 12.00 | 0.6 |
| 338 | Excess sludge pump | 6 | - | 11.00 | 66.00 | 0.6 |
| 339 | Excess sludge valve | 30 | - | 0.20 | 6.00 | 0.6 |
| 340 | Comminuter | 1 | - | 3.70 | 3.70 | 1.0 |
| 351 | Floor drainage pump | 30 | - | 2.20 | 66.00 | 0.6 |
| | | | | | | |
| | DISINFECTION FACILITY | | | | | |
| 414 | Sodium hypochlorite pump | 6 | - | 0.40 | 2.40 | 1.0 |
| | | | | | | |
| | WATER SUPPLY FACILITY | | | | | |
| 512 | Treated water supply pump (1) | 3 | - | 30.00 | 90.00 | 1.0 |
| 513 | Treated water strainer (1) | 1 | - | 0.40 | 0.40 | 0.6 |
| 516 | Treated water strainer (2) | 2 | - | 22.00 | 44.00 | 0.8 |
| 524 | Fitered water supply pump | 1 | - | 11.00 | 11.00 | 0.6 |
| | | | | | | |

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# ELECTRICAL EQUIPMENT LIST

Name of electric consumer : Wastewater Treatment Plant (WWTP) - Phase 2
Address :
Working table-time :
Schedule of electric consumer: Issue date Rev.1 13-Jan-01

| No. | Electrical equipment name | Q'ty | Capacity | | Total | Remarks |
|---|---|---|---|---|---|---|
| | | | (HB) | (kW) | (kW) | (Demand Factor) |
| | SLUDGE TREATMENT FACILITY | | | | | |
| 611 | Gravity thickener | 3 | - | 1.50 | 4.50 | 1.0 |
| 613 | Thickened sludge pump | 3 | - | 5.50 | 16.50 | 0.6 |
| 614 | Thickened sffiuent pump | 3 | - | 5.50 | 16.50 | 0.6 |
| 615 | Floor drainage pump | 3 | - | 2.20 | 6.60 | 0.6 |
| 621 | Excess sludge mixer | 1 | - | 11.00 | 11.00 | 1.0 |
| 622 | Excess sludge feed pump | 3 | - | 30.00 | 90.00 | 1.0 |
| 623A | Centrifugal thickener drive motor | 3 | - | 90.00 | 270.00 | 1.0 |
| 623B | Centrifugal thickener backdrive moto | 3 | - | 22.00 | 66.00 | 1.0 |
| 623C | Centrifugal thickener lubrication pum | 3 | - | 0.75 | 2.25 | 1.0 |
| 631 | Mixed sludge mixer | 6 | - | 11.00 | 66.00 | 1.0 |
| 632 | Mixed sludge feed pump | 3 | - | 11.00 | 33.00 | 1.0 |
| 633A | Centrifugal thickener drive motor | 3 | - | 110.00 | 330.00 | 1.0 |
| 633B | Centrifugal thickener backdrive moto | 3 | - | 37.00 | 111.00 | 1.0 |
| 633C | Centrifugal thickener lubrication pum | 3 | - | 0.40 | 1.20 | 1.0 |
| 634A | Cake hopper | 3 | - | 1.50 | 4.50 | 0.3 |
| 634B | Cake hopper | 3 | - | 1.50 | 4.50 | 0.3 |
| 635 | Polymer feeder | 3 | - | 0.40 | 1.20 | 1.0 |
| 636 | Polymer dissolution tank | 3 | - | 5.50 | 16.50 | 1.0 |
| 637 | Polymer feed pump | 3 | - | 3.70 | 11.10 | 1.0 |
| 638A | Water suooly pump unit | 1 | - | 18.50 | 18.50 | 0.6 |
| 638B | Water suooly pump unit | 1 | - | 18.50 | 18.50 | 0.6 |
| 639 | Air compressor | 1 | - | 5.50 | 5.50 | 0.5 |
| 640 | Dehumidifier | 1 | - | 0.25 | 0.25 | 0.5 |
| 651 | Recycle flow mixer | 1 | - | 11.00 | 11.00 | 1.0 |
| 652 | Recycle flow pump | 1 | - | 30.00 | 30.00 | 0.6 |
| 662 | Deodorization fan | 1 | - | 7.50 | 7.50 | 1.0 |
| 671 | Floor drainage pump | 2 | - | 2.20 | 4.40 | 0.6 |
| | | | | | | |
| | COMPOST FACILITY | | | | | |
| 721 | Mixing machine | 6 | - | 90.00 | 540.00 | 1.0 |
| 722 | Sucking fan | 6 | - | 5.50 | 33.00 | 1.0 |
| 723 | Humidifing pump | 6 | - | 1.50 | 9.00 | 0.5 |
| 742 | Deodorization fan | 15 | - | 22.00 | 330.00 | 1.0 |
| 744 | Spray water fan | 3 | - | 2.20 | 6.60 | 0.5 |
| 745 | Floor drainage pump | 6 | - | 2.20 | 13.20 | 0.5 |
| | | | | | | |
| | | | | | | |

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# ELECTRICAL EQUIPMENT LIST

Name of electric consumer : Wastewater Treatment Plant (WWTP) - Phase 2
Address :
Working table-time :
Schedule of electric consumer: Issue date Rev.1 13-Jan-01

| No. | Electrical equipment name | Q'ty | Capacity | | Total | Remarks |
|---|---|---|---|---|---|---|
| | | | (HB) | (kW) | (kW) | (Demand Factor) |
| | VENTILATION FACILITY | | | | | |
| 801 | Air exhaust fan | 8 | - | 0.40 | 3.20 | 1.0 |
| 802 | Air exhaust fan | 18 | - | 0.40 | 7.20 | 1.0 |
| 803 | Air exhaust fan | 24 | - | 0.30 | 7.20 | 1.0 |
| 804 | Air exhaust fan | 3 | - | 0.30 | 0.90 | 1.0 |
| 805 | Air exhaust fan | 3 | - | 0.30 | 0.90 | 1.0 |
| 806 | Air exhaust fan | 6 | - | 15.00 | 90.00 | 1.0 |
| 807 | Air exhaust fan | 6 | - | 7.50 | 45.00 | 1.0 |
| 812 | Air exhaust fan | 3 | - | 0.75 | 2.25 | 1.0 |
| 814 | Air exhaust fan | 1 | - | 7.50 | 7.50 | 1.0 |
| 818 | Air exhaust fan | 1 | - | 3.70 | 3.70 | 1.0 |
| 820 | Air exhaust fan | 1 | - | 0.30 | 0.30 | 1.0 |
| | | | | | | |
| 901 | Miscellaneous | 1 | - | 10.00 | 10.00 | 0.6 |
| 902 | Lighting | 1 | - | 20.00 | 20.00 | 0.9 |
| 903 | Ventilation | 1 | - | 10.00 | 10.00 | 1.0 |
| 904 | Air conditioning unit | 1 | - | 10.00 | 10.00 | 1.0 |
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| | TOTAL | | | | 5,964.70 | 0.8 |