JAPAN INTERNATIONAL COOPERATION AGENCY

BASIC DESIGN PACKAGE OF

RECOMMENDABLE WASTEWATER TREATMENT PLANT

FOR

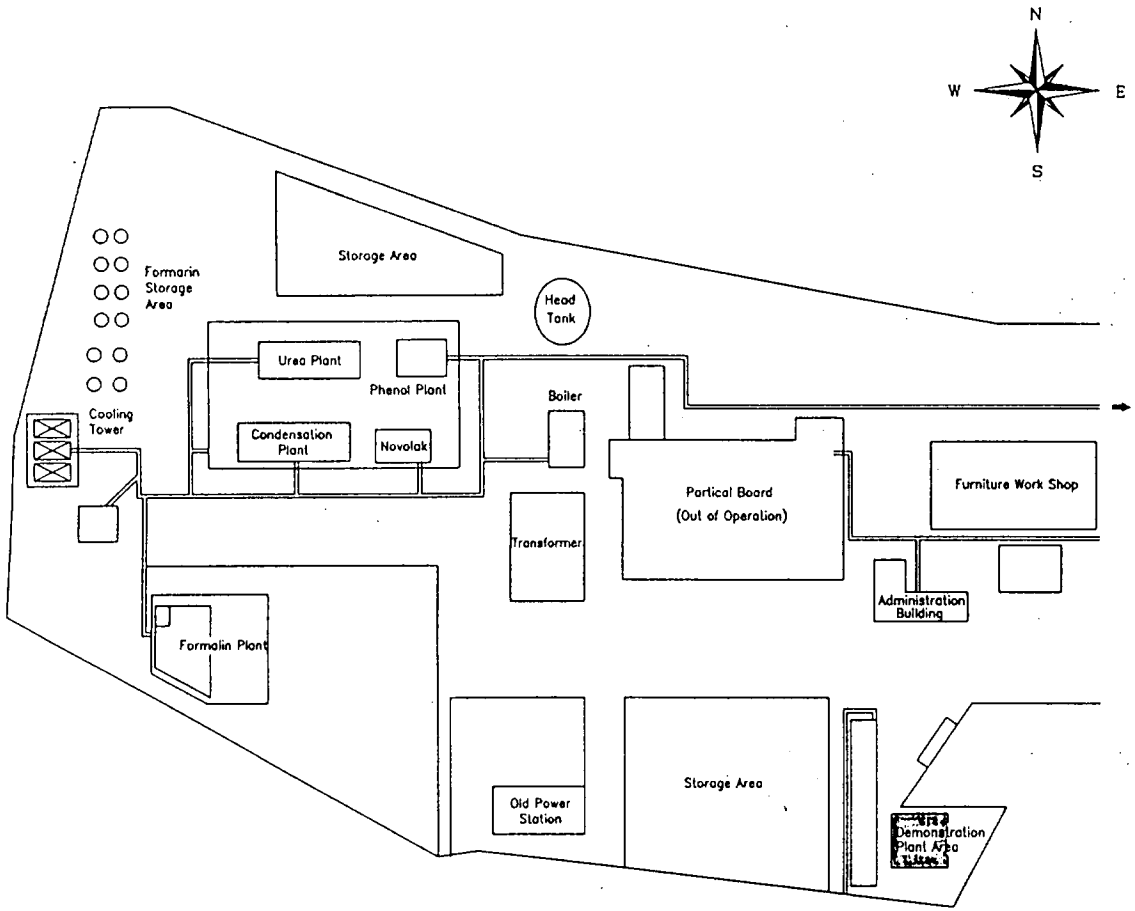
MANSOURA CO. FOR RESINS AND CHEMICALS

February 2000

CHIYODA DAMES AND MOORE CO.

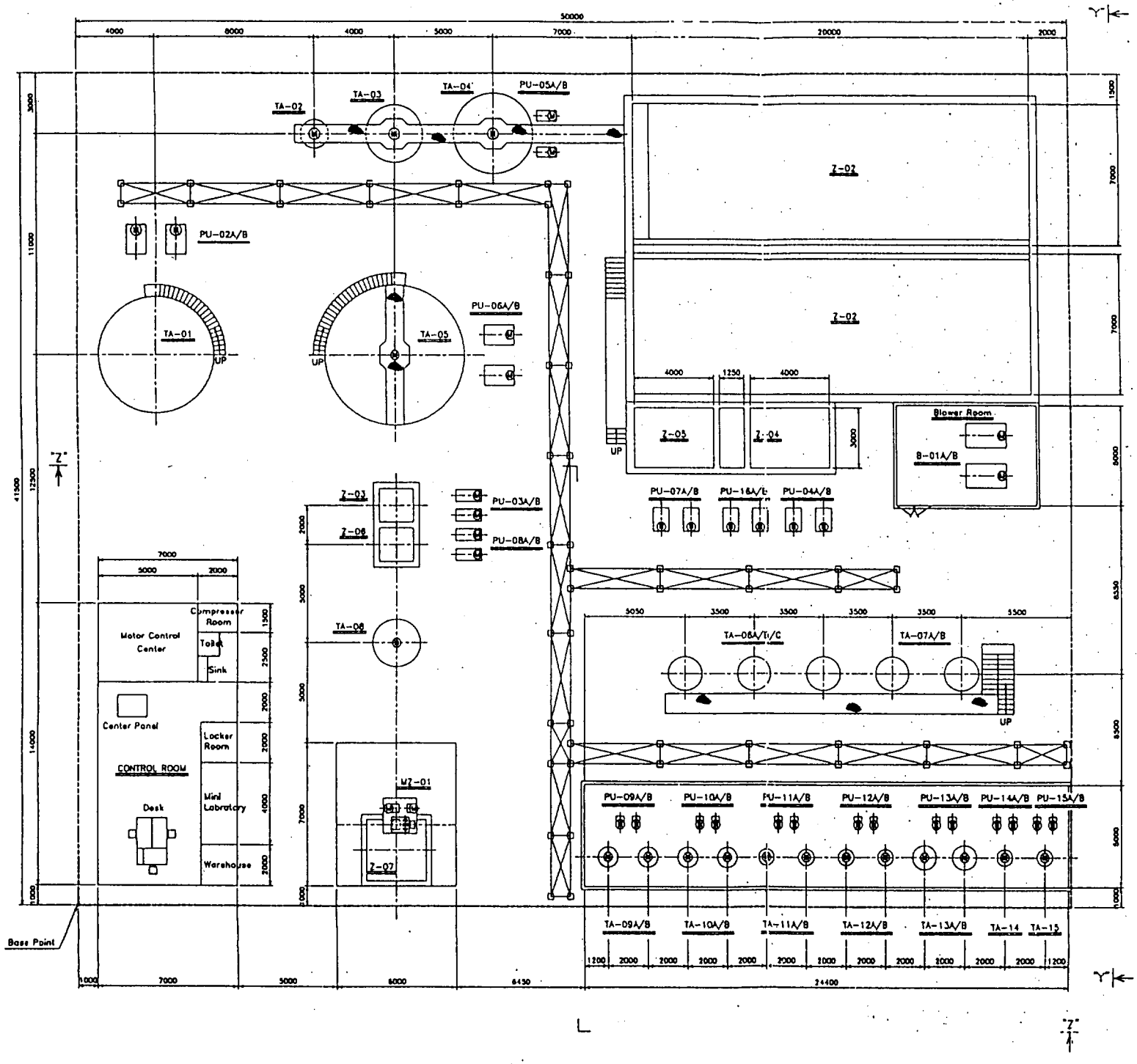
CHIYODA CORPORATION

BD-12



JICA	Chck	Tech	Appr						
Sign									
Date									
CNSL	Dsgn	Chck	Appr						
Sign				Rev	Description	Dsgn	Chck	Appr	Date
Date					REVISION				

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION		
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION		
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT		
TITLE	FOR MANSOURA CO.,FOR RESINS AND CHEMICALS LOCATION OF RECOMMENDABLE W.W.T. PLANT		
ISSUED DATE		SCALE	
DWG NO	RC-BD-SK-01	REV.	0

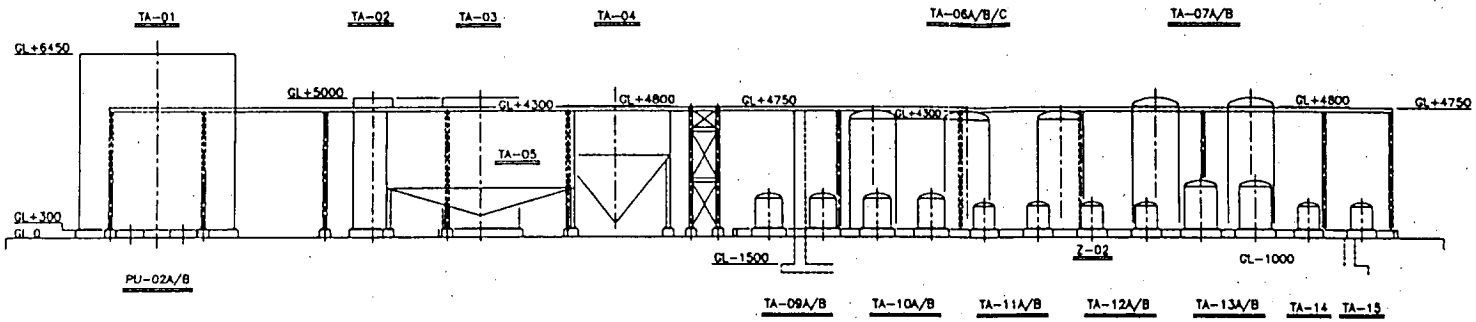


Equipment No.	Service	No. Pcs.	Type of Equipment
TA-01	Equalization Tank	1	34ϕ*4H=1,360m³
TA-02	Coagulation Tank	1	1.9ϕ*2.0H=3.8m³
TA-03	Flocculation Tank	1	3.6ϕ*3.0H=11.3m³
TA-04	Sedimentation Tank	1	10.0ϕ*4.5H=353m³
TA-05	Clarifier	1	9.0ϕ*4.0H=254m³
TA-06A/B/C	Sand Filter	1	1.8ϕ*4.0H=10m³
TA-07A/B	Activated Carbon Filter	1	1.8ϕ*4.5H=11m³
TA-08	Thickener	1	2.4ϕ*4.0H=18.1m³
TA-09A/B	Coagulant Tank	1	1.0ϕ*1.3H=1.1m³
TA-10A/B	Lime Tank	1	1.0ϕ*1.3H=1.1m³
TA-11A/B	Polymer-A Tank	1	0.8ϕ*1.0H=0.5m³
TA-12A/B	Phosphate Tank	1	0.8ϕ*1.0H=0.5m³
TA-13A/B	Urea Tank	1	1.2ϕ*1.8H=2.0m³
TA-14	Polymer-B Tank	1	0.8ϕ*1.0H=0.5m³
TA-15	NaOCl Tank	1	0.8ϕ*1.0H=0.5m³
I-01	Waste Water Pit	1	4.0mW*4.0mL*2.0mH=31.8m³
I-02	Aeration Pond	1	14.0mW*38.0mL*3.5mH=1,862m³
I-03	Clarified Water Pond	1	7.0mW*3.0mL*3.0mH=126m³
I-04	Treated Water Pond	1	30.0mW*4.5mL*3.0mH=1,350m³
I-05	Waste Water Pond	1	30.0mW*4.0mL*3.0mH=1,350m³
I-06	Sludge Pond	1	20.0mW*5.0mL*3.0mH=1,200m³
I-07	Combined Boiler Storage	1	30.0mW*5.0mL*2.0mH=1,140m³
PU-01A/B/C	Raw Water Pump	3	30m³/hr*30m*3.7kw
PU-02A/B	Coagulation Tank Feed Pump	2	30m³/hr*15m*2.2kw
PU-03A/B	Filter Feed Pump	2	30m³/hr*25m*3.7kw
PU-04A/B	Backwash Pump	2	80m³/hr*15m*5.5kw
PU-05A/B	Sludge Pump	2	0.5m³/hr*15m*1.5kw
PU-06A/B	Return Sludge Pump	2	15m³/hr*15m*2.2kw
PU-07A/B	Backwashed Water Pump	2	2m³/hr*12m*1.5kw
PU-08A/B	Centrifuge Feed Pump	2	1.5m³/hr*15m*1.5kw
PU-09A/B	Coagulant Pump	2	PV-type, 1.5kw×6 stroke
PU-10A/B	Lime Pump	2	10L/hr*0.3kg/cm²*0.4kw
PU-11A/B	Polymer-A Pump	2	3L/hr*0.3kg/cm²*0.4kw
PU-12A/B	Phosphate Pump	2	3L/hr*0.3kg/cm²*0.4kw
PU-13A/B	Urea Pump	2	15L/hr*0.3kg/cm²*0.4kw
PU-14A/B	Polymer-B Pump	2	1L/hr*0.3kg/cm²*0.4kw
PU-15A/B	NaOCl	2	2L/hr*0.3kg/cm²*0.4kw
PU-16A/B	Treated Water Pump	2	30m³/hr*15m*3.7kw
B-01A/B	Blower	2	30m³/hr*15m*3.7kw
M7-01	Dehydrator	1	1.5kg-DS/hr*3m*1.5kw
M9-01	Rapid Mixer	1	Vertical type, 0.4kw
M9-02	Flocculator	1	Vertical type, 1.2kw
M9-03	Sedimentation Tank Rake	1	Center Drive Type, 0.4kw
M9-04	Clarifier Rake	1	Center Drive Type, 0.75kw
M9-05	Thickener Rake	1	Center Drive Type, 0.4kw
M9-06A/B	Coagulant Tank Mixer	1	Vertical type, 0.2kw
M9-07A/B	Lime Tank Mixer	1	Vertical type, 0.2kw
M9-08A/B	Polymer-A Tank Mixer	1	Vertical type, 0.1kw
M9-09A/B	Phosphate Tank Mixer	1	Vertical type, 0.1kw
M9-10A/B	Urea Tank Mixer	1	Vertical type, 0.4kw
M9-11	Polymer-B Tank Mixer	1	Vertical type, 0.1kw

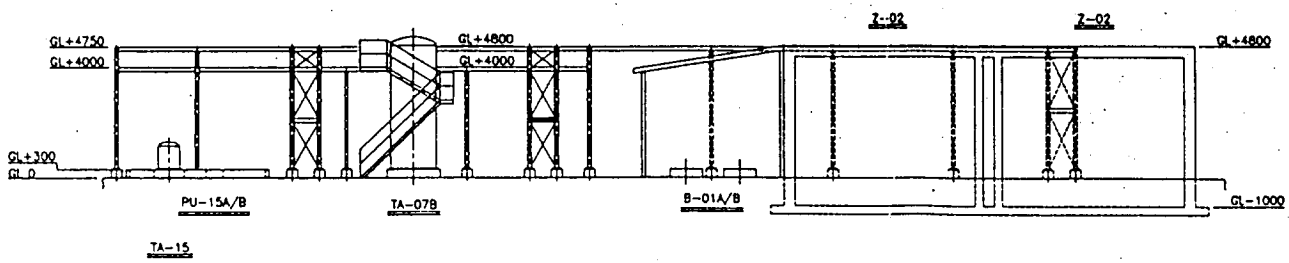
JICA	Chck	Tech	Appr							
Sign										
Date										
CNSL	Dsgn	Chck	Appr							
Sign				Rev	Description	Dsgn	Chck	Appr	Date	
Date					REVISION					

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR MANSOURA CO., FOR RESINS AND CHEMICALS BASIC DESIGN OF WASTE WATER PLOT PLAN
ISSUED DATE	SCALE 1/100
DWG NO	RC-BD-12-01 REV. 0

BD-14



VIEW "Z"-"Z"



VIEW "Y"-"Y"

Equipment NO.	Service	No. Req'd	Type of Equipment
TA-01	Equalization Tank	1	5811³ ø15000×1150m²
TA-02	Coagulation Tank	1	1100³ ø3000×1.5m²
TA-03	Flocculation Tank	1	3960³ ø3000×1.5m²
TA-04	Sedimentation Tank	1	4000³ ø4500×1.5m²
TA-05	Clarifier	1	7000³ ø4000×1150m²
TA-06A/B/C	Sand Filter	3	1800³ ø4500×4m²
TA-07A/B	Activated Carbon Filter	2	1800³ ø4500×4m²
TA-08	Thickener	1	2400³ ø4000×1.5m²
TA-08A/B	Coagulant Tank	2	1000³ ø1300×1m²
TA-10A/B	Lime Tank	2	1000³ ø1300×1m²
TA-11A/B	Polymer-A Tank	2	800³ ø1000×0.5m²
TA-12A/B	Phosphate Tank	2	800³ ø1000×0.5m²
TA-13A/B	Urea Tank	2	1200³ ø1600×3m²
TA-14	Polymer-B Tank	1	800³ ø1000×0.1m²
TA-15	NaOCl Tank	1	800³ ø1000×0.1m²
I-01	Waste Water Pit	1	4000³ ø4000×20000³ ø16m²
I-02	Aeration Pond	1	14000 ø30000×24000³ ø1400m²
I-03	Clarified Water Pond	1	9000³ ø9000×3000³ ø80m²
I-04	Treated/Sterilizing Water P	1	3000³ ø1350×3000³ ø30m²
I-05	Waste Water Pond	1	3000³ ø4000×3000³ ø30m²
I-06	Sludge Pond	1	9000³ ø9000×3000³ ø80m²
I-07	Dewatered Sludge Storage	1	5000³ ø5000×2000³ ø114m²
PU-01A/B/C	Raw Water Pump	3	30m³/hr ø20mm 7.5kw
PU-02A/B	Coagulation Tank Feed Pump	2	30m³/hr ø15mm 5.5kw
PU-03A/B	Filter Feed Pump	2	30m³/hr ø20mm 7.5kw
PU-04A/B	Backwash Pump	2	60m³/hr ø15mm 5.5kw
PU-05A/B	Sludge Pump	2	0.5m³/hr ø15mm 1.5kw
PU-06A/B	Return Sludge Pump	2	1.5m³/hr ø15mm 1.5kw
PU-07A/B	Backwashed Water Pump	2	2m³/hr ø15mm 1.5kw
PU-08A/B	Centrifuge Feed Pump	2	1.5m³/hr ø15mm 1.5kw
PU-09A/B	Coagulant Pump	2	7L/hr ø0.34mm 0.4kw
PU-10A/B	Lime Pump	2	10L/hr ø0.34mm 0.4kw
PU-11A/B	Polymer-A Pump	2	3L/hr ø0.34mm 0.4kw
PU-12A/B	Phosphate Pump	2	5L/hr ø0.34mm 0.4kw
PU-13A/B	Urea Pump	2	15L/hr ø0.34mm 0.4kw
PU-14A/B	Polymer-B Pump	2	1L/hr ø0.34mm 0.4kw
PU-15A/B	NaOCl	2	5L/hr ø0.34mm 0.4kw
PU-16A/B	Treated Water Pump	2	30m³/hr ø15mm 5.5kw
B-01A/B	Blower	2	30m³/hr ø15mm 5.5kw
M2-01	Dehydrator	1	45kg-Dry/hr 7.5kw+1.5kw
MX-01	Rapid Mixer	1	Vertical Type, 0.4kw
MX-02	Flocculator	1	Vertical Type, 2.2kw
MX-03	Sedimentation Tank Rake	1	Center Drive Type, 0.4kw
MX-04	Clarifier Rake	1	Center Drive Type, 0.75kw
MX-05	Thickener Rake	1	Center Drive Type, 0.4kw
MX-08A/B	Coagulant Tank Mixer	2	Vertical Type, 0.2kw
MX-07A/B	Lime Tank Mixer	2	Vertical Type, 0.2kw
MX-08A/B	Polymer-A Tank Mixer	2	Vertical Type, 0.1kw
MX-09A/B	Phosphate Tank Mixer	2	Vertical Type, 0.1kw
MX-10A/B	Urea Tank Mixer	2	Vertical Type, 0.4kw
MX-11	Polymer-B Tank Mixer	1	Vertical Type, 0.1kw

BD-15

JICA	Chck	Tech	Appr						
Sign									
Date									
CNSL	Dsgn	Chck	Appr						
Sign				Rev	Description	Dsgn	Chck	Appr	Date
Date					REVISION				

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR MANSOURA CO., FOR RESINS AND CHEMICALS BASIC DESIGN OF WASTE WATER PLOT PLAN(ELEVATION)
ISSUED DATE	SCALE 1/100
DWG NO	RC-BD-12-02 REV. 0

TANK

CONE ROOF TANK

OPEN TANK

DRUMS

HORIZONTAL TYPE

VERTICAL TYPE

VERTICAL TYPE(OPEN)

PUMP,BLOWER,ETC

CENTRIFUGAL PUMP

RECIPROCATING PUMP

ROOT BLOWER

EJECTOR

MIXER

BELT CONVEYOR

BELT CONVEYOR

ELECTRIC HOIST

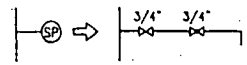
TANK CAR

DUMP TRUCK

MOTOR DRIVEN

SAMPLING CONNECTION

SAMPLING CONNECTION FOR WATER FROM PIPE LINE



SYMBOLS OF LINE

MAIN PROCESS LINE

PROCESS LINE
(& UTILITY LINE etc.)

UTILITY LINE.
SUPPLEMENTARY LINE

IMAGINARY LINE. BURIED LINE

CENTER LINE

BOUNDARY LINE

DESIGNATES PIPING CLASS
CHANGES OR APPLICABLE LOW.

INCLINED

LINE IDENTIFICATION

GENERAL

CONTRACTOR

FLUID NAME
FROM or TO

FACTORY-JICA
UNIT-UNIT

EFD SHEET NO.

EFD-EFD

BREAK DOWN OF EFD-EFD

PROCESS LINE

FLUID NAME
FROM

FLUID NAME
TO

ITEM
NO.

ITEM
NO.

IN EACH SYSTEM EFD

SYMBOLS OF LINE

GATE VALVE

GLOBE VALVE

CHECK VALVE

BUTTERFLY VALVE

BALL VALVE

NEEDLE VALVE

DIAPHRAGM VALVE

COCK VALVE

3WAY VALVE

SAFETY VALVE

FLANGE CONNECTION

CONCENTRIC REDUCER

ECCENTRIC REDUCER

BLIND

SPECTACLE BLIND

FLEXIBLE TUBE

BELLOWS EXPANTION JOINT

SLEEVE EXPANTION JOINT

C
HOSE CONNECTION

RO
RESTRICTION ORIFICE

SYMBOLS OF EQUIPMENT

Y-TIPE STRAINER

T-TYPE STRAINER

TEMPORARY STRAINER

SEWER DRAIN

FLOW DETECTOR

SG
SIGHT GLASS

FOOT VALVE

S.P.
SPOOL PIECE

SYMBOLS OF EQUIPMENT

EYE SHOWER

SHOWER

SILENCER

M
MAN HOLE

H
HAND HOLE

SG
SIGHT GLASS

LINE MIXER

Y_D
TO OILY SEWER

Y_R
TO RAINY SEWER

SYMBOLS OF FLUID

SYMBOL	SERVICE
CA	CAUSTIC
AI	INSTRUMENT AIR
AS	SERVICE AIR
WCS	COOLING WATER SUPPLY
WCR	COOLING WATER RETURN
WD	DRINKING WATER
WI	INDUSTRIAL WATER
WR	RECOVERED WATER
WW	WASTE WATER
HCL	HCL
CHL	CHEMICAL

ABBREVIATION

(SV)	SAFETY VALVE
B/L	BATTERY LIMIT
ATM	ATMOSPHERE
MFR	MANUFACTURER
MISC	MISCELLANEOUS
T.S	TEMPORARY STRAINER
NC	NOMAL CLOSE
NO	NOMAL OPEN
FC	FAILURE CLOSE
FO	FAILURE OPEN
BW	BUTT WELD

JICA	Chck	Tech	Appr						
Sign									
Date									
CNSL	Dsgn	Chck	Appr						
Sign				Rev	Description	Dsgn	Chck	Appr	Dat
Date					REVISION				

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR ENGINEERING FLOW DIAGRAM LEAD SHEET(1/2)
ISSUED DATE	SCALE: None
DWG NO	REV.: 0

INSTRUMENTION SYMBOLS AND LEGEND

1.INSTRUMENT LINE SYMBOLS

- PNEUMATIC SIGNAL
- ELECTRIC SIGNAL

2.GENERAL INSTRUMENT SYMBOLS

- LOCALLY MOUNTED
- MOUNTED ON BOARD
- MOUNTED ON LOCAL BOARD
- TRANSMITTER
- LAMP
- INSTRUMENT IN MAIN PANEL

3.CONTROL VALVE ACTUATOR SYMBOLS

- DIAPHRAGM
- CYLINDER W/O SPRING
- CYLINDER WITH SPRING
- SOLENOID
- MOTOR
- WITH HAND WHEEL

ACCESSORIES

- WITH HAND WHEEL
- WITH LIMIT SWITCH

4.SYMBOLS FOR SELF ACTUATED REGULATOR

- BACKPRESSURE REGULATOR SELF-CONTAINED
- PRESSURE-REDUCING REGULATOR SELF-CONTAINED
- BACKPRESSURE REGULATOR WITH EXTERNAL PRESSIRE TAP
- PRESSURE-REDUCING REGULATOR WITH EXTERNAL PRESSURE TAP

5.SYMBOLS FOR TEMPERATURE,FLOW AND LEVEL INSTRUMENTS

5-1.TEMPERATURE

- TEMPERATURE CONNECTION WITH WELL
- TEMPERATURE INDICATOR FILLED SYSTEM TYPE
- BIMETALLIC TYPE THERMOMETER OR OTHER LOCAL UNCLASSIFIED TEMPERATURE INDICATOR
- TEMPERATURE TRANSMITTER
- THERMOCOUPLE DETECTOR
- TEMPERATURE SWITCHES (DOUBLE ELEMENT)
- TEMPERATURE INDICATOR AND TEMPERATURE SWITCH (SINGLE ELEMENT PARALLEL CONNECTION IN CONTROL ROOM)

5-2.PRESSURE

- PRESSURE INDICATOR DIRECT CONNECTION
- PRESSURE INDICATOR CONNECTION TO CHEMICAL PROTECTOR WITH FILLED SYSTEM

5-3.FLOW

- ORIFICE-FLANGE ASSEMBLY
- VENTURY OR FLOW NOZZLE
- TURBINE OR PROPELLER TYPE PRIMARY ELEMENT
- FIXED RESTRICTION ORIFUCE
- ROTAMETER TYPE FLOW INDICATOR
- POSITIVE DISPLACEMENT TYPE FLOW TOTALIZING INDICATOR
- MAGNETIC FLOW METER TYPE FLOW TOTALIZING INDICATOR

5-4.LEVEL

- LEVEL SWITCH
- LEVEL TRANSMITTER (INTERNAL FLOAT TYPE OR INTERNAL DISPLACER TYPE)
- LEVEL TRANSMITTER (EXTERNAL DISPLANCER TYPE)
- CAPACITANCE TYPE (D/P CELL TYPE)
- SONIC TYPE LEVEL TRANSMITTER WITH INTEGRAL SENSOR
- LEVEL INDICATOR (FLOAT TYPE)
- LEVEL INDICATOR (TAPE TYPE)
- CAGE GLASS

5-6.OTHERS

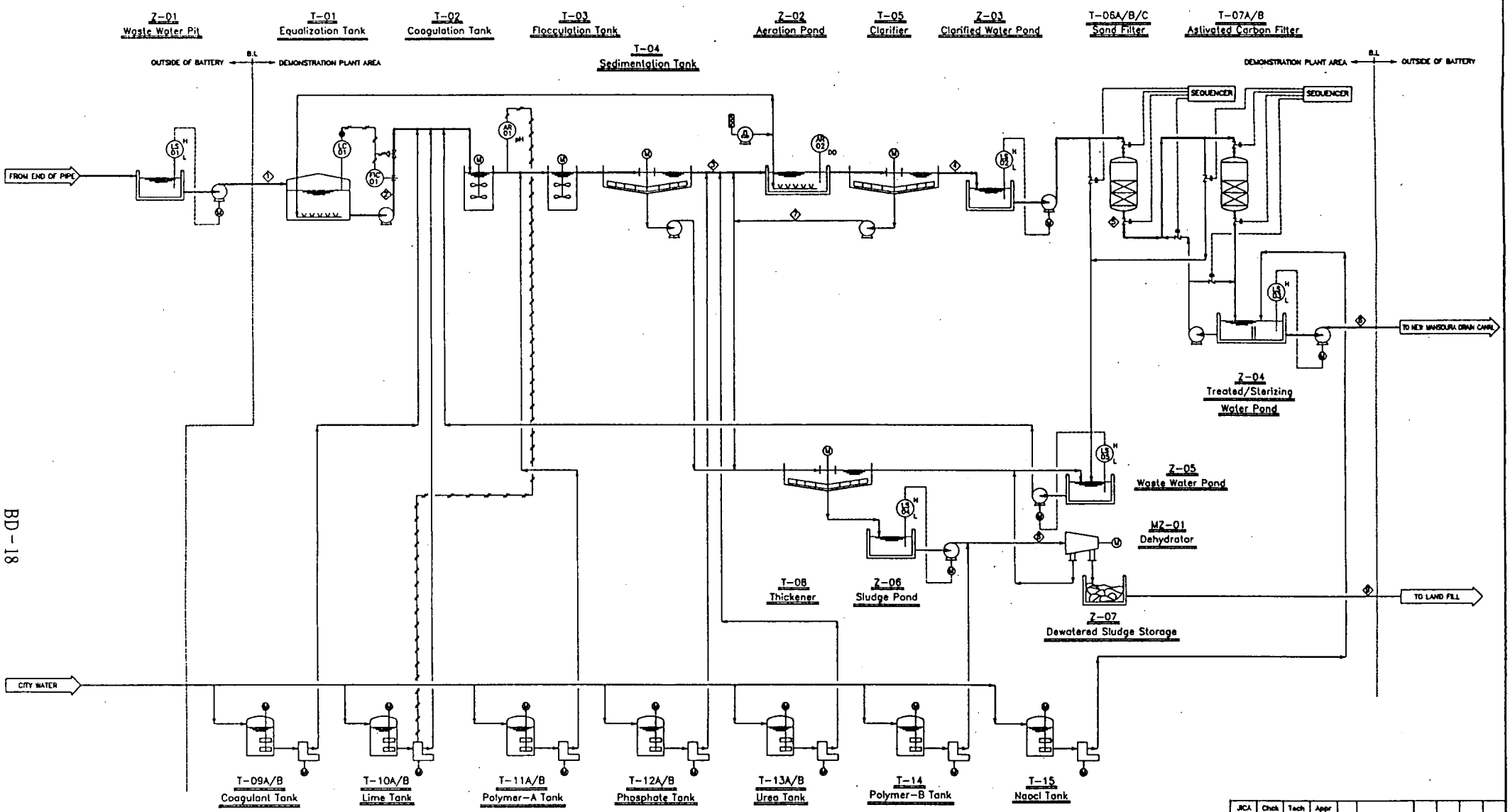
- DIAPHRAGM
- SAFETY VALVE
- SOLENOID VALVE
- SOLENOID VALVE WITH MANUAL RESET
- PURGE

FUNCTIONAL IDENTIFICATION LETTERS

LETTER	PROCESS VARIABLE/ FIRST LETTER	FUNCTION/ SUCCEEDING LETTER
A	ANALYSIS	ALARM
B	BURNER FLAME	
C	ELECTRICAL CONDUCTIVITY	CONTROL
D	DENSITY	
E	ELECTRIC VARIABLE	MEASURING ELEMENT
F	FLOW RATE	
G	DIMENSIONAL GAUGING	LOCAL INDICATE
H	HAND	HAND OPERATE
I		INDICATE
J		
K	TIME	COMPUTER CONTROL
L	LEVEL	LOGGING
M	MOISTURE OR HUMIDITY	
N	FREQUENCY	
O		
P	PRESSURE	SAMPLING POINT
Q	CALORIE	INTEGRATE OR TOTALISE
R		RECORD
S	SPEED,REVOLUTION OR FREQUENCY	SWITCHING/SEQUENCE
T	TEMPERATURE	TRANSMIT
U	UNCLASSIFIED OR MULTIPLE VARIABLE	UNCLASSIFIED OR MULTIPLE FUNCTION
V	VIBRATION	VALVE,DAMPER OR LOUVER
W	WEIGHT OR FORCE	WELL
X	OTHER VARIABLE	OTHER FUNCTION
Y		COMPUTE OR RELAY
Z		SAFETY OR EMERGENCY

JICA	Chck	Tech	Appr						
Sign									
Date									
CNSL	Dsgn	Chck	Appr						
Sign				Rev	Description	Dsgn	Chck	Appr	Date
Date					REVISION				

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION		
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION		
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT		
TITLE	FOR ENGINEERING FLOW DIAGRAM LEAD SHEET(2/2)		
ISSUED DATE		SCALE	None
DWG NO		REV.	0

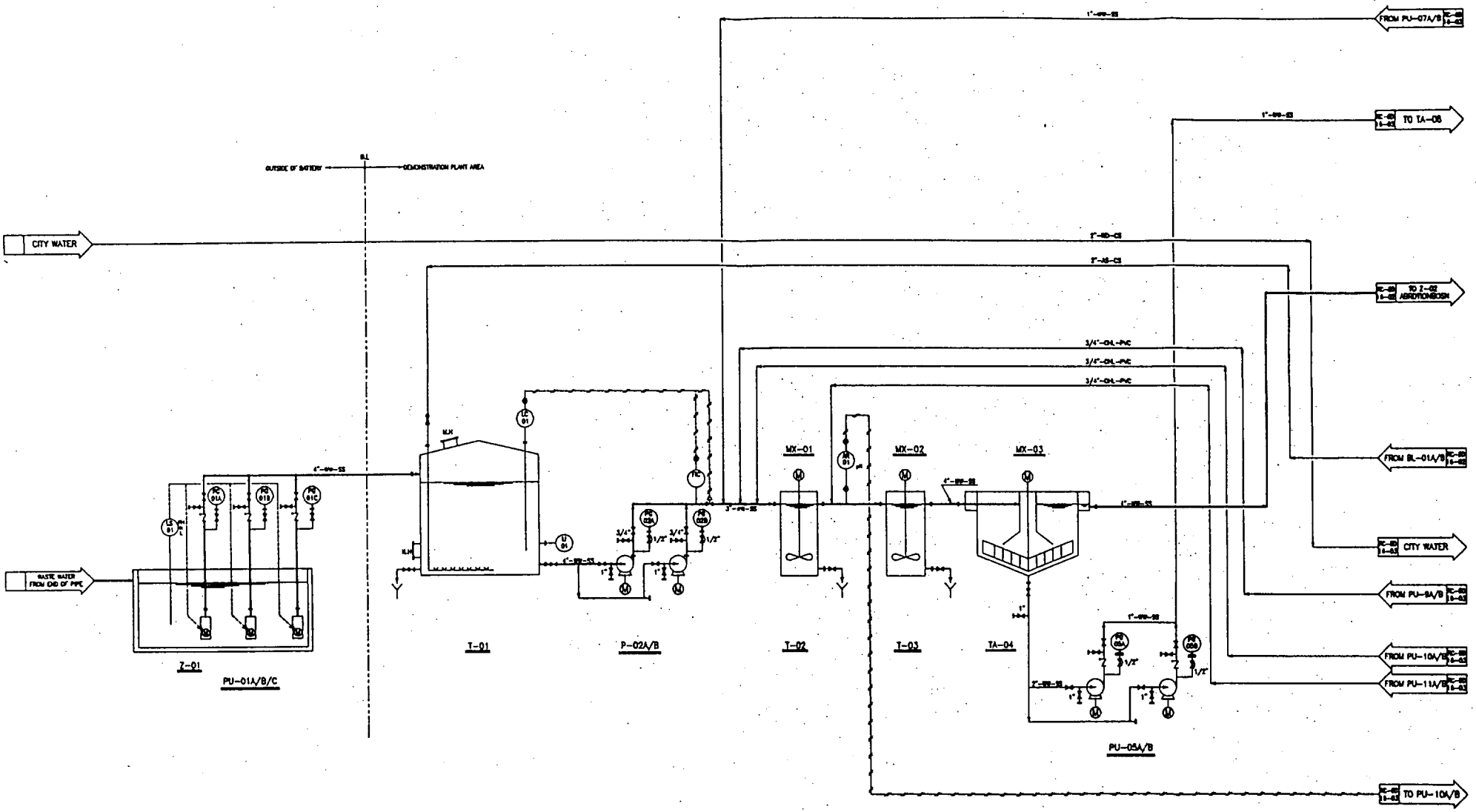


BD-18

Item \ Stream No		①	②	③	④	⑤	⑥	⑦	⑧	⑨	Nile River Regulation
Flow Rate MAX	(m³/d)	40	30	→	→	→	→	7.5	0.4	73kg/h	
Flow Rate Av.	(m³/h)	30	30	→	→	→	→	7.5	0.4	73kg/h	—
pH	(-)	6~7	6~7	7~8	6~7	→	6~9	6~7	6~7	6~7	6~9
Conductivity	(μs/cm)	2,000	2,000	→	→	→	→	—	—	—	—
SS	(mg/L)	100	100	20	20	5	1	10,000	30,000	150,000	50
Oil & Grease	(mg/L)	20	20	5	3	2	1	3	—	—	10
BOD	(mg/L)	1,300	1,300	1,000	50	30	20	—	—	—	60
CODcr	(mg/L)	2,400	2,400	2,200	100	80	30	—	—	—	100
Phenol	(mg/L)	460	460	460	0.5	0.5	0.005				0.005

JICA	Chck	Tech	Appr							
Sign										
Date										
CNSL	Dsgn	Chck	Appr							
Sign				Rev	Description	Dsgn	Chck	Appr	Date	
Date					REVISION					

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR MANSOURA CO., FOR RESINS AND CHEMICALS PROCESS FLOW DIAGRAM OF W.W.T. DEMONSTRATION PLANT
ISSUED DATE	· SCALE None
DWG NO	IS-BD-15-01 REV. 0

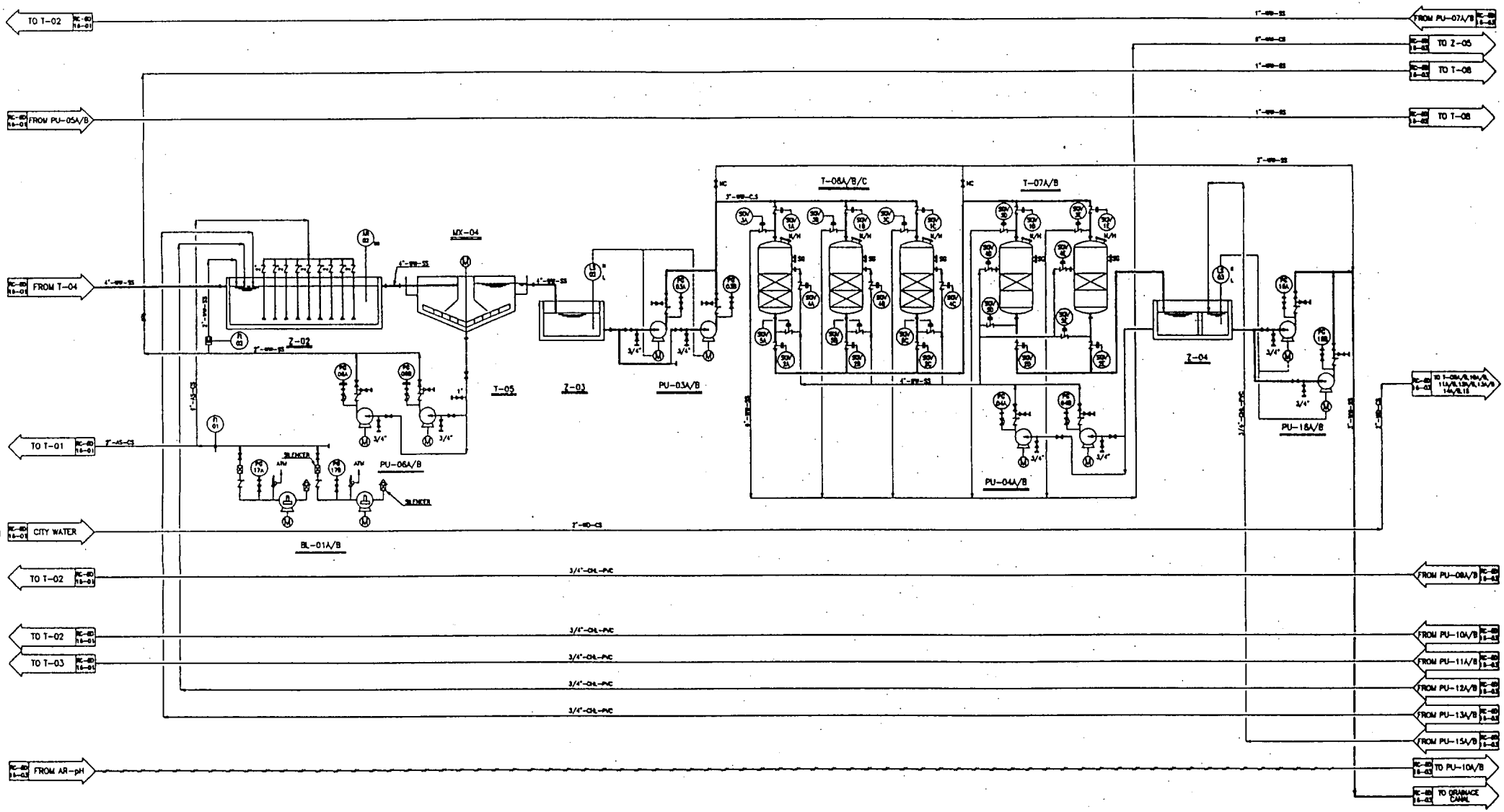


BD - 19

Item.No.	Z-01	PU-01A/B/C	PU-02A/B	PU-05A/B	T-01	T-02	T-03	T-04	MX-01	MX-02	MX-03
Service	Waste Water Pit	Raw Water Pump	Coagulation Tank Feed Pump	Sludge Pump	Equalization Tank	Coagulation Tank	Flocculation Tank	Sedimentation Tank	Rapid Mixer	Flocculator	Sedimentation Tank Rake
Size(m)	4.0*x4.0-x2.0*x16m³	30m³/hx20mx3.7kW	30m³/hx20mx2.2kW	0.5m³/hx15mx1.5kW	5.81*x6.105*x120m³	1.43*x2.0*x3m³	2.88*x3.0*x15m³	4.0*x4.5*x45m³	0.4kw	2.2kw	0.4kw
Design Press (Mpa)	Full Water	——	——	——	Full Water	Full Water	Full Water	Full Water	——	——	——
Design Temp.	40	40	38		40	38	38	35	38	38	35
Material/Type	R.C/Open Basin	SCS14/Centrifugal	SCS13/Centrifugal	SCS13/Centrifugal	C.S/Epoxy Coating	C.S/Epoxy Coating	C.S/Epoxy Coating	C.S/Epoxy Coating	SUS304/Vertical	SUS304/Vertical	C.S/Epoxy Coating

JICA	Chck	Tech	Appr						
Sign									
Date									
CNSL	Dsgn	Chck	Appr						
Sign				Rev	Description	Dsgn	Chck	Appr	Da
Date					REVISION				

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR MANSOURA CO., FOR RESINS AND CHEMICALS BASIC DESIGN OF WASTE WATER ENGINEERING FLOW DIAGRAM(1/3)
ISSUED DATE	SCALE: Horiz



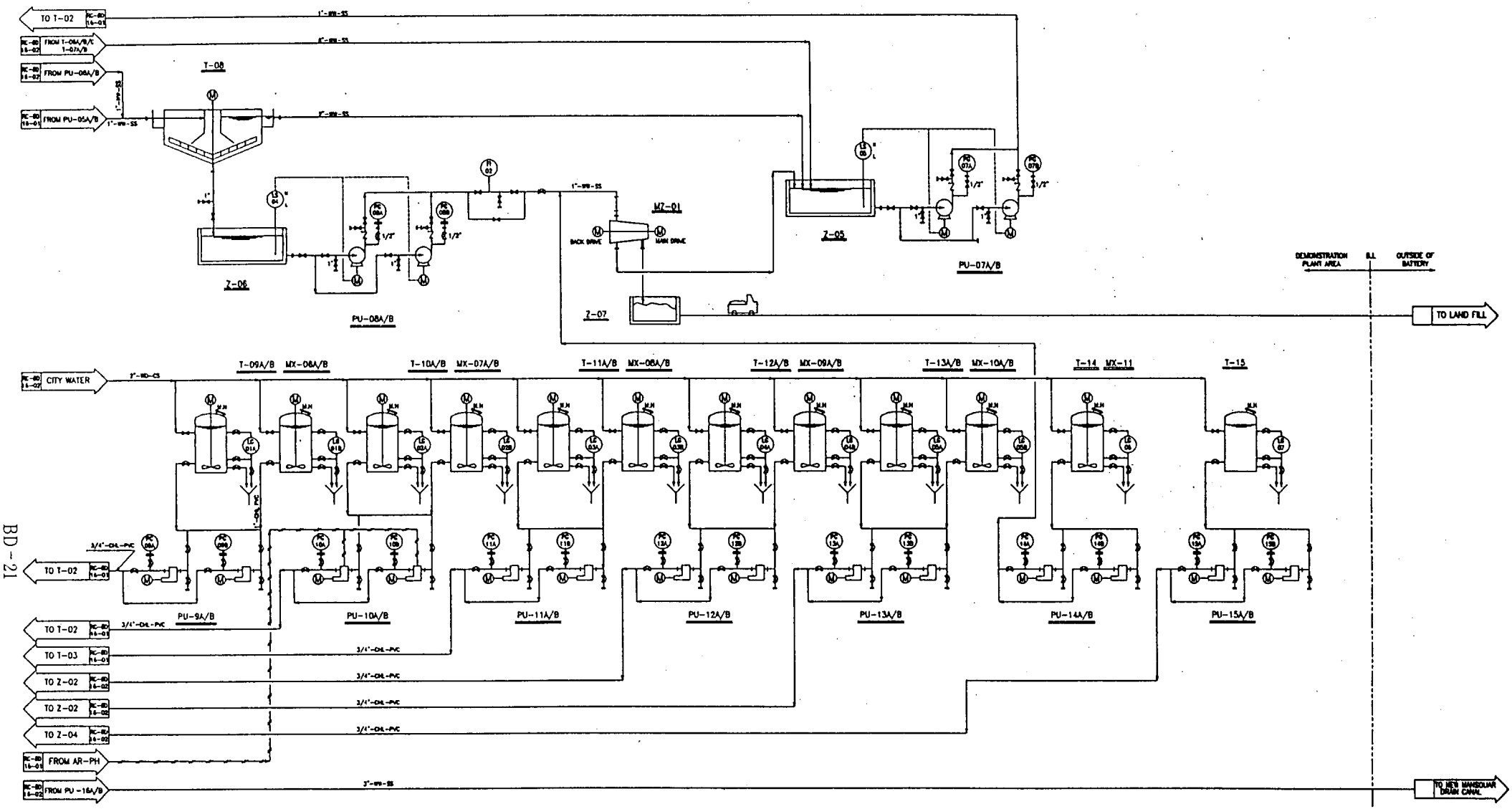
BD - 20

Item.No.	MX-04
Service	Clarifier Rake
Size(m)	0.75kW
Design Press (kpa)	——
Design Temp.	35
Material/Type	Vertical

Item.No.	Z-02	Z-03	Z-04	T-05	T-06A/B/C	T-07A/B	PU-03A/B	PU-04A/B	PU-06A/B	PU-16A/B	B-01A/B
Service	Aeration Pond	Clarified Water Pond	Treated/Sterilizing Water Pond	Clarifier	Sand Filter	Activated Carbon Filter	Filter Feed Pump	Backwash Pump	Return Sludge Pump	Treated Water Pump	Blower
Size(m)	14.0*x20.0*x5.8*x1400m³	2.0*x2.0*x3.0*x8m³	3.0*x4.25*x3.0*x30m³	7.0*x4.0*x120m³	1.6*x4.0*x8m³	1.6*x4.5*x9m³	30m³/Hx25mx3.7kW	80m³/Hx15mx5.5kW	15m³/Hx15mx2.2kW	30m³/Hx12mx2.2kW	226m³/min0.5kg/cm² Gx37kw
Design Press (kpa)	Full Water	Full Water	Full Water	Full Water	0.3	0.3	——	——	——	——	——
Design Temp.	35	35	35	35	35	35	35	35	35	35	Amb.
Material/Type	R.C/Open	R.C/Open	R.C/Open	C.S/Epoxy Coating	C.S/Epoxy Coating	C.S/Epoxy Coating	SCS13/Centrifugal	SCS13/Centrifugal	SCS13/Centrifugal	SCS13/Centrifugal	FC/Root Type

JICA	Chck	Tech	Appr						
Sign									
Date									
CNSL	Dsgn	Chck	Appr						
Sign				Rev	Description	Dsgn	Chck	Appr	Date
Date					REVISION				

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR MANSOURA CO., FOR RESINS AND CHEMICALS BASIC DESIGN OF WASTE WATER ENGINEERING FLOW DIAGRAM(2/3)
ISSUED DATE	SCALE: None
DWG NO	RC-BD-16-02 REV. 0

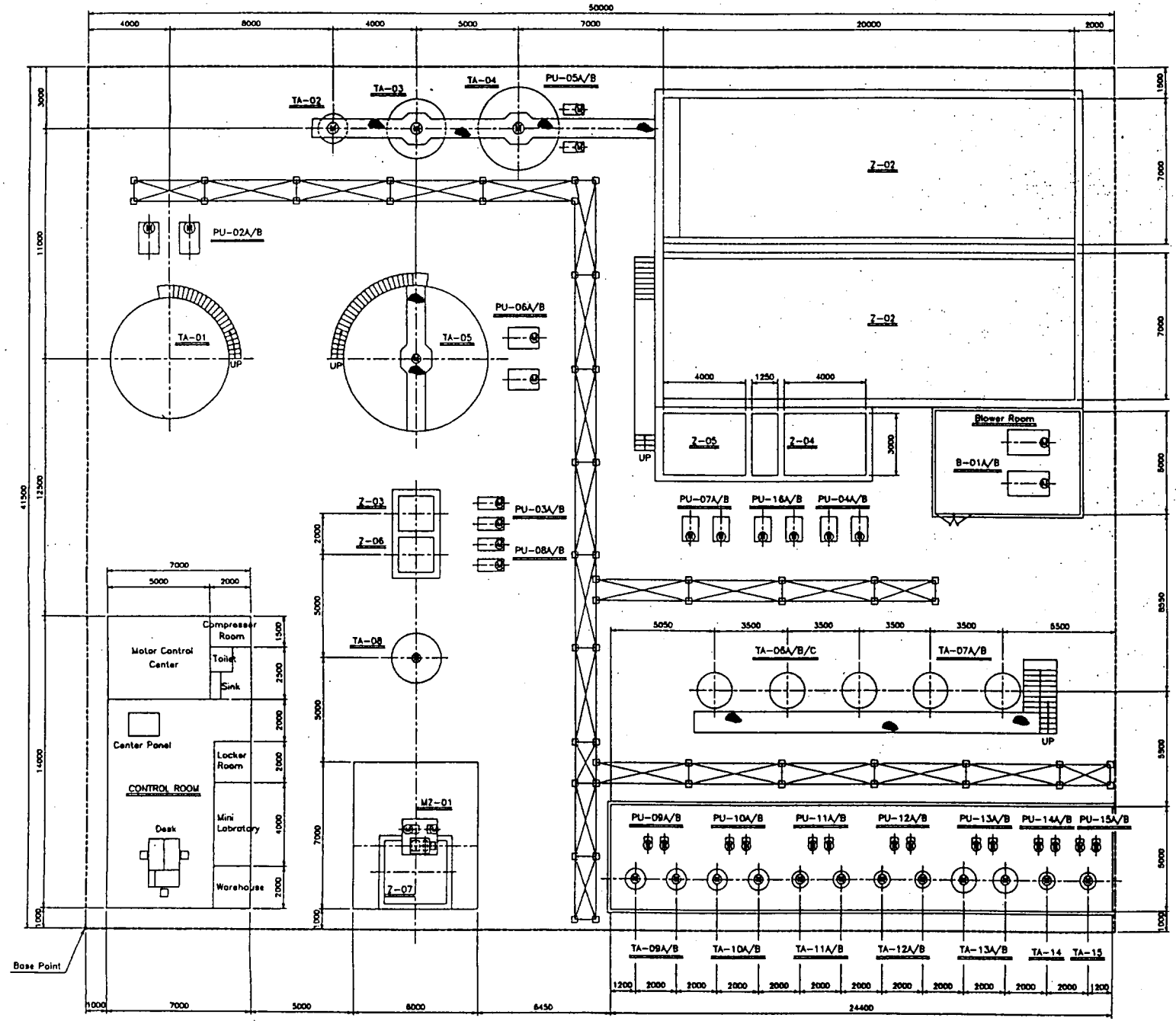


Item No.	PU-09A/B	PU-10A/B	PU-11A/B	PU-12A/B	PU-13A/B	PU-14A/B	PU-15A/B	MX-06A/B	MX-07A/B	MX-08A/B	MX-09A/B	MX-10A/B	MX-11
Service	Coagulant Pump	Lime Pump	Polymer-A Pump	Phosphate Pump	Urea Pump	Polymer -B Pump	NaOCl Pump	Coagulant Tank Mixer	Lime Tank Mixer	Polymer-A Tank Mixer	Phosphate Tank Mixer	Urea Tank Mixer	Polymer-B Tank Mixer
Size(m)	7L/hr×0.3Mpa×0.4kW	10L/hr×0.3Mpa×0.4kW	3L/hr×0.3Mpa×0.4kW	5L/hr×0.3Mpa×0.4kW	15L/hr×0.3Mpa×0.4kW	1L/hr×0.3Mpa×0.4kW	2L/hr×0.3Mpa×0.4kW	0.2kW	0.2kW	0.1kW	0.1kW	0.4kW	0.1kW
Design Press (kw)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	——	——	——	——	——	——
Design Temp.	25	25	25	25	25	25	25	25	25	25	25	25	25
Material/Type	Reciprocating	Reciprocating		Reciprocating	Reciprocating	Reciprocating	Reciprocating	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical

Item No.	T-08	T-09A/B	T-10A/B	T-11A/B	T-12A/B	T-13A/B	T-14	T-15	M7-01	Z-07	Z-06	Z-05	PU-08A/B	PU-07A/B
Service	Thickener	Coagulant Tank	Lime Tank	Polymer-A Tank	Phosphate Tank	Urea Tank	Polymer-B Tank	NaOCl Tank	Dehydrator	Dewatered Sludge Storage	Sludge Pond	Wastewater Pond	Centrifuge Feed Pump	Backwashed Water Pump
Size(m)	2.4*×4.0*×13m³	1.0*×1.3*×1m³	1.0*×1.3*×1m³	0.8*×1.0*×0.5m³	0.8*×1.0*×0.5m³	1.2*×1.8*×2m³	0.8*×1.0*×0.5m³	0.8*×1.0*×0.5m³	45kg-Dry/hr7.5kW+1.5kW	3.0*×3.0*×2.0*×14m³	2.0*×2.0*×3.0*×8m³	3.0*×4.0*×3.0*×30m³	1.5m³/hr×15mx1.5kW	2m³/hr×13mx1.5kW
Design Press (kw)	Full Water	Full Water	Full Water	Full Water	Full Water	Full Water	Full Water	Full Water	——	——	Full Water	Full Water	——	——
Design Temp.	35	25	25	25	25	25	25	25	35	——	35	35	35	35
Material/Type	CS/Epoxy Coating	FRP	FRP	FRP	FRP	FRP	FRP	FRP	SCS13/Centrifuge	——	R.C/Open	R.C/Open	Cast/Rugal	Centrifugal

JICA	Chck	Tech	Appr						
Sign									
Date									
CNSL	Dsgn	Chck	Appr						
Sign				Rev	Description	Dsgn	Chck	Appr	Date
Date				REVISION					

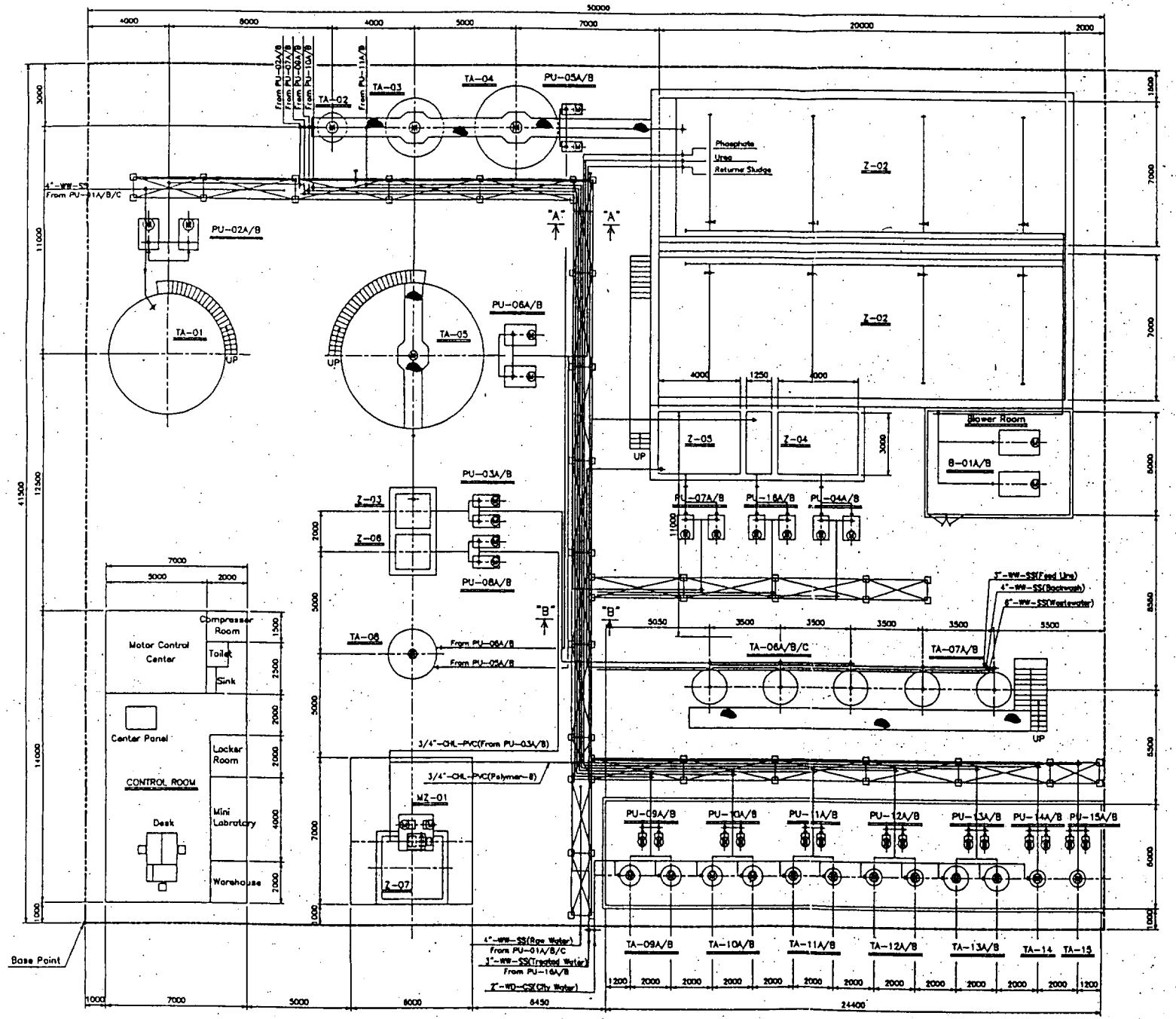
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR MANSOURA CO., FOR RESINS AND CHEMICALS BASIC DESIGN OF WASTE WATER ENGINEERING FLOW DIAGRAM(3/3)
ISSUED DATE	SCALE: None
DWG NO	RC-BD-16-03 REV. 0

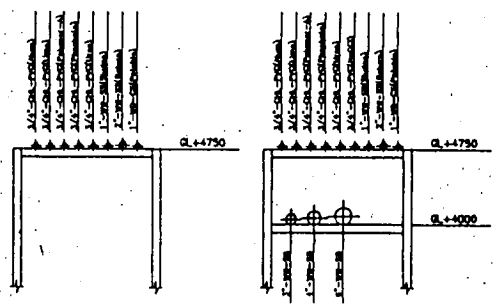


Equipment NO.	Service	No. Req'd	Type of Equipment
TA-01	Equalization Tank	1	581 P ø18.5m*11.0m
TA-02	Coagulation Tank	1	1440 P 3000*3.5m
TA-03	Flocculation Tank	1	2880 P 3000*11.5m
TA-04	SedimentationTank	1	4000 P 4500*4.5m
TA-05	Clarifier	1	7000 P 4000*11.0m
TA-06A/B/C	Sand Filter	3	1800 P 4000*4m
TA-07A/B	Activated Carbon Filter	2	1800 P 4000*4m
TA-08	Thickener	1	2400 P 4000*11.5m
TA-09A/B	Coagulant Tank	2	1800 P 1300*1m
TA-10A/B	Lime Tank	2	1800 P 1300*1m
TA-11A/B	Polymer-A Tank	2	800 P 1000*0.8m
TA-12A/B	Phosphate Tank	2	800 P 1000*0.8m
TA-13A/B	Urea Tank	2	1800 P 1800*3m
TA-14	Polymer-B Tank	1	600 P 1000*0.1m
TA-15	NaOH Tank	1	600 P 1000*0.1m
Z-01	Waste Water Pit	1	4000*4000*2000*16m
Z-02	Aeration Pond	1	14000 P 20000*38000*5 1400m
Z-03	Clarified Water Pond	1	7000*12000*3000*84m
Z-04	Treated Water Basin Water P	1	3000*4000*3000*36m
Z-05	Waste Water Pond	1	3000*4000*3000*36m
Z-06	Sludge Pond	1	7000*12000*3000*84m
Z-07	Dewatered Sludge Storage	1	3000*3000*2000*21.6m
PU-01A/B/C	Raw Water Pump	3	30m³/hr*30m*3.7kw
PU-02A/B	Coagulation Tank Feed Pump	2	30m³/hr*15m*2.2kw
PU-03A/B	Filter Feed Pump	2	30m³/hr*25m*3.7kw
PU-04A/B	Backwash Pump	2	80m³/hr*15m*5.5kw
PU-05A/B	Sludge Pump	2	0.5m³/hr*15m*1.5kw
PU-06A/B	Return Sludge Pump	2	1.5m³/hr*15m*1.5kw
PU-07A/B	Backwashed Water Pump	2	2m³/hr*12m*1.5kw
PU-08A/B	Centrifuge Feed Pump	2	1.5m³/hr*15m*1.5kw
PU-09A/B	Coagulant Pump	2	1L/hr*0.5kg/cm²0.4kw
PU-10A/B	Lime Pump	2	18L/hr*0.5kg/cm²0.4kw
PU-11A/B	Polymer-A Pump	2	3L/hr*0.5kg/cm²0.4kw
PU-12A/B	Phosphate Pump	2	3L/hr*0.5kg/cm²0.4kw
PU-13A/B	Urea Pump	2	18L/hr*0.5kg/cm²0.4kw
PU-14A/B	Polymer-B Pump	2	1L/hr*0.5kg/cm²0.4kw
PU-15A/B	NaOH	2	3L/hr*0.5kg/cm²0.4kw
PU-16A/B	Treated Water Pump	2	30m³/hr*15m*2.2kw
B-01A/B	Blower	2	30m³/hr*15m*3.7kw
M2-01	Dehydrator	1	45kg-Dry/hr*7.5kw+1.5kw
MX-01	Rapid Mixer	1	Vertical Type,0.4kw
MX-02	Flocculator	1	Vertical Type,2.2kw
MX-03	Sedimentation Tank Rake	1	Center Drive Type,0.4kw
MX-04	Clarifier Rake	1	Center Drive Type,0.75kw
MX-05	Thickener Rake	1	Center Drive Type,0.4kw
MX-06A/B	Coagulant Tank Mixer	2	Vertical Type,0.2kw
MX-07A/B	Lime Tank Mixer	2	Vertical Type,0.2kw
MX-08A/B	Polymer-A Tank Mixer	2	Vertical Type,0.1kw
MX-09A/B	Phosphate Tank Mixer	2	Vertical Type,0.1kw
MX-10A/B	Urea Tank Mixer	2	Vertical Type,0.4kw
MX-11	Polymer-B Tank Mixer	1	Vertical Type,0.1kw

JICA	Chck	Tech	Appr						
Sign									
Date									
CNSL	Dsgn	Chck	Appr						
Sign				Rev	Description	Dsgn	Chck	Appr	Date
Date					REVISION				

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR MANSOURA CO., FOR RESINS AND CHEMICALS BASIC DESIGN OF WASTE WATER PLOT PLAN
ISSUED DATE	SCALE 1/100
DWG NO	RC-BD-12-01 REV. 0





SECTION "A"-"A"

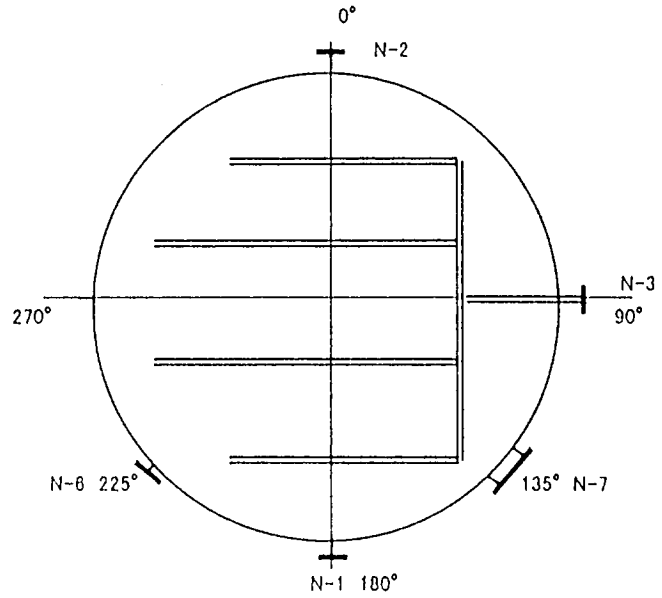
SECTION "B"-"B"

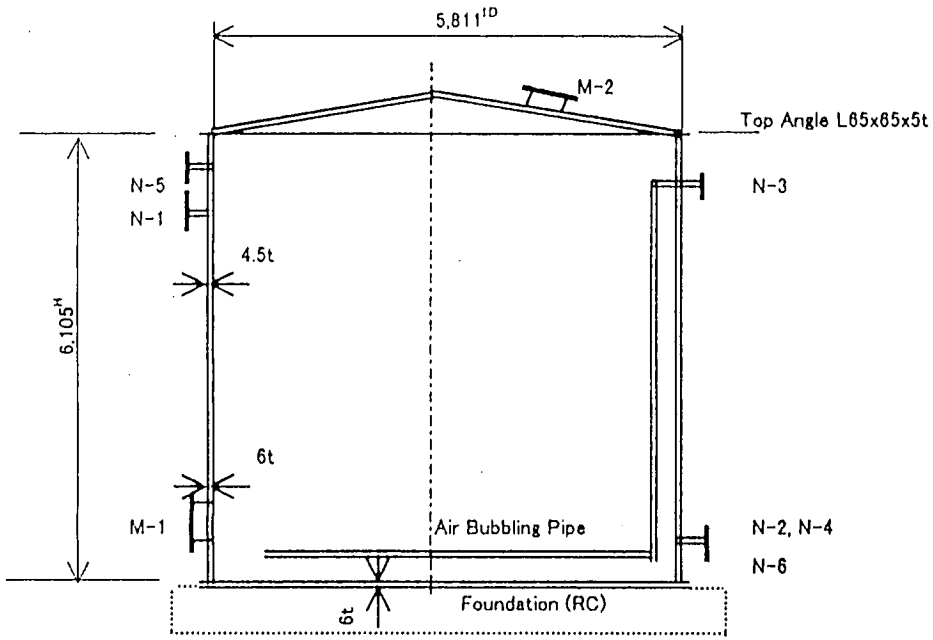
Equipment NO.	Service	No. Req'd	Type of Equipment
TA-01	Equalization Tank	1	5811 m^3 ø15000×10m
TA-02	Coagulation Tank	1	1440 m^3 ø12000×12m
TA-03	Flocculation Tank	1	2880 m^3 ø15000×12m
TA-04	Sedimentation Tank	1	4020 m^3 ø15000×12m
TA-05	Clarifier	1	7000 m^3 ø24000×15000
TA-06A/B/C	Sand Filter	3	1800 m^3 ø2000×12m
TA-07A/B	Activated Carbon Filter	2	1800 m^3 ø2000×12m
TA-08	Thickener	1	2400 m^3 ø4000×12m
TA-09A/B	Coagulant Tank	2	1000 m^3 ±1000×1m
TA-10A/B	Urea Tank	2	1000 m^3 ±1000×1m
TA-11A/B	Polymer-A Tank	2	800 m^3 ±1000×0.8m
TA-12A/B	Phosphate Tank	2	800 m^3 ±1000×0.8m
TA-13A/B	Urea Tank	2	1200 m^3 ±1800×2m
TA-14	Polymer-B Tank	1	800 m^3 ±1000×0.1 m^3
TA-15	NaOCl Tank	1	800 m^3 ±1000×0.1 m^3
I-01	Waste Water Pit	1	4000×4000×2000 m^3×1.6m
I-02	Aeration Pond	1	14400 m^3/000×24000×1400 m^3
I-03	Clarified Water Pond	1	2000×24000×3000 m^3/m
I-04	Treated Raw Boiling Water P	1	3000×1250×3000 m^3×1.5m
I-05	Waste Water Pond	1	3000×4000×3000 m^3×1.5m
I-06	Sludge Pond	1	2000×3000×3000 m^3×2m
I-07	Dewatered Sludge Storage	1	3000×3000×2000 m^3×1.4m
PU-01A/B/C	Raw Water Pump	3	30 m^3/hr×20m×1.7kw
PU-02A/B	Coagulation Tank Feed Pump	2	30 m^3/hr×12m×2.2kw
PU-03A/B	Filter Feed Pump	2	30 m^3/hr×25m×3.7kw
PU-04A/B	Backwash Pump	2	80 m^3/hr×15m×5.5kw
PU-05A/B	Sludge Pump	2	0.3 m^3/hr×15m×1.5kw
PU-06A/B	Return Sludge Pump	2	15 m^3/hr×15m×2.2kw
PU-07A/B	Backwashed Water Pump	2	2 m^3/hr×12m×1.5kw
PU-08A/B	Centrifuge Feed Pump	2	1.3 m^3/hr×15m×1.5kw
PU-09A/B	Coagulant Pump	2	1L/mn×Stroke×0.1kw
PU-10A/B	Urea Pump	2	10L/mn×Stroke×0.4kw
PU-11A/B	Polymer-A Pump	2	3L/mn×Stroke×0.4kw
PU-12A/B	Phosphate Pump	2	3L/mn×Stroke×0.4kw
PU-13A/B	Urea Pump	2	15L/mn×Stroke×0.4kw
PU-14A/B	Polymer-B Pump	2	1L/mn×Stroke×0.4kw
PU-15A/B	NaOCl	2	3L/mn×Stroke×0.4kw
PU-16A/B	Treated Water Pump	2	30 m^3/hr×15m×3.7kw
B-01A/B	Blower	2	30 m^3/hr×15m×3.7kw
MZ-01	Dehydrator	1	45kg-Dry/hr×7.5m×1.5kw
MX-01	Rapid Mixer	1	Vertical Type,0.4kw
MX-02	Flocculator	1	Vertical Type,2.2kw
MX-03	Sedimentation Tank Rake	1	Center Drive Type,0.4kw
MX-04	Clarifier Rake	1	Center Drive Type,0.75kw
MX-05	Thickener Rake	1	Center Drive Type,0.4kw
MX-06A/B	Coagulant Tank Mixer	2	Vertical Type,0.2kw
MX-07A/B	Urea Tank Mixer	2	Vertical Type,0.2kw
MX-08A/B	Polymer-A Tank Mixer	2	Vertical Type,0.1kw
MX-09A/B	Phosphate Tank Mixer	2	Vertical Type,0.1kw
MX-10A/B	Urea Tank Mixer	2	Vertical Type,0.4kw
MX-11	Polymer-B Tank Mixer	1	Vertical Type,0.1kw

JICA	Chck	Tech	Appr						
Sign									
Date									
CNSL	Dsgn	Chck	Appr						
Sign				Rev	Description	Dsgn	Chck	Appr	Date
Date				REVISION					

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR MANSOURA CO., FOR RESINS AND CHEMICALS BASIC DESIGN OF WASTE WATER PIPING PLAN
ISSUED DATE	SCALE 1/100
	REV. 0

BD-23



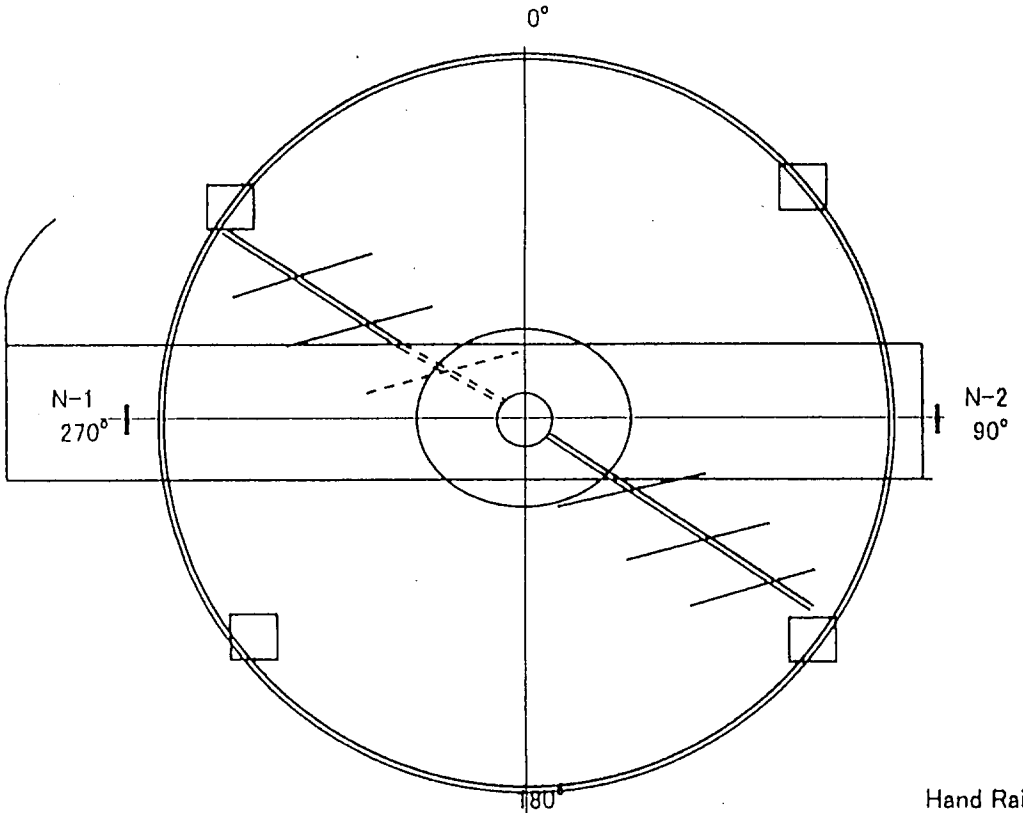


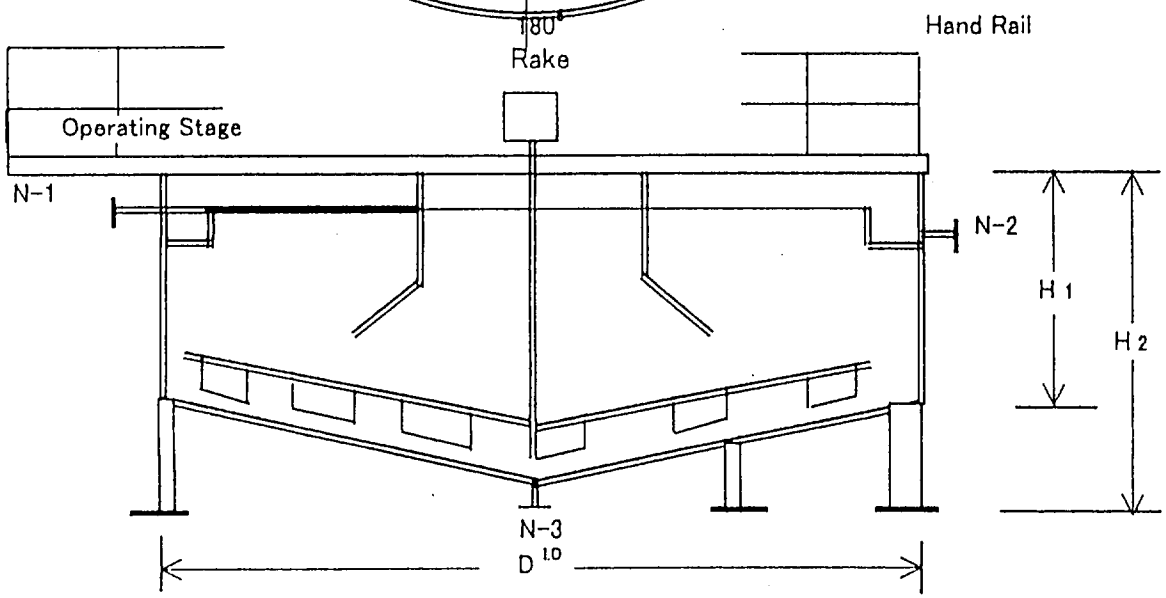
NOTE:
1)Type : Vertical Cylindrical Tank
(Open Top Tank)
2)Materials : Carbon Steel'
inside Epoxy Coating
3)Accessories: Stairway
Inside Ladder
Air Bubbling Tube

Loading Data :
: Empty Weight 9.7 ton
: Full Water 130 ton

No	Name	Size	No	Note
M-2	Manhole	500Φ	1	
M-1	Manhole	500Φ	1	
N-6	Level Instrument	2"	1	
N-5	Over Flow	4"	1	
N-4	Drain	2"	1	
N-3	Bubbling Air Inlet	2"	1	
N-2	Raw Water Outlet	4"	1	
N-1	Raw Water inlet	4"	1	

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY		
TYTLE	FOR: MANSOURA CO.,FOR RESINS AND CHEMICALS 120 m^3 EQUALIZATION TANK (T - 01) WASTEWATER TREATMENT PLANT		
DWG. NO	RC - BD - 22 - SK01	REV.	0





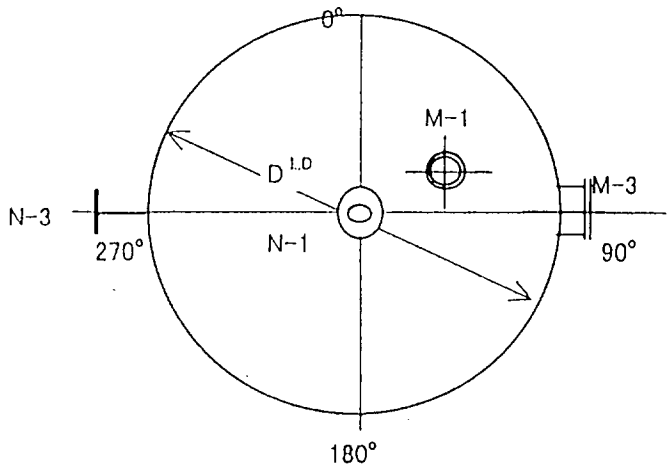
NOTE:
1)Type : Vertical Cylindrical Tank
(Open Top Tank)
2)Materials : Carbon Steel
inside Epoxy Coating
3)Accessories: Stairway
Inside Ladder
Air Bubbling Tube

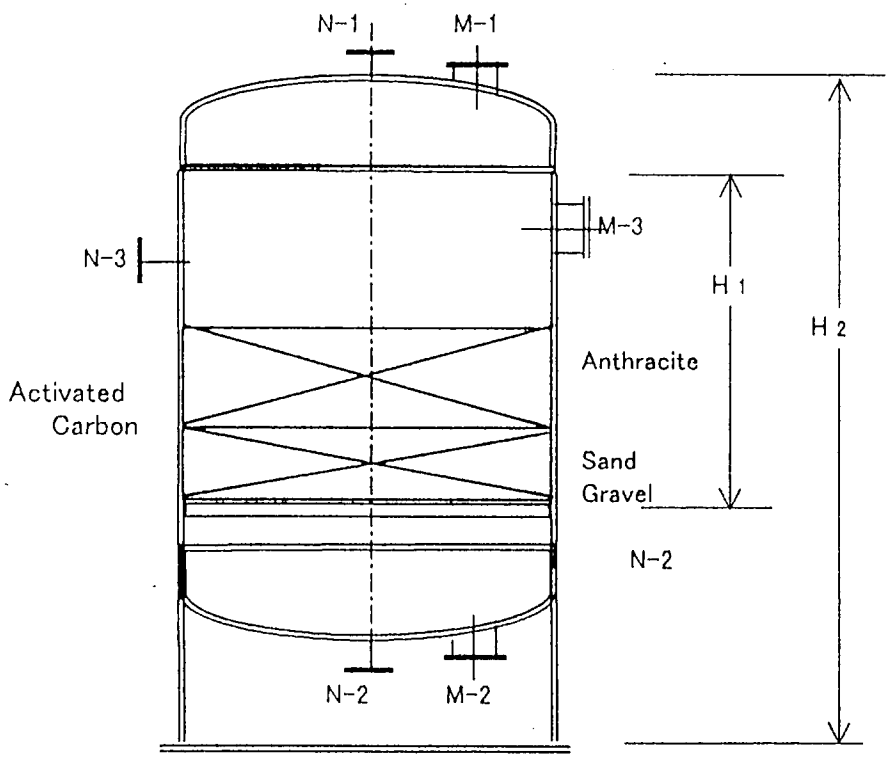
Equuipment No	Service	D	H_1	H_2	W_1	W_2
T-04	Sedimentation Tank	4,000	3,500	4,500	3.2	48.2
T-05	Clarifier	7,000	3,000	4,000	6.2	126.2
T-08	Thickener	2,400	3,000	4,000	1.5	14.5

W_1 : Empty Weight ton
W_2 : Full Water ton

No	Name	Size	No	Note
N-4				
N-3	Sludge Outlet	2B	1	
N-2	Water Outlet	6B	1	
N-1	Water inlet	6B	1	

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY		
TYTLE	FOR: MANSOURA CO.,FOR RESINS AND CHEMICALS SEDIMENTATION TANK, CLARIFIER & THIKENER WASTEWATER TREATMENT PLANT		
DWG. NO	RC - BD - 22 - SK02	REV.	0





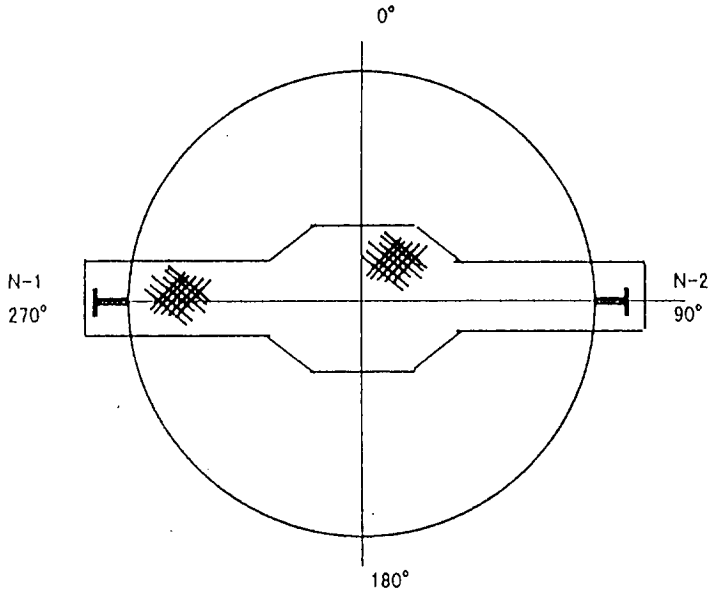
NOTE:
1)Type : Vertical Cylindrical Tank
(Open Top Tank)
2)Materials : Carbon Steel
inside Epoxy Coating
3)Accessories: Stairway
Inside Ladder
Air Bubbling Tube

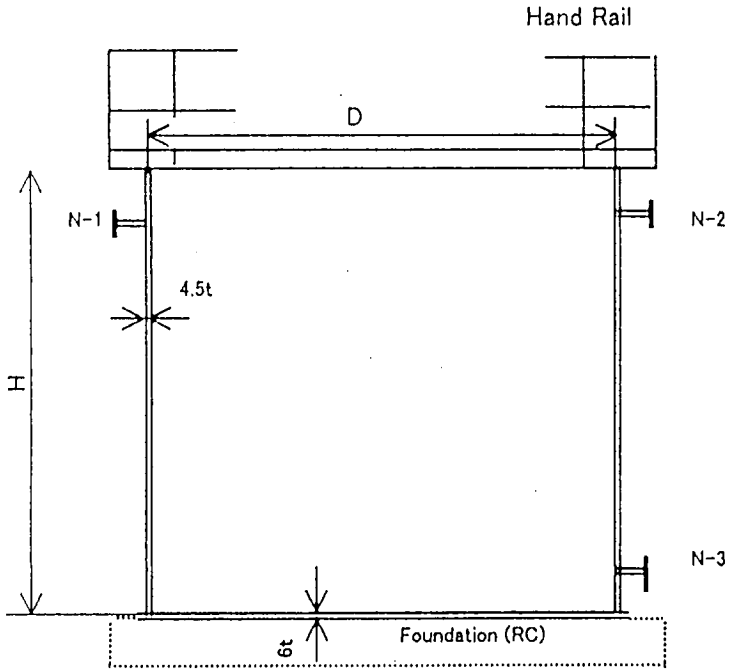
Equuipment No	Service	D	H_1	H_2	W_1	W_2
T-06A/B/C	Sand Filter	1,600	4,000	6,000	8.9	18.5
T-05A/B	Activated Carbon Filter	1,600	4,500	6,500	6.8	17.6

W_1 : Empty Weight ton
W_2 : Full Water ton

No	Name	Size	No	Note
M-3	Manhole	500Φ	1	
M-2	Manhole	500Φ	1	
M-1	Manhole	500Φ	1	
N-3	Surface Wash water	2"	1	
	Inlet			
N-2	Filtered Water Outlet/	4"	1	
	Backwash Water Inlet			
N-1	Clarified W.ater inlet/	6"	1	
	Backwash Waste Outlet			

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY		
TYTLE	FOR: MANSOURA CO.,FOR RESINS AND CHEMICALS SAND FILTER & ACTIVATED CARBON FILTER WASTEWATER TREATMENT PLANT		
DWG. NO	RC - BD - 22 - SK03	REV.	0





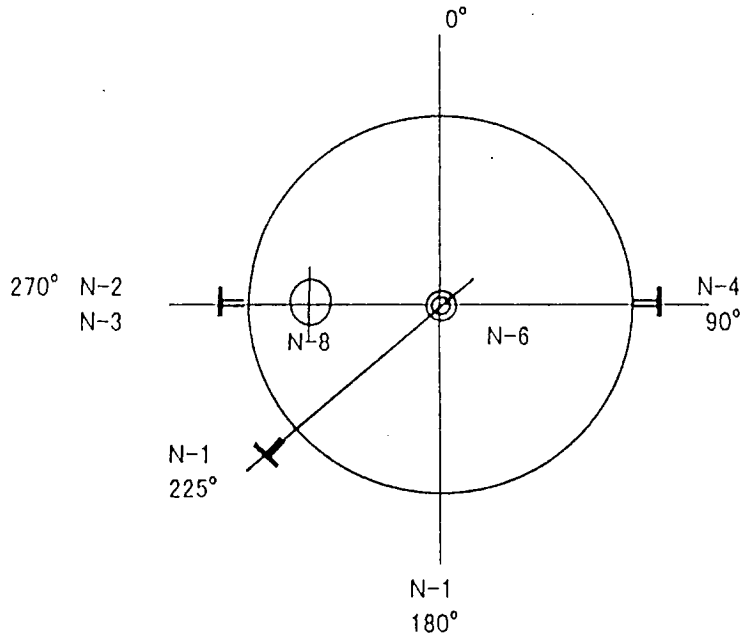
NOTE:
1)Type : Vertical Cylindrical Tank
(Open Top Tank)
2)Materials : Carbon Steel
inside Epoxy Coating
3)Accessories: Stairway

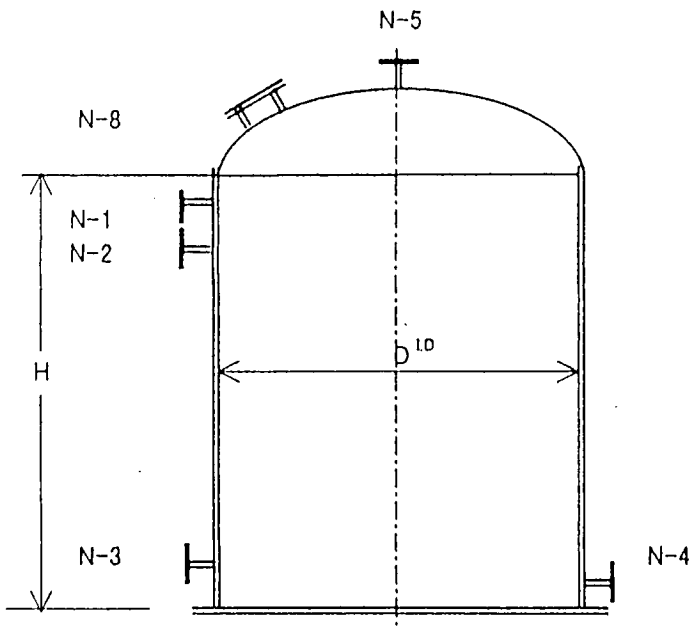
Equuipment No	Service	D	H	W_1	W_2
T-02	Coagulant Tank	1,430	2,000	1	4
T-03	Flocculation Tank	2,800	3,000	3	18

W_1 : Empty Weight ton
W_2 : Full Water ton

No	Name	Size	No	Note
N-3	Drain	1"	1	
N-2	Water Outlet	4"	1	
N-1	Water Inlet	4"	1	

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY		
TYTLE	FOR: MANSOURA CO.,FOR RESINS AND CHEMICALS COAGULATION/FLOCCULATION TANK (T-02/03) WASTEWATER TREATMENT PLANT		
DWG. NO	RC - BD - 22 - SK05	REV.0	





NOTE:
1)Type : Vertical Cylindrical Tank

2)Materials : FRP

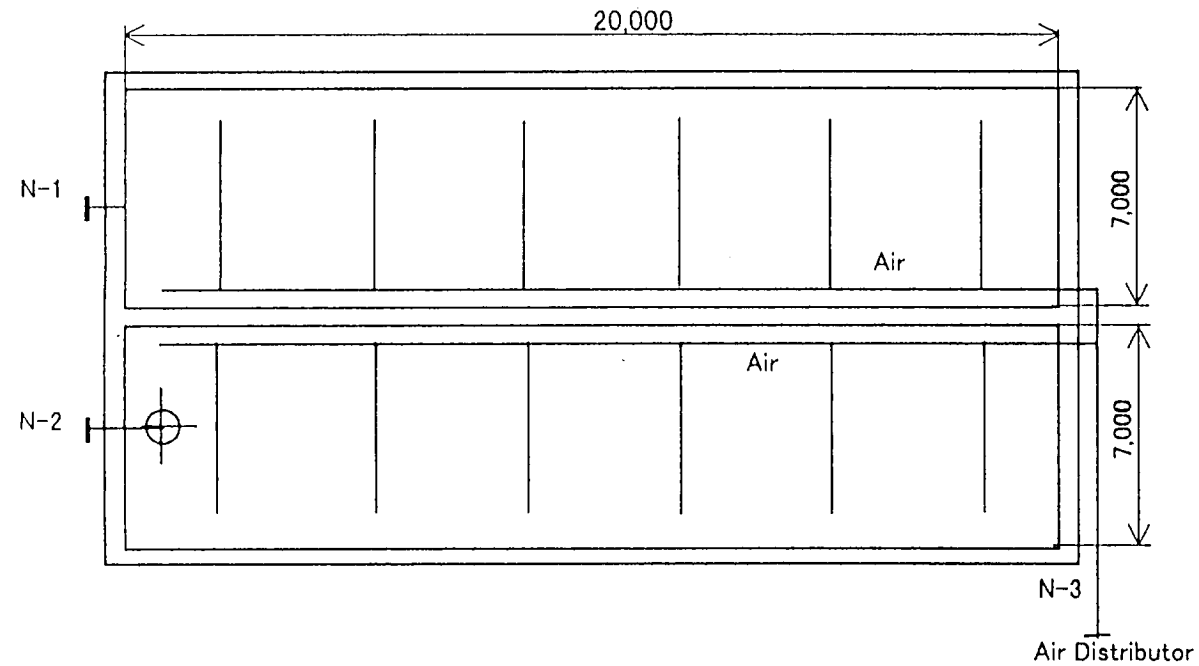
3)Accessories: Level Gage
Man-hole

Equuipment No	Service	D	H_1	H_2	W_1	W_2
T-09A/B	Coagulation Tank	1,000	1,300	6,000	0.06	1
T-10A/B	Lime Tank	1,000	1,300	6,500	0.06	1
T-11A/B	Polymer-A Tank	800	1,000	6,000	0.04	0.5
T-12A/B	Phosphate Tank	800	1,000	6,500	0.04	0.5
T-13A/B	Urea Tank	1,200	1,800	6,000	0.1	2
T-14A/B	Polymer-B Tank	800	1,000	6,500	0.04	0.5
T-15A/B	NaOCl Tank	800	1,000	6,000	0.04	0.5

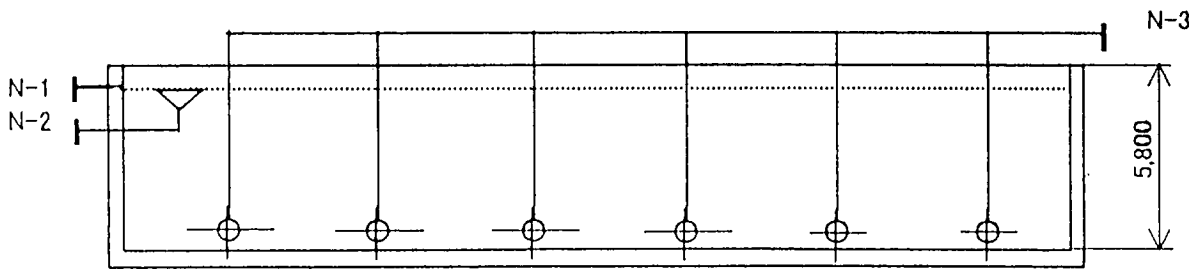
W_1 : Empty Weight ton
W_2 : Full Water ton

No	Name	Size	No	Note
M-1	Manhole	400Φ	1	
N-5	Vent	1"	1	
N-4	Drain	1"	1	
N-3	Level Gage	3/4"	1	
N-2	Level Gage	3/4"	1	
N-1	Water Inlet	1"	1	

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY		
TYTLE	FOR: MANSOURA CO.,FOR RESINS AND CHEMICALS CHEMICAL TANK WASTEWATER TREATMENT PLANT		
DWG. NO	RC - BD - 22 - SK04	REV.	0

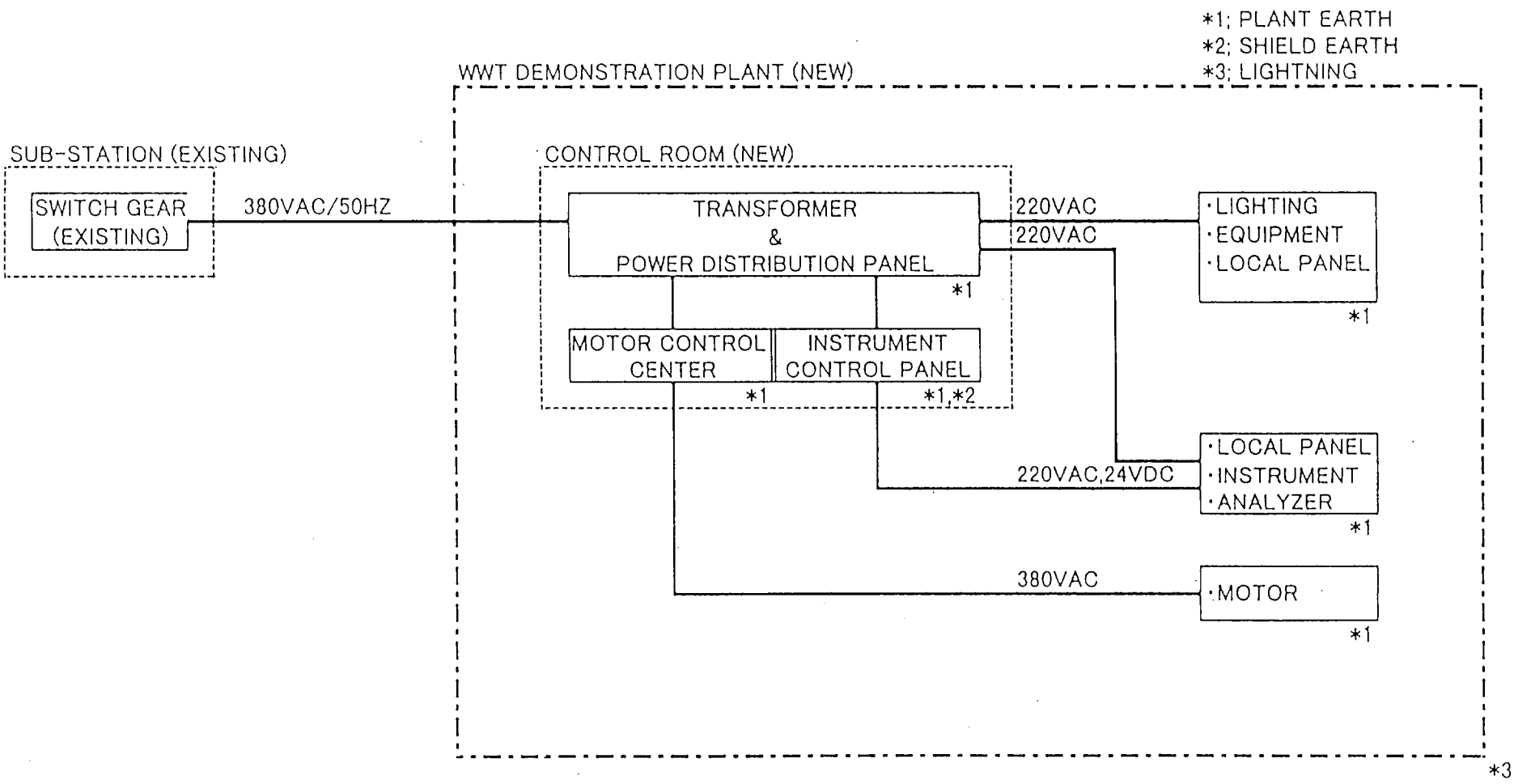


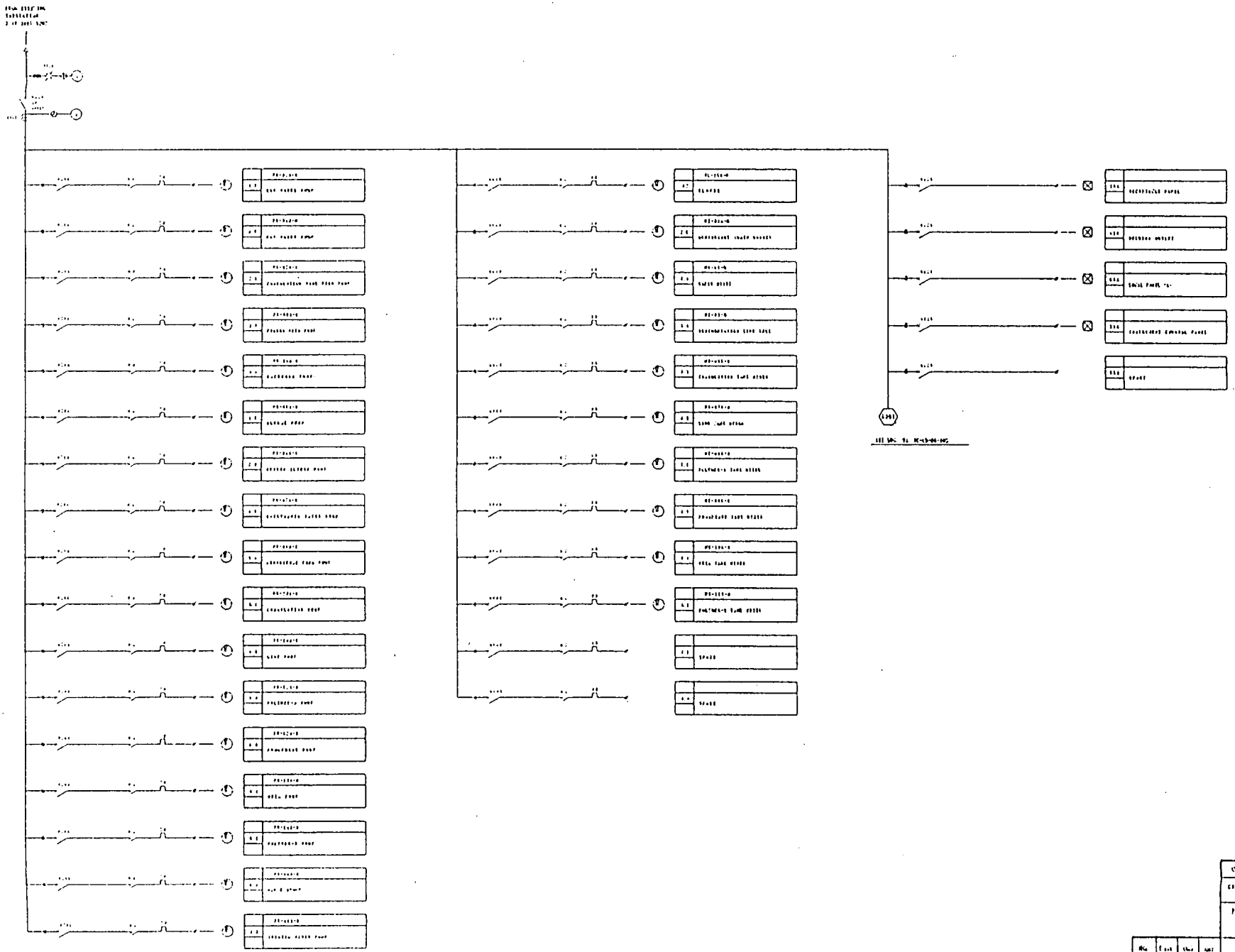
Material : Reinforced Concrete
Accessories : Operating Stage
Stairway
Air Distributig pipings

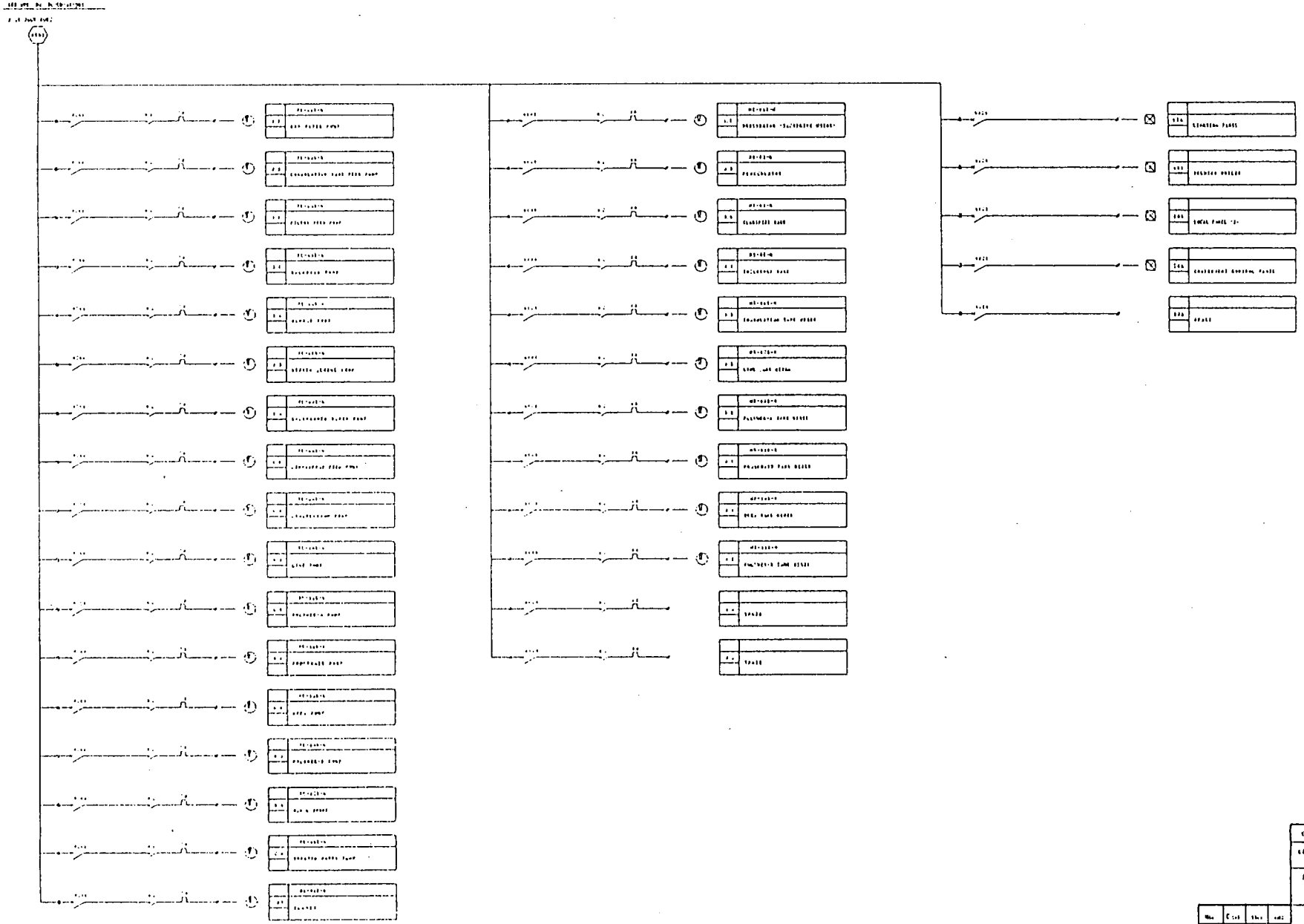


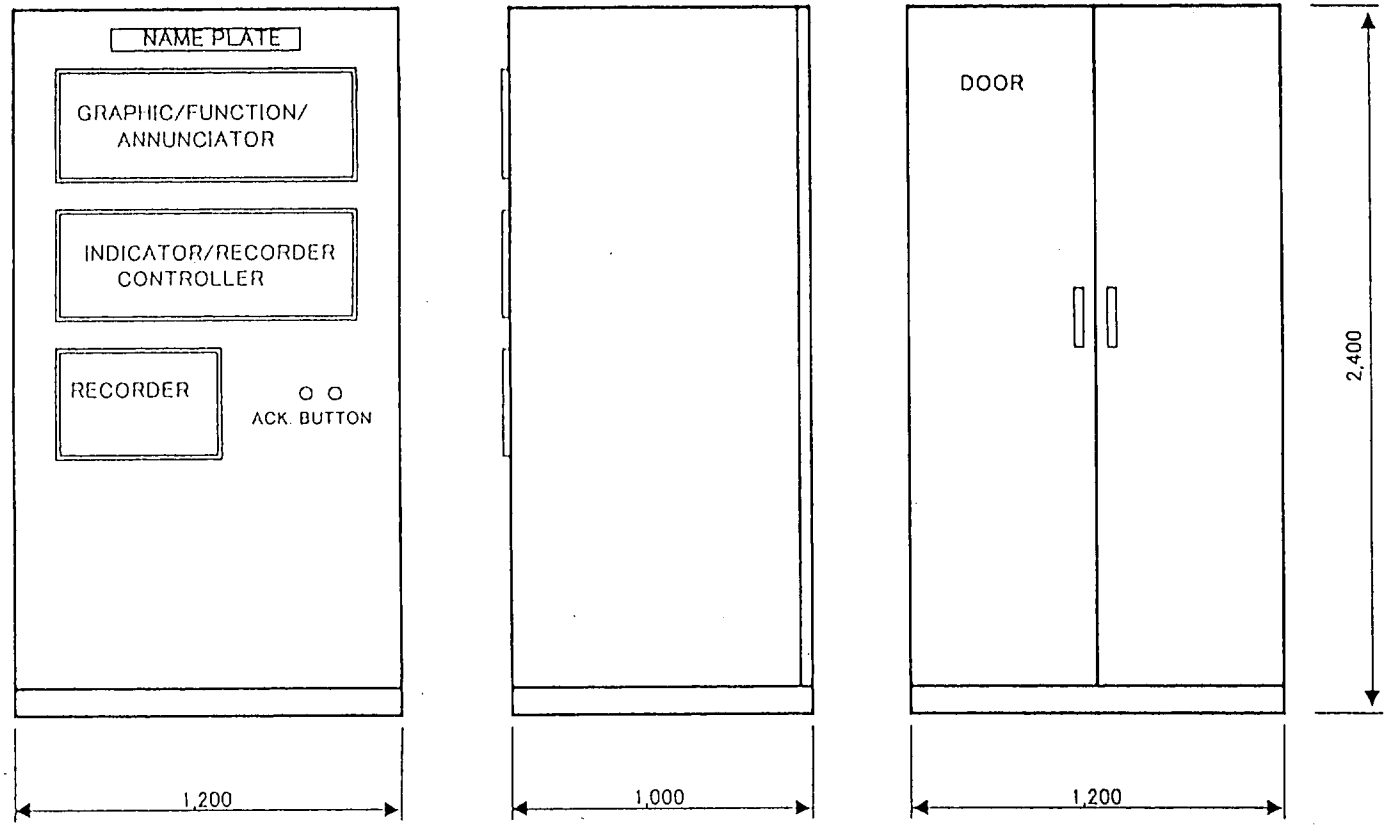
N-3	Drain	1"	1	
N-2	Water Outlet	4"	1	
N-1	Water inlet	4"	1	
No	Name	Size	No	Note
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY			
TYTLE	FOR: MANSOURA CO.,FOR RESINS AND CHEMICALS AERATION POND (Z-02) WASTEWATER TREATMENT PLANT			
DWG. NO	RC - BD - 22 - SK08		REV.0	

CONFIGURATION OF ELECTRICAL & INSTRUMENTATION SYSTEM FOR DEMONSTRATION PLANT









PANEL SPECIFICATION

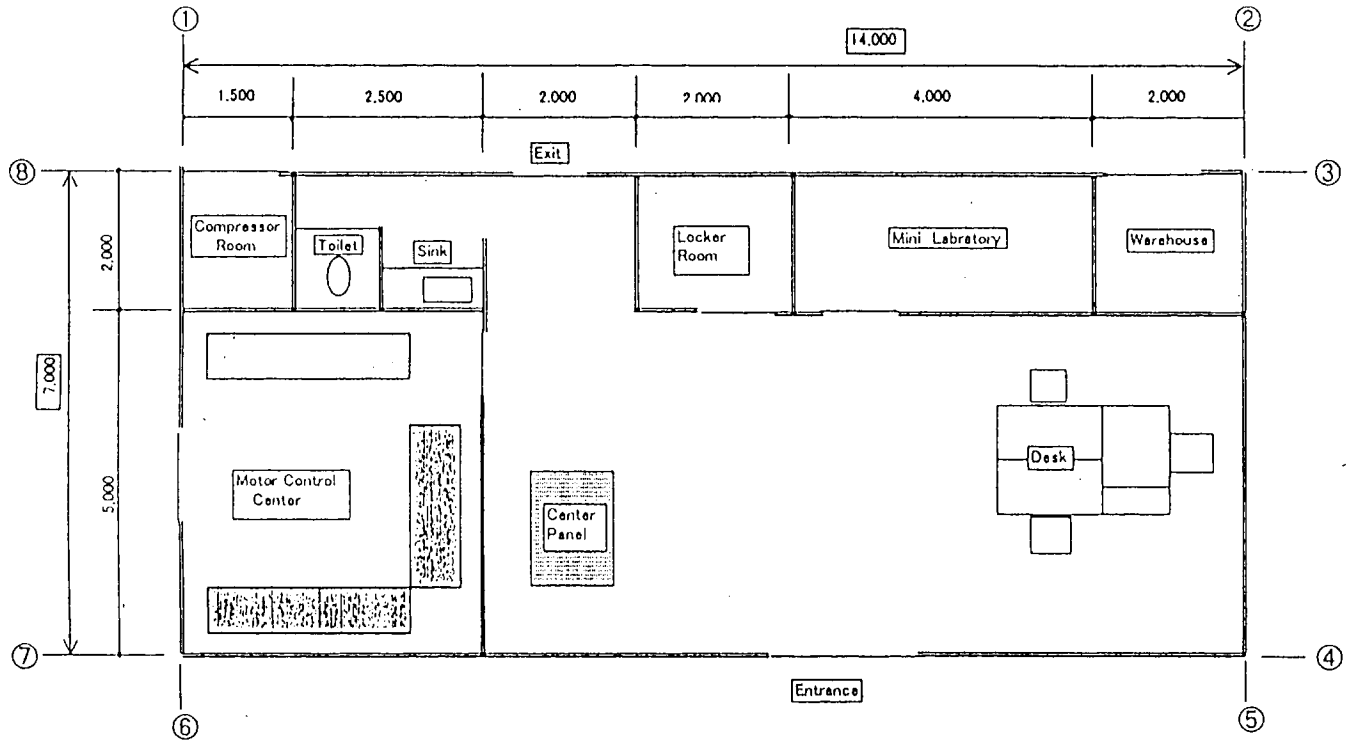
1. SELF STANDING TYPE FOR INDOOR
2. STRUCTURE : 3.2MM STEEL
3. COLOR : YELLOW GREEN
4. CABLE ENTRY : BOTTOM

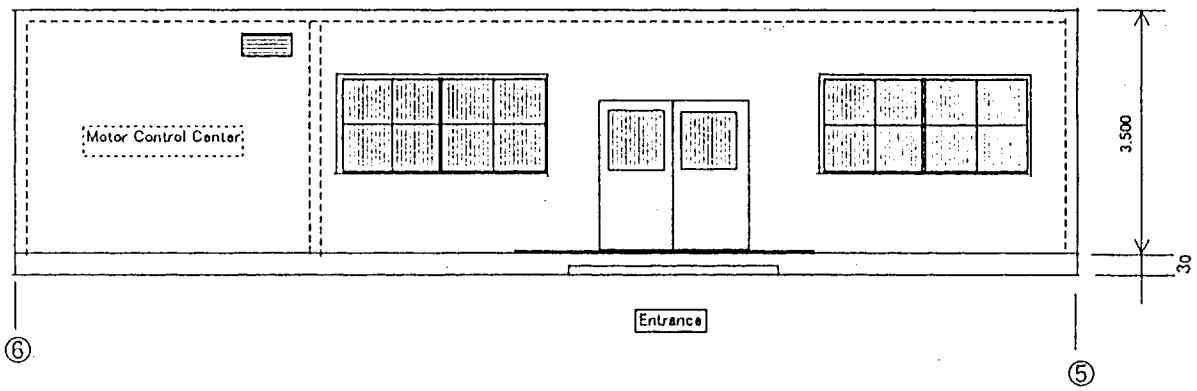
CONTROL PANEL OUTLINE FOR DEMONSTRATION PLANT

(SCALE : NONE)
(UNIT: MM)

JICA	Chck	Tech.	Appr						
Sign									
Date									
CNSLT	Dsgn	Chck	Appr						
Sign				No.	Descri	Dsgn	Chc	Appr	Date
Date	Dec.'99			REVISION					

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR MANSOURA CO. FOR RASINS AND CHEMICALS CONTROL PANEL OUTLINE FOR W.W.T. DEMONSTRATION PLANT
ISSUED DATE	SCALE: NONE
DWG NO	RC - BD - 70 - 1 REV. 0





Mfd.	Chck	Tech	Appr						
Num									
Date									
Cht.	Dsgn	Chck	Appr						
Num				Rev	Description	Dsgn	Chck	Appr	Date
Date									

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY		
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION		
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT		
TITLE	FOR Nominated Factory W.W.T Cotrol Room		
ISSUED		SCALE	None
DWG	00-BD-56-01	REV	0

EQUIPMENT LIST for Mansoura Co. for Resins and Chemicals

DOC. NO. RC-BD-L1

CLIENT :Japan International Cooperation Agency

PROJECT :The Study on Industrial Waste Water Plant

PLANT :Monsoura Co. for Resins and Chemicals

WASTE W. :End of Pipe(Sanitary Waste W.+ Waste Water)

REV	1	2	3	MADE	
BY				CKD	
APVE				APVE	
DATE				DATE	06.16.99

Equipment NO.	Service	No. Req'd	Type of Equipment	Remarks
T-01	Equalization Tank	1	Vertical Cylindrical Type	Carbon Steel/Epoxy
			$5,811^{\phi} \times 6,105^{H} \times 120\ m^3$	Coating
T-02	Coagulation Tank	1	Vertical Cylindrical Type	Carbon Steel/Epoxy
			$1,430^{\phi} \times 2,000^{H} \times 3\ m^3$	Coating
T-03	Flocculation Tank	1	Vertical Cylindrical Type	Carbon Steel/Epoxy
			$2,860^{\phi} \times 3,000^{H} \times 15\ m^3$	Coating
T-04	Sedimentation Tank	1	Vertical Cylindrical Type	Carbon Steel/Epoxy
			$4,000^{\phi} \times 4,500^{H} \times 45\ m^3$	Coating
T-05	Clarifier	1	Vertical Cylindrical Type	Carbon Steel/Epoxy
			$7,000^{\phi} \times 4,000^{H} \times 120\ m^3$	Coating
T-06A/B/C	Sand Filter	3	Vertical Cylindrical Type	Carbon Steel/Epoxy
			$1,600^{\phi} \times 4,000^{H} \times 8\ m^3$	Coating
T-07A/B	Activated Carbon Filter	2	Vertical Cylindrical Type	Carbon Steel/Epoxy
			$1,600^{\phi} \times 4,500^{H} \times 9\ m^3$	Coating
T-08	Thickener	1	Vertical Cylindrical Type	Carbon Steel/Epoxy
			$2,400^{\phi} \times 4,000^{H} \times 13\ m^3$	Coating
T-09A/B	Coagulant Tank	2	Vertical Cylindrical Type	FRP
			$1,000^{\phi} \times 1,300^{H} \times 1\ m^3$	
T-10A/B	Lime Tank	2	Vertical Cylindrical Type	FRP
			$1,000^{\phi} \times 1,300^{H} \times 1\ m^3$	
T-11A/B	Polymer-A Tank	2	Vertical Cylindrical Type	FRP
			$800^{\phi} \times 1,000^{H} \times 0.5\ m^3$	
T-12A/B	Phosphate Tank	2	Vertical Cylindrical Type	FRP
			$800^{\phi} \times 1,000^{H} \times 0.5\ m^3$	

Note:

EQUIPMENT LIST for Mansoura Co. for Resins and Chemicals

DOC. NO. RC-BD-L1 (2/5)

CLIENT :Japan International Cooperation Agency

PROJECT :The Study on Industrial Waste Water Plant

PLANT :Monsoura Co. for Resins and Chemicals

WASTE W. :End of Pipe(Sanitary Waste W. + Waste Water)

REV	1	2	3	MADE	
BY				CKD	
APVE				APVE	
DATE				DATE	

Equipment NO.	Service	No. Req'd	Type of Equipment	Remarks
T-13A/B	Urea Tank	2	Vertical Cylindrical Type	FRP
			1,200$^{\phi}$×1,800^{H}×2 m^3	
T-14	Polymer-B	1	Vertical Cylindrical Type	FRP
			800$^{\phi}$×1,000^{H}×0.1 m^3	
T-15	NaOCl Tank	1	Vertical Cylindrical Type	FRP
			800$^{\phi}$×1,000^{H}×0.1 m^3	
Z-01	Waste Water Pit	1	Vertical Square Type	Reinforced Concrete
			4,000^{W}×4,000^{L}×2,000^{H}×16 m^3	
Z-02	Aeration Pond	1	Vertical Rectangular Type	Reinf. Coating
			14,000^{W}×20,000^{L}×5,800^{H}×1,400 m^3	
Z-03	Clarified Water Pond	1	Vertical Square Type	Reinforced Concrete
			2,000^{W}×2,000^{L}×3,000^{H}×8 m^3	
Z-04	Treated/Sterilizing Water P	1	Vertical Rectangular Type	Reinforced Concrete
			3,000^{W}×5,250^{L}×3,000^{H}×30 m^3	
Z-05	Waste Water Pond	1	Vertical Rectangular Type	Reinforced Concrete
			3,000^{W}×4,000^{L}×3,000^{H}×30 m^3	
Z-06	Sludge Pond	1	Vertical Square Type	Reinforced Concrete
			2,000^{W}×2,000^{L}×3,000^{H}×8 m^3	
Z-07	Dewatered Sludge Storage	1	Vertical Square Type	Reinforced Concrete
			3,000^{W}×3,000^{L}×2,000^{H}×14 m^3	

Note:

EQUIPMENT LIST for Mansoura Co. for Resins and Chemicals

DOC. NO. RC-BD-L1 (3/5)

CLIENT :Japan International Cooperation Agency

PROJECT :The Study on Industrial Waste Water Plant

PLANT :Monsoura Co. for Resins and Chemicals

WASTE W. :End of Pipe(Sanitary Waste W. + Waste Water)

REV	1	2	3	MADE	
BY				CKD	
APVE				APVE	
DATE				DATE	

Equipment NO.	Service	No. Req'd	Type of Equipment	Remarks
PU-01	Raw Water Pump	3	Submergible Type	SCS14/SCS14
A/B/C			30 m^3/h×20 m×3.7 kW	
PU-02A/B	Coagulation Tank Feed Pump	2	Horizontal Centrifugal Type	SCS13/SCS13
			30 m^3/h×12 m×2.2 kW	
PU-03A/B	Filter Feed Pump	2	Horizontal Centrifugal Type	SCS13/SCS13
			30 m^3/h×25 m×3.7 kW	
PU-04A/B	Backwash Pump	2	Horizontal Centrifugal Type	SCS13/SCS13
			80 m^3/h×15 m×5.5 kW	
PU-05A/B	Sludge Pump	2	Horizontal Centrifugal Type	SCS13/SCS13
			0.5 m^3/h×15 m×1.5 kW	
PU-06A/B	Return Sludge Pump	2	Horizontal Centrifugal Type	SCS13/SCS13
			15 m^3/h×15 m×2.2 kW	
PU-07A/B	Backwashed Water Pump	2	Horizontal Centrifugal Type	SCS13/SCS13
			2 m^3/h×12 m×1.5 kW	
PU-08A/B	Centrifuge Feed Pump	2	Horizontal Centrifugal Type	SCS13/SCS13
			1.5 m^3/h×15 m×1.5 kW	
PU-09A/B	Coagulant Pump	2	Reciprocating Type	SCS14/SCS14
			7 L/h×0.3 Mpa×0.4 kW	
PU-10A/B	Lime Pump	2	Reciprocating Type	SCS13/SCS13
			10 L/h×0.3 MPa×0.4 kW	
PU-11A/B	Polymer-A Pump	2	Reciprocating Type	SCS13/SCS13
			3 L/h×0.3 MPa×0.4 kW	
PU-12A/B	Phosphate Pump	2	Reciprocating Type	SCS13/SCS13
			5 L/h×0.3 MPa×0.4 kW	

Note:

EQUIPMENT LIST for Mansoura Co. for Resins and Chemicals

DOC. NO. RC-BD-L1 (4/5)

CLIENT :Japan International Cooperation Agency

PROJECT :The Study on Industrial Waste Water Plant

PLANT :Monsoura Co. for Resins and Chemicals

WASTE W. :End of Pipe(Sanitary Waste W. + Waste Water)

REV	1	2	3	MADE	
BY				CKD	
APVE				APVE	
DATE				DATE	

Equipment NO.	Service	No. Req'd	Type of Equipment	Remarks
PU-13A/B	Urea Pump	2	Reciprocating Type	SCS13/SCS13
			15 L/h×0.3 MPa×0.4 kW	
PU-14A/B	Polymer-B Pump	2	Reciprocating Type	SCS13/SCS13
			1 L/h×0.3 MPa×0.4 kW	
PU-15A/B	NaClO	2	Reciprocating Type	PVC/PVC
			2 L/h×0.3 MP×0.4 kW	
PU-16A/B	Treated Water Pump	2	Horizontal Centrifugal Type	SCS13/SCS13
			30 m^3/h×12 m×2.2 kW	
B-01A/B	Blower	2	Root Type	FC/FC
			22 Nm^3/min×0.05 MPa×37 kW	
MZ-01	Dehydrator	1	Centrifuge Type	SCS13/SCS13
			45 kg-Dry/h×7.5 kW+1.5 kW	
			Sharples/Super-D-Canter	
MX-01	Rapid Mixer	1	Vertical Type, 0.4 kW	SUS304
MX-02	Flocculator	1	Vertical Type, 2.2 kW	SUS304
MX-03	Sedimentation Tank Rake	1	Center Drive Type, 0.4 kW	Carbon Steel
				/Epoxy Coating
MX-04	Clarifier Rake	1	Center Drive Type, 0.75 kW	Carbon Steel
				/Epoxy Coating
MX-05	Thickener Rake	1	Center Drive Type, 0.4 kW	Carbon Steel
				/Epoxy Coating
MX-06A/B	Coagulant Tank Mixer	2	Vertical Type, 0.2 kW	SUS304
MX-07A/B	Lime Tank Mixer	2	Vertical Type, 0.2 kW	SUS304
MX-08A/B	Polymer-A Tank Mixer	2	Vertical Type, 0.1 kW	SUS304
MX-09A/B	Phosphate Tank Mixer	2	Vertical Type, 0.1 kW	SUS304

Note:

EQUIPMENT LIST for Mansoura Co. for Resins and Chemicals

DOC. NO. RC-BD-L1

CLIENT :Japan International Cooperation Agency

PROJECT :The Study on Industrial Waste Water Plant

PLANT :Monsoura Co. for Resins and Chemicals

WASTE W. :End of Pipe(Sanitary Waste W.+ Waste Water)

REV	1	2	3	MADE	
BY				CKD	
APVE				APVE	
DATE				DATE	

Equipment NO.	Service	No. Req'd	Type of Equipment	Remarks
MX-10A/B	Urea Tank Mixer	2	Vertical Type, 0.4 kW	SUS304
MX-11A/B	Polymer-B Tank Mixer	2	Vertical Type, 0.1 kW	SUS304

Note:

INSTRUMENT LIST for Mansoura Co. for Resins and Chemicals

DOC. NO. :RC-BD-L2-(1/3) (1/3)

CLIENT :Japan International Cooperation Agency

PROJECT :The Study on Industrial W. W. Pollution Control

PLANT :Monsoura Co. for Resins and Chemicals

WASTE W. :End of Pipe(Sanitary Waste W.+ Waste Water)

REV	1	2	3	MADE	
BY				CKD	
APVE				APVE	
DATE				DATE	DEC. 16.'99

Equipment NO.	Service	No. Req'd	Type of Equipment	Remarks
AR-01	WW, T-02 Coagulation T. Out	1	pH 4～10	
			pH Analyzer	C.P.
AR-02	WW, Z-02 Aeration Pond	1	0～10 mg/L	
			Disolved Oxygen Analyzer	C.P.
FIC-01	Sedimentation line	1	10 m^3/h～50 m^3/h	
			Flow Indicating Controller	
FI-01	AS, BL-01A/B Blower Outlet	1	15 Nm^3/min～30 Nm^3/min	
			Flow Meter	
FI-02	WW, Z-02 Aeration Pond Inlet	1	5 m^3/h～30 m^3/h	
			Magnetic Flow Meter	
FI-03	WW, PU-08A/B Feed Pump Out.	1	0.5 m^3/h～3 m^3/h	
			Flow Meter	
LS-01	WW, Z-01 Waste Water Pit	1	500 mm～1,000 mm	
			Level Switch HH, H, L	
LC-01	WW, T-01 Equalization Tank	1	1,000 mm～4,500 mm	
			Level Controller	
LI-01	WW, T-01 Equalization Tank	1	500 mm～5,500 mm	
			Level Indicator	
LS-02	WW, Z-03 Clarified Water Pond	1	1,000 mm～1,500 mm	
			Level Switch H, L	
LS-03	CHL, Z-04 Treated Water Pond	1	1,000 mm～2,000 mm	
			Level Switch H, L	
LS-04	WW, Z-06 Sludge Pond	1	500 mm～2,000 mm	
			Level Switch H, L	
LS-05	WW, Z-05 Wastewater Pond	1	500 mm～2,500 mm	
			Level Switch H, L	

Note: C.P. = Center Panel Mount

L.P. = Local Panel Mount

INSTRUMENT LIST for Mansoura Co. for Resins and Chemicals

DOC. NO. :RC-BD-L2-(2/3)

CLIENT :Japan International Cooperation Agency

PROJECT :The Study on Industrial W. W. Pollution Control

PLANT :Monsoura Co. for Resins and Chemicals

WASTE W. :End of Pipe(Sanitary Waste W.+ Waste Water)

(2/3)

REV	1	2	3	MADE	
BY				CKD	
APVE				APVE	
DATE				DATE	

Equipment NO.	Service	No. Req'd	Type of Equipment	Remarks
LG-01A/B	T-09A/B Coagulant Tank	2	Tubular	
			Level Gage	
LG-02A/B	T-10A/B Lime Tank	2	Tubular	
			Level Gage	
LG-03A/B	T-11A/B Polymer-A Tank	2	Tubular	
			Level Gage	
LG-04A/B	T-12A/B Phosphate Tank	2	Tubular	
			Level Gage	
LG-05A/B	T-13A/B Urea Tank	2	Tubular	
			Level Gage	
LG-06	T-14 Polymer-B Tank	1	Tubular	
			Level Gage	
LG-07	T-15 NaOCl Tank	1	Tubular	
			Level Gage	
PI-01A/B/C	WW, PU-01A/B/C Outlet	3	Buldon Tube	
			Pressure Indicator	
PI-02A/B	WW, PU-02A/B Outlet	2	Buldon Tube	
			Pressure Indicator	
PI-05A/B	WW, PU-05A/B Outlet	2	Diaphragm	
			Pressure Indicator	
PI-06A/B	WW, PU-06A/B Outlet	2	Diaphragm	
			Pressure Indicator	
PI-17A/B	AS, BL-01A/B Outlet	2	Buldon Tube	

Note: C.P. = Center Panel Mount

L.P. = Local Panel Mount

INSTRUMENT LIST for Mansoura Co. for Resins and Chemicals

(3/3)

DOC. NO. :RC-BD-L2-(3/3)

CLIENT :Japan International Cooperation Agency

PROJECT :The Study on Industrial W. W. Pollution Control

PLANT :Monsoura Co. for Resins and Chemicals

WASTE W. :End of Pipe(Sanitary Waste W.+ Waste Water)

REV	1	2	3	MADE	
BY				CKD	
APVE				APVE	
DATE				DATE	

Equipment NO.	Service	No. Req'd	Type of Equipment	Remarks
PI-03A/B	WW, PU-03A/B Outlet	2	Buldon Tube	
			Pressure Indicattor	
PI-04A/B	WW, PU-04A/B Outlet	2	Buldon Tube	
			Pressure Indicattor	
PI-16A/B	WW, PU-16A/B Outlet	2	Buldon Tube	
			Pressure Indicattor	
PI-08A/B	WW, PU-08A/B Outlet	2	Diaphragm	
			Pressure Indicattor	
PI-07A/B	WW, PU-07A/B Outlet	2	Buldon Tube	
			Pressure Indicattor	
PI-09A/B	Coagulant, PU-09A/B Outlet	2	Diaphragm	
			Pressure Indicattor	
PI-10A/B	Lime, PU-10A/B Outlet	2	Diaphragm	
			Pressure Indicattor	
PI-11A/B	Polymer, PU-11A/B Outlet	2	Diaphragm	
			Pressure Indicattor	
PI-12A/B	Phosphate, PU-12A/B Outlet	2	Diaphragm	
			Pressure Indicattor	
PI-13A/B	Urea, PU-13A/B Outlet	2	Diaphragm	
			Pressure Indicattor	
PI-14A/B	Polymer, PU-14A/B Outlet	2	Diaphragm	
			Pressure Indicattor	
PI-15A/B	NaOCl, PU-15A/B Outlet	2	Diaphragm	
			Pressure Indicattor	

Note: C.P. = Center Panel Mount

L.P. = Local Panel Mount

DOC.NO. : RC-BD-LI

INDUCTION MOTOR LIST

CLIENT : Japan International Cooperation Agency
PROJECT : The Study on Industrial Waste Water Plant
PLANT : Monsoura Co. for Resins and Chemicals
WASTE W. : End of Pipe(Sanitary Waste W. + Waste Water)

REV	1	2	3	MADE	
BY				CKD	
APVE				APVE	
DATE				DATE	

Motor No.	Service	No. Required	Type	Output Estimate	Output Final	Speed Chrst	Revolution	Pole / r.p.m	V-Φ-Hz	Time Rating	Starting Current	Starting Torque	Insulation	Enclose.	Cable	Mounting	Drive	Bearing	Acc.	Location	Color Finish	Remarks
PU-01-A-C-M	Raw Water Pump	3	SC	3.7		C	CW	4 / 1500	380-3-50	C				TEFC		H	D			OD		
PU-02A/B-M	Coagulation Tank Feed Pump	2	SC	2.2		C	CW	4 / 1500	380-3-50	C				TEFC		H	D			OD		
PU-03A/B-M	Filter Feed Pump	2	SC	3.7		C	CW	4 / 1500	380-3-50	C				TEFC		H	D			OD		
PU-04A/B-M	Backwash Pump	2	SC	5.5		C	CW	4 / 1500	380-3-50	C				TEFC		H	D			OD		
PU-05A/B-M	Sludge Pump	2	SC	1.5		C	CW	4 / 1500	380-3-50	C				TEFC		H	D			OD		
PU-06A/B-M	Return Sludge Pump	2	SC	2.2		C	CW	4 / 1500	380-3-50	C				TEFC		H	D			OD		
PU-07A/B-M	Backwashed Water Pump	2	SC	1.5		C	CW	4 / 1500	380-3-50	C				TEFC		H	D			OD		
PU-08A/B-M	Centrifuge Feed Pump	2	SC	1.5		C	CW	4 / 1500	380-3-50	C				TEFC		H	D			OD		
PU-09A/B-M	Coagulation Pump	2	SC	0.4		C	CW	4 / 1500	380-3-50	C				TEFC		H	G			OD		
PU-10A/B-M	Lime Pump	2	SC	0.4		C	CW	4 / 1500	380-3-50	C				TEFC		H	G			OD		
PU-11A/B-M	Polymer-A Pump	2	SC	0.4		C	CW	4 / 1500	380-3-50	C				TEFC		H	G			OD		
PU-12A/B-M	Phosphate Pump	2	SC	0.4		C	CW	4 / 1500	380-3-50	C				TEFC		H	G			OD		
PU-13A/B-M	Urea Pump	2	SC	0.4		C	CW	4 / 1500	380-3-50	C				TEFC		H	G			OD		
PU-14A/B-M	Polymer-B Pump	2	SC	0.4		C	CW	4 / 1500	380-3-50	C				TEFC		H	G			OD		
PU-15A/B-M	NaOCl Pump	2	SC	0.4		C	CW	4 / 1500	380-3-50	C				TEFC		H	G			OD		
PU-16A/B-M	Treated Water Pump	2	SC	2.2		C	CW	4 / 1500	380-3-50	C				TEFC		H	G			OD		
BL-01A/B-M	Blower	2	SC	37		C	CW	4 / 1500	380-3-50	C				TEFC		H	V			OD		
MZ-01-A-M	Dehydrator (Main Motor)	1	SC	7.5		C	CW	4 / 1500	380-3-50	C				TEFC		H	V			OD		
MZ-01-B-M	Dehydrator (Backdrive Motor)	1	SC	1.5		C	CW	4 / 1500	380-3-50	C				TEFC		H	V			OD		
MX-01-M	Rapid Mixer	1	SC	0.4		C	CW	4 / 1500	380-3-50	C				TEFC		V	G			OD		
MX-02-M	Flocculator	1	SC	2.2		C	CW	4 / 1500	380-3-50	C				TEFC		V	G			OD		
MX-03-M	Sedimentation Tank Rake	1	SC	0.4		C	CW	4 / 1500	380-3-50	C				TEFC		V	G			OD		
MX-04-M	Clarifier Rake	1	SC	0.8		C	CW	4 / 1500	380-3-50	C				TEFC		V	G			OD		
MX-05-M	Thickener Rake	1	SC	0.4		C	CW	4 / 1500	380-3-50	C				TEFC		V	G			OD		
MX-06A/B-M	Coagulation Tank Mixer	2	SC	0.2		C	CW	4 / 1500	380-3-50	C				TEFC		V	G			OD		
MX-07A/B-M	Lime Tank Mixer	2	SC	0.2		C	CW	4 / 1500	380-3-50	C				TEFC		V	G			OD		
MX-08A/B-M	Polymer-A Tank Mixer	2	SC	0.1		C	CW	4 / 1500	380-3-50	C				TEFC		V	G			OD		
MX-09A/B-M	Phosphate Tank Mixer	2	SC	0.1		C	CW	4 / 1500	380-3-50	C				TEFC		V	G			OD		
MX-10A/B-M	Urea Tank Mixer	2	SC	0.4		C	CW	4 / 1500	380-3-50	C				TEFC		V	G			OD		
MX-11A/B-M	Polymer-B Tank Mixer	2	SC	0.1		C	CW	4 / 1500	380-3-50	C				TEFC		V	G			OD		

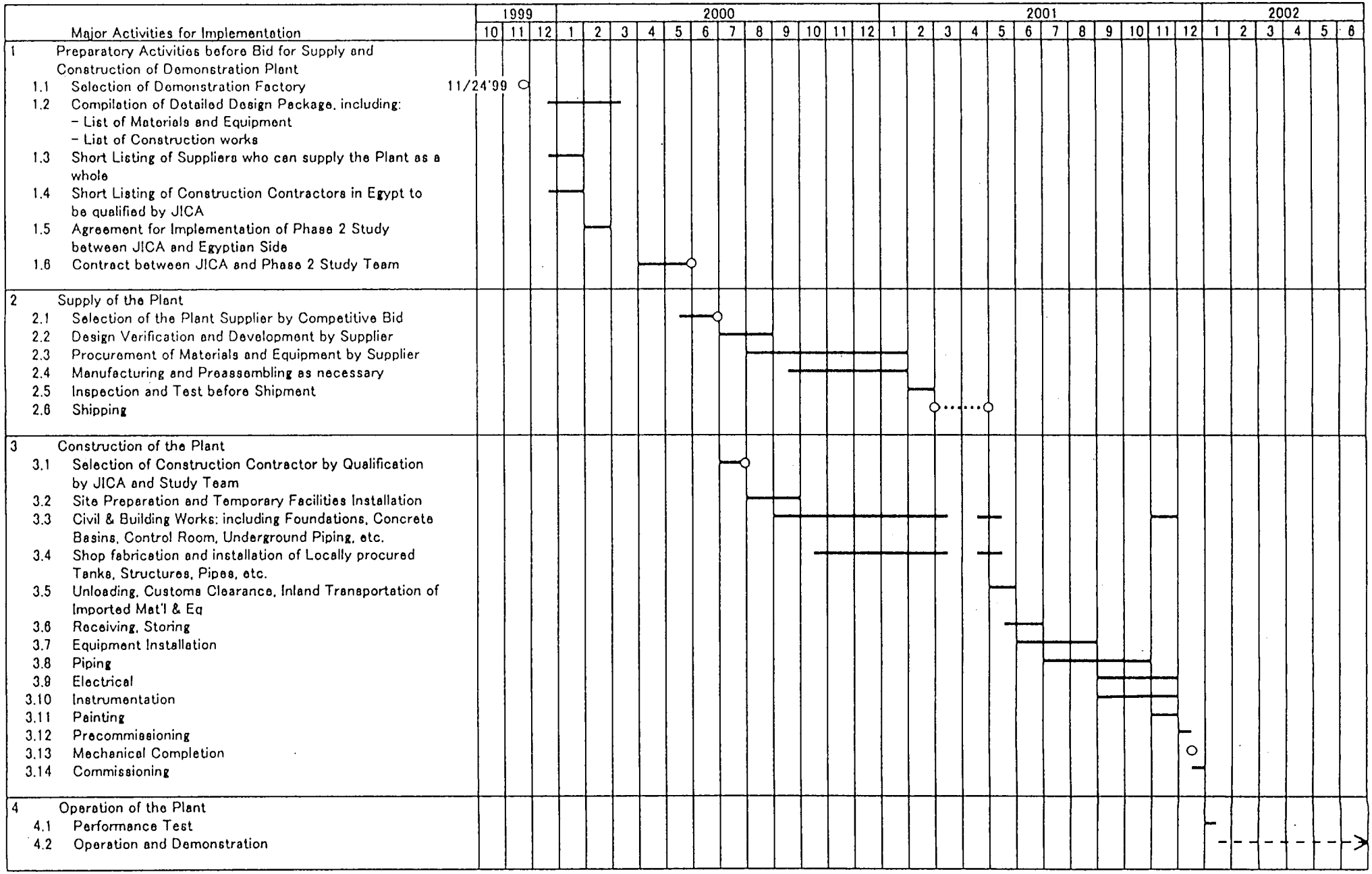
Notes:

1. Type : SC = Squirrel Cage. W = Wound Rotor.
2. Speed : C = Constant. M = Multi. A = Adjustable. V = Varying.
3. Revolution Direction : Direction when viewed from coupling side.
   CW = Clockwise. CCW = Counter-Clockwise.
4. Voltage : Rated Voltage
5. Time Rating : C = Continuouse. ST = Short Time. P = Periodic.
6. Enclosure : TEFC = Totally-Enclosed Fan-Cooled.
   DR = Drip-Proof.
7. Cable(or Wire) : T = Top. B = Bottom. S = Side. H = Hub for conduit tube or flexible tube.
8. Mounting : H = Horizontal. V = Vertical
9. Drive : D = Direct. B = Belt. C = Chain. G = Gear.
10. Location : ID = Indoor. OD = Outdoor.

Overall Schedule for Implementation of Demonstration Plant (Preliminary)

Phase 1 Study

Dec. 11, 1999



Demo-Plant in Mansoula Co., Resins & Chemicals: ESTIMATE SUMMARY & DEMARCATION

(Base Case) 1999.12.16

ITEM	IBL		OBL		Demarcation (Eq.¥1000)	
	Yen Portion (¥1000)	LE Portion (LE)	Yen Portion (¥1000)	LE Portion (LE)	Japanese Side	Egyptian Side
1. Equipment & Materials						
(1) Machinery	50,290					
(2) Piping Materials	10,207					
(3) Instrument'n Eq. & Mtl's	16,950					
(4) Electrical Eq. & Mtl's	12,600					
(5) Testing Eq., Etc.	3,854					
1. Subtotal	93,901	0	0	0	93,901	0
2. Field Construction						
(1) Steel Tanks & Vessels		481,837				
(2) Acid-Proof Lining		0				
(3) Equipment Installation		60,500				
(4) Piping		128,980		17,600		600
(5) Foundations		75,000				0
(6) RC-made Reservoir/Structure		843,750				0
(7) Road/Pavement		30,000				0
(8) Building		361,760				0
(9) Platform, Piperack		30,000				0
(10) Painting		50,000				0
(11) Electrical Works		62,840		11,760		400
(12) Instrumentation		300,000				0
(13) Commissioning/Test		30,000				0
2. Subtotal	0	2,454,667	0	29,360	83,500	1,000
Direct Cost: 1 + 2 (Eq. ¥1000)	177,360		998			
3. Indirect Cost						
(1) Export Packing, Ocean Tra	13,500				13,500	0
(2) Import Duty, Inland Transportation*1		790,000		0		26,900
(3) Temporary Facilities*2		147,000		—	5,000	
(4) Subcontractor Expenses*3		613,667		—	20,900	
(5) Insurance, Social Tax*4		152,000		1,000	5,200	0
(6) Supervisor Expenses	10,000				10,000	
3. Subtotal	23,500	1,702,667	0	1,000	54,500	26,900
All Total: 1 + 2 + 3	117,401	4,157,334	0	30,360	231,901	27,900
All Total (Eq. ¥1000)	117,401	141,400	0	1,000		
IBL/OBL Total (Eq. ¥1000)	258,801		1,000			
Total Cost	259,801				231,901	27,900

*1 : (日本調達資材費+輸出梱包·海上輸送費) x25%
IBL=264,500千円x25%=66,125千円=1,945,000LE
OBL=9,500千円x25%=2,375千円=69,900LE

*2 : 現地工事費x6%=6,560,000LEx0.06=393,600LE

*3 : 現地工事費x25%=6,560,000LEx0.25=1,640,000LE

*4 : 1+2 (Superviser Feeを除く) x2.7%
IBL=7,142千円(210,000LE)+177,000LE=387,000LE
OBL=257千円(7,600LE)+30,500LE=38,100LE

Costs are Demarcated to Egyptian Side.

Unit Cost for Estimation of W.W.T. Demonstration Plant (Reference)

Factory Name: Mansoura Co. for Resins and Chemicals.
Design Case: Basic Design

1. Major Equipment

Equipment Name	Unit Cost [x10^{3}Yen]	Note
(1) Acid water pumps	600	Material: SCS
(2) Clarifier Rake	10,000	1 set
(3) Sedimentation Tank rake	8,000	1 set
(4) Thickener Rake	6,000	1 set
(5) Dehydrator	6,000	3 sets
(6) Motor Control Center	13,500	
(7) Center Control Panel	3,000	1 set

2. Field Work

Work Item	unit	unit Cost[LE]	Note
(1) Site Preparation	[m^2]	8	
(2) Civil (Earth Work)	[m^3]	34	
(3) RC Work	[m^3]	1,500	Foundation, Water Basin
(3) Storage Tank	[ton]	3,430	Equalization Tank, Chemical tank Neutralization Tanks
(4) Structural Steel	[ton]	2,000	Pipe rack, Operating Stage
(5) Equipment Installation	[ton]	400	Pumps, Clarifier rakes, Dehydrator
(6) Piping	[ton]	3,970	Except valves
	[in-m]	30	Except valves
(7) Painting	[m^2]	50	
(8) Local Building	[m^2]	2,600	W.W.T Control Room
(9) Electrical	[cable-m]	3	

Running Cost-Mansoura Co., Resins and chemicals

1999.11.23
T.Yasukawa

* Unit cost is not fixed yet

Items	Treating Capacity (m^3/h)	Feeding Ratio (mg/L)	Consump. (kg/h)	Unit Cost (LE/kg)	Cost-1 (LE/h)	Cost-2 (LE/day)	Cost-3 LE/year)	Unit Cost (LE/m^3)	Remarks
1 Chemical Cost									
1) Alum ($Al_2(SO_4)_2 \cdot 18H_2O$)	30	30	0.9	0.3	0.27	6	2,138	0.009	
* 2) Lime ($Ca(OH)_2$)	30	20	0.6	0.1	0.06	1	475	0.002	
3) Polymer-A (Anionic or Cationic)	30	0.3	0.01	27	0.24	6	1,925	0.008	
4) Polymer-B (Anionic or Cationic)	11 kg/h	1%	0.11	27	2.97	71	23,522	—	
5) $CO(NH_2)_2$	30	110	3.3	0.6	1.98	48	15,682	0.066	
* 6) H_3PO_4	30	30	0.9	0.6	0.54	13	4,277	0.018	
7) NaOCl	30	4	0.9	0.385	0.35	8	2,744	0.012	
Sub-Total	—	—	—	—	6.41	154	50,763	0.214	
2 Filter Media	Loading	Loss	Loss/h						
* 1) Anthracite (3 Sets)	4.2 m^3	20 %/year	0.2	1	0.20	5	1,584	0.007	
* 2) Sand (3 Sets)	1.8 m^3	10 %/year	0.1	0.3	0.03	1	238	0.001	
* 3) Activated Carbon (1 Set)	5.0 m^3	14 days	7.4	14.7	108.78	2,611	861,538	3.626	
Sub-Total	—	—	—	—	109.01	2,616	863,359	3.634	
			kWh/d	LE/kWh					
3 Power Consumption			1,244	0.12	6.22	149.23	49,248	0.207	
			m^3/day	m^3					
4 Industrial Water or Potable Water			5	0.528	0.11	2.64	871	0.004	
			Person/d	LE/P/year					
5 Operator	1 Person*3 Shift+1P		4	10,000	5.05	121.21	40,000	0.168	
6 Maintenance Fee	8,984,706				34.03	816.79	269,541	1.134	
(Plant Cost * 3 %/year) 305,480,000/34=8,984,706 LE									
Total Operation Cost	—	—	—	—	160.83	3,859.95	1,273,782	5.36	

Power Consumption

Tag No.	kW	Operation	Consump.
PU-01	3.7	24	88.80
PU-02	2.2	24	52.80
PU-03	3.7	24	88.80
PU-04	5.5	0.5	2.75
PU-05	1.5	24	36.00
PU-06	2.2	24	52.80
PU-07	1.5	24	36.00
PU-08	1.5	8	12.00
PU-09	0.4	24	9.60
PU-10	0.4	24	9.60
PU-11	0.4	24	9.60
PU-12	0.4	24	9.60
PU-13	0.4	24	9.60
PU-14	0.4	24	9.60
PU-15	0.4	24	9.60
PU-16	2.2	24	52.80
B-01	37	24	888.00
MZ-01	9	8	72.00
MX-01	0.4	24	9.60
MX-02	2.2	24	52.80
MX-03	0.4	24	9.60
MX-04	0.75	24	18.00
MX-05	0.4	24	9.60
MX-06	0.2	0.2	0.04
MX-07	0.2	24	4.80
MX-08	0.1	0.2	0.02
MX-09	0.1	0.2	0.02
MX-10	0.4	0.2	0.08
MX-11	0.1	0.2	0.02
Total	—	—	1,554.53 kWh/d

Client: JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

Project Name: THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT

Factory Name: MANSOURA CO. FOR RESINS AND CHEMICALS

BASIC DESIGN

Document Title:

CALCULATION SHEET FOR W.W.T. RECOMMENDABLE PLANT

Issued Date: September 2000

Consultant: JICA STUDY TEAM

CHIYODA DAMES AND MOORE CO.

CHIYODA CORPORATION

1. Object

This design calculation sheet is applied to the study of W.W.T. Recommendation Plant planning for 「Mansoura Co.for Resins and Chemicals 」.

2. Wastewater to be treated

(1) Process Waste Water except Formalin Plant Regeneration Waste and Novolak Resin Solid Resin of Phenol Formaldehyde

The Formalin Plant regeneration Waste and Novolak Resin Solid Resin of Phenol Formaldehyde shall be treated by boiler or incinerator.

(2) Sanitary Waste Water

3. Design Conditions

(1) Waste management system in the Factory should be organized, and operated adequatly under the responsible managers.

(2) Suitable routine works, periodical maintainances should be conducted in the whole company.

4. Contents of Wastewater Treating Facility

(1) Pre-treatment : Equalization Tank

(2) Primary Treatment : Chemical Clarifier

(3) Secondary Treatment : Activated Sludge Treatment including Sludge treatment

(4) Advanced Treatment : Sand Filter and Activated Carbon Filter

5. Design Basis

5.1 Quality and Quantity of Influent Wastewater

Shown on Table-1.

5.2 Quality and Quantity of Treated Water

The Law 48/82 Non potable Surface Water (Industrial) is to Basic Design.

Treated water qualities are shown on Table-1.

Table－1 Design Basis of Wastewater Quality and Quantity

Items		Raw Water	Treated Water	Law48/82
Flow Rate	[m^3/h]	20 ～40	30	—
pH	[-]	6 ～7	6 ～9	6 ～9
SS	[mg/L]	100	< 1	< 50
BOD	[mg/L]	1,300	< 20	< 60
COD	[mg/L]	2,400	< 30	< 100
Oil&Grease	[mg/L]	20	< 1	< 10
Phenol	[mg/L]	460	< 0.005	< 0.005
TDS	[mg/L]	700	< 750	< 2,000
Water Temp.	[℃]	35 ～40	30 ～32	< 35

6 . Unit Design

6.1 Wastewater Collection (Out of Battery)

The waste water of end of pipe is pumped to Equalization Tank.

6.1 .1 Waste Water Pit (Z-01)

(1) Design Condition

1) Flow Rate(Q) : 700 m^3/d = 29.2 m^3/h

Take : 30 m^3/h = 0.50 m^3/min

2) Retention Time : 30 min.

3) Specification : Rectangular、RC(Semi-Underground)、1 set

(2) Sizing

1) Required Volume : 15 m^3

2) Effictive Height : 1 m(take)

3) Required Area : Ac= Q/Ah= 15 m^2

Take : $4{,}000^{W} \times 4{,}000^{L} \times 2{,}000^{H} \times 1$ Set

6.1 .2 Raw water Pump (PU-01A/B/C)

The Raw Water pumps (PU-01A/B/C) are normamally operated with one operation/two standby basis.

If water level in Waste water pit (Z-01) increase to high-high level point (LC-01), the one of two standby pump is automatically started by the level switch, LC-01.

If water level in Waste water pit (Z-01) decrease to high level point (LC-01), the one of two running pumps is automatically stoped by the level switch ,(LC-01). switch, LC-01.

1) Capacity Allowance : 5 % Design Flow Rate 31.5 m^3/h

2) Required Total Head : 20 m (take)

3) Efficiency of pump : 0.7

4) Motor Allowance : 0.9

5) Motor Power : 2.72 kW

Take : 31.5m^3/h x 0.2 Mpa x 3.7 kW×3 Sets

6.2 Equalization Tank

Waste water from end of pipe is storaged in the Equalization Tank (TK-01) for equalization of waste water quantity and quality for further treatment.

6.2 1. Equalization Tank (T-01)

(1) Design Conditions

1) Quality of Wastewater: Shown on Table-2
2) Retention Time : 4 h
3) Specification : Vertical cylindrical、1 set
4) Others : Air bubbling device

Table-2 Quantity and Quality of Wastewater

Items		Raw Water		Equalized W.
Flow Rate	[m^3/h]	20 ~40		30
pH	[-]	6 ~7		6 ~7
SS	[mg/L]	100		100
BOD	[mg/L]	1,300		1,300
COD	[mg/L]	2,400		2,400
Oil&Grease	[mg/L]	20		20
Phenol	[mg/L]	460		460
TDS	[mg/L]	700		700
Water Temp.	[℃]	35 ~40		35 ~40

(2) Sizing

1) Required Volume : 120 m^3
2) Effictive Height : 5 m(take)
3) Required Area : Ac= Q/Ah= 24 m^2 Diameter = 5.53

Take : $5,811^{\phi} \times 6,105^{H}$ (Chiyada Standard Tank)

4) Air Bubbling Device

a) Required Air (design base): 3 $Nm^3/m^2/h$
b) Required Air Quantity: 72 Nm^3/h= 1.2 Nm^3/min(take)

6.2 .2 Coagulation Tank Feed Pump (PU-02A/B)

Two pumps are provided as Coagulation Tank Feed Pumps(PU-2A/B).
One pump is normally in operation and the other pump is standby.

1) Capacity Allowance : 5 % Design Flow Rate 31.5 m^3/h
2) Required Total Head : 12 m (take)
3) Efficiency of pump : 0.7
4) Motor Allowance : 0.9
5) Motor Power : 1.63 kW

Take : 31.5m^3/h x 0.2 Mpa x 2.2 kW×2 Sets

6.3 Chemical Clarifier

(1) Purpose

The function of Chemical Clarifier is to reduce Suspended Solid (SS), free oil and color of the wastewater.

(2) Design Conditions

1) Wastewater : W.W. after equalized in T-01.
2) Capacity : 30 m^3/h
3) Quality of In & outlet of Clarifier: Shown on Table-3.
4) Chemicals : a) Coagulant= $Al_2(SO4)_3$
   b) pH Controller=$Ca(OH)_2$
   c) Coagulant Aid=Polymer

Table-3 Quantity and Quality of Wastewater

Items		Equalized W.		Clarified W.
Flow Rate	[m^3/h]	30		30
pH	[-]	6 ~7		7 ~8
SS	[mg/L]	100		20
BOD	[mg/L]	1,300		1,000
COD	[mg/L]	2,400		2,200
Oil&Grease	[mg/L]	20		5
Phenol	[mg/L]	460		460
TDS	[mg/L]	700		750
Water Temp.	[℃]	35 ~40		35 ~40

(3) Sizing

1) Coagulation Tank (T-02)
   a) Rapid Mixing Time : 5 min (take)
   b) Reruired Volume : V= 2.5 m^3
   c) Specification : Vertical Cylindrical, Carbon Steel with Epoxy Coating
   d) Number of Required : 1 set
   e) Demension : H= 1.6 m (take) Req'd Area= 1.56 m^2
      D= 1.41 m

   Take : $1,430^{\phi} \times 2,000^{H} \times 1$ Set

2) Flocculation Tank (T-03)
   a) Slow Mixing Time : 30 min (take)
   b) Reruired Volume : V= 15 m^3
   c) Specification : Vertical Cylindrical, Carbon Steel with Epoxy Coating
   d) Number of Required : 1 set
   Demension : H= 2.5 m (take) Req'd Area = 6 m^2
      D= 2.76 m

   Take : $2,860^{\phi} \times 3,000^{H} \times 1$ Set

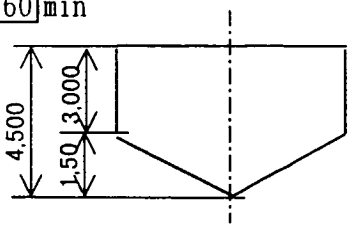
3) Sedimentation Tank
   a) Surface Load : Ls= 3 $m^3/m^2/h$ (take)
   b) Required Area : As= 10 m^2
   c) Specification : Vertical Cylindrical, Carbon Steel with Epoxy Coating
   d) Number of Required : 1 set

e) Retention Time : Ts= 1 h (take)= 60 min

f) Demension : H= 3 m (take)

D= 3.6 m

Take : 4,000$^{\phi}$ × 4,500^{H} × 2 Sets



4) Generated Sludge

a) SS Removal : 2.4 kg/h= 57.6 kg/d

b) Concentration of SS: 1 % (take)

c) Sludge Draw-off : Q= 240 kg/h≒ 0.24 m^3/h

d) Dewatered Sludge : W= 16 kg/h = 0.384 Ton/day

5) Coagulant $Al_2(SO_4)_3 \cdot 18H_2O$ Injection Unit

a) Dosing Ratio : 30 mg/L, Max. 50 mg/L

b) Concentration : 20 wt % = 222.4 g/L

c) Specific Gravity : 1.112

d) Injection Rate : Q_{P0}= 4.0 L/h= 0.07 L/min

e) Tank Volume : V_{P0}= 0.7 m^3 (for 7days)

f) Height : H_{P0}= 1.0 m (take) A_{P0}= 0.68 m^2

g) Diameter : D_{P0}= 0.9 m

Take: 1,000$^{\phi}$ × 1,300^{H} × 2 Sets

6) pH Controller : $Ca(OH)_2$ Injection Unit

a) Dosing Ratio : 20 mg/L, Max. 50 mg/L

b) Concentration : 10 wt % = 100 g/L

c) Specific Gravity : 1

d) Injection Rate : Q_{P0}= 6.0 L/h= 0.10 L/min

e) Tank Volume : V_{P0}= 1.0 m^3 (for 7days)

f) Height : H_{P0}= 1.2 m (take) A_{P0}= 0.84 m^2

g) Diameter : D_{P0}= 1.0 m

Take: 1,000$^{\phi}$ × 1,300^{H} × 2 Sets

7) Coagulant Aid: Polymer Injection Unit

a) Dosing Ratio : 0.3 mg/L, Max. 0.5 mg/L

b) Concentration : 0.5 wt % = 5 g/L

c) Specific Gravity : 1

d) Injection Rate : Q_{P0}= 1.8 L/h= 0.03 L/min

e) Tank Volume : V_{P0}= 0.3 m^3 (for 7days)

f) Height : H_{P0}= 0.6 m (take) A_{P0}= 0.50 m^2

g) Diameter : D_{P0}= 0.8 m

Take: 800$^{\phi}$ × 1,000^{H} × 2 Sets

6.4 Biological Treating Unit (Activated Sludge Treatment)

(1) Purpose

To remove Organic Substances (BOD,COD,Phenol etc.) by aerobic micro bacterias.

(2)Design Conditions

1) Wastewater :Treated water from Chemical Clarifier
2) Treating Method :Activated Sludge Treatment
3) Capacity : 30 m^3/h
4) Water Quality :Shown on table-4

Table-4 Water Quality

Items		Clarified W.		Clarified W.
Flow Rate	[m^3/h]	30		30
pH	[-]	7 ~8		6 ~7
SS	[mg/L]	20		20
BOD	[mg/L]	1,000		50
COD	[mg/L]	2,200		100
Oil&Grease	[mg/L]	5		3
Phenol	[mg/L]	460		0.5
TDS	[mg/L]	750		750
Water Temp.	[℃]	35 ~40		32 ~35

5) Specification :
   a) Aeration Basin :Rectangular/Above ground, RC, 1 set
   b) Clarifier :Circular/Above ground, CS+Epoxy coating, 1 set
6) Chemicals
   N and P are injected in case of lack of nutrient.

(3) Sizing

1) Aeration Basin
   a) BOD Loading : 0.5 kg-BOD/m^3/day (take)
   b) Volume of Basin : Vas= 1368 m^3
   c) Height of Basin : Has= 5 m(take) Aas= 273.6 m^2
      W= 14 W(take) L= 19.54 m

   Take : $14,000^W \times 20,000^L \times 5,800^H \times 1$ Set

   d) BOD Removal : R_{BOD}= 684 kg/day
   e) MLSS : Ca= 2,000 mg/L

2) Clarifier
   a) Surface Loading : Las= 1 $m^3/m^2/h$(take)= 24 $m^3/m^2/day$
   b) Surface Area : Ass= 30 m^2
   c) Height of Basin : Hss= 3 m (take)
   d) Volume of Basin : Vss= 90 m^3
   e) Retention Time : Tss= 3 h
   f) Sludge Concentrati. : C_R= 10,000 mg/L
   g) Diameter : Dss= 6.18 m

   Take: $7,000^{\phi} \times 4,000^H \times 1$ Set

3) Surplus Sludge

a) BOD→SS Conversin Rate : 0.3 (take)

b) Sludge from Act. Sludge T.: Ws_1= 8.55 kg/h from BOD

c) Sludge from Chemical Clar.: Ws_2= 2.40 kg/h from SS

d) Total Generated Sludge : W_{TS}= 10.95 kg/h= 262.8 kg/day

f) Generated 85 % Water Cont.S W_{85}= 73 kg/h= 1,752 kg/day

g) Centrifuge Feed Flow : Q= 1.5 m^3/h

4) Air Requirement for Aeration

a) Oxygen Demand : W_{O2}= a*R_{BOD}+b*Sa = 519.84 kg/day

a= BOD Factor = 0.55 $kg\text{-}O_2/kg\text{-}O_2$

b= MLVSS Factor= 0.07

Sa= 0.75*MLSS*Vol.of Basin/1,000= 2,052 kg

R_{BOD}= BOD Removal = 684 kg/day

b) Required Air : $Qair = (W_{O2}*3.57 m^3/kg\text{-}O_2*1.2)/(0.08*24*60)$

$= 19.33\ Nm^3/min$

c) Blower capacity : Qta= 24.638 Nm^3/min

Take: 25 Nm^3/minx6 mHx37 kW

5) Return Sludge Ratio : Rs= Ca/(Cr-Ca)

= 25 %

6) Nutrient as N :$CO(NH_2)_2$ Injection Unit

a) Dosing Ratio :BOD : N = 100 : 5

BOD : $CO(NH_2)_2$ = 100 : 11

b) Concentration : 25 wt %

c) Specific Gravity : 1.069

d) Injection Rate : Q_{CO}= 12.3 L/h

e) Tank Volume : V_{CO}= 2.1 m^3 (7days)

f) Height : H_{PO}= 1.8 m (take) A_{PO}= 1.15 m^2

g) Diameter : D_{PO}= 1.2 m

Take: 1,200$^{\phi}$×1,800^{H}×2 Sets

7) Nutrient as P :H_3PO_4 Injection Unit

a) Dosing Ratio :BOD : P = 100 : 1

BOD : H_3PO_4 = 100 : 3

b) Concentration : 25 wt %

c) Specific Gravity : 1.189

d) Injection Rate : Q_{ph}= 3.0 L/h

e) Tank Volume : V_{ph}= 0.5 m^3 (7days)

f) Height : H_{PO}= 0.9 m (take) A_{PO}= 0.57 m^2

g) Diameter : D_{PO}= 0.8 m

Take: 800$^{\phi}$×1,000^{H}×2 Sets

8) Polymer-B

a) Dosing Ratio : 1 % as dry SS

b) Concentration : 0.5 wt %

c) Specific Gravity : 1

d) Injection Rate : Q_{ph}= 0.13 L/h

e) Tank Volume : V_{ph}= 0.02 m^3 (7days)

f) Height : H_{PO}= 0.5 m (take) A_{PO}= 0.04 m^2

g) Diameter : D_{PO}= 0.2 m

Take: $800^{\phi} \times 1,000^{H} \times 1$ Set

9) Sludge Thickener

a) Solids Loading Lss= 60 $kg/m^2/d$

b) Total Solids Lto= 262.8 kg/d

c) Required Area Ath= 4.38 m^2

d) Diameter D_{PO}= 2.36 m

Take: $2,400^{\phi} \times 4,000^{H} \times 1$Set

6.5 Sand Filter Unit

(1) Purpose

To remove overflow floc(SS) from Activated Sludge Treatment

(2) Design Conditions

1) Wastewater :Treated Water from Biological Treatment Unit

2) Capacity : 30 m^3/h

3) Water Quality :Show on Table-5

Table-5 Water Quality

Items		Biological T.		Filtered W.
Flow Rate	[m^3/h]	30		30
pH	[-]	7 ~8		6 ~7
SS	[mg/L]	20		5
BOD	[mg/L]	1,000		30
COD	[mg/L]	2,200		80
Oil&Grease	[mg/L]	5		2
Phenol	[mg/L]	0.5		0.5
TDS	[mg/L]	750		750
Water Temp.	[℃]	35 ~40		32 ~35

4) Specification :Vertical Cylindrical,Carbon Steel with Epoxy Coating, Pressure Type

5) No. of Filter :3 Sets (2 Operatio + 1 Stand-by)

6) Filter Media :Anthracite + Sand/Gravel

7) Backwashing : Water (Pump)

(3) Sizing

1) Filter

a) Filter Velocity : Vf= 180 m/day= 7.5 m/h (take)

b) Filter Area/Diameter Af= 2 m^2 Df= 1.6 m

c) Height : Hf=

d) <Linear part>

Upper of Trough	0.5 m
Trough	0.3 m
Trough-Anthracite	0.7
Anthracite	0.7 m
Sand+Gravel	0.8 m
Support+Under	0.7 m
Allowance	0.3 m
Total Height	4 m

Take: $1,600^{\phi} \times 4,000^{H} \times 3$ Sets

2) Filtered Water Pond & Waste Water Pond

a) Volume of Pond : Vfb= 60 min (take) 30 m^3

b) Depth of Pit : Hfb= 2.5 m (take) Surface Area 12 m^2

W= 3 m L= 4.00 m

Take: $3,000^{W} \times 4,000^{L} \times 3,000^{H}$

3) Backwashing Pump

a) Backwash Velocity : Ubw= 40 m/h (take)

b) Backwash Flow rate : Qbw= 80 m^3/h

c) Backwashing Time : Tbw= 10 min(take)

d) Backwashing Water : Vbw= 13.33 m^3/h/Cycle

e) Backwash Pump : Qp= 88 m^3/h Hp= 12 mH(take)

P= 4.10 kW 5.5 kW

Take : 88 m^3/h x 0.12 Mpa x 5.5 kW×2 Sets

6.5 Activated Carbon Filter Unit

(1) Purpose

To remove dissolved organic substances (BOD,COD,Phenol etc.) by adsorption.

(2) Design Conditions

1) Wastewater :Treated Water from Filter Unit

2) Capacity : 30 m^3/h

3) Water Quality :Show on Table-6

Table-6 Water Quality

Items		Filtered W.		Treated Water
Flow Rate	[m^3/h]	30		30
pH	[-]	6 ~7		6 ~9
SS	[mg/L]	5		1
BOD	[mg/L]	30		20
COD	[mg/L]	80		30
Oil&Grease	[mg/L]	2		1
Phenol	[mg/L]	0.5		0.005
TDS	[mg/L]	750		750
Water Temp.	[°C]	32 ~35		32 ~35

4) specification :Vertical Cylindrical,Carbon Steel with Epoxy Coating, Pressure Type

5) No. of Filter :2 Sets (1 Operatio + 1 Stand-by)

6) Filter Media :Activated Carbon

7) Backwashing : Water (Pump)

(3) Sizing

1) A/C Filter

a) Filter Velocity : Vf= 360 m/day= 15 m/h (take)

b) Filter Area/Diameter Af= 2 m^2 Df= 1.6 m

c) Retention Time : Ta= 10 min.

d) A/C Volume : Va= 5 m^3

Height : Hf=

Upper of Trough	0.4 m
<Linear part> Trough-A/C	0.8 m
Activated Carbon	2.5
Support+Under	0.5 m
Allowance	0.3 m
Total Height	4.5 m

Take: $1,600^{\phi} \times 4,500^{H} \times 2$ Sets

6.6 Sterilization

(1) Purpose

To sterilize treated water including sanitary wastewater

(2) Design Condition

a) Wastewater :Filtered water

b) Disinfictant :NaCLO Conc 12 wt% Sp.Gra 1.0155

c) Dosage : 4 mg/L (Max. 6mg/L)

d) Contact Time : 15 min

(3) Sizing

a) Injection Rate : Q= 1 L/h

b) Req'd Drum Volume : V= 0.2 m^3 (for 7days)

c) Tank Dimension : Take: $800^{\phi} \times 1,000^{H} \times 1$ Set

d) Sterilization Pond : 7.5 m^3

e) Pond Dimension : H= 2 m (take) A= 3.75 m^2

W= 3 m (take) LA= 1.25

Take: $3,000^{W} \times 1,250^{L} \times 3,000^{H}$