TABLE K.2 CROSSCHECK OF DISTRIBUTION FIELD WORK

(RESIDUAL CHLORINE)

CITY OF MANILA GROUP II SAMPLING DATE:OCT. 25. 1991

NOS.	LOCATION	RES. CHLORINE (mg/l) MWSS	JICA
13	Herran-Taft Avenue	0.4	0.3
14	Herran-Panaderos	0.3	0.2
15	San Andres-Singalong	0.6	0.5
16	Bautista, Sta. Ana	0.6	0.4
17	American Embassy	TRACE	TRACE
18	Sn. Nicolas Fire Station	0.4	0.2
19	Dagupan, Tondo	0.6	0.4
20	Rodriguez - M. Bay Blvd.	0.4	0.3
21	Pampanga-R. Fernandez	0.4	0.3
22	Tayuman, Tondo	NO WATER	
23	Kapt. Tiago-Isaganl	0.1	0.1
24	M. Earnshaw, Sampaloc	0.0	TRACE

CITY OF MANILA GROUP III SAMPLING DATE:OCT. 24. 1991

NOS.	LOCATION	RES. CHLORINE (mg/l) MWSS	JICA
25	Nesus Pandacan	0.6	0.4
26	Plaza Hugo Sta. Ana	0.2	0.2
27	Fernin, Singalong	0.4	0.3
28	Arlegui, Quiapo	0.3	0.3
29	Bonifacio Drive, p.a.	0.5	0.2
30	Angalo-MH de Santos	0.5	0.3
31	Juan Luna, Tondo	0.5	0.4
32	Tenement House, Vitas	0.5	0.3
33	Bo. Obrero (Narra)	0.5	0.3
34	Molave-Batangas Sts.	0.5	0.3
35	MHD Lab., Quiricada	0.5	0.3
36	Sta. Cruz Church	0.5	0.3

2. Procedures

2.1 Selection of Sampling Points

The area being served solely by the Balara Plant was isolated and divided into four districts for the sake of convenience as shown in Table K.3; (1) QUEZON CITY DISTRICT, (2) SAN JUAN-MANDALUYONG DISTRICT, (3) MANILA DISTRICT, and (4) MAKATI DISTRICT. Within such districts more than 10 sampling points were identified . Each sampling points were decided on the basis of its proximity to the trunk main as shown in Fig.K.1. This was done to prevent the distributed water contaminated through the service pipings from being sampled, otherwise, unreliable test results will be obtained.

TABLE K.3 SELECTED SAMPLING POINTS

DISTRICT	NO.	LOCATION
I :QUEZON CITY	1	North Ave., cor. Mindanao Ave., Caltex Gas Station
	2	#91 West Ave., (nr. Phil-AmGate) LongMile Vulcanizing
	3	Tomas Morato cor. Timog Petron Gas Station (Employee's Quarters)
	4	Edsa cor. Mother Ignacia Shell Gas Station
	5	Kamuning-T. Morato Jocelyn's Lumpia House
	6	East Ave., cor. Magalang St., Caltex Station
	7	#35 Kalayaan Ave., Tenemark Appliances Comp.
	8	15th Ave., cor. Main Ave., Goldi Burger Stand
	9	#143 Katipunan Road (Residential)
	10	Xavierville cor. Esteban Abada Ambrosia Restaurant
	11	Katipunan cor. CP Garcia PEtron Gas Station
	12	Along Amang Rodriguez Ave., cor. Marcos Hi-way South Supermarket
II :SAN JUAN-MANDALUYONG	1	San Juan Pumping Station Inlet Cov. Res. #1
	2	San Juan Pumping Station Outlet Cov. Res. #1
	3	Mariposa cor. West Road (Gracecourt-Condominium)
	4	Edsa cor. Santolan Machine Hamburger Shop
	5	Connecticut cor. Edsa Caltex Gas Station
	6	Wilson Street ESL Auto Aircon Wilson Circle Vill. Gate
	7	# 192 A. Mabini St., near CM Rector (Apt.)
	8	Meralco Ave., cor. Gen. Segundo Fire Dept. Headquarters
	9	#167-C Pasig Blvd., Near San Ignacio
	10	Pasig Blvd., (Dr. M. Flores cor. G. Salonga)
	11	Along Dr. Sixto Antonio Ave., nr. Maybunga Health Center
III :MANILA	1	E. Rodriguez cor. Araneta Shell Gas Station
	2	F. Blumentritt nr. N. Domingo Edna's Chicken Dealer
	3	Santol cor. Manga Ave. nr. R. Magsaysay (nr. MWSS Branch)
	4	#3265 R. Magsaysay cor. Maganda St.
	5	C.M. Recto cor. Legarda MWSS Branch Office
	6	#1517 V. Mata cor. Nagtahan under Nagtahan Bridge
	7	Beata cor. Tomas Claudio nr. Railroad Track
	8	#2223 Sequia cor. Tejeron front of Gas Station
	9	J.P. Rizal cor. Pasong Tamo Lydia's Lechon Stall
	10	Panaderos cor. Lamayan Public Faucet
IV :MAKATI	1	#2758 Zenaida cor. E. Zobel (nr. Mkti. Mun. Hall)
	2	Yague cor. Kakarong (nr. South Cemetery) Public Faucet
	3	Real cor. Sta. Potentiana Security Guardhouse Urdaneta Vill.
	4	San Lorenzo Drive cor. Abelardo Security Guardhouse San Lorenzo Vill.
	5	Magallanes parking Canteen South Supermarket South Superhighway
	6	Sales/Recto Villamor Airbase Hydrant
	7	Edsa cor. Pasay Road Dasmarinas Vill. Opp. side of Nikko Hotel
	8	Edsa cor. Mercedes Hydrant
	9	Makati Pumping Station P. Burgos St., Outlet
	10	Makati Pumping Station P. Burgos St., Inlet
	11	Don Sixto Antonio Ave., cor. San Joaquin Rd., (Shell Gas Station)

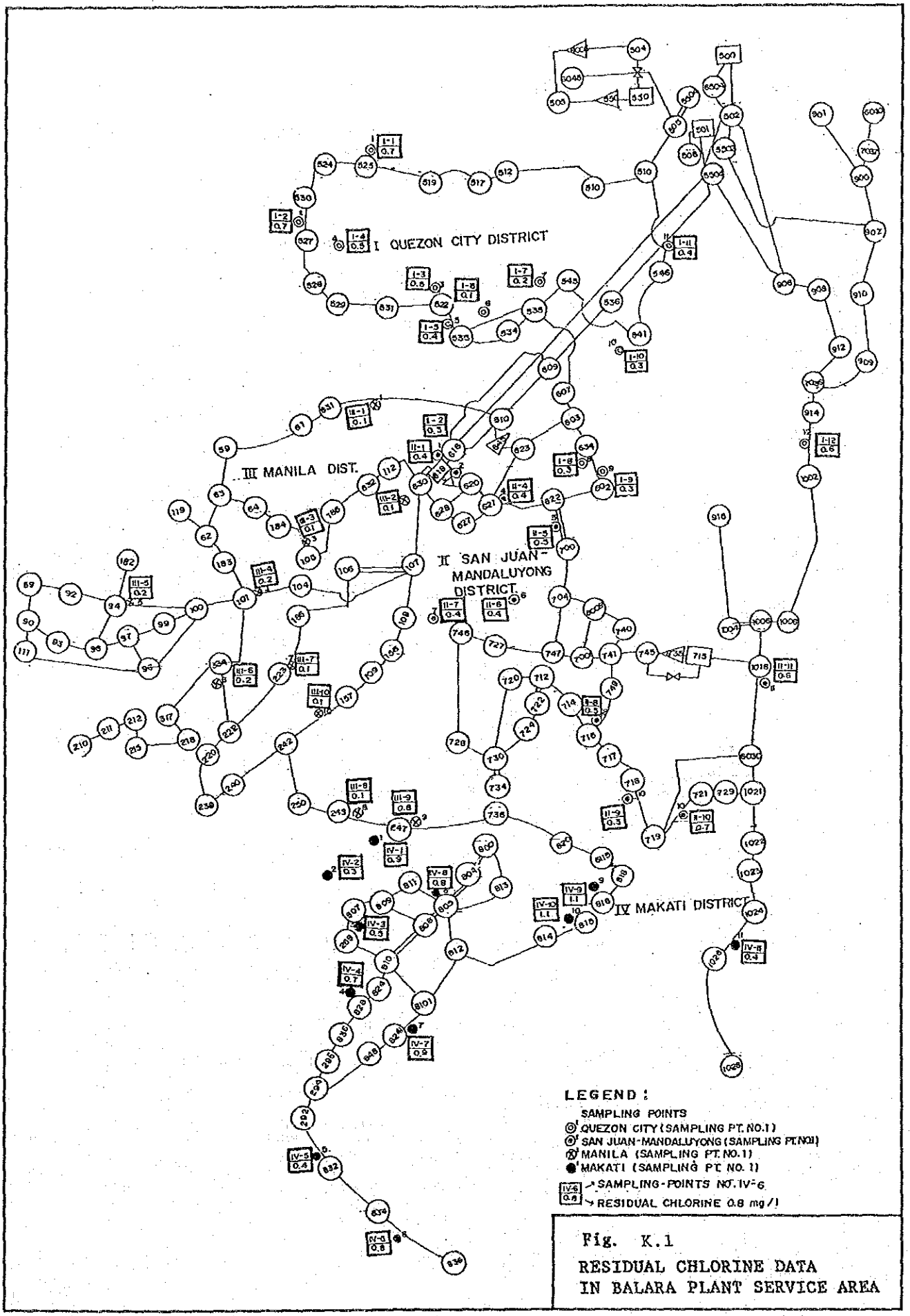

Fig. K.1
RESIDUAL CHLORINE DATA
IN BALARA PLANT SERVICE AREA

QUEZON CITY DISTRICT/Sampling Point No. 1 North Ave., cor. Mindanao Ave., Caltex Gas Station

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
SEPT. 10	9:10	27.3	0.7	9.5	6.71	123.2	ND	1.06	4.5
SEPT. 23	9:45	27.2	0.5	6.0	6.62	123.5	ND	1.01	7.1
SEPT. 30	9:25	27.5	1.3	8.8	6.70	145.2	ND	1.11	3.4
OCT . 7	8:50	28.5	0.9	8.5	6.98	134.3	ND	1.18	6.8
OCT . 14	9:05	28.6	0.2	5.7	7.01	139.0	ND	1.18	2.6
OCT . 21	11:10	28.7	0.8	3.7	6.88	141.9	ND	1.20	2.3
MAX		28.7	1.3	9.5	7.01	145.2	ND		
MIN		27.2	0.2	3.7	6.62	123.2	ND		
AVG		28.0	0.7	7.0	6.82	134.5	ND		

QUEZON CITY DISTRICT/Sampling Point No. 2 #91 West Ave., (nr. Philam Gate) Longmile Vulcanizing

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
SEPT. 10	9:20	28.5	0.8	8.5	6.64	122.2	ND	1.06	4.5
SEPT. 23	10:00	28.1	0.2	5.7	6.63	122.8	ND	1.01	7.1
SEPT. 30	9:37	28.6	1.3	8.0	6.60	143.8	ND	1.11	3.4
OCT . 7	9:05	29.0	0.8	11.7	6.97	132.9	ND	1.18	6.8
OCT . 14	9:15	30.0	0.2	4.9	7.00	137.7	ND	1.18	2.6
OCT . 21	11:20	30.5	0.8	5.1	6.86	142.1	ND	1.20	2.3
MAX		30.5	1.3	11.7	7.00	143.8	ND		
MIN		28.1	0.2	4.9	6.60	122.2	ND		
AVG		29.1	0.7	7.3	6.76	133.6	ND		

QUEZON CITY DISTRICT /Sampling Point No. 3 Tomas Morato cor. Timog Petron Gas Station (Employee's Quarter)

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
SEPT. 10	9:55	27.3	0.7	8.9	6.68	121.8	ND	1.06	4.5
SEPT. 23	11:00	27.6	0.3	7.2	6.67	121.6	ND	1.01	7.1
SEPT. 30	10:05	27.0	0.9	9.7	6.60	144.0	ND	1.11	3.4
OCT . 7	9:35	28.4	0.5	7.4	6.99	135.4	ND	1.18	6.8
OCT . 14	9:45	28.6	0.2	7.9	6.99	144.3	ND	1.18	2.6
OCT . 21	11:43	28.5	0.8	3.4	6.90	144.3	ND	1.20	2.3
MAX		28.6	0.9	9.7	6.99	144.3	ND		
MIN		27.0	0.2	3.4	6.60	121.6	ND		
AVG		27.9	0.6	7.4	6.81	135.2	ND		

QUEZON CITY DISTRICT /Sampling Point No. 4 Edsa cor. Mother Ignacia Shell Gas Station

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Finished Water Turbidity (mg/l)
SEPT. 10	10:15	31.5	0.4	12.0	6.64	125.4	ND	1.06	4.5
SEPT. 23	10:15	31.5	0.2	2.8	6.62	124.7	ND	1.01	7.1
SEPT. 30	9:50	31.0	1.0	14.5	6.64	145.5	ND	1.11	3.4
OCT . 7	9:20	31.2	0.3	5.4	6.91	134.2	ND	1.18	6.8
OCT . 14	9:30	30.5	0.1	5.5	6.97	138.4	ND	1.18	2.6
OCT . 21	11:30	31.0	0.8	2.3	6.87	143.7	ND	1.20	2.3
MAX		31.5	1.0	14.5	6.97	145.5	ND		
MIN		30.5	0.1	2.3	6.62	124.7	ND		
AVG		31.1	0.5	7.1	6.78	135.3	ND		

QUEZON CITY DISTRICT /Sampling Point No. 5 Kamuning-T. Morato Jocelyn's Lumpia House

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Finished Water Turbidity (mg/l)
SEPT. 10	10:35	27.0	0.4	9.5	6.73	124.6	ND	1.06	4.5
SEPT. 23	11:15	27.6	0.2	7.7	6.63	120.7	ND	1.01	7.1
SEPT. 30	10:20	27.0	0.7	7.7	6.65	139.9	ND	1.11	3.4
OCT . 7	10:05	28.3	0.3	7.5	6.98	140.2	ND	1.18	6.8
OCT . 14	9:50	28.4	0.2	6.5	7.00	145.6	ND	1.18	2.6
OCT . 21	11:50	28.0	0.4	3.4	6.86	146.2	ND	1.20	2.3
MAX		28.4	0.7	9.5	7.00	146.2	ND		
MIN		27.0	0.2	3.4	6.63	120.7	ND		
AVG		27.7	0.4	7.1	6.81	136.2	ND		

QUEZON CITY DISTRICT /Sampling Point No. 6 East Ave., cor. Magalang St., Caltex Station

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Finished Water Turbidity (mg/l)
SEPT. 10	10:55	28.0	0.2	6.0	7.04	125.8	ND	1.06	4.5
SEPT. 23	10:25	28.3	0.1	4.8	6.92	124.1	ND	1.01	7.1
SEPT. 30	10:55	27.8	0.3	9.2	6.93	164.6	ND	1.11	3.4
OCT . 7	10:15	29.0	0.2	9.2	7.24	135.8	ND	1.18	6.8
OCT . 14	10:10	29.2	0.1	5.0	7.18	136.5	ND	1.18	2.6
OCT . 21	12:05	28.7	TRACE	2.6	7.08	138.6	ND	1.20	2.3
MAX		29.2	0.3	9.2	7.24	164.6	ND		
MIN		27.8	TRACE	2.6	6.92	124.1	ND		
AVG		28.5	0.1	6.1	7.07	137.6	ND		

QUEZON CITY DISTRICT /Sampling Point No. 7 #35 Kalayaan Ave., Tenemark Appliances Comp.

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
SEPT. 10	11:15	28.7	0.3	8.0	6.67	124.5	ND	1.06	4.5
SEPT. 23	10:45	29.1	0.2	4.5	6.58	123.8	ND	1.01	7.1
SEPT. 30	11:17	29.3	0.3	6.2	6.61	143.1	ND	1.11	3.4
OCT . 7	10:30	29.8	0.1	5.4	6.30	137.2	ND	1.18	6.8
OCT . 14	10:20	29.8	TRACE	5.3	7.00	137.7	ND	1.18	2.6
OCT . 21	10:45	29.5	0.1	2.0	6.84	141.8	ND	1.20	2.3
MAX		29.8	0.3	8.0	7.00	143.1	ND		
MIN		28.7	TRACE	2.0	6.30	123.8	ND		
AVG		29.4	0.2	5.2	6.67	134.7	ND		

QUEZON CITY DISTRICT /Sampling Point No. 8 15th Ave., cor. Main Ave., Goldi Burger Stand

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
SEPT. 10	11:45	26.4	0.4	5.4	6.70	124.4	ND	1.06	4.5
SEPT. 23	11:40	27.0	0.2	10.8	6.69	119.3	ND	1.01	7.1
SEPT. 30	11:35	27.2	0.3	6.0	6.64	141.5	ND	1.11	3.4
OCT . 7	10:55	Suspention of water supply.						1.18	6.8
OCT . 14	10:50	Suspention of water supply.						1.18	2.6
OCT . 21	9:35	28.0	0.3	3.9	6.88	141.7	ND	1.20	2.3
MAX		28.0	0.4	10.8	6.88	141.7	ND		
MIN		26.4	0.2	3.9	6.64	119.3	ND		
AVG		27.2	0.3	6.5	6.73	131.7	ND		

QUEZON CITY DISTRICT /Sampling Point No. 9 #143 Katipunan Road (Residential)

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
SEPT. 10	12:05	27.2	0.2	4.6	6.67	127.1	ND	1.06	4.5
SEPT. 23	12:00	27.4	0.2	6.6	6.65	124.5	ND	1.01	7.1
SEPT. 30	11:50	27.0	0.3	5.9	6.68	143.7	ND	1.11	3.4
OCT . 7	11:05	Suspention of water supply.						1.18	6.8
OCT . 14	11:05	Suspention of water supply.						1.18	2.6
OCT . 21	9:45	28.0	0.3	3.7	6.89	142.1	ND	1.20	2.3
MAX		28.0	0.3	6.6	6.89	143.7	ND		
MIN		27.0	0.2	3.7	6.65	124.5	ND		
AVG		27.4	0.3	5.2	6.72	134.4	ND		

QUEZON CITY DISTRICT /Sampling Point No. 10 Xavierville cor. Esteban Abada Ambrosia Restaurant

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Finished Water Turbidity (mg/l)
SEPT. 10	12:50	26.5	0.2	5.2	6.85	126.1	ND	1.06	4.5
SEPT. 23	12:58	27.3	0.4	6.2	6.60	121.6	ND	1.01	7.1
SEPT. 30	12:34	27.3	0.4	6.6	6.69	139.2	ND	1.11	3.4
OCT . 7	11:40	28.3	0.3	6.5	7.01	139.8	ND	1.18	6.8
OCT . 14	12:20	27.6	*0.0	8.9	7.13	144.7	5	1.18	2.6
OCT . 21	9:15	27.5	0.4	3.1	6.85	145.8	ND	1.20	2.3
MAX		28.3	0.4	8.9	7.13	145.8	5		
MIN		26.5	0.0	3.1	6.60	121.6	ND		
AVG		27.4	0.3	6.1	6.86	136.2	< 1		

* Water Treatment Plant is power down(10:00-12:00)

QUEZON CITY DISTRICT /Sampling Point No. 11 Katipunan cor. CP Garcia Petron Gas Station

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Finished Water Turbidity (mg/l)
SEPT. 10	1:00	27.5	0.2	4.8	6.88	126.6	ND	1.06	4.5
SEPT. 23	2:20	28.2	0.3	9.1	6.62	120.4	ND	1.01	7.1
SEPT. 30	1:07	27.6	0.8	8.0	6.64	141.1	ND	1.11	3.4
OCT . 7	12:30	28.5	0.3	8.2	7.02	140.7	ND	1.18	6.8
OCT . 14	12:35	28.5	*0.0	2.9	7.05	142.4	15	1.18	2.6
OCT . 21	10:30	28.0	0.5	3.5	6.83	149.7	ND	1.20	2.3
MAX		28.5	0.8	9.1	7.05	149.7	15		
MIN		27.5	0.0	2.9	6.62	120.4	ND		
AVG		28.1	0.4	6.1	6.84	136.8	2.5		

* Water Treatment Plant is power down(10:00-12:00)

QUEZON CITY DISTRICT /Sampling Point No. 12 Along Amang Rodriguez Ave., cor. Marcos Hi-way South Supermarket

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Finished Water Turbidity (mg/l)
SEPT. 23	12:44	28.8	0.7	3.5	6.71	127.6	ND	1.01	7.1
SEPT. 30	12:15	28.5	0.7	3.1	6.75	147.9	ND	1.11	3.4
OCT . 7	11:20	29.5	0.2	5.1	7.10	137.9	ND	1.18	6.8
OCT . 14	11:25	29.0	1.3	6.9	7.05	141.0	ND	1.18	2.6
OCT . 21	10:10	28.2	0.2	3.5	7.02	143.0	ND	1.20	2.3
MAX		29.5	1.3	6.9	7.10	147.9	ND		
MIN		28.2	0.2	3.1	6.71	127.6	ND		
AVG		28.8	0.6	4.4	6.93	139.5	ND		

SAN JUAN-MANDALUYONG DISTRICT/Sampling Point No.1 San Juan Pumping Station Inlet Cov. Res. # 1

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
SEPT. 11	9:27	26.0	0.2	5.9	6.61	132.7	ND	1.06	3.5
SEPT. 17	10:05	27.3	0.8	6.9	6.51	128.8	ND	1.05	3.9
SEPT. 24	9:25	27.5	0.3	13.6	6.70	121.1	ND	1.00	4.2
OCT . 1	9:05	27.2	0.4	6.8	6.76	134.6	ND	1.10	3.5
OCT . 8	9:23	26.7	0.5	4.5	6.90	149.0	ND	1.16	3.9
OCT . 15	9:45	26.8	0.3	2.3	6.81	150.2	ND	1.18	5.2
OCT . 22	10:15	27.5	0.5	3.9	7.13	139.7	ND	1.20	2.6
MAX		27.5	0.8	13.6	7.13	150.2	ND		
MIN		26.0	0.2	2.3	6.51	121.1	ND		
AVG		27.0	0.4	6.2	6.77	136.6	ND		

SAN JUAN-MANDALUYONG DISTRICT/Sampling Point No.2 San Juan Pumping Station Outlet Cov. Res. #1

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
SEPT. 11	9:35	26.5	1.0	13.6	6.67	126.8	ND	1.06	3.5
SEPT. 17	10:20	26.9	0.8	8.9	6.60	129.2	ND	1.05	3.9
SEPT. 24	9:30	27.0	0.4	8.9	6.78	121.6	ND	1.00	4.2
OCT . 1	9:15	27.2	0.5	8.6	6.84	135.7	ND	1.10	3.5
OCT . 8	9:32	28.0	0.3	7.9	7.02	131.2	ND	1.16	3.9
OCT . 15	9:50	27.0	0.3	3.4	6.94	138.9	ND	1.18	5.2
OCT . 22	10:25	27.8	0.4	2.8	7.12	140.3	ND	1.20	2.6
MAX		28.0	1.0	13.6	7.12	140.3	ND		
MIN		26.5	0.3	2.8	6.60	121.6	ND		
AVG		27.2	0.5	7.7	6.85	132.0	ND		

SAN JUAN-MANDALUYONG DISTRICT/Sampling Point No.3 Mariposa cor. West Road (Gracecourt-Condominium)

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
SEPT. 11	9:50	26.8	0.9	10.2	6.70	127.7	ND	1.06	3.5
SEPT. 17	10:35	27.7	0.4	6.2	6.66	130.7	ND	1.05	3.9
SEPT. 24	10:00	27.5	0.5	10.5	6.72	122.2	ND	1.00	4.2
OCT . 1	9:25	27.3	0.4	8.5	6.71	134.7	ND	1.10	3.5
OCT . 8	9:44	28.3	0.2	6.3	6.99	133.2	ND	1.16	3.9
OCT . 15	10:03	27.8	0.2	3.2	6.94	139.1	ND	1.18	5.2
OCT . 22	10:37	28.0	0.4	2.9	7.06	140.5	ND	1.20	2.6
MAX		28.3	0.9	10.5	7.06	140.5	ND		
MIN		26.8	0.2	2.9	6.66	122.2	ND		
AVG		27.6	0.4	6.8	6.83	132.6	ND		

SAN JUAN-MANDALUYONG DISTRICT/Sampling Point No.4 Edsa cor. Santolan Machine Hamburger Shop

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
SEPT. 11	10:00	26.8	0.6	9.2	6.67	126.4	ND	1.06	3.5
SEPT. 17	10:45	27.7	0.4	5.5	6.57	131.4	ND	1.05	3.9
SEPT. 24	10:10	27.5	0.2	9.2	6.79	124.8	ND	1.00	4.2
OCT . 1	9:36	26.8	0.6	8.5	6.83	135.3	ND	1.10	3.5
OCT . 8	9:50	27.2	0.1	6.9	7.06	132.6	ND	1.16	3.9
OCT . 15	10:13	27.3	0.2	3.3	6.98	139.2	ND	1.18	5.2
OCT . 22	10:45	27.0	0.3	3.1	7.16	139.5	ND	1.20	2.6
MAX		27.7	0.8	9.2	7.16	139.5	ND		
MIN		26.8	0.1	3.1	6.57	124.8	ND		
AVG		27.2	0.4	6.5	6.87	132.7	ND		

SAN JUAN-MANDALUYONG DISTRICT/Sampling Point No.5 Connecticut cor. EDSA Caltex Gas Station

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
SEPT. 11	10:15	26.5	0.9	11.9	6.69	128.9	ND	1.06	3.5
SEPT. 17	11:05	27.0	0.5	7.4	6.54	129.2	ND	1.05	3.9
SEPT. 24	10:17	27.0	0.5	10.2	6.65	122.7	ND	1.00	4.2
OCT . 1	9:42	27.0	0.5	11.9	6.78	134.7	ND	1.10	3.5
OCT . 8	10:05	28.0	0.2	6.2	6.98	132.6	ND	1.16	3.9
OCT . 15	10:25	28.2	0.3	3.5	6.93	138.9	ND	1.18	5.2
OCT . 22	10:57	28.0	0.3	2.6	7.11	140.0	ND	1.20	2.6
MAX		28.2	0.9	11.9	7.11	140.0	ND		
MIN		26.5	0.2	2.6	6.54	122.7	ND		
AVG		27.4	0.5	7.7	6.81	132.4	ND		

SAN JUAN-MANDALUYONG DISTRICT/Sampling Point No.6 Wilson St., ESL Auto Aircon Wilson Circle Vill. Gate

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
SEPT. 11	10:37	27.0	0.9	15.2	6.62	127.6	ND	1.06	3.5
SEPT. 17	11:15	27.8	0.4	6.3	6.56	130.7	ND	1.05	3.9
SEPT. 24	10:30	28.0	0.4	9.4	6.69	123.9	ND	1.00	4.2
OCT . 1	9:57	27.8	0.6	8.5	6.76	136.3	ND	1.10	3.5
OCT . 8	10:20	28.5	0.2	7.4	7.03	133.0	ND	1.16	3.9
OCT . 15	10:43	28.6	0.2	2.6	6.94	141.3	ND	1.18	5.2
OCT . 22	11:13	28.3	0.4	2.5	7.11	141.9	ND	1.20	2.6
MAX		28.6	0.9	15.2	7.11	141.9	ND		
MIN		27.0	0.2	2.5	6.56	123.9	ND		
AVG		28.0	0.4	7.4	6.82	133.5	ND		

SAN JUAN-MANDALUYONG DISTRICT/Sampling Point No.7 #192 A. Mabini St., near CM Recto (Apt.)

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
SEPT. 11	10:50	27.0	0.9	10.2	6.73	126.8	ND	1.06	3.5
SEPT. 17	11:30	27.6	0.3	7.5	6.60	129.5	ND	1.05	3.9
SEPT. 24	10:45	27.7	0.4	10.0	6.74	121.2	ND	1.00	4.2
OCT . 1	10:10	27.5	0.6	8.3	6.83	134.8	ND	1.10	3.5
OCT . 8	10:29	28.3	0.2	6.9	7.09	132.4	ND	1.16	3.9
OCT . 15	10:54	28.1	0.2	2.8	6.93	139.9	ND	1.18	5.2
OCT . 22	11:25	28.0	0.3	2.6	7.10	140.1	ND	1.20	2.6
MAX		28.3	0.9	10.2	7.10	140.1	ND		
MIN		27.0	0.2	2.6	6.60	121.2	ND		
AVG		27.7	0.4	6.9	6.86	132.1	ND		

SAN JUAN-MANDALUYONG DISTRICT/Sampling Point No.8 Meralco Ave., cor. Gen. Segundo Fire Dept. Headquarters

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
SEPT. 11	11:20	26.8	0.4	8.5	6.79	137.0	ND	1.06	3.5
SEPT. 17	11:57	27.0	0.2	6.9	6.69	137.2	ND	1.05	3.9
SEPT. 24	11:15	27.0	0.5	5.1	6.71	124.2	ND	1.00	4.2
OCT . 1	10:30	27.0	0.8	5.4	6.83	135.6	ND	1.10	3.5
OCT . 8	10:47	Ssuspention of water supply.					ND	1.16	3.9
OCT . 15	11:10	Ssuspention of water supply.					ND	1.18	5.2
OCT . 22	11:45	Ssuspention of water supply.					ND	1.20	2.6
MAX		27.0	0.8	8.5	6.83	137.2	ND		
MIN		26.8	0.2	5.1	6.69	124.2	ND		
AVG		27.0	0.5	6.5	6.76	133.5	ND		

SAN JUAN-MANDALUYONG DISTRICT/Sampling Point No.9 #167-C Pasig Blvd., nr. San Ignacio

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
SEPT. 11	11:40	27.6	0.3	10.0	6.58	126.4	ND	1.06	3.5
SEPT. 17	12:10	29.5	TRACE	3.7	6.70	131.3	ND	1.05	3.9
SEPT. 24	11:25	28.2	0.3	6.2	6.70	123.4	ND	1.00	4.2
OCT . 1	10:45	27.7	0.5	6.9	6.79	135.4	ND	1.10	3.5
OCT . 8	10:55	28.3	0.2	6.6	6.93	133.1	ND	1.16	3.9
OCT . 15	11:15	Ssuspention of water supply.					ND	1.18	5.2
OCT . 22	11:50	Ssuspention of water supply.					ND	1.20	2.6
MAX		29.5	0.5	10.0	6.93	135.4	ND		
MIN		27.6	TRACE	3.7	6.58	123.4	ND		
AVG		28.3	0.3	6.7	6.74	129.9	ND		

SAN JUAN-MANDALUYONG DISTRICT/Sampling Point No.10 Pasig Blvd., (Dr. M. Flores cor. G. Salonga)

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Plant Operation Finished Water Turbidity(mg/l)
SEPT.11	12:10	28.9	0.2	5.2	6.83	126.1	ND	1.06	3.5
SEPT.17	12:23	27.2	0.8	6.8	6.58	129.1	ND	1.05	3.9
SEPT.24	11:35	27.5	0.6	13.4	6.66	118.8	ND	1.00	4.2
OCT.1	10:55	27.2	0.8	4.9	6.78	135.6	ND	1.10	3.5
OCT.8	11:05	28.1	0.7	6.5	6.93	129.9	ND	1.16	3.9
OCT.15	11:25	28.0	1.2	3.5	6.86	139.4	ND	1.18	5.2
OCT.22	11:55	27.0	0.3	2.8	7.05	140.5	ND	1.20	2.6
MAX		28.9	1.2	13.4	7.05	140.5	ND		
MIN		27.0	0.2	2.8	6.58	118.8	ND		
AVG		27.7	0.7	6.2	6.81	131.3	ND		

SAN JUAN-MANDALUYONG DISTRICT/Sampling Point No.11 Along Dr. Sixto Ave., nr. Maybunga Health Center

DATE	TIME	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Plant Operation Finished Water Turbidity(mg/l)
SEPT.24	12:00	27.2	0.8	10.2	6.78	119.9	ND	1.00	4.2
OCT.1	11:12	27.3	0.8	6.6	6.81	134.0	ND	1.10	3.5
OCT.8	11:20	28.0	TRACE	7.1	7.08	128.7	ND	1.16	3.9
OCT.15	11:40	28.0	1.2	4.2	6.89	135.8	ND	1.18	5.2
OCT.22	12:10	27.8	0.2	4.6	7.16	136.8	ND	1.20	2.6
MAX		28.0	1.2	10.2	7.16	136.8	ND		
MIN		27.2	TRACE	4.2	6.78	119.9	ND		
AVG		27.7	0.6	6.5	6.94	131.0	ND		

MANILA DISTRICT/Sampling Point No.1 E. Rodriguez cor. Araneta Shell Gas Station

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Plant Operation Finished Water Turbidity(mg/l)
SEPT. 18	9:35	27.3	TRACE	3.4	6.57	126.3	ND	1.05	3.1
SEPT. 25	10:15	28.0	TRACE	4.8	6.64	126.0	ND	1.00	4.8
OCT . 2	9:20	27.7	TRACE	2.9	6.57	130.8	ND	1.10	3.7
OCT . 9	9:05	27.2	0.1	10.2	6.92	148.6	ND	1.18	4.3
OCT . 16	9:50	27.2	0.2	3.5	6.92	154.0	ND	1.17	2.5
MAX		28.0	0.2	10.2	6.92	154.0	ND		
MIN		27.2	TRACE	2.9	6.57	126.0	ND		
AVG		27.5	0.1	5.0	6.72	137.1	ND		

MANILA DISTRICT/Sampling Point No.2 F. Blumentritt nr. N. Domingo Edna's Chicken Dealer

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Plant Operation Finished Water Turbidity(mg/l)
SEPT. 18	13:26	26.9	0.1	8.5	6.50	131.2	ND	1.05	3.1
SEPT. 25	10:35	27.2	0.1	6.2	6.71	126.2	ND	1.00	4.8
OCT . 2	9:30	27.3	0.2	4.6	6.60	132.1	ND	1.10	3.7
OCT . 9	9:20	27.3	TRACE	8.0	6.98	142.9	ND	1.18	4.3
OCT . 16	10:03	27.4	0.2	3.1	6.97	148.5	ND	1.17	2.5
MAX		27.4	0.2	8.5	6.98	148.5	ND		
MIN		26.9	TRACE	3.1	6.50	126.2	ND		
AVG		27.2	0.1	6.1	6.75	136.2	ND		

MANILA DISTRICT/Sampling Point No.3 F. Santol cor. Manga Ave., nr. R. Magsaysay (nr. MWSS Branch)

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Plant Operation Finished Water Turbidity(mg/l)
SEPT. 18	9:46	26.8	0.2	5.2	6.57	129.1	ND	1.05	3.1
SEPT. 25	10:47	27.1	0.1	6.6	6.78	127.2	ND	1.00	4.8
OCT . 2	9:45	27.1	0.2	5.4	6.65	132.9	ND	1.10	3.7
OCT . 9	9:30	27.3	TRACE	8.5	7.02	142.6	ND	1.18	4.3
OCT . 16	10:15	27.3	0.1	3.4	6.98	148.2	ND	1.17	2.5
MAX		27.3	0.2	8.5	7.02	148.2	ND		
MIN		26.8	TRACE	3.4	6.57	127.2	ND		
AVG		27.1	0.1	5.8	6.80	136.0	ND		

MANILA DISTRICT/Sampling Point No.4 #3265 R. Magsaysay cor. Maganda St.

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Plant Operation Finished Water Turbidity(mg/l)
SEPT.18	10:05	27.2	0.2	4.8	6.57	130.3	ND	1.05	3.1
SEPT.25	11:00	27.2	0.2	7.9	6.67	126.4	ND	1.00	4.8
OCT .2	9:55	27.3	0.4	6.0	6.60	134.6	ND	1.10	3.7
OCT .9	9:35	28.0	TRACE	9.2	6.95	136.2	ND	1.18	4.3
OCT .16	10:25	28.0	TRACE	3.7	7.01	141.6	ND	1.17	2.5
MAX		28.0	0.4	9.2	7.01	141.6	ND		
MIN		27.2	TRACE	3.7	6.57	126.4	ND		
AVG		27.5	0.2	6.3	6.76	133.8	ND		

MANILA DISTRICT/Sampling Point No.5 C.M. Recto cor. Legarda MWSS Branch Office

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Plant Operation Finished Water Turbidity(mg/l)
SEPT.18	10:35	29.0	0.2	3.2	6.56	131.9	ND	1.05	3.1
SEPT.25	11:20	29.5	0.2	8.0	6.81	128.0	ND	1.00	4.8
OCT .2	10:10	29.2	0.4	6.9	6.62	135.2	ND	1.10	3.7
OCT .9	10:00	31.4	TRACE	7.9	7.01	137.7	ND	1.18	4.3
OCT .16	10:40	30.5	0.1	3.9	6.97	141.7	ND	1.17	2.5
MAX		31.4	0.4	8.0	7.01	141.7	ND		
MIN		29.0	TRACE	3.2	6.56	128.0	ND		
AVG		29.9	0.2	6.0	6.79	134.9	ND		

MANILA DISTRICT/Sampling Point No.6 #1517 V. Mata cor. Nagtahan under Nagtahan Bridge

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Plant Operation Finished Water Turbidity(mg/l)
SEPT.18	10:56	27.0	0.3	5.5	6.55	130.9	ND	1.05	3.1
SEPT.25	10:44	27.0	0.2	8.6	6.76	127.6	ND	1.00	4.8
OCT .2	10:20	27.2	0.4	8.2	6.56	133.2	ND	1.10	3.7
OCT .9	10:25	27.8	0.1	10.2	6.98	136.2	ND	1.18	4.3
OCT .16	10:55	27.7	0.2	4.0	7.00	141.1	ND	1.17	2.5
MAX		27.8	0.4	10.2	7.00	141.1	ND		
MIN		27.0	TRACE	4.0	6.55	127.6	ND		
AVG		27.3	0.2	7.3	6.77	133.8	ND		

MANILA DISTRICT/Sampling Point No.7 Beata cor. Tomas Claudio nr. Railroad Track

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Finished Water Turbidity(mg/l)
SEPT.18	11:23	27.0	0.1	4.5	6.57	128.5	ND	1.05	3.1
SEPT.25	12:00	27.3	TRACE	5.9	6.75	124.5	ND	1.00	4.8
OCT.2	10:43	27.4	0.1	4.0	6.59	130.1	ND	1.10	3.7
OCT.9	10:35	27.2	TRACE	7.5	6.98	145.3	ND	1.18	4.3
OCT.16	11:10	27.7	0.2	3.1	6.99	150.9	ND	1.17	2.5
MAX		27.7	0.2	7.5	6.99	150.9	ND		
MIN		27.0	TRACE	3.1	6.57	124.5	ND		
AVG		27.3	0.1	5.0	6.78	135.9	ND		

MANILA DISTRICT/Sampling Point No.8 #2223 Sequia cor. Tejeron front of Gas Station

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Finished Water Turbidity(mg/l)
SEPT.18	11:50	27.0	0.1	6.6	6.55	126.3	ND	1.05	3.1
SEPT.25	12:15	27.3	TRACE	6.8	6.73	124.2	ND	1.00	4.8
OCT.2	11:10	27.4	TRACE	4.3	6.58	129.9	ND	1.10	3.7
OCT.9	10:50	27.2	0.1	9.5	7.00	146.3	ND	1.18	4.3
OCT.16	11:25	27.2	0.2	3.9	6.97	151.1	ND	1.17	2.5
MAX		27.4	0.2	9.5	7.00	151.1	ND		
MIN		27.0	TRACE	3.9	6.55	124.2	ND		
AVG		27.2	0.1	6.2	6.77	135.6	ND		

MANILA DISTRICT/Sampling Point No.9 J.P. Rizal cor. Pasong Tamo Lydia's Lechon Stall

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Finished Water Turbidity(mg/l)
SEPT.18	12:00	27.6	0.3	5.1	6.60	146.5	ND	1.05	3.1
SEPT.25	12:26	28.3	0.8	8.6	6.70	132.0	ND	1.00	4.8
OCT.2	11:20	28.4	0.5	9.5	6.58	138.4	ND	1.10	3.7
OCT.9	11:02	28.2	1.2	7.5	6.90	134.1	ND	1.18	4.3
OCT.16	11:40	28.8	1.0	4.0	6.94	144.0	ND	1.17	2.5
MAX		28.8	1.2	9.5	6.94	146.5	ND		
MIN		27.6	0.3	4.0	6.58	132.0	ND		
AVG		28.3	0.8	7.0	6.74	139.0	ND		

MANILA DISTRICT/Sampling Point No.10 Panaderos cor. Lamayan Public Faucet

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Finished Water Turbidity(mg/l)
SEPT.18	12:35	27.0	TRACE	7.1	6.67	131.0	ND	1.05	3.1
SEPT.25	12:45	27.2	0.1	6.8	6.80	123.1	ND	1.00	4.8
OCT .2	11:32	27.3	0.1	5.2	6.61	128.7	ND	1.10	3.7
OCT .9	11:30	27.0	0.1	9.1	6.98	144.5	ND	1.18	4.3
OCT .16	11:55	26.9	0.2	3.2	7.01	150.1	ND	1.17	2.5
MAX		27.3	0.2	9.1	7.01	150.1	ND		
MIN		26.9	TRACE	3.2	6.61	123.1	ND		
AVG		27.1	0.1	6.3	6.81	135.5	ND		

MAKATI DISTRICT/Sampling Point No.1 #2758 Zenaida cor. E. Zobel (nr. Makati. Municipal Hall)

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Plant Operation Finished Water Turbidity(mg/l)
SEPT.12	9:55	26.6	0.3	9.2	6.70	127.3	ND	1.05	3.5
SEPT.19	10:55	27.0	1.0	4.2	6.44	132.8	ND	1.05	4.9
SEPT.26	9:50	27.0	0.4	5.2	6.76	133.1	ND	1.02	4.3
OCT .3	9:37	27.0	0.8	6.0	6.59	140.0	ND	1.10	4.9
OCT .10	9:37	28.1	1.3	5.4	6.97	134.1	ND	1.18	3.1
OCT .17	9:40	27.9	1.3	5.4	6.99	136.5	ND	1.20	2.9
MAX		28.1	1.3	9.2	6.99	140.0	ND		
MIN		26.6	0.3	4.2	6.44	127.3	ND		
AVG		27.3	0.9	5.9	6.74	134.0	ND		

MAKATI DISTRICT/Sampling Point No.2 Yague cor. Kakarong (nr. South Cemetery) Public Faucet

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Plant Operation Finished Water Turbidity(mg/l)
SEPT.12	10:17	26.7	0.3	9.5	6.85	137.9	ND	1.05	3.5
SEPT.19	11:08	26.7	0.3	4.9	6.64	123.3	ND	1.05	4.9
SEPT.26	10:10	26.8	0.2	3.9	6.96	145.5	ND	1.02	4.3
OCT .3	9:50	26.8	0.3	5.4	7.00	152.8	ND	1.10	4.9
OCT .10	9:53	27.2	0.2	3.9	7.08	153.7	ND	1.18	3.1
OCT .17	9:53	27.4	0.4	3.9	7.08	148.5	ND	1.20	2.9
MAX		27.4	0.4	9.5	7.08	153.7	ND		
MIN		26.7	0.2	3.9	6.64	123.3	ND		
AVG		26.9	0.3	5.2	6.94	143.6	ND		

MAKATI DISTRICT/Sampling Point No.3 Real cor. Sta. Potentiana Hydrant Urdaneta Vill.

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Plant Operation Finished Water Turbidity(mg/l)
SEPT.12	10:55	27.2	0.3	**75.5	6.60	125.7	ND	1.05	3.5
SEPT.19	11:37	27.4	0.4	15.1	6.72	129.0	ND	1.05	4.9
SEPT.26	10:35	27.6	0.3	17.7	6.98	136.4	ND	1.02	4.3
OCT .3	10:10	27.1	0.3	29.3	6.82	138.3	ND	1.10	4.9
OCT .10	10:10	28.0	0.8	15.4	7.07	134.8	ND	1.18	3.1
OCT .17	10:10	28.2	0.8	3.1	7.22	137.4	ND	1.20	2.9
MAX		28.2	0.8	75.5	7.22	138.3	ND		
MIN		27.1	0.3	3.1	6.60	125.7	ND		
AVG		27.6	0.5	26.0	6.90	133.6	ND		

** :Sampled in short time after Hydrant opened.

MAKATI DISTRICT/Sampling Point No.4 San Lorenzo Drive cor. Abelardo Security Guardhouse San Lorenzo Vill.

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Finished Water Turbidity(mg/l)
SEPT.12	11:15	27.3	0.2	10.0	6.60	127.8	ND	1.05	3.5
SEPT.19	11:48	27.4	0.9	7.7	6.47	128.1	ND	1.05	4.9
SEPT.26	11:10	27.4	0.4	5.7	6.75	133.9	ND	1.02	4.3
OCT .3	10:40	27.2	0.7	5.1	6.59	140.8	ND	1.10	4.9
OCT .10	10:43	28.4	1.1	4.2	6.87	140.1	ND	1.18	3.1
OCT .17	10:45	28.4	0.8	4.0	6.98	138.1	ND	1.20	2.9
MAX		28.4	1.1	10.0	6.98	140.8	ND		
MIN		27.2	0.2	4.0	6.47	127.8	ND		
AVG		27.7	0.7	6.1	6.71	134.8	ND		

MAKATI DISTRICT/Sampling Point No.5 Magallanes parking Canteen South Supermarket South Superhighway

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Finished Water Turbidity(mg/l)
SEPT.12	11:30	28.7	0.2	4.5	6.67	129.9	ND	1.05	3.5
SEPT.19	12:03	28.3	0.3	2.9	6.47	129.9	ND	1.05	4.9
SEPT.26	11:25	28.0	0.2	4.3	6.76	135.2	ND	1.02	4.3
OCT .3	10:57	28.3	0.5	5.4	6.61	142.8	ND	1.10	4.9
OCT .10	10:58	30.0	0.4	3.9	6.99	139.0	ND	1.18	3.1
OCT .17	11:04	29.5	0.7	4.8	7.06	147.0	ND	1.20	2.9
MAX		30.0	0.7	5.4	7.06	147.0	ND		
MIN		28.0	0.2	2.9	6.47	129.9	ND		
AVG		28.8	0.4	4.3	6.76	137.3	ND		

MAKATI DISTRICT/Sampling Point No.6 Sales/Recto Villamor Airbase Hydrant

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Finished Water Turbidity(mg/l)
SEPT.12	11:48	27.0	0.4	8.9	7.04	125.3	ND	1.05	3.5
SEPT.19	12:15	27.1	0.9	3.9	6.30	126.6	ND	1.05	4.9
SEPT.26	11:40	27.2	0.4	5.4	7.02	130.7	ND	1.02	4.3
OCT .3	11:07	27.9	1.2	6.3	6.84	137.7	ND	1.10	4.9
OCT .10	11:10	28.1	0.7	6.2	7.18	134.3	ND	1.18	3.1
OCT .17	11:16	28.1	1.0	4.9	7.23	136.4	ND	1.20	2.9
MAX		28.1	1.2	8.9	7.23	137.7	ND		
MIN		27.0	0.4	3.9	6.30	125.3	ND		
AVG		27.4	0.8	5.9	6.94	131.8	ND		

MAKATI DISTRICT/Sampling Point No.7 Edsa cor. Pasay Road Dasmarinas Vill. Opp. side of Nikko Hotel

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Finished Water Turbidity(mg/l)
SEPT.12	12:05	26.3	1.0	10.5	6.57	131.0	ND	1.05	3.5
SEPT.19	12:30	27.0	1.0	5.5	6.42	124.8	ND	1.05	4.9
SEPT.26	11:47	27.1	0.8	5.9	6.72	134.7	ND	1.02	4.3
OCT .3	11:25	27.0	1.0	10.9	6.61	139.8	ND	1.10	4.9
OCT .10	11:26	28.0	0.9	5.2	6.91	133.2	ND	1.18	3.1
OCT .17	11:38	28.1	0.8	3.9	7.04	135.2	ND	1.20	2.9
MAX		28.1	1.0	10.9	7.04	139.8	ND		
MIN		26.3	0.8	3.9	6.42	124.8	ND		
AVG		27.3	0.9	7.0	6.71	133.1	ND		

MAKATI DISTRICT/Sampling Point No.8 Edsa cor. Mercedes Hydrant

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Finished Water Turbidity(mg/l)
SEPT.12	13:35	26.8	0.8	10.6	6.77	132.4	ND	1.05	3.5
SEPT.19	11:25	26.8	0.8	5.7	6.62	128.2	ND	1.05	4.9
SEPT.26	10:50	27.0	0.8	7.7	6.80	135.4	ND	1.02	4.3
OCT .3	10:21	26.9	0.8	7.9	6.89	138.3	ND	1.10	4.9
OCT .10	10:28	28.0	1.0	6.6	7.01	133.3	ND	1.18	3.1
OCT .17	10:25	27.9	0.8	5.5	7.14	136.9	ND	1.20	2.9
MAX		28.0	1.0	10.6	7.14	138.3	ND		
MIN		26.8	0.8	5.5	6.62	128.2	ND		
AVG		27.2	0.8	7.3	6.87	134.1	ND		

MAKATI DISTRICT/Sampling Point No.9 Makati Sampling Point P. Burgos St., Outlet

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Finished Water Turbidity(mg/l)
SEPT.12	14:10	26.7	1.0	12.9	6.72	124.3	ND	1.05	3.5
SEPT.19	12:45	26.8	1.0	6.5	6.42	123.8	ND	1.05	4.9
SEPT.26	12:15	26.9	1.2	5.4	6.77	135.2	ND	1.02	4.3
OCT .3	10:41	26.9	1.0	7.7	6.54	137.4	ND	1.10	4.9
OCT .10	11:44	28.0	1.3	7.4	6.80	132.6	ND	1.18	3.1
OCT .17	11:55	27.9	1.3	5.1	7.03	136.7	ND	1.20	2.9
MAX		28.0	1.3	12.9	7.03	137.4	ND		
MIN		26.7	1.0	5.1	6.42	123.8	ND		
AVG		27.2	1.1	7.5	6.71	131.7	ND		

MAKATI DISTRICT/Sampling Point No.10 Makati Pumping Station P. Burgos St., Inlet

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Finished Water Turbidity(mg/l)
SEPT.12	14:15	26.7	1.0	10.0	6.70	126.2	ND	1.05	3.5
SEPT.19	12:50	26.8	1.0	4.2	6.51	123.9	ND	1.05	4.9
SEPT.26	12:10	26.9	1.0	4.6	6.80	134.9	ND	1.02	4.3
OCT .3	10:38	26.9	1.0	9.2	6.84	137.8	ND	1.10	4.9
OCT .10	11:40	28.0	1.3	6.9	6.89	132.5	ND	1.18	3.1
OCT .17	11:52	27.8	1.3	4.6	7.16	136.2	ND	1.20	2.9
MAX		28.0	1.3	10.0	7.16	137.8	ND		
MIN		26.7	1.0	4.2	6.51	123.9	ND		
AVG		27.2	1.1	6.6	6.82	131.9	ND		

MAKATI DISTRICT/Sampling Point No.11 Don Sixto Ave., cor. San Joaquin Rd., (Shell Gas Station)

DATE	TIME	Temp. (C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Finished Water Turbidity(mg/l)
SEPT.26	13:25	28.5	0.4	8.6	6.89	132.4	ND	1.02	4.3
OCT .3	12:05	29.4	0.1	12.5	6.86	138.6	ND	1.10	4.9
OCT .10	12:08	29.2	0.8	7.7	7.07	135.6	ND	1.18	3.1
OCT .17	12:20	30.0	0.2	2.9	7.18	143.4	ND	1.20	2.9
MAX		30.0	0.8	12.5	7.18	143.4	ND		
MIN		28.5	0.1	2.9	6.86	132.4	ND		
AVG		29.3	0.4	7.9	7.00	137.5	ND		

QUEZON CITY DISTRICT / SAMPLING DATE : SEPT.10.1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Plant Operation Finished Water Turbidity(mg/l)
1	9:10	North Ave., cor. Mindanao Ave., Caltex Gas Station	27.3	0.7	9.5	6.71	123.2	ND	1.06	4.5
2	9:20	#91 West Ave., (nr. Phil-AmGate) LongMile Vulcanizing	28.5	0.8	8.5	6.64	122.2	ND		
3	9:55	Tomas Morato cor. Timog Petron Gas Station (Employee's Quarters)	27.3	0.7	8.9	6.68	121.8	ND		
4	10:15	Edsa cor. Mother Ignacia Shell Gas Station	31.5	0.4	12.0	6.64	125.4	ND		
5	10:35	Kamuning-T. Morato Jocelyn's Lumpia House	27.0	0.4	9.5	6.73	124.6	ND		
6	10:55	East Ave., cor. Magalang St., Caltex Station	28.0	0.2	6.0	7.04	125.8	ND		
7	11:15	#35 Kalayaan Ave., Tenemark Appliances Comp.	28.7	0.3	8.0	6.67	124.5	ND		
8	11:45	15th Ave., cor. Main Ave., Goldi Burger Stand	26.4	0.4	5.4	6.70	124.4	ND		
9	12:05	#143 Katipunan Road (Residential)	27.2	0.2	4.6	6.67	127.1	ND		
10	12:50	Xavierville cor. Esteban Abada Ambrosia Restaurant	26.5	0.2	5.2	6.85	126.1	ND		
11	1:00	Katipunan cor. CP Garcia Petron Gas Station	27.5	0.2	4.8	6.88	126.6	ND		

QUEZON CITY DISTRICT / SAMPLING DATE : SEPT. 23. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Finished Water Turbidity(mg/l)
1	9:45	North Ave., cor. Mindanao Ave., Caltex Gas Station	27.2	0.5	6.0	6.62	123.5	ND	1.01	7.1
2	10:00	#91 West Ave., (nr. Phil-AmGate) LongMile Vulcanizing	28.1	0.2	5.7	6.63	122.8	ND		
3	11:00	Tomas Morato cor. Timog Petron Gas Station (Employee's Quarters)	27.6	0.3	7.2	6.67	121.6	ND		
4	10:15	Edsa cor. Mother Ignacia Shell Gas Station	31.5	0.2	2.8	6.62	124.7	ND		
5	11:15	Kamuning-T. Morato Jocelyn's Lumpia House	27.6	0.2	7.7	6.63	120.7	ND		
6	10:25	East Ave., cor. Magalang St., Caltex Station	28.3	0.1	4.8	6.92	124.1	ND		
7	10:45	#35 Kalayaan Ave., Tenemark Appliances Comp.	29.1	0.2	4.5	6.58	123.8	ND		
8	11:40	15th Ave., cor. Main Ave., Goldi Burger Stand	27.0	0.2	10.8	6.69	119.3	ND		
9	12:00	#143 Katipunan Road (Residential)	27.4	0.2	6.6	6.65	124.5	ND		
10	12:58	Xavierville cor. Esteban Abada Ambrosia Restaurant	27.3	0.4	6.2	6.60	121.6	ND		
11	2:20	Katipunan cor. CP Garcia Petron Gas Station	28.2	0.3	9.1	6.62	120.4	ND		
12	12:44	Along Amang Rodriguez Ave., cor. Marcos Hi-way South Supermarket	28.8	0.7	3.5	6.71	127.6	ND		

QUEZON CITY DISTRICT / SAMPLING DATE : SEPT. 30. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
1	9:25	North Ave., cor. Mindanao Ave., Caltex Gas Station	27.5	1.3	8.8	6.70	145.2	ND	1.11	3.4
2	9:37	#91 West Ave., (nr. Phil-AmGate) LongMile Vulcanizing	28.6	1.3	8.0	6.60	143.8	ND		
3	10:05	Tomas Morato cor. Timog Petron Gas Station (Employee's Quarters)	27.0	0.9	9.7	6.60	144.0	ND		
4	9:50	Edsa cor. Mother Ignacia Shell Gas Station	31.0	1.0	14.5	6.64	145.5	ND		
5	10:20	Kamuning-T. Morato Jocelyn's Lumpia House	27.0	0.7	7.7	6.65	139.9	ND		
6	10:55	East Ave., cor. Magalang St., Caltex Station	27.8	0.3	9.2	6.93	164.6	ND		
7	11:17	#35 Kalayaan Ave., Tenemark Appliances Comp.	29.3	0.3	6.2	6.61	143.1	ND		
8	11:35	15th Ave., cor. Main Ave., Goldi Burger Stand	27.2	0.3	6.0	6.64	141.5	ND		
9	11:50	#143 Katipunan Road (Residential)	27.0	0.3	5.9	6.68	143.7	ND		
10	12:34	Xavierville cor. Esteban Abada Ambrosia Restaurant	27.3	0.4	6.6	6.69	139.2	ND		
11	1:07	Katipunan cor. CP Garcia Petron Gas Station	27.6	0.8	8.0	6.64	141.1	ND		
12	12:15	Along Amang Rodriguez Ave., cor. Marcos Hi-way South Supermarket	28.5	0.7	3.1	6.75	147.9	ND		

QUEZON CITY DISTRICT / SAMPLING DATE : OCT. 7. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Plant Operation Finished Water Turbidity(mg/l)
1	8:50	North Ave., cor. Mindanao Ave., Caltex Gas Station	28.5	0.9	8.5	6.98	134.3	ND	1.18	6.8
2	9:05	#91 West Ave., (nr. Phil-AmGate) LongMile Vulcanizing	29.0	0.8	11.7	6.97	132.9	ND		
3	9:35	Tomas Morato cor. Timog Petron Gas Station (Employee's Quarters)	28.4	0.5	7.4	6.99	135.4	ND		
4	9:20	Edsa cor. Mother Ignacia Shell Gas Station	31.2	0.3	5.4	6.91	134.2	ND		
5	10:05	Kamuning-T. Morato Jocelyn's Lumpia House	28.3	0.3	7.5	6.98	140.2	ND		
6	10:15	East Ave., cor. Magalang St., Caltex Station	29.0	0.2	9.2	7.24	135.8	ND		
7	10:30	#35 Kalayaan Ave., Tenemark Appliances Comp.	29.8	0.1	5.4	6.30	137.2	ND		
8	10:55	15th Ave., cor. Main Ave., Goldi Burger Stand	Suspention of water							
9	11:05	#143 Katipunan Road (Residential)	Suspention of water							
10	11:40	Xavierville cor. Esteban Abada Ambrosia Restaurant	28.3	0.3	6.5	7.01	139.8	ND		
11	12:30	Katipunan cor. CP Garcia Petron Gas Station	28.5	0.3	8.2	7.02	140.7	ND		
12	11:20	Along Amang Rodriguez Ave., cor. Marcos Hi-way South Supermarket	29.5	0.2	5.1	7.10	137.9	ND		

QUEZON CITY DISTRICT / SAMPLING DATE : OCT. 14. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
1	9:05	North Ave., cor. Mindanao Ave., Caltex Gas Station	28.6	0.2	5.7	7.01	139.0	ND	1.18	2.6
2	9:15	#91 West Ave., (nr. Phil-AmGate) LongMile Vulcanizing	30.0	0.2	4.9	7.00	137.7	ND		
3	9:45	Tomas Morato cor. Timog Petron Gas Station (Employee's Quarters)	28.6	0.2	7.9	6.99	144.3	ND		
4	9:30	Edsa cor. Mother Ignacia Shell Gas Station	30.5	0.1	5.5	6.97	138.4	ND		
5	9:50	Kamuning-T. Morato Jocelyn's Lumpia House	28.4	0.2	6.5	7.00	145.6	ND		
6	10:10	East Ave., cor. Magalang St., Caltex Station	29.2	0.1	5.0	7.18	136.5	ND		
7	10:20	#35 Kalayaan Ave., Tenemark Appliances Comp.	29.8	TRACE	5.3	7.00	137.7	ND		
8	10:50	15th Ave., cor. Main Ave., Goldi Burger Stand	Suspention of water							
9	11:05	#143 Katipunan Road (Residential)	Suspention of water							
10	12:20	Xavierville cor. Esteban Abada Ambrosia Restaurant	27.6	*0.0	8.9	7.13	144.7	5		
11	12:35	Katipunan cor. CP Garcia Petron Gas Station	28.5	*0.0	2.9	7.05	142.4	15		
12	11:25	Along Amang Rodriguez Ave., cor. Marcos Hi-way South Supermarket	29.0	1.3	6.9	7.05	141.0	ND		

* Water Treatment Plant is power down(10:00-12:00)

QUEZON CITY DISTRICT / SAMPLING DATE : OCT. 21. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose(mg/l)	Finished Water Turbidity(mg/l)
1	11:10	North Ave., cor. Mindanao Ave., Caltex Gas Station	28.7	0.8	3.7	6.88	141.9	ND	1.20	2.3
2	11:20	#91 West Ave., (nr. Phil-AmGate) LongMile Vulcanizing	30.5	0.8	5.1	6.86	142.1	ND		
3	11:43	Tomas Morato cor. Timog Petron Gas Station (Employee's Quarters)	28.5	0.8	3.4	6.90	144.3	ND		
4	11:30	Edsa cor. Mother Ignacia Shell Gas Station	31.0	0.8	2.3	6.87	143.7	ND		
5	11:50	Kamuning-T. Morato Jocelyn's Lumpia House	28.0	0.4	3.4	6.86	146.2	ND		
6	12:05	East Ave., cor. Magalang St., Caltex Station	28.7	TRACE	2.6	7.08	138.6	ND		
7	10:45	#35 Kalayaan Ave., Tenemark Appliances Comp.	29.5	0.1	2.0	6.84	141.8	ND		
8	9:35	15th Ave., cor. Main Ave., Goldi Burger Stand	28.0	0.3	3.9	6.88	141.7	ND		
9	9:45	#143 Katipunan Road (Residential)	28.0	0.3	3.7	6.89	142.1	ND		
10	9:15	Xavierville cor. Esteban Abada Ambrosia Restaurant	27.5	0.4	3.1	6.85	145.8	ND		
11	10:30	Katipunan cor. CP Garcia Petron Gas Station	28.0	0.5	3.5	6.83	149.7	ND		
12	10:10	Along Amang Rodriguez Ave., cor. Marcos Hi-way South Supermarket	28.2	0.2	3.5	7.02	143.0	ND		

SAN JUAN-MANDALUYONG DISTRICT / SAMPLING DATE : SEPT. 11. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
1	9:27	San Juan Pumping Station Inlet Cov. Res. #1	26.0	0.2	5.9	6.61	132.7	ND	1.06	3.5
2	9:35	San Juan Pumping Station Outlet Cov. Res. #1	26.5	1.0	13.6	6.67	126.8	ND		
3	9:50	Mariposa cor. West Road (Gracecourt-Condominium)	26.8	0.9	10.2	6.70	127.7	ND		
4	10:00	Edsa cor. Santolan Machine Hamburger Shop	26.8	0.8	9.2	6.67	126.4	ND		
5	10:15	Connecticut cor. EDSA Caltex Gas Station	26.5	0.9	11.9	6.69	128.9	ND		
6	10:37	Wilson Street ESL Auto Aircon Wilson Circle Vill. Gate	27.0	0.9	15.2	6.62	127.6	ND		
7	10:50	# 192 A. Mabini St., near CM Rector (Apt.)	27.0	0.9	10.2	6.73	126.8	ND		
8	11:20	Meralco Ave., cor. Gen. Segundo Fire Dept. Headquarters	26.8	0.4	8.5	6.79	137.0	ND		
9	11:40	#167-C Pasig Blvd., nr. San Ignacio	27.6	0.3	10.0	6.58	126.4	ND		
10	12:10	Pasig Blvd., (Dr. M. Flores cor. G. Salonga)	28.9	0.2	5.2	6.83	126.1	ND		

SAN JUAN-MANDALUYONG DISTRICT / SAMPLING DATE : SEPT. 17. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
1	10:05	San Juan Pumping Station Inlet Cov. Res. #1	27.3	0.8	6.9	6.51	128.8	ND	1.05	3.9
2	10:20	San Juan Pumping Station Outlet Cov. Res. #1	26.9	0.8	8.9	6.60	129.2	ND		
3	10:35	Mariposa cor. West Road (Gracecourt-Condominium)	27.7	0.4	6.2	6.66	130.7	ND		
4	10:45	Edsa cor. Santolan Machine Hamburger Shop	27.7	0.4	5.5	6.57	131.4	ND		
5	11:05	Connecticut cor. EDSA Caltex Gas Station	27.0	0.5	7.4	6.54	129.2	ND		
6	11:15	Wilson Street ESL Auto Aircon Wilson Circle Vill. Gate	27.8	0.4	6.3	6.56	130.7	ND		
7	11:30	# 192 A. Mabini St., near CM Rector (Apt.)	27.6	0.3	7.5	6.60	129.5	ND		
8	11:57	Meralco Ave., cor. Gen. Segundo Fire Dept. Headquarters	27.0	0.2	6.9	6.69	137.2	ND		
9	12:10	#167-C Pasig Blvd., nr. San Ignacio	29.5	TRACE	3.7	6.70	131.3	ND		
10	12:23	Pasig Blvd., (Dr. M. Flores cor. G. Salonga)	27.2	0.8	6.8	6.58	129.1	ND		

SAN JUAN-MANDALUYONG DISTRICT / SAMPLING DATE : SEPT. 24. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
1	9:25	San Juan Pumping Station Inlet Cov. Res. #1	27.5	0.3	13.6	6.70	121.1	ND	1.00	4.2
2	9:30	San Juan Pumping Station Outlet Cov. Res. #1	27.0	0.4	8.9	6.78	121.6	ND		
3	10:00	Mariposa cor. West Road (Gracecourt-Condominium)	27.5	0.5	10.5	6.72	122.2	ND		
4	10:10	Edsa cor. Santolan Machine Hamburger Shop	27.5	0.2	9.2	6.79	124.8	ND		
5	10:17	Connecticut cor. EDSA Caltex Gas Station	27.0	0.5	10.2	6.65	122.7	ND		
6	10:30	Wilson Street ESL Auto Aircon Wilson Circle Vill. Gate	28.0	0.4	9.4	6.69	123.9	ND		
7	10:45	# 192 A. Mabini St., near CM Rector (Apt.)	27.7	0.4	10.0	6.74	121.2	ND		
8	11:15	Meralco Ave., cor. Gen. Segundo Fire Dept. Headquarters	27.0	0.5	5.1	6.71	124.2	ND		
9	11:25	#167-C Pasig Blvd., nr. San Ignacio	28.2	0.3	6.2	6.70	123.4	ND		
10	11:35	Pasig Blvd., (Dr. M. Flores cor. G. Salonga)	27.5	0.6	13.4	6.66	118.8	ND		
11	12:00	Along Dr. Sixto Antonio Ave., nr. Maybunga Health Center	27.2	0.8	10.2	6.78	119.9	ND		

SAN JUAN-MANDALUYONG DISTRICT / SAMPLING DATE : OCT. 1. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
1	9:05	San Juan Pumping Station Inlet Cov. Res. #1	27.2	0.4	6.8	6.76	134.6	ND	1.10	3.5
2	9:15	San Juan Pumping Station Outlet Cov. Res. #1	27.2	0.5	8.6	6.84	135.7	ND		
3	9:25	Mariposa cor. West Road (Gracecourt-Condominium)	27.3	0.4	8.5	6.71	134.7	ND		
4	9:36	Edsa cor. Santolan Machine Hamburger Shop	26.8	0.6	8.5	6.83	135.3	ND		
5	9:42	Connecticut cor. EDSA Caltex Gas Station	27.0	0.5	11.9	6.78	134.7	ND		
6	9:57	Wilson Street ESL Auto Aircon Wilson Circle Vill. Gate	27.8	0.6	8.5	6.76	136.3	ND		
7	10:10	# 192 A. Mabini St., near CM Rector (Apt.)	27.5	0.6	8.3	6.83	134.8	ND		
8	10:30	Meralco Ave., cor. Gen. Segundo Fire Dept. Headquarters	27.0	0.8	5.4	6.83	135.6	ND		
9	10:45	#167-C Pasig Blvd., nr. San Ignacio	27.7	0.5	6.9	6.79	135.4	ND		
10	10:55	Pasig Blvd., (Dr. M. Flores cor. G. Salonga)	27.2	0.8	4.9	6.78	135.6	ND		
11	11:12	Along Dr. Sixto Antonio Ave., nr. Maybunga Health Center	27.3	0.8	6.6	6.81	134.0	ND		

SAN JUAN-MANDALUYONG DISTRICT / SAMPLING DATE : OCT. 8. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
1	9:23	San Juan Pumping Station Inlet Cov. Res. #1	26.7	0.5	4.5	5.90	149.0	ND	1.16	3.9
2	9:32	San Juan Pumping Station Outlet Cov. Res. #1	28.0	0.3	7.9	7.02	131.2	ND		
3	9:44	Mariposa cor. West Road (Gracecourt-Condominium)	28.3	0.2	6.3	6.99	133.2	ND		
4	9:50	Edsa cor. Santolan Machine Hamburger Shop	27.2	0.1	6.9	7.06	132.6	ND		
5	10:05	Connecticut cor. EDSA Caltex Gas Station	28.0	0.2	6.2	6.98	132.6	ND		
6	10:20	Wilson Street ESL Auto Aircon Wilson Circle Vill. Gate	28.5	0.2	7.4	7.03	133.0	ND		
7	10:29	# 192 A. Mabini St., near CM Rector (Apt.)	28.3	0.2	6.9	7.09	132.4	ND		
8	10:47	Meralco Ave., cor. Gen. Segundo Fire Dept. Headquarters	Suspention of Water supply.							
9	10:55	#167-C Pasig Blvd., nr. San Ignacio	28.3	0.2	6.6	6.93	133.1	ND		
10	11:05	Pasig Blvd., (Dr. M. Flores cor. G. Salonga)	28.1	0.7	6.5	6.93	129.9	ND		
11	11:20	Along Dr. Sixto Antonio Ave., nr. Maybunga Health Center	28.0	TRACE	7.1	7.08	128.7	ND		

SAN JUAN-MANDALUYONG DISTRICT / SAMPLING DATE : OCT. 15. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
1	9:45	San Juan Pumping Station Inlet Cov. Res. #1	26.8	0.3	2.3	6.81	150.2	ND	1.18	5.2
2	9:50	San Juan Pumping Station Outlet Cov. Res. #1	27.0	0.3	3.4	6.94	138.9	ND		
3	10:03	Mariposa cor. West Road (Gracecourt-Condominium)	27.8	0.2	3.2	6.94	139.1	ND		
4	10:13	Edsa cor. Santolan Machine Hamburger Shop	27.3	0.2	3.3	6.98	139.2	ND		
5	10:25	Connecticut cor. EDSA Caltex Gas Station	28.2	0.3	3.5	6.93	138.9	ND		
6	10:43	Wilson Street ESL Auto Aircon Wilson Circle Vill. Gate	28.6	0.2	2.6	6.94	141.3	ND		
7	10:54	# 192 A. Mabini St., near CM Rector (Apt.)	28.1	0.2	2.8	6.93	139.9	ND		
8	11:10	Meralco Ave., cor. Gen. Segundo Fire Dept. Headquarters	Suspention of Water supply.							
9	11:15	#167-C Pasig Blvd., nr. San Ignacio	Suspention of Water supply.							
10	11:25	Pasig Blvd., (Dr. M. Flores cor. G. Salonga)	28.0	1.2	3.5	6.86	139.4	ND		
11	11:40	Along Dr. Sixto Antonio Ave., nr. Maybunga Health Center	28.0	1.2	4.2	6.89	135.8	ND		

SAN JUAN-MANDALUYONG DISTRICT / SAMPLING DATE : OCT. 22. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
1	10:15	San Juan Pumping Station Inlet Cov. Res. #1	27.5	0.5	3.9	7.13	139.7	ND	1.20	2.6
2	10:25	San Juan Pumping Station Outlet Cov. Res. #1	27.8	0.4	2.8	7.12	140.3	ND		
3	10:37	Mariposa cor. West Road (Gracecourt-Condominium)	28.0	0.4	2.9	7.06	140.5	ND		
4	10:45	Edsa cor. Santolan Machine Hamburger Shop	27.0	0.3	3.1	7.16	139.5	ND		
5	10:57	Connecticut cor. EDSA Caltex Gas Station	28.0	0.3	2.6	7.11	140.0	ND		
6	11:13	Wilson Street ESL Auto Aircon Wilson Circle Vill. Gate	28.3	0.4	2.5	7.11	141.9	ND		
7	11:25	# 192 A. Mabini St., near CM Rector (Apt.)	28.0	0.3	2.6	7.10	140.1	ND		
8	11:45	Meralco Ave., cor. Gen. Segundo Fire Dept. Headquarters	Suspention of Water supply.							
9	11:50	#167-C Pasig Blvd., nr. San Ignacio	Suspention of Water supply.							
10	11:55	Pasig Blvd., (Dr. M. Flores cor. G. Salonga)	27.0	0.3	2.8	7.05	140.5	ND		
11	12:10	Along Dr. Sixto Antonio Ave., nr. Maybunga Health Center	27.8	0.2	4.6	7.16	136.8	ND		

MANILA DISTRICT / SAMPLING DATE : SEPT. 18, 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
1	9:35	E. Rodriguez cor. Arsneta Shell Gas Station	27.3	TRACE	3.4	6.57	126.3	ND	1.05	3.1
2	13:26	F. Blumentritt nr. N. Domingo Edna's Chicken Dealer	26.9	0.1	8.5	6.50	131.2	ND		
3	9:46	Santol cor. Manga Ave. nr. R. Magsaysay (nr. MWSS Branch)	26.8	0.2	5.2	6.57	129.1	ND		
4	10:05	#3265 R. Magsaysay cor. Maganda St.	27.2	0.2	4.8	6.57	130.3	ND		
5	10:35	C.M. Recto cor. Legarda MWSS Branch Office	29.0	0.2	3.2	6.56	131.9	ND		
6	10:56	#1517 V. Mata cor. Nagtahan under Nagtahan Bridge	27.0	0.3	5.5	6.55	130.9	ND		
7	11:23	Beata cor. Tomas Claudio nr. Railroad Track	27.0	0.1	4.5	6.57	128.5	ND		
8	11:50	#2223 Sequia cor. Tejeron front of Gas Station	27.0	0.1	6.6	6.55	126.3	ND		
9	12:00	J.P. Rizal cor. Pasong Tamo Lydia's Lechon Stall	27.6	0.3	5.1	6.60	146.5	ND		
10	12:35	Panaderos cor. Lamayan Public Faucet	27.0	TRACE	7.1	6.67	131.0	ND		

MANILA DISTRICT / SAMPLING DATE : SEPT. 25. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
1	10:15	E. Rodriguez cor. Araneta Shell Gas Station	28	TRACE	4.8	6.64	126.0	ND	1.00	4.8
2	10:35	F. Blumentritt nr. N. Domingo Edna's Chicken Dealer	27.2	0.1	6.2	6.71	126.2	ND		
3	10:47	Santol cor. Manga Ave. nr. R. Magsaysay (nr. MWSS Branch)	27.1	0.1	6.6	6.78	127.2	ND		
4	11:00	#3265 R. Magsaysay cor. Maganda St.	27.2	0.2	7.9	6.67	126.4	ND		
5	11:20	C.M. Recto cor. Legarda MWSS Branch Office	29.5	0.2	8.0	6.81	128.0	ND		
6	10:44	#1517 V. Mata cor. Nagtahan under Nagtahan Bridge	27.0	0.2	8.6	6.76	127.6	ND		
7	12:00	Beata cor. Tomas Claudio nr. Railroad Track	27.3	TRACE	5.9	6.75	124.5	ND		
8	12:15	#2223 Sequia cor. Tejeron front of Gas Station	27.3	TRACE	6.8	6.73	124.2	ND		
9	12:26	J.P. Rizal cor. Pasong Tamo Lydia's Lechon Stall	28.3	0.8	8.6	6.70	132.0	ND		
10	12:45	Panaderos cor. Lamayan Public Faucet	27.2	0.05	6.8	6.80	123.1	ND		

MANILA DISTRICT / SAMPLING DATE : OCT. 2. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
1	9:20	E. Rodriguez cor. Araneta Shell Gas Station	27.7	TRACE	2.9	6.57	130.8	ND	1.10	3.7
2	9:30	F. Blumentritt nr. N. Domingo Edna's Chicken Dealer	27.3	0.2	4.6	6.60	132.1	ND		
3	9:45	Santol cor. Manga Ave. nr. R. Magsaysay (nr. MWSS Branch)	27.1	0.2	5.4	6.65	132.9	ND		
4	9:55	#3265 R. Magsaysay cor. Maganda St.	27.3	0.4	6.0	6.60	134.6	ND		
5	10:10	C.M. Recto cor. Legarda MWSS Branch Office	29.2	0.4	6.9	6.62	135.2	ND		
6	10:20	#1517 V. Mata cor. Nagtahan under Nagtahan Bridge	27.2	0.4	8.2	6.56	133.2	ND		
7	10:43	Beata cor. Tomas Claudio nr. Railroad Track	27.4	0.1	4.0	6.59	130.1	ND		
8	11:10	#2223 Sequia cor. Tejeron front of Gas Station	27.4	TRACE	4.3	6.58	129.9	ND		
9	11:20	J.P. Rizal cor. Pasong Tamo Lydia's Lechon Stall	28.4	0.5	9.5	6.58	138.4	ND		
10	11:32	Panaderos cor. Lamayan Public Faucet	27.3	0.1	5.2	6.61	128.7	ND		

MANILA DISTRICT / SAMPLING DATE : OCT. 9. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
1	9:05	E. Rodriguez cor. Araneta Shell Gas Station	27.2	0.1	10.2	6.92	148.6	ND	1.18	4.3
2	9:20	F. Blumentritt nr. N. Domingo Edna's Chicken Dealer	27.3	TRACE	8.0	6.98	142.9	ND		
3	9:30	Santol cor. Manga Ave. nr. R. Magsaysay (nr. MWSS Branch)	27.3	TRACE	8.5	7.02	142.6	ND		
4	9:35	#3265 R. Magsaysay cor. Maganda St.	28.0	TRACE	9.2	6.95	136.2	ND		
5	10:00	C. M. Recto cor. Legarda MWSS Branch Office	31.4	TRACE	7.9	7.01	137.7	ND		
6	10:25	#1517 V. Mata cor. Nagtahan under Nagtahan Bridge	27.8	0.1	10.2	6.98	136.2	ND		
7	10:35	Beata cor. Tomas Claudio nr. Railroad Track	27.2	TRACE	7.5	6.98	145.3	ND		
8	10:50	#2223 Sequia cor. Tejeron front of Gas Station	27.2	0.1	9.5	7.00	146.3	ND		
9	11:02	J. P. Rizal cor. Pasong Tamo Lydia's Lechon Stall	28.2	1.2	7.5	6.90	134.1	ND		
10	11:30	Panaderos cor. Lamayan Public Faucet	27.0	0.1	9.1	6.98	144.5	ND		

MANILA DISTRICT / SAMPLING DATE : OCT. 16. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
1	9:50	E. Rodriguez cor. Araneta Shell Gas Station	27.2	0.2	3.5	6.92	154.0	ND	1.17	2.5
2	10:03	F. Blumentritt nr. N. Domingo Edna's Chicken Dealer	27.4	0.2	3.1	6.97	148.5	ND		
3	10:15	Santol cor. Manga Ave. nr. R. Magsaysay (nr. MWSS Branch)	27.3	0.1	3.4	6.98	148.2	ND		
4	10:25	#3265 R. Magsaysay cor. Maganda St.	28.0	TRACE	3.7	7.01	141.6	ND		
5	10:40	C.M. Recto cor. Legarda MWSS Branch Office	30.5	0.1	3.9	6.97	141.7	ND		
6	10:55	#1517 V. Mata cor. Nagtahan under Nagtahan Bridge	27.7	0.2	4.0	7.00	141.1	ND		
7	11:10	Beata cor. Tomas Claudio nr. Railroad Track	27.7	0.2	3.1	6.99	150.9	ND		
8	11:25	#2223 Sequia cor. Tejeron front of Gas Station	27.2	0.2	3.9	6.97	151.1	ND		
9	11:40	J.P. Rizal cor. Pasong Tamo Lydia's Lechon Stall	28.8	1.0	4.0	6.94	144.0	ND		
10	11:55	Panaderos cor. Lamayan Public Faucet	26.9	0.2	3.2	7.01	150.1	ND		

MAKATI DISTRICT / SAMPLING DATE : SEPT. 12. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
1	9:55	#2758 Zenaida cor. E. Zobel (nr. Mkti. Mun. Hall)	26.6	0.3	9.2	6.70	127.3	ND	1.05	3.5
2	10:17	Yague cor. Kakarong (nr. South Cemetery) Public Faucet	26.7	0.3	9.5	6.85	137.9	ND		
3	10:55	Real St. cor. Sta. Potenciana Secrutiy Guardhouse Urdaneta Vill.	27.2	0.3	75.5	6.60	125.7	ND		
4	11:15	San Lorenzo Drive cor. Abelardo Security Guard- house San Lorenzo Vill	27.3	0.2	10.0	6.60	127.8	ND		
5	11:30	Magallanes parking Canteen South Supermarket South Superhighway	28.7	0.2	4.5	6.67	129.9	ND		
6	11:48	Sales/Recto Villamor Airbase Hydrant	27.0	0.4	8.9	7.04	125.3	ND		
7	12:05	Edsa cor. Pasay Road Dasmarinas Vill. Opp. side of Nikko Hotel	26.3	1.0	10.5	6.57	131.0	ND		
8	13:35	Edsa cor. Mercedes Fire Hydrant	26.8	0.8	10.6	6.77	132.4	ND		
9	14:10	Makati Pumping Stn. P. Burgos St., Inlet	26.7	1.0	12.9	6.72	124.3	ND		
10	14:15	Makati Pumping Stn. P. Burgos St., Outlet	26.7	1.0	10.0	6.70	126.2	ND		

MAKATI DISTRICT / SAMPLING DATE : SEPT. 19. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
1	10:55	#2758 Zenaida cor. E. Zobel (nr. Mkti. Mun. Hall)	27.0	1.0	4.2	6.44	132.8	ND	1.05	4.9
2	11:08	Yague cor. Kakarong (nr. South Cemetery) Public Faucet	26.7	0.3	4.9	6.64	123.3	ND		
3	11:37	Real St. cor. Sta. Potenciana Secrutiy Guardhouse Urdaneta Vill.	27.4	0.4	15.1	6.72	129.0	ND		
4	11:48	San Lorenzo Drive cor. Abelardo Security Guard- house San Lorenzo Vill	27.4	0.9	7.7	6.47	128.1	ND		
5	12:03	Magallanes parking Canteen South Supermarket South Superhighway	28.3	0.3	2.9	6.47	129.9	ND		
6	12:15	Sales/Recto Villamor Airbase Hydrant	27.1	0.9	3.9	6.30	126.6	ND		
7	12:30	Edsa cor. Pasay Road Dasmarinas Vill. Opp. side of Nikko Hotel	27.0	1.0	5.5	6.42	124.8	ND		
8	11:25	Edsa cor. Mercedes Fire Hydrant	26.8	0.8	5.7	6.62	128.2	ND		
9	12:45	Makati Pumping Stn. P. Burgos St., Inlet	26.8	1.0	6.5	6.42	123.8	ND		
10	12:50	Makati Pumping Stn. P. Burgos St., Outlet	26.8	1.0	4.2	6.51	123.9	ND		

MAKATI DISTRICT / SAMPLING DATE : SEPT. 26. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
1	9:50	#2758 Zenaida cor. E. Zobel (nr. Mkti. Mun. Hall)	27.0	0.4	5.2	6.76	133.1	ND	1.02	4.3
2	10:10	Yague cor. Kakarong (nr. South Cemetery) Public Faucet	26.8	0.2	3.9	6.96	145.5	ND		
3	10:35	Real St. cor. Sta. Potenciana Secrutiy Guardhouse Urdaneta Vill.	27.6	0.3	17.7	6.98	136.4	ND		
4	11:10	San Lorenzo Drive cor. Abelardo Security Guard- house San Lorenzo Vill	27.4	0.4	5.7	6.75	133.9	ND		
5	11:25	Magallanes parking Canteen South Supermarket South Superhighway	28.0	0.2	4.3	6.76	135.2	ND		
6	11:40	Sales/Recto Villamor Airbase Hydrant	27.2	0.4	5.4	7.02	130.7	ND		
7	11:47	Edsa cor. Pasay Road Dasmarinas Vill. Opp. side of Nikko Hotel	27.1	0.8	5.9	6.72	134.7	ND		
8	10:50	Edsa cor. Mercedes Fire Hydrant	27.0	0.8	7.7	6.80	135.4	ND		
9	12:15	Makati Pumping Stn. P. Burgos St., Inlet	26.9	1.2	5.4	6.77	135.2	ND		
10	12:10	Makati Pumping Stn. P. Burgos St., Outlet	26.9	1.0	4.6	6.80	134.9	ND		
11	13:25	Don Sixto Antonio Ave., cor. San Joaquin Rd., (Shell Gas Station)	28.5	0.4	8.6	6.89	132.4	ND		

MAKATI DISTRICT / SAMPLING DATE : OCT. 3. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
1	9:37	#2758 Zenaida cor. E. Zobel (nr. Mkti. Mun. Hall)	27.0	0.8	6.0	6.59	140.0	ND	1.10	4.9
2	9:50	Yague cor. Kakarong (nr. South Cemetery) Public Faucet	26.8	0.3	5.4	7.00	152.8	ND		
3	10:10	Real St. cor. Sta. Potenciana Secrutiy Guardhouse Urdaneta Vill.	27.1	0.3	29.3	6.82	138.3	ND		
4	10:40	San Lorenzo Drive cor. Abelardo Security Guard- house San Lorenzo Vill	27.2	0.7	5.1	6.59	140.8	ND		
5	10:57	Magallanes parking Canteen South Supermarket South Superhighway	28.3	0.5	5.4	6.61	142.8	ND		
6	11:07	Sales/Recto Villamor Airbase Hydrant	27.0	1.2	6.3	6.84	137.7	ND		
7	11:25	Edsa cor. Pasay Road Dasmarinas Vill. Opp. side of Nikko Hotel	27.0	1.0	10.9	6.61	139.8	ND		
8	10:21	Edsa cor. Mercedes Fire Hydrant	26.9	0.8	7.9	6.89	138.3	ND		
9	10:41	Makati Pumping Stn. P. Burgos St., Inlet	26.9	1.0	7.7	6.54	137.4	ND		
10	10:38	Makati Pumping Stn. P. Burgos St., Outlet	26.9	1.0	9.2	6.84	137.8	ND		
11	12:05	Don Sixto Antonio Ave., cor. San Joaquin Rd., (Shell Gas Station)	29.4	0.1	12.5	6.86	138.6	ND		

MAKATI DISTRICT / SAMPLING DATE : OCT. 10. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
1	9:37	#2758 Zenaida cor. E. Zobel (nr. Mkti. Mun. Hall)	28.1	1.3	5.4	6.97	134.1	ND	1.18	3.1
2	9:53	Yague cor. Kakarong (nr. South Cemetery) Public Faucet	27.2	0.2	3.9	7.08	153.7	ND		
3	10:10	Real St. cor. Sta. Potenciana Secrutiy Guardhouse Urdaneta Vill.	28.0	0.8	15.4	7.07	134.8	ND		
4	10:43	San Lorenzo Drive cor. Abelardo Security Guard- house San Lorenzo Vill	28.4	1.1	4.2	6.87	140.1	ND		
5	10:58	Magallanes parking Canteen South Supermarket South Superhighway	30.0	0.4	3.9	6.99	139.8	ND		
6	11:10	Sales/Recto Villamor Airbase Hydrant	28.1	0.7	6.2	7.18	134.3	ND		
7	11:26	Edsa cor. Pasay Road Dasmarinas Vill. Opp. side of Nikko Hotel	28.0	0.9	5.2	6.91	133.2	ND		
8	10:28	Edsa cor. Mercedes Fire Hydrant	28.0	1.0	6.6	7.01	133.3	ND		
9	11:44	Makati Pumping Stn. P. Burgos St., Inlet	28.0	1.3	7.4	6.80	132.6	ND		
10	11:40	Makati Pumping Stn. P. Burgos St., Outlet	28.0	1.3	6.9	6.89	132.5	ND		
11	12:08	Don Sixto Antonio Ave., cor. San Joaquin Rd., (Shell Gas Station)	29.2	0.8	7.7	7.07	135.6	ND		

MAKATI DISTRICT / SAMPLING DATE : OCT. 17. 1991

NO.	TIME	LOCATION	Temp. (°C)	Res. Chlorine (mg/l)	Turbidity (mg/l)	pH	Conductivity (uS/cm)	Coliform (count/ml)	Plant Operation Chlorine Dose (mg/l)	Plant Operation Finished Water Turbidity (mg/l)
1	9:40	#2758 Zenaida cor. E. Zobel (nr. Mkti. Mun. Hall)	27.9	1.3	5.4	6.99	136.5	ND	1.20	2.9
2	9:53	Yague cor. Kakarong (nr. South Cemetery) Public Faucet	27.4	0.4	3.9	7.08	148.5	ND		
3	10:10	Real St. cor. Sta. Potenciana Secrutiy Guardhouse Urdaneta Vill.	28.2	0.8	3.1	7.22	137.4	ND		
4	10:45	San Lorenzo Drive cor. Abelardo Security Guard- house San Lorenzo Vill	28.4	0.8	4.0	6.98	138.1	ND		
5	11:04	Magallanes parking Canteen South Supermarket South Superhighway	29.5	0.7	4.8	7.06	147.0	ND		
6	11:16	Sales/Recto Villamor Airbase Hydrant	28.1	1.0	4.9	7.23	136.4	ND		
7	11:38	Edsa cor. Pasay Road Dasmarinas Vill. Opp. side of Nikko Hotel	28.1	0.8	3.9	7.04	135.2	ND		
8	10:25	Edsa cor. Mercedes Fire Hydrant	27.9	0.8	5.5	7.14	136.9	ND		
9	11:55	Makati Pumping Stn. P. Burgos St., Inlet	27.9	1.3	5.1	7.03	136.7	ND		
10	11:52	Makati Pumping Stn. P. Burgos St., Outlet	27.8	1.3	4.6	7.16	136.2	ND		
11	12:20	Don Sixto Antonio Ave., cor. San Joaquin Rd., (Shell Gas Station)	30.0	0.2	2.9	7.18	143.4	ND		

APPENDIX L EVALUATION ON DETERIORATION OF MECHANICAL EQUIPMENT

The deterioration of the mechanical equipment will be estimated mainly by four important factors; a) installed year; b) frequency of operation; c) location and humidity; d) fragility/precision

A detailed classification of each category is as follows:

1. Installed Year (Completed Project)

a. 1935 - Sedimentation basins and Filters in Plant No. 1
b. 1958 - Accelators in Plant No. 1 and 12 filters in Plant No. 2
c. 1965 - 6 Sedimentation basins (South) in Plant No. 2
d. 1968 - Additional 6 Sedimentation basins (North) in Plant No.2
e. 1970 - Additional 8 filters in Plant No. 2
f. 1981 - Rehabilitation of the entire plant
g. Others - Minor replacements after 1981

2. Frequency of Operation

a. Continuous - Rapid mixer, flocculation, effluent valve in filter
b. Daily or more - Washwater pump, recovery water pump
c. Weekly or more - Sluice gate/valve in filter
d. Annually or more- Sluice gate/valve in Sedimentation basin

3. Location/Humidity

a. Humid/corrosive - Pit, basement of filter building/alum, chlorine
b. Submergence - Accelator, flocculation/Sedimentation basin
c. Above ground/outdoor - -ditto-
d. Above ground/indoor - Pump house, ground floor of filter building

4. Fragility/Precision

a. Precise - Variable speed gear, reduction gear, Rotodip, chlorinator
b. Ordinary- Pump, motor, hydraulic penstock/valve
c. Simple - Manual sluice gate/valve

Taking into consideration the above four categories, the degree of deterioration is evaluated using the following Table L.1:

TABLE L.1 EVALUATION STANDARD

ITEM	RATING (POINTS)		
Year	1935	1958-70	1981
	20	15	10
Operation	Continuous	Daily/weekly	Annually
	20	15	5
Location	Humid/ Corrosive	Underwater	Aboveground
	20	10	5
Fragility/Precision	Precise	Ordinary	Simple
	40	30	10

The results of the evaluation are shown in Tables L.2, L.3, and L.4. The tables are to be used as one of the indexes to determine the deterioration.

Total Points	Type of Rehabilitation
more than 70	Replacement
60 to 70	Repair/Replacement
less than 60	Minor Repair if required

In addition to this result, actual rehabilitation works, however, shall be determined considering importance of the equipment, frequency/cost of repair after installation, etc.

During the inspection of the Study Team, it was observed that most of the mechanical facilities were operational and the operators were trying their best to maintain the plant in good condition. However, the facilities are in its advanced stage of deterioration and will require immediate repair and in some cases, total replacement.

TABLE L.2 DETERIORATION OF MECHANICAL EQUIPMENT OF PLANT NO. 1

EQUIPMENT	YEAR	OPERATION	LOCATION	FRAGILITY	TOTAL
Rapid mixer	10	20	5	40	75
Flocculator	10	20	5	40	75
Sluice gate	20	5	5	10	40
Drain valve	20	5	20	10	55
Accelator					
- variable Speed Gear	10	20	5	40	75
- Reduction Gear	15	20	5	40	80
- Air Compressor	15	15	5	40	75
- Sludge Valve	15	15	20	30	80
- Inflow Valve	15	5	10	10	40
Hydraulic Control					
- Pump	10	15	20	30	75
- Air Compressor	10	15	20	40	85
- Tank	15	15	20	10	60
Pneumatic Control					
- Air Compressor	10	15	20	40	85
- Air Dryer	10	20	20	30	80
Filter					
- Hydraulic Sluice gate	15	15	10	30	70
- Hydraulic Valve	10	15	20	30	75
- Manual Valve	10	5	20	10	45
Main Valve					
- Effluent	20	15	20	10	65
- Backwash	10	15	20	30	75
- Surface Wash	10	15	20	30	75
Washwater Pump	15	15	5	30	65
Recovery Pump	15	15	5	30	65

TABLE L.3 DETERIORATION OF MECHANICAL EQUIPMENT OF PLANT NO. 2

EQUIPMENT	YEAR	OPERATION	LOCATION	FRAGILITY	TOTAL
Flocculator					
- Drive Unit	15	20	5	40	80
- Paddle	15	20	10	10	55
- Sluice gate	15	5	10	10	40
Filter					
- Hydraulic Sluice gate	15	15	10	30	70
- Hydraulic Valve	10	10	20	30	70
Hydraulic Control					
- Pump	10	15	20	30	75
- Air Compressor	10	15	20	40	85
- Tank	10	15	20	10	55
Pneumatic Control					
- Air Compressor	10	15	5	40	70
- Air Dryer	10	20	20	30	80
Main Valve					
- Backwash	10	15	20	30	75
- Surface wash	10	15	20	30	75
Washwater Pump	15	15	5	30	65
Recovery Pump	10	15	5	30	60

TABLE L.4 DETERIORATION OF MECHANICAL EQUIPMENT OF CHEMICAL/CHLORINE HOUSE

EQUIPMENT	YEAR	OPERATION	LOCATION	FRAGILITY	TOTAL
Alum Feeder	10	20	20	40	90
Polymer Tank	10	20	5	10	45
Polymer Mixer	10	15	5	30	60
Polymer Feeder	10	20	5	40	75
Evaporation	10	20	20	40	90
Chlorinator	10	20	20	40	90
Booster Pump	10	20	20	30	80

APPENDIX M SELECTION OF EQUIPMENT FOR REHABILITATION

In terms of the Rehabilitation Plan that includes mainly mechanical and electrical facilities, it is impractical to attend to the other alternatives technically in some levels. Actually, the implementation of the major rehabilitation scheme is directly related to various aspects, not only technical but also financial and other critical aspects.

In the preparation, a series of steps were carried out to come up with an optimum level of rehabilitation plan, initiated by setting-up a selection plan of equipment as described hereunder.

The selection plan of equipment, a framework from which the Rehabilitation Plan is classified according to the technical and other related aspects, includes a possible equipment list (see attached tables) that was chosen for every treatment process according to the following plans:

PLAN 1 provides rehabilitation works with the existing treatment process unaltered that is focused on the replacement of superannuated items for mechanical and electrical facilities.

PLAN 2 provides rehabilitation works with the existing plant capacity upgraded that is connected to reliable water quality control and O & M.

PLAN 3 provides rehabilitation works with the improvement on the treatment process including minor modification of the structure that is connected to the application of modernization of each process.

Each possible equipment plan is further evaluated technically taking into consideration the construction plan, hydraulic constraints, water quality control and O & M. Then, the final classification of rehabilitation is formulated according to three levels as shown in Level 1, Level 2, and Level 3, Main Report.

APPENDIX M SELECTION PLAN OF EQUIPMENT FOR REHABILITATION

PLANT NO. 1

ITEM	FACILITIES	PLAN 1	PLAN 2	PLAN 3
1	Aqueduct No. 1 & No. 2	Replacement of sluice gate guides (4 units)	<---------	<---------
		4 units out of 5 units of sluice gate guide are not functional due to wear out. Replacement is preferable so as to recover their functions including shutdown of aqueduct in the event of reguar maintenance and inflow rate control to the accelators.		
2	Rapid Mixing	Replacement of rapid mixers (2 units) Construction of baffle walls	Replacement of rapid mixers to higher performance of rapid mixing	<---------
		Although 2 units of rapid mixers are maintained operational at present, frequency and cost of maintenance are increasing due to superannuation. Metal parts are corroded and rotation is not stable. As rapid mixing is one of the most important processes to ensure good results in water treatment, replacement is recommended before wear out.		
3	Flocculation	Replacement of Flocculators (24 + 2 units)	Replacement of flocculators to widen range of agitation	Reconstruction of baffled channel flocculation
		Although almost of flocculators are maintained operational at present, frequency and cost of maintenance are increasing due to superannuation. Metal parts are corroded and rotation is not stable. As flocculation is one of the most important processes to ensure good results in water treatment, replacement is recommended before wear out.		
4	Sedimentation	Replacement of drain valves (basin-6 units) (channel-4 units)	Construction of collecting troughs with perforated baffle walls. Construction of baffle walls in the basin No. 2 (L.S.)	Installation of inclined plates with sludge removal system. Dredging of the sludge discharge creek.
		Overflow rate is calculated to be over 6,000 m3/m/d that extremely deviate from 300 to 500 m3/m/day of standard. Accordingly floc carried over to filters are observed and filter run might be shortened. Construction of collecting troughs at the end of the sedimentation basins is indispensable as a solution to the present situation. Perforated baffle wall is also preferable to promote the improvement of flow. It is important that current that could stir up any settled solids and carry them as effluent do not develop in the outlet zone of sedimentation basins. Sludge discharge is not functioning due to insufficient hydraulic gradient between the sedimentation basins No. 1 & No.2 and discharge creek on the premises of the Plant caused by accumulation of discharged sludge.		

APPENDIX M SELECTION PLAN OF EQUIPMENT FOR REHABILITATION

PLANT NO. 1

ITEM	FACILITIES	PLAN 1	PLAN 2	PLAN 3
		Meanwhile, inclined plates that could increase treatment capacity without major structural changes is classified as Alt. 3.		
5	Accelators	Replacement of driving units. (2 units) Replacement of sludge blow-off equipment (2 sets)	<---------	Installation of inclined plates
		Although 2 units of rotor mixing units are maintained operational at present, frequency and cost of maintenance are increasing due to superannuation. Parts of metals are corroded. As driving units provide such important roles as combination of coagulation and flocculation, replacement is preferable before wear out. Mixing performance will be kept the same as the existing facilities. Sludge blow-off system, bearing an essential role to maintain stable slurry concentration, is out of order. Recovering functional order, easy operation, and replacement is preferable. Inclined plates that could increase treatment capacity without major structional changes is classified as Alt. 3		
6	Filtration	Replacement of rate of flow controllers for filtration. (10 units) Replacement of Venturi tubes (10 units) Replacement of rate of flow controllers for surface wash and backwash (1 unit each) Replacement of seals of inlet and drain sluice gates (10 units each) Replacement of pumps and air compressors for hydraulic control Replacement of air compressors for pneumatic instrumentation	Replacement of anthracite Improvement of surface wash system (10 basins)	Installation of surface wash pumps Modification of filtration system from constant flow rate (the existing system) to variable declining rate.
		Equipment listed in Alt. 1 are out of order. Accordingly filter operation depends on manipulation of each equipment without confirmation of loss of head status, filter run, and filtered water quality at present. Replacement of worn-out equipment is preferable to ensure good results of water treatment. Improvement of surface wash system is also preferable. The existing perforated surface wash system is likely imperfect especially during initial operation periods due to perforation angle to anthracite. Improvement shall be carried out by changing the perforation angle to anthracite or additional installation of surface wash nozzles. Replacement of anthracite shall be considered according to the grain size analysis results, including seive analysis and further physicochemical analysis available at the site. It is, however, observed that due to the loss of anthracite during		

PLANT NO. 1

ITEM	FACILITIES	PLAN 1	PLAN 2	PLAN 3
		backwashing, supplemental amount of anthracite for replenishment shall be included with the Rehab. Availability is also classified on the modification of filtration system from constant flow rate to variable declining rate.		
7	Washwater Transmission	Replacement of washwater transmission pumps (3 units) Repair of pump house (L.S.)	<---------	<---------
		Although washwater transmission pumps are maintained operational at present, frequency and cost of maintenance are increasing due to superannuation. Furthermore, pumping efficiency is low compared to the designed value due to apparent leakage at the bearings. Together with the replacement of equipment, superannuated pump house is needed to be repaired.		
8	Washwater recovery	N/A	Replacement of washwater recovery pumps. (3 units) Reconstruction of pump house (7m X 5m:L.S)	Change of washwater returning point (L.S.)
		Although washwater recovery pumps are maintained operational at present, frequency and cost of maintenance are increasing due to superannuation. Furthermore, pump efficiency is low compared to the design value due to apparent leakage at the pump bearings. Accordingly replacement of pumps are preferable, at the same time, discharge capacity of pumps shall be optimized, assuming that washing shall be implemented at 4 basins per shift. Recovered water is then preferable to return to just before rapid mixer of Sedimentation Basin No. 1 instead of No. 2 of which treatment effects are likely worse than that of No. 1 due to unstable current caused by curved structure. For the supply of seed sludge for the accelators, pipings are also preferable to be branched from the washwater returning pipe to the accelators.		

APPENDIX M SELECTION PLAN OF EQUIPMENT FOR REHABILITATION

PLANT NO. 2

ITEM	FACILITIES	PLAN 1	PLAN 2	PLAN 3
9	Rapid mixing (parshall flume)	Replacement of inflow level indicators (2 units)	<---	<---
		At present, partial flume is working effectively as a hydraulic rapid mixer (see reference no. 5), however, the other function of flow measurement is spoiled due to wear out of inflow level indicators.		
10	Flocculation	Replacement of flocculators	Construction of baffle walls (L.S.)	Change from the existing horizontal paddle type to vertical turbine type
		Several units of flocculators are not operational due to defective driving gears, chain, and severe water leakage at driving shafts. Even on operational units of flocculators, frequency and cost of maintenance are increasing due to superannnuation. Metal parts are corroded and rotation is not stable. Accordingly replacement of all units of flocculators are preferable. Then optimization will be conducted including changing the flocculator diameter, shaft level and location Furthermore, construction of baffle walls are preferable to prevent short-circuiting through flocculation basins. Meanwhile, applications of vertical turbine type same as Plant No. 1 is classified as Alt. 3		
11	Sedimentation	Reinforcement of foundations of inflow sluice gate guides. (24 units)	Construction of collecting troughs with perforated baffle walls.	Installation of inclined plates with sludge removal system.
		Some cracks on the foundation of the sluice gate guides are apparent. Accordingly, some ste facilities to support the sluice gate guides shall be installed. Replacement of all inflow sluice gates are preferable before wear even if some of them are maintained in operational at present so as to recover their functions, including dhut-down of inflow to the flocculation and sedimentation basins in th event of maintenance of flocculators and sludge cleaning. Overflow rate of the existing weir of each sedimentation basin is calculated to be over 5,000 m3/m/d that extremely deviate from 300 to 500 m3/m/d of standard. Carrying over of particles which are stirred up after once settling are observed (see reference No. 7). Accordingly the construction of collecting troughs together with perforated baffle wall are indispensable as a solution to the present situation. Meanwhile, inclined plates that could increase production capacity withouth major changes is classified as Alt. 3		
12	Filtration	Replacement of control units (20 units) Replacement of rate of flow controllers for	Replacement of anthracite Improvement of surface wash system (20 basins) Improvement of washwater	Construction of roof for basin No. 1, 2, 3, 4, 17, 18, 19, and 20.

PLANT NO. 2

ITEM	FACILITIES	PLAN 1	PLAN 2	PLAN 3
		filtration (20 units) Replacement of rate of flow controllers for surface wash and backwash (1 each) Replacement of seals of inlet and drain sluice gate (20 units each) Replacement of pumps and air compressors for hydraulic control. Replacement of air compressors for pneumatic instrumentation	troughs	
		In addition to the same reasons as filtration of plant No.1, the following : are pointed out: Washwater troughs are not functional due to submergence during backwash, a series of hydraulic problems such as opening size of washwater drainage sluice gate and available hydraulic gradient through troughs and drainage channel. As a solution to these problems, change of washwater drainage sluice gates and raising of top level of troughs are considered. Then, raising of top level of washwater trough, according to hydraulic calculation and actual operational conditions, is preferable. Meanwhile, Alt. 3 shall be withdrawn from the Rehab. project since investigation results show that roofing has little effect on the treated water quality.		
13	Washwater transmission	Replacement of pumps (3 units) Repair of pump house (L.S.)	< --------	< --------
		Although washwater transmission pumps are maintained operational at present, frequency and cost of maintenance are increasing due to superannuation. Since washwater is indispensable to recover the function of filter beds by means of surface wash and backwashing, replacement of pumps is preferable before wear out. Together with the replacement of equipment, superannuated portion of pump house is preferable to be repaired as pumps are kept in good conditions.		
14	Washwater recovery	N/A	N/A	Replacement of pumps (3 units) Construction of washwater recovery tank and pumphouse (L.S.)

PLANT NO. 2

ITEM	FACILITIES	PLAN 1	PLAN 2	PLAN 3
		At present, washwater recovery is puaped at the overflow weir installed at the washwater drainage creek on the premises of the Plant and returned to the accelators. To upgrade at the same level as plant No. 1 where aeration tank is available as a storage tank of washwater tank, construction of washwater recovery tank provided with pumps is preferable. Then, water shall be returned to just before parshall flume of plant No. 2		
15	Chemical dosing (Alum)	Replacement of feeders (6 units)	Installation of calibration flow meter (L.S.) Construction of elevated foundation for feeders	<---------
		Mechanical parts which control the rotation speed of rotodip are superannuated so that actual dose amount is not reliable. The actual dose amount checked by the Consultants supports the above fact. Accordingly, together with replacement of feeders, installation of calibration flow meter is preferable, the Construction of elevated foundation for feeders is preferable to ensure the mixing of solution water with Alua.		
16	Chemical dosing (Chlorine)	Replacement of chlorinators (4 units) Replacement of evaporators (2 units) Replacement of chlorine leak detectors (3 units) Replacement of exhaust fan (3 units) Replacement of hoist (1 unit) Replacement of chlorine booster pumps (3 units) Replacement of dosing pipelines (3 lines)	Expansion of chlorine storage house. (L.S.) Installation of hoisting rail.	<---------
		Equipment listed in Alt. 1 are maintained operational at present, however, replacement is preferable before wear out because of the importance of chlorination as a disinfection process of filtered water. Frequency of maintenance is also increasing due to superannuation. The existing chlorine storage house has only capacity for approx. 1 week usage of chlorine. Considering on emergency case such as delay of chlorine delivery, expansion of storage house is preferable to stock chlorine cylinder for 3 weeks usage.		
17	Chemical dosing (Polymer)	Replacement of feeders (5 units)	Installation of calibration flow meter (L.S.)	<---------

APPENDIX N SELECTION PLAN OF EQUIPMENT FOR REHABILITATION

PLANT NO. 2

ITEM	FACILITIES	PLAN 1	PLAN 2	PLAN 3
		According to the actual dose test made by the Consultants, accuracy of dose amount is not reliable. Accordingly, replacement of feeders and installation of calibration flow meter are highly preferable.		
	Laboratory Equipment	Replacement for Plant No. 2 and Central Lab.		
		For water quality control superannuated laboratory equipment will be replaced.		

CIVIL/ARCHITECTURAL WORKS (ADDITIONAL)

ITEM	FACILITIES	PLAN 1	PLAN 2	PLAN 3
	Plant No. 1			
	Flocculation basin No. 1 & No. 2		Construction of control panel house (5 m X 3m x 2 houses)	
	Accelator	Repair of operation house		
	Washwater transmission	Repair of pump house		
	Plant No. 2		Construction of control panel house (6m X 4m X 1 house)	
	Flocculation & Sedimentation			
	Chlorination House	Repair of roof		

APPENDIX M SELECTION PLAN OF EQUIPMENT FOR REHABILITATION

PLANT NO. 1

ITEM	FACILITIES	PLAN 1	PLAN 2	PLAN 3
1	Aqueduct No. 1 & No. 2	Replacement of sluice gate guides (4 units)	<---	<---
		4 units out of 5 units of sluice gate guide are not functional due to wear out. Replacement is preferable so as to recover their functions including shutdown of aqueduct in the event of reguar maintenance and inflow rate control to the accelators.		
2	Rapid Mixing	Replacement of rapid mixers (2 units) Construction of baffle walls	Replacement of rapid mixers to higher performance of rapid mixing	<---
		Although 2 units of rapid mixers are maintained operational at present, frequency and cost of maintenance are increasing due to superannuation. Metal parts are corroded and rotation is not stable. As rapid mixing is one of the most important processes to ensure good results in water treatment, replacement is recommended before wear out.		
3	Flocculation	Replacement of Flocculators (24 + 2 units)	Replacement of flocculators to widen range of agitation	Reconstruction of baffled channel flocculation
		Although almost of flocculators are maintained operational at present, frequency and cost of maintenance are increasing due to superannuation. Metal parts are corroded and rotation is not stable. As flocculation is one of the most important processes to ensure good results in water treatment, replacement is recommended before wear out.		
4	Sedimentation	Replacement of drain valves (basin-6 units) (channel-4 units)	Construction of collecting troughs with perforated baffle walls. Construction of baffle walls in the basin No. 2 (L.S.)	Installation of inclined plates with sludge removal system. Dredging of the sludge discharge creek.
		Overflow rate is calculated to be over 6,000 m3/m/d that extremely deviate from 300 to 500 m3/m/day of standard. Accordingly floc carried over to filters are observed and filter run might be shortened. Construction of collecting troughs at the end of the sedimentation basins is indispensable as a solution to the present situation. Perforated baffle wall is also preferable to promote the improvement of flow. It is important that current that could stir up any settled solids and carry them as effluent do not develop in the outlet zone of sedimentation basins. Sludge discharge is not functioning due to insufficient hydraulic gradient between the sedimentation basins No. 1 & No.2 and discharge creek on the premises of the Plant caused by accumulation of discharged sludge.		

PLANT NO. 1

ITEM	FACILITIES	PLAN 1	PLAN 2	PLAN 3
		Meanwhile, inclined plates that could increase treatment capacity without major structural changes is classified as Alt. 3.		
5	Accelators	Replacement of driving units. (2 units) Replacement of sludge blow-off equipment (2 sets)	<---------	Installation of inclined plates
		Although 2 units of rotor mixing units are maintained operational at present, frequency and cost of maintenance are increasing due to superannuation. Parts of metals are corroded. As driving units provide such important roles as combination of coagulation and flocculation, replacement is preferable before wear out. Mixing performance will be kept the same as the existing facilities. Sludge blow-off system, bearing an essential role to maintain stable slurry concentration, is out of order. Recovering functional order, easy operation, and replacement is preferable. Inclined plates that could increase treatment capacity without major structional changes is classified as Alt. 3		
6	Filtration	Replacement of rate of flow controllers for filtration. (10 units) Replacement of Venturi tubes (10 units) Replacement of rate of flow controllers for surface wash and backwash (1 unit each) Replacement of seals of inlet and drain sluice gates (10 units each) Replacement of pumps and air compressors for hydraulic control Replacement of air compressors for pneumatic instrumentation	Replacement of anthracite Improvement of surface wash system (10 basins)	Installation of surface wash pumps Modification of filtration system from constant flow rate (the existing system) to variable declining rate.
		Equipment listed in Alt. 1 are out of order. Accordingly filter operation depends on manipulation of each equipment without confirmation of loss of head status, filter run, and filtered water quality at present. Replacement of worn-out equipment is preferable to ensure good results of water treatment. Improvement of surface wash system is also preferable. The existing perforated surface wash system is likely imperfect especially during initial operation periods due to perforation angle to anthracite. Improvement shall be carried out by changing the perforation angle to anthracite or additional installation of surface wash nozzles. Replacement of anthracite shall be considered according to the grain size analysis results, including seive analysis and further physicochemical analysis available at the site. It is, however, observed that due to the loss of anthracite during		

PLANT NO. 1

ITEM	FACILITIES	PLAN 1	PLAN 2	PLAN 3
		backwashing, supplemental amount of anthracite for replenishment shall be included with the Rehab. Availability is also classified on the modification of filtration system from constant flow rate to variable declining rate.		
7	Washwater Transmission	Replacement of washwater transmission pumps (3 units) Repair of pump house (L.S.)	<---------	<---------
		Although washwater transmission pumps are maintained operational at present, frequency and cost of maintenance are increasing due to superannuation. Furthermore, pumping efficiency is low compared to the designed value due to apparent leakage at the bearings. Together with the replacement of equipment, superannuated pump house is needed to be repaired.		
8	Washwater recovery	N/A	Replacement of washwater recovery pumps. (3 units) Reconstruction of pump house (7m X 5m:L.S)	Change of washwater returning point (L.S.)
		Although washwater recovery pumps are maintained operational at present, frequency and cost of maintenance are increasing due to superannuation. Furthermore, pump efficiency is low compared to the design value due to apparent leakage at the pump bearings. Accordingly replacement of pumps are preferable, at the same time, discharge capacity of pumps shall be optimized, assuming that washing shall be implemented at 4 basins per shift. Recovered water is then preferable to return to just before rapid mixer of Sedimentation Basin No. 1 instead of No. 2 of which treatment effects are likely worse than that of No. 1 due to unstable current caused by curved structure. For the supply of seed sludge for the accelators, pipings are also preferable to be branched from the washwater returning pipe to the accelators.		

APPENDIX M SELECTION PLAN OF EQUIPMENT FOR REHABILITATION

PLANT NO. 2

ITEM	FACILITIES	PLAN 1	PLAN 2	PLAN 3
9	Rapid mixing (parshall flume)	Replacement of inflow level indicators (2 units)	<---	<---
		At present, partial flume is working effectively as a hydraulic rapid mixer (see reference no. 5), however, the other function of flow measurement is spoiled due to wear out of inflow level indicators.		
10	Flocculation	Replacement of flocculators	Construction of baffle walls (L.S.)	Change from the existing horizontal paddle type to vertical turbine type
		Several units of flocculators are not operational due to defective driving gears, chain, and severe water leakage at driving shafts. Even on operational units of flocculators, frequency and cost of maintenance are increasing due to superannnuation. Metal parts are corroded and rotation is not stable. Accordingly replacement of all units of flocculators are preferable. Then optimization will be conducted including changing the flocculator dianeter, shaft level and location Furthermore, construction of baffle walls are preferable to prevent short-circuiting through flocculation basins. Meanwhile, applications of vertical turbine type same as Plant No. 1 is classified as Alt. 3		
11	Sedimentation	Reinforcement of foundations of inflow sluice gate guides. (24 units)	Construction of collecting troughs with perforated baffle walls.	Installation of inclined plates with sludge removal system.
		Some cracks on the foundation of the sluice gate guides are apparent. Accordingly, some ste facilities to support the sluice gate guides shall be installed. Replacement of all inflow sluice gates are preferable before wear even if some of them are maintained in operational at present so as to recover their functions, including dhut-down of inflow to the flocculation and sedimentation basins in th event of maintenance of flocculators and sludge cleaning. Overflow rate of the existing weir of each sedimentation basin is calculated to be over 5,000 m3/m/d that extremely deviate from 300 to 500 m3/m/d of standard. Carrying over of particles which are stirred up after once settling are observed (see reference No. 7). Accordingly the construction of collecting troughs together with perforated baffle wall are indispensable as a solution to the present situation. Meanwhile, inclined plates that could increase production capacity withouth major changes is classified as Alt. 3		
12	Filtration	Replacement of control units (20 units) Replacement of rate of flow controllers for	Replacement of anthracite Improvement of surface wash system (20 basins) Improvement of washwater	Construction of roof for basin No. 1, 2, 3, 4, 17, 18, 19, and 20.

PLANT NO. 2

ITEM	FACILITIES	PLAN 1	PLAN 2	PLAN 3
		filtration (20 units) Replacement of rate of flow controllers for surface wash and backwash (1 each) Replacement of seals of inlet and drain sluice gate (20 units each) Replacement of pumps and air compressors for hydraulic control. Replacement of air compressors for pneumatic instrumentation	troughs	
		In addition to the same reasons as filtration of plant No.1, the following : are pointed out: Washwater troughs are not functional due to submergence during backwash, a series of hydraulic problems such as opening size of washwater drainage sluice gate and available hydraulic gradient through troughs and drainage channel. As a solution to these problems, change of washwater drainage sluice gates and raising of top level of troughs are considered. Then, raising of top level of washwater trough, according to hydraulic calculation and actual operational conditions, is preferable. Meanwhile, Alt. 3 shall be withdrawn from the Rehab. project since investigation results show that roofing has little effect on the treated water quality.		
13	Washwater transmission	Replacement of pumps (3 units) Repair of pump house (L.S.)	< --------	< --------
		Although washwater transmission pumps are maintained operational at present, frequency and cost of maintenance are increasing due to superannuation. Since washwater is indispensable to recover the function of filter beds by means of surface wash and backwashing, replacement of pumps is preferable before wear out. Together with the replacement of equipment, superannuated portion of pump house is preferable to be repaired as pumps are kept in good conditions.		
14	Washwater recovery	N/A	N/A	Replacement of pumps (3 units) Construction of washwater recovery tank and pumphouse (L.S.)

PLANT NO. 2

ITEM	FACILITIES	PLAN 1	PLAN 2	PLAN 3
		At present, washwater recovery is pumped at the overflow weir installed at the washwater drainage creek on the premises of the Plant and returned to the accelators. To upgrade at the same level as plant No. 1 where aeration tank is available as a storage tank of washwater tank, construction of washwater recovery tank provided with pumps is preferable. Then, water shall be returned to just before parshall flume of plant No. 2		
15	Chemical dosing (Alum)	Replacement of feeders (6 units)	Installation of calibration flow meter (L.S.) Construction of elevated foundation for feeders	<---------
		Mechanical parts which control the rotation speed of rotodip are superannuated so that actual dose amount is not reliable. The actual dose amount checked by the Consultants supports the above fact. Accordingly, together with replacement of feeders, installation of calibration flow meter is preferable, the Construction of elevated foundation for feeders is preferable to ensure the mixing of solution water with Alum.		
16	Chemical dosing (Chlorine)	Replacement of chlorinators (4 units) Replacement of evaporators (2 units) Replacement of chlorine leak detectors (3 units) Replacement of exhaust fan (3 units) Replacement of hoist (1 unit) Replacement of chlorine booster pumps (3 units) Replacement of dosing pipelines (3 lines)	Expansion of chlorine storage house. (L.S.) Installation of hoisting rail.	<---------
		Equipment listed in Alt. 1 are maintained operational at present, however, replacement is preferable before wear out because of the importance of chlorination as a disinfection process of filtered water. Frequency of maintenance is also increasing due to superannuation. The existing chlorine storage house has only capacity for approx. 1 week usage of chlorine. Considering on energency case such as delay of chlorine delivery, expansion of storage house is preferable to stock chlorine cylinder for 3 weeks usage.		
17	Chemical dosing (Polymer)	Replacement of feeders (5 units)	Installation of calibration flow meter (L.S.)	<---------

APPENDIX M SELECTION PLAN OF EQUIPMENT FOR REHABILITATION

PLANT NO. 2

ITEM	FACILITIES	PLAN 1	PLAN 2	PLAN 3
		According to the actual dose test made by the Consultants, accuracy of dose amount is not reliable. Accordingly, replacement of feeders and installation of calibration flow meter are highly preferable.		
	Laboratory Equipment	Replacement for Plant No. 2 and Central Lab.		
		For water quality control superannuated laboratory equipment will be replaced.		

CIVIL/ARCHITECTURAL WORKS (ADDITIONAL)

ITEM	FACILITIES	PLAN 1	PLAN 2	PLAN 3
	Plant No. 1			
	Flocculation basin No. 1 & No. 2		Construction of control panel house (5 m X 3m x 2 houses)	
	Accelator	Repair of operation house		
	Washwater transmission	Repair of pump house		
	Plant No. 2		Construction of control panel house (6m X 4m X 1 house)	
	Flocculation & Sedimentation			
	Chlorination House	Repair of roof		

APPENDIX N ENVIRONMENTAL IMPACT ASSESSMENT

Environmental impact assessment for the Feasibility Study on the Balara Water Treatment Plant Rehabilitation Project was conducted. Attached is the PROJECT DESCRIPTION, consisting of;

1. Name and Address of Project/Program Proponent
2. Type and Purpose of the Project
3. Location of the Project
4. Description of environmental Setting
5. Project Scale and Cycle
6. Sources of Environmental Impacts
7. Environmental Management Measures
8. Status of the Project

According to the assessment results which indicated that the environmental impacts were considered minimal, MWSS has already submitted the request letter for an exemption from the EIA requirement and the issuance of ECC (Environmental Compliance Certificate) to the Environmental Management Bureau, DENR in compliance with the regulations (see attached letter).

CABLE ADDRESS:
"MWSS"

IN REPLY PLEASE REFER TO
TEL. NOS. 95-32-11 TO 29

Republika ng Pilipinas
PANGASIWAAN NG TUBIG AT ALKANTARILYA SA METRO MANILA
METROPOLITAN WATERWORKS AND SEWERAGE SYSTEM
KATIPUNAN ROAD, BALARA, QUEZON CITY

12 November 1991

MR. RODRIGO FLORES
Director
Environmental Management Bureau, DENR
6/F Philippine Heart Center,
East Ave., Quezon City

SUBJECT: Issuance of ECC (Environmental Compliance Certificate) Feasibility Study on the Balara Water Treatment Plant Rehabilitation Project.

Dear Mr. Flores:

The MWSS is presently undertaking the Feasibility Study on the Balara Water Treatment Plant Rehabilitation Project thru the Japanese Technical Assistance Program.

In connection with the above mentioned Project, we are respectfully requesting for an exemption from the EIA requirement since the aforementioned project is included in the list of exemptible projects. The said Rehabilitation will consist mainly of replacement of defective mechanical and electrical equipment. The environmental impacts that were identified during the conduct of the study were considered minimal.

In view of this, we request for the issuance of Environmental Compliance Certificate (ECC) for the proposed project. Attached herewith for your perusal is the Project Description (Annotated Outline).

Should you need additional information, please contact: MR. ALBEN QUE BUKUHAN, Project Coordinator, BWTPRP at telephone numbers 95-32-11 to 16 local 282.

Thank you.

Very truly yours,

LUIS V.Z. SISON
Administrator

PROJECT DESCRIPTION
(Annotated Outline)

1.0 Name and Address of Project/Program Proponent

Metropolitan Waterworks and Sewerage System (MWSS)
Katipunan Road, Balara, Quezon City
Telephone No. 953211/991451

2.0 Type and Purpose of the Project

The project is the feasibility study on The Balara Water Treatment Plant Rehabilitation Project involving improvement works, repair, upgrading and replacement of existing facilities/utilities to improve the quality of treated water in the distribution system of Metro Manila.

The Balara Plant plays a significant role in the MWSS System, serving as one of the two huge water treatment plants in Metro Manila. However, its facilities and equipment are superannuated and has become difficult to operate properly even after the implementation of some small scale rehabilitation works. The Balara Plant supplies about 60% of the total demand of safe water in Metro Manila. Considering that Manila is the capital city of the country, this infrastructure plays an important part in meeting one of the basic needs of its residents. The cost of rehabilitating the entire plant including its superannuated equipment will be economically & socially viable, since it assures that Metro Manila residents will consume only safe & potable water.

The project involves the rehabilitation of the Balara treatment plant adjunct with the operation and maintenance aspects. The objective of this project is to recover the designed capacity and efficiency of the Treatment Plant. The project however, will not include any rehabilitation of aqueducts, distribution pipeline, reservoirs, nor alterations on the Plant building structure. The rehabilitation work will consist mainly of replacement of defective mechanical and electrical equipment and very minor civil works as shown in Appendix M. Therefore, no specific changes in the environmental aspects and no adverse effect is expected during the execution of the proposed project.

3.0 Location of the Project

(Please refer to Figs. N.1 and N.2)

4.0 Description of Environmental Setting

The basic environmental resources of the Plant premises were reviewed to substantially evaluate the potential effects of this project. For purposes of environmental assessment, the study area was confined to the surrounding areas within the plant (Fig. N.2). The area is located in the Balara area, West of Quezon City and bounded in the North by the Capitol Hills Golf and Country Club, the Diliman residential area, a low population density area to the South, vast forests to the East and the MWSS Headquarter buildings and the UP campus to the West. Generally, the surrounding environ is a quiet and peaceful green area.

The area is approximately 0.25 km^2 and rather undulating. The elevation varies from 50 m to 75 m. There are two small impetuous streams at the center of the premises, flowing from North to South. They are about 2.0 to 3.0m wide and which ultimately flows to the Marikina River. The two streams and the Marikina River appear to have no economically vital utilization because of the contaminated water caused by wastewater discharge from residential areas and factories around the vicinity and illegal disposal of garbage.

The land not occupied by the facilities such as the sedimentation basins, filters, chemical house and chlorine house are mostly covered with gardens and cultivated land. Vegetation in the area is mostly mixed garden, cultivation of banana and papaya and common trees in the Philippines such as Acacia, Ipil-ipil, Tamarind and Mango. There are no specific wildlife habitants. Animals found in the area are mostly livestocks.

Majority of the residents within the Balara Plant premises are employees of the MWSS. The outside perimeter of the Treatment Plant is bounded by steel fences. The population density in the locality is quite scarce. Recreational facilities include the Balara Swimming Pools which is often full of excursionists during the weekends.

5.0 Project Scale and Cycle

The total area covered by the project is approximately twenty-five (25.0) Hectares. The main scope of the aforementioned rehabilitation work will be confined within the Balara Plant premise and the projected lifespan of the rehabilitated portions of the Plant is fifteen (15) years and is estimated to cost approximately ₱700,000,000.00. The tentative breakdown of estimates are as follows:

TENTATIVE

Cost Item	Amount (1,000 Peso)
A. Rehabilitation Cost	
a. Plant No. 1	96,047
b. Plant No. 2	248,269
c. Chemical/chlorination/Others	51,560
d. Electrical equipment	182,362
Sub Total	578,238
B. Engineering charge (D/D,C/S, 10%)	57,824
Total	636,062
C. Physical Contingency (8%)	50,885
Grand Total	686,947

Note: 1) D/D is Detailed Design
2) C/S is Construction Supervision

Providing that the application for funding arrangements commences in 1992, the entire project is expected to be finished in 1995 since the actual rehabilitation work will require about two years to be completed. The implementation schedule is shown in Fig. N.3 while the tentative construction schedule is shown in Fig. N.4.

The implementation schedule of the rehabilitation project was planned taking into consideration the features of rehabilitation, financial resources and the duration required for each item of rehabilitation work, as well as considerations to ensure minimum interruption of water production during the implementation.

The possible duration within which the operation of the Plant can be temporarily suspended to accommodate repair works is about 1.5 - 2.0 hours taking into account the range of water level available for use at the San Juan reservoir which was reported to be between 47.0 - 48.5

meters. Basically each basin /bed can be isolated from the overall operation of the Plant during rehabilitation activities, provided that the interruption of the filters will affect only one group of five beds to stop operating when the inlet and drain sluice gate is rehabilitated.

Considering the high raw water turbidity (40 - 80 mg/l) during the rainy season, it is evident that suspending the operation of the filter facilities and sedimentation basins during these months is not advisable. The rainy season is from the months of July to October. Therefore, the rehabilitation work should be conducted during the remaining eight months of the year. The rehabilitation work will be executed in phases to ensure minimal interruption in water production. Therefore, the temporary process that will prevail during the rehabilitation work will be similar to direct filtration. The rehabilitation of the parshall flumes entails no problem since this item involves only the replacement of level meters.

All the replacement equipment for panels and chlorination will be installed directly adjacent to the existing defective equipment to facilities the immediate shift of operation from the old equipment to their new replacements. In the Chemical Dosing/ Washwater/ Water Recovery facilities, the functions of the equipment to be replaced will be performed by temporarily installed pumps and pipelines.

6.0 Sources of Environmental Impacts

As discussed in the aforementioned sections, there are no environmental hazards that were identified in the conduct of this study. Since the Plant to be rehabilitated is already existing and the rehabilitation work will consist only of replacing defective mechanical and electrical equipment. The facilities and equipments of the Plant is deteriorating rapidly and it is very urgent that the necessary repair and replacement be implemented immediately.

As discussed in item No. 2.0, no adverse impact on the existing environmental conditions is foreseen during the implementation of the project since majority of the rehabilitation work will be the replacement of equipment and some minor civil works which will make use of noise and pollution-free machineries. As mentioned before, no alterations will be

done in the building structure nor in the existing aqueducts, reservoirs and distribution system. As a matter of fact, water production and treatment of potable water would be greatly improved after the completion of the project.

There will also be no alterations in ground water flow and elevations and ground water sources. No chronic air pollution is expected from the operation of the facility. There is however, a minor air quality risk which is associated with the storage, handling & use of Chlorine gas. There are of course, existing precautionary & safety procedures being implemented to safeguard against any kind of air pollution.

There will be no effect on the aesthetic qualities of the surrounding areas during the rehabilitation work since most of the work is confined within the existing building structure. Scenic features of the project area will not be impaired and the quality of the atmosphere will remain the same even after the completion of the project.

The existing human health, welfare & social structures within the project area will not be affected by the proposed project. However, a short-term labor market impact may take place if and when the civil works contractor decides to hire workers living within the locality to work in the project area. The total workforce to be employed by the project proponent is as follows:

1) Personnel	14	a. Local	6	b. Migrant	8
2) Laborers	60	a. Local	60	b. Migrant	0

7.0 Environmental Management Measures

To ensure that there will be an effective protection of the environment, the implementation of control and monitoring measures will be a condition that will be clearly stipulated in the contract documents. (Refer to Table N.1 Environmental Checklist)

8.0 Status of the Project

At the present stage, the feasibility study is being conducted by the Japan International Cooperation Agency (JICA) Team in collaboration with

MWSS. The proposed project plans are frequently being reviewed as to its conformity to existing laws and government policies through consultations with MWSS and other concerned government agencies.

TABLE N.1 ENVIRONMENTAL CHECKLIST (WATER SUPPLY)

	CHECK ITEMS	MAJOR	SMALL	NONE	NOT CLEAR	PROBLEMS	ACTION TO COUNTERMEASURES PLANNED	REMARKS
POLLUTION	1.Air pollution resulting from chlorination		X				Monitoring and alarm system included in design	
	2.Soil erosion following the cutting of trees, etc, facility construction and consequent deterioration of water quality downstream		X				Construction site management practice recommended	Scale of excavation is very small. Implementation of control measure should be a condition stipulated in the contract documents.
	3.Noise and vibration around water treatment plant			X				Premises is broad and equipment of the noise free type
	4.Ground subsidence			X				No related works
	5.Treatment of sludge from water treatment plant							Inorganic constituents and harmless
NATURAL ENVIRONMENT	1.Effect of construction on the ecology			X				Main work is Mechanical & Electrical Equipment
	2.Effect on landscape			X				same as existing
HUMAN ENVIRONMENT	1.Effect of construction of the facility on the historical and cultural heritage			X				
	2.Effect on existing infrastructure			X				
	3.Effect on other water uses			X				
OTHERS	1.Effect on the environment during construction period			X				
	2.Environmental monitoring			X				not necessary

TAB6-1.WK1

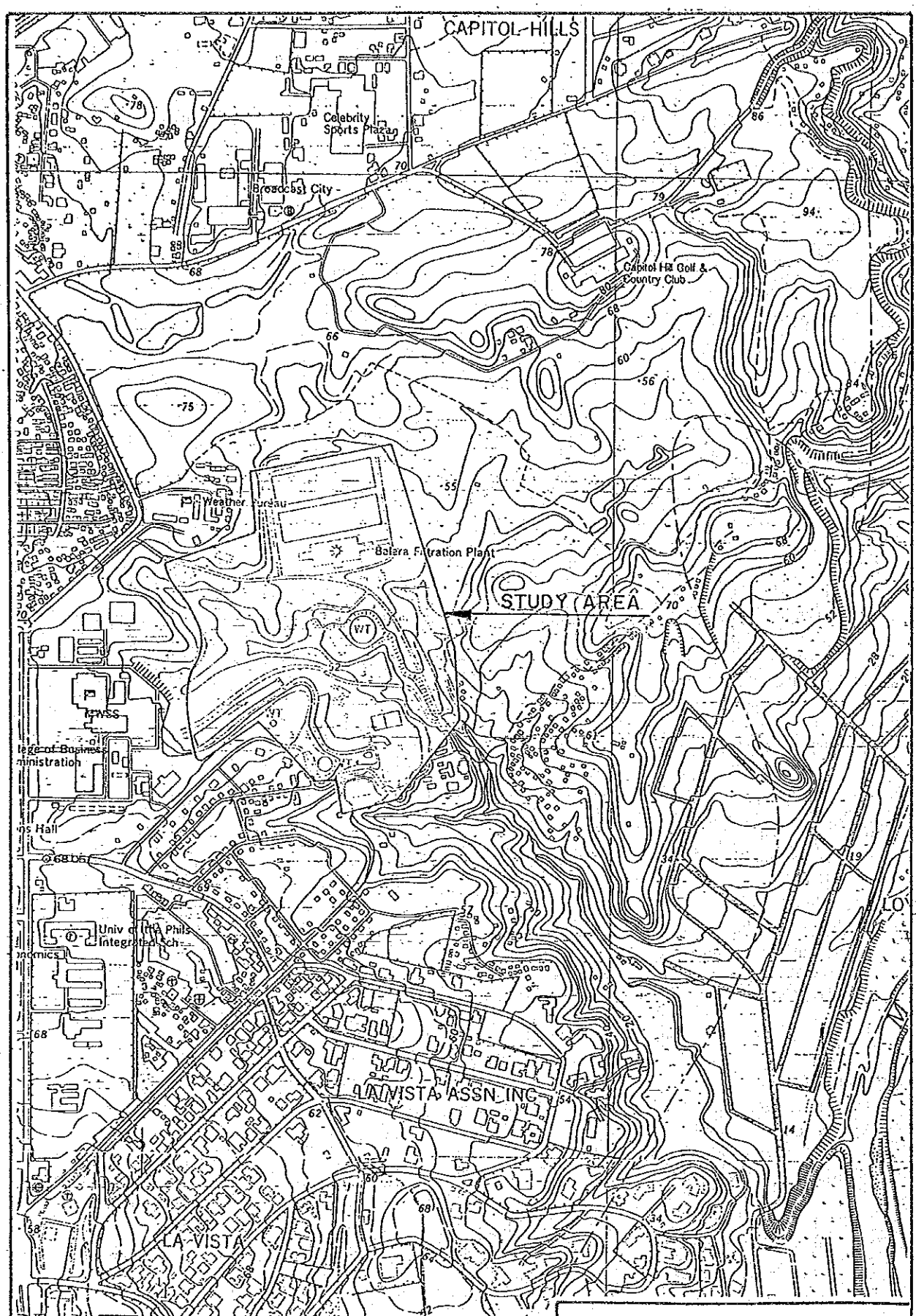

Fig. N.2
STUDY AREA FOR
ENVIRONMENTAL ASSESSMENT

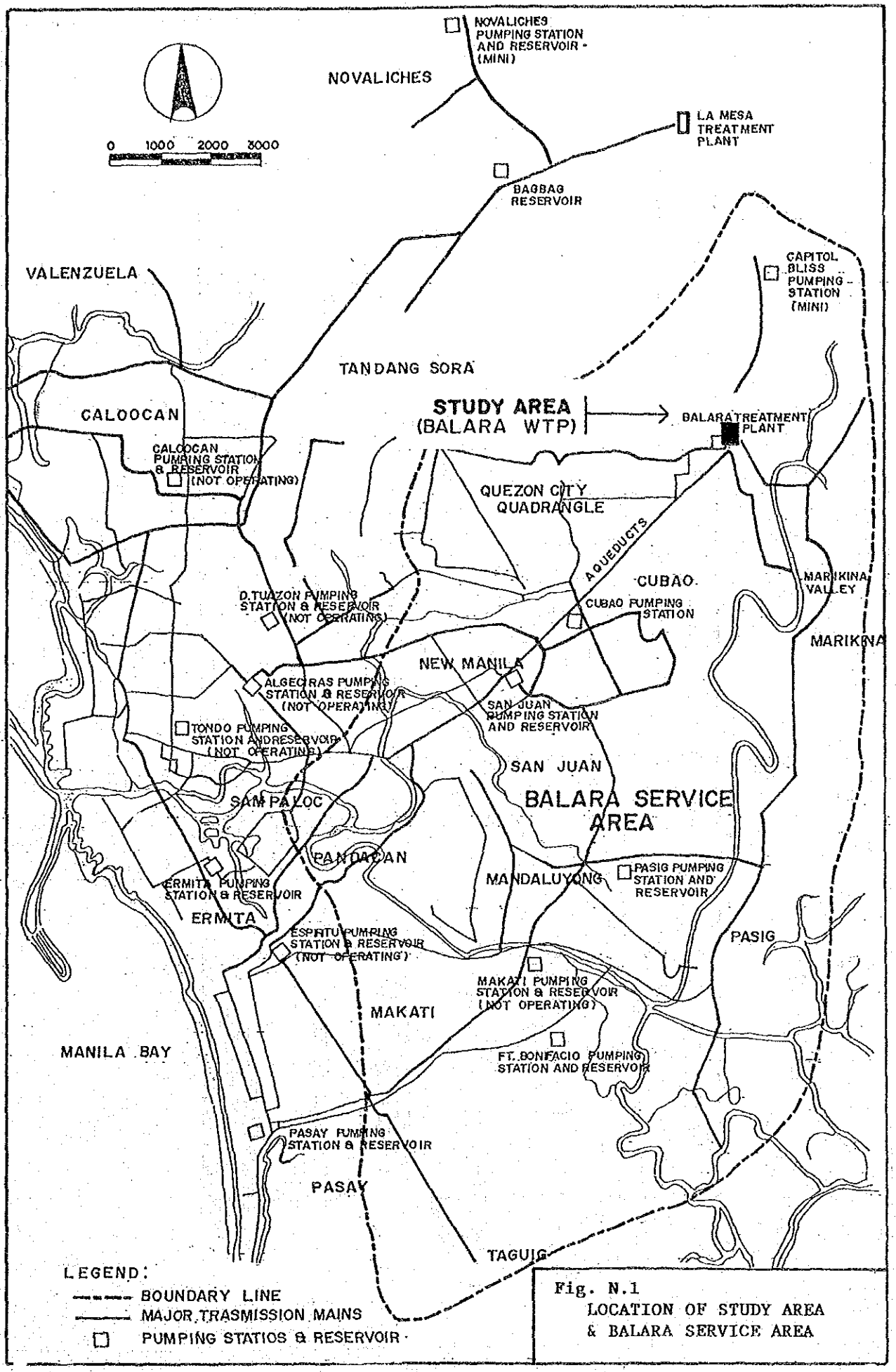

Fig. N.1
LOCATION OF STUDY AREA
& BALARA SERVICE AREA

Fig. N.3 IMPLEMENTATION SCHEDULE

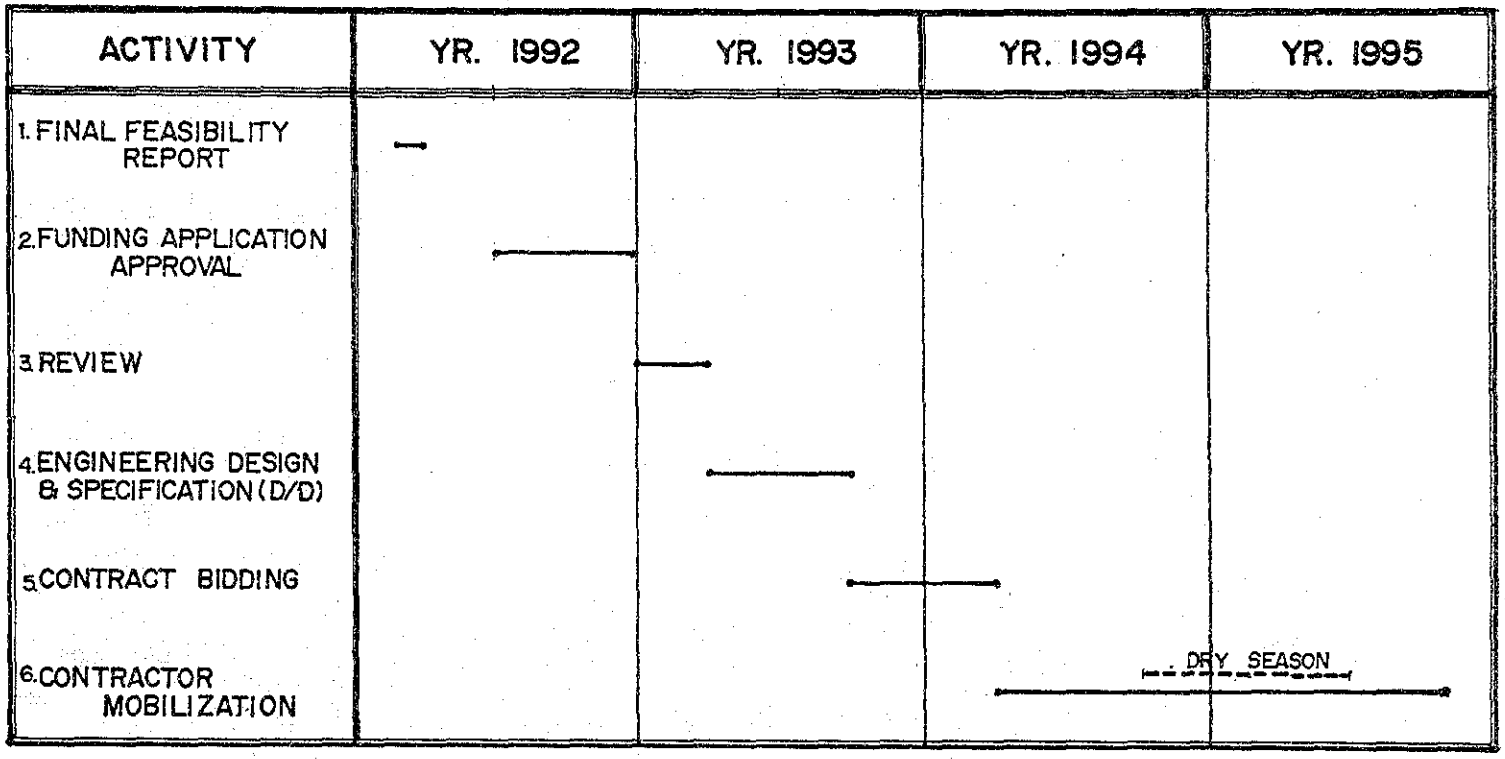

Fig. N.4 CONSTRUCTION SCHEDULE