ANNEX 11

RESULTS OF NETWORK ANALYSIS ON EXISTING PIPE NETWORK

ANNEX 11 RESULTS OF NETWORK ANALYSIS ON EXISTING PIPE NETWORK

1 General

Network analysis on the existing pipe network has been conducted by using WaterCAD which runs under AutoCAD environment after examination of the existing transmission and distribution network of which diameter is more than 100mm. Survey results of flow and pressure measurements mentioned in **Annex 10** have been also taken into account for the network analysis. Comparison between results of network analysis and survey results is shown in **Section 6**.

2 Modeling

For modeling of the network analysis, the following conditions have been considered.

- Junction locations were basically referred to the network analysis carried out by BCEOM in 2001.
- Demand of each junction was calculated based on the billing data.
- Demand pattern was estimated from the results of flow measurement.
- Discharges from Chinaimo and Kaolieo Treatment Plants were set to the same amount as the actual discharge of March 2003.
- Flow rates of 700 mm transmission main to Phonethane Reservoir, 700 mm distribution main to the center of the City and 300 mm transmission main to Salakham Reservoir from Chinaimo Treatment Plant were adjusted based on the results of flow measurement.

Figure 1 shows a network analysis model conducted for the existing network of Vientiane Water Supply System.

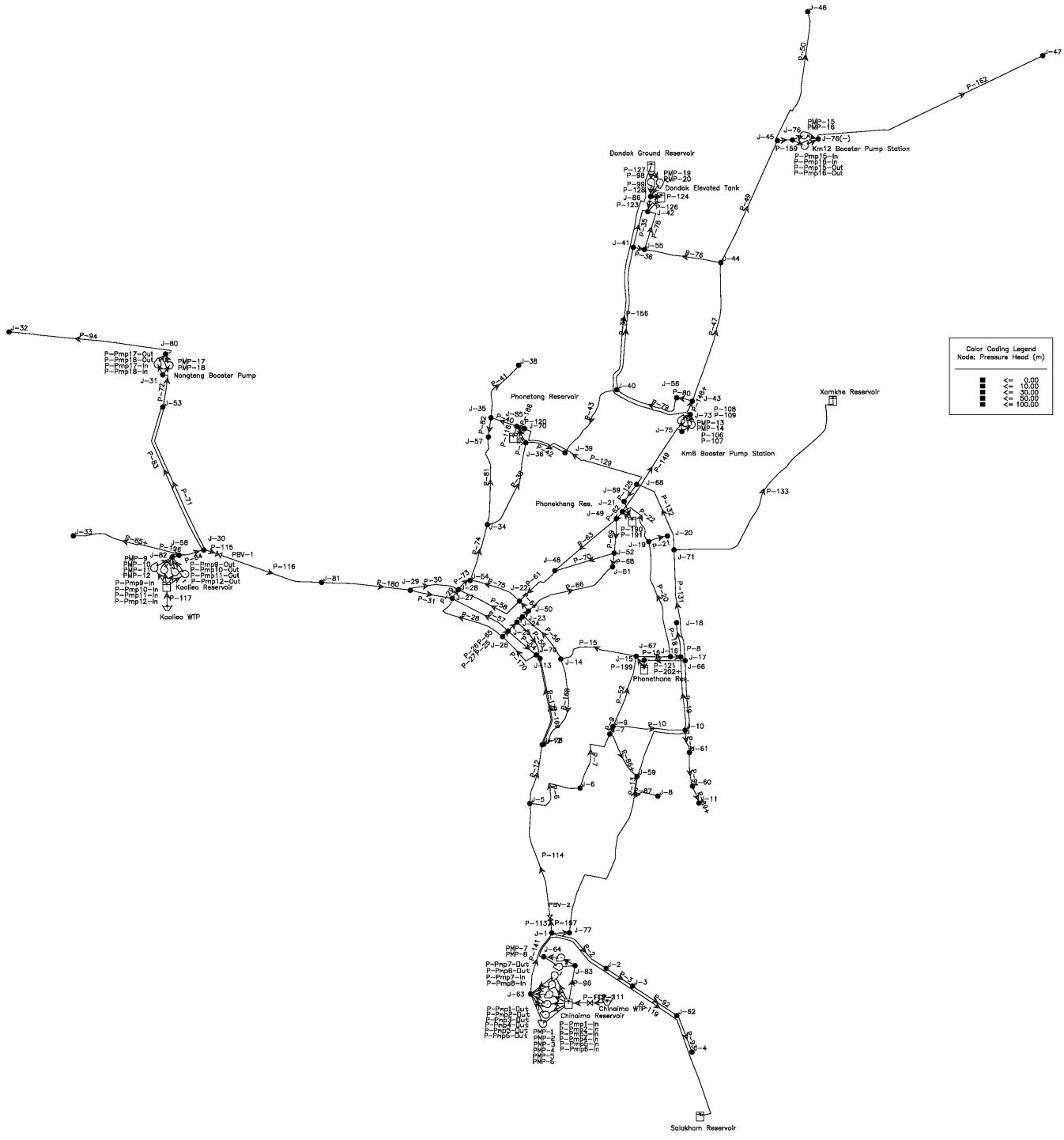


Figure 1 Existing Network Analysis Model

3 Data for Network Analysis

Junction Report: Steady State Analysis

Label	Elevation (m)	Demand (l/s)	Demand Pattern	Pressure (m H2O)
J-1	171.11	24.63	Fixed	41.920
J-2	171.00	6.07	Fixed	39.948
J-3	170.00	12.65	Fixed	40.724
J-4	167.00	13.78	Fixed	43.278
J-5	170.00	42.05	Fixed	31.363
J-6	180.00	20.39	Fixed	21.136
J-7	177.00	7.51	Fixed	23.982
J-8	174.00	4.52	Fixed	25.971
J-9	176.50	4.19	Fixed	24.471
J-10	167.70	6.17	Fixed	30.558
J-11	167.00	4.52	Fixed	22.268
J-12	172.00	8.16	Fixed	23.374
J-13	172.00	22.63	Fixed	5.352
J-14	170.50	44.21	Fixed	24.394
J-15	176.83	25.17	Fixed	24.137
J-16	173.00	9.77	Fixed	24.690
J-17	168.73	13.02	Fixed	28.183
J-18	170.00	41.84	Fixed	23.809
J-19	167.00	52.34	Fixed	27.651
J-20	167.00	17.94	Fixed	25.709
J-21	178.92	32.48	Fixed	14.568
J-22	170.00	0.00	Fixed	5.432
J-23	169.50	6.18	Fixed	7.803
J-24	169.50	1.04	Fixed	7.886
J-25	169.00	10.04	Fixed	8.587
J-26	169.00	2.47	Fixed	11.558
J-27	170.00	60.18	Fixed	4.682
J-28	169.00	13.71	Fixed	4.967
J-29	167.00	88.30	Fixed	7.715
J-30	167.00	42.24	Fixed	60.008
J-31	200.00	5.44	Fixed	10.148
J-32	200.00	6.65	Fixed	87.458
J-33	170.00	41.41	Fixed	35.335
J-34	169.00	54.58	Fixed	-1.737
J-35	170.00	0.00	Fixed	-13.573
J-36	174.60	16.63	Fixed	-10.001
J-38	180.00	54.56	Fixed	-55.303
J-39	175.00	5.64	Fixed	-10.551
J-40	175.00	5.64	Fixed	5.758
J-41	192.40	13.80	Fixed	-16.024
J-42	190.70	6.89	Fixed	-14.360
J-43	169.00	0.00	Fixed	24.207
J-44	170.00	27.87	Fixed	6.799
J-45	168.00	11.76	Fixed	1.291
J-46	175.00	9.40	Fixed	-7.501
J-47	181.30	5.30	Fixed	16.141

Label	Elevation (m)	Demand (l/s)	Demand Pattern	Pressure (m H2O)
J-48	171.70	32.71	Fixed	5.747
J-49	183.00	12.01	Fixed	7.306
J-50	170.00	9.38	Fixed	5.944
J-51	174.00	22.90	Fixed	0.241
J-52	176.00	7.29	Fixed	2.013
J-53	169.00	15.11	Fixed	53.967
J-54	170.00	43.54	Fixed	2.311
J-55	192.40	15.85	Fixed	-16.047
J-56	169.00	0.00	Fixed	23.728
J-57	169.00	23.39	Fixed	-12.658
J-58	171.50	21.07	Fixed	56.199
J-59	176.00	0.00	Fixed	24.777
J-60	167.00	0.00	Fixed	28.087
J-61	167.00	0.00	Fixed	30.985
J-62	168.00	9.32	Fixed	42.501
J-63	171.00	24.45	Fixed	42.431
J-64	171.21	0.00	Fixed	46.801
J-66	168.73	0.00	Fixed	35.671
J-67	176.83	9.66	Fixed	26.171
J-68	168.65	0.00	Fixed	29.812
J-69	178.92	0.00	Fixed	14.768
J-70	180.18	0.00	Fixed	18.305
J-71	166.60	0.00	Fixed	33.632
J-73	166.50	0.00	Fixed	29.633
J-75	166.50	29.00	Fixed	7.719
J-76	170.00	5.50	Fixed	28.741
J-76(-)	176.00	0.00	Fixed	-7.676
J-77	174.40	0.00	Fixed	38.216
J-78	172.00	1.32	Fixed	14.208
J-79	172.00	2.40	Fixed	15.723
J-80	200.00	5.44	Fixed	89.004
J-81	167.00	64.43	Fixed	10.029
J-82	171.50	0.00	Fixed	56.283
J-83	166.91	0.00	Fixed	1.741
J-85	180.18	0.00	Fixed	-16.190
J-86	190.70	0.00	Fixed	29.912

Pipe Report: Steady State Analysis

Label	From Node	To Node	Length (m)	Diameter (mm)	Velocity (m/s)	Discharge (l/s)	Loss (m/km)	Loss (m)
P-2	J-1	J-2	875.00	250.0	0.85	41.82	2.38	2.09
P-3	J-2	J-3	125.00	250.0	0.73	35.75	1.78	0.22
P-4	J-10	J-61	583.00	150.0	0.26	4.52	0.47	0.27
P-6	J-5	J-6	1,250.00	600.0	0.26	72.73	0.20	0.25
P-7	J-6	J-7	1,375.00	600.0	0.19	52.34	0.11	0.15
P-8	J-16	J-17	125.00	200.0	1.24	38.82	6.16	0.77
P-9	J-7	J-9	150.00	600.0	0.14	40.31	0.07	0.01
P-10	J-9	J-10	875.00	200.0	0.85	26.73	3.09	2.70
P-12	J-5	J-12	950.00	450.0	1.39	221.48	6.32	6.01
P-13	J-77	J-66	4,875.00	700.0	0.90	346.86	1.69	8.22
P-15	J-14	J-15	1,250.00	350.0	1.03	-99.21	4.86	6.07
P-16	J-15	J-16	500.00	450.0	1.42	225.81	6.55	3.28
P-18	J-17	J-18	440.00	200.0	1.33	41.84	7.08	3.11
P-19	J-10	J-17	1,125.00	200.0	0.51	16.04	1.20	1.35
P-20	J-16	J-19	725.00	450.0	1.11	177.23	4.18	3.03
P-21	J-19	J-20	325.00	150.0	1.02	17.94	5.99	1.95
P-22	J-19	J-21	725.00	450.0	0.67	106.95	1.64	1.19
P-25	J-24	J-23	100.00	200.0	0.36	11.42	0.83	0.08
P-26	J-25	J-24	175.00	200.0	0.43	13.66	1.16	0.20
P-27	J-26	J-25	125.00	200.0	2.22	69.82	23.81	2.98
P-28	J-26	J-27	1,250.00	400.0	1.10	138.63	4.71	5.89
P-29	J-27	J-28	175.00	400.0	1.02	128.38	4.09	0.72
P-30	J-29	J-28	750.00	300.0	0.52	36.72	1.00	0.75
P-31	J-29	J-27	675.00	300.0	0.11	7.81	0.06	0.04
P-35	J-41	J-42	500.00	250.0	0.08	4.03	0.07	0.03
P-36	J-41	J-55	250.00	150.0	0.11	1.97	0.09	0.02
P-38	J-34	J-36	1,500.00	400.0	0.65	82.14	1.79	2.68
P-39	J-85	J-36	625.00	400.0	0.48	-59.87	0.99	0.62
P-40	J-85	J-35	550.00	200.0	1.91	59.87	13.74	7.56
P-41	J-35	J-38	2,750.00	200.0	1.74	54.56	11.57	31.81
P-42	J-36	J-39	875.00	200.0	0.18	5.64	0.17	0.15
P-43	J-39	J-40	1,825.00	200.0	0.00	0.00	0.00	0.00
P-44	J-40	J-41	2,500.00	200.0	0.63	19.80	1.77	4.43
P-47	J-43	J-44	2,250.00	250.0	1.56	76.57	7.31	16.44
P-49	J-44	J-45	1,750.00	200.0	1.02	31.96	4.30	7.52
P-50	J-45	J-46	1,000.00	150.0	0.53	9.40	1.81	1.81
P-52	J-9	J-15	1,000.00	600.0	0.03	9.39	0.00	0.00
P-54	J-25	J-13	500.00	150.0	0.23	4.00	0.48	0.24
P-55	J-24	J-13	750.00	150.0	0.07	1.20	0.05	0.04
P-56	J-14	J-23	800.00	150.0	2.05	36.25	22.03	17.62
P-57	J-25	J-27	925.00	250.0	0.86	42.12	3.15	2.91
P-58	J-28	J-22	1,000.00	200.0	0.49	-15.50	1.47	1.47
P-61	J-22	J-48	675.00	200.0	0.72	-22.75	2.99	2.02
P-62	J-21	J-49	250.00	250.0	1.83	89.75	12.78	3.20
P-63	J-48	J-49	1,250.00	200.0	1.41	-44.39	10.29	12.86
P-64	J-50	J-22	200.00	200.0	0.77	24.19	2.57	0.51
P-65	J-23	J-50	150.00	200.0	1.32	41.49	9.08	1.36

Label	From Node	To Node	Length (m)	Diameter (mm)	Velocity (m/s)	Discharge (l/s)	Loss (m/km)	Loss (m)
P-66	J-50	J-51	1,000.00	150.0	0.45	7.91	1.71	1.71
P-68	J-52	J-51	675.00	150.0	0.85	14.99	5.59	3.77
P-69	J-49	J-52	500.00	150.0	1.89	33.35	24.61	12.30
P-70	J-48	J-52	925.00	200.0	0.35	-11.08	0.60	0.56
P-71	J-30	J-53	1,850.00	200.0	0.71	22.22	2.19	4.05
P-72	J-53	J-31	2,250.00	150.0	0.99	17.53	5.74	12.91
P-73	J-28	J-54	250.00	400.0	1.33	166.89	6.64	1.66
P-74	J-54	J-34	875.00	400.0	1.23	154.80	5.78	5.06
P-75	J-54	J-22	750.00	200.0	1.00	-31.45	4.17	3.13
P-76	J-44	J-55	1,125.00	250.0	0.34	16.74	0.44	0.49
P-78	J-55	J-42	575.00	250.0	0.06	2.86	0.02	0.01
P-79	J-56	J-40	1,050.00	150.0	1.44	25.44	11.43	12.01
P-80	J-43	J-56	150.00	200.0	0.81	25.44	3.20	0.48
P-81	J-34	J-57	1,585.50	150.0	1.02	18.08	6.90	10.94
P-82	J-57	J-35	539.50	200.0	0.17	-5.31	0.15	0.08
P-83	J-30	J-53	1,850.00	150.0	0.59	10.42	2.19	4.05
P-84	J-58	J-30	120.00	450.0	1.71	272.14	5.69	0.68
P-85+	J-58	J-33	2,840.50	200.0	1.32	41.41	7.89	22.41
P-86+	J-7	J-59	435.50	150.0	0.26	4.52	0.47	0.20
P-87	J-59	J-8	239.50	100.0	0.58	4.52	3.36	0.80
P-89+	J-60	J-11	427.50	75.0	1.02	4.52	13.64	5.83
P-91	J-61	J-60	864.50	100.0	0.58	4.52	3.36	2.90
P-92	J-3	J-62	276.00	250.0	0.47	23.10	0.79	0.22
P-93	J-62	J-4	724.00	250.0	0.28	13.78	0.31	0.22
P-94	J-80	J-32	1,625.00	150.0	0.38	6.65	0.95	1.55
P-96	Chinaimo Reservoir	J-83	1.00	150.0	5.14	90.83	255.82	0.26
P-98	Dondok Ground Reservoir	PMP-19	10.00	250.0	0.83	40.64	4.79	0.05
P-99	PMP-19	J-86	10.00	250.0	0.83	40.64	4.79	0.05
P-106	J-75	PMP-13	5.00	150.0	3.71	65.64	140.18	0.70
P-107	J-75	PMP-14	5.00	150.0	3.71	65.64	140.18	0.70
P-108	PMP-13	J-73	5.00	150.0	3.71	65.64	140.18	0.70
P-109	PMP-14	J-73	5.00	150.0	3.71	65.64	140.18	0.70
P-111	Chinaimo WTP	FCV-2	5.00	500.0	5.25	1,030.00	65.18	0.33
P-112	FCV-2	Chinaimo Reservoir	5.00	500.0	5.25	1,030.00	65.18	0.33
P-113	J-1	PBV-2	5.00	700.0	0.87	336.26	38.93	0.19
P-114	PBV-2	J-5	1,870.00	700.0	0.87	336.26	1.59	2.98
P-115	J-30	PBV-1	200.00	450.0	1.24	197.26	3.14	0.63
P-116	PBV-1	J-81	1,390.00	450.0	1.24	197.26	3.14	4.36
P-117	Kaolieo WTP	Kaolieo Reservoir	10.00	500.0	3.13	613.94	25.00	0.25
P-118	Phonetong Reservoir	J-85	10.00	400.0	0.00	0.00	0.00	0.00
P-119	J-64	Salakham Reservoir	3,125.00	300.0	1.28	90.83	5.38	16.81

Label	From Node	To Node	Length (m)	Diameter (mm)	Velocity (m/s)	Discharge (l/s)	Loss (m/km)	Loss (m)
P-120	J-70	J-85	10.00	400.0	0.00	0.00	0.00	0.00
P-121	J-66	J-67	625.00	300.0	0.62	43.85	2.27	1.42
P-123	J-86	J-42	10.00	250.0	0.00	0.00	0.00	0.00
P-124	J-86	Dondok Elevated Tank	10.00	250.0	1.66	81.27	17.29	0.17
P-125	J-68	J-69	375.00	400.0	1.89	237.93	12.81	4.80
P-126	Dondok Elevated Tank	J-42	10.00	250.0	0.00	0.00	0.00	0.00
P-127	Dondok Ground Reservoir	PMP-20	10.00	250.0	0.83	40.64	4.79	0.05
P-128	PMP-20	J-86	10.00	250.0	0.83	40.64	4.79	0.05
P-129	J-68	J-70	2,500.00	500.0	0.00	0.00	0.00	0.00
P-131	J-66	J-71	1,500.00	600.0	1.07	303.01	2.78	4.17
P-132	J-71	J-68	1,000.00	600.0	0.84	237.93	1.78	1.78
P-133	J-71	Xamkhe Reservoir	4,625.00	400.0	0.52	65.08	1.16	5.37
P-141	J-63	J-1	325.00	1,000.0	0.95	749.58	1.24	0.40
P-148+	J-73	J-43	271.00	300.0	1.44	102.01	10.84	2.94
P-149	J-21	J-75	1,632.50	350.0	1.67	160.28	11.81	19.28
P-156	J-73	Dondok Ground Reservoir	4,000.00	300.0	0.41	29.27	1.07	4.29
P-159	J-45	J-76(-)	421.00	150.0	0.61	10.80	2.34	0.98
P-162	J-76	J-47	2,117.50	150.0	0.30	5.30	0.63	1.33
P-168	J-14	J-78	1,340.50	150.0	1.06	18.75	6.50	8.71
P-169	J-78	J-13	1,200.00	150.0	0.99	17.43	7.40	8.87
P-170	J-79	J-26	700.00	400.0	1.68	210.92	10.25	7.17
P-171	J-12	J-79	1,300.00	450.0	1.34	213.32	5.90	7.67
P-180	J-81	J-29	1,537.00	450.0	0.84	132.83	1.51	2.32
P-186	J-70	Phonetong Reservoir	10.00	500.0	0.00	0.00	0.00	0.00
P-190	J-69	Phonekheng Res.	10.00	400.0	1.89	237.93	12.81	0.13
P-191	Phonekheng Res.	J-21	10.00	400.0	1.40	175.56	7.30	0.07
P-196	J-82	J-58	10.00	450.0	2.10	334.62	8.35	0.08
P-197	J-1	J-77	250.00	700.0	0.90	346.86	1.69	0.42
P-199	Phonethane Res.	J-15	20.00	300.0	4.82	340.80	101.20	2.02
P-202+	J-67	Phonethane Res.	10.00	300.0	0.48	34.19	1.43	0.01
P-Pmp1-In	Chinaimo Reservoir	PMP-1	10.00	150.0	10.95	193.51	870.15	8.70
P-Pmp1-Out	PMP-1	J-63	10.00	150.0	10.95	193.51	870.15	8.70
P-Pmp2-In	Chinaimo Reservoir	PMP-2	10.00	150.0	10.95	193.51	870.15	8.70

Label	From Node	To Node	Length (m)	Diameter (mm)	Velocity (m/s)	Discharge (l/s)	Loss (m/km)	Loss (m)
P-Pmp2-Out	PMP-2	J-63	10.00	150.0	10.95	193.51	870.15	8.70
P-Pmp3-In	Chinaimo Reservoir	PMP-3	10.00	150.0	10.95	193.51	870.15	8.70
P-Pmp3-Out	PMP-3	J-63	10.00	150.0	10.95	193.51	870.15	8.70
P-Pmp4-In	Chinaimo Reservoir	PMP-4	10.00	150.0	10.95	193.51	870.15	8.70
P-Pmp4-Out	PMP-4	J-63	10.00	150.0	10.95	193.51	870.15	8.70
P-Pmp5-In	Chinaimo Reservoir	PMP-5	10.00	150.0	0.00	-0.00	0.00	0.00
P-Pmp5-Out	PMP-5	J-63	10.00	150.0	0.00	-0.00	0.00	0.00
P-Pmp6-In	Chinaimo Reservoir	PMP-6	10.00	150.0	0.00	-0.00	0.00	0.00
P-Pmp6-Out	PMP-6	J-63	10.00	150.0	0.00	-0.00	0.00	0.00
P-Pmp7-In	J-83	PMP-7	10.00	150.0	5.14	90.83	255.83	2.56
P-Pmp7-Out	PMP-7	J-64	10.00	300.0	1.28	90.83	65.11	0.65
P-Pmp8-In	J-83	PMP-8	10.00	150.0	0.00	-0.00	0.00	0.00
P-Pmp8-Out	PMP-8	J-64	10.00	300.0	0.00	-0.00	0.00	0.00
P-Pmp9-In	Kaolieo Reservoir	PMP-9	10.00	150.0	6.31	111.54	374.23	3.74
P-Pmp9-Out	PMP-9	J-82	10.00	150.0	6.31	111.54	374.23	3.74
P-Pmp10-In	Kaolieo Reservoir	PMP-10	10.00	150.0	6.31	111.54	374.23	3.74
P-Pmp10-Out	PMP-10	J-82	10.00	150.0	6.31	111.54	374.23	3.74
P-Pmp11-In	Kaolieo Reservoir	PMP-11	10.00	150.0	6.31	111.54	374.23	3.74
P-Pmp11-Out	PMP-11	J-82	10.00	150.0	6.31	111.54	374.23	3.74
P-Pmp12-In	Kaolieo Reservoir	PMP-12	10.00	150.0	0.00	-0.00	0.00	0.00
P-Pmp12-Out	PMP-12	J-82	10.00	150.0	0.00	-0.00	0.00	0.00
P-Pmp15-In	J-76(-)	PMP-15	10.00	150.0	0.31	5.40	1.37	0.01
P-Pmp15-Out	PMP-15	J-76	10.00	150.0	0.31	5.40	1.37	0.01
P-Pmp16-In	J-76(-)	PMP-16	10.00	150.0	0.31	5.40	1.37	0.01
P-Pmp16-Out	PMP-16	J-76	10.00	150.0	0.31	5.40	1.37	0.01

Label	From Node	To Node	Length (m)	Diameter (mm)	Velocity (m/s)	Discharge (l/s)	Loss (m/km)	Loss (m)
P-Pmp17 -In	J-31	PMP-17	10.00	150.0	0.34	6.03	1.69	0.02
P-Pmp17 -Out	PMP-17	J-80	10.00	150.0	0.34	6.03	1.69	0.02
P-Pmp18 -In	J-31	PMP-18	10.00	150.0	0.34	6.06	1.70	0.02
P-Pmp18 -Out	PMP-18	J-80	10.00	150.0	0.34	6.06	1.04	0.01

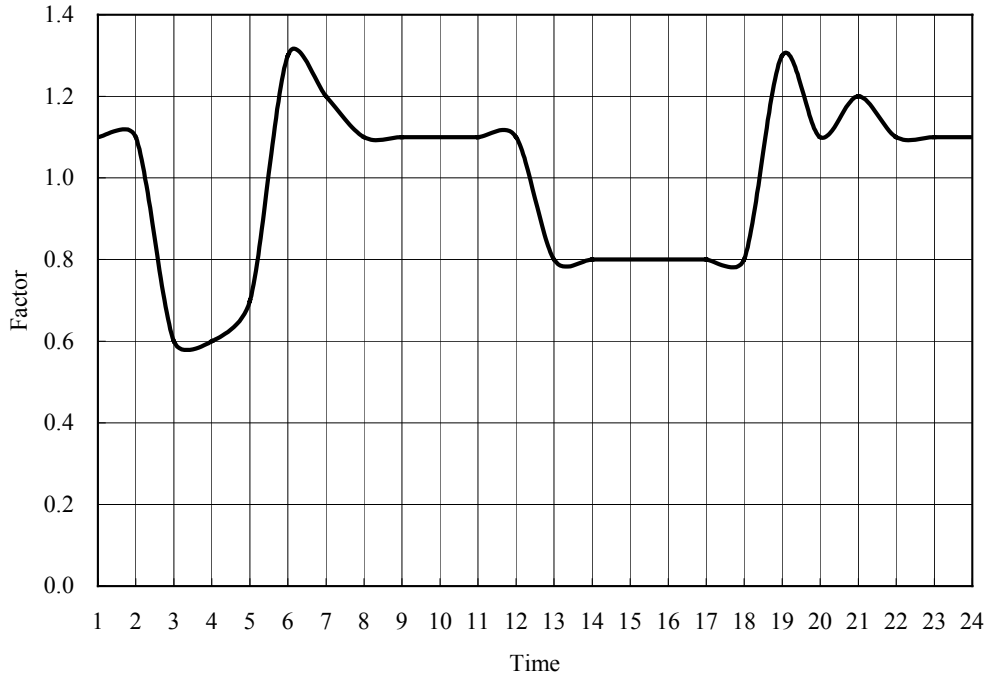
Reservoir Report: Steady State Analysis

Label	Total Volume (m^3)	LWL (m)	Initial WL (m)	HWL (m)	Elevation (m)	Calculated Level (m)	Calculated Percent Full (%)
Phonethane Res.	1,500	201.04	203.04	207.24	176.83	2.00	32.3
Phonekheng Res.	2,000	191.59	193.59	197.85	178.92	2.00	31.9
Salakham Reservoir	1,500	199.30	201.30	206.00	170.00	2.00	29.9
Phonetong Reservoir	1,500	198.57	198.57	204.77	180.18	0.00	0.0
Chinaimo Reservoir	3,300	166.91	168.91	171.49	171.21	2.00	43.7
Kaolieo Reservoir	4,000	165.75	171.25	171.25	171.50	5.50	100.0
Xamkhe Reservoir	2,000	192.93	194.93	199.63	177.63	2.00	29.9
Dondok Ground Reservoir	1,000	190.90	191.90	193.40	190.70	1.00	40.0
Dondok Elevated Tank	660	220.50	220.50	226.50	190.70	-0.00	-0.0

4 Demand Pattern

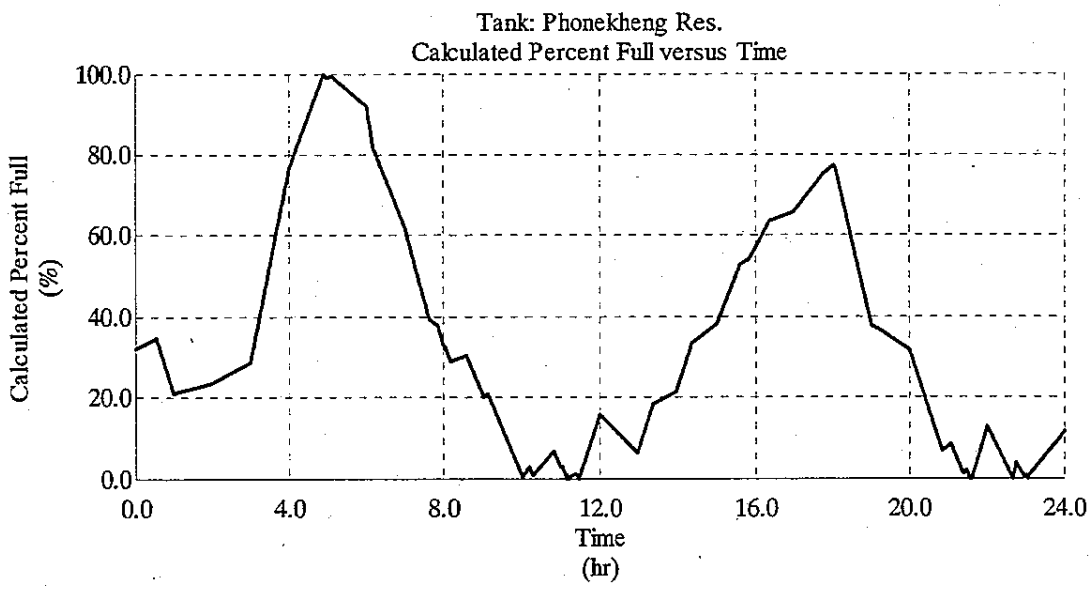
Determination of Demand Pattern for Network Analysis
based on the flow data of 250mm pipe branced for Nongteng on 31/3/03 - 1/4/03

Time	Flow Rate (l/sec)	Hourly Factor	
		Calculated	Adjusted
1	66.8	1.121	1.1
2	66.8	1.122	1.1
3	37.8	0.635	0.6
4	38.2	0.642	0.6
5	39.1	0.657	0.7
6	76.7	1.288	1.3
7	72.8	1.222	1.2
8	67.7	1.137	1.1
9	67.5	1.134	1.1
10	66.3	1.114	1.1
11	65.8	1.105	1.1
12	63.1	1.059	1.1
13	48.8	0.820	0.8
14	48.2	0.809	0.8
15	50.6	0.849	0.8
16	50.3	0.845	0.8
17	46.6	0.782	0.8
18	46.8	0.786	0.8
19	74.8	1.255	1.3
20	68.1	1.143	1.1
21	68.8	1.155	1.2
22	62.6	1.051	1.1
23	68.1	1.144	1.1
24	67.0	1.125	1.1
	59.6	24	24

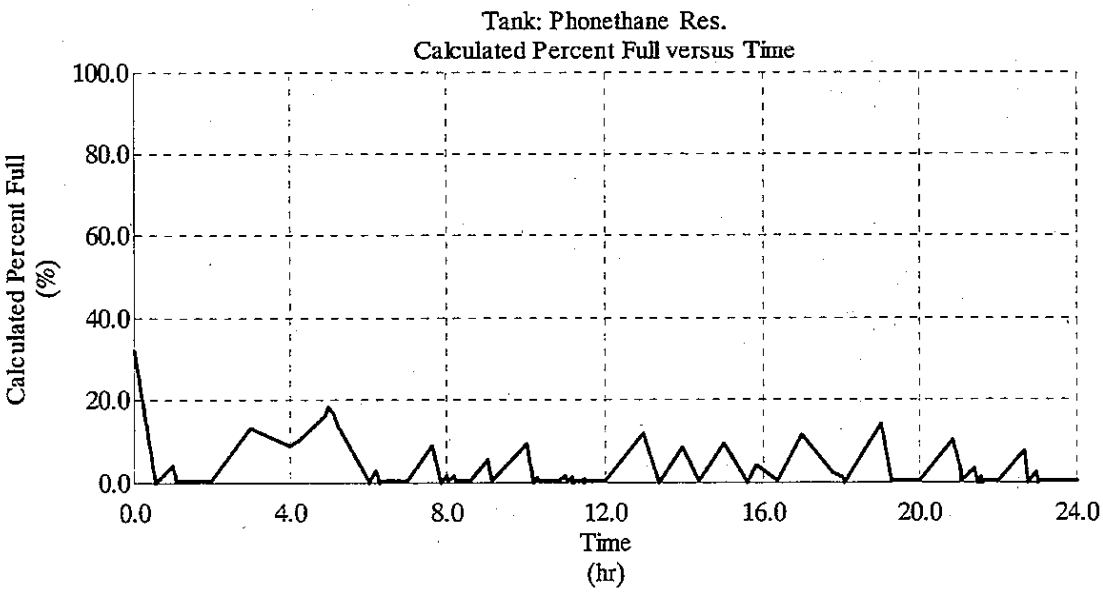


5 Water Level of Reservoirs

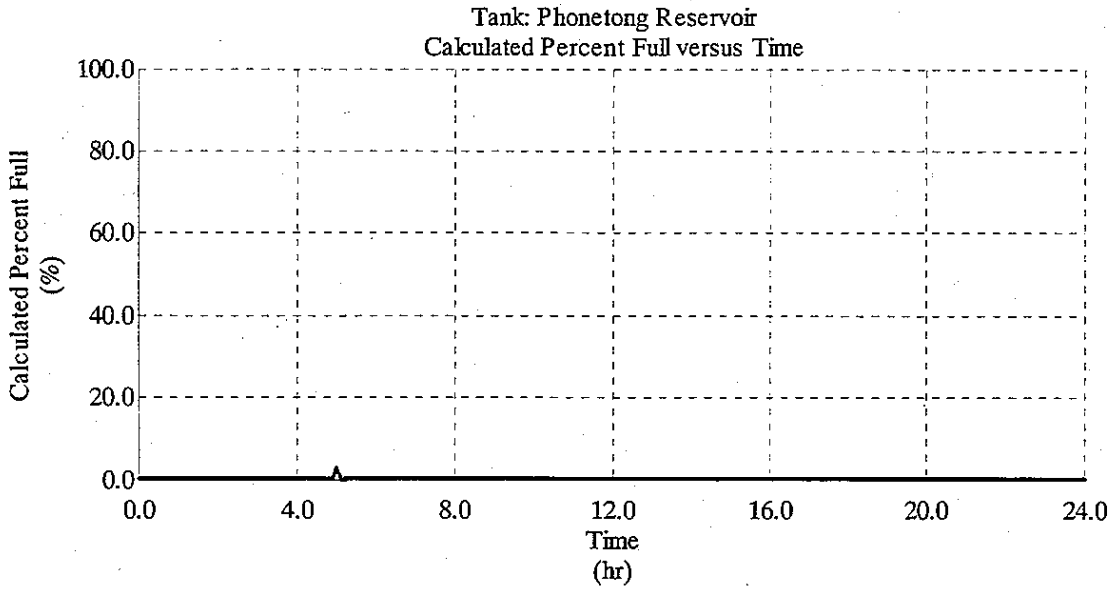
5.1. Phonekheng Reservoir



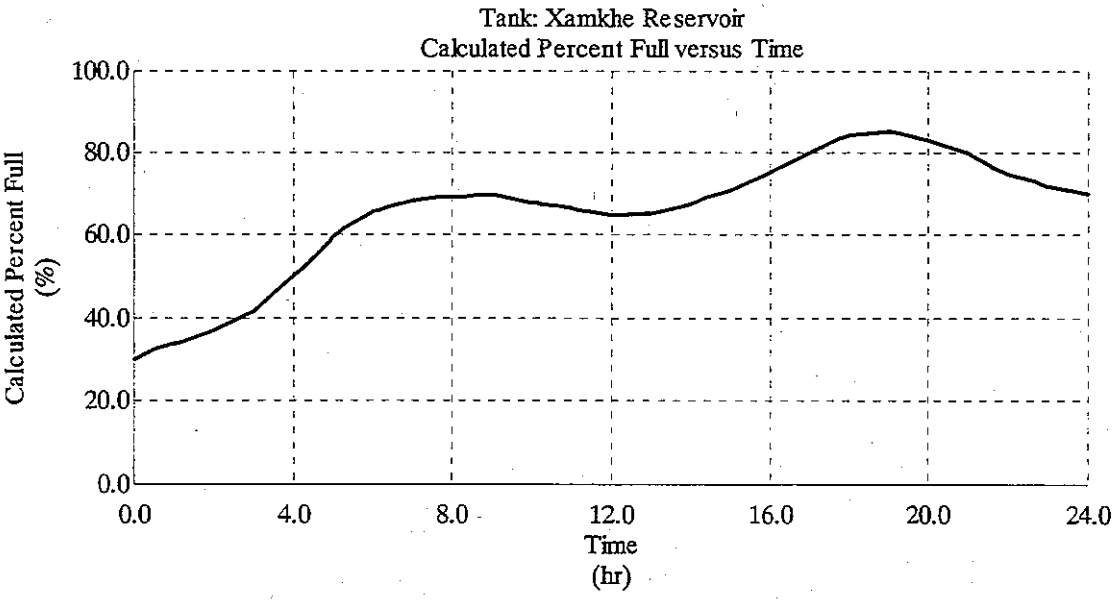
5.2. Phonethane Reservoir



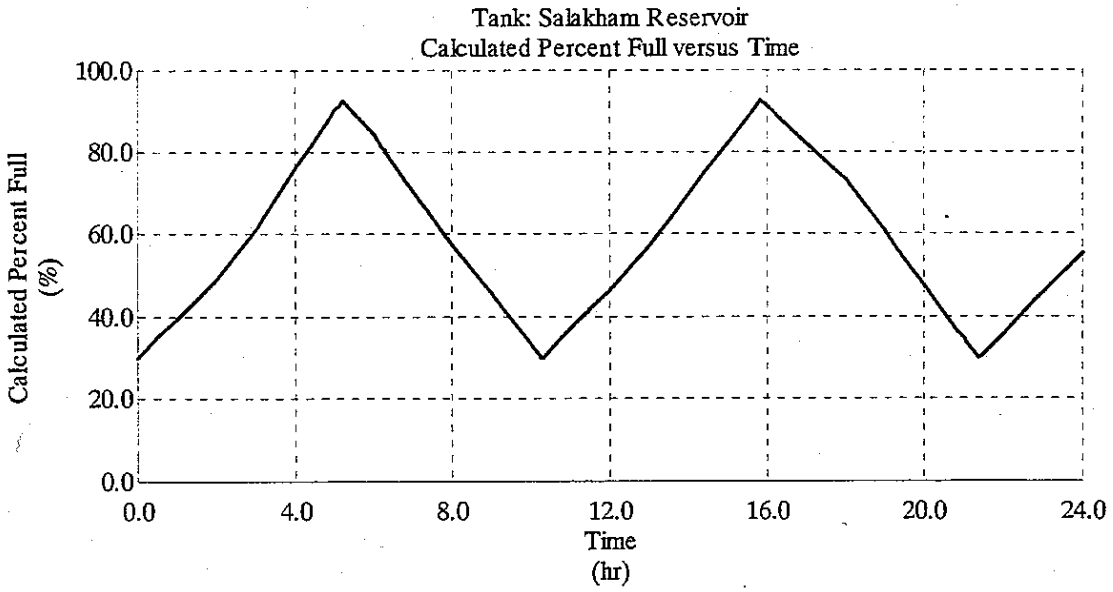
5.3. Phonetong Reservoir



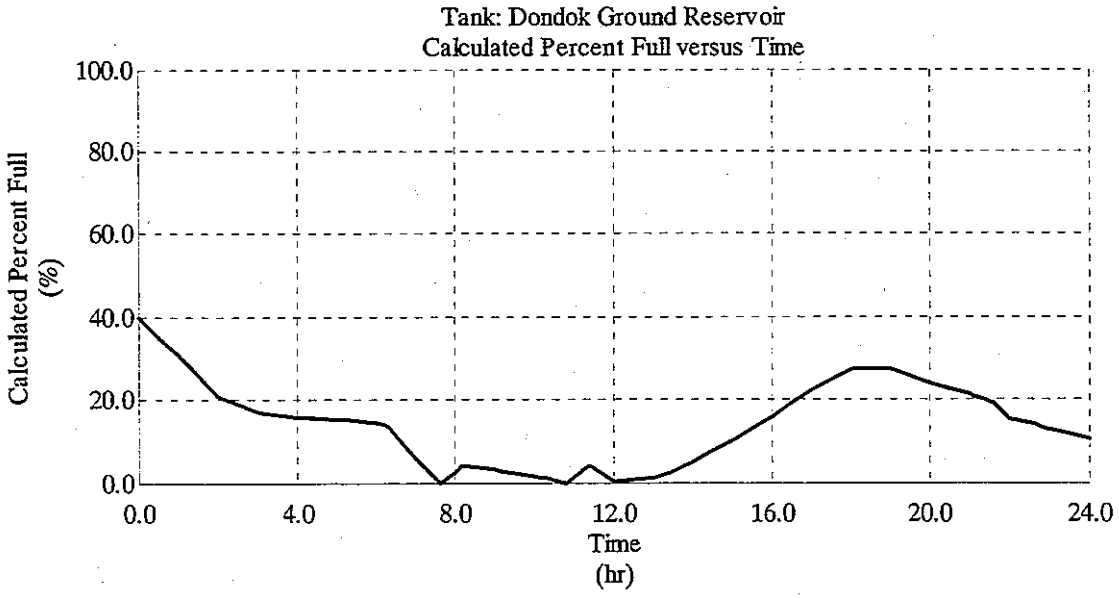
5.4. Xamkhe Reservoir



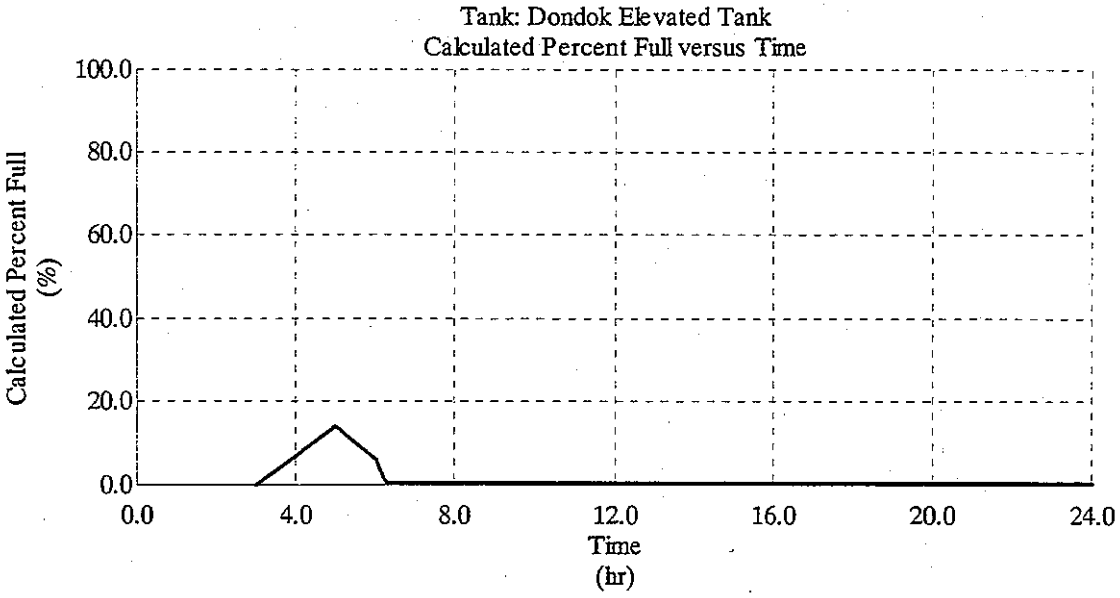
5.5. Salakham Reservoir



5.6. Dongdok Ground Reservoir



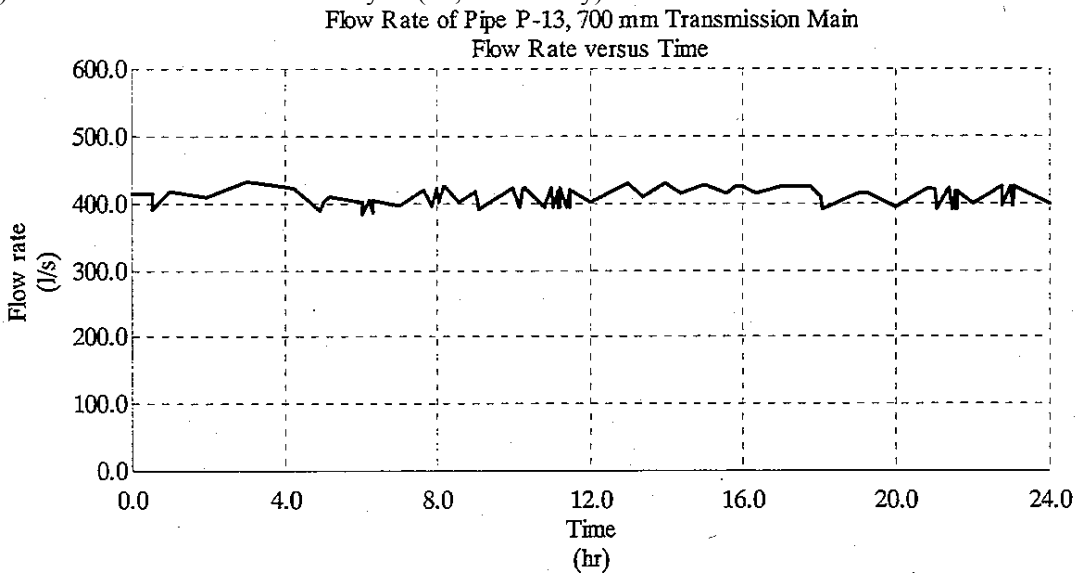
5.7. Dongdok Elevated Reservoir



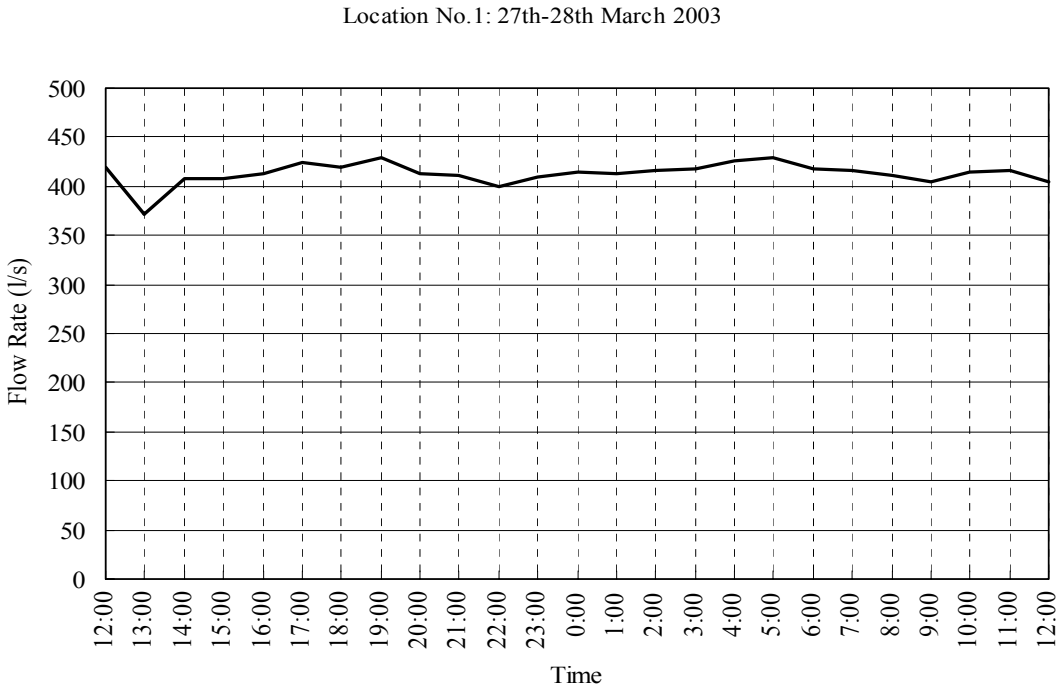
6. Results of Network Analysis and Flow Measurement Survey

6.1. 700mm Transmission Main from Chinaimo WTP

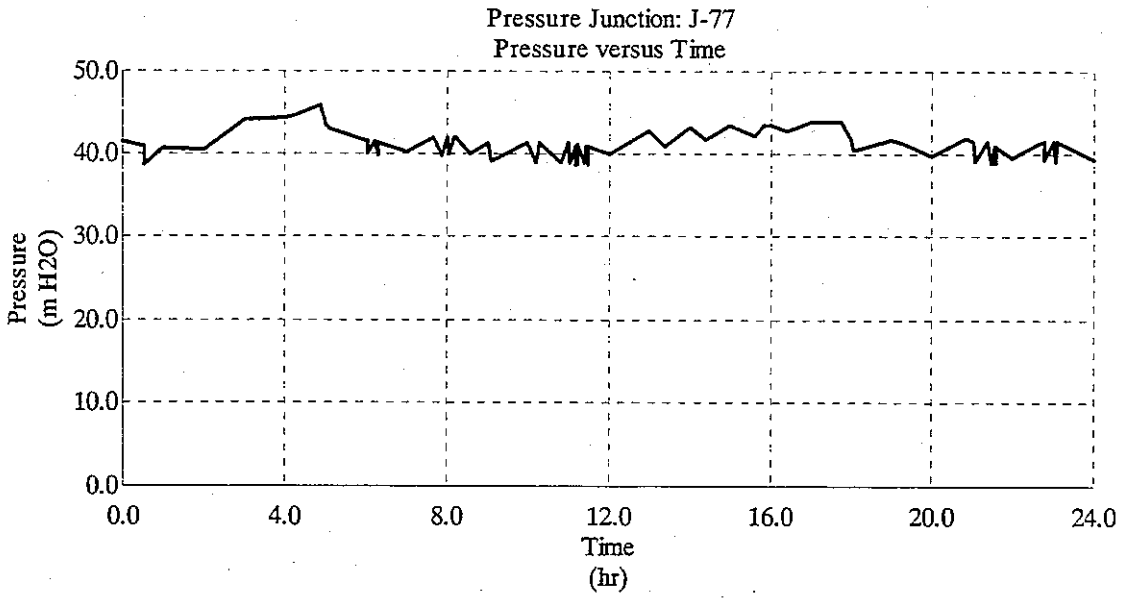
(1) Results of Network Analysis (35,574 m3/day)



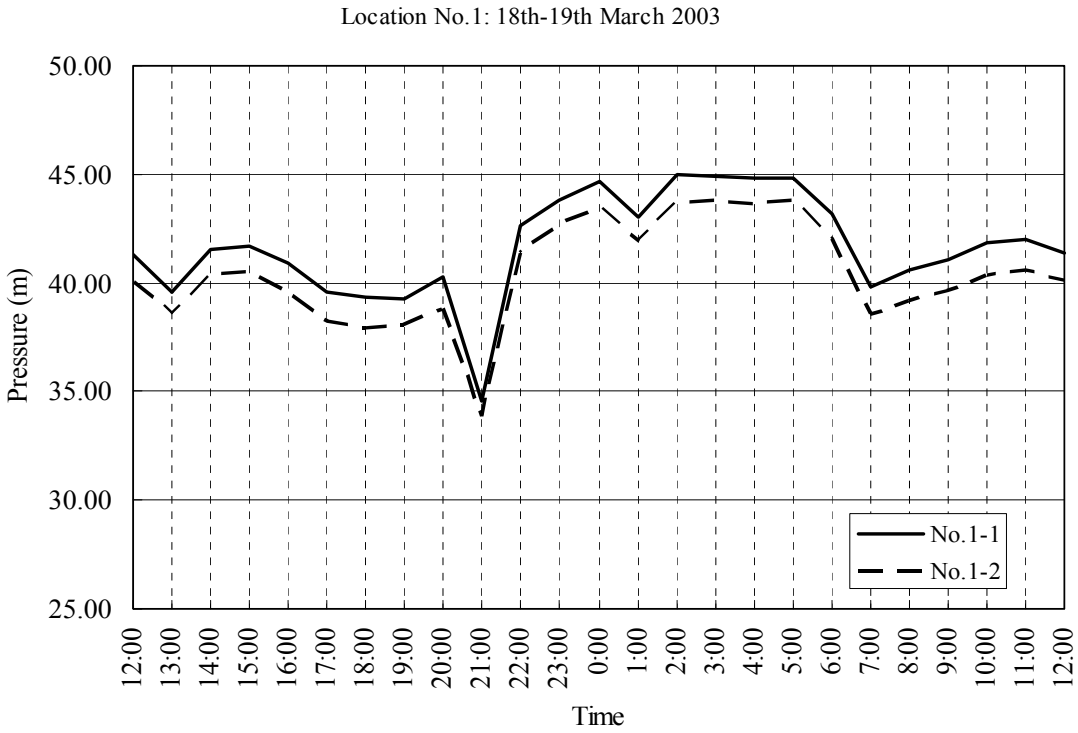
(2) Result of Flow Measurement Survey (35,700 m3/day)



(3) Results of Network Analysis

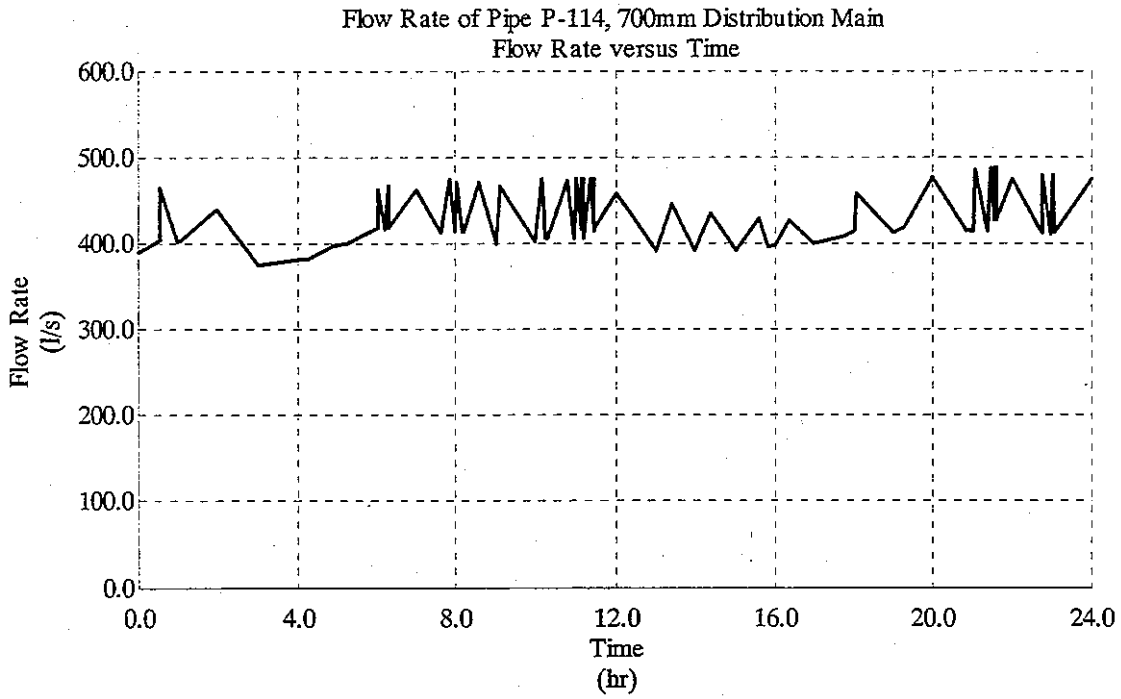


(4) Result of Pressure Measurement

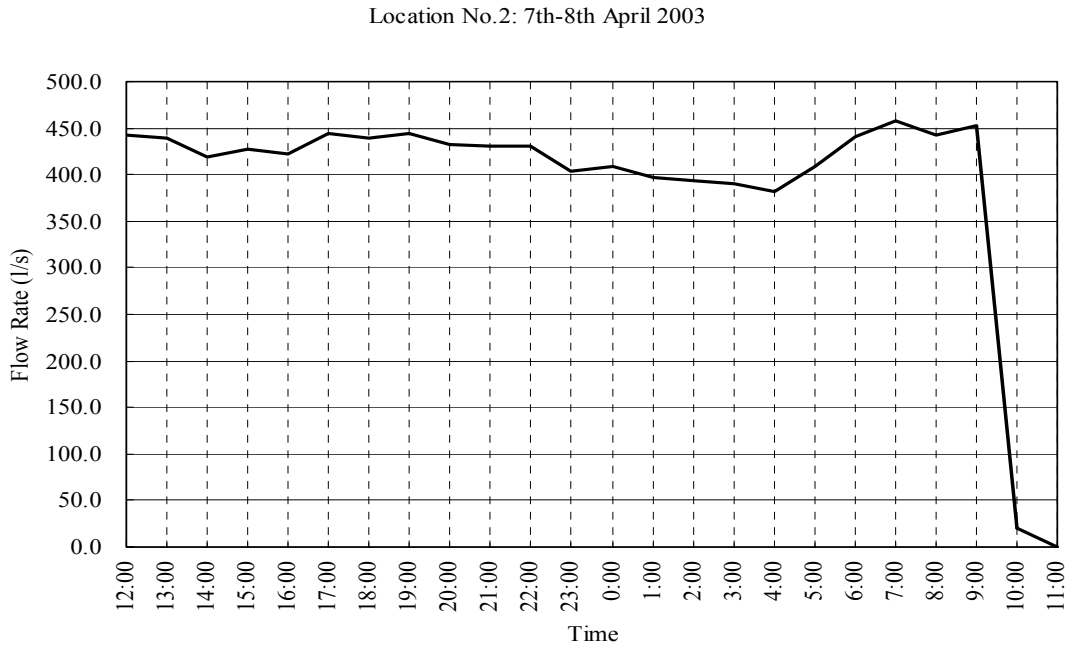


6.2. 700 mm Distribution Main to the Center of the City

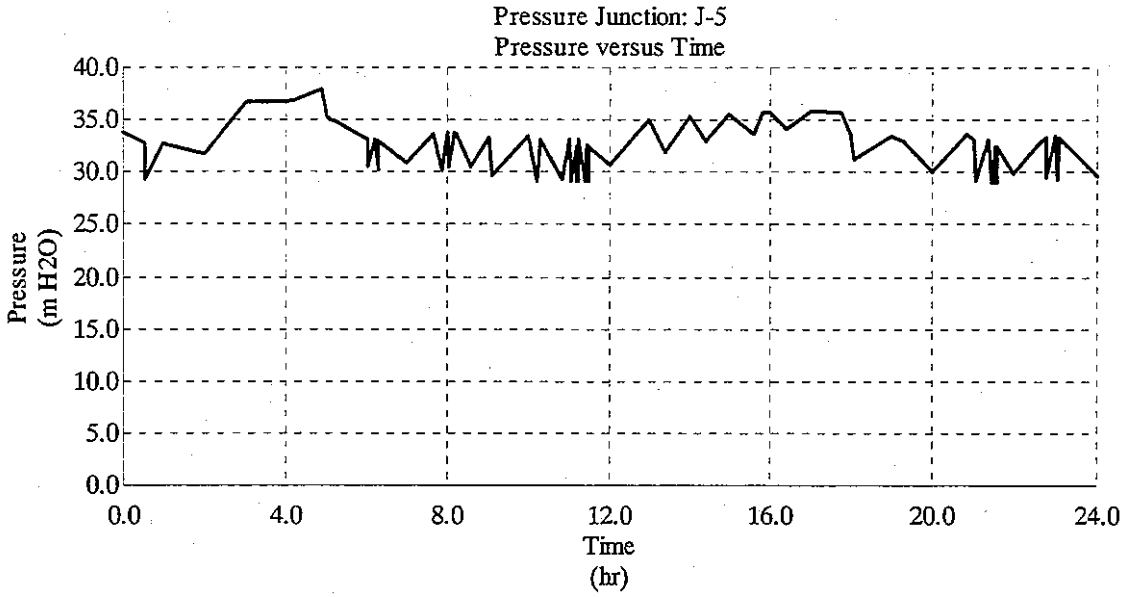
(1) Results of Network Analysis (36,882 m3/day)



(2) Result of Flow Measurement Survey (36,717 m3/day)

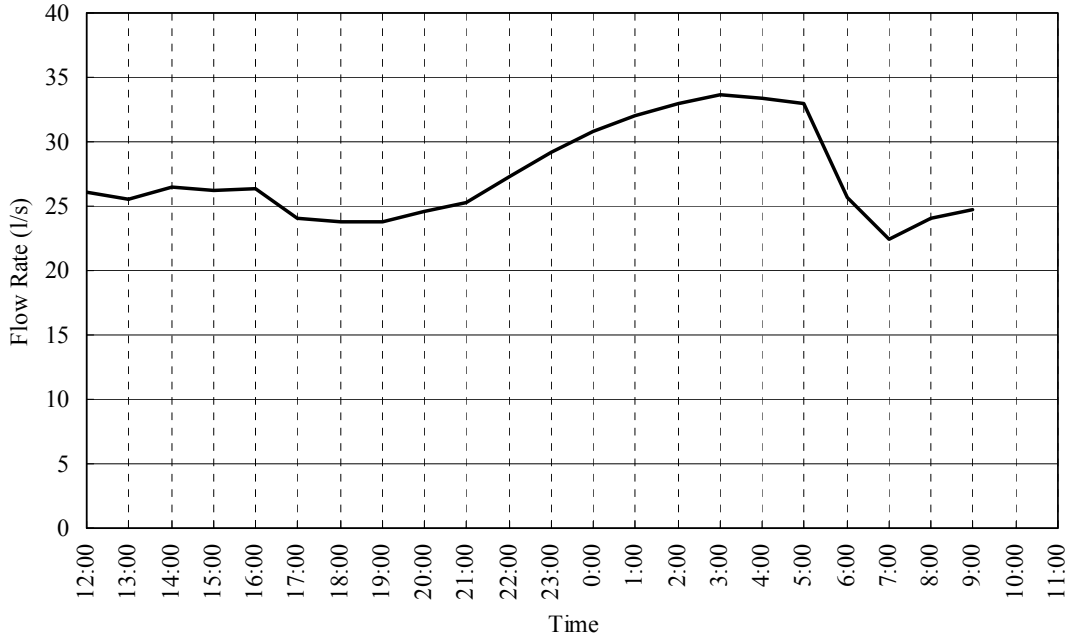


(3) Results of Network Analysis



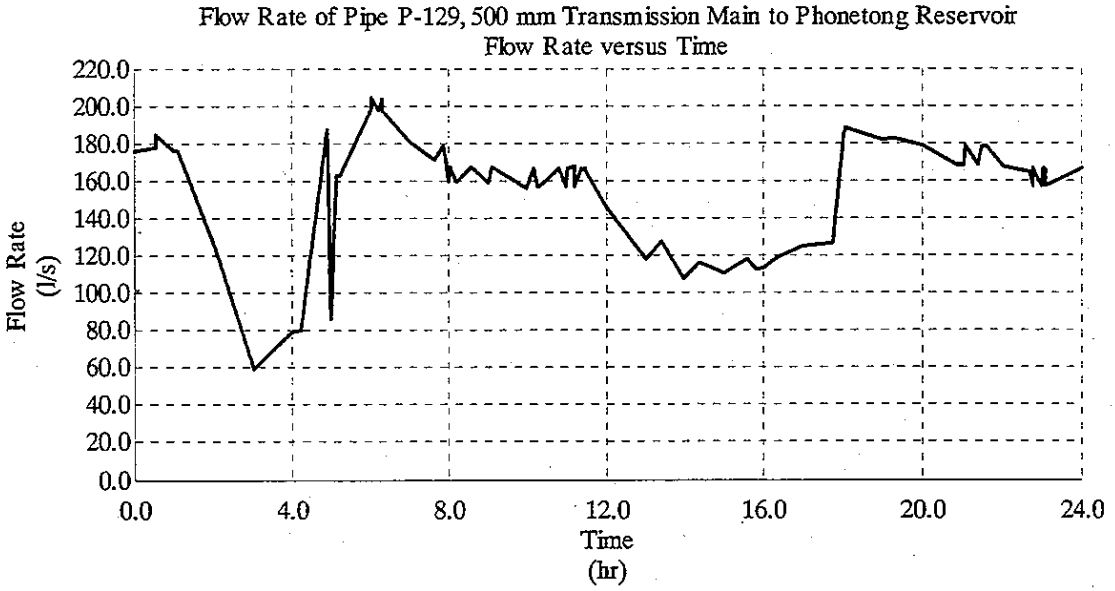
(4) Result of Pressure Measurement

Location No.2: 7th-8th April 2003

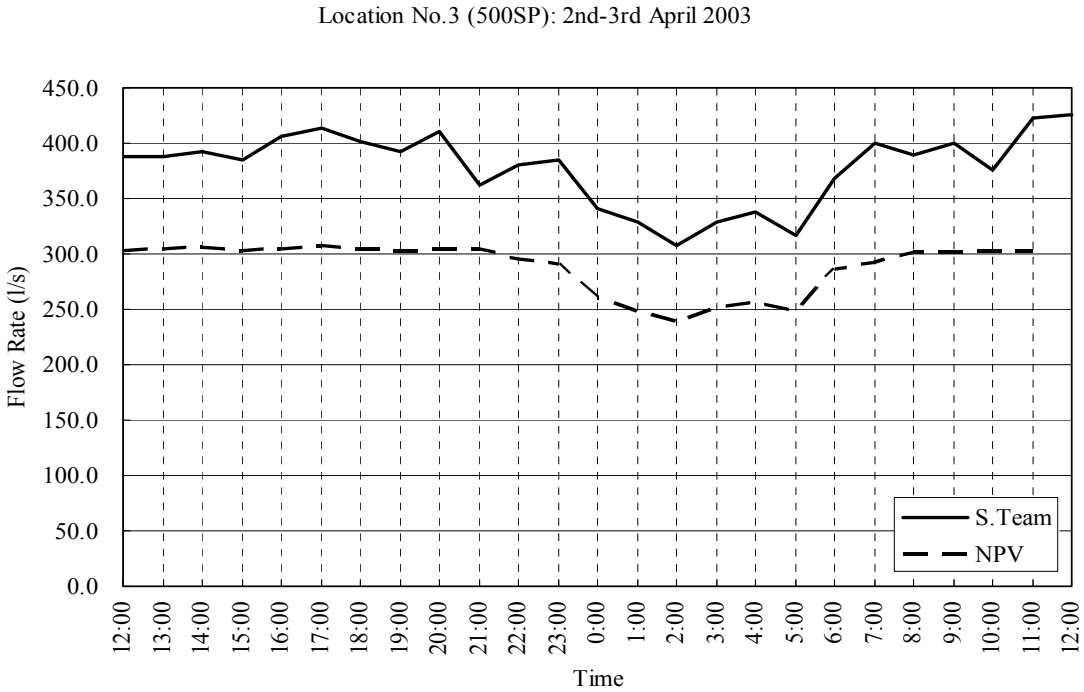


3.6. 500 mm Transmission Main to Phonetong Reservoir

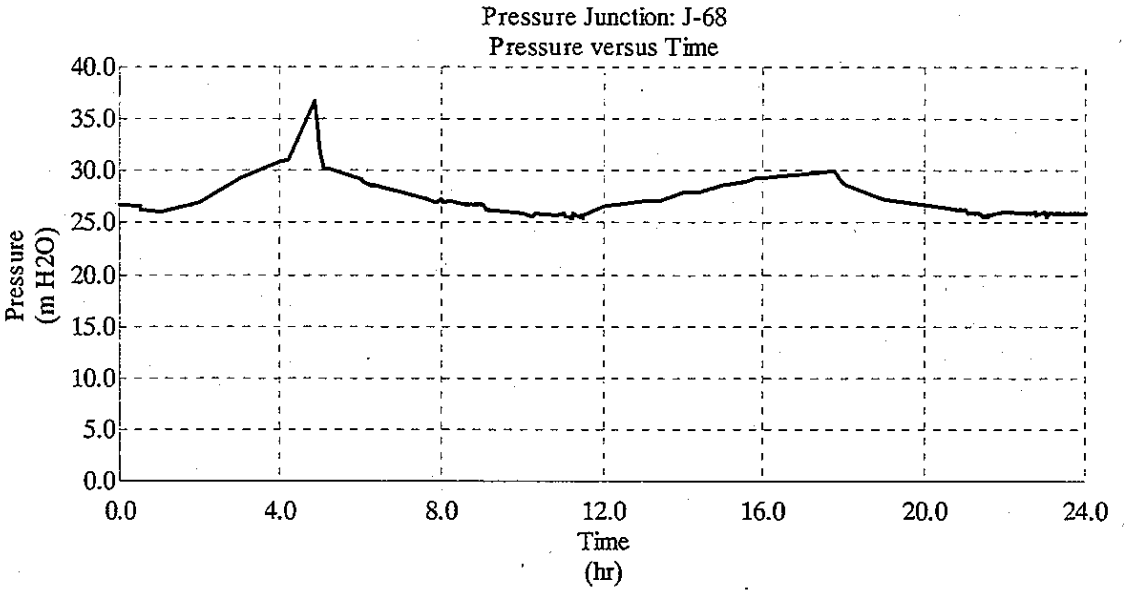
(1) Results of Network Analysis (12,971 m3/day)



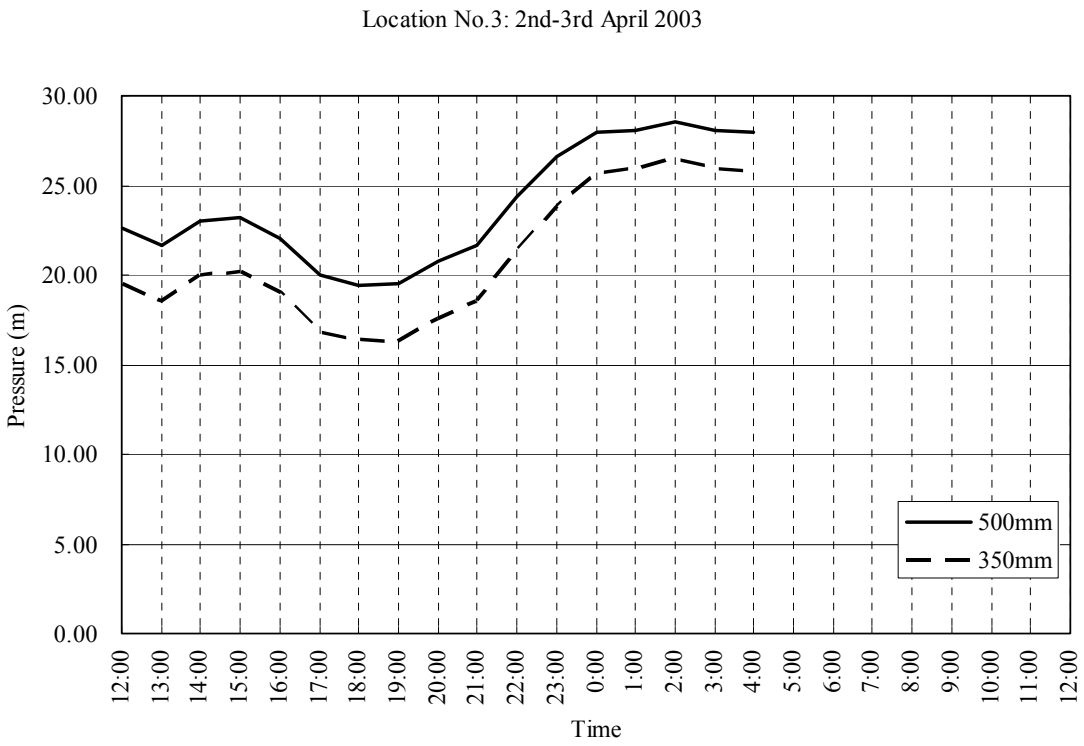
(2) Result of Flow Measurement Survey (32,648 m3/day, 24,925 m3/day)



(3) Results of Network Analysis

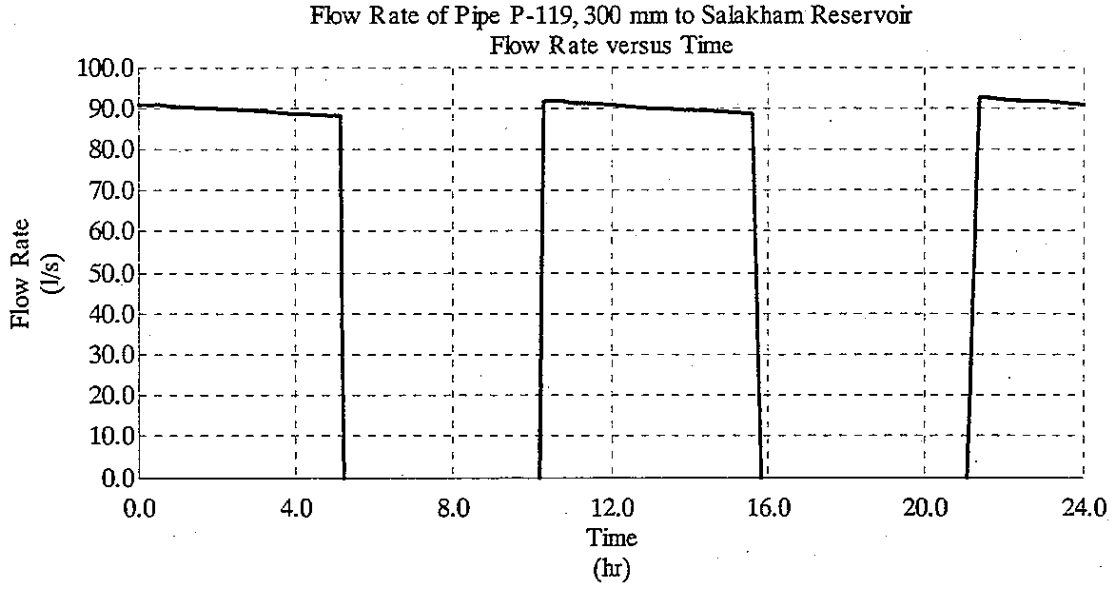


(4) Result of Pressure Measurement



6.4. 300 mm Transmission Main to Salakham Reservoir

(1) Results of Network Analysis (4,353 m3/day)



(2) Result of Flow Measurement Survey (4,887 m3/day)