Table 7.4.6 Study on Existing Sewer Improvement (Separate Case-2 : Supplementary Storm Sewer)

Storm Water Flow

Rainfall Intensity Formula	=	2750	(Return Period : 4 Year)
For Main Pipe (D≧500)		t + 17	
Rainfall Intensity Formula	=	2520	(Return Period : 2.5 Year)
For Small Pipe (D≦450)		t + 17	
Runoff Coefficient	=	0.5	
Inlet Time	=	5 min	
Assumed Average Velocity	=	1.5 m/sec	

No.	Down Stream	Length (m) Increment	Area (ha) Total	StormWater $Q_1(m^3/s)$	Existing Pipe Specification D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Sapplementary Pipe Specification D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Total $Q_2(m^3/s)$
3001	3008	725	24.00	3.045	400	18.2	2.24	0.281	1000	18.2	4.12	3.236	3.517
3002	3004	275	5.80	0.883	400	17.8	2.21	0.278	600	17.8	2.90	0.820	1.098
3003	3004	108	0.35	0.053	400	12.9	1.88	0.236					0.236
3004	3007	42	6.25	0.936	400	57.1	3.96	0.498	400	57.1	3.96	0.498	0.995
3005	3006	203	1.43	0.206	300	9.8	1.35	0.095	350	9.8	1.50	0.144	0.240
3006	3007	130	1.88	0.256	400	49.2	3.68	0.462					0.462
3007	3008	25	8.16	1.199	400	2.0	0.74	0.093	1100	2.0	1.45	1.378	1.471
3008	3009	82	33.73	4.156	500	6.7	1.57	0.308	1300	6.7	2.98	3.955	4.264
3009	3011	215	41.85	4.786	600	13.9	2.56	0.724	1200	13.9	4.06	4.592	5.316
3010	3011	152	1.14	0.168	400	12.4	1.85	0.232					0.232
3011	3013	66	43.19	4.838	600	21.2	3.16	0.893	1100	21.2	4.74	4.505	5.398
3012	3013	149	0.90	0.133	400	7.3	1.42	0.178					0.178
3013	3017	58	45.57	5.016	500	10.3	1.95	0.383	1300	10.3	3.69	4.898	5.281
3014	3015	221	2.25	0.321	300	20.3	1.95	0.138	350	20.3	2.16	0.208	0.346
3015	3016	278	6.52	0.906	400	3.4	0.97	0.122	900	3.4	1.66	1.056	1.178
3016	3017	180	9.46	1.225	400	2.7	0.86	0.108	1000	2.7	1.59	1.249	1.357
3017	3021	352	62.28	6.163	800	13.9	3.10	1.558	1300	13.9	4.29	5.694	7.252
3018	3019	227	2.42	0.377	500	2.0	0.86	0.169	600	2.0	0.97	0.274	0.443
3019	3020	558	18.10	2.252	600	11.9	2.37	0.670	900	11.9	3.10	1.972	2.642
3020	3021	308	20.60	2.307	600	2.9	1.17	0.331	1200	2.9	1.86	2.104	2.434
3021	3025	132	83.48	7.951	600	3.0	1.19	0.336	2000	3.0	2.65	8.325	8.662
3022	3023	120	1.05	0.158	400	12.5	1.85	0.232					0.232
3023	3024	268	2.98	0.433	500	19.0	2.65	0.520					0.520
3024	3025	93	3.11	0.399	600	20.4	3.10	0.877					0.877
3025	3026	63	86.89	8.134	600	7.9	1.93	0.546	1700	7.9	3.86	8.761	9.307
3026	3027	190	89.39	7.959	800	24.7	4.13	2.076	1200	24.7	5.42	6.130	8.206
3027	Exs. Outlet	71	89.59	7.830	600	18.3	2.94	0.831	1400	18.3	5.17	7.959	8.790
3028	Exs. Outlet	543	7.00	0.955	800	14.7	3.19	1.603					1.603
Exs. Outlet	Lana River	-	96.59	8.442									
3029	New Outlet	256	3.20	0.493	800	15.2	3.24	1.629					1.629
3030	3031	402	5.91	0.852	400	11.4	1.77	0.222	600	11.4	2.32	0.656	0.878
3031	New Outlet	305	11.19	1.429	600	19.0	2.99	0.845	600	19.0	2.99	0.845	1.691
New Outlet	Lana River	-	14.39	1.838									
3032	New Outlet	370	3.85	0.563	800	7.2	2.23	1.121					1.121
3033	3035	142	0.92	0.149	500	2.0	0.86	0.169					0.169
3034	3035	83	0.81	0.124	400	2.0	0.74	0.093	300	2.0	0.61	0.043	0.136
3035	3036	85	2.67	0.416	400	10.7	1.71	0.215	400	10.7	1.71	0.215	0.430
3036	3038	169	4.02	0.582	500	8.2	1.74	0.342	450	8.2	1.62	0.258	0.599
3037	3038	278	1.60	0.223	500	10.4	1.96	0.385					0.385
3038	New Outlet	166	6.77	0.917	600	28.9	3.69	1.043					1.043
New Outlet	Lana River	-	10.62	1.438									
3039	New Outlet	113	0.65	0.098	800	10.9	2.75	1.382					1.382
3040	New Outlet	155	1.46	0.216	400	27.7	2.76	0.347					0.347
New Outlet	Lana River	-	2.11	0.340									
3041	New Outlet	365	2.30	0.337	800	2.8	1.39	0.699					0.699
3042	3044	410	5.20	0.747	600	13.4	2.51	0.710	200	13.4	1.21	0.038	0.748
3043	3044	98	0.77	0.117	400	2.0	0.74	0.093	250	2.0	0.54	0.027	0.119
3044	3045	221	8.42	1.109	500	9.9	1.91	0.375	700	9.9	2.39	0.920	1.295

No.	Down Stream	Length (m) Increment	Area (ha) Total	StormWater $Q_1(m^3/s)$	Existing Pipe Specification D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Supplementary Pipe Specification D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Total $Q_2(m^3/s)$
3045	3052	454	19.93	2.232	600	12.3	2.41	0.681	900	12.3	3.16	2.010	2.692
3046	3048	263	4.73	0.726	400	2.0	0.74	0.093	900	2.0	1.27	0.808	0.901
3047	3048	167	2.87	0.459	400	4.7	1.14	0.143	600	4.7	1.49	0.421	0.565
3048	3050	58	8.30	1.238	400	2.0	0.74	0.093	1100	2.0	1.45	1.378	1.471
3049	3050	272	1.83	0.256	400	9.5	1.62	0.204	250	9.5	1.18	0.058	0.261
3050	3051	173	11.55	1.604	400	2.0	0.74	0.093	1200	2.0	1.54	1.742	1.835
3051	3052	77	11.84	1.598	600	2.0	0.97	0.274	1100	2.0	1.45	1.378	1.652
3052	3055	174	33.23	3.526	600	2.0	0.97	0.274	1600	2.0	1.87	3.760	4.034
3053	3054	118	0.43	0.065	400	2.0	0.74	0.093					0.093
3054	3055	98	0.78	0.112	500	6.7	1.57	0.308					0.308
3055	3060	12	34.02	3.599	600	2.0	0.97	0.274	1600	2.0	1.87	3.760	4.034
3056	3059	287	2.82	0.427	500	13.2	2.21	0.434					0.434
3057	3059	203	1.29	0.186	500	17.2	2.52	0.495					0.495
3058	3059	111	0.46	0.069	400	2.0	0.74	0.093					0.093
3059	3060	235	5.75	0.790	600	8.8	2.04	0.577	450	8.8	1.68	0.267	0.844
3060	3061	114	40.22	4.107	600	2.0	0.97	0.274	1700	2.0	1.94	4.403	4.678
3061	New Outlet	348	48.69	4.503	600	6.7	1.78	0.503	1400	6.7	3.13	4.818	5.322
New Outlet	Lana River	-	50.99	4.716									
3062	New Outlet	514	9.30	1.282	800	3.6	1.58	0.794	700	3.6	1.44	0.554	1.348
3063	3065	256	1.33	0.188	600	7.8	1.92	0.543					0.543
3064	3065	216	1.32	0.189	600	8.3	1.98	0.560					0.560
3065	3067	86	3.40	0.503	600	2.0	0.97	0.274	600	2.0	0.97	0.274	0.549
3066	3067	232	2.02	0.314	600	9.0	2.06	0.582					0.582
3067	New Outlet	372	7.62	0.973	600	11.2	2.30	0.650	500	11.2	2.04	0.401	1.051
3068	3070	416	4.63	0.665	500	2.0	0.86	0.169	800	2.0	1.18	0.593	0.762
3069	3070	285	3.24	0.491	400	2.8	0.88	0.111	700	2.8	1.27	0.489	0.599
3070	3072	176	8.99	1.201	500	2.1	0.88	0.173	1000	2.1	1.40	1.100	1.272
3071	3072	114	0.68	0.102	400	9.6	1.62	0.204					0.204
3072	3074	100	10.08	1.296	500	2.9	1.04	0.204	1000	2.9	1.64	1.288	1.492
3073	3074	127	0.86	0.129	400	14.9	2.02	0.254					0.254
3074	New Outlet	574	14.30	1.513	500	7.1	1.62	0.318	900	7.1	2.40	1.527	1.845
New Outlet	Lana River	-	31.22	3.303									
3075	Exs. Outlet	415	0.15	0.020	800	2.0	1.18	0.593					0.593
3076	Exs. Outlet	220	1.93	0.302	500	9.0	1.82	0.357					0.357
Exs. Outlet	Lana River	-	2.08	0.299									
3077	New Outlet	270	2.80	0.428	800	2.0	1.18	0.593					0.593
3078	New Outlet	533	5.32	0.728	300	2.0	0.61	0.043	900	2.0	1.27	0.808	0.851
New Outlet	Lana River	-	8.12	1.112									
3079	New Outlet	233	0.76	0.108	800	2.0	1.18	0.593					0.593
3080	3082	134	0.47	0.070	200	10.4	1.06	0.033	250	10.4	1.24	0.061	0.094
3081	3082	70	1.43	0.240	400	2.0	0.74	0.093	500	2.0	0.86	0.169	0.262
3082	3084	47	2.11	0.336	400	2.0	0.74	0.093	600	2.0	0.97	0.274	0.367
3083	3084	212	1.68	0.263	500	2.0	0.86	0.169	450	2.0	0.80	0.127	0.296
3084	New Outlet	70	4.00	0.609	500	2.0	0.86	0.169	800	2.0	1.18	0.593	0.762
New Outlet	Lana River	-	4.76	0.724									
3085	New Outlet	421	3.12	0.446	1000	5.8	2.32	1.822					1.822
3086	3087	290	2.72	0.412	300	6.8	1.13	0.080	600	6.8	1.79	0.506	0.586
3087	3092	95	3.02	0.402	400	27.3	2.74	0.344	250	27.3	2.00	0.098	0.442
3088	3089	52	0.36	0.056	300	2.0	0.61	0.043	200	2.0	0.47	0.015	0.058
3089	3092	220	1.61	0.225	400	20.8	2.39	0.300					0.300
3091	3092	199	5.17	0.816	300	3.0	0.75	0.053	900	3.0	1.56	0.992	1.045
3092	3096	344	14.44	1.832	500	4.9	1.35	0.265	1000	4.9	2.14	1.681	1.946
3093	3095	327	1.95	0.291	300	2.0	0.61	0.043	600	2.0	0.97	0.274	0.317
3094	3095	290	2.15	0.326	300	6.8	1.13	0.080	500	6.8	1.59	0.312	0.392
3095	3096	267	4.40	0.588	400	5.4	1.22	0.153	600	5.4	1.60	0.452	0.606
3096	3097	191	19.22	2.280	600	9.9	2.16	0.611	900	9.9	2.83	1.800	2.411
3097	3100	30	19.24	2.254	600	2.0	0.97	0.274	1300	2.0	1.63	2.164	2.438
3098	3099	91	0.34	0.052	300	2.0	0.61	0.043	200	2.0	0.47	0.015	0.058

No.	Down Stream	Length (m) Increment	Area (ha) Total	StormWater $Q_1(m^3/s)$	Existing Pipe Specification D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Supplementary Pipe Specification D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Total $Q_2(m^3/s)$
3099	3100	251	1.58	0.214	600	8.8	2.04	0.577					0.577
3100	3103	93	21.60	2.455	800	2.0	1.18	0.593	1300	2.0	1.63	2.164	2.757
3101	3102	230	1.92	0.298	300	2.0	0.61	0.043	600	2.0	0.97	0.274	0.317
3102	3103	239	4.12	0.579	600	8.9	2.05	0.580					0.580
3103	New Outlet	101	26.54	2.921	800	2.0	1.18	0.593	1400	2.0	1.71	2.632	3.225
New Outlet	Lana River	-	29.66	3.265									
3104	New Outlet	257	2.41	0.370	1000	2.0	1.37	1.076					1.076
3105	3106	187	1.49	0.236	800	2.1	1.21	0.608					0.608
3106	New Outlet	210	3.31	0.479	500	2.0	0.86	0.169	700	2.0	1.08	0.416	0.584
New Outlet	Lana River	-	5.72	0.828									
3107	New Outlet	667	11.60	1.507	1000	3.1	1.70	1.335	500	3.1	1.07	0.210	1.545
3108	New Outlet	193	2.23	0.353	500	5.1	1.37	0.269	350	5.1	1.08	0.104	0.373
New Outlet	Lana River	-	13.83	1.797									
3109	New Outlet	456	4.93	0.695	1000	2.0	1.37	1.076					1.076
3110	3112	491	2.69	0.374	600	5.2	1.57	0.444					0.444
3111	3112	181	4.18	0.665	400	7.7	1.45	0.182	600	7.7	1.91	0.540	0.722
3112	New Outlet	489	11.28	1.310	600	2.0	0.97	0.274	1000	2.0	1.37	1.076	1.350
New Outlet	Lana River	-	16.21	1.882									
3113	Exs. Outlet	20	0.00	0.000	1000	2.0	1.37	1.076					1.076
3114	3116	579	3.68	0.495	500	4.6	1.30	0.255	500	4.6	1.30	0.255	0.511
3115	3116	67	0.44	0.068	400	8.9	1.56	0.196					0.196
3116	3118	68	4.44	0.581	600	10.2	2.19	0.619					0.619
3117	3118	70	1.40	0.235	400	2.0	0.74	0.093	500	2.0	0.86	0.169	0.262
3118	3121	199	8.22	1.000	1000x500	2.0	1.32	0.594	700	2.0	1.08	0.416	1.010
3119	3120	268	3.27	0.500	400	6.3	1.32	0.166	600	6.3	1.72	0.486	0.652
3120	3121	213	6.43	0.900	500	7.9	1.71	0.336	700	7.9	2.14	0.824	1.159
3121	3125	232	17.05	1.915	500	9.7	1.89	0.371	900	9.7	2.80	1.781	2.152
3122	3124	276	2.60	0.396	400	9.4	1.61	0.202	400	9.4	1.61	0.202	0.405
3123	3124	124	1.80	0.294	400	3.2	0.94	0.118	500	3.2	1.09	0.214	0.332
3124	3125	208	5.21	0.726	400	2.0	0.74	0.093	900	2.0	1.27	0.808	0.901
3125	3126	500	26.84	2.595	400	10.3	1.68	0.211	1000	10.3	3.10	2.435	2.646
3126	Exs. Outlet	1009	26.84	2.022	600	3.2	1.23	0.348	1100	3.2	1.84	1.749	2.096
Exs. Outlet	Lana River	-	26.84	2.022									
3128	Exs. Outlet	254	2.27	0.350	300	8.2	1.24	0.088	500	8.2	1.74	0.342	0.429
3129	3131	71	3.60	0.537	400	2.0	0.74	0.093	800	2.0	1.18	0.593	0.686
3130	3131	201	1.00	0.145	400	8.9	1.56	0.196					0.196
3131	3136	122	6.00	0.849	500	2.0	0.86	0.169	900	2.0	1.27	0.808	0.977
3132	3133	124	0.60	0.090	300	9.6	1.34	0.095					0.095
3133	3135	95	1.00	0.143	400	9.4	1.61	0.202					0.202
3134	3135	149	1.16	0.187	400	2.6	0.85	0.107	400	2.6	0.85	0.107	0.214
3135	3136	20	2.21	0.342	400	2.0	0.74	0.093	600	2.0	0.97	0.274	0.367
3136	3141	287	12.31	1.557	600	9.4	2.11	0.597	800	9.4	2.55	1.282	1.878
3137	3138	328	3.02	0.451	500	8.5	1.77	0.348	350	8.5	1.40	0.135	0.482
3138	3140	138	3.62	0.508	600	2.0	0.97	0.274	600	2.0	0.97	0.274	0.549
3139	3140	122	4.10	0.669	400	7.3	1.42	0.178	600	7.3	1.86	0.526	0.704
3140	3141	68	8.11	1.110	800	2.0	1.18	0.593	800	2.0	1.18	0.593	1.186
3141	3142	120	20.85	2.528	800	2.0	1.18	0.593	1300	2.0	1.63	2.164	2.757
3142	3148	281	22.10	2.440	800	6.9	2.19	1.101	900	6.9	2.36	1.501	2.602
3143	3144	159	1.39	0.204	300	16.9	1.78	0.126	300	16.9	1.78	0.126	0.252
3144	3145	302	3.15	0.444	400	8.9	1.56	0.196	450	8.9	1.69	0.269	0.465
3145	3147	248	9.13	1.166	500	6.5	1.55	0.304	800	6.5	2.12	1.066	1.370
3146	3147	185	0.70	0.102	600	4.3	1.42	0.401					0.401
3147	3148	497	17.27	1.863	600	4.6	1.47	0.416	1000	4.6	2.07	1.626	2.041
3148	3151	367	40.56	3.922	1000	4.6	2.07	1.626	1200	4.6	2.34	2.646	4.272
3149	3150	218	0.70	0.100	300	15.1	1.68	0.119					0.119
3150	3151	404	4.17	0.551	400	2.7	0.86	0.108	700	2.7	1.25	0.481	0.589
3151	Exs. Outlet	430	47.03	4.055	1000	2.0	1.37	1.076	1500	2.0	1.79	3.163	4.239
Exs. Outlet	Lana River	-	49.30	4.251									

No.	Down Stream	Length (m) Increment	Area (ha) Total	StormWater $Q_1(m^3/s)$	Existing Pipe Specification D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Supplementary Pipe Specification D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Total $Q_2(m^3/s)$
3153	Exs. Outlet	464	1.32	0.185	400	2.0	0.74	0.093	400	2.0	0.74	0.093	0.186
Exs. Outlet	Lana River	-	1.32	0.170									
3155	3156	537	3.38	0.461	300	8.3	1.25	0.088	600	8.3	1.98	0.560	0.648
3156	Exs. Outlet	480	6.83	0.783	400	2.0	0.74	0.093	900	2.0	1.27	0.808	0.901
Exs. Outlet	Lana River	-	10.21	1.171									
3158	3159	175	1.41	0.225	300	2.8	0.72	0.051	500	2.8	1.02	0.200	0.251
3159	3161	149	2.22	0.331	400	3.3	0.95	0.119	500	3.3	1.10	0.216	0.335
3160	3161	169	1.25	0.200	400	2.0	0.74	0.093	450	2.0	0.80	0.127	0.220
3161	3163	194	8.97	1.232	600	2.0	0.97	0.274	1000	2.0	1.37	1.076	1.350
3162	3163	150	2.50	0.403	400	2.0	0.74	0.093	700	2.0	1.08	0.416	0.509
3163	Exs. Outlet	189	12.27	1.567	600	4.2	1.41	0.399	900	4.2	1.84	1.171	1.569
Exs. Outlet	Lana River	-	12.27	1.567									
3165	3166	479	4.05	0.567	300	9.1	1.31	0.093	600	9.1	2.07	0.585	0.678
3166	3167	106	4.61	0.618	300	2.0	0.61	0.043	800	2.0	1.18	0.593	0.636
3167	3168	144	5.79	0.735	800	4.3	1.73	0.870					0.870
3168	3169	137	6.76	0.817	800	2.0	1.18	0.593	600	2.0	0.97	0.274	0.867
3169	Exs. Outlet	392	6.76	0.717	800	13.0	3.00	1.508					1.508
Exs. Outlet	Lana River	-	6.76	0.717									
4001	4002	24	5.70	0.976	200	41.6	2.13	0.067	600	41.6	4.43	1.253	1.319
4002	4003	64	8.60	1.428	300	46.8	2.96	0.209	600	46.8	4.70	1.329	1.538
4003	4004	837	21.60	2.554	400	8.0	1.48	0.186	1100	8.0	2.91	2.765	2.951
4004	4006	46	21.95	2.556	300	73.1	3.70	0.262	700	73.1	6.51	2.505	2.767
4005	4006	637	4.60	0.604	300	17.5	1.81	0.128	500	17.5	2.54	0.499	0.627
4006	New Outlet	34	26.80	3.083	300	11.7	1.48	0.105	1100	11.7	3.52	3.345	3.450
New Outlet	Brook	-	26.80	3.083									
4007	4011	295	2.42	0.365	400	8.1	1.49	0.187	400	8.1	1.49	0.187	0.374
4009	4010	147	0.72	0.107	300	10.2	1.38	0.098	200	10.2	1.05	0.033	0.131
4010	4011	538	12.50	1.613	400	15.7	2.08	0.261	800	15.7	3.30	1.659	1.920
4011	Exs. Outlet	74	17.60	2.211	400	7.6	1.44	0.181	1000	7.6	2.66	2.089	2.270
Exs. Outlet	Brook	-	17.60	2.211									
4012	Exs. Outlet	162	2.25	0.361	400	9.2	1.59	0.200	400	9.2	1.59	0.200	0.400
Exs. Outlet	Brook	-	2.25	0.361									
4013	4015	156	1.56	0.251	400	5.1	1.18	0.148	350	5.1	1.08	0.104	0.252
4014	4015	377	2.17	0.290	400	15.6	2.07	0.260	200	15.6	1.30	0.041	0.301
4015	New Outlet	266	6.41	0.917	400	12.0	1.82	0.229	700	12.0	2.64	1.016	1.245
4016	New Outlet	913	12.80	1.523	800	22.8	3.97	1.996					1.996
New Outlet	Lana River	-	19.21	2.286									
4017	New Outlet	154	0.88	0.130	800	20.1	3.73	1.875					1.875
4018	4021	313	5.26	0.788	300	17.2	1.79	0.127	600	17.2	2.85	0.806	0.932
4019	4020	68	1.00	0.168	300	2.0	0.61	0.043	450	2.0	0.80	0.127	0.170
4020	4021	260	2.03	0.278	300	19.8	1.92	0.136	350	19.8	2.13	0.205	0.341
4021	4022	57	7.64	1.110	400	24.8	2.61	0.328	600	24.8	3.42	0.967	1.295
4022	4023	36	8.17	1.169	400	55.5	3.90	0.490	500	55.5	4.53	0.889	1.380
4023	New Outlet	446	12.77	1.543	400	9.1	1.58	0.199	900	9.1	2.71	1.724	1.923
New Outlet	Brook	-	13.65	1.650									
4024	Exs. Outlet	170	0.88	0.129	800	10.5	2.70	1.357					1.357
Exs. Outlet	Brook	-	0.88	0.129									
4025	New Outlet	196	0.97	0.140	800	22.4	3.94	1.980					1.980
New Outlet	Brook	-	0.97	0.140									
4026	New Outlet	976	12.24	1.425	400	30.2	2.88	0.362	600	30.2	3.77	1.066	1.428
New Outlet	Brook	-	12.24	1.425									

No.	Down Stream	Length (m) Increment	Area (ha) Total	StormWater $Q_1(m^3/s)$	Existing Pipe Specification D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Supplementary Pipe Specification D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Total $Q_2(m^3/s)$
4027	New Outlet	305	1.50	0.207	500	7.5	1.67	0.328					0.328
New Outlet	Brook	-	1.50	0.226									
4028	New Outlet	183	0.85	0.124	800	2.0	1.18	0.593					0.593
4045	4053	231	1.43	0.222	500	4.3	1.26	0.247					0.247
4051	4052	354	6.88	1.015	400	2.8	0.88	0.111	900	2.8	1.51	0.961	1.071
4052	4053	404	14.93	1.876	600	9.9	2.16	0.611	800	9.9	2.62	1.317	1.928
4053	New Outlet	70	16.66	2.039	600	4.2	1.41	0.399	1100	4.2	2.11	2.005	2.404
New Outlet	Lana River	-	17.51	2.144									
4029	4030	52	1.41	0.218	300	57.6	3.28	0.232					0.232
4030	4031	215	3.33	0.509	400	6.9	1.38	0.173	600	6.9	1.80	0.509	0.682
4031	4036	178	4.11	0.584	500	2.0	0.86	0.169	800	2.0	1.18	0.593	0.762
4032	4033	77	0.65	0.099	200	87.0	3.08	0.097	200	87.0	3.08	0.097	0.194
4033	4034	153	1.53	0.218	300	23.5	2.10	0.148	250	23.5	1.86	0.091	0.240
4034	4035	169	5.71	0.826	400	20.1	2.35	0.295	500	20.1	2.73	0.536	0.831
4035	4036	55	5.98	0.846	500	12.7	2.17	0.426	500	12.7	2.17	0.426	0.852
4036	4045	343	12.73	1.574	500	29.5	3.30	0.648	600	29.5	3.73	1.055	1.703
4037	4038	175	2.49	0.365	300	18.2	1.85	0.131	400	18.2	2.24	0.281	0.412
4038	4041	89	3.16	0.444	400	26.9	2.72	0.342	300	26.9	2.24	0.158	0.500
4039	4040	119	0.88	0.132	300	47.0	2.97	0.210					0.210
4040	4041	50	0.98	0.157	400	2.0	0.74	0.093	350	2.0	0.68	0.065	0.158
4041	4042	210	4.90	0.686	400	19.5	2.31	0.290	450	19.5	2.50	0.398	0.688
4042	New Outlet	10	4.91	0.684	500	3.4	1.12	0.220	700	3.4	1.40	0.539	0.759
4043	4044	119	0.55	0.083	300	42.5	2.82	0.199					0.199
4044	New Outlet	259	1.36	0.182	400	16.9	2.15	0.270					0.270
New Outlet	Brook	-	6.27	0.874									
4046	4047	168	1.02	0.163	300	2.3	0.66	0.047	450	2.3	0.86	0.137	0.183
4047	4048	161	2.26	0.336	400	2.0	0.74	0.093	600	2.0	0.97	0.274	0.367
4048	New Outlet	423	11.40	1.432	500	30.2	3.34	0.656	600	30.2	3.77	1.066	1.722
4049	New Outlet	197	0.88	0.127	500	31.4	3.41	0.670					0.670
New Outlet	Brook	-	12.28	1.543									
4050	Exs. Outlet	253	2.78	0.428	400	7.1	1.40	0.176	500	7.1	1.62	0.318	0.494
Exs. Outlet	Brook	-	2.78	0.428									
4054	New Outlet	115	0.31	0.047	800	2.0	1.18	0.593					0.593
4055	New Outlet	265	2.53	0.388	500	8.6	1.78	0.350	250	8.6	1.12	0.055	0.404
New Outlet	Lana River	-	2.84	0.436									
4056	New Outlet	99	0.34	0.052	800	2.0	1.18	0.593					0.593
4057	4059	62	0.50	0.077	400	2.0	0.74	0.093					0.093
4058	4059	58	1.22	0.206	400	2.0	0.74	0.093	450	2.0	0.80	0.127	0.220
4059	New Outlet	279	9.36	1.386	500	14.9	2.35	0.461	700	14.9	2.94	1.131	1.593
New Outlet	Lana River	-	9.70	1.436									
4060	Exs. Outlet	25	0.03	0.005	800	2.0	1.18	0.593					0.593
4061	Exs. Outlet	712	4.94	0.631	400	5.7	1.25	0.157	700	5.7	1.82	0.700	0.857
Exs. Outlet	Lana River	-	4.97	0.635									
4062	New Outlet	88	0.27	0.041	800	2.0	1.18	0.593					0.593
4063	New Outlet	258	2.07	0.318	600	2.0	0.97	0.274	350	2.0	0.68	0.065	0.340
New Outlet	Lana River	-	2.34	0.359									
4064	Exs. Outlet	93	0.31	0.047	800	2.0	1.18	0.593					0.593
4065	Exs. Outlet	461	3.64	0.513	600	3.6	1.30	0.368	450	3.6	1.08	0.172	0.539
Exs. Outlet	Lana River	-	3.95	0.557									
4068	New Outlet	168	0.80	0.117	800	2.0	1.18	0.593					0.593
4069	New Outlet	77	0.38	0.058	400	5.1	1.18	0.148					0.148
New Outlet	Lana River	-	1.18	0.173									

No.	Down Stream	Length (m) Increment	Area (ha) Total	StormWater Q_1(m^3/s)	Existing Pipe Specification D (mm)	I (‰)	V (m/s)	Q_2(m^3/s)	Supplementary Pipe Specification D (mm)	I (‰)	V (m/s)	Q_2(m^3/s)	Total Q_2(m^3/s)
4070	New Outlet	179	1.02	0.149	800	5.9	2.02	1.015					1.015
4071	4073	155	1.15	0.170	800	6.4	2.10	1.056					1.056
4072	4073	58	0.28	0.043	400	2.0	0.74	0.093					0.093
4073	4075	176	2.64	0.392	500	10.7	1.99	0.391	200	10.7	1.08	0.034	0.425
4074	4075	94	0.45	0.068	400	5.3	1.21	0.152					0.152
4075	4077	74	3.49	0.503	600	8.1	1.95	0.551					0.551
4076	4077	334	1.20	0.163	500	8.9	1.81	0.355					0.355
4077	New Outlet	94	5.27	0.732	800	2.0	1.18	0.593	500	2.0	0.86	0.169	0.762
New Outlet	Lana River	-	6.29	0.874									
4078	New Outlet	191	1.83	0.290	800	7.9	2.34	1.176					1.176
4079	4080	107	1.37	0.226	400	2.0	0.74	0.093	500	2.0	0.86	0.169	0.262
4080	4082	256	4.09	0.601	400	7.7	1.45	0.182	600	7.7	1.91	0.540	0.722
4081	4082	165	0.95	0.140	800	13.9	3.10	1.558					1.558
4082	4085	174	6.22	0.848	800	10.3	2.67	1.342					1.342
4083	4084	80	0.64	0.098	400	32.5	2.99	0.376					0.376
4084	4085	189	3.75	0.573	500	2.0	0.86	0.169	700	2.0	1.08	0.416	0.584
4085	4087	182	11.04	1.406	600	2.0	0.97	0.274	1100	2.0	1.45	1.378	1.652
4086	4087	158	3.57	0.573	800	10.1	2.64	1.327					1.327
4087	4091	78	14.87	1.838	800	2.0	1.18	0.593	1100	2.0	1.45	1.378	1.971
4090	4091	162	1.27	0.204	800	2.0	1.18	0.593					0.593
4091	4097	96	16.57	1.984	800	2.0	1.18	0.593	1200	2.0	1.54	1.742	2.335
4092	4094	157	1.16	0.171	800	9.5	2.56	1.287					1.287
4093	4094	69	0.31	0.048	600	37.6	4.21	1.190					1.190
4094	4096	97	1.86	0.286	800	2.0	1.18	0.593					0.593
4095	4096	87	0.24	0.037	800	2.0	1.18	0.593					0.593
4096	4097	178	3.38	0.482	500	2.0	0.86	0.169	700	2.0	1.08	0.416	0.584
4097	4099	215	22.18	2.470	600	5.9	1.67	0.472	1100	5.9	2.50	2.376	2.848
4098	4099	190	2.50	0.396	500	7.3	1.64	0.322	300	7.3	1.17	0.083	0.405
4099	4101	68	25.03	2.724	1000	2.9	1.64	1.288	1100	2.9	1.75	1.663	2.951
4100	4101	177	1.10	0.160	400	11.2	1.75	0.220					0.220
4101	New Outlet	174	27.40	2.828	1000	2.0	1.37	1.076	1300	2.0	1.63	2.164	3.240
New Outlet	Lana River	-	29.23	3.017									
4102	Exs. Outlet	73	0.29	0.045	800	11.6	2.83	1.423					1.423
4103	Exs. Outlet	361	2.90	0.426	400	2.4	0.81	0.102	700	2.4	1.18	0.454	0.556
Exs. Outlet	Lana River	-	3.19	0.469									
4104	New Outlet	420	2.80	0.401	800	3.8	1.62	0.814					0.814
4105	4106	62	0.54	0.083	500	12.9	2.18	0.428					0.428
4106	4107	243	5.45	0.820	600	18.5	2.95	0.834					0.834
4107	New Outlet	627	10.26	1.209	800	4.7	1.80	0.905	600	4.7	1.49	0.421	1.326
4108	4109	384	5.70	0.828	500	2.3	0.92	0.181	900	2.3	1.36	0.865	1.046
4109	New Outlet	99	6.37	0.875	600	2.0	0.97	0.274	900	2.0	1.27	0.808	1.082
New Outlet	Lana River	-	19.43	2.290									
4110	New Outlet	95	0.35	0.053	1000	2.0	1.37	1.076					1.076
4113	4114	177	3.39	0.539	500	2.2	0.90	0.177	700	2.2	1.13	0.435	0.612
4114	4115	325	12.07	1.670	500	11.9	2.10	0.412	800	11.9	2.87	1.443	1.855
4115	4117	166	12.81	1.664	500	2.0	0.86	0.169	1200	2.0	1.54	1.742	1.911
4116	4117	289	1.68	0.255	200	2.4	0.51	0.016	600	2.4	1.06	0.300	0.316
4117	New Outlet	80	14.85	1.872	500	5.1	1.37	0.269	1000	5.1	2.18	1.712	1.981
New Outlet	Lana River	-	15.20	1.916									
4111	4112	152	1.46	0.216	800	34.2	4.87	2.448					2.448
4112	Exs. Outlet	358	11.34	1.564	800	13.9	3.10	1.558	200	13.9	1.23	0.039	1.597
Exs. Outlet	Brook	-	11.34	1.564									
4118	New Outlet	447	8.80	1.245	1000	4.2	1.98	1.555					1.555
4119	New Outlet	150	0.82	0.121	400	6.6	1.35	0.170					0.170
New Outlet	Lana River	-	9.62	1.361									
4120	New Outlet	583	2.62	0.351	1000	6.6	2.48	1.948					1.948

No.	Down Stream	Length (m) Increment	Area (ha) Total	StormWater $Q_1(m^3/s)$	Existing Pipe Specification D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Sapplementary Pipe Specification D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Total $Q_2(m^3/s)$
4121	New Outlet	223	2.72	0.424	300	14.7	1.66	0.117	450	14.7	2.17	0.345	0.462
New Outlet	Lana River	-	5.34	0.716									
4122	Exs. Outlet	234	4.20	0.652	1000	2.0	1.37	1.076					1.076
4123	4124	110	1.10	0.181	300	2.7	0.71	0.050	450	2.7	0.93	0.148	0.198
4124	4125	548	7.10	0.926	400	6.9	1.38	0.173	700	6.9	2.00	0.770	0.943
4125	4129	368	11.60	1.327	500	18.4	2.61	0.512	600	18.4	2.95	0.834	1.347
4126	4127	473	6.90	0.965	400	9.0	1.57	0.197	700	9.0	2.28	0.877	1.075
4127	4128	341	14.40	1.774	300	7.6	1.19	0.084	1000	7.6	2.66	2.089	2.173
4128	4129	197	15.90	1.829	400	11.6	1.78	0.224	900	11.6	3.06	1.947	2.170
4129	4131	130	28.30	3.106	400	37.6	3.21	0.403	900	37.6	5.52	3.512	3.915
4130	4131	435	5.90	0.841	400	33.5	3.03	0.381	450	33.5	3.28	0.522	0.902
4131	Exs. Outlet	213	35.10	3.604	400	2.0	0.74	0.093	1600	2.0	1.87	3.760	3.853
Exs. Outlet	Lana River	-	39.30	4.035									

Table 7.4.7 Existing Small Sewer Improvement Cost (Combined System : Case-1)

Dia	Cost	Length (m)			Construction Cost (US$)		
		Lana-North	Lana-South	Total	Lana-North	Lana-South	Total
(mm)	(US$)	Network	Network	Network	Network	Network	Network
200	82.50						
250	90.24		77	77		6,948	6,948
300	98.01	134		134	13,133		13,133
350	107.25	143	300	443	15,337	32,175	47,512
400	118.07	159	260	419	18,772	30,697	49,469
450	126.47	424	175	599	53,621	22,131	75,753
500	136.47		501	501		68,371	68,371
600	176.54	2,025	1,331	3,356	357,483	234,968	592,451
700	219.36	557	64	621	122,184	14,039	136,223
800	266.34		46	46		12,252	12,252
900	363.14	838		838	304,307		304,307
1000	460.40		341	341		156,995	156,995
1100	523.28		34	34		17,791	17,791
1200	588.09						
1300	653.60						
1400	722.51						
1500	793.70						
1600	864.32						
1700	935.45						
2000	1165.88						
Total		4,280	3,129	7,409	884,838	596,368	1,481,206

Table 7.4.8 Existing Small Sewer Improvement Cost (Combined System : Case-2)

Dia	Cost	Length (m)			Construction Cost (US$)		
		Lana-North	Lana-South	Total	Lana-North	Lana-South	Total
(mm)	(US$)	Network	Network	Network	Network	Network	Network
200	82.50	143	224	367	11,798	18,480	30,278
250	90.24	134	153	287	12,092	13,807	25,899
300	98.01	159		159	15,584		15,584
350	107.25	424	260	684	45,474	27,885	73,359
400	118.07		175	175		20,661	20,661
450	126.47		569	569		71,959	71,959
500	136.47	719		719	98,122		98,122
600	176.54	1,863	1,327	3,190	328,885	234,262	563,147
700	219.36		46	46		10,091	10,091
800	266.34	106		106	28,232		28,232
900	363.14	732		732	265,815		265,815
1000	460.40		341	341		156,995	156,995
1100	523.28		34	34		17,791	17,791
1200	588.09						
1300	653.60						
1400	722.51						
1500	793.70						
1600	864.32						
1700	935.45						
2000	1165.88						
Total		4,280	3,129	7,409	806,001	571,930	1,377,931

Table 7.4.9 Existing Middle/Large Sewer Improvement Cost (Combined System : Case-1)

Dia	Cost	Length (m)									Construction Cost (US$)								
		Lana-North			Lana-South			Total			Lana-North			Lana-South			Total		
(mm)	(US$)	Network	Interceptor	Total	Network	Interceptor	Total	Network	Interceptor	Total	Network	Interceptor	Total	Network	Interceptor	Total	Network	Interceptor	Total
200	82.50																		
250	90.24																		
300	98.01																		
350	107.25																		
400	118.07																		
450	126.47	548		548	466		466	1,014		1,014	69,303		69,303	58,933		58,933	128,236		128,236
500	136.47	149		149	50		50	199		199	20,334		20,334	6,824		6,824	27,158		27,158
600	176.54	2,484		2,484	2,435		2,435	4,919		4,919	438,513		438,513	429,863		429,863	868,376		868,376
700	219.36	3,758		3,758	4,548		4,548	8,306		8,306	824,355		824,355	997,649		997,649	1,822,004		1,822,004
800	266.34	2,305		2,305	3,370		3,370	5,675		5,675	613,914		613,914	897,566		897,566	1,511,480		1,511,480
900	363.14	2,250	370	2,620	2,738	73	2,811	4,988	443	5,431	817,054	134,360	951,414	994,264	26,509	1,020,772	1,811,317	160,869	1,972,186
1000	460.40	3,372	365	3,737	857	553	1,410	4,229	918	5,147	1,552,452	168,044	1,720,496	394,559	254,598	649,157	1,947,010	422,643	2,369,653
1100	523.28	2,921	648	3,569	991	910	1,901	3,912	1,558	5,470	1,528,486	339,082	1,867,568	518,566	476,180	994,746	2,047,052	815,262	2,862,314
1200	588.09	1,325	1,061	2,386	633	776	1,409	1,958	1,837	3,795	779,219	623,963	1,403,183	372,261	456,358	828,619	1,151,480	1,080,321	2,231,802
1300	653.60	523		523	174		174	697		697	341,830		341,830	113,726		113,726	455,556		455,556
1400	722.51	1,273	1,123	2,396	68	447	515	1,341	1,570	2,911	919,749	811,373	1,731,122	49,130	322,960	372,090	968,879	1,134,333	2,103,212
1500	793.70	539		539	174	234	408	713	234	947	427,802		427,802	138,103	185,725	323,828	565,905	185,725	751,629
1600	864.32	186		186	213		213	399		399	160,763		160,763	184,099		184,099	344,862		344,862
1700	935.45	607		607				607		607	567,815		567,815				567,815		567,815
2000	1165.88	132		132				132		132	153,896		153,896				153,896		153,896
Total		22,372	3,567	25,939	16,717	2,993	19,710	39,089	6,560	45,649	9,215,483	2,076,823	11,292,306	5,155,541	1,722,330	6,877,870	14,371,024	3,799,153	18,170,177

Table 7.4.10 Existing Middle/Large Sewer Improvement Cost (Combined System : Case-2)

Dia	Cost	Length (m)									Construction Cost (US$)								
		Lana-North			Lana-South			Total			Lana-North			Lana-South			Total		
(mm)	(US$)	Network	Interceptor	Total	Network	Interceptor	Total	Network	Interceptor	Total	Network	Interceptor	Total	Network	Interceptor	Total	Network	Interceptor	Total
200	82.50	239		239	553		553	792		792	19,718		19,718	45,623		45,623	65,340		65,340
250	90.24	875		875	928		928	1,803		1,803	78,960		78,960	83,743		83,743	162,703		162,703
300	98.01	83	370	453	279		279	362	370	732	8,135	36,264	44,399	27,345		27,345	35,480	36,264	71,743
350	107.25	521		521	489		489	1,010		1,010	55,877		55,877	52,445		52,445	108,323		108,323
400	118.07	552		552	50	73	123	602	73	675	65,172		65,172	5,903	8,619	14,522	71,075	8,619	79,694
450	126.47	1,551		1,551	954		954	2,505		2,505	196,147		196,147	120,648		120,648	316,795		316,795
500	136.47	1,364		1,364	447		447	1,811		1,811	186,145		186,145	61,002		61,002	247,147		247,147
600	176.54	2,642		2,642	3,016	774	3,790	5,658	774	6,432	466,405		466,405	532,430	136,638	669,068	998,835	136,638	1,135,473
700	219.36	1,483	365	1,848	4,250	362	4,612	5,733	727	6,460	325,311	80,066	405,377	932,280	79,408	1,011,688	1,257,591	159,475	1,417,066
800	266.34	1,359	435	1,794	1,484		1,484	2,843	435	3,278	361,956	115,858	477,814	395,249		395,249	757,205	115,858	873,063
900	363.14	3,641	490	4,131	1,660	515	2,175	5,301	1,005	6,306	1,322,175	177,936	1,500,111	602,804	187,015	789,819	1,924,979	364,951	2,289,929
1000	460.40	3,394	270	3,664	434	588	1,022	3,828	858	4,686	1,562,581	124,307	1,686,887	199,811	270,712	470,524	1,762,392	395,019	2,157,411
1100	523.28	1,235	1,637	2,872	1,454	447	1,901	2,689	2,084	4,773	646,245	856,601	1,502,846	760,842	233,904	994,746	1,407,086	1,090,505	2,497,592
1200	588.09	1,253		1,253	332	234	566	1,585	234	1,819	736,877		736,877	195,246	137,613	332,859	932,123	137,613	1,069,736
1300	653.60	735		735	174		174	909		909	480,392		480,392	113,726		113,726	594,118		594,118
1400	722.51	520		520				520		520	375,703		375,703				375,703		375,703
1500	793.70	430		430				430		430	341,289		341,289				341,289		341,289
1600	864.32	186		186	213		213	399		399	160,763		160,763	184,099		184,099	344,862		344,862
1700	935.45	177		177				177		177	165,574		165,574				165,574		165,574
2000	1165.88	132		132				132		132	153,896		153,896				153,896		153,896
Total		22,372	3,567	25,939	16,717	2,993	19,710	39,089	6,560	45,649	7,709,318	1,391,032	9,100,350	4,313,194	1,053,909	5,367,103	12,022,513	2,444,941	14,467,453

Table 7.4.11 Existing Small Sewer Improvement Cost (Separate System : Case-1)

Dia	Cost	Length (m)									Construction Cost (US$)								
		Lana-North			Lana-South			Total			Lana-North			Lana-South			Total		
(mm)	(Lek)	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total
200	82.50																		
250	90.24					196	196		196	196					8,844	8,844		8,844	8,844
300	98.01		476	476		171	171		647	647		23,326	23,326		8,380	8,380		31,706	31,706
350	107.25		143	143		300	300		443	443		7,668	7,668		16,088	16,088		23,756	23,756
400	118.07		362	362		260	260		622	622		21,370	21,370		15,348	15,348		36,718	36,718
450	126.47		221	221		175	175		396	396		13,974	13,974		11,066	11,066		25,040	25,040
500	136.47					569	569		569	569					38,826	38,826		38,826	38,826
600	176.54		2,025	2,025		1,263	1,263		3,288	3,288		178,742	178,742		111,482	111,482		290,224	290,224
700	219.36		557	557		64	64		621	621		122,184	122,184		14,039	14,039		136,223	136,223
800	266.34					46	46		46	46					12,252	12,252		12,252	12,252
900	363.14		838	838					838	838		304,307	304,307					304,307	304,307
1000	460.40					341	341		341	341					156,995	156,995		156,995	156,995
1100	523.28					34	34		34	34					17,791	17,791		17,791	17,791
1200	588.09																		
1300	653.60																		
1400	722.51																		
1500	793.70																		
1600	864.32																		
1700	935.45																		
2000	1165.88																		
Total			4,622	4,622		3,419	3,419		8,041	8,041		671,571	671,571		411,109	411,109		1,082,681	1,082,681

Table 7.4.12 Existing Small Sewer Improvement Cost (Separate System : Case-2)

Dia	Cost	Length (m)									Construction Cost (US$)								
		Lana-North			Lana-South			Total			Lana-North			Lana-South			Total		
(mm)	(Lek)	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total
200	82.50	4,622	143	4,765	2,998	224	3,222	7,620	367	7,987	381,315	5,899	387,214	247,335	9,240	256,575	628,650	15,139	643,789
250	90.24		134	134	387	153	540	387	287	674		6,046	6,046	34,923	6,903	41,826	34,923	12,949	47,872
300	98.01		159	159					159	159		7,792	7,792					7,792	7,792
350	107.25		424	424		260	260		684	684		22,737	22,737		13,943	13,943		36,680	36,680
400	118.07				34	175	209	34	175	209				4,014	10,331	14,345	4,014	10,331	14,345
450	126.47					569	569		569	569					35,979	35,979		35,979	35,979
500	136.47		719	719		637	637		1,356	1,356		49,061	49,061		43,466	43,466		92,527	92,527
600	176.54		1,863	1,863		690	690		2,553	2,553		164,442	164,442		60,905	60,905		225,347	225,347
700	219.36					46	46		46	46					10,091	10,091		10,091	10,091
800	266.34		106	106					106	106		28,232	28,232					28,232	28,232
900	363.14		732	732					732	732		265,815	265,815					265,815	265,815
1000	460.40					341	341		341	341					156,995	156,995		156,995	156,995
1100	523.28					34	34		34	34					17,791	17,791		17,791	17,791
1200	588.09																		
1300	653.60																		
1400	722.51																		
1500	793.70																		
1600	864.32																		
1700	935.45																		
2000	1165.88																		
Total		4,622	4,280	8,902	3,419	3,129	6,548	8,041	7,409	15,450	381,315	550,024	931,339	286,272	365,643	651,915	667,587	915,667	1,583,254

Table 7.4.13 Existing Middle/Large Sewer Improvement Cost (Separate System : Case-1)

Dia	Cost	Length (m)									Construction Cost (US$)								
		Lana-North			Lana-South			Total			Lana-North			Lana-South			Total		
(mm)	(US$)	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total
200	82.50		20	20		94	94		114	114		825	825		3,878	3,878		4,703	4,703
250	90.24		523	523		153	153		676	676		23,598	23,598		6,903	6,903		30,501	30,501
300	98.01		180	180		955	955		1,135	1,135		8,821	8,821		46,800	46,800		55,621	55,621
350	107.25		1,065	1,065		1,206	1,206		2,271	2,271		57,111	57,111		64,672	64,672		121,782	121,782
400	118.07		1,329	1,329		1,059	1,059		2,388	2,388		78,454	78,454		62,515	62,515		140,970	140,970
450	126.47		1,659	1,659		1,277	1,277		2,936	2,936		104,903	104,903		80,748	80,748		185,651	185,651
500	136.47		1,298	1,298		790	790		2,088	2,088		88,569	88,569		53,906	53,906		142,475	142,475
600	176.54		4,312	4,312		3,629	3,629		7,941	7,941		380,609	380,609		320,323	320,323		700,932	700,932
700	219.36		5,818	5,818		5,020	5,020		10,838	10,838		1,276,236	1,276,236		1,101,187	1,101,187		2,377,424	2,377,424
800	266.34		2,347	2,347		3,851	3,851		6,198	6,198		625,100	625,100		1,025,675	1,025,675		1,650,775	1,650,775
900	363.14		3,280	3,280		2,795	2,795		6,075	6,075		1,191,083	1,191,083		1,014,962	1,014,962		2,206,045	2,206,045
1000	460.40		3,312	3,312		1,304	1,304		4,616	4,616		1,524,828	1,524,828		600,355	600,355		2,125,183	2,125,183
1100	523.28		3,588	3,588		991	991		4,579	4,579		1,877,511	1,877,511		518,566	518,566		2,396,076	2,396,076
1200	588.09		1,325	1,325		633	633		1,958	1,958		779,219	779,219		372,261	372,261		1,151,480	1,151,480
1300	653.60		523	523		174	174		697	697		341,830	341,830		113,726	113,726		455,556	455,556
1400	722.51		1,711	1,711		68	68		1,779	1,779		1,236,206	1,236,206		49,130	49,130		1,285,336	1,285,336
1500	793.70		101	101		174	174		275	275		80,163	80,163		138,103	138,103		218,266	218,266
1600	864.32		186	186		213	213		399	399		160,763	160,763		184,099	184,099		344,862	344,862
1700	935.45		607	607					607	607		567,815	567,815					567,815	567,815
2000	1165.88		132	132					132	132		153,896	153,896					153,896	153,896
Total			33,316	33,316		24,386	24,386		57,702	57,702		10,557,540	10,557,540		5,757,808	5,757,808		16,315,348	16,315,348

Table 7.4.14 Existing Middle/Large Sewer Improvement Cost (Separate System : Case-2)

Dia	Cost	Length (m)									Construction Cost (US$)								
		Lana-North			Lana-South			Total			Lana-North			Lana-South			Total		
(mm)	(US$)	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total
200	82.50	16,828	410	17,238	13,585	911	14,496	30,413	1,321	31,734	1,388,310	76,973	1,405,223	1,120,763	37,579	1,158,341	2,509,073	54,491	2,563,564
250	90.24	5,779	465	6,244	2,360	265	2,625	8,139	730	8,869	521,497	20,981	542,478	212,966	11,957	224,923	734,463	32,938	767,401
300	98.01	2,083	83	2,166	1,031	279	1,310	3,114	362	3,476	204,155	4,067	208,222	101,048	13,672	114,721	305,203	17,740	322,943
350	107.25	1,915	521	2,436	1,917	464	2,381	3,832	985	4,817	205,384	27,939	233,322	205,598	24,882	230,480	410,982	52,821	463,803
400	118.07	1,429	1,016	2,445	1,027	457	1,484	2,456	1,473	3,929	168,715	59,977	228,692	121,253	26,978	148,231	289,968	86,955	376,923
450	126.47	556	1,087	1,643	1,077	1,164	2,241	1,633	2,251	3,884	70,315	68,734	139,048	136,203	73,603	209,805	206,517	142,336	348,854
500	136.47	606	2,031	2,637	396	714	1,110	1,002	2,745	3,747	82,701	138,585	221,286	54,042	48,720	102,762	136,743	187,305	324,048
600	176.54	502	2,642	3,144		3,426	3,426	502	6,068	6,570	88,621	233,203	321,823		302,404	302,404	88,621	535,607	624,228
700	219.36	1,300	2,196	3,496	626	3,193	3,819	1,926	5,389	7,315	285,168	481,715	766,883	137,319	700,416	837,736	422,487	1,182,131	1,604,618
800	266.34	1,585	1,160	2,745	1,003	1,445	2,448	2,588	2,605	5,193	422,149	308,954	731,103	267,139	384,861	652,000	689,288	693,816	1,383,104
900	363.14	713	3,830	4,543	1,035	1,610	2,645	1,748	5,440	7,188	258,915	1,390,807	1,649,722	375,845	584,647	960,492	634,760	1,975,454	2,610,214
1000	460.40	20	3,205	3,225	329	154	483	349	3,359	3,708	9,208	1,475,566	1,484,774	151,470	70,901	222,371	160,678	1,546,467	1,707,145
1100	523.28		1,235	1,235		1,450	1,450		2,685	2,685		646,245	646,245		758,749	758,749		1,404,993	1,404,993
1200	588.09		1,253	1,253		262	262		1,515	1,515		736,877	736,877		154,080	154,080		890,956	890,956
1300	653.60		735	735		174	174		909	909		480,392	480,392		113,726	113,726		594,118	594,118
1400	722.51		520	520					520	520		375,703	375,703					375,703	375,703
1500	793.70		430	430					430	430		341,289	341,289					341,289	341,289
1600	864.32		186	186		213	213		399	399		160,763	160,763		184,099	184,099		344,862	344,862
1700	935.45		177	177					177	177		165,574	165,574					165,574	165,574
2000	1165.88		132	132					132	132		153,896	153,896					153,896	153,896
Total		33,316	23,314	56,630	24,386	16,181	40,567	57,702	39,495	97,197	3,705,136	7,288,177	10,993,314	2,883,646	3,491,274	6,374,920	6,588,783	10,779,451	17,368,233

Actuall Small PipeLength : **14 Times as long as Table 7.4.7 , 7.4.8 , 7.4.11 , 7.4.12**

Table 7.4.15 Existing Sewer Improvement Length

		Length (m)								
		Lana-North			Lana-South			Total		
Combined		Network	Interceptor	Total	Network	Interceptor	Total	Network	Interceptor	Total
Case-1	Small	59,920		59,920	43,806		43,806	103,726		103,726
	Mid./Large	22,372	3,567	25,939	16,717	2,993	19,710	39,089	6,560	45,649
	Total	82,292	3,567	85,859	60,523	2,993	63,516	142,815	6,560	149,375
Case-2	Small	59,920		59,920	43,806		43,806	103,726		103,726
	Mid./Large	22,372	3,567	25,939	16,717	2,993	19,710	39,089	6,560	45,649
	Total	82,292	3,567	85,859	60,523	2,993	63,516	142,815	6,560	149,375
Separate		Sanitary	Stormwater	Total	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total
Case-1	Small		64,708	64,708		47,866	47,866		112,574	112,574
	Mid./Large		33,316	33,316		24,386	24,386		57,702	57,702
	Total		98,024	98,024		72,252	72,252		170,276	170,276
Case-2	Small	64,708	59,920	124,628	47,866	43,806	91,672	112,574	103,726	216,300
	Mid./Large	33,316	23,314	56,630	24,386	16,181	40,567	57,702	39,495	97,197
	Total	98,024	83,234	181,258	72,252	59,987	132,239	170,276	143,221	313,497

Table 7.4.16 Existing Sewer Improvement Cost

		Construction Cost (US$)									
		Lana-North			Lana-South			Total			
Combined		Network	Interceptor	Total	Network	Interceptor	Total	Network	Interceptor	Total	
Case-1	Small	12,387,727		12,387,727	8,349,152		8,349,152	20,736,879		20,736,879	
	Mid./Large	9,215,483	2,076,823	11,292,306	5,155,541	1,722,330	6,877,870	14,371,024	3,799,153	18,170,177	
	Total	21,603,210	2,076,823	23,680,033	13,504,693	1,722,330	15,227,023	35,107,903	3,799,153	38,907,056	98%
Case-2	Small	11,284,010		11,284,010	8,007,023		8,007,023	19,291,034		19,291,034	
	Mid./Large	7,709,318	1,391,032	9,100,350	4,313,194	1,053,909	5,367,103	12,022,513	2,444,941	14,467,453	
	Total	18,993,329	1,391,032	20,384,361	12,320,217	1,053,909	13,374,126	31,313,546	2,444,941	33,758,487	85%
Separate		Sanitary	Stormwater	Total	Sanitary	Stormwater	Total	Sanitary	Stormwater	Total	
Case-1	Small		9,401,997	9,401,997		5,755,530	5,755,530		15,157,528	15,157,528	
	Mid./Large		10,557,540	10,557,540		5,757,808	5,757,808		16,315,348	16,315,348	
	Total		19,959,537	19,959,537		11,513,339	11,513,339		31,472,876	31,472,876	80%
Case-2	Small	5,338,410	7,700,333	13,038,743	4,007,809	5,118,998	9,126,807	9,346,219	12,819,331	22,165,551	
	Mid./Large	3,705,136	7,288,177	10,993,314	2,883,646	3,491,274	6,374,920	6,588,783	10,779,451	17,368,233	
	Total	9,043,546	14,988,510	24,032,057	6,891,455	8,610,272	15,501,727	15,935,002	23,598,782	39,533,784	100%

CHAPTER 8

OVERALL PLAN AND PRELIMINARY DESIGN OF SEWERAGE SYSTEM

8.1.1 Sewage Collection System

Table 8.1.1 Improvement of Existing Sewer (Combined Case-1 : New Combined Sewer)

Sanitary Sewage Flow
Sanitary Sewage per Capita = 440 liter/day (Hourly Maximum)

Storm Water Flow
Rainfall Intensity Formula = $\frac{2750}{t + 17}$ (Return Period : 4 Year)
For Main Pipe (D≧500)
Rainfall Intensity Formula = $\frac{2520}{t + 17}$ (Return Period : 2.5 Year)
For Small Pipe (D≦450)
Runoff Coefficient = 0.5
Inlet Time = 5 min
Assumed Average Velocity = 1.5 m/sec

No.	Down Stream	Length (m) Increment	Area (ha) Increment	Area (ha) Total	Sewage Quantity Sanitary Sewage	Storm Water	Remain Sewage	Q_1(m³/s)	Planned Pipe Specification D (mm)	I (‰)	V (m/s)	Q_2(m³/s)	Capacity Q_1/Q_2	Existing New
1001	1004	826	9.80	9.80	0.013	1.200		1.213	800	12.4	2.93	1.473	82%	New
1002	1003	94	4.10	4.10	0.006	0.624		0.629	600	17.0	2.83	0.800	79%	New
1003	1004	295	6.60	10.70	0.014	1.424		1.438	800	19.1	3.64	1.830	79%	New
1004	1009	355	5.47	25.97	0.035	2.826		2.861	1,000	22.0	4.53	3.558	80%	New
1005	1006	450	7.60	7.60	0.010	1.075		1.085	700	18.6	3.28	1.262	86%	New
1006	1008	249	8.30	15.90	0.021	2.038		2.059	1,300	2.0	1.63	2.164	95%	New
1007	1008	205	2.88	2.88	0.004	0.415		0.419	500	20.9	2.78	0.546	77%	New
1008	1009	252	3.03	21.81	0.029	2.555		2.585	1,000	16.6	3.93	3.087	84%	New
1009	1011	360	6.37	54.15	0.073	5.290		5.363	1,200	27.2	5.69	6.435	83%	New
1010	1011	564	4.03	4.03	0.005	0.544		0.549	600	21.9	3.21	0.908	61%	Existing
Out-11								-5.673						
1011	1012	824	0.97	59.15	0.080		0.160	0.239	600	18.0	2.91	0.823	29%	Existing
1012	1021	491	0.00	59.15	0.080		0.160	0.239	600	6.3	1.72	0.486	49%	Existing
1013	1014	247	1.33	1.33	0.002	0.206		0.207	600	17.2	2.85	0.806	26%	Existing
1014	1015	163	4.25	5.58	0.008	0.734		0.742	900	2.0	1.27	0.808	92%	New
1015	1016	268	7.90	13.48	0.018	1.745		1.763	1,300	2.0	1.63	2.164	82%	New
1016	1017B	708	7.90	21.38	0.029	2.001		2.030	900	12.8	3.22	2.048	99%	New
1017A	1017B	186	1.20	1.20	0.002	0.190		0.192	500	41.3	3.91	0.768	25%	Existing
1017B	1020	122	1.30	23.88	0.032	2.351		2.383	1,300	2.6	1.85	2.456	97%	New
1018	1019	426	4.59	4.59	0.006	0.657		0.663	900	2.0	1.27	0.808	82%	New
1019	1020	100	2.85	7.44	0.010	1.022		1.032	1,000	1.9	1.33	1.045	99%	New
1020	1021	895	0.00	31.32	0.042	2.456		2.499	1,200	5.6	2.58	2.918	86%	New
Out-12								-2.372						
1021	1060	855	0.00	90.47	0.122		0.244	0.366	600	5.2	1.57	0.444	83%	Existing
1022	1023	100	0.77	0.77	0.001	0.117		0.118	400	5.9	1.27	0.160	74%	Existing
1023	1024	86	0.69	1.46	0.002	0.212		0.214	400	14.0	1.96	0.246	87%	Existing
1024	1025	91	0.81	2.27	0.003	0.317		0.320	500	9.8	1.90	0.373	86%	New
1025	1027	127	0.83	3.10	0.004	0.447		0.451	500	20.4	2.75	0.540	84%	Existing
1026	1027	50	0.28	0.28	0.000	0.043		0.044	400	1.9	0.72	0.090	48%	Existing
1027	1028	127	0.83	4.21	0.006	0.576		0.582	600	11.8	2.36	0.667	87%	New
1028	1035	180	1.03	5.24	0.007	0.669		0.676	700	6.1	1.88	0.724	93%	New
1029	1031	326	2.47	2.47	0.003	0.338		0.341	500	8.2	1.74	0.342	100%	New
1030	1031	209	1.80	1.80	0.002	0.283		0.285	600	15.3	2.69	0.761	38%	Existing
1031	1034	227	2.35	6.62	0.009	0.900		0.909	800	7.6	2.29	1.151	79%	New
1032	1034	132	1.36	1.36	0.002	0.203		0.204	600	2.0	0.97	0.274	75%	New
1033	1034	103	1.59	1.59	0.002	0.241		0.243	600	2.0	0.97	0.274	89%	New
1034	1035	151	1.14	10.71	0.014	1.373		1.387	800	12.5	2.94	1.478	94%	New
1035	1037	220	2.36	18.31	0.025	2.165		2.190	1,000	13.6	3.56	2.796	78%	New
1036	1037	339	2.14	2.14	0.003	0.290		0.293	500	9.4	1.86	0.365	80%	New
1037	1041	347	4.19	24.64	0.033	2.600		2.633	1,500	2.0	1.79	3.163	83%	New
1038	1039	110	1.70	1.70	0.002	0.256		0.259	500	7.2	1.63	0.320	81%	New
1039	1040	140	1.15	2.85	0.004	0.439		0.443	600	6.4	1.74	0.492	90%	New
1040	1041	124	1.15	4.00	0.005	0.583		0.589	600	11.3	2.31	0.653	90%	Existing
1041	1044	136	0.85	29.49	0.040	2.988		3.027	1,000	22.0	4.53	3.558	85%	New
1042	1044	73	2.17	2.17	0.003	0.364		0.366	500	42.4	3.96	0.778	47%	Existing
1043	1044	78	0.49	0.49	0.001	0.082		0.082	500	2.5	0.96	0.188	44%	Existing
1044	1049	286	2.08	34.23	0.046	3.197		3.243	1,000	18.5	4.15	3.259	99%	New

No.	Down Stream	Length (m)	Area (ha)		Sewage Quantity				Planned Pipe Specification				Capacity	
		Increment	Increment	Total	Sanitary Sewage	Storm Water	Remain Sewage	$Q_1(m^3/s)$	D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Q_1/Q_2	Existing New
1045	1046	283	3.12	3.12	0.004	0.435		0.439	600	12.7	2.45	0.693	63%	New
1046	1048	125	1.70	4.82	0.007	0.695		0.701	700	10.9	2.51	0.966	73%	New
1047	1048	123	2.35	2.35	0.003	0.384		0.387	500	16.2	2.45	0.481	80%	Existing
1048	1049	156	1.80	8.97	0.012	1.211		1.223	1,000	4.4	2.02	1.587	77%	New
1049	1053	274	0.90	44.10	0.060	3.837		3.896	1,700	2.0	1.94	4.403	88%	New
1050	1051	56	0.80	0.80	0.001	0.135		0.136	500	2.0	0.86	0.169	81%	Existing
1051	1052	149	2.65	3.45	0.005	0.542		0.547	800	2.0	1.18	0.593	92%	New
1052	1053	157	0.85	4.30	0.006	0.632		0.637	900	1.8	1.21	0.770	83%	New
1053	1057	121	1.08	49.48	0.067	4.172		4.239	1,700	2.0	1.94	4.403	96%	New
1054	1056	325	2.64	2.64	0.004	0.394		0.397	600	16.6	2.80	0.792	50%	Existing
1055	1056	373	3.30	3.30	0.004	0.483		0.487	600	12.0	2.38	0.673	72%	Existing
1056	1057	296	1.30	7.24	0.010	0.941		0.950	1,000	2.0	1.37	1.076	88%	New
1057	1060	444	6.15	62.87	0.085	4.783		4.868	1,800	2.0	2.02	5.140	95%	New
1058	1059	300	3.29	3.29	0.004	0.455		0.460	500	17.6	2.55	0.501	92%	New
1059	1060	945	7.30	10.59	0.014	1.130		1.144	1,100	2.0	1.45	1.378	83%	New
Out-13								-5.715						
1060	1061	722	0.00	163.93	0.221		0.442	0.664	700	8.6	2.23	0.858	77%	New
1061	1062	482	0.00	163.93	0.221		0.442	0.664	700	7.8	2.13	0.820	81%	New
1062	1063	280	36.20	200.13	0.270	5.509	0.442	6.221	1,300	17.4	4.80	6.371	98%	New
1063	1065	267	3.45	203.58	0.275	5.389	0.442	6.106	1,800	3.3	2.59	6.591	93%	New
1064	1065	149	3.83	3.83	0.005	0.617		0.622	1,000	3.3	1.75	1.374	45%	Existing
1065	To STP	1130	6.20	213.61	0.288		0.576	0.865	1000x600	3.8	1.93	1.042	83%	Existing
Out-14								-0.288						
To STP					0.288		0.576	0.865						
2001	2002	480	14.95	14.95	0.023	1.917		1.939	1,100	5.8	2.48	2.357	82%	New
2002	2003	193	4.38	19.33	0.030	2.503		2.532	900	26.2	4.61	2.933	86%	New
2003	2005	242	3.74	23.07	0.035	2.736		2.772	1,000	18.5	4.15	3.259	85%	New
New Outlet	To 1017A													
2004	2005	348	6.90	6.90	0.011	1.018		1.028	800	9.1	2.51	1.262	81%	New
New Outlet	To 1017A													
2005	2007	169	1.15	31.12	0.048	0.184	0.095	0.326	600	8.2	1.97	0.557	59%	Existing
2006	2007	300	1.60	1.60	0.002	0.221		0.224	500	5.0	1.36	0.267	84%	New
2007	2009	48	0.23	32.95	0.050	0.466	0.095	0.612	600	12.5	2.43	0.687	89%	Existing
2008	2009	273	2.10	2.10	0.003	0.294		0.297	600	5.1	1.55	0.438	68%	New
2009	2011	262	2.10	37.15	0.057	1.005	0.095	1.156	1500x70	9.5	3.67	3.468	33%	Existing
2010A	2010B	50	0.54	0.54	0.001	0.084		0.084	300	11.9	1.49	0.105	80%	Existing
2010B	2011	175	1.67	2.21	0.003	0.316		0.319	700	2.0	1.08	0.416	77%	New
2011	2013	210	0.40	39.76	0.061	1.259	0.095	1.415	1500x700	4.0	2.38	2.249	63%	Existing
2012	2013	218	5.20	5.20	0.008	0.746		0.754	700	14.2	2.87	1.105	68%	New
2013	2015	138	0.80	45.76	0.070	1.933	0.095	2.098	1,300	2.0	1.63	2.164	97%	New
2014	2015	102	1.35	1.35	0.002	0.205		0.207	500	4.9	1.35	0.265	78%	New
2015	2017	850	6.00	53.11	0.081	2.177	0.095	2.353	1500x700	6.3	2.99	2.826	83%	Existing
New Outlet	To 3074													
2016	2017	150	1.03	1.03	0.002	0.152		0.154	450	4.0	1.13	0.180	86%	New
New Outlet	To 3074													
2017	2019	280	1.35	55.49	0.085	0.205	0.169	0.460	1500x700	8.3	3.43	3.241	14%	Existing
2018	2019	206	1.60	1.60	0.002	0.251		0.254	600	10.6	2.24	0.633	40%	Existing
2019	2021	132	0.35	57.44	0.088	0.474	0.169	0.731	1,000	20.2	4.34	3.409	21%	Existing
2020	2021	118	2.82	2.82	0.004	0.424		0.428	450	24.5	2.81	0.447	96%	New
2021	2025	250	1.14	61.40	0.094	0.943	0.169	1.206	1,000	2.0	1.37	1.076	112%	Existing
2022	2024	269	5.75	5.75	0.009	0.878		0.887	700	10.4	2.45	0.943	94%	New
2023	2024	313	2.71	2.71	0.004	0.372		0.376	600	6.3	1.72	0.486	77%	New
2024	2025	150	1.10	9.56	0.015	1.347		1.362	1,200	1.5	1.34	1.516	90%	New
2025	2030	290	5.30	76.26	0.116	2.592	0.169	2.877	1,300	4.4	2.41	3.199	90%	New
2026	2027	253	3.12	3.12	0.005	0.440		0.445	600	11.8	2.36	0.667	67%	New
2027	2029	193	1.85	4.97	0.008	0.644		0.652	600	15.5	2.70	0.763	85%	New
2028	2029	341	2.99	2.99	0.005	0.406		0.410	500	13.3	2.22	0.436	94%	New
2029	2030	175	0.54	8.50	0.013	1.123		1.136	900	4.2	1.84	1.171	97%	New
2030	2033	144	1.20	85.96	0.131	3.554	0.169	3.854	1500x700	15.9	4.75	4.489	86%	Existing

No.	Down Stream	Length (m)	Area (ha)		Sewage Quantity				Planned Pipe Specification				Capacity	
		Increment	Increment	Total	Sanitary Sewage	Storm Water	Remain Sewage	$Q_1(m^3/s)$	D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Q_1/Q_2	Existing New
2031	2032	212	1.66	1.66	0.003	0.238		0.241	450	10.8	1.86	0.296	81%	New
2032	2033	316	2.82	4.48	0.007	0.613		0.620	700	5.0	1.70	0.654	95%	New
2033	2034	95	0.84	91.28	0.139	4.030	0.169	4.339	1,000	46.3	6.57	5.160	84%	Existing
2034	2044	130	0.77	92.05	0.141	3.945	0.169	4.255	1,700	2.0	1.94	4.403	97%	New
2035	2037	130	0.90	0.90	0.001	0.147		0.148	600	6.1	1.70	0.481	31%	Existing
2036	2037	111	1.40	1.40	0.002	0.211		0.213	450	7.2	1.52	0.242	88%	New
2037	2040	438	3.80	6.10	0.009	0.823		0.833	600	23.0	3.29	0.930	90%	Existing
2038	2040	187	3.08	3.08	0.005	0.447		0.452	800	2.0	1.18	0.593	76%	New
2039	2040	145	0.80	0.80	0.001	0.129		0.131	500	27.5	3.19	0.626	21%	Existing
2040	2042	538	9.90	19.88	0.030	2.214		2.244	1,100	8.1	2.93	2.784	81%	New
2041	2042	451	2.14	2.14	0.003	0.277		0.281	450	15.7	2.25	0.358	78%	New
2042	2044	47	0.08	22.10	0.034	2.426		2.459	1,400	2.0	1.71	2.632	93%	New
2043	2044	102	16.60	16.60	0.025	2.745		2.770	1,000	16.6	3.93	3.087	90%	New
2044	2052	302	0.00	130.75	0.200	7.315	0.169	7.684	1,900	4.0	2.96	8.392	92%	New
2045	2046	269	2.27	2.27	0.003	0.318		0.321	400	24.9	2.62	0.329	98%	Existing
2046	2049	272	4.30	6.57	0.010	0.896		0.906	700	9.9	2.39	0.920	99%	New
2047	2048	196	5.50	5.50	0.008	0.795		0.804	900	2.0	1.27	0.808	99%	New
2048	2049	208	3.40	8.90	0.014	1.175		1.189	1,100	2.0	1.45	1.378	86%	New
2049	2051	618	8.20	23.67	0.036	2.590		2.627	1,200	6.7	2.82	3.189	82%	New
2050	2051	130	1.10	1.10	0.002	0.165		0.166	450	4.6	1.22	0.194	86%	New
2051	2052	365	0.30	25.07	0.038	2.462		2.500	1,200	4.6	2.34	2.646	94%	New
2052	2053	469	0.00	155.82	0.238	8.592	0.169	8.999	1,900	6.1	3.66	10.377	87%	New
2053	2062	930	6.33	162.15	0.248	7.420	0.169	7.837	1,800	4.8	3.13	7.965	98%	New
2054	2055	48	0.80	0.80	0.001	0.124		0.126	450	2.0	0.80	0.127	99%	New
2055	2056	151	2.47	3.27	0.005	0.516		0.521	700	5.3	1.75	0.673	77%	New
2056	2057	67	0.24	3.51	0.005	0.536		0.542	600	28.3	3.65	1.032	52%	Existing
2057	2058	115	14.50	18.01	0.027	2.626		2.653	1,200	5.2	2.49	2.816	94%	New
2058	2059	152	0.00	18.01	0.027	2.466		2.493	900	31.5	5.05	3.213	78%	New
2059	2061	676	0.00	18.01	0.027	1.943		1.971	1,100	6.5	2.62	2.490	79%	New
2060	2061	117	3.00	3.00	0.005	0.492		0.496	800	2.0	1.18	0.593	84%	New
2061	2062	868	0.00	21.01	0.032	1.779		1.811	1,300	2.0	1.63	2.164	84%	New
2062	To STP	10	0.00	183.16	0.280	8.213		8.493						
Out-21								-7.654						
To STP					0.280		0.559	0.839						

No.	Down Stream	Length (m)	Area (ha)		Sewage Quantity				Planned Pipe Specification				Capacity	
		Increment	Increment	Total	Sanitary Sewage	Storm Water	Remain Sewage	$Q_1(m^3/s)$	D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Q_1/Q_2	Existing New
3001	3008	725	24.00	24.00	0.043	3.045		3.088	1,000	18.2	4.12	3.236	95%	New
3002	3004	275	5.80	5.80	0.010	0.883		0.893	700	17.8	3.21	1.235	72%	New
3003	3004	108	0.35	0.35	0.001	0.053		0.053	400	12.9	1.88	0.236	23%	Existing
3004	3007	42	0.10	6.25	0.011	0.936		0.947	600	57.1	5.19	1.467	65%	New
3005	3006	203	1.43	1.43	0.003	0.206		0.209	450	9.8	1.77	0.282	74%	New
3006	3007	130	0.45	1.88	0.003	0.256		0.259	400	49.2	3.68	0.462	56%	Existing
3007	3008	25	0.03	8.16	0.015	1.199		1.213	1,100	2.0	1.45	1.378	88%	New
3008	3009	82	1.57	33.73	0.060	4.156		4.216	1,400	6.7	3.13	4.818	87%	New
3009	3011	215	8.12	41.85	0.075	4.786		4.860	1,300	13.9	4.29	5.694	85%	New
3010	3011	152	1.14	1.14	0.002	0.168		0.170	400	12.4	1.85	0.232	73%	Existing
3011	3013	66	0.20	43.19	0.077	4.838		4.914	1,200	21.2	5.02	5.677	87%	New
3012	3013	149	0.90	0.90	0.002	0.133		0.135	400	7.3	1.42	0.178	75%	Existing
3013	3017	58	1.48	45.57	0.081	5.016		5.097	1,400	10.3	3.88	5.973	85%	New
3014	3015	221	2.25	2.25	0.004	0.321		0.325	450	20.3	2.55	0.406	80%	New
3015	3016	278	4.27	6.52	0.012	0.906		0.917	900	3.4	1.66	1.056	87%	New
3016	3017	180	2.94	9.46	0.017	1.225		1.242	1,000	2.7	1.59	1.249	99%	New
3017	3021	352	7.25	62.28	0.111	6.163		6.273	1,400	13.9	4.50	6.927	91%	New
3018	3019	227	2.42	2.42	0.004	0.377		0.382	700	2.0	1.08	0.416	92%	New
3019	3020	558	15.68	18.10	0.032	2.252		2.284	1,000	11.9	3.33	2.615	87%	New
3020	3021	308	2.50	20.60	0.037	2.307		2.344	1,300	2.9	1.96	2.602	90%	New
3021	3025	132	0.60	83.48	0.149	7.951		8.100	2,000	3.0	2.65	8.325	97%	New
3022	3023	120	1.05	1.05	0.002	0.158		0.160	400	12.5	1.85	0.232	69%	Existing
3023	3024	268	1.93	2.98	0.005	0.433		0.438	500	19.0	2.65	0.520	84%	Existing
3024	3025	93	0.13	3.11	0.006	0.399		0.404	600	20.4	3.10	0.877	46%	Existing
3025	3026	63	0.30	86.89	0.155	8.134		8.289	1,700	7.9	3.86	8.761	95%	New
3026	3027	190	2.50	89.39	0.159	7.959		8.118	1,400	24.7	6.00	9.236	88%	New
3027	3029	71	0.20	89.59	0.160	7.830		7.990	1,500	18.3	5.41	9.560	84%	New
Exs. Outlet								-7.511						
InFlow Area	3028		4.05	4.05	0.007	-		0.007						
3028	3029	543	7.00	11.05	0.020	0.955	0.039	1.014	800	14.7	3.19	1.603	63%	Existing
Exs. Outlet								-0.955						
3029	3032	256	3.20	103.84	0.185	0.493	0.370	1.047	800	15.2	3.24	1.629	64%	Existing
New Outlet								-0.493						
3030	3031	402	5.91	5.91	0.011	0.852		0.862	700	11.4	2.57	0.989	87%	New
3031	3032	305	5.28	11.19	0.020	1.429		1.449	800	19.0	3.63	1.825	79%	New
New Outlet								-1.390						
3032	3039	370	3.85	118.88	0.212	0.563	0.423	1.198	900	7.2	2.41	1.533	78%	New
New Outlet								-0.563						
3033	3035	142	0.92	0.92	0.002	0.149		0.151	500	2.0	0.86	0.169	89%	Existing
3034	3035	83	0.81	0.81	0.001	0.124		0.125	450	2.0	0.80	0.127	98%	New
3035	3036	85	0.94	2.67	0.005	0.416		0.421	600	10.7	2.25	0.636	66%	New
3036	3038	169	1.35	4.02	0.007	0.582		0.589	700	8.2	2.18	0.839	70%	New
3037	3038	278	1.60	1.60	0.003	0.223		0.226	500	10.4	1.96	0.385	59%	Existing
3038	3039	166	1.15	6.77	0.012	0.917		0.929	600	28.9	3.69	1.043	89%	Existing
New Outlet								-0.893						
3039	3041	113	0.65	126.30	0.225	0.098	0.450	0.772	800	10.9	2.75	1.382	56%	Existing
New Outlet								-0.098						
3040	3041	155	1.46	1.46	0.003	0.216		0.218	400	27.7	2.76	0.347	63%	Existing
New Outlet								-0.210						
3041	3062	365	2.30	130.06	0.232	0.337	0.463	1.031	1,000	2.8	1.62	1.272	81%	New
New Outlet								-0.337						
3042	3044	410	5.20	5.20	0.009	0.747		0.756	700	13.4	2.79	1.074	70%	New
3043	3044	98	0.77	0.77	0.001	0.117		0.118	450	2.0	0.80	0.127	93%	New
3044	3045	221	2.45	8.42	0.015	1.109		1.124	800	9.9	2.62	1.317	85%	New
3045	3052	454	11.51	19.93	0.035	2.232		2.268	1,000	12.3	3.39	2.662	85%	New
3046	3048	263	4.73	4.73	0.008	0.726		0.734	900	2.0	1.27	0.808	91%	New
3047	3048	167	2.87	2.87	0.005	0.459		0.464	700	4.7	1.65	0.635	73%	New

No.	Down Stream	Length (m)	Area (ha)		Sewage Quantity				Planned Pipe Specification				Capacity	
		Increment	Increment	Total	Sanitary Sewage	Storm Water	Remain Sewage	$Q_1(m^3/s)$	D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Q_1/Q_2	Existing New
3048	3050	58	0.70	8.30	0.015	1.238		1.253	1,100	2.0	1.45	1.378	91%	New
3049	3050	272	1.83	1.83	0.003	0.256		0.259	450	9.5	1.75	0.278	93%	New
3050	3051	173	1.42	11.55	0.021	1.604		1.625	1,200	2.0	1.54	1.742	93%	New
3051	3052	77	0.29	11.84	0.021	1.598		1.619	1,200	2.0	1.54	1.742	93%	New
3052	3055	174	1.46	33.23	0.059	3.526		3.585	1,600	2.0	1.87	3.760	95%	New
3053	3054	118	0.43	0.43	0.001	0.065		0.065	400	2.0	0.74	0.093	70%	Existing
3054	3055	98	0.35	0.78	0.001	0.112		0.113	500	6.7	1.57	0.308	37%	Existing
3055	3060	12	0.01	34.02	0.061	3.599		3.660	1,600	2.0	1.87	3.760	97%	New
3056	3059	287	2.82	2.82	0.005	0.427		0.432	500	13.2	2.21	0.434	100%	Existing
3057	3059	203	1.29	1.29	0.002	0.186		0.188	500	17.2	2.52	0.495	38%	Existing
3058	3059	111	0.46	0.46	0.001	0.069		0.070	400	2.0	0.74	0.093	76%	Existing
3059	3060	235	1.18	5.75	0.010	0.790		0.800	700	8.8	2.26	0.870	92%	New
3060	3061	114	0.45	40.22	0.072	4.107		4.179	1,700	2.0	1.94	4.403	95%	New
3061	3062	348	8.47	48.69	0.087	4.503		4.590	1,400	6.7	3.13	4.818	95%	New
New Outlet								-4.329						
3062	3075	514	9.30	188.05	0.335	1.282	0.670	2.287	1,200	3.6	2.07	2.341	98%	New
New Outlet								-1.282						
3063	3065	256	1.33	1.33	0.002	0.188		0.190	600	7.8	1.92	0.543	35%	Existing
3064	3065	216	1.32	1.32	0.002	0.189		0.192	600	8.3	1.98	0.560	34%	Existing
3065	3067	86	0.75	3.40	0.006	0.503		0.509	800	2.0	1.18	0.593	86%	New
3066	3067	232	2.02	2.02	0.004	0.314		0.317	600	9.0	2.06	0.582	54%	Existing
3067	3075	372	2.20	7.62	0.014	0.973		0.987	800	11.2	2.78	1.397	71%	New
New Outlet								-0.946						
3068	3070	416	4.63	4.63	0.008	0.665		0.673	900	2.0	1.27	0.808	83%	New
3069	3070	285	3.24	3.24	0.006	0.491		0.497	800	2.8	1.39	0.699	71%	New
3070	3072	176	1.12	8.99	0.016	1.201		1.217	1,100	2.1	1.49	1.416	86%	New
3071	3072	114	0.68	0.68	0.001	0.102		0.103	400	9.6	1.62	0.204	51%	Existing
3072	3074	100	0.41	10.08	0.018	1.296		1.314	1,100	2.9	1.75	1.663	79%	New
3073	3074	127	0.86	0.86	0.002	0.129		0.130	400	14.9	2.02	0.254	51%	Existing
3074	3075	574	3.36	14.30	0.025	1.513		1.538	1,000	7.1	2.57	2.018	76%	New
New Outlet								-1.462						
3075	3077	415	0.15	210.12	0.374	0.020	0.748	1.142	1,100	2.0	1.45	1.378	83%	New
Exs. Outlet								-0.020						
3076	3077	220	1.93	1.93	0.003	0.302		0.306	500	9.0	1.82	0.357	86%	Existing
Exs. Outlet								-0.295						
3077	3079	270	2.80	214.85	0.383	0.428	0.765	1.575	1,200	2.0	1.54	1.742	90%	New
New Outlet								-0.428						
3078	3079	533	5.32	5.32	0.009	0.728		0.738	900	2.0	1.27	0.808	91%	New
New Outlet								-0.709						
3079	3085	233	0.76	220.93	0.393	0.108	0.787	1.288	1,100	2.0	1.45	1.378	93%	New
New Outlet								-0.108						
3080	3082	134	0.47	0.47	0.001	0.070		0.071	300	10.4	1.40	0.099	72%	New
3081	3082	70	1.43	1.43	0.003	0.240		0.242	600	2.0	0.97	0.274	88%	New
3082	3084	47	0.21	2.11	0.004	0.336		0.340	700	2.0	1.08	0.416	82%	New
3083	3084	212	1.68	1.68	0.003	0.263		0.266	600	2.0	0.97	0.274	97%	New
3084	3085	70	0.21	4.00	0.007	0.609		0.616	900	2.0	1.27	0.808	76%	New
New Outlet								-0.594						
3085	3104	421	3.12	228.05	0.406	0.446	0.812	1.664	1,000	5.8	2.32	1.822	91%	Existing
New Outlet								-0.446						
3086	3087	290	2.72	2.72	0.005	0.412		0.417	600	6.8	1.79	0.506	82%	New
3087	3092	95	0.30	3.02	0.005	0.402		0.407	450	27.3	2.96	0.471	87%	New
3088	3089	52	0.36	0.36	0.001	0.056		0.056	350	2.0	0.68	0.065	86%	New
3089	3092	220	1.25	1.61	0.003	0.225		0.228	400	20.8	2.39	0.300	76%	Existing
3091	3092	199	5.17	5.17	0.009	0.816		0.825	900	3.0	1.56	0.992	83%	New
3092	3096	344	4.64	14.44	0.026	1.832		1.858	1,100	4.9	2.28	2.167	86%	New
3093	3095	327	1.95	1.95	0.003	0.291		0.294	700	2.0	1.08	0.416	71%	New

No.	Down Stream	Length (m)	Area (ha)		Sewage Quantity				Planned Pipe Specification				Capacity	
		Increment	Increment	Total	Sanitary Sewage	Storm Water	Remain Sewage	$Q_1(m^3/s)$	D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Q_1/Q_2	Existing New
3094	3095	290	2.15	2.15	0.004	0.326		0.330	600	6.8	1.79	0.506	65%	New
3095	3096	267	0.30	4.40	0.008	0.588		0.595	700	5.4	1.77	0.681	87%	New
3096	3097	191	0.38	19.22	0.034	2.280		2.314	1,000	9.9	3.04	2.388	97%	New
3097	3100	30	0.02	19.24	0.034	2.254		2.288	1,400	2.0	1.71	2.632	87%	New
3098	3099	91	0.34	0.34	0.001	0.052		0.052	350	2.0	0.68	0.065	80%	New
3099	3100	251	1.24	1.58	0.003	0.214		0.217	600	8.8	2.04	0.577	38%	Existing
3100	3103	93	0.78	21.60	0.038	2.455		2.494	1,400	2.0	1.71	2.632	95%	New
3101	3102	230	1.92	1.92	0.003	0.298		0.302	700	2.0	1.08	0.416	73%	New
3102	3103	239	2.20	4.12	0.007	0.579		0.586	700	8.9	2.27	0.874	67%	New
3103	3104	101	0.82	26.54	0.047	2.921		2.969	1,500	2.0	1.79	3.163	94%	New
New Outlet								-2.827						
3104	3107	257	2.41	257.00	0.458	0.370	0.915	1.742	1,200	2.0	1.54	1.742	100%	New
New Outlet								-0.370						
3105	3106	187	1.49	1.49	0.003	0.236		0.239	800	2.1	1.21	0.608	39%	Existing
3106	3107	210	1.82	3.31	0.006	0.479		0.485	800	2.0	1.18	0.593	82%	New
New Outlet								-0.467						
3107	3109	667	11.60	271.91	0.484	1.507	0.968	2.959	1,400	3.1	2.13	3.279	90%	New
New Outlet								-1.507						
3108	3109	193	2.23	2.23	0.004	0.353		0.357	600	5.1	1.55	0.438	82%	New
New Outlet								-0.345						
3109	3113	456	4.93	279.07	0.497	0.695	0.994	2.185	1,400	2.0	1.71	2.632	83%	New
New Outlet								-0.695						
3110	3112	491	2.69	2.69	0.005	0.374		0.378	600	5.2	1.57	0.444	85%	Existing
3111	3112	181	4.18	4.18	0.007	0.665		0.673	700	7.7	2.11	0.812	83%	New
3112	3113	489	4.41	11.28	0.020	1.310		1.330	1,100	2.0	1.45	1.378	96%	New
New Outlet								-1.269						
3113	3127	20	0.50	290.85	0.518	0.000	1.036	1.554	1,200	2.0	1.54	1.742	89%	New
Exs. Outlet								0.000						
3114	3116	579	3.68	3.68	0.007	0.495		0.501	700	4.6	1.63	0.627	80%	New
3115	3116	67	0.44	0.44	0.001	0.068		0.069	400	8.9	1.56	0.196	35%	Existing
3116	3118	68	0.32	4.44	0.008	0.581		0.589	600	10.2	2.19	0.619	95%	Existing
3117	3118	70	1.40	1.40	0.002	0.235		0.237	600	2.0	0.97	0.274	86%	New
3118	3121	199	2.38	8.22	0.015	1.000		1.015	1,000	2.0	1.37	1.076	94%	New
3119	3120	268	3.27	3.27	0.006	0.500		0.505	700	6.3	1.91	0.735	69%	New
3120	3121	213	3.16	6.43	0.011	0.900		0.911	800	7.9	2.34	1.176	77%	New
3121	3125	232	2.40	17.05	0.030	1.915		1.946	1,000	9.7	3.01	2.364	82%	New
3122	3124	276	2.60	2.60	0.005	0.396		0.400	600	9.4	2.11	0.597	67%	New
3123	3124	124	1.80	1.80	0.003	0.294		0.297	600	3.2	1.23	0.348	85%	New
3124	3125	208	0.81	5.21	0.009	0.726		0.736	900	2.0	1.27	0.808	91%	New
3125	3126	500	4.58	26.84	0.048	2.595		2.643	1,100	10.3	3.30	3.136	84%	New
3126	3127	1009	0.00	26.84	0.048	2.022		2.070	1,200	3.2	1.95	2.205	94%	New
Exs. Outlet								-1.926						
3127	3152	97	0.05	317.74	0.566	-	1.131	1.697						
Exs. Outlet														
3128	3129	254	2.27	2.27	0.004	0.350		0.354	600	8.2	1.97	0.557	63%	New
3129	3131	71	1.33	3.60	0.006	0.537		0.544	800	2.0	1.18	0.593	92%	New
3130	3131	201	1.00	1.00	0.002	0.145		0.146	400	8.9	1.56	0.196	75%	Existing
3131	3136	122	1.40	6.00	0.011	0.849		0.859	1,000	2.0	1.37	1.076	80%	New
3132	3133	124	0.60	0.60	0.001	0.090		0.091	300	9.6	1.34	0.095	96%	Existing
3133	3135	95	0.40	1.00	0.002	0.143		0.145	400	9.4	1.61	0.202	72%	Existing
3134	3135	149	1.16	1.16	0.002	0.187		0.189	500	2.6	0.98	0.192	98%	New
3135	3136	20	0.05	2.21	0.004	0.342		0.346	700	2.0	1.08	0.416	83%	New
3136	3141	287	4.10	12.31	0.022	1.557		1.579	900	9.4	2.76	1.756	90%	New
3137	3138	328	3.02	3.02	0.005	0.451		0.456	600	8.5	2.00	0.565	81%	New
3138	3140	138	0.60	3.62	0.006	0.508		0.515	800	2.0	1.18	0.593	87%	New
3139	3140	122	4.10	4.10	0.007	0.669		0.677	700	7.3	2.06	0.793	85%	New

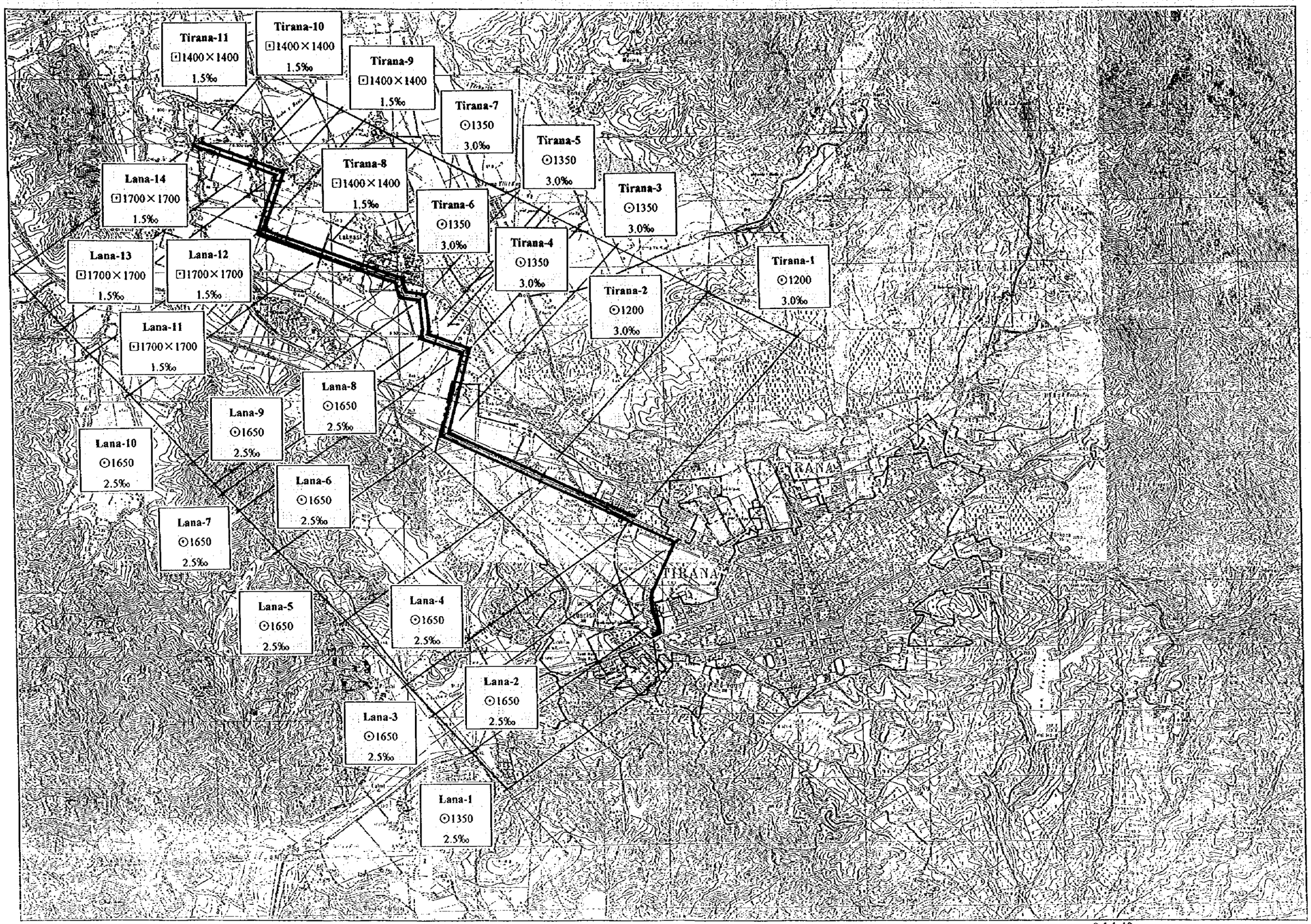
No.	Down Stream	Length (m)	Area (ha)		Sewage Quantity				Planned Pipe Specification				Capacity	
		Increment	Increment	Total	Sanitary Sewage	Storm Water	Remain Sewage	$Q_1(m^3/s)$	D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Q_1/Q_2	Existing New
3140	3141	68	0.39	8.11	0.014	1.110		1.125	1,100	2.0	1.45	1.378	82%	New
3141	3142	120	0.43	20.85	0.037	2.528		2.565	1,400	2.0	1.71	2.632	97%	New
3142	3148	281	1.25	22.10	0.039	2.440		2.479	1,100	6.9	2.70	2.566	97%	New
3143	3144	159	1.39	1.39	0.002	0.204		0.207	400	16.9	2.15	0.270	77%	New
3144	3145	302	1.76	3.15	0.006	0.444		0.450	600	8.9	2.05	0.580	78%	New
3145	3147	248	5.98	9.13	0.016	1.166		1.183	900	6.5	2.29	1.457	81%	New
3146	3147	185	0.70	0.70	0.001	0.102		0.103	600	4.3	1.42	0.401	26%	Existing
3147	3148	497	7.44	17.27	0.031	1.863		1.894	1,100	4.6	2.21	2.100	90%	New
3148	3151	367	1.19	40.56	0.072	3.922		3.994	1,500	4.6	2.71	4.789	83%	New
3149	3150	218	0.70	0.70	0.001	0.100		0.102	300	15.1	1.68	0.119	86%	Existing
3150	3151	404	3.47	4.17	0.007	0.551		0.559	800	2.7	1.37	0.689	81%	New
3151	3152	430	2.30	47.03	0.084	4.055		4.139	1,700	2.0	1.94	4.403	94%	New
Exs. Outlet								-3.887						
3152	3154	43	0.06	364.83	0.650	-	1.299	1.949						
3153	3154	464	1.32	1.32	0.002	0.185		0.188	600	2.0	0.97	0.274	68%	New
Exs. Outlet								-0.181						
3154	3157	22	0.01	366.16	0.652	-	1.304	1.956						
3155	3156	537	3.38	3.38	0.006	0.461		0.467	600	8.3	1.98	0.560	83%	New
3156	3157	480	3.45	6.83	0.012	0.783		0.796	900	2.0	1.27	0.808	98%	New
Exs. Outlet								-0.759						
3157	3164	181	0.70	373.69	0.665	-	1.331	1.996						
3158	3159	175	1.41	1.41	0.003	0.225		0.228	600	2.8	1.15	0.325	70%	New
3159	3161	149	0.81	2.22	0.004	0.331		0.335	600	3.3	1.25	0.353	95%	New
3160	3161	169	1.25	1.25	0.002	0.200		0.202	600	2.0	0.97	0.274	74%	New
3161	3163	194	5.50	8.97	0.016	1.232		1.248	1,100	2.0	1.45	1.378	91%	New
3162	3163	150	2.50	2.50	0.004	0.403		0.407	700	2.0	1.08	0.416	98%	New
3163	3164	189	0.80	12.27	0.022	1.567		1.589	1,100	4.2	2.11	2.005	79%	New
Exs. Outlet								-1.524						
3164	3170	439	3.70	389.66	0.694	-	1.388	2.081						
3165	3166	479	4.05	4.05	0.007	0.567		0.574	600	9.1	2.07	0.585	98%	New
3166	3167	106	0.56	4.61	0.008	0.618		0.626	900	2.0	1.27	0.808	77%	New
3167	3168	144	1.18	5.79	0.010	0.735		0.745	800	4.3	1.73	0.870	86%	Existing
3168	3169	137	0.97	6.76	0.012	0.817		0.829	1,000	2.0	1.37	1.076	77%	New
3169	3170	392	0.00	6.76	0.012	0.717		0.729	800	13.0	3.00	1.508	48%	Existing
Exs. Outlet								-0.693						
3170	To STP	930	0.00	396.42	0.706	-	1.412	2.118						
4001	4002	24	5.70	5.70	0.010	0.976		0.986	600	41.6	4.43	1.253	79%	New
4002	4003	64	2.90	8.60	0.015	1.428		1.443	700	46.8	5.21	2.005	72%	New
Shkoza	4003		14.60	-	0.033	-		0.033						
4003	4004	837	13.00	21.60	0.071	2.554		2.625	1,100	8.0	2.91	2.765	95%	New
4004	4006	46	0.35	21.95	0.071	2.556		2.627	800	73.1	7.11	3.574	74%	New
InFlow Area	4005		10.78	10.78	0.019	-		0.019						
4005	4006	637	4.60	4.60	0.027	0.604		0.630	600	17.5	2.87	0.811	78%	New
4006	4007	34	0.25	26.80	0.099	3.083		3.182	1,100	11.7	3.52	3.345	95%	New
New Outlet								-2.886						
4007	4011	295	2.42	29.22	0.103	0.365	0.206	0.674	700	8.1	2.17	0.835	81%	New
4009	4010	147	0.72	0.72	0.001	0.107		0.108	350	10.2	1.53	0.147	73%	New
4010	4011	538	11.78	12.50	0.022	1.613		1.635	800	15.7	3.30	1.659	99%	New
4011	4012	74	2.68	44.40	0.129	2.211	0.258	2.598	1,100	7.6	2.84	2.699	96%	New
Exs. Outlet								-2.211						

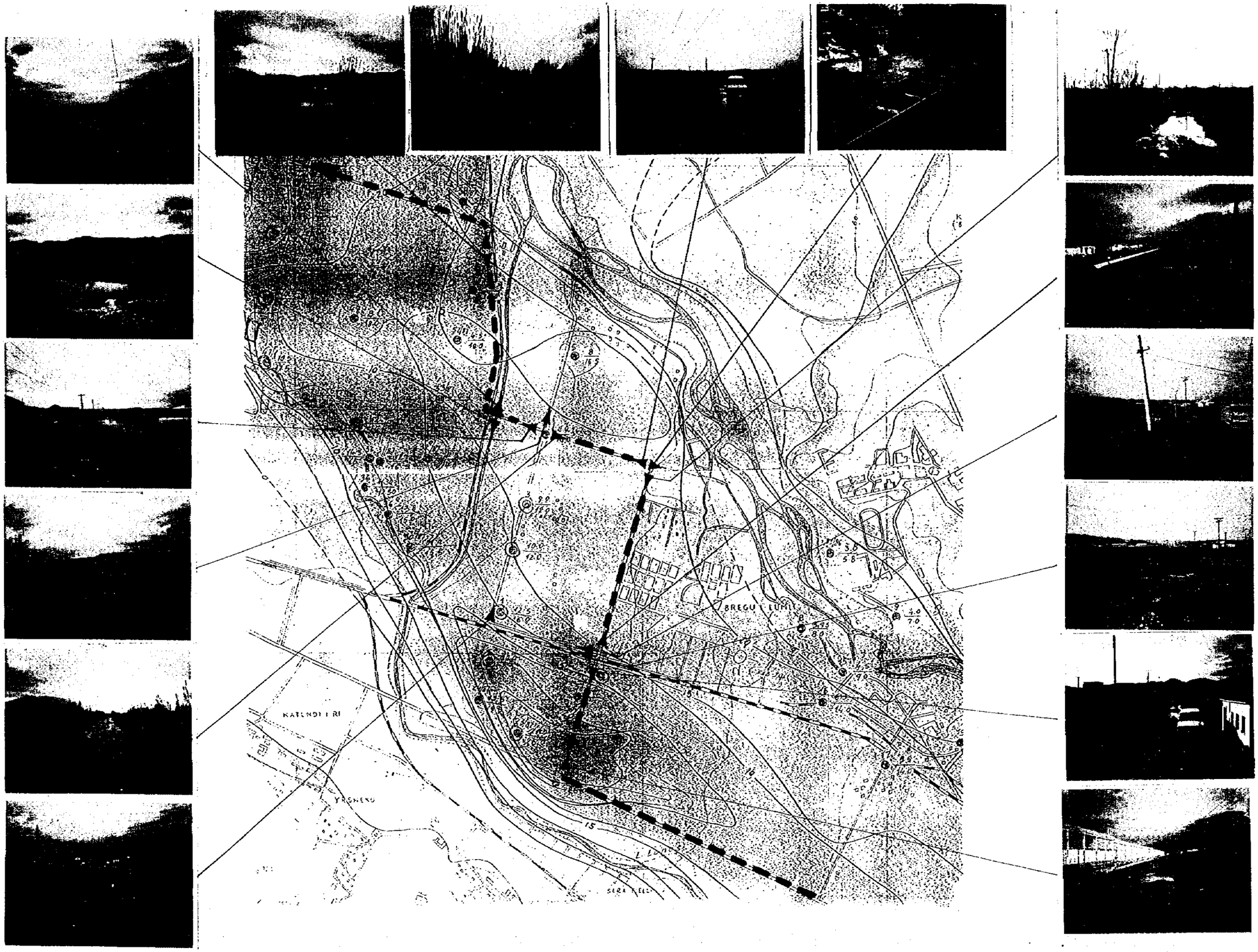
No.	Down Stream	Length (m)	Area (ha)		Sewage Quantity				Planned Pipe Specification				Capacity	
		Increment	Increment	Total	Sanitary Sewage	Storm Water	Remain Sewage	$Q_1(m^3/s)$	D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Q_1/Q_2	Existing New
4012	4013	162	2.25	46.65	0.133	0.361	0.266	0.760	700	9.2	2.31	0.889	85%	New
Ext. Outlet								-0.361						
4013	4015	156	1.56	48.21	0.136	0.251	0.271	0.658	700	5.1	1.72	0.662	99%	New
4014	4015	377	2.17	2.17	0.004	0.290		0.294	450	15.6	2.24	0.356	82%	New
4015	4017	266	2.68	53.06	0.144	0.917	0.288	1.349	800	12.0	2.88	1.448	93%	New
New Outlet								-0.917						
4016	4017	913	12.80	12.80	0.022	1.523	0.044	1.590	800	22.8	3.97	1.996	80%	Existing
New Outlet								-1.523						
4017	4024	154	0.88	66.74	0.168	0.130	0.336	0.633	800	20.1	3.73	1.875	34%	Existing
New Outlet								-0.130						
4018	4021	313	5.26	5.26	0.009	0.788		0.797	600	17.2	2.85	0.806	99%	New
4019	4020	68	1.00	1.00	0.002	0.168		0.169	600	2.0	0.97	0.274	62%	New
4020	4021	260	1.03	2.03	0.004	0.278		0.281	400	19.8	2.33	0.293	96%	New
4021	4022	57	0.35	7.64	0.013	1.110		1.123	700	24.8	3.79	1.459	77%	New
4022	4023	36	0.53	8.17	0.014	1.169		1.183	600	55.5	5.12	1.448	82%	New
New Outlet								-1.140						
InFlow Area	4023		4.01	4.01	0.007	-		0.007						
4023	4024	446	4.60	12.77	0.029	1.543	0.058	1.631	900	9.1	2.71	1.724	95%	New
New Outlet								-1.543						
4024	4025	170	0.88	80.39	0.198	0.129	0.397	0.724	800	10.5	2.70	1.357	53%	Existing
New Outlet								-0.129						
InFlow Area	4025		7.30	7.30	0.013	-		0.013						
4025	4028	196	0.97	81.36	0.213	0.140	0.426	0.779	800	22.4	3.94	1.980	39%	Existing
New Outlet								-0.140						
Student's	4026		29.50	-	0.028	-		0.028						
4026	4027	976	12.24	12.24	0.049	1.425		1.474	700	30.2	4.18	1.609	92%	New
New Outlet								-1.328						
4027	4028	305	1.50	13.74	0.051	0.207	0.103	0.361	600	7.5	1.88	0.532	68%	New
New Outlet								-0.207						
InFlow Area	4028		14.00	14.00	0.024	-		0.024						
4028	4054	183	0.85	95.95	0.290	0.124	0.580	0.994	1,000	2.0	1.37	1.076	92%	New
New Outlet								-0.124						
4029	4030	52	1.41	1.41	0.002	0.218		0.221	300	57.5	3.28	0.232	95%	Existing
4030	4031	215	1.92	3.33	0.006	0.509		0.515	700	6.9	2.00	0.770	67%	New
4031	4036	178	0.78	4.11	0.007	0.584		0.591	800	2.0	1.18	0.593	100%	New
4032	4033	77	0.65	0.65	0.001	0.099		0.100	250	87.0	3.57	0.175	57%	New
4033	4034	153	0.88	1.53	0.003	0.218		0.220	350	23.5	2.32	0.223	99%	New
4034	4035	169	4.18	5.71	0.010	0.826		0.836	600	20.1	3.08	0.871	96%	New
4035	4036	55	0.27	5.98	0.010	0.846		0.856	700	12.7	2.71	1.043	82%	New
4036	4045	343	2.64	12.73	0.022	1.574		1.596	800	29.5	4.52	2.272	70%	New
4037	4038	175	2.49	2.49	0.004	0.365		0.369	450	18.2	2.42	0.385	96%	New
4038	4041	89	0.67	3.16	0.005	0.444		0.450	450	26.9	2.94	0.468	96%	New
4039	4040	119	0.88	0.88	0.002	0.132		0.134	300	47.0	2.97	0.210	64%	Existing
4040	4041	50	0.10	0.98	0.002	0.157		0.158	500	2.0	0.86	0.169	94%	New
4041	4042	210	0.76	4.90	0.008	0.686		0.694	600	19.5	3.03	0.857	81%	New
4042	4045	10	0.01	4.91	0.009	0.684		0.693	800	3.4	1.53	0.769	90%	New
New Outlet								-0.667						
4043	4044	119	0.55	0.55	0.001	0.083		0.084	300	42.5	2.82	0.199	42%	Existing
4044	4045	259	0.81	1.36	0.002	0.182		0.184	400	16.9	2.15	0.270	68%	Existing
New Outlet								-0.177						

No.	Down Stream	Length (m)	Area (ha)		Sewage Quantity				Planned Pipe Specification				Capacity	
		Increment	Increment	Total	Sanitary Sewage	Storm Water	Remain Sewage	$Q_1(m^3/s)$	D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Q_1/Q_2	Existing New
4045	4053	231	1.43	20.43	0.035	0.222	0.071	0.328	600	4.3	1.42	0.401	82%	New
4046	4047	168	1.02	1.02	0.002	0.163		0.165	500	2.3	0.92	0.181	91%	New
4047	4048	161	1.24	2.26	0.004	0.336		0.340	700	2.0	1.08	0.416	82%	New
4048	4050	423	9.14	11.40	0.020	1.432		1.452	700	30.2	4.18	1.609	90%	New
New Outlet								-1.393						
4049	4050	197	0.88	0.88	0.002	0.127		0.129	500	31.4	3.41	0.670	19%	Existing
New Outlet								-0.124						
4050	4051	253	2.78	15.06	0.026	0.428	0.052	0.506	600	7.1	1.83	0.517	98%	New
Exs. Outlet								-0.428						
4051	4052	354	6.88	21.94	0.038	1.015	0.076	1.129	1,000	2.8	1.62	1.272	89%	New
InFlow Area	4052		21.39	21.39	0.037	-		0.037						
4052	4053	404	8.05	29.99	0.089	1.876	0.178	2.143	1,000	9.9	3.04	2.388	90%	New
4053	4054	70	0.30	50.72	0.125	2.039	0.250	2.415	1,200	4.2	2.23	2.522	96%	New
New Outlet								-2.039						
4054	4056	115	0.31	146.98	0.415	0.047	0.831	1.293	1,100	2.0	1.45	1.378	94%	New
New Outlet								-0.047						
4055	4056	265	2.53	2.53	0.004	0.388		0.392	600	8.6	2.01	0.568	69%	New
New Outlet								-0.379						
4056	4060	99	0.34	149.85	0.420	0.052	0.841	1.313	1,100	2.0	1.45	1.378	95%	New
New Outlet								-0.052						
4057	4059	62	0.50	0.50	0.001	0.077		0.078	400	2.0	0.74	0.093	84%	Existing
4058	4059	58	1.22	1.22	0.002	0.206		0.208	600	2.0	0.97	0.274	76%	New
4059	4060	279	7.64	9.36	0.016	1.386		1.402	800	14.9	3.21	1.614	87%	New
New Outlet								-1.353						
4060	4062	25	0.03	159.24	0.437	0.005	0.873	1.315	1,100	2.0	1.45	1.378	95%	New
Exs. Outlet								-0.005						
4061	4062	712	4.94	4.94	0.009	0.631		0.640	700	5.7	1.82	0.700	91%	New
Exs. Outlet								-0.614						
4062	4064	88	0.27	164.45	0.446	0.041	0.892	1.378	1,100	2.0	1.45	1.378	100%	New
New Outlet								-0.041						
4063	4064	258	2.07	2.07	0.004	0.318		0.321	700	2.0	1.08	0.416	77%	New
New Outlet								-0.310						
4064	4068	93	0.31	166.83	0.450	0.047	0.900	1.397	1,200	2.0	1.54	1.742	80%	New
Exs. Outlet								-0.047						
4065	4068	461	3.64	3.64	0.006	0.513		0.519	700	3.6	1.44	0.554	94%	New
Exs. Outlet								-0.500						
4068	4070	168	0.80	171.27	0.458	0.117	0.915	1.490	1,200	2.0	1.54	1.742	86%	New
New Outlet								-0.117						
4069	4070	77	0.38	0.38	0.001	0.058		0.059	400	5.1	1.18	0.148	40%	Existing
New Outlet								-0.057						
4070	4078	179	1.02	172.67	0.460	0.149	0.920	1.529	1,000	5.9	2.34	1.838	83%	New
New Outlet								-0.149						
4071	4073	155	1.15	1.15	0.002	0.170		0.172	800	6.4	2.10	1.056	16%	Existing
4072	4073	58	0.28	0.28	0.000	0.043		0.044	400	2.0	0.74	0.093	47%	Existing
4073	4075	176	1.21	2.64	0.005	0.392		0.397	600	10.7	2.25	0.636	62%	New
4074	4075	94	0.45	0.45	0.001	0.068		0.069	400	5.3	1.21	0.152	46%	Existing
4075	4077	74	0.40	3.49	0.006	0.503		0.509	600	8.1	1.95	0.551	92%	Existing
4076	4077	334	1.20	1.20	0.002	0.163		0.166	500	8.9	1.81	0.355	47%	Existing
4077	4078	94	0.58	5.27	0.009	0.732		0.741	900	2.0	1.27	0.808	92%	New
New Outlet								-0.714						

No.	Down Stream	Length (m)	Area (ha)		Sewage Quantity				Planned Pipe Specification				Capacity	
		Increment	Increment	Total	Sanitary Sewage	Storm Water	Remain Sewage	$Q_1(m^3/s)$	D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Q_1/Q_2	Existing New
4078	4102	191	1.83	179.77	0.472	0.290	0.945	1.707	1,000	7.9	2.71	2.128	80%	New
New Outlet								-0.290						
4079	4080	107	1.37	1.37	0.002	0.226		0.228	600	2.0	0.97	0.274	83%	New
4080	4082	256	2.72	4.09	0.007	0.601		0.608	700	7.7	2.11	0.812	75%	New
4081	4082	165	0.95	0.95	0.002	0.140		0.141	800	13.9	3.10	1.558	9%	Existing
4082	4085	174	1.18	6.22	0.011	0.848		0.859	800	10.3	2.67	1.342	64%	Existing
4083	4084	80	0.64	0.64	0.001	0.098		0.099	400	32.5	2.99	0.376	26%	Existing
4084	4085	189	3.11	3.75	0.007	0.573		0.579	800	2.0	1.18	0.593	98%	New
4085	4087	182	1.07	11.04	0.019	1.406		1.425	1,200	2.0	1.54	1.742	82%	New
4086	4087	158	3.57	3.57	0.006	0.573		0.579	800	10.1	2.64	1.327	44%	Existing
4087	4091	78	0.26	14.87	0.026	1.838		1.864	1,300	2.0	1.63	2.164	86%	New
4090	4091	162	1.27	1.27	0.002	0.204		0.206	800	2.0	1.18	0.593	35%	Existing
4091	4097	96	0.43	16.57	0.029	1.984		2.013	1,300	2.0	1.63	2.164	93%	New
4092	4094	157	1.16	1.16	0.002	0.171		0.173	800	9.5	2.56	1.287	13%	Existing
4093	4094	69	0.31	0.31	0.001	0.048		0.048	600	37.6	4.21	1.190	4%	Existing
4094	4096	97	0.39	1.86	0.003	0.286		0.290	800	2.0	1.18	0.593	49%	Existing
4095	4096	87	0.24	0.24	0.000	0.037		0.037	800	2.0	1.18	0.593	6%	Existing
4096	4097	178	1.28	3.38	0.006	0.482		0.488	800	2.0	1.18	0.593	82%	New
4097	4099	215	2.23	22.18	0.038	2.470		2.508	1,200	5.9	2.65	2.997	84%	New
4098	4099	190	2.50	2.50	0.004	0.396		0.401	600	7.3	1.86	0.526	76%	New
4099	4101	68	0.35	25.03	0.043	2.724		2.767	1,400	2.9	2.06	3.171	87%	New
4100	4101	177	1.10	1.10	0.002	0.160		0.162	400	11.2	1.75	0.220	74%	Existing
4101	4102	174	1.27	27.40	0.048	2.828		2.876	1,500	2.0	1.79	3.163	91%	New
New Outlet								-2.733						
4102	4104	73	0.29	207.46	0.520	0.045	1.041	1.606	900	11.6	3.06	1.947	82%	New
Exs. Outlet								-0.045						
4103	4104	361	2.90	2.90	0.005	0.426		0.431	700	2.4	1.18	0.454	95%	New
Exs. Outlet								-0.416						
4104	4110	420	2.80	213.16	0.530	0.401	1.060	1.991	1,200	3.8	2.13	2.409	83%	New
New Outlet								-0.401						
4105	4106	62	0.54	0.54	0.001	0.083		0.084	500	12.9	2.18	0.428	20%	Existing
4106	4107	243	4.91	5.45	0.009	0.820		0.829	600	18.5	2.95	0.834	99%	Existing
4107	4110	627	4.81	10.26	0.008	1.209		1.218	900	4.7	1.95	1.241	98%	New
New Outlet								-1.193						
4108	4109	384	5.70	5.70	0.010	0.828		0.838	900	2.3	1.36	0.865	97%	New
4109	4110	99	0.67	6.37	0.011	0.875		0.886	1,000	2.0	1.37	1.076	82%	New
New Outlet								-0.853						
4110	4118	95	0.35	230.14	0.550	0.053	1.100	1.704	1,200	2.0	1.54	1.742	98%	New
New Outlet								-0.053						
4111	4112	152	1.46	1.46	0.003	0.216		0.218	800	34.2	4.87	2.448	9%	Existing
InFlow Area	4112		8.38	8.38	0.015	-		0.015						
4112	4113	358	9.88	11.34	0.034	1.564		1.598	900	13.9	3.35	2.131	75%	New
Exs. Outlet								-1.495						
4113	4114	177	3.39	14.73	0.040	0.539	0.080	0.660	900	2.2	1.33	0.846	78%	New
4114	4115	325	8.68	23.41	0.055	1.670		1.725	900	11.9	3.10	1.972	87%	New
4115	4117	166	0.74	24.15	0.056	1.664		1.721	1,200	2.0	1.54	1.742	99%	New
4116	4117	289	1.68	1.68	0.003	0.255		0.258	600	2.4	1.06	0.300	86%	New
4117	4118	80	0.36	26.19	0.060	1.872		1.932	1,100	5.1	2.32	2.205	88%	New
New Outlet								-1.752						
InFlow Area	4118		4.10	4.10	0.007	-		0.007						
4118	4120	447	8.80	265.13	0.633	1.245	1.265	3.142	1,400	4.2	2.48	3.818	82%	New
New Outlet								-1.245						
4119	4120	150	0.82	0.82	0.001	0.121		0.123	400	6.6	1.35	0.170	72%	Existing
New Outlet								-0.118						

No.	Down Stream	Length (m)	Area (ha)		Sewage Quantity				Planned Pipe Specification				Capacity	
		Increment	Increment	Total	Sanitary Sewage	Storm Water	Remain Sewage	$Q_1(m^3/s)$	D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Q_1/Q_2	Existing New
Selita	4120		35.60	-	0.044	-		0.044						
4120	4122	583	2.62	268.57	0.683	0.351	1.365	2.399	1,100	6.6	2.64	2.509	96%	New
New Outlet								-0.351						
4121	4122	223	2.72	2.72	0.005	0.424		0.429	500	14.7	2.33	0.457	94%	New
New Outlet								-0.415						
4122	4132	234	4.20	275.49	0.695	0.652	1.389	2.736	1,500	2.0	1.79	3.163	86%	New
Exs. Outlet								-0.652						
4123	4124	110	1.10	1.10	0.002	0.181		0.183	500	2.7	1.00	0.196	93%	New
4124	4125	548	6.00	7.10	0.012	0.926		0.938	800	6.9	2.19	1.101	85%	New
4125	4129	368	4.50	11.60	0.020	1.327		1.347	800	18.4	3.57	1.794	75%	New
4126	4127	473	6.90	6.90	0.012	0.965		0.977	800	9.0	2.50	1.257	78%	New
4127	4128	341	7.50	14.40	0.025	1.774		1.799	1,000	7.6	2.66	2.089	86%	New
4128	4129	197	1.50	15.90	0.028	1.829		1.857	900	11.6	3.06	1.947	95%	New
4129	4131	130	0.80	28.30	0.049	3.106		3.155	900	37.6	5.52	3.512	90%	New
4130	4131	435	5.90	5.90	0.010	0.841		0.851	600	33.5	3.97	1.122	76%	New
4131	4132	213	0.90	35.10	0.061	3.604		3.665	1,600	2.0	1.87	3.760	97%	New
Exs. Outlet								-3.482						
4132	To STP	0	0.00	310.59	0.755		1.511	2.266	1,400	2.0	1.71	2.632	86%	New


Tirana-11
⊡1400×1400
1.5‰
Tirana-10
⊡1400×1400
1.5‰
Tirana-9
⊡1400×1400
1.5‰
Tirana-7
⊙1350
3.0‰
Tirana-5
⊙1350
3.0‰
Tirana-8
⊡1400×1400
1.5‰
Tirana-3
⊙1350
3.0‰
Lana-14
⊡1700×1700
1.5‰
Tirana-6
⊙1350
3.0‰
Tirana-4
⊙1350
3.0‰
Tirana-1
⊙1200
3.0‰
Lana-13
⊡1700×1700
1.5‰
Lana-12
⊡1700×1700
1.5‰
Tirana-2
⊙1200
3.0‰
Lana-11
⊡1700×1700
1.5‰
Lana-8
⊙1650
2.5‰
Lana-9
⊙1650
2.5‰
Lana-10
⊙1650
2.5‰
Lana-6
⊙1650
2.5‰
Lana-7
⊙1650
2.5‰
Lana-5
⊙1650
2.5‰
Lana-4
⊙1650
2.5‰
Lana-2
⊙1650
2.5‰
Lana-3
⊙1650
2.5‰
Lana-1
⊙1350
2.5‰
TIRANA
TIRANA


KATUNDI I RI
BREGU I LUMIT

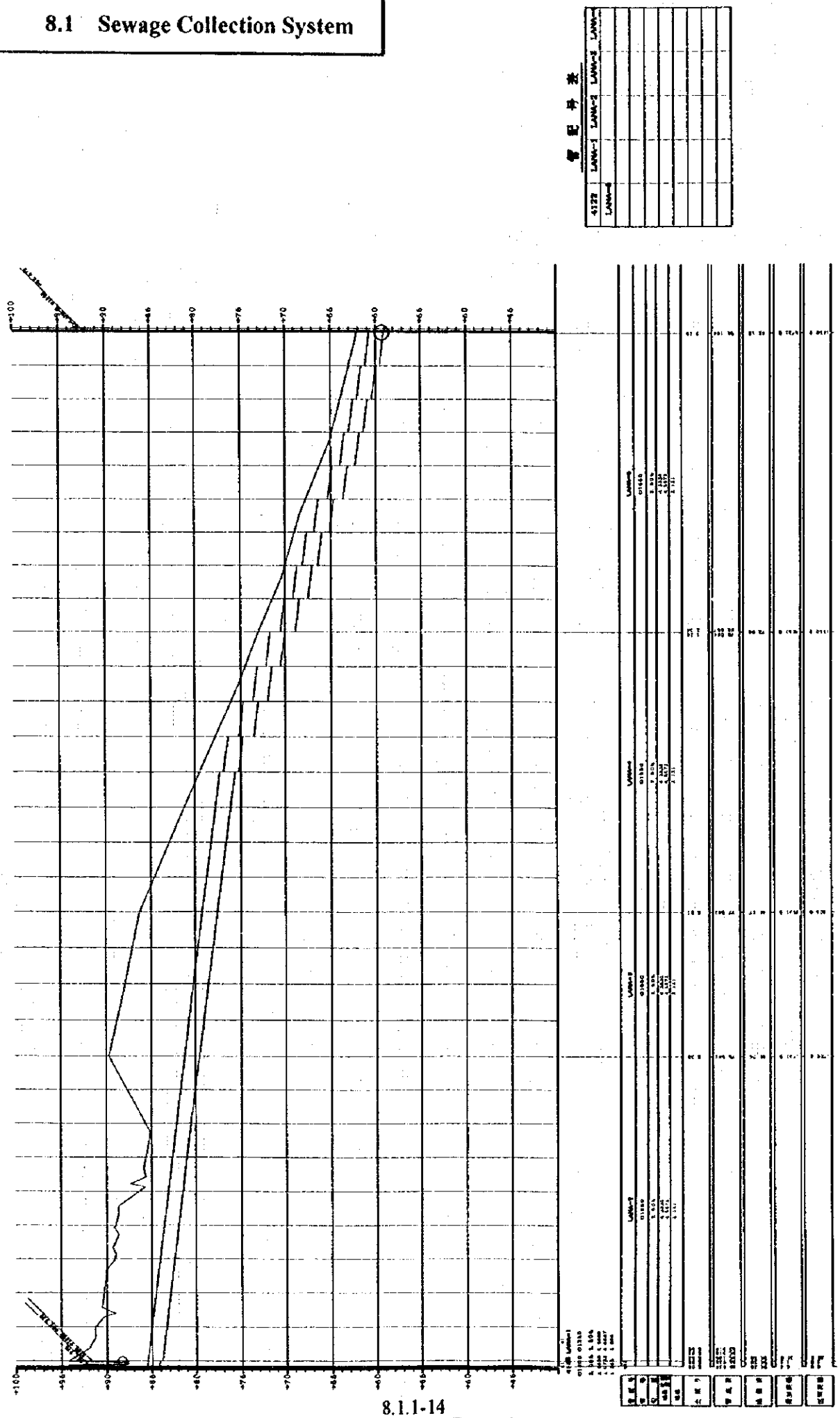
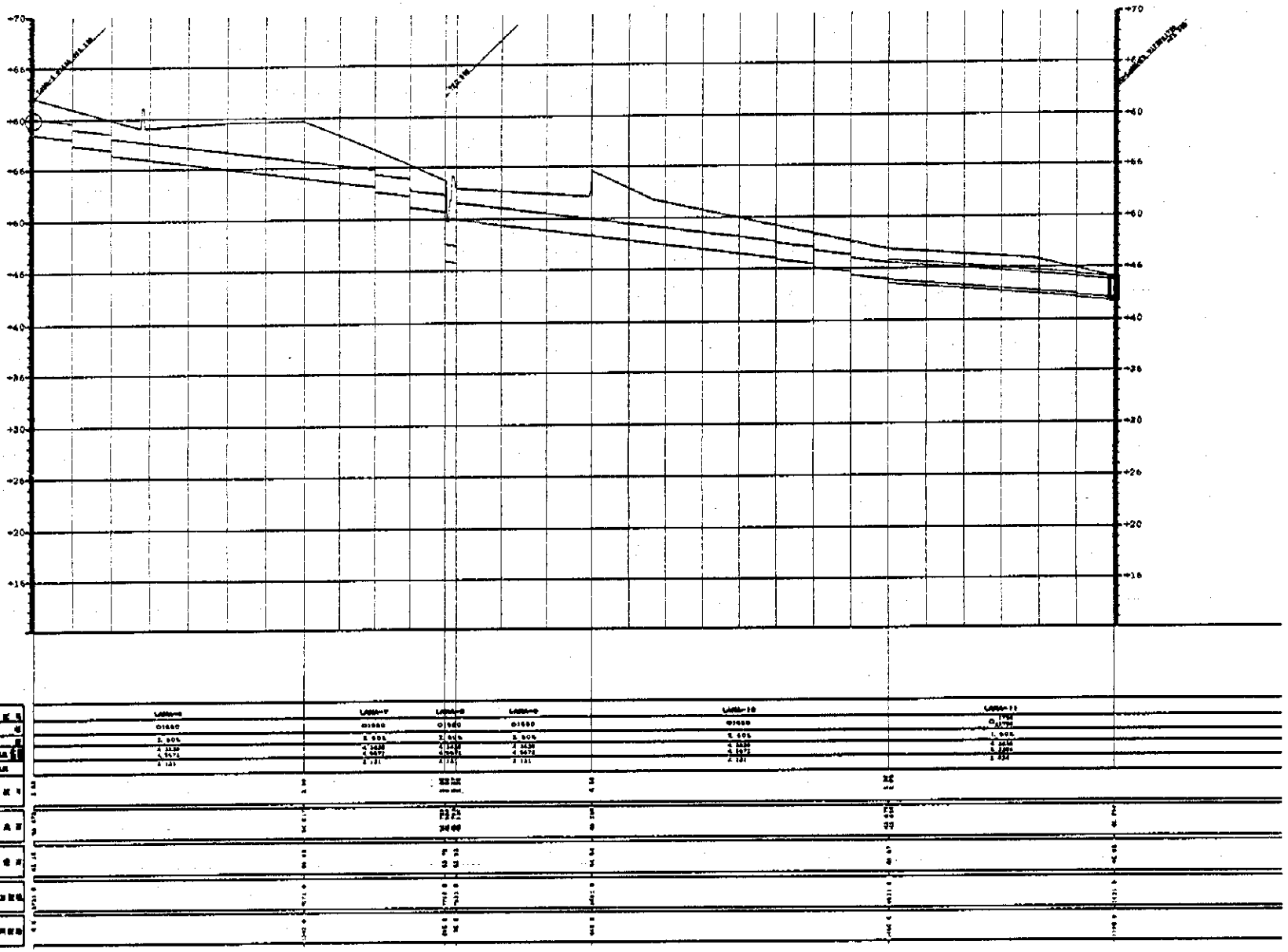


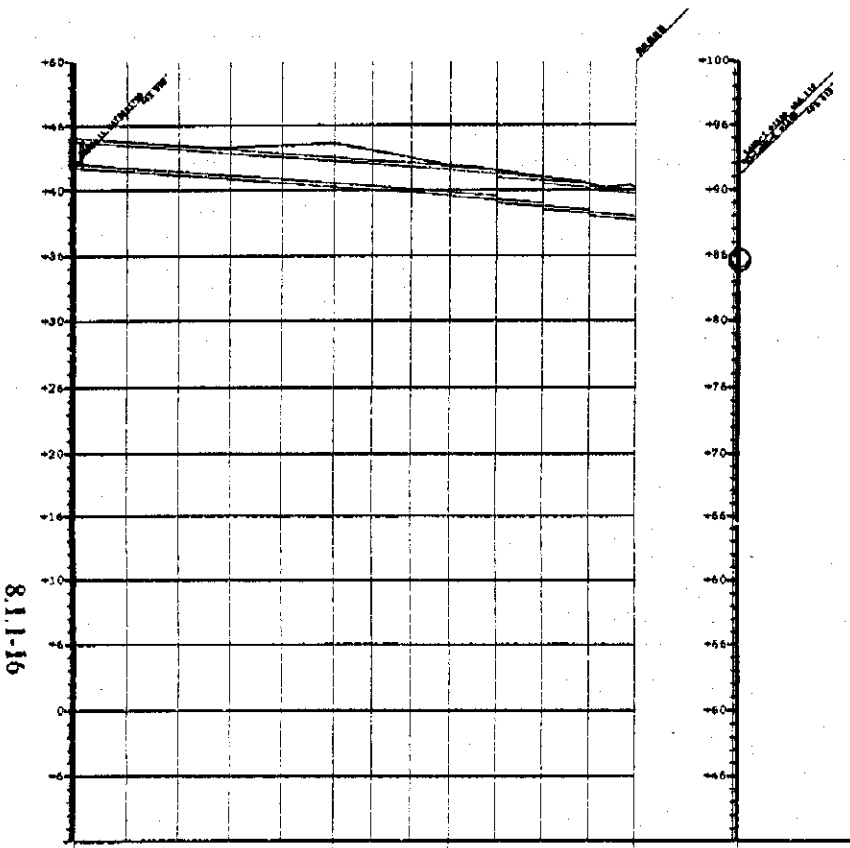
Figure 8.1.1 Trunk Main Profile

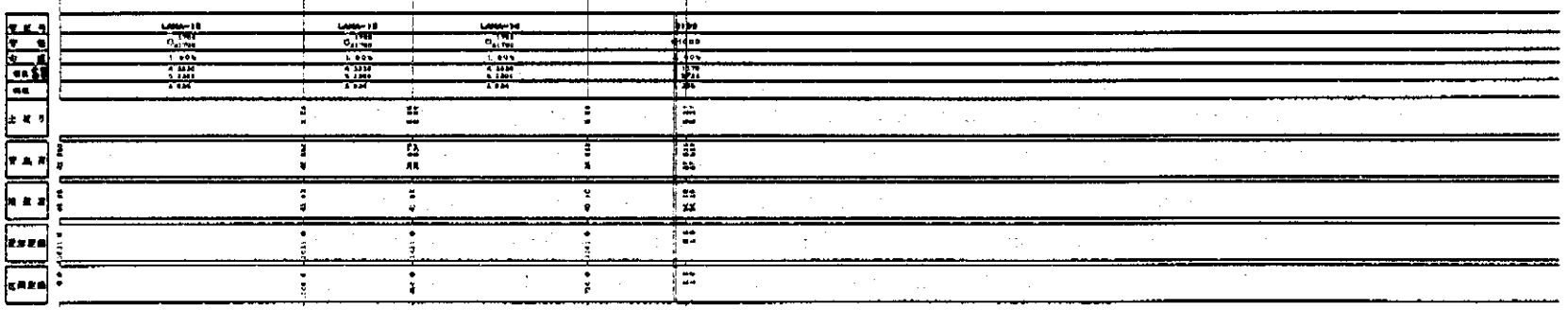


8.1.1-15

管 記 号 表

LANA-6	LANA-7	LANA-8	LANA-9	LANA-10
LANA-11				

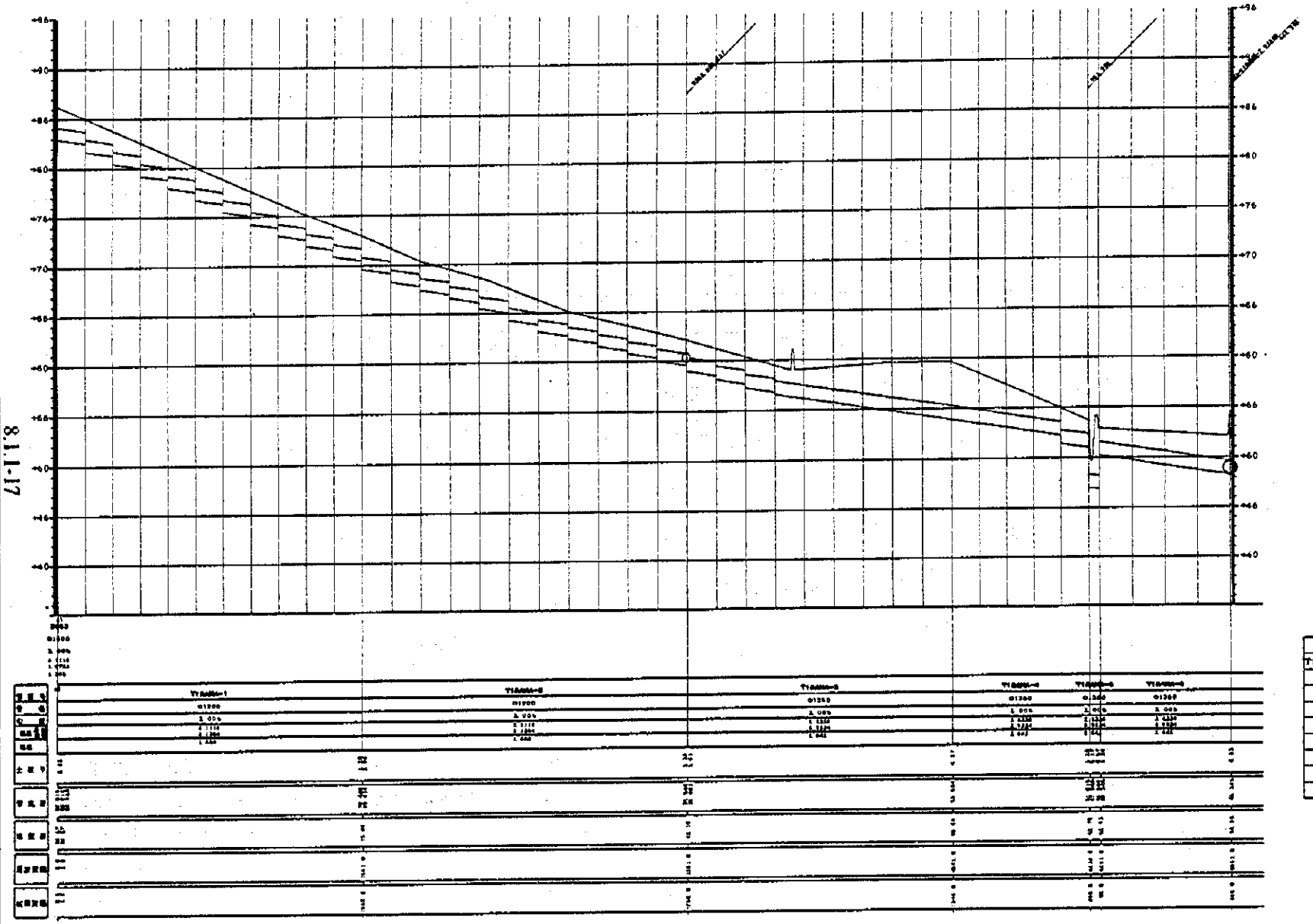




管 記 号 表

LAMA-12	LAMA-13	LAMA-14	3109

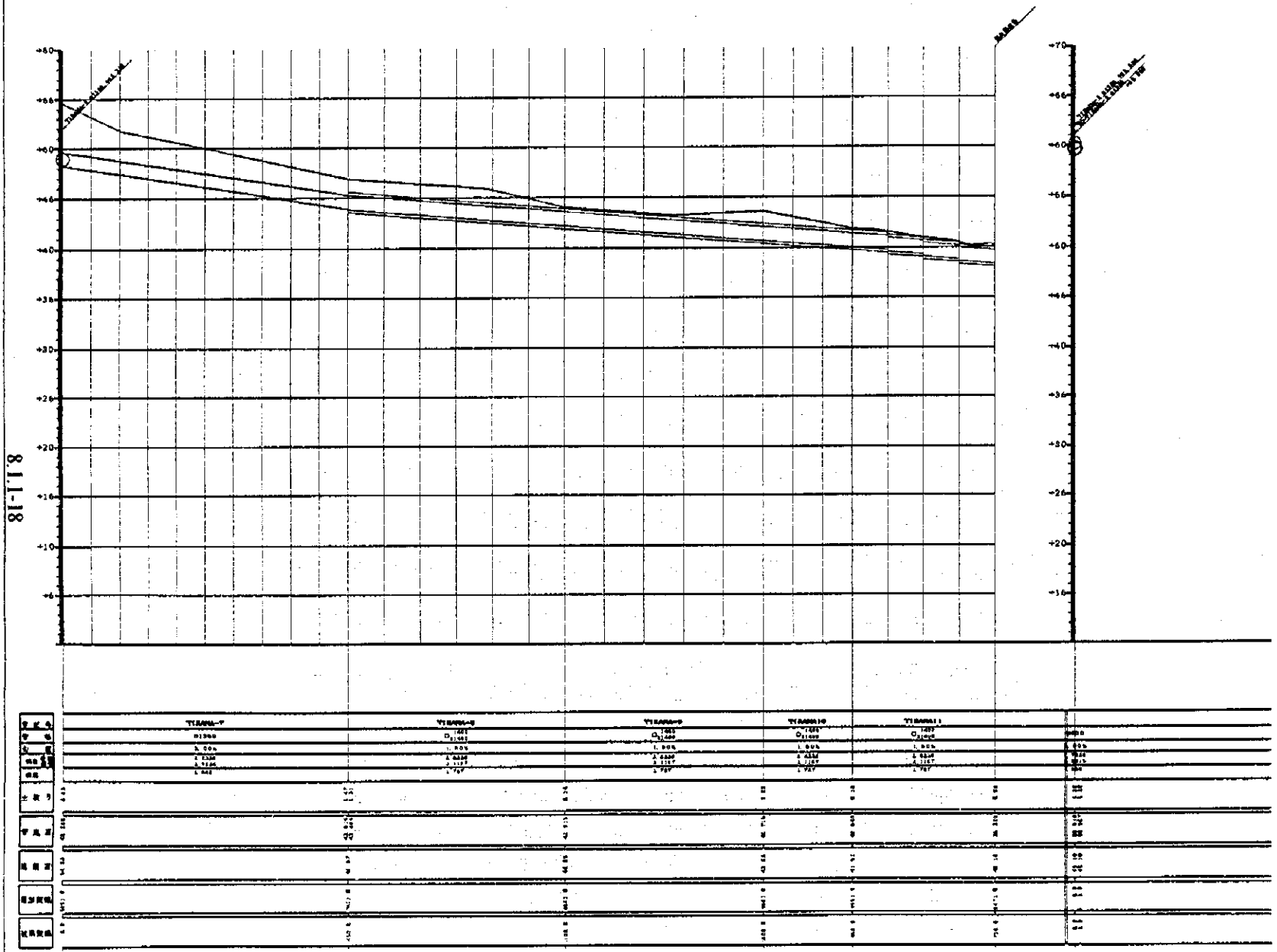
8.11-19



8.1.17

管 記 号 表

2053	T1RAHA-1	T1RAHA-2	T1RAHA-3	T1RAHA-4
T1RAHA-5	T1RAHA-6			



8.11-18

管 配 号 表

LUMI I TIRANES

PROFILI 12

LUMI I TIRANES

PROFILI 11

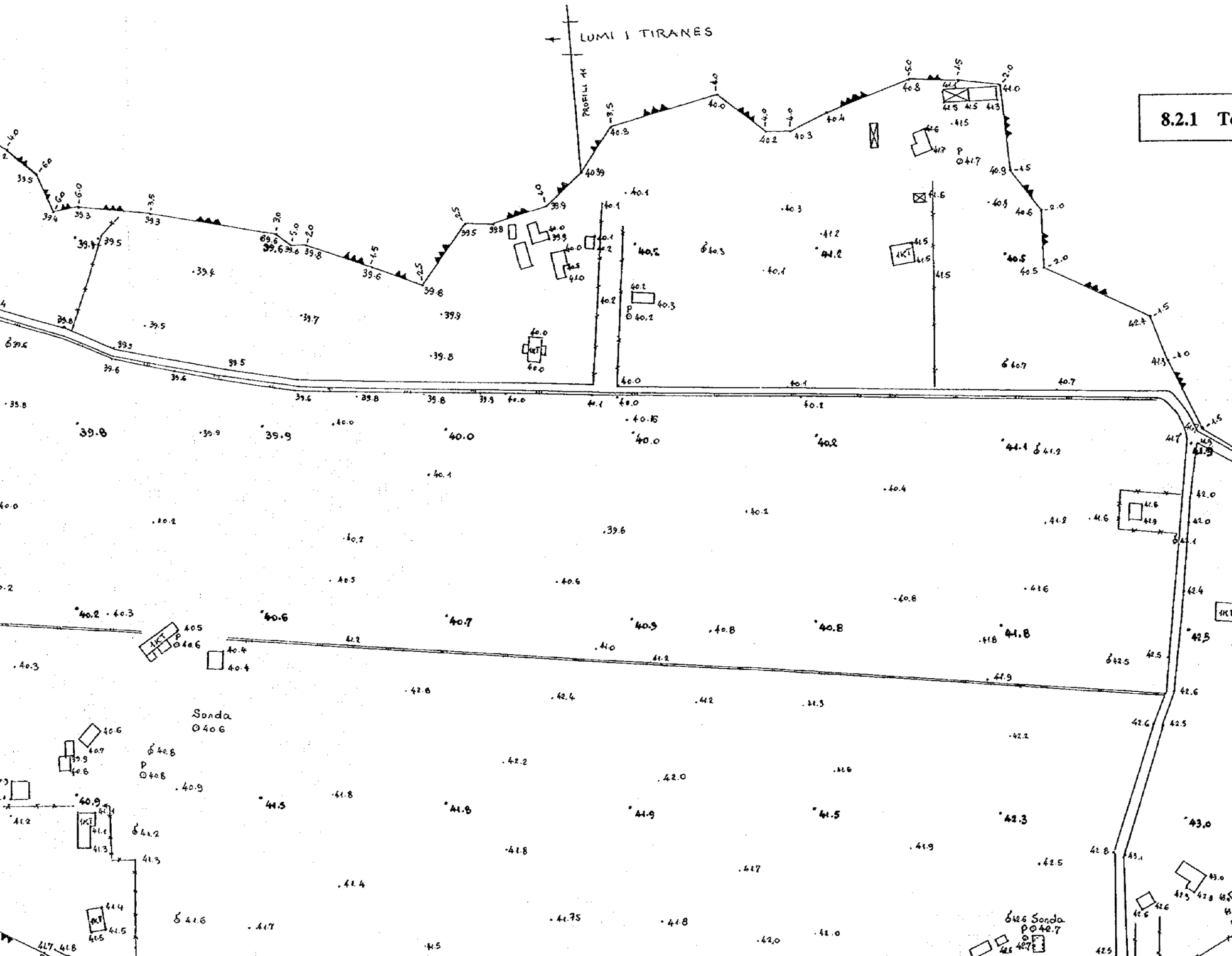
VARREZA

LANA

Sonda
Φ40.6

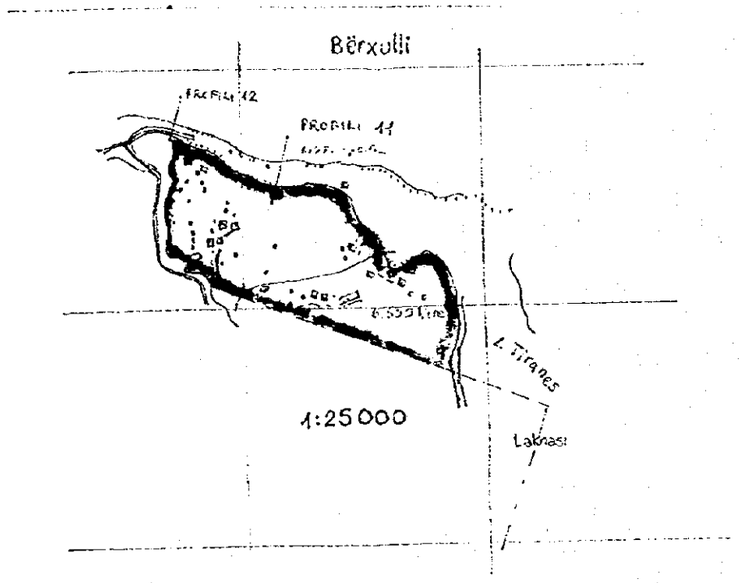
8.2.1 Topographic Survey of Wastewater Treatment Pla

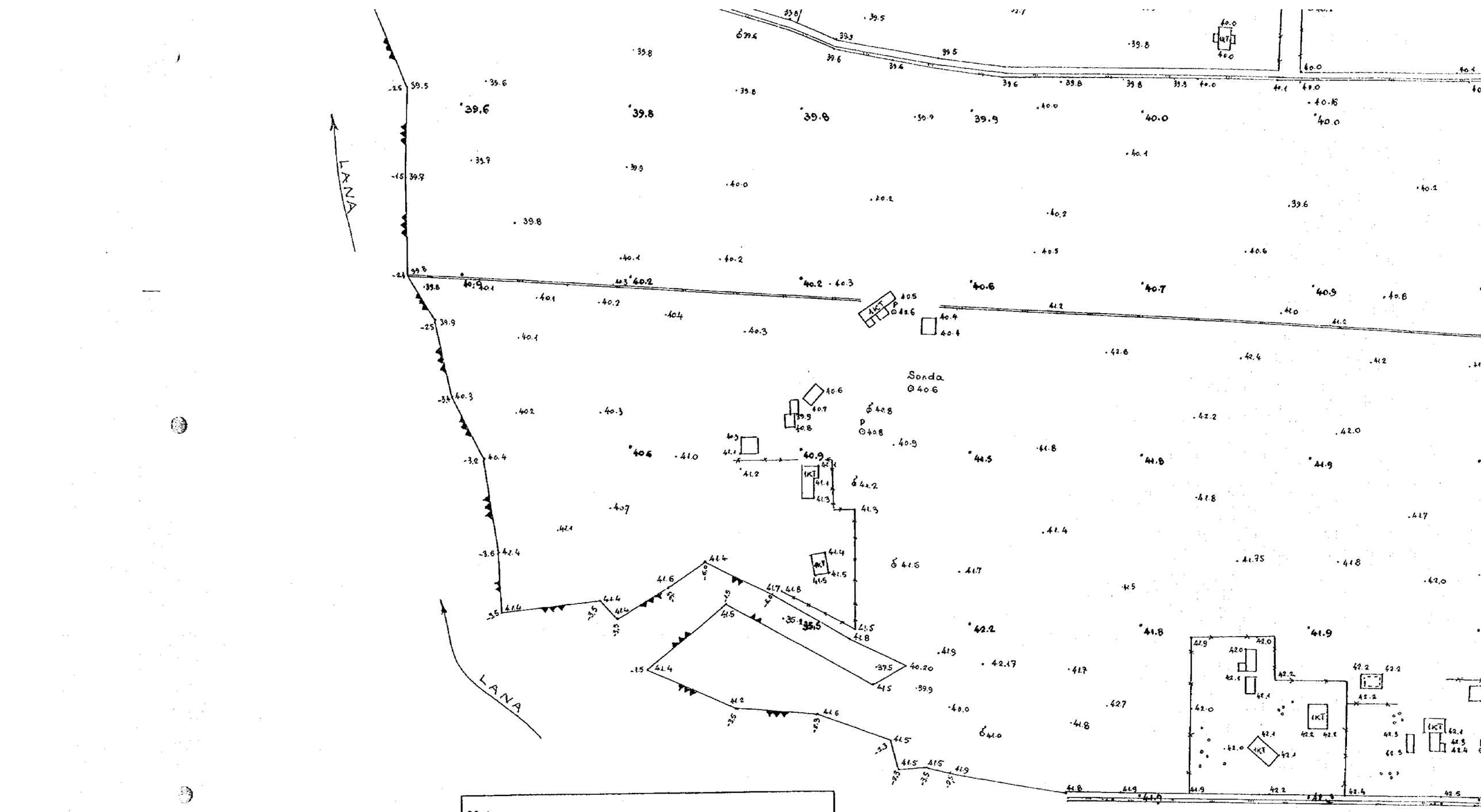
SH= 1:2000



8.2.1 Topographic Survey of Wastewater Treatment Plant Site

SH= 1:2000





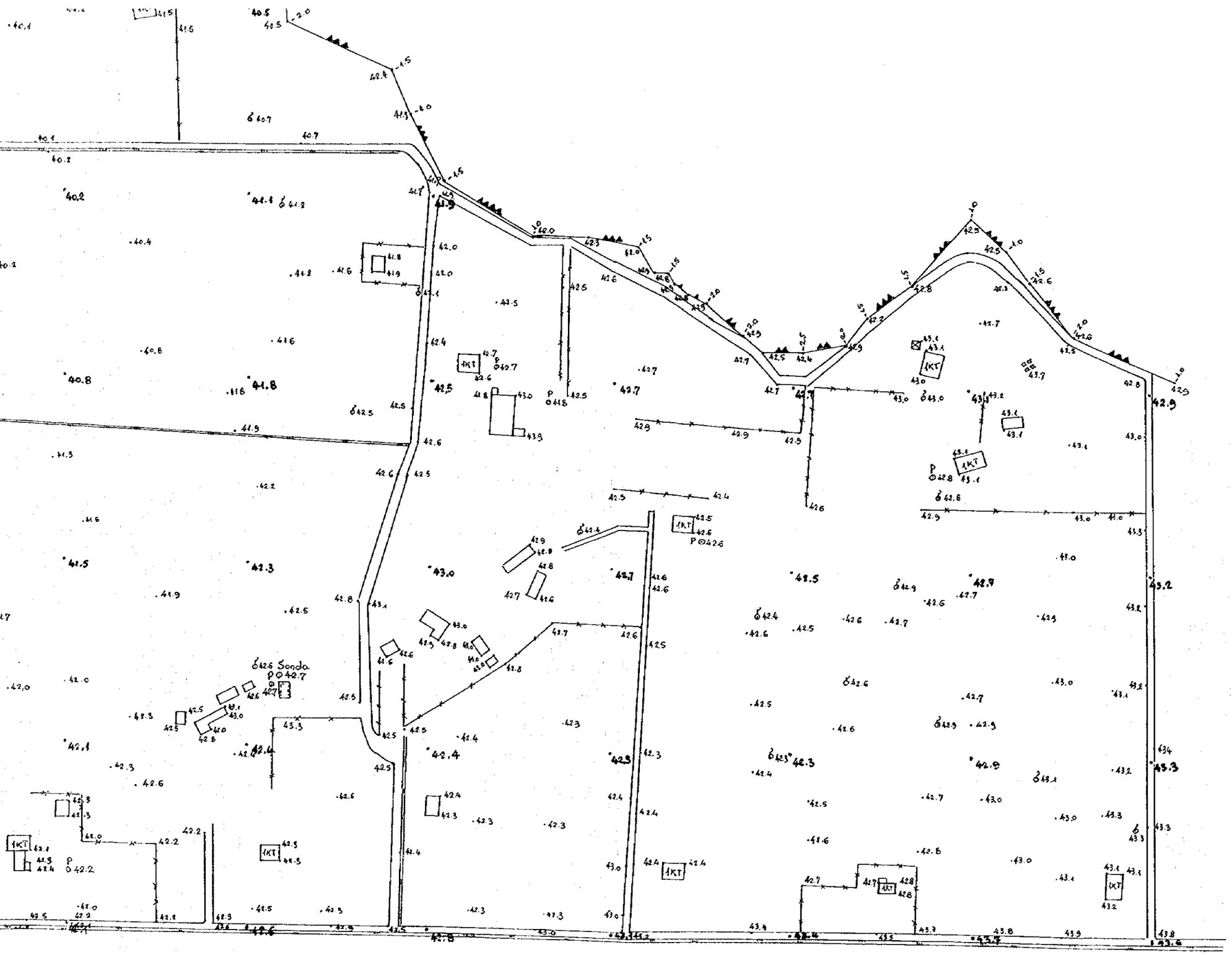
Note:

All ground levels shall be read -1.90m, since temporary bench mark was used during this survey.

Sonda
⊙40.6

Sonda
⊙42.7

nce temporary



RILEVOI:

Dr.Ing. YLLI KOLONJA

JANAR 1997