Table 4.1.11 Evaluation of Existing Sewer Capacity (For Separate System Sanitary Sewer)

Sanitary Sewage Flow

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

No.	Down Stream	Length (m)		Area (ha)		Sewage Quantity		Existing Pipe Specification				Capacity	
		Increment	Total	Increment	Total	Population	Q_1(m^3/s)	D (mm)	I (‰)	V (m/s)	Q_2(m^3/s)	Q_1/Q_2	Judge
1001	1004	826	826	9.80	9.80	2,597	0.013	600	12.4	2.42	0.684	2%	OK
1002	1003	94	94	4.10	4.10	1,086	0.006	300	17.0	1.78	0.126	4%	OK
1003	1004	295	389	6.60	10.70	2,835	0.014	400	19.1	2.29	0.288	5%	OK
1004	1009	355	1181	5.47	25.97	6,881	0.035	600	22.0	3.22	0.910	4%	OK
1005	1006	450	450	7.60	7.60	2,014	0.010	600	18.6	2.96	0.837	1%	OK
1006	1008	249	699	8.30	15.90	4,213	0.021	600	2.0	0.97	0.274	8%	OK
1007	1008	205	205	2.88	2.88	763	0.004	400	20.9	2.40	0.302	1%	OK
1008	1009	252	951	3.03	21.81	5,779	0.029	600	16.6	2.80	0.792	4%	OK
1009	1011	360	1541	6.37	54.15	14,348	0.073	600	27.2	3.58	1.012	7%	OK
1010	1011	564	564	4.03	4.03	1,068	0.005	600	21.9	3.21	0.908	1%	OK
1011	1012	824	2365	0.97	59.15	15,673	0.080	600	18.0	2.91	0.823	10%	OK
1012	1021	491	2856	0.00	59.15	15,673	0.080	600	6.3	1.72	0.486	16%	OK
1013	1014	247	247	1.33	1.33	352	0.002	600	17.2	2.85	0.806	0%	OK
1014	1015	163	410	4.25	5.58	1,479	0.008	400	2.0	0.74	0.093	8%	OK
1015	1016	268	678	7.90	13.48	3,572	0.018	500	2.0	0.86	0.169	11%	OK
1016	1017B	708	1386	7.90	21.38	5,665	0.029	400	12.8	1.87	0.235	12%	OK
1017A	1017B	186	186	1.20	1.20	318	0.002	500	41.3	3.91	0.768	0%	OK
1017B	1020	122	1508	1.30	23.88	6,327	0.032	500	2.6	0.98	0.192	17%	OK
1018	1019	426	426	4.59	4.59	1,216	0.006	600	2.0	0.97	0.274	2%	OK
1019	1020	100	526	2.85	7.44	1,971	0.010	800	1.9	1.15	0.578	2%	OK
1020	1021	895	2403	0.00	31.32	8,299	0.042	800	5.6	1.97	0.990	4%	OK
1021	1060	855	3711	0.00	90.47	23,972	0.122	600	5.2	1.57	0.444	28%	OK
1022	1023	100	100	0.77	0.77	204	0.001	400	5.9	1.27	0.160	1%	OK
1023	1024	86	186	0.69	1.46	387	0.002	400	14.0	1.96	0.246	1%	OK
1024	1025	91	277	0.81	2.27	601	0.003	400	9.8	1.64	0.206	1%	OK
1025	1027	127	404	0.83	3.10	821	0.004	500	20.4	2.75	0.540	1%	OK
1026	1027	50	50	0.28	0.28	74	0.000	400	1.9	0.72	0.090	0%	OK
1027	1028	127	531	0.83	4.21	1,116	0.006	500	11.8	2.09	0.410	1%	OK
1028	1035	180	711	1.03	5.24	1,388	0.007	600	6.1	1.70	0.481	1%	OK
1029	1031	326	326	2.47	2.47	654	0.003	400	8.2	1.50	0.188	2%	OK
1030	1031	209	209	1.80	1.80	477	0.002	600	15.3	2.69	0.761	0%	OK
1031	1034	227	553	2.35	6.62	1,754	0.009	500	7.6	1.68	0.330	3%	OK
1032	1034	132	132	1.36	1.36	360	0.002	400	2.0	0.74	0.093	2%	OK
1033	1034	103	103	1.59	1.59	421	0.002	400	2.0	0.74	0.093	2%	OK
1034	1035	151	704	1.14	10.71	2,838	0.014	500	12.5	2.15	0.422	3%	OK
1035	1037	220	931	2.36	18.31	4,852	0.025	500	13.6	2.24	0.440	6%	OK
1036	1037	339	339	2.14	2.14	567	0.003	400	9.4	1.61	0.202	1%	OK
1037	1041	347	1278	4.19	24.64	6,529	0.033	500	2.0	0.86	0.169	20%	OK
1038	1039	110	110	1.70	1.70	450	0.002	400	7.2	1.41	0.177	1%	OK
1039	1040	140	250	1.15	2.85	755	0.004	500	6.4	1.54	0.302	1%	OK
1040	1041	124	374	1.15	4.00	1,060	0.005	600	11.3	2.31	0.653	1%	OK
1041	1044	136	1414	0.85	29.49	7,814	0.040	500	22.0	2.85	0.560	7%	OK
1042	1044	73	73	2.17	2.17	575	0.003	500	42.4	3.96	0.778	0%	OK
1043	1044	78	78	0.49	0.49	130	0.001	500	2.5	0.96	0.188	0%	OK
1044	1049	286	1700	2.08	34.23	9,070	0.046	500	18.5	2.62	0.514	9%	OK
1045	1046	283	283	3.12	3.12	827	0.004	400	12.7	1.87	0.235	2%	OK
1046	1048	125	408	1.70	4.82	1,277	0.007	500	10.9	2.01	0.395	2%	OK
1047	1048	123	123	2.35	2.35	623	0.003	500	16.2	2.45	0.481	1%	OK
1048	1049	156	564	1.80	8.97	2,377	0.012	500	4.4	1.28	0.251	5%	OK
1049	1053	274	1974	0.90	44.10	11,685	0.060	800	2.0	1.18	0.593	10%	OK
1050	1051	56	56	0.80	0.80	212	0.001	500	2.0	0.86	0.169	1%	OK
1051	1052	149	205	2.65	3.45	914	0.005	600	2.0	0.97	0.274	2%	OK
1052	1053	157	362	0.85	4.30	1,139	0.006	800	1.8	1.12	0.563	1%	OK
1053	1057	121	2095	1.08	49.48	13,111	0.067	800	2.0	1.18	0.593	11%	OK
1054	1056	325	325	2.64	2.64	700	0.004	600	16.6	2.80	0.792	0%	OK
1055	1056	373	373	3.30	3.30	874	0.004	600	12.0	2.38	0.673	1%	OK
1056	1057	296	669	1.30	7.24	1,918	0.010	800	2.0	1.18	0.593	2%	OK

No.	Down Stream	Length (m)		Area (ha)		Sewage Quantity		Existing Pipe Specification				Capacity	
		Increment	Total	Increment	Total	Population	Q_1(m^3/s)	D (mm)	I (‰)	V (m/s)	Q_2(m^3/s)	Q_1/Q_2	Judge
1057	1060	444	2539	6.15	62.87	16,659	0.085	1000	2.0	1.37	1.076	8%	OK
1058	1059	300	300	3.29	3.29	872	0.004	400	17.6	2.20	0.276	2%	OK
1059	1060	945	1245	7.30	10.59	2,806	0.014	600	2.0	0.97	0.274	5%	OK
1060	1061	722	4433	0.00	163.93	43,436	0.221	600	8.6	2.01	0.568	39%	OK
1061	1062	482	4915	0.00	163.93	43,436	0.221	600	7.8	1.92	0.543	41%	OK
1062	1063	280	5195	36.20	200.13	53,028	0.270	800	17.4	3.47	1.744	15%	OK
1063	1065	267	5462	3.45	203.58	53,942	0.275	800	3.3	1.51	0.759	36%	OK
1064	1065	149	149	3.83	3.83	1,015	0.005	1000	3.3	1.75	1.374	0%	OK
1065	To STP	1130	6592	6.20	213.61	56,600	0.288	1000x600	3.8	1.93	1.042	28%	OK
2001	2002	480	480	14.95	14.95	4,481	0.023	400	5.8	1.26	0.158	14%	OK
2002	2003	193	673	4.38	19.33	5,794	0.030	500	26.2	3.11	0.611	5%	OK
2003	2005	242	915	3.74	23.07	6,915	0.035	600	18.5	2.95	0.834	4%	OK
2004	2005	348	348	6.90	6.90	2,068	0.011	600	9.1	2.07	0.585	2%	OK
2005	2007	169	1084	1.15	31.12	9,328	0.048	600	8.2	1.97	0.557	9%	OK
2006	2007	300	300	1.60	1.60	480	0.002	400	5.0	1.17	0.147	2%	OK
2007	2009	48	1132	0.23	32.95	9,876	0.050	600	12.5	2.43	0.687	7%	OK
2008	2009	273	273	2.10	2.10	629	0.003	300	5.1	0.98	0.069	5%	OK
2009	2011	262	1394	2.10	37.15	11,135	0.057	1500x700	9.5	3.67	3.468	2%	OK
2010A	2010B	50	50	0.54	0.54	162	0.001	300	11.9	1.49	0.105	1%	OK
2010B	2011	175	225	1.67	2.21	662	0.003	400	2.0	0.74	0.093	4%	OK
2011	2013	210	1604	0.40	39.76	11,918	0.061	1500x700	4.0	2.38	2.249	3%	OK
2012	2013	218	218	5.20	5.20	1,559	0.008	400	14.2	1.97	0.248	3%	OK
2013	2015	138	1742	0.80	45.76	13,716	0.070	1500x700	2.0	1.68	1.588	4%	OK
2014	2015	102	102	1.35	1.35	405	0.002	400	4.9	1.16	0.146	1%	OK
2015	2017	850	2592	6.00	53.11	15,919	0.081	1500x700	6.3	2.99	2.826	3%	OK
2016	2017	150	150	1.03	1.03	309	0.002	400	4.0	1.05	0.132	1%	OK
2017	2019	280	2872	1.35	55.49	16,632	0.085	1500x700	8.3	3.43	3.241	3%	OK
2018	2019	206	206	1.60	1.60	480	0.002	600	10.6	2.24	0.633	0%	OK
2019	2021	132	3004	0.35	57.44	17,217	0.088	1000	20.2	4.34	3.409	3%	OK
2020	2021	118	118	2.82	2.82	845	0.004	400	24.5	2.59	0.325	1%	OK
2021	2025	250	3254	1.14	61.40	18,404	0.094	1000	2.0	1.37	1.076	9%	OK
2022	2024	269	269	5.75	5.75	1,723	0.009	500	10.4	1.96	0.385	2%	OK
2023	2024	313	313	2.71	2.71	812	0.004	400	6.3	1.32	0.166	2%	OK
2024	2025	150	463	1.10	9.56	2,865	0.015	500	1.5	0.74	0.145	10%	OK
2025	2030	290	3544	5.30	76.26	22,858	0.116	1000	4.4	2.02	1.587	7%	OK
2026	2027	253	253	3.12	3.12	935	0.005	300	11.8	1.49	0.105	5%	OK
2027	2029	193	446	1.85	4.97	1,490	0.008	400	15.5	2.06	0.259	3%	OK
2028	2029	341	341	2.99	2.99	896	0.005	400	13.3	1.91	0.240	2%	OK
2029	2030	175	621	0.54	8.50	2,548	0.013	500	4.2	1.25	0.245	5%	OK
2030	2033	144	3688	1.20	85.96	25,765	0.131	1500x700	15.9	4.75	4.489	3%	OK
2031	2032	212	212	1.66	1.66	498	0.003	400	10.8	1.72	0.216	1%	OK
2032	2033	316	528	2.82	4.48	1,343	0.007	700x500	5.0	1.84	0.580	1%	OK
2033	2034	95	3783	0.84	91.28	27,360	0.139	1000	46.3	6.57	5.160	3%	OK
2034	2044	130	3913	0.77	92.05	27,591	0.141	800	2.0	1.18	0.593	24%	OK
2035	2037	130	130	0.90	0.90	270	0.001	600	6.1	1.70	0.481	0%	OK
2036	2037	111	111	1.40	1.40	420	0.002	400	7.2	1.41	0.177	1%	OK
2037	2040	438	568	3.80	6.10	1,828	0.009	600	23.0	3.29	0.930	1%	OK
2038	2040	187	187	3.08	3.08	923	0.005	400	2.0	0.74	0.093	5%	OK
2039	2040	145	145	0.80	0.80	240	0.001	500	27.5	3.19	0.626	0%	OK
2040	2042	538	1106	9.90	19.88	5,959	0.030	800	8.1	2.37	1.191	3%	OK
2041	2042	451	451	2.14	2.14	641	0.003	400	15.7	2.08	0.261	1%	OK
2042	2044	47	1153	0.08	22.10	6,624	0.034	1000	2.0	1.37	1.076	3%	OK
2043	2044	102	102	16.60	16.60	4,976	0.025	800	16.6	3.39	1.704	1%	OK
2044	2052	302	4215	0.00	130.75	39,191	0.200	1000	4.0	1.93	1.516	13%	OK
2045	2046	269	269	2.27	2.27	680	0.003	400	24.9	2.62	0.329	1%	OK
2046	2049	272	541	4.30	6.57	1,969	0.010	600	9.9	2.16	0.611	2%	OK
2047	2048	196	196	5.50	5.50	1,649	0.008	300	2.0	0.61	0.043	19%	OK
2048	2049	208	404	3.40	8.90	2,668	0.014	400	2.0	0.74	0.093	15%	OK
2049	2051	618	1159	8.20	23.67	7,095	0.036	600	6.7	1.78	0.503	7%	OK
2050	2051	130	130	1.10	1.10	330	0.002	400	4.6	1.12	0.141	1%	OK
2051	2052	365	1524	0.30	25.07	7,514	0.038	800	4.6	1.78	0.895	4%	OK
2052	2053	469	4684	0.00	155.82	46,705	0.238	600	6.1	1.70	0.481	49%	OK

No.	Down Stream	Length (m)		Area (ha)		Sewage Quantity		Existing Pipe Specification				Capacity	
		Increment	Total	Increment	Total	Population	$Q_1(m^3/s)$	D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Q_1/Q_2	Judge
2053	2062	930	5614	6.33	162.15	48,603	0.248	1000	4.8	2.11	1.657	15%	OK
2054	2055	48	48	0.80	0.80	240	0.001	400	2.0	0.74	0.093	1%	OK
2055	2056	151	199	2.47	3.27	980	0.005	500	5.3	1.40	0.275	2%	OK
2056	2057	67	266	0.24	3.51	1,052	0.005	600	28.3	3.65	1.032	1%	OK
2057	2058	115	381	14.50	18.01	5,398	0.027	500	5.2	1.39	0.273	10%	OK
2058	2059	152	533	0.00	18.01	5,398	0.027	500	31.5	3.41	0.670	4%	OK
2059	2061	676	1209	0.00	18.01	5,398	0.027	600	6.5	1.75	0.495	6%	OK
2060	2061	117	117	3.00	3.00	899	0.005	500	2.0	0.86	0.169	3%	OK
2061	2062	868	2077	0.00	21.01	6,297	0.032	1000	2.0	1.37	1.076	3%	OK
2062	To STP	400	6014	0.00	183.16	54,900	0.280	1000	2.0	1.37	1.076	26%	OK
3001	3008	725	725	24.00	24.00	8,391	0.043	400	18.2	2.24	0.281	15%	OK
3002	3004	275	275	5.80	5.80	2,028	0.010	400	17.8	2.21	0.278	4%	OK
3003	3004	108	108	0.35	0.35	122	0.001	400	12.9	1.88	0.236	0%	OK
3004	3007	42	317	0.10	6.25	2,185	0.011	400	57.1	3.96	0.498	2%	OK
3005	3006	203	203	1.43	1.43	500	0.003	300	9.8	1.35	0.095	3%	OK
3006	3007	130	333	0.45	1.88	657	0.003	400	49.2	3.68	0.462	1%	OK
3007	3008	25	358	0.03	8.16	2,853	0.015	400	2.0	0.74	0.093	16%	OK
3008	3009	82	807	1.57	33.73	11,793	0.060	500	6.7	1.57	0.308	19%	OK
3009	3011	215	1022	8.12	41.85	14,632	0.075	600	13.9	2.56	0.724	10%	OK
3010	3011	152	152	1.14	1.14	399	0.002	400	12.4	1.85	0.232	1%	OK
3011	3013	66	1088	0.20	43.19	15,100	0.077	600	21.2	3.16	0.893	9%	OK
3012	3013	149	149	0.90	0.90	315	0.002	400	7.3	1.42	0.178	1%	OK
3013	3017	58	1146	1.48	45.57	15,933	0.081	500	10.3	1.95	0.383	21%	OK
3014	3015	221	221	2.25	2.25	787	0.004	300	20.3	1.95	0.138	3%	OK
3015	3016	278	499	4.27	6.52	2,280	0.012	400	3.4	0.97	0.122	10%	OK
3016	3017	180	679	2.94	9.46	3,307	0.017	400	2.7	0.86	0.108	16%	OK
3017	3021	352	1498	7.25	62.28	21,775	0.111	800	13.9	3.10	1.558	7%	OK
3018	3019	227	227	2.42	2.42	846	0.004	500	2.0	0.86	0.169	3%	OK
3019	3020	558	785	15.68	18.10	6,328	0.032	600	11.9	2.37	0.670	5%	OK
3020	3021	308	1093	2.50	20.60	7,202	0.037	600	2.9	1.17	0.331	11%	OK
3021	3025	132	1630	0.60	83.48	29,187	0.149	600	3.0	1.19	0.336	44%	OK
3022	3023	120	120	1.05	1.05	367	0.002	400	12.5	1.85	0.232	1%	OK
3023	3024	268	388	1.93	2.98	1,042	0.005	500	19.0	2.65	0.520	1%	OK
3024	3025	93	481	0.13	3.11	1,087	0.006	600	20.4	3.10	0.877	1%	OK
3025	3026	63	1693	0.30	86.89	30,379	0.155	600	7.9	1.93	0.546	28%	OK
3026	3027	190	1883	2.50	89.39	31,253	0.159	800	24.7	4.13	2.076	8%	OK
3027	3029	71	1954	0.20	89.59	31,323	0.160	600	18.3	2.94	0.831	19%	OK
	3028			4.05	4.05	1,416	0.007						
3028	3029	543	543	7.00	11.05	3,863	0.020	800	14.7	3.19	1.603	1%	OK
3029	3032	256	2210	3.20	103.84	36,305	0.185	800	15.2	3.24	1.629	11%	OK
3030	3031	402	402	5.91	5.91	2,066	0.011	400	11.4	1.77	0.222	5%	OK
3031	3032	305	707	5.28	11.19	3,912	0.020	600	19.0	2.99	0.845	2%	OK
3032	3039	370	2580	3.85	118.88	41,564	0.212	800	7.2	2.23	1.121	19%	OK
3033	3035	142	142	0.92	0.92	322	0.002	500	2.0	0.86	0.169	1%	OK
3034	3035	83	83	0.81	0.81	283	0.001	400	2.0	0.74	0.093	2%	OK
3035	3036	85	227	0.94	2.67	934	0.005	400	10.7	1.71	0.215	2%	OK
3036	3038	169	396	1.35	4.02	1,406	0.007	500	8.2	1.74	0.342	2%	OK
3037	3038	278	278	1.60	1.60	559	0.003	500	10.4	1.96	0.385	1%	OK
3038	3039	166	562	1.15	6.77	2,367	0.012	600	28.9	3.69	1.043	1%	OK
3039	3041	113	2693	0.65	126.30	44,158	0.225	800	10.9	2.75	1.382	16%	OK
3040	3041	155	155	1.46	1.46	510	0.003	400	27.7	2.76	0.347	1%	OK
3041	3062	365	3058	2.30	130.06	45,473	0.232	800	2.8	1.39	0.699	33%	OK
3042	3044	410	410	5.20	5.20	1,818	0.009	600	13.4	2.51	0.710	1%	OK
3043	3044	98	98	0.77	0.77	269	0.001	400	2.0	0.74	0.093	1%	OK
3044	3045	221	631	2.45	8.42	2,944	0.015	500	9.9	1.91	0.375	4%	OK
3045	3052	454	1085	11.51	19.93	6,968	0.035	600	12.3	2.41	0.681	5%	OK
3046	3048	263	263	4.73	4.73	1,654	0.008	400	2.0	0.74	0.093	9%	OK
3047	3048	167	167	2.87	2.87	1,003	0.005	400	4.7	1.14	0.143	4%	OK
3048	3050	58	321	0.70	8.30	2,902	0.015	400	2.0	0.74	0.093	16%	OK
3049	3050	272	272	1.83	1.83	640	0.003	400	9.5	1.62	0.204	2%	OK
3050	3051	173	494	1.42	11.55	4,038	0.021	400	2.0	0.74	0.093	22%	OK
3051	3052	77	571	0.29	11.84	4,140	0.021	600	2.0	0.97	0.274	8%	OK

No.	Down Stream	Length (m)		Area (ha)		Sewage Quantity		Existing Pipe Specification				Capacity	
		Increment	Total	Increment	Total	Population	$Q_1(m^3/s)$	D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Q_1/Q_2	Judge
3052	3055	174	1259	1.46	33.23	11,618	0.059	600	2.0	0.97	0.274	22%	OK
3053	3054	118	118	0.43	0.43	150	0.001	400	2.0	0.74	0.093	1%	OK
3054	3055	98	216	0.35	0.78	273	0.001	500	6.7	1.57	0.308	0%	OK
3055	3060	12	1271	0.01	34.02	11,894	0.061	600	2.0	0.97	0.274	22%	OK
3056	3059	287	287	2.82	2.82	986	0.005	500	13.2	2.21	0.434	1%	OK
3057	3059	203	203	1.29	1.29	451	0.002	500	17.2	2.52	0.495	0%	OK
3058	3059	111	111	0.46	0.46	161	0.001	400	2.0	0.74	0.093	1%	OK
3059	3060	235	522	1.18	5.75	2,010	0.010	600	8.8	2.04	0.577	2%	OK
3060	3061	114	1385	0.45	40.22	14,062	0.072	600	2.0	0.97	0.274	26%	OK
3061	3062	348	1733	8.47	48.69	17,023	0.087	600	6.7	1.78	0.503	17%	OK
3062	3075	514	3572	9.30	188.05	65,748	0.335	800	3.6	1.58	0.794	42%	OK
3063	3065	256	256	1.33	1.33	465	0.002	600	7.8	1.92	0.543	0%	OK
3064	3065	216	216	1.32	1.32	462	0.002	600	8.3	1.98	0.560	0%	OK
3065	3067	86	342	0.75	3.40	1,189	0.006	600	2.0	0.97	0.274	2%	OK
3066	3067	232	232	2.02	2.02	706	0.004	600	9.0	2.06	0.582	1%	OK
3067	3075	372	714	2.20	7.62	2,664	0.014	600	11.2	2.30	0.650	2%	OK
3068	3070	416	416	4.63	4.63	1,619	0.008	500	2.0	0.86	0.169	5%	OK
3069	3070	285	285	3.24	3.24	1,133	0.006	400	2.8	0.88	0.111	5%	OK
3070	3072	176	592	1.12	8.99	3,143	0.016	500	2.1	0.88	0.173	9%	OK
3071	3072	114	114	0.68	0.68	238	0.001	400	9.6	1.62	0.204	1%	OK
3072	3074	100	692	0.41	10.08	3,524	0.018	500	2.9	1.04	0.204	9%	OK
3073	3074	127	127	0.86	0.86	301	0.002	400	14.9	2.02	0.254	1%	OK
3074	3075	574	1266	3.36	14.30	5,000	0.025	500	7.1	1.62	0.318	8%	OK
3075	3077	415	3987	0.15	210.12	73,464	0.374	800	2.0	1.18	0.593	63%	OK
3076	3077	220	220	1.93	1.93	675	0.003	500	9.0	1.82	0.357	1%	OK
3077	3079	270	4257	2.80	214.85	75,118	0.383	800	2.0	1.18	0.593	64%	OK
3078	3079	533	533	5.32	5.32	1,860	0.009	300	2.0	0.61	0.043	22%	OK
3079	3085	233	4490	0.76	220.93	77,244	0.393	800	2.0	1.18	0.593	66%	OK
3080	3082	134	134	0.47	0.47	164	0.001	200	10.4	1.06	0.033	3%	OK
3081	3082	70	70	1.43	1.43	500	0.003	400	2.0	0.74	0.093	3%	OK
3082	3084	47	181	0.21	2.11	738	0.004	400	2.0	0.74	0.093	4%	OK
3083	3084	212	212	1.68	1.68	587	0.003	500	2.0	0.86	0.169	2%	OK
3084	3085	70	282	0.21	4.00	1,399	0.007	500	2.0	0.86	0.169	4%	OK
3085	3104	421	4911	3.12	228.05	79,733	0.406	1000	5.8	2.32	1.822	22%	OK
3086	3087	290	290	2.72	2.72	951	0.005	300	6.8	1.13	0.080	6%	OK
3087	3092	95	385	0.30	3.02	1,056	0.005	400	27.3	2.74	0.344	2%	OK
3088	3089	52	52	0.36	0.36	126	0.001	300	2.0	0.61	0.043	1%	OK
3089	3092	220	272	1.25	1.61	563	0.003	400	20.8	2.39	0.300	1%	OK
3091	3092	199	199	5.17	5.17	1,808	0.009	300	3.0	0.75	0.053	17%	OK
3092	3096	344	729	4.64	14.44	5,049	0.026	500	4.9	1.35	0.265	10%	OK
3093	3095	327	327	1.95	1.95	682	0.003	300	2.0	0.61	0.043	8%	OK
3094	3095	290	290	2.15	2.15	752	0.004	300	6.8	1.13	0.080	5%	OK
3095	3096	267	594	0.30	4.40	1,538	0.008	400	5.4	1.22	0.153	5%	OK
3096	3097	191	920	0.38	19.22	6,720	0.034	600	9.9	2.16	0.611	6%	OK
3097	3100	30	950	0.02	19.24	6,727	0.034	600	2.0	0.97	0.274	12%	OK
3098	3099	91	91	0.34	0.34	119	0.001	300	2.0	0.61	0.043	1%	OK
3099	3100	251	342	1.24	1.58	552	0.003	600	8.8	2.04	0.577	0%	OK
3100	3103	93	1043	0.78	21.60	7,552	0.038	800	2.0	1.18	0.593	6%	OK
3101	3102	230	230	1.92	1.92	671	0.003	300	2.0	0.61	0.043	8%	OK
3102	3103	239	469	2.20	4.12	1,440	0.007	600	8.9	2.05	0.580	1%	OK
3103	3104	101	1144	0.82	26.54	9,279	0.047	800	2.0	1.18	0.593	8%	OK
3104	3107	257	5168	2.41	257.00	89,855	0.458	1000	2.0	1.37	1.076	43%	OK
3105	3106	187	187	1.49	1.49	521	0.003	800	2.1	1.21	0.608	0%	OK
3106	3107	210	397	1.82	3.31	1,157	0.006	500	2.0	0.86	0.169	3%	OK
3107	3109	667	5835	11.60	271.91	95,068	0.484	1000	3.1	1.70	1.335	36%	OK
3108	3109	193	193	2.23	2.23	780	0.004	500	5.1	1.37	0.269	1%	OK
3109	3113	456	6291	4.93	279.07	97,571	0.497	1000	2.0	1.37	1.076	46%	OK
3110	3112	491	491	2.69	2.69	941	0.005	600	5.2	1.57	0.444	1%	OK
3111	3112	181	181	4.18	4.18	1,461	0.007	400	7.7	1.45	0.182	4%	OK
3112	3113	489	980	4.41	11.28	3,944	0.020	600	2.0	0.97	0.274	7%	OK
3113	3127	20	6311	0.50	290.85	101,690	0.518	1000	2.0	1.37	1.076	48%	OK
3114	3116	579	579	3.68	3.68	1,287	0.007	500	4.6	1.30	0.255	3%	OK

No.	Down Stream	Length (m)		Area (ha)		Sewage Quantity		Existing Pipe Specification				Capacity	
		Increment	Total	Increment	Total	Population	$Q_1(m^3/s)$	D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Q_1/Q_2	Judge
3115	3116	67	67	0.44	0.44	154	0.001	400	8.9	1.56	0.196	0%	OK
3116	3118	68	647	0.32	4.44	1,552	0.008	600	10.2	2.19	0.619	1%	OK
3117	3118	70	70	1.40	1.40	489	0.002	400	2.0	0.74	0.093	3%	OK
3118	3121	199	846	2.38	8.22	2,874	0.015	1000x500	2.0	1.32	0.594	2%	OK
3119	3120	268	268	3.27	3.27	1,143	0.006	400	6.3	1.32	0.166	4%	OK
3120	3121	213	481	3.16	6.43	2,248	0.011	500	7.9	1.71	0.336	3%	OK
3121	3125	232	1078	2.40	17.05	5,961	0.030	500	9.7	1.89	0.371	8%	OK
3122	3124	276	276	2.60	2.60	909	0.005	400	9.4	1.61	0.202	2%	OK
3123	3124	124	124	1.80	1.80	629	0.003	400	3.2	0.94	0.118	3%	OK
3124	3125	208	484	0.81	5.21	1,822	0.009	400	2.0	0.74	0.093	10%	OK
3125	3126	500	1578	4.58	26.84	9,384	0.048	400	10.3	1.68	0.211	23%	OK
3126	3127	1009	2587	0.00	26.84	9,384	0.048	600	3.2	1.23	0.348	14%	OK
3127	3152	97	6408	0.05	317.74	111,091	0.566						
3128	3129	254	254	2.27	2.27	794	0.004	300	8.2	1.24	0.088	5%	OK
3129	3131	71	325	1.33	3.60	1,259	0.006	400	2.0	0.74	0.093	7%	OK
3130	3131	201	201	1.00	1.00	350	0.002	400	8.9	1.56	0.196	1%	OK
3131	3136	122	447	1.40	6.00	2,098	0.011	500	2.0	0.86	0.169	6%	OK
3132	3133	124	124	0.60	0.60	210	0.001	300	9.6	1.34	0.095	1%	OK
3133	3135	95	219	0.40	1.00	350	0.002	400	9.4	1.61	0.202	1%	OK
3134	3135	149	149	1.16	1.16	406	0.002	400	2.6	0.85	0.107	2%	OK
3135	3136	20	239	0.05	2.21	773	0.004	400	2.0	0.74	0.093	4%	OK
3136	3141	287	734	4.10	12.31	4,304	0.022	600	9.4	2.11	0.597	4%	OK
3137	3138	328	328	3.02	3.02	1,056	0.005	500	8.5	1.77	0.348	2%	OK
3138	3140	138	466	0.60	3.62	1,266	0.006	600	2.0	0.97	0.274	2%	OK
3139	3140	122	122	4.10	4.10	1,433	0.007	400	7.3	1.42	0.178	4%	OK
3140	3141	68	534	0.39	8.11	2,835	0.014	800	2.0	1.18	0.593	2%	OK
3141	3142	120	854	0.43	20.85	7,290	0.037	800	2.0	1.18	0.593	6%	OK
3142	3148	281	1135	1.25	22.10	7,727	0.039	800	6.9	2.19	1.101	4%	OK
3143	3144	159	159	1.39	1.39	486	0.002	300	16.9	1.78	0.126	2%	OK
3144	3145	302	461	1.76	3.15	1,101	0.006	400	8.9	1.56	0.196	3%	OK
3145	3147	248	709	5.98	9.13	3,192	0.016	500	6.5	1.55	0.304	5%	OK
3146	3147	185	185	0.70	0.70	245	0.001	600	4.3	1.42	0.401	0%	OK
3147	3148	497	1206	7.44	17.27	6,038	0.031	600	4.6	1.47	0.416	7%	OK
3148	3151	367	1573	1.19	40.56	14,181	0.072	1000	4.6	2.07	1.626	4%	OK
3149	3150	218	218	0.70	0.70	245	0.001	300	15.1	1.68	0.119	1%	OK
3150	3151	404	622	3.47	4.17	1,458	0.007	400	2.7	0.86	0.108	7%	OK
3151	3152	430	2003	2.30	47.03	16,443	0.084	1000	2.0	1.37	1.076	8%	OK
3152	3154	43	6451	0.06	364.83	127,555	0.650						
3153	3154	464	464	1.32	1.32	462	0.002	400	2.0	0.74	0.093	3%	OK
3154	3157	22	6473	0.01	366.16	128,020	0.652						
3155	3156	537	537	3.38	3.38	1,182	0.006	300	8.3	1.25	0.088	7%	OK
3156	3157	480	1017	3.45	6.83	2,388	0.012	400	2.0	0.74	0.093	13%	OK
3157	3164	181	6654	0.70	373.69	130,653	0.665						
3158	3159	175	175	1.41	1.41	493	0.003	300	2.8	0.72	0.051	5%	OK
3159	3161	149	324	0.81	2.22	776	0.004	400	3.3	0.95	0.119	3%	OK
3160	3161	169	169	1.25	1.25	437	0.002	400	2.0	0.74	0.093	2%	OK
3161	3163	194	518	5.50	8.97	3,136	0.016	600	2.0	0.97	0.274	6%	OK
3162	3163	150	150	2.50	2.50	874	0.004	400	2.0	0.74	0.093	5%	OK
3163	3164	189	707	0.80	12.27	4,290	0.022	600	4.2	1.41	0.399	5%	OK
3164	3170	439	7093	3.70	389.66	136,237	0.694						
3165	3166	479	479	4.05	4.05	1,416	0.007	300	9.1	1.31	0.093	8%	OK
3166	3167	106	585	0.56	4.61	1,612	0.008	300	2.0	0.61	0.043	19%	OK
3167	3168	144	729	1.18	5.79	2,024	0.010	800	4.3	1.73	0.870	1%	OK
3168	3169	137	866	0.97	6.76	2,363	0.012	800	2.0	1.18	0.593	2%	OK
3169	3170	392	1258	0.00	6.76	2,363	0.012	800	13.0	3.00	1.508	1%	OK
3170	To STP	930	8023	0.00	396.42	138,600	0.706						
4001	4002	24	24	5.70	5.70	1,913	0.010	200	41.6	2.13	0.067	15%	OK
4002	4003	64	88	2.90	8.60	2,886	0.015	300	46.8	2.96	0.209	7%	OK
4003	4004	837	925	13.00	21.60	7,248	0.037	400	8.0	1.48	0.186	20%	OK
4004	4006	46	971	0.35	21.95	7,366	0.038	300	73.1	3.70	0.262	14%	OK
4005	4005			10.78	10.78	3,617	0.018						
4005	4006	637	637	4.60	15.38	5,161	0.026	300	17.5	1.81	0.128	21%	OK

No.	Down Stream	Length (m)		Area (ha)		Sewage Quantity		Existing Pipe Specification				Capacity	
		Increment	Total	Increment	Total	Population	$Q_1(m^3/s)$	D (mm)	I (‰)	V (m/s)	$Q_2(m^3/s)$	Q_1/Q_2	Judge
4006	4007	34	1005	0.25	37.58	12,611	0.064	300	11.7	1.48	0.105	61%	OK
4007	4011	295	1300	2.42	40.00	13,423	0.068	400	8.1	1.49	0.187	37%	OK
4009	4010	147	147	0.72	0.72	242	0.001	300	10.2	1.38	0.098	1%	OK
4010	4011	538	685	11.78	12.50	4,195	0.021	400	15.7	2.08	0.261	8%	OK
4011	4012	74	1374	2.68	55.18	18,517	0.094	400	7.6	1.44	0.181	52%	OK
4012	4013	162	1536	2.25	57.43	19,272	0.098	400	9.2	1.59	0.200	49%	OK
4013	4015	156	1692	1.56	58.99	19,795	0.101	400	5.1	1.18	0.148	68%	OK
4014	4015	377	377	2.17	2.17	728	0.004	400	15.6	2.07	0.260	1%	OK
4015	4017	266	1958	2.68	63.84	21,423	0.109	400	12.0	1.82	0.229	48%	OK
4016	4017	913	913	12.80	12.80	4,295	0.022	800	22.8	3.97	1.996	1%	OK
4017	4024	154	2112	0.88	77.52	26,013	0.132	800	20.1	3.73	1.875	7%	OK
4018	4021	313	313	5.26	5.26	1,765	0.009	300	17.2	1.79	0.127	7%	OK
4019	4020	68	68	1.00	1.00	336	0.002	300	2.0	0.61	0.043	4%	OK
4020	4021	260	328	1.03	2.03	681	0.003	300	19.8	1.92	0.136	3%	OK
4021	4022	57	385	0.35	7.64	2,564	0.013	400	24.8	2.61	0.328	4%	OK
4022	4023	36	421	0.53	8.17	2,742	0.014	400	55.5	3.90	0.490	3%	OK
4023	4023			4.01	4.01	1,346	0.007						
4023	4024	446	867	4.60	16.78	5,631	0.029	400	9.1	1.58	0.199	14%	OK
4024	4025	170	2282	0.88	95.18	31,939	0.163	800	10.5	2.70	1.357	12%	OK
4025	4025			7.30	7.30	2,450	0.012						
4025	4028	196	2478	0.97	103.45	34,714	0.177	800	22.4	3.94	1.980	9%	OK
4026	4027	976	976	12.24	12.24	4,107	0.021	400	30.2	2.88	0.362	6%	OK
4027	4028	305	1281	1.50	13.74	4,611	0.023	500	7.5	1.67	0.328	7%	OK
4028	4028			14.00	14.00	4,698	0.024						
4028	4054	183	2661	0.85	132.04	44,308	0.226	800	2.0	1.18	0.593	38%	OK
4029	4030	52	52	1.41	1.41	473	0.002	300	57.6	3.28	0.232	1%	OK
4030	4031	215	267	1.92	3.33	1,117	0.006	400	6.9	1.38	0.173	3%	OK
4031	4036	178	445	0.78	4.11	1,379	0.007	500	2.0	0.86	0.169	4%	OK
4032	4033	77	77	0.65	0.65	218	0.001	200	87.0	3.08	0.097	1%	OK
4033	4034	153	230	0.88	1.53	513	0.003	300	23.5	2.10	0.148	2%	OK
4034	4035	169	399	4.18	5.71	1,916	0.010	400	20.1	2.35	0.295	3%	OK
4035	4036	55	454	0.27	5.98	2,007	0.010	500	12.7	2.17	0.426	2%	OK
4036	4045	343	797	2.64	12.73	4,272	0.022	500	29.5	3.30	0.648	3%	OK
4037	4038	175	175	2.49	2.49	836	0.004	300	18.2	1.85	0.131	3%	OK
4038	4041	89	264	0.67	3.16	1,060	0.005	400	26.9	2.72	0.342	2%	OK
4039	4040	119	119	0.88	0.88	295	0.002	300	47.0	2.97	0.210	1%	OK
4040	4041	50	169	0.10	0.98	329	0.002	400	2.0	0.74	0.093	2%	OK
4041	4042	210	474	0.76	4.90	1,644	0.008	400	19.5	2.31	0.290	3%	OK
4042	4045	10	484	0.01	4.91	1,648	0.008	500	3.4	1.12	0.220	4%	OK
4043	4044	119	119	0.55	0.55	185	0.001	300	42.5	2.82	0.199	0%	OK
4044	4045	259	378	0.81	1.36	456	0.002	400	16.9	2.15	0.270	1%	OK
4045	4053	231	1028	1.43	20.43	6,856	0.035	400	4.3	1.09	0.137	25%	OK
4046	4047	168	168	1.02	1.02	342	0.002	300	2.3	0.66	0.047	4%	OK
4047	4048	161	329	1.24	2.26	758	0.004	400	2.0	0.74	0.093	4%	OK
4048	4050	423	752	9.14	11.40	3,825	0.019	500	30.2	3.34	0.656	3%	OK
4049	4050	197	197	0.88	0.88	295	0.002	500	31.4	3.41	0.670	0%	OK
4050	4051	253	1005	2.78	15.06	5,054	0.026	400	7.1	1.40	0.176	15%	OK
4051	4052	354	1359	6.88	21.94	7,362	0.037	400	2.8	0.88	0.111	34%	OK
4052	4052			21.39	21.39	7,178	0.037						
4052	4053	404	1763	8.05	51.38	17,241	0.088	600	9.9	2.16	0.611	14%	OK
4053	4054	70	1833	0.30	72.11	24,198	0.123	600	4.2	1.41	0.399	31%	OK
4054	4056	115	2776	0.31	204.46	68,610	0.349	800	2.0	1.18	0.593	59%	OK
4055	4056	265	265	2.53	2.53	849	0.004	500	8.6	1.78	0.350	1%	OK
4056	4060	99	2875	0.34	207.33	69,573	0.354	800	2.0	1.18	0.593	60%	OK
4057	4059	62	62	0.50	0.50	168	0.001	400	2.0	0.74	0.093	1%	OK
4058	4059	58	58	1.22	1.22	409	0.002	400	2.0	0.74	0.093	2%	OK
4059	4060	279	341	7.64	9.36	3,141	0.016	500	14.9	2.35	0.461	3%	OK
4060	4062	25	2900	0.03	216.72	72,724	0.370	800	2.0	1.18	0.593	62%	OK
4061	4062	712	712	4.94	4.94	1,658	0.008	400	5.7	1.25	0.157	5%	OK
4062	4064	88	2988	0.27	221.93	74,472	0.379	800	2.0	1.18	0.593	64%	OK
4063	4064	258	258	2.07	2.07	695	0.004	600	2.0	0.97	0.274	1%	OK
4064	4068	93	3081	0.31	224.31	75,271	0.383	800	2.0	1.18	0.593	65%	OK

No.	Down Stream	Length (m)		Area (ha)		Sewage Quantity		Existing Pipe Specification				Capacity	
		Increment	Total	Increment	Total	Population	Q_1(m^3/s)	D (mm)	I (‰)	V (m/s)	Q_2(m^3/s)	Q_1/Q_2	Judge
4065	4068	461	461	3.64	3.64	1,221	0.006	600	3.6	1.30	0.368	2%	OK
4068	4070	168	3249	0.80	228.75	76,761	0.391	800	2.0	1.18	0.593	66%	OK
4069	4070	77	77	0.38	0.38	128	0.001	400	5.1	1.18	0.148	0%	OK
4070	4078	179	3428	1.02	230.15	77,231	0.393	800	5.9	2.02	1.015	39%	OK
4071	4073	155	155	1.15	1.15	386	0.002	800	6.4	2.10	1.056	0%	OK
4072	4073	58	58	0.28	0.28	94	0.000	400	2.0	0.74	0.093	1%	OK
4073	4075	176	331	1.21	2.64	886	0.005	500	10.7	1.99	0.391	1%	OK
4074	4075	94	94	0.45	0.45	151	0.001	400	5.3	1.21	0.152	1%	OK
4075	4077	74	405	0.40	3.49	1,171	0.006	600	8.1	1.95	0.551	1%	OK
4076	4077	334	334	1.20	1.20	403	0.002	500	8.9	1.81	0.355	1%	OK
4077	4078	94	499	0.58	5.27	1,768	0.009	800	2.0	1.18	0.593	2%	OK
4078	4102	191	3619	1.83	237.25	79,613	0.405	800	7.9	2.34	1.176	34%	OK
4079	4080	107	107	1.37	1.37	460	0.002	400	2.0	0.74	0.093	3%	OK
4080	4082	256	363	2.72	4.09	1,372	0.007	400	7.7	1.45	0.182	4%	OK
4081	4082	165	165	0.95	0.95	319	0.002	800	13.9	3.10	1.558	0%	OK
4082	4085	174	537	1.18	6.22	2,087	0.011	800	10.3	2.67	1.342	1%	OK
4083	4084	80	80	0.64	0.64	215	0.001	400	32.5	2.99	0.376	0%	OK
4084	4085	189	269	3.11	3.75	1,258	0.006	500	2.0	0.86	0.169	4%	OK
4085	4087	182	719	1.07	11.04	3,705	0.019	600	2.0	0.97	0.274	7%	OK
4086	4087	158	158	3.57	3.57	1,198	0.006	800	10.1	2.64	1.327	0%	OK
4087	4091	78	797	0.26	14.87	4,990	0.025	800	2.0	1.18	0.593	4%	OK
4090	4091	162	162	1.27	1.27	426	0.002	800	2.0	1.18	0.593	0%	OK
4091	4097	96	893	0.43	16.57	5,560	0.028	800	2.0	1.18	0.593	5%	OK
4092	4094	157	157	1.16	1.16	389	0.002	800	9.5	2.56	1.287	0%	OK
4093	4094	69	69	0.31	0.31	104	0.001	600	37.6	4.21	1.190	0%	OK
4094	4096	97	254	0.39	1.86	624	0.003	800	2.0	1.18	0.593	1%	OK
4095	4096	87	87	0.24	0.24	81	0.000	800	2.0	1.18	0.593	0%	OK
4096	4097	178	432	1.28	3.38	1,134	0.006	500	2.0	0.86	0.169	3%	OK
4097	4099	215	1108	2.23	22.18	7,443	0.038	600	5.9	1.67	0.472	8%	OK
4098	4099	190	190	2.50	2.50	839	0.004	500	7.3	1.64	0.322	1%	OK
4099	4101	68	1176	0.35	25.03	8,399	0.043	1000	2.9	1.64	1.288	3%	OK
4100	4101	177	177	1.10	1.10	369	0.002	400	11.2	1.75	0.220	1%	OK
4101	4102	174	1350	1.27	27.40	9,195	0.047	1000	2.0	1.37	1.076	4%	OK
4102	4104	73	3692	0.29	264.94	88,905	0.453	800	11.6	2.83	1.423	32%	OK
4103	4104	361	361	2.90	2.90	973	0.005	400	2.4	0.81	0.102	5%	OK
4104	4110	420	4112	2.80	270.64	90,818	0.462	800	3.8	1.62	0.814	57%	OK
4105	4106	62	62	0.54	0.54	181	0.001	500	12.9	2.18	0.428	0%	OK
4106	4107	243	305	4.91	5.45	1,829	0.009	600	18.5	2.95	0.834	1%	OK
4107	4110	627	932	4.81	10.26	3,443	0.018	800	4.7	1.80	0.905	2%	OK
4108	4109	384	384	5.70	5.70	1,913	0.010	500	2.3	0.92	0.181	5%	OK
4109	4110	99	4211	0.67	6.37	2,138	0.011	600	2.0	0.97	0.274	4%	OK
4110	4118	95	722	0.35	287.62	96,516	0.492	1000	2.0	1.37	1.076	46%	OK
4111	4112	152	152	1.46	1.46	490	0.002	800	34.2	4.87	2.448	0%	OK
4112	4112			8.38	8.38	2,812	0.014						
4112	4113	358	510	9.88	19.72	6,617	0.034	800	13.9	3.10	1.558	2%	OK
4113	4114	177	687	3.39	23.11	7,755	0.039	500	2.2	0.90	0.177	22%	OK
4114	4115	325	1012	8.68	31.79	10,668	0.054	500	11.9	2.10	0.412	13%	OK
4115	4117	166	1178	0.74	32.53	10,916	0.056	500	2.0	0.86	0.169	33%	OK
4116	4117	289	289	1.68	1.68	564	0.003	200	2.4	0.51	0.016	18%	OK
4117	4118	80	1258	0.36	34.57	11,601	0.059	500	5.1	1.37	0.269	22%	OK
4118	4118			4.10	4.10	1,376	0.007						
4118	4120	447	1169	8.80	335.09	112,445	0.573	1000	4.2	1.98	1.555	37%	OK
4119	4120	150	150	0.82	0.82	275	0.001	400	6.6	1.35	0.170	1%	OK
4120	4122	583	1752	2.62	338.53	113,599	0.579	1000	6.6	2.48	1.948	30%	OK
4121	4122	223	223	2.72	2.72	913	0.005	300	14.7	1.66	0.117	4%	OK
4122	4132	234	1986	4.20	345.45	115,922	0.590	1000	2.0	1.37	1.076	55%	OK
4123	4124	110	110	1.10	1.10	369	0.002	300	2.7	0.71	0.050	4%	OK
4124	4125	548	658	6.00	7.10	2,383	0.012	400	6.9	1.38	0.173	7%	OK
4125	4129	368	1026	4.50	11.60	3,893	0.020	500	18.4	2.61	0.512	4%	OK
4126	4127	473	473	6.90	6.90	2,315	0.012	400	9.0	1.57	0.197	6%	OK
4127	4128	341	814	7.50	14.40	4,832	0.025	300	7.6	1.19	0.084	29%	OK
4128	4129	197	1011	1.50	15.90	5,336	0.027	400	11.6	1.78	0.224	12%	OK

No.	Down Stream	Length (m)		Area (ha)		Sewage Quantity		Existing Pipe Specification				Capacity	
		Increment	Total	Increment	Total	Population	Q_1(m^3/s)	D (mm)	I (‰)	V (m/s)	Q_2(m^3/s)	Q_1/Q_2	Judge
4129	4131	130	1156	0.80	28.30	9,497	0.048	400	37.6	3.21	0.403	12%	OK
4130	4131	435	435	5.90	5.90	1,980	0.010	400	33.5	3.03	0.381	3%	OK
4131	4132	213	1369	0.90	35.10	11,778	0.060	400	2.0	0.74	0.093	65%	OK
4132	To STP	0	1986	0.00	380.55	127,700	0.650	1000	2.0	1.37	1.076	60%	OK
5001	5002	94	94	0.50	0.50	146	0.001	400	28.7	2.81	0.353	0%	OK
5002	5006	519	613	5.35	5.85	1,714	0.009	1000	7.3	2.61	2.050	0%	OK
5003	5004	100	100	0.50	0.50	146	0.001	300	7.9	1.22	0.086	1%	OK
5004	5005	350	450	2.70	3.20	937	0.005	400	11.1	1.75	0.220	2%	OK
5005	5006	179	629	4.15	7.35	2,153	0.011	1000	11.7	3.30	2.592	0%	OK
5006	To STP	195	824	1.10	14.30	4,189	0.021	1000	6.6	2.48	1.948	1%	OK
6001	6002	87	87	0.30	0.30	88	0.000	200	14.9	1.27	0.040	1%	OK
6002	6003	273	360	4.20	4.50	1,318	0.007	300	13.1	1.57	0.111	6%	OK
6003	6006	358	718	4.80	9.30	2,725	0.014	300	8.3	1.25	0.088	16%	OK
6004	6005	216	216	2.40	2.40	703	0.004	200	14.4	1.25	0.039	9%	OK
6005	6006	396	612	4.60	7.00	2,051	0.010	300	25.0	2.16	0.153	7%	OK
6006	6009	225	943	2.30	18.60	5,449	0.028	400	16.4	2.12	0.266	10%	OK
6007	6008	117	117	1.10	1.10	322	0.002	300	2.0	0.61	0.043	4%	OK
6008	6009	290	407	2.40	3.50	1,025	0.005	400	2.0	0.74	0.093	6%	OK
6009	6013	48	991	0.20	22.30	6,533	0.033	300	2.0	0.61	0.043	77%	OK
6010	6011	350	350	3.00	3.00	879	0.004	200	19.1	1.44	0.045	10%	OK
6011	6012	260	610	4.50	7.50	2,197	0.011	300	13.0	1.56	0.110	10%	OK
6012	6013	215	825	1.30	8.80	2,578	0.013	400	5.5	1.23	0.155	8%	OK
6013	To STP	961	1952	0.00	31.10	9,111	0.046	400	2.0	0.74	0.093	50%	OK
7001	7002	451	451	4.08	4.08	1,195	0.006	200	23.9	1.61	0.051	12%	OK
7002	7003	100	551	3.50	7.58	2,221	0.011	200	12.0	1.14	0.036	32%	OK
7003	7004	160	711	3.10	10.68	3,129	0.016	600	21.8	3.21	0.908	2%	OK
7004	To STP	250	961	14.90	25.58	7,494	0.038	600	12.8	2.46	0.696	5%	OK

4.1.2 Field Inspection Result on Interceptor Main

Location of Pipe Condition Survey

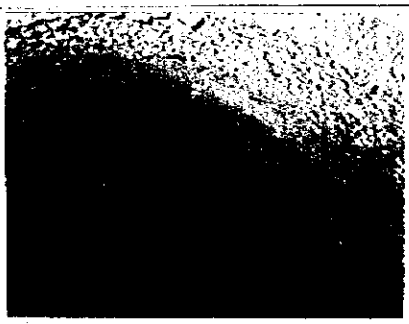
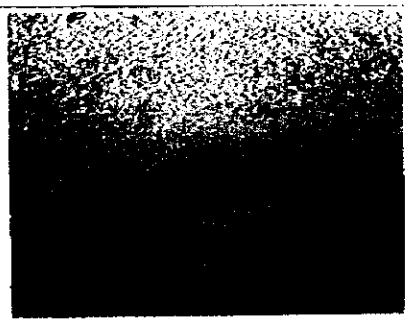
4.1.2-1

Manner of Pipe Condition Survey

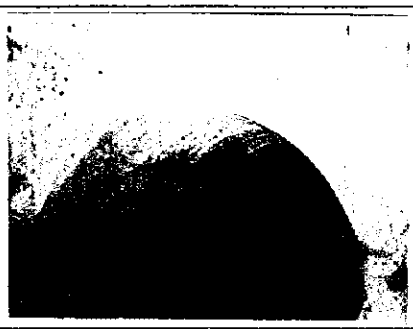
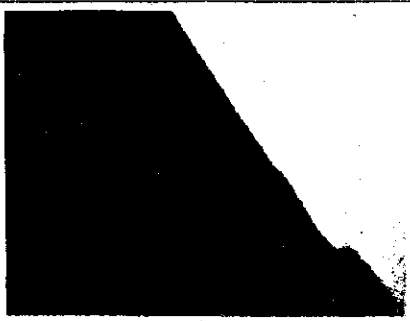
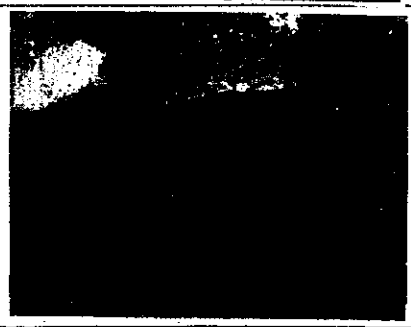
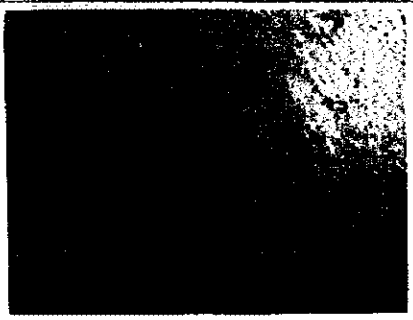
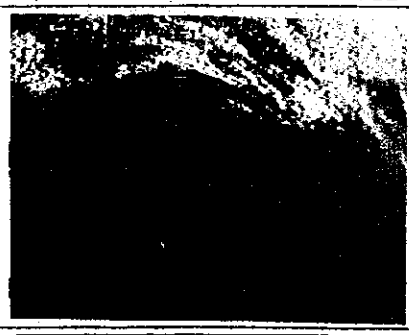
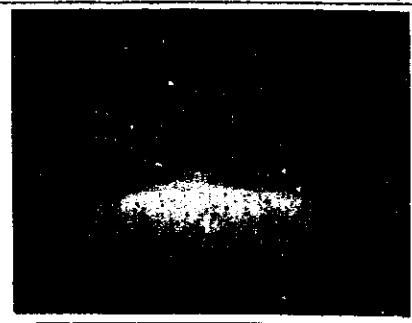
Inner Pipe Photographs

	Upper	Lower
1		
2		
3		
4		
5		

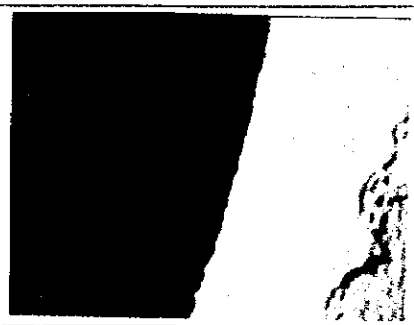
Inner Pipe Photographs

	Upper	Lower
6		
7		
8		
9		
10		

Inner Pipe Photographs

	Upper	Lower
11		
12		
13		
14		
15		

Inner Pipe Photographs

	Upper	Lower
16		
17		
18		
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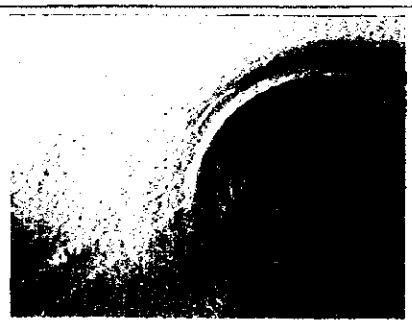
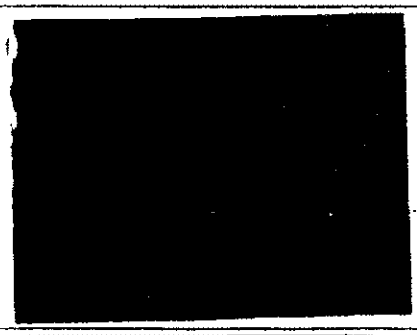
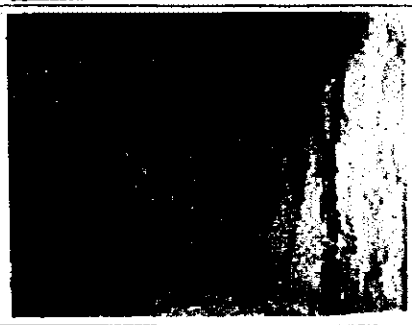
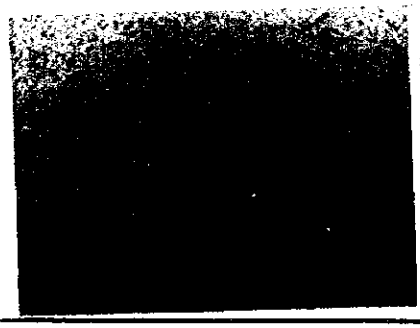
20		

Inner Pipe Photographs

	Upper	Lower
21		
22		
23		
24		
25		

Inner Pipe Photographs

	Upper	Lower
26		
27		
28		
29		
Right side (3109)		

Table 4.1.7 Field Inspection Result on Interceptor Main

No.	Sewer No.		Manhole No.	Dia. (mm)	Location (m)	Level		Depth		Photograph			
						Ground (M)	Pipe bottpm (M)	Settled sand (m)	Flow (m)	Film	Upper	Lower	Others
Right side													
1	3029		886	800	0	118.92	115.95	0.60	0.95	O	1	2	3
2	3029	2	884	800	105	117.84	114.89	0.09	0.25	O	4	5	6
3	3032		881	800	50	115.61	112.61	0.00	0.14	O	7	8	
4	3032	2	877	800	255	115.98	112.95	0.37	0.42	O	9	10	
5	3032	3	877	800	310	113.52	110.29	0.52	0.72	O	11		
6	3039		1083	800	0	113.40	110.22	0.00	0.00	O	12		
7	3041		1085	800	120	110.58	107.42	0.41	0.50	O	13	14	15
8	3041	2	1088	800	180	110.32	107.24	0.22	0.40	O	16	17	
9	3062		-	800	0	109.80	106.52	0.00	0.00	O	18	19	20
10	3062	2	2186	800	340	106.90	103.90	0.10	0.24	O	21	22	
11	3062	3	2187	800	450	105.60	102.90	0.00	0.08	O	23	24	25
12	3075		2188	800	15	105.44	102.69	0.00	0.00	U	1	2	3,4
13	3079		2192	800	60	100.80	98.65	0.00	0.05	T	2	1,3	
14	3085		2196	1000	190	101.00	98.90	0.00	0.16	T	7	6	
15	3107		-	1000	65	97.26	94.39	0.41	0.61	T	11	12	
	3109		-	1000	90		N.A.			T			13,14,15
	3109		-	1000	180		N.A.			T			16
Left side													
16	4016		6	800	600	116.69	113.09	0.01	0.01	U	7	8	
17	4024		256	800	75	110.48	107.78	0.15	0.21	U	9	10	
18	4025		-	800	0	109.20	106.82	0.13	0.20	U	11	12	
19	4028		543	800	40	108.11	105.26	0.02	0.13	U	13	14	
20	4064		2214	800	0	105.06	102.21	0.00	0.01	U	15	16	
21	4068		2213	800	0	104.33	101.65	0.00	0.16	U	17	18	
22	4070		2211	800	0	103.04	100.56	0.00	0.23	U	19	20	
23	4078		2238	800	0	101.20	99.15	0.03	0.18	ex	3		
24	4078	2	2208	800	120	100.72	98.82	0.00	0.00	ex	1		
25	4104		2206	800	0	98.80	96.35	0.07	0.30	T	24	25	
26	4104	2	2203	800	250	97.44	95.27	0.04	0.48	T	22	23	
27	4110		2202	1000	0	97.00	93.86	0.09	0.30	U	24	25	
28	4118		5520	1000	30	95.53	92.70	0.00	0.07	T	19	20	
29	4120		-	1000	410	93.41	89.65	0.38	0.75	T	17	18	

4.4.1 Residents' Awareness on Environmental Sanitation

QUESTIONNAIRE STUDY OF THE SEWERAGE SYSTEM IN METROPOLITAN TIRANA

AND

OF THE AWARENESS OF THE CITIZENS ABOUT THE HEALTH CONDITIONS AND ENVIRONMENT

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I. INTRODUCTION

This study is carried out by Japan International Cooperation Agency (JICA) in cooperation with the Ministry of Public Work, Tourism and Territory Adjustment.

The main goal of the study is to estimate what are the awareness, readiness, and the financial possibilities of the population of Tirana related to the future improvements of the hygienic and health conditions planned to be made by the Project for "Improvement of sewerage network systems in Tirana". Main part of the study looks at the existing conditions of water supply and sewerage system at present in Tirana, supplying problems, discharging of water or sewerage, maintenance, looks at the living conditions and hygienic-sanitarian conditions.

The area of this study is very wide and very important and sensible for all the population given the existing conditions where they live and given the special period our country is in.

Study, from one side, aims to present the existing conditions and problems, and from the other side it emphasizes the need for decisions to be taken, for defining reasonable policies how to face and solve these major problems, which for sure, if the measurements are not taken, it will cause bigger problems in the near future.

After making some analysis of the existing situation, at the end of the study conclusions are presented and some recommendations are given for the future.

As a target of the study there were chosen four areas in Tirana, which were judged as representing different kinds of building structures and water supply or sewerage service provided.

A questionnaire draft was given to the group and some changes were made according to some testing interviews that were made. In the questionnaire all the sections were judged to be interesting for the study.

In the first and second parts of the questionnaire information is given concerning the house (building), location, building structure, year of construction, configuration, different ways of using compartments of the house, how families use water supply and sewerage services, eating place, or kinds of toilette they use, etc.

In the third part of questionnaire questions are asked about the family content and the ways of living, income and expenses, specifying the charges for water or electric service, different sources of income, etc.

The fourth part of the questionnaire deals with water supply and hygiene and it asks information how families use the water, how the water meters work, how often the water is supplied, and water sources other than city supply. In this section emphasis is given also to the use of the pumps, clearness of the water, cases of sicknesses, etc.

The fifth part of the questionnaire looks at toilette conditions and supplies, sanitarian practices of these ambient, etc.

Last part of the questionnaire aims to find out the future potential improvements that population is interested related to water supply and sewerage systems. We look at financial, legal and moral aspects of the problem.

Study is divided into four chapters: first chapter shows about the methodology of the study, second chapter gives in a detailed form all the data analysis and results that were found, third part presents some conclusions, and in the last chapter we do give some recommendations.

We have put as an Appendix a copy of the questionnaire in order to make references.

II. METHODOLOGY

To realize this study we allocated four areas of Tirana, three from which were located in the center of Tirana and one was located in the suburban area. Areas were chosen by the Japanese Team based on and related to the other part of the study: water sampling. Areas were categorized as follows:

A. Serviced area
   In these areas does exist a sewerage city network system for discharge.

   A.1 Buildings with old apartments
   A.2 Buildings with new apartments
   A.3 Old individual houses

B. Unserved area

In this area our target was to interview 20 families with no connection to sewerage city network system for discharge.

B.1 Village Selita e Vogel

Table 1. shows in detail the areas chosen for interviews, the address, number of interviews taken and the correspondent percentages.

In total we made 120 interviews from which 20 were made in a Not Serviced Area.

Interviews were based on the questionnaire drafted first by NJS and then changed a little after some testing and then the Albanian specialists for interviewing went to field to make the interviews GCC. A short training was made for the interviewers in order to have them understand the logic of the questionnaire, the goal, and different technical ways of how to code the answers.

We mobilized six groups of interviewers with two members each.

Especially for the three areas in city of Tirana was that all the families interviewed had to be selected from the same pipe of sewerage network.

In the village of Selita e Vogel we interviewed families which houses were connected to the city sewerage pipes (10 families) and families who did not have any service at all (20 families).

In general, we tried to interview the head of the household.

Table 1. Number of interviews by area

Areas	Qt'y	Percentage
Dora D'Istria (new apt. building)	34	28.3
Muhamet Gjollesha (old apt. building)	28	23.3
Qemal Stafa (old individual houses)	28	23.3
Selita e Vogel (Not serviced area)	30	25.0
Total	120	100.0

See Fig.1 also.

III. DATA ANALYSIS

III.1 Identification

Houses were identified using their address (for the city interviews) and by their location in the village. All houses were legal constructions. In the major part of the interviews, 115 houses (95.8%), families who lived there owned the houses. In three houses families had rented them from the state, and in two other places from the private people.

In other words, most of the persons interviewed were the legal owners of their houses.

III.2 House structure

III.2.1 Kind of structure

Houses were classified in: individual houses with garden (villa), apartment building, or option "other". Among the families interviewed we have 53 which live in individual houses (villa), from which 29 are in the village, and we have 67 families living in apartments, from which only 1 in the village.

Apartment buildings were from 2 to 6 floors. Most of them (71.2%) are 5 floors buildings, only 3% are 2 floors buildings, and there is a uniform distribution of the buildings with 3 or 4 floors buildings (7-10% for each case).

In apartment buildings about 90% of habitants are chosen from the first to fourth floor of the building and 10% from the fifth and sixth floor.

Table 2 shows the detailed distribution of many floors apartment buildings that were interviewed.

Table 2. Number of interviews by the floor where they live

Which Floor	Number of interviews	Percentage
1	16	24.2
2	13	19.7
3	15	22.7
4	13	19.7
5	8	12.1
6	1	1.5

III.2.2 Year of construction

Most of the constructions in the city and village, about 38.3%, are built between 1971 -1980 and before 1980 are built about 87% of the houses. Only 13.5% are built after 1980. The number of the houses built before 1960 is about 27%, and before 1970 are half of the constructions interviewed.

Table 3. Number of houses by year of construction

Count Total(%)	Year of construction					
	Before 1960	61-70	71-80	81-90	After 1991	Row Total
Separate house	30 25.0%	8 6.7%	10 8.3%	1 .8%	4 3.3%	53 44.2%
Apartment	3 2.5%	18 15.0%	36 30.0%	5 4.2%	5 4.2%	67 55.8%
Column Total	33 27.5%	26 21.7%	46 38.3%	6 5.0%	9 7.5%	120 100.0%

See Fig. 2 also

III.2.3 House composition

About 95% of habitants interviewed live in houses with 1+1, 1+2 or 1+3 composition.

Note: House composition in Albania shows number of living room (usually one, and in Albania people call it Kitchen, later on we will refer to it as "Living Room") and the number of bedrooms. It is assumed that you have a bathroom. Annex is called the place that people use for cooking. Later on we will refer to Annex as Kitchen. Garçoniere is called the house which has only one bedroom and one bathroom.

The following table shows in detail the distribution of the interviews by the composition of the house.

Table 4. Number of the interviews by house composition

Config.	Frequency	Percent	Cum Percent
1+1	29	24.2	24.2
1+2	70	58.3	82.5
1+3	15	12.5	95.0
1+4	2	1.7	96.7
Garconiere	3	2.5	99.2
Other	1	.8	100.0
Total	120	100.0	100.0

In Table 5 is given the number of families which house is built in a certain year and the composition they have (See Fig. 3 also).

Table 5. Number of interviews by year of construction and house composition

Row Pct		Count Year of Construction					Row Total
		Before 60	61-70	71-80	81-90	After 91	
House Configuration	1+1	10 34.5%	9 31.0%	7 24.1%	2 6.9%	1 3.4%	29 24.2%
	2+1	18 25.7%	15 21.4%	25 35.7%	4 5.7%	8 11.4%	70 58.3%
	3+1		1 6.7%	14 93.3%			15 12.5%
	4+1	1 50.0%	1 50.0%				2 1.7%
	G	3 100.0%					3 2.5%
	Villa	1 100.0%					1 .8%
Column Total		33 27.5%	26 21.7%	46 38.3%	6 5.0%	9 7.5%	120 100.0%

It is clear from the table (see first row) that the number of the houses with 1+1 composition is reducing by time.

From the families interviewed there are 65 (54.2%) that have Kitchen in their house and 55 (45.8%) who do not have. There are 77 houses (64.2%) with separate living room, and 43 houses (35.8%) without a separate living room.

The majority of families, 73 (60.8%), eat in the living room and 47 families (39.2%) eat in Kitchen.

In general families have the shower room and toilette together (91%). Only 11 families (9.2%) have separate shower room. In few cases, specially in the village, families have a separate toilette.

Detailed statistics is given in two tables below:

1. Separate Shower	Frequency	Percent
Yes	11	9.2
No	109	90.8
Total	120	100.0

2. Shower room and/or WC	Frequency	Percent
Yes	94	78.3
No	26	21.7
Total	120	100.0

Table 6 shows the distribution of the number of families whose house is built in a given year and if they have the toilette together with the shower room or not.

Table 6. Number of families by year of construction and the kind of toilette or shower

Count Row Pct	Year of construction					Row Total
	Before 60	'61-'70	'71-'80	'81-'90	After 91	
WC + shower together	16 17.0%	23 24.5%	41 43.6%	6 6.4%	8 8.5%	94 78.3%
WC + shower separate	17 65.4%	3 11.5%	5 19.2%		1 3.8%	26 21.7%
Column Total	33 27.5%	26 21.7%	46 38.3%	6 5.0%	9 7.5%	120 100.0%

Tables 7 and 8 show where the families prefer to eat by the case when they have a Kitchen in their house or not.

In general the place where families eat their meals is in Living Room even in the cases when houses have a Kitchen.

We have got the same result even for the houses with larger space. In big houses, the same as in small houses, people prefer to eat in Living Room.

Table 7. Where do families eat

Count Row Pct	Place to eat		Row Total
	Liv.Room	Kitchen	
Kitchen Yes	37 56.9%	28 43.1%	65 54.2%
Kitchen No	36 65.5%	19 34.5%	55 45.8%
Column Total	73 60.8%	47 39.2%	120 100.0%

Table 8. Where do families eat by house composition

Count Row Pct	Place where they eat		Row Total
	Liv.Room	Kitchen	
1+1	20 69.0%	9 31.0%	29 24.2%
1+2	36 51.4%	34 48.6%	70 58.3%
1+3	12 80.0%	3 20.0%	15 12.5%
1+4	1 50.0%	1 50.0%	2 1.7%
Garconiere	3 100.0%		3 2.5%
Other	1 100.0%		1 .8%
Column Total	73 60.8%	47 39.2%	120 100.0%

III.3 Family content and the way of living

Following data describe families and the way of living.

III.3.1 Family content

In Table 9 is shown in detail the family content of the persons interviewed by the number of family members.

Table 9. Number of families by number of members in the family

Family members	Number of families	Percentage
1	1	.8
2	8	6.7
3	18	15.0
4	33	27.5
5	18	15.0
6	18	15.0
7	12	10.0
8	4	3.3
9	4	3.3
10	2	1.7
12	2	1.7
Total:	120	100.0

We see that 27 families have from 1 to 3 members (22.5% of families), 51 families have 4 or 5 members (61.2% of families) and 42 others (50.4%) from 120 have more than 5 members in their family.

Average number of family members is 4.98.

In Table 10, is shown the distribution of the number of families by the different areas of interviewing and by the number of members for each family.

Table 10. Number of families by the number of members in the family members and the area of interview

Number of family members	Address				Total for row:
	Dora D'Istria	Muhamet Gjoll.	Qemal Stafa	Selita e Vogel	
1-3	9	4	9	5	27 22.5%
3-5	16	11	15	9	51 42.5%
Over 5	9	13	4	16	42 35.0%
Total for column:	34 28.3%	28 23.3%	28 23.3%	30 25.0%	120 100.0%
Average of family members	4.59	5.07	4.07	6.17	

Average number of family members over 18 years old, in four areas, is about 4 persons a family (3.68) and below 18 years old is 1 person (1.27).

Average number of family members that do work for gaining money, in four areas, is about 2 persons (2.36).

In Table 11 is given the number of families that eat in Kitchen or in the Living Room dependent on the number of the members in the family. We see an increase of the number of the families that eat in Living Room when the number of family members increases (look at the same row). This is related to the limited space in the house.

Table 11. Number of families by the place where they eat

Count Row Pct		Number of family members			Row Total
		1-3	3-5	Over 5	
Place to eat:	Living room	20 27.4	27 37.0	26 35.6	73 60.8
	Kitchen	7 14.9	24 51.1	16 34.0	47 39.2
	Column Total	27 22.5	51 42.5	42 35.0	120 100.0

III.3.2 Income and Expenses

We looked at Income in different aspects. We looked at the number of persons that generate money in the family, income sources and the priorities they have in their life, and also the average amount of income. In the same way we did look at the monthly expenses, expenses for water or electric charges. Following there is a more detailed presentation of the results.

In average, in one family about 2 people work for generating money (exactly 2.36). Half of the family have less than two people who generate income. There are only two families (1.7%) who do not have any person to generate money. There are only two families (1.7%) who have 5 people (maximum) working for generating money. Most of the families (39.2%) have two people that generate money in their families.

This is shown in detail in the Table 12.

Only two from the families interviewed have income from their relatives who are working abroad and there is only one families that said that they get about 3'000 Leke/month from him.

Note: The answers of this question are to be considered carefully, because people do not declare everything they get from abroad.

Table 12. Number of persons in a family that do work for generating money

Number of persons working	Number of families	Percent	Cum Percent
0	2	1.7	1.7
1	22	18.3	20.0
2	47	39.2	59.2
3	31	25.8	85.0
4	16	13.3	98.3
5	2	1.7	100.0
Total	120	100.0	

We also looked at the income sources and how they are prioritized in the life of the families.

In general, the major income source if the government salary - about 66.7% have ranked this source of income as the most important one. Second ranked is their own private business and then it is the employment to the private sector.

Table 13. The main Income sources by their weight

Income Source	Number of families	Percentage
Government Salary	80	66.7
Employed to private	13	10.8
Your own private business	19	15.8
Income from abroad	1	.8
Giving money with interest	7	5.8
Total	120	100.0

Table 14 shows the number of families that have ranked the different income sources as second in their family life.

Table 14. Second income sources

Income Source	Number of families	Percentage
Government Salary	19	15.8%
Employed to private	16	13.3%
Your own private business	9	7.5%
Income from abroad	1	.8%
Giving money with interest	6	5.0%
Total	51	42.5%

There are 69 (57.5%) from 120 families that have not given any second ranked income source.

The following table shows the third ranked income source:

Table 15. Third income source

Income Source	Number of families	Percentage
Government Salary	7	5.8%
Giving money with interest	3	2.5%
Total	10	11.3%

There are 110 from 120 families (91.7%) that do not have any third income source.

Table below shows the fourth income source.

Table 16. Fourth income source

Income Source	Number of families	Percentage
Your own private business	1	0.8%

There are 119 from 120 families (99.2%) that do not have any fourth ranked income source.

There is no family that has answered to have any fifth ranked income source.

Distribution of monthly income is shown in Table 17. About 36% of the families have their income in between 8000-16000 Leke/month. Second group are the families who have their income between 16000-25000 Leke/month (22.5%).

Table 17. Number of families by income amount

Income: (in Leke/month)	Number of families	Percentage
1500 - 4000	11	9.2%
4000 - 8000	18	15.0%
8000 - 16000	44	36.7%
16000 - 25000	27	22.5%
Over 25000	20	16.7%
Total	120	100.0%

The average monthly income for the families interviewed is 14'331 Leke/month (std dev = 7257.95%, CI (Confidential Interval) for Mean (13019.41, 15643.09), IQR = 8500.000).

For each of the areas in the study, Table 18 shows the number of the families by income amount.

Average monthly expenses of a family is 14'551.5 Leke/month (std err 779), the minimum expense is 800 Leke/month and the maximum expense reaches to 50000 Leke/month.

Half of the families spend less than 13'500 Leke/month.

Table 18. Distribution of the number of the families by the address and the income amount

Count Row Pct	Income amount					Row Total
	1500-4000	4000-8000	8000-16000	16000-25000	Over 25000	
Dora D'Istria		1 2.9%	10 29.4%	11 32.4%	12 35.3%	34 28.3%
Muhamet Gjollesha	3 10.7%	6 21.4%	8 28.6%	8 28.6%	3 10.7%	28 23.3%
Qemal Stafa	6 21.4%	7 25.0%	9 32.1%	4 14.3%	2 7.1%	28 23.3%
Selita e Vogel	2 6.7%	4 13.3%	17 56.7%	4 13.3%	3 10.0%	30 25.0%
Column Total	11 9.2%	18 15.0%	44 36.7%	27 22.5%	20 16.7%	120 100.0%

Following table shows detailed information.

Table 19. Number of families by monthly expenses

Expenses	Number of families	Percentage
Up to 5000	10	8.3%
5000 - 10000	37	30.8%
10000 - 15000	35	29.3%
15000 - 20000	22	18.3%
20000 - 25000	7	5.8%
25000 - 30000	2	1.6%
Over 30000	7	5.9%
Total:	120	100%

See Fig. 4 also.

Concerning the water charge payments we see that the payment is made independently from what the water meter shows. The payment is made in a per capita basis. The charge varies depending on which floor you live in (upper floors pay less). Following we show some numerical estimations of what people pay. First, 5 families (4.16) say that they do not pay anything for the water used. In 120 families with 594 habitants the average amount paid by each family as a water charge is 113.96 Leke/month or as an average per capita is 23.02 Leke/month.

The payment for the electric charge is made in general based on what the electric meter shows. In the cases when the electric meter does not function or it is not put in place families paid a fixed amount of money. Following we show some data: first
only one family (0.8%) does not pay the electricity charge. All the families with number of members from 1 to 12, pay 186'500 Leke/month in total. Average amount of money per family paid as electric charge is 1554.17 a month.

See Fig. 5 also.

III.4 Water Supply and Hygiene

The main results we were expecting from this group of questions were related with number of faucets in the house, conditions of water supply, hygienic conditions in the house related to water, etc.

III.4.1 Water faucets

The number of water faucets in the house is shown in Table 20. Most of the houses have two faucets (45% of families interviewed). 96% of all the families have from 1 to 4 faucets. All the families have at least one faucet in the house.

Table 20. Distribution of the number of faucets

Number of faucets	Number of families	Percent	Cum Percent
1	6	5.0	5.0
2	54	45.0	50.0
3	37	30.8	80.8
4	19	15.8	96.7
5	4	3.3	100.0
Total	120	100.0	100.0

Table 21. Number of faucets by the areas of interview

Count Tot Pct	Number of faucets					Row Total
	1	2	3	4	5	
Dora D'Istria	1 .8%	6 5.0%	12 10.0%	12 10.0%	3 2.5%	34 28.3%
Muhamet Gjollesha	1 .8%	19 15.8%	7 5.8%	1 .8%		28 23.3%
Qemal Stafa	1 .8%	14 11.7%	11 9.2%	2 1.7%		28 23.3%
Selita e Vogel	3 2.5%	15 12.5%	7 5.8%	4 3.3%	1 .8%	30 25.0%
Column Total	6 5.0%	54 45.0%	37 30.8%	19 15.8%	4 3.3%	120 100.0%

According to different areas interviewed the situation is given in Table 21.

III.4.2 Use of water

The purpose of this question was to find out if the water was used for the garden or for laundry.

Most of the families interviewed (98.3%) declare that they do not use water for gardening. In the villages we have to consider carefully if their answer is always accurate. Only two persons (1.7%) have answered that they do use water for gardening.

87 families (72.5%) have washing machine at home, and they do use it often. Only 33 families (27.5%) do not have washing machine at all.

Number of washing machines is not the same for different areas of interview. Table 22 shows that area Dora D'Istria uses more the washing machines than the other areas. We can see also that in the village families use it less.

Table 22. Number of washing machines by area of interview

Count Row Pct	Washing machine		Row Total
	Yes	No	
Dora D'Istria	31 91.2%	3 8.8%	34 28.3%
Muhamet Gjollesha	21 75.0%	7 25.0%	28 23.3%
Qemal Stafa	20 71.4%	8 28.6%	28 23.3%
Selita e Vogel	15 50.0%	15 50.0%	30 25.0%
Column Total	87 72.5%	33 27.5%	120 100.0%

See Fig. 6 also.

III.4.3 Conditions of water supply

The purpose of this group of questions was to look at the existing conditions of water supply, how people use it, what is the supplying schedule for families, do they use pumps, etc.

Water Meters

61.7% of the families have answered that they do not have any water meter in their house. 38.3% of the families do have water meter but about half of them say that the it does not function. In other words we can say that only 17.5% of the families do have water meter which functions. Answers are not always accurate because some people do say we do not have a meter only because they are used to pay a fixed rate defined by the government for each family member.

Some results are:

Water Counter	Frequency	Percent
No	74	61.7
Yes, not functioning	25	20.8
Yes, functioning	21	17.5
Total	120	100.0

See Fig. 7 also.

Situation in different areas is like following:

Table 23. Status of the water counters in by area of interview

Count / Row Pct	Water counter in the house			
	No	Yes, not funct.	Yes funct.	Row Total
Dora D'Istria	28 82.4%	1 2.9%	5 14.7%	34 28.3%
Muhamet Gjollesha	26 92.9%	1 3.6%	1 3.6%	28 23.3%
Qemal Stafa	14 50.0%	10 35.7%	4 14.3%	28 23.3%
Selita e Vogel	6 20.0%	13 43.3%	11 36.7%	30 25.0%
Column Total	74 61.7%	25 20.8%	21 17.5%	120 100.0%

By year of construction we see that the houses built between 1971-1980 have more water meters, and the houses built after 1981 have the least number of water meters installed.

Table 24 shows the detailed situation of water meters by the year of construction.

Water interruptions

Interruption of the water supply is an everyday phenomenon. 100% of the families answered that they have an everyday interruption of the supply. Only one person answers that his family has interruptions 2—3 times a week.

Table 24. Water meter situation by the year of construction

	Count / Row Pct	Water meter in the house			
		No	Yes, not funct.	Yes, funct.	Row Total
Year of construction	Before 1960	54.5%	18 10 30.3%	5 15.2%	33 27.5%
	1961-70	57.7%	15 6 23.1%	5 19.2%	26 21.7%
	1971-80	67.4%	31 7 15.2%	8 17.4%	46 38.3%
	1981-90	66.7%	4 16.7%	1 16.7%	1 5.0%
	After 91	6 66.7%	1 11.1%	2 22.2%	9 7.5%
	Column Total	74 61.7%	25 20.8%	21 17.5%	120 100.0%

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Concerning the amount of time when the families have water in their houses the situation is different for different areas. 17 families (14.2%) of the families answer that they do not have water at all, 15 from these families are in the area "Selita e Vogel" and 2 cases are in "Qemal Stafa". Water situation is very bad for the area of Selita where families miss the water all day even that there are pipes for bringing the water.

In Table 25 is shown how many times a day do families have water. 65% of the families there is water 3 times a day. 85.8% of the families have water at least once a day.

Table 25. Status of water supply during the day

Water during the day	Number of families	Percent	Cum Percent
none	17	14.2	14.2
once	21	17.5	31.7
twice	4	3.3	35.0
three times	78	65.0	100.0
	120	100.0	100.0

In average during one day there is water supply for 4.75 hours per family. (std 3.19 hours, maximum value 17 hours).

Table 26 shows the number of times there is water in different areas of interview.

Table 26. Number of families by the number of times they have water during the day

Count Row Pct	How many times a day there is water				Row Total
	0	1	2	3	
Dora d'Istria		3 8.8%	1 2.9%	30 88.2%	34 28.3%
Muhamet Gjollesha		8 28.6%	3 10.7%	17 60.7%	28 23.3%
Qemal Stafa	2 7.1%	2 7.1%		24 85.7%	28 23.3
Selita e Vogel	15 50.0%	8 26.7%		7 23.3%	30 25.0%
Column Total	17 14.2%	21 17.5%	4 3.3%	78 65.0%	120 100.0%

Note: Families who do not have water at all use to go to neighbors and get water from them.

The average amount of hours when there is water, by area of interview, are as following:

Dora D'Istria:

Mean	6.5	Std Err	.3	Min	1.0
Median	7.0	Variance	2.2	Max	7.0

95% CI for Mean (5.99, 7.01)

Muhamet Gjollesha:

Mean	4.8	Std Err	.5	Min	1.0
Median	5.0	Variance	7.4	Max	13.0

95% CI for Mean (3.77, 5.88)

Qemal Stafa:

Mean	5.1	Std Err	.4	Min	.0
Median	5.0	Variance	4.0	Max	8.0

95% CI for Mean (4.3, 5.8)

Selita e Vogel:

Mean	2.4	Std Err	.8	Min	.0
Median	.5	Variance	19.3	Max	17.0

95% CI for Mean (.8, 4.0)

Each cell of Table 27 shows the number of families that live in apartments in different floors and have water as said for each row.

In Table 28 is given the relation between number of times when families have drinking water by the floor where they live.

Table 27. Number of hours with running water during a day for different floors

Count / Row Pct	Floor					Row Total
	Floor 1	Floor 2	Floor 3	Floor 4	Floor 5	
0 hours				2 100.0%		2 3.0%
1, 2 or 3 hours	2 18.2%	1 9.1%		5 45.5%	2 18.2%	11 16.7%
4, 5 or 6 hours	4 23.5%	4 23.5%	8 47.1%	1 5.9%		17 25.8%
more than 7 hours	10 27.8%	8 22.2%	7 19.4%	5 13.9%	6 16.7%	36 54.5%
Column Total	16 24.2%	13 19.7%	15 22.7%	13 19.7%	8 12.1%	66 100.0%

(Continued)

Count Row Pct	Floor Floor 6	Row Total
0 hours		2 3.0%
1, 2 or 3 hours	1 9.1%	11 16.7%
4, 5 or 6 hours		17 25.8%
more than 7 hours		36 54.5%
Column Total	1 1.5	66 100.0%

Other water sources

96.7% of families do not have any other source for water, except the water from the city pipes. Only 3.3% of the families have other water source and they have answered that they do have deep well.

Use of electric pumps

Most of the families interviewed (67.5%) do not use pumps for water. 3.3% of the families have their own private pump, the other part have cooperated with neighbors to have collective pumps, for financial reasons.

Table 28. Number of times with water supply by the floor

Count Row Pct	Floor					Row Total
	Floor 1	Floor 2	Floor 3	Floor 4	Floor 5	
How many times water 0				2 100.0%		2 3.0%
1	2 18.2%	1 9.1%	1 9.1%	4 36.4%	2 18.2%	11 16.7%
2			1 50.0%	1 50.0%		2 3.0%
3	14 27.5%	12 23.5%	13 25.5%	6 11.8%	6 11.8%	51 77.3%
Column (Continued) Total	16 24.2%	13 19.7%	15 22.7%	13 19.7%	8 12.1%	66 100.0%

Count Row Pct		Floor Floor 6	Row Total
How many times water	0		2 3.0%
	1	1 9.1%	11 16.7%
	2		2 3.0%
	3		51 77.3%
Column Total		1 1.5%	66 100.0%

Table below shows the situation for this question.

Table 29. Number of families by the use of pump

Use of pump	Number of families	Percent
No	81	67.5
Yes, private	4	3.3
Yes, with neighbors	35	29.2
Total	120	100.0

See Fig. 8 also.

Only 62.5% of habitants knew that the use of pumps was dangerous, as it brings different kinds of dirt. 37.5% of the people interviewed did not know at all about this problem.

III.4.4 Hygienic conditions related to water

In general people believe that the discharge of water from the septic holes and the overflow of sewerage from pipes are causing problems through making the drinking water dirty. Also, the fact that water is supplied based on a daily schedule is associated with flowing of the dirty water in the pipes of the drinking water. The results of the questions related to these problems are given in the following paragraphs.

Cases of sickness

About 75.8% of the families interviewed answered that none of their family had ever had any case of sickness. 24.2% of the families answered that they have had cases of sicknesses like diarrhea, dysentery, skin disease, etc. Most common sickness is diarrhea, as 19.2% of the people interviewed answered they have had cases of diarrhea, and they think the cause for it is the bad quality of the drinking water.

The interviewers say that they have seen a tendency from the families to hide the information related to this question. We have added up to the number of families who said "No sickness" the number of people who have said "Do not know" answer that can be treated as a try to hide the true information.

Table 30. Cases of sicknesses by area of interview

Count Row Pct	Cases of sickness				Row Total
	No	Diarrhea	Dysent.	Skin Dis	
Dora D'Istria	23 67.6%	11 32.4%			34 28.3%
Muhamet Gjollesha	82.1%	23 17.9%	5		28 23.3%
Qemal Stafa	20 71.4%	7 25.0%		1 3.6%	28 23.3%
Selita e Vogel	25 83.3%		2 6.7%	3 10.0%	30 25.0%
Column Total	91 75.8%	23 19.2%	2 1.7%	4 3.3%	120 100.0

In the village Selita e Vogel only 16.7% of people interviewed answered that they have had people sick because of the drinking water. On the other side none of them has answered they had diarrhea. We can possibly conclude that either people in the village do not know exactly what diarrhea means or it is because of the tendency to not accept it as it can be taken as an offense. We have people who have answered that they had cases of sickness each day (minimum value) or once a year (maximum value).
In average the period for people to get sick is once in 136 days (std dev = 40.05).

Red Water from the faucet

There are 101 from 120 families (84.2%) that have had cases of red water. The situation for different areas of interview is shown in Table 31.

Table 31. Cases of red water by area of interview

Count Row Pct	Red Water		Row Total
	Yes	No	
Dora D'Istria	29 85.3%	5 14.7%	34 28.3%
Muhamet Gjollesha	24 85.7%	4 14.3%	28 23.3%
Qemal Stafa	22 78.6%	6 21.4%	28 23.3%
Selita e Vogel	26 86.7%	4 13.3%	30 25.0%
Column Total	101 84.2%	19 15.8%	120 100.0%

The average period when there have been cases of red water is once in 58 days (std dev 117.5 days, maximum value 2 years and the minimum value less than one day).

Strange odor/taste of water

39.8% of families have not had any case of strange odor/taste of the water. Distribution by area of interview is shown in Table below.

In each case more than half of the interviewed people say that they have had cases of strange odor/taste water. Higher rates we have in area of Selita.

In average every 67 days there is one case of strange odor/taste in the water (std dev 151 days, minimum value zero days which means that every day the water comes with strange odor/taste, and the maximum value is 1000 days). But the half of interviewed people answer that they have cases of odor water once in 10 days. 73.2% of the families answered that they have cases of odor water at least once a month.

Table 32. Cases of water with strange odor/taste

Count Row Pct	Odor Water		Row Total
	Yes	No	
Dora D'Istria	25 73.5%	9 26.5%	34 28.3%
Muhamet Gjollesha	9 32.1%	19 67.9%	28 23.3%
Qemal Stafa	15 53.6%	13 46.4%	28 23.3%
Selita e Vogel	24 80.0%	6 20.0%	30 25.0%
Column Total	73 60.8%	47 39.2%	120 100.0%

Danger for health

Cases of health problems from the bad quality of water from unihygienic sources is as following: 83 persons (69.2%) say that they have not seen such cases, and 21 cases (17.5%) agree that they have had bad cases, and 16 persons (13.3%) do not know the answer.

Table 33. Cases of danger by area of interview

Count Row Pct	Cases of Danger			Row Total
	No	Yes	Don't know	
Dora D'Istria	12 35.3%	17 50.0%	5 14.7%	34 28.3%
Muhamet Gjollesha	22 78.6%		6 21.4%	28 28.3%
Qemal Stafa	24 85.7%	1 3.6%	3 10.7%	28 23.3%
Selita e Vogel	25 83.3%	3 10.0%	2 6.7%	30 25.0%
Column Total	83 69.2%	21 17.5%	16 13.3%	120 100.0

III.5 Toilette services

The purpose of this group of questions was to make evidence of characteristics
of the toilette places (WC), discharge of the sewerage or water from kitchen
or from bathroom, status of the sewerage pipes and to look at sanitarian
practices.

III.5.1 Toilette comfort

Kinds of Toilette

Only in one case there is a house without toilette place at all. All the other families have toilette and by the kind of toilette they are divided as following:

Kind of toilette	Frequency	Percent	Cum Percent
Without	1	.8	.8
Flushing by tap water	85	70.8	71.7
Pour flush	23	19.2	90.8
Septic hole (Pit latrine)	6	5.0	95.8
Septic hole with ventilation	5	4.2	100.0
Total	120	100.0	100.0

Most of the families (85 cases, 70.8%) have their toilette with flushing by tap water. With septic hole there are 11 cases (9.2%).

See Fig. 9 also.

Discharge of sewerage from WC

The following table shows that 89.9% of the families have toilette discharging to the city pipes and only about 10% discharge them in drainage canal or in septic holes. We should also say that in Selita there are cases when all the discharges go to roads.

Where do You discharge WC sewerage	Frequency	Percent	Valid Percent	Cum Percent
To sewerage pipes	107	89.2	89.9	89.9
To drainage canal	4	3.3	3.4	93.3
To septic hole (Pit latrine)	6	5.0	5.0	98.3
Other	2	1.7	1.7	100.0
No toilette	1	.8	Missing	
Total	120	100.0	100.0	

The answers: "Other" are: discharge to garden or to roads (both cases from Selita e Vogel).

Discharge of water from kitchen and bathroom

Situation is very similar even for the water that is discharged from the kitchen or bathroom. 91.6% of the cases do discharge their waters into the sewerage pipes. Table below shows detailed information.

Discharge of water from kitchen or bathroom	Frequency	Percent	Valid Percent	Cum Percent
To the sewerage pipes	109	90.8	91.6	91.6
To drainage canal	3	2.5	2.5	94.1
To septic hole (Pit latrine)	1	.8	.8	95.0
Other	6	5.0	5.0	100.0
	1	.8	Missing	
Total	120	100.0	100.0	

The answers "Other" are: garden, road, in nature. All cases are from area of Selita. We should say that the interviewers think that the number of people who do not discharge to pipes should be higher, because even that people from village answer that they discharge to pipes this is not always accurate because the sewerage pipes do not function, as nobody takes care about it.

Tables 34, 35, 36 show different kinds of toilettes and the different places where the discharge is made.

In Table 34 is shown the distribution of different kinds of toilette for each area of interview.

Table 34. Kinds of toilette by area of interview

Count Row Pct	Toilette					Row Total
	No	Tap. flush	Pour flush	Septic hole	Vent Sept hole	
Dora D'Istria		34 100.0%				34 28.3%
Muhamet Gjollesha		14 50.0%	14 50.0%			28 23.3%
Qemal Stafa	1 3.6%	20 71.4%	7 25.0%			28 23.3%
Selita e Vogel		17 56.7%	2 6.7%	6 20.0	5 16.7	30 25.0%
Column Total	1 .8	85 70.8%	23 19.2%	6 5.0%	5 4.2%	120 100.0%

In Table 35 is shown where do people through their sewerage from toilette by area of interview.

Note: In the case of Selita there are about 9 families which do have discharging canal but it does not function because it is blocked. This note is valid for the next questions too.

Table 35. Place of throughing the garbage by the area of interview

Count Row Pct	Discharge of sewerage from WC				Row Total
	Sewer. pipes	Drainage canal	Septic hole	Other	
Dora D'Istria	33 97.1%	1 2.9%			34 28.6%
Muhamet Gjollesha	28 100.0%				28 23.5%
Qemal Stafa	27 100.0%				27 22.7%
Selita e Vogel	19 * 63.3%	3 10.0%	6 20.0%	2 6.7%	30 25.2%
Column Toal	107 89.9%	4 3.4%	6 5.0%	2 1.7%	119 100.0%

Table 36 shows how are distributed the places for discharges from kitchen and bathroom by area of interview.

Table 36. Places of discharge of water from kitchen or bathroom

Count Row Pct	Discharge of water from kitchen or bathroom				Row Total
	Sewer. pipes	Drainage canal	Septic hole	Other	
Dora D'Istria	34 100.0%				34 28.6%
Muhamet Gjollesha	28 100.0%				28 23.5%
Qemal Stafa	27 100.0%				27 22.7%
Selita e Vogel	20 * 66.7%	3 10.0%	1 3.3%	6 20.0%	30 25.2%
Column Toal	109 91.6%	3 2.5%	1 .8%	6 5.0%	119 100.0%

See Fig. 10 also.

Sewerage pipes. Drainage facility.

In 111 cases (102.5%), sewerage pipes are nearby the house and only in 9 cases is far away. From the cases when is nearby only 4 families are not connected to and this for the reasons like high cost, willing to be connected, or the need for. Different reasons given to this question are: blockage of main canal, it is not possible to be connected, there is no toilette in the house, or no reason for it. Table 37 shows some of the results.

Table 37. Characteristics of pipes by the area of interview

Count Row Pct	Pipes			Row Total
	Sewer. pipes	Drainage canal	Septic hole	
Dora D'Istria	1 2.9%	33 97.1%		34 28.3%
Muhamet Gjollesha		28 100.0%		28 23.3%
Qemal Stafa	1 3.6%	26 92.9%	1 3.6%	28 23.3%
Selita e Vogel	7 23.3%	20 66.7%	3 10.0%	30 25.0%
Column Toal	9 7.5%	107 89.2%	4 3.3%	120 100.0%

Note: See the previous note for the case of Selita e Vogel

Blockage of WC

This is a well-known case because 43% of the families have faced at least once this problem.

Table below shows how many times the WC is blocked and the number of families that do answer "Yes".

How many times a year	Number of families	Percent	Valid Percent	Cum Percent
1	18	15.0	40.9	40.9
2	13	10.8	29.5	70.5
3	8	6.7	18.2	88.6
4	1	.8	2.3	90.9
5	2	1.7	4.5	95.5
10	1	.8	2.3	97.7
60	1	.8	2.3	100.0
No blockage	76	63.3	Missing	
Total	120	100.0	100.0	

In average 3.5 times a year the bathrooms are blocked. Half of the families answer that bathrooms are blocked twice a year. The most frequent case is once a year.

The time to be repaired varies from 1 to 30 days. Average time for repair is 4.8 days. Half of the families say that the repair lasts 2 days, but the most frequent answer is 1 day. In 92.9% of the cases the repair finishes in 7 days.

Sanitarian Practices

In cases of WC blockage, about 60.8% do repair it by themselves and do not expect to be repaired by local authorities. It is common that they do cooperate with their neighbors (40% of the cases) and only 20.8% of the cases are repaired by individuals.

See Fig. 11 also.

About 39.2% (47 families) answer that they do not repair it by themselves and 45 from them wait for the local power to repair it.

In general people through their garbage in the proper place. Only 16.7% of families through their garbage to roads or into drainage canals. But people do complain that these places are most of the time unclean.

III.6 Improvements of the sanitarian conditions of water supply

In this part of the study we have aimed to look at the different ways that people are trying to find other water sources in order to increase the amount of water coming in the house. We asked for different potential ways for improvements and to see the readiness of citizens to contribute using financial support, through monthly taxes or through capital investments or through loan policies.

III.6.1 Improvements of water supply

Tax payment

About 97.5% of the families are ready to pay as the water meter will show, if the conditions of water supply will be improved. Only three from 120 families do not agree to pay pretending that they are veterans (war partisans) and they should not pay. One other case that the person is ready to pay but he does not know how much. There are no other claims.

What payment can people afford

Table below shows the number of families grouped by the amount of money that people can afford.

Amount of money:	Number of families	Percent
20	2	1.7%
50 - 100	38	31.7%
101 - 200	41	34.2%
201 - 300	15	12.5%
301 - 400	13	10.8%
500 -- 1000	7	5.8%
Total	116	96.6%

To see how these answers relate to income we have presented Table 38, which shows the distribution of number of families who are ready to pay the tax (fee) for the water supply, if the service will be improved, related with the amount of income per family.

Table 38. Number of families by income and by the readiness of paying

Count / Row Pct		Income (in Leke)					Row Total
		1500-4000	4000-8000	8000-16000	16000-25000	Over 25000	
Fee that can afford (Leke):	Less than 50			2 100.0			2 1.7
	50-100	8 21.1	14 36.8	8 21.1	6 15.8	2 5.3	38 32.8
	101-200	2 4.9	1 2.4	20 48.8	12 29.3	6 14.6	41 35.3
	201-300		2 13.3	7 46.7	2 13.3	4 26.7	15 12.9
	301-400	1 7.7		2 15.4	5 38.5	5 38.5	13 11.2
	Over 400		1 14.3	2 28.6	1 14.3	3 42.9	7 6.0
Column Total		11 9.5	18 15.5	41 35.3	26 22.4	20 17.2	116 100.0

In Table 39 is shown the distribution of number of families by their main income sources and by the fact that are they ready to pay the water supply fee after the conditions will be improved.

Table 39. Distribution of the number of families by the main income source and readiness to pay

Count / Col Pct		Readiness to pay		Row Total
		No	Yes	
Main income source:	Govern salary	2 66.7%	78 66.7%	80 66.7%
	Employed to priv.	1 33.35%	12 10.3%	13 10.85
	Private business		19 16.2%	19 15.8%
	Income from abroad		1 .9%	1 .8%
	Money with interest		7 6.0%	7 5.8%
Column Total		3 2.5%	117 97.5%	120 100.0%

Most of the families who agree to pay the water supply fee are from families whose main income source is government salary (see column number 2).

Saving water

Families interviewed answer to the question "which directions will you save your water if you will pay more?", in a confusing way. Some people say that saving water is a common thing for them to do. Different answers are: not leave the faucets open, not use the water for garden, using carefully the water for laundry.

Water from water supply or from well

After improving the conditions of water supply 119 families (99.2%) answer that they will use the city water instead of wells. Reasons that people give are different but they do emphasize that the use of water supply from the city service is more comfortable. There is only one case where the person interviewed said that the city water is not cleaner than his well's water.

Priorities of improvements

Following table shows the priorities of the improvements that families would like to do, concerning the water supply.

Main priority

Kind of improvement	Number of families	Percent
Continuous supply	47	39.2%
Enough pressure	4	3.3%
To be drinkable	67	55.8%
Low payment rates	2	1.7%
Total	120	100.0%

Following table shows the second priority that different families have given to the question "Which improvement would you like to do", concerning the water supply.

Second priority

Kind of improvement	Number of families	Percent
Continuous supply	54	45.0%
Enough pressure	18	15.0%
To be drinkable	42	35.0%
Low payment rates	2	1.7%
Total	116	96.7%

There are four families who have not chosen any second priority of improvement.

Following table shows the third improvement that families would do.

Third priority

Kind of improvement	Number of families	Percent
Continuous supply	10	8.3%
Enough pressure	33	27.5%
To be drinkable	5	4.2%
Low payment rate	40	33.3%
Total	116	73.3%

32 families have not chosen any third priority.

Following table shows the fourth priority improvement the families would like to do.

Fourth priority

Kind of improvement	Number of families	Percent
Continuous supply	5	4.2%
Enough pressure	31	25.8%
To be drinkable	2	1.7%
Low payment rate	42	35.0%
Total	80	66.7%

We see that 40 families have not answered for the fourth priority.

The tables above show that the two highest priority improvements to be made are the continuous supply and the water to be cleaned (water should be drinkable). Less emphasis is given to the other potential improvements like enough pressure or price. It seems from the interviews that people do not care much about paying.

Respecting Laws

After improving the conditions of water supply and sewerage system new laws will be written. To the question if people will respect this laws which possibly will require to be connected to the public service pipes, 109 from 120 families (90.8%) have answered "Yes". Only 11 families do not like to be connected.

Reasons presented:	Number of families	Percent
'I do not need it'	1	.8%
'I don't want to spend money'	5	4.2%
'it is not my responsibility, government should do it'	5	4.2%
Total:	11	9.2%

More details are shown below. In the following table we give some data about the families who refuse to respect the laws and do not agree to pay.

In the table below we show the same results but for the families that do agree to respect the law and to pay in order to be connected to the city pipes.

Amount of money they can afford	Number of families	Percent
0	17	14.2%
100 - 500	18	15.0%
501 - 1000	27	22.5%
1001 - 1500	2	1.7%
1501 - 3000	24	20.0%
3001 - 5000	8	6.7%
Over 10000	13	10.8%
Total	109	90.8%

There is one family which does agree to pay and that they will pay whatever the cost will be, even if they will have to borrow money.

Support for improvements of the WC

To the question that "Will you improve your toilette facilities if the government authorities will support you financially", 108 from 120 families answer "Yes".

Fee for the sewerage service

For the maintenance and the functioning of the sewerage system each user of it will have to pay a service tax. To the question "Will you pay this fee" 104 families (86.7%) have answered "Yes", the others (13.3%) have answered "No".

Payment that they can afford

Table below shows a detailed information related to the capability of habitants to pay the fee for maintenance and functioning of the sewerage system for the people who agree to pay.

Amount of money in Leke:	Number of interviewed	Percent
Up to 50	9	8.7%
50 - 100	77	74.0%
101 - 200	12	11.5%
201 - 300	3	2.9%
301 - 400	1	0.9%
Over 500	2	1.9%
Total	104	100.0%

In Table 40 is shown the distribution of the number of families by income amount and the fee that they can afford.

Table 40. Number of families by income amount and tax that they can afford

Count / Row Pct		Income (in Leke)					Row Total
		1500-4000	4000-8000	8000-16000	16000-25000	Over 25000	
Fee that they can pay (Leke)	Less than 50	1 11.1%		6 66.7%	2 22.2%		9 8.7%
	50-100	8 10.4%	15 19.55	24 31.2%	17 22.1%	13 16.9%	77 74.0%
	101-200	1 8.3%	2 16.7%	6 50.0%	3 25.0%		12 11.5%
	201-300			1 33.3%		2 66.7%	3 2.9%
	301-400				1 100.0%		1 1.0%
	Over 400			1 50.0%		1 50.0%	2 1.9%
Column total		10 9.6%	17 16.3%	38 36.5%	23 22.1%	16 15.4%	104 100.0%

Table 41. Distribution of number of families by readiness to pay the fee and by the income sources

Count / Col Pct		Readiness to pay the fee		Row Total
		Yes	No	
Main Income	Govern. Salary	70 67.3%	10 62.5%	80 66.7%
	Employed to private	9 8.7%	4 25.0%	13 10.8%
	Own private business	19 18.3%		19 15.8%
	Income from abroad	1 1.0%		1 .8%
	Money with interest	5 4.8%	2 12.5%	7 5.8%
Column Total		104 86.7%	16 13.3%	120 100.0%

In Table 41 is shown the number of families dependent by the main income sources and by the fact that they are ready to pay the fee for sewerage service. As we can see the major number of the families who accept to pay the fees have as the main income source the salary from the government (see first column).

In Table 42 is shown the number of families by main income source and by the most important need of habitants for water. We can see that the most important request of the population is to have continuous water and with enough pressure, but there are more cases

where people do care only to have continuous water (compare the first column with the third one).

Table 42. Number of families by main income source and by the main improvement they would like

Count / Col Pct		Most valuable improvement for the water supply (look at legend below)				Row Total
		1	2	3	4	
Main Income	Govern. Salary	4 36.4%		7 63.6%		11 9.2%
	Employed to pivate	7 38.9%		10 55.6%	1 5.6%	18 15.0%
	Own private business	17 38.6%	3 6.8%	23 52.3%	1 2.3%	44 36.7%
	Income from abroad	9 33.3%		18 66.7%		27 22.5%
	Money with interest	10 50.0%	1 5.0%	9 45.0%		20 16.7%
Column Total		47 39.2%	4 3.3%	67 55.8%	2 1.7%	120 100.0%

1. Continuous supply
2. Enough pressure to reach the upper floor
3. To be drinkable
4. Low payment rate

We see that 16 families do not agree to pay at all. Table below shows why these people do not want to pay.

Reasons presented	Number of families	Percent
'I have never paid since the house was connected to the network'	5	33.3%
'I think such kinds of expenses should be paid by the government'	7	46.7%
'I do not have enough money for sewerage service'	3	20.0%
Total	15	100.0%

Improvements for the water supply.
Cooperation with neighbors.

64 families (53.3%) have not made any improvements related to water supply. From the families who have made some kind of improvements are: 35 families (29.2%) have installed an electric pump for bringing the water to upper floors, 3 families (2.5%) have invested on improving the bathroom, and 2 families have installed the water heater, etc. The total payment of all families is 846'160 Leke and the average amount of money per family (there are 56 families who have made improvements) is 15'110 Leke for the improvements of water supply. The minimum value paid is 60 Leke and the maximum is 200'000 Leke.

42 from these 56 families (77.8%) interviewed have cooperated with neighbors and 14 others have made improvements by themselves.

Improvements made for the sewerage system.
Cooperation with neighbors.

There are 102 from 120 families (85%) that have answered "no" to the question if they have made any improvement related to the sewerage system or not. 18 other families have made improvements as following: 4 families (3.3%) are connected to the sewerage pipes, 3 families (2.5%) have improved the toilette, 3 families have made a drainage canal, 3 families have put money in order to repair the blockage of the toilette. Total payment by these families is 467'350 Leke and the average (for 18 families who have made improvements) is 25'963 Leke. Minimum value is zero and the maximum is 200'000 Leke. 5 from these 18 families have cooperated with neighbors (29.4%), the others have made improvements by themselves.

Financial support by the government

Only 2 families (3.3%) say that they have had financial support by the government.

IV. CONCLUSIONS

Building structure and Family

The recent democratic changes in Albania have made that almost all the interviewees are owners of the houses where they live. Housing is and will be a problem for Albanians for few more years. It is true that there are more houses to be rented but the financial situation of Albanians is poor. New houses that are being built and for sale are out of the financial capacities of the most of the population.

The period of time when the houses are built is about 50 years. About 40% of the houses are built between 1971 and 1980. Individual houses with gardens (Villa) are built up to year 1960. This tendency is a characteristic of the areas that we have chosen.

In apartment buildings the majority of the apartments are of configuration 1+1, 2+1 and 3+1. The number of family members is high and we can say that the living space is small. Many families eat in the living room as they do not have enough space to have a separate eating place. In many families interviewed the cooking place (kitchen) was very limited.

From this common phenomenon in Albania there is a small part of people who have their own business and generate money much more than what they can gain from the work in the government. However, many of these families in general have not solved the living conditions.

Majority of families have only one toilette and almost all of the families have it with the shower room together.

Income

In average in each family there are 2 persons who generate income. The main source of income is the government salary (66.7%). We think that this is as a result of the tendency of the people to declare only the known income and they do not refer to income related to the temporary jobs. In villages for example only few people consider the work in the garden as another kind of income source.

There are no many cases that have income from abroad. Second ranked income source is the government salary again. Also the money from being employed to private or working in their own private business is ranked in the first priorities of income. New phenomenon in these families is giving money with high interest rates, which has become a good source of income more important than having money from abroad. Number of families without any second source of income is high (57%). Monthly average income is about 14'000 Leke, but there are differences between areas chosen for interview. The poorest area is Selita and Qemal
Stafa.

Monthly average expenses are almost the same as the income. In general families do spend all their income. Half of the families spend less than 13'000 Leke a month. In all cases, families pay the charges for the use of electricity and in all legal houses there is an electric meter. The payment is made based on what the meter shows.

Charges for water are in a fixed rate and in per capita basis. These charges are different for different floors of living in apartment buildings. Upper floors pay less water charges as they have less water coming in the house because of the low pressure. So, families do not use the water meters at all and in the same place families have put a pump for bringing the water up.

Families do not use water for the garden (in villages some answered we do not have water at all). In general people use the washing machine (in the cities 100%). For doing laundry families use the drinking water. As there are areas where families do not have water for long time makes the families do hand washing or through the water from the top of the washing machine.

A typical problem for Albanian families is the interruption of running water and use of it in a limited amount of hours. It is the main problem for all the interviewed families. After families generate some money the first investment they make is to put large water tanks (300-500 Liters, metal or plastic tanks, on the roof of apartment buildings too) or to install electric pumps for having water in upper floors.

In general families do not use water sources other than the city water. Only few private houses have a well, but they are not maintained. People have started to use frequently the bottled mineral water or they do boil it.

Use of the electric water pumps is becoming a typical phenomenon for families who live from the third floor and up. People do usually cooperate with neighbors and families in different floors pay

different amount of money (upper floors pay more). There are cases when people from the lower floors do not agree to pay for buying a pump, which makes some of the families install their own personal pump. The amount of money to be paid for pump installation is high compared to what the normal families get as income. Problems of condominium are important to be considered and to be solved institutionally as well.

Hygienic awareness and education of habitants is good relatively. They do know the danger that the use of electric pumps has, as it brings dirt from the pipes and causes different diseases, like diarrhea, dysentery or skin disease.

Most of the families say that they have very frequent cases of red water or strange odor/taste water coming from the faucet of drinking water. Specially after raining or after a long interruption of water a lot of dirt comes from the faucets. Financially they can not afford to solve this problem. Only few families say they buy and drink mineral water from bottles.

As there is no running water, the cleaning conditions of the toilette space or the house are not so good. In most of the families that do have the flushing capacity but they do not use it, and they just clean it by throughing water from the top of toilette. Toilette conditions are almost the same for the three areas in the city. They are connected to the sewerage pipes and in general have flushing by tap water facility. Investments for improving of toilette conditions are dependent on the amount of income per family. After families make some money they do invest to improve the toilette, change facilities, put a water heater, bath or slabs, or they do the reconstruction of hydro-system of the toilette or kitchen.

The situation is different for area of Selita where many houses are not connected to the sewerage pipe network and they discharge the water from WC, kitchen or bathroom to drainage canals, to garden or to roads nearby. Maintenance of the sewerage pipes is very poor and it comes out of the interviews that the administrative structures are missing.

In cases of blockage of toilette people in general cooperate with neighbors to solve the common problems (specially in cases of low cost repair), and the local authorities usually do not help in this issue. All persons interviewed say that they through the garbage to the proper place, however the places are not always clean. Families complain that local authorities do only a little in terms of garbage collection, putting special dustbins for garbage, or doing a scheduled disinfection.

In general we see that people are ready to pay for fees of water supply services, they say we need water and we will pay what ever the rate will be. When families were asked if they can afford to pay more after the improvement of services they do complain for having very low salary level. The first ranked improvement that people like is to have continuous water and then the quality of it.

In general families have not had any financial support (in the form of loans, or grants, or cost-sharing) for improving the toilette

services. In village area we see that families are more ready to invest in order to improve the water or sewerage facilities, as such systems are missing or are in a very bad condition. In the city, families still have not had very bad experiences with the sewerage. It comes that families do care more about keeping clean the house inside and do not care the same for the outside ambient.

V. RECOMMENDATIONS

This study shows very clear that the issues of water supply, sewerage, discharge of water from WC, kitchen or bathroom, is a very big problem for families in Tirana for now and for the future. Everyday that passes makes the situation worse, given that Tirana is growing rapidly. This is a very well-known problem of population and this study makes an evidence of it and calls for authorities to take immediate measurements for improvements. The essence is how to make the local or central power invest more money in this area.

Families should be supported financially (grants, loans, sharing costs) in order to improve the infrastructure conditions, specially the water supply and sewerage services.

It is urgent the improvement of supplying drinking water for all the city of Tirana, and specially for the village. As families use the pipe water for drinking it is very important to improve the water quality, by finding also other water resources, by increasing the pressure, etc., and of course by improving the water supply network itself.

Situation is similar for the sewerage system. New constructions, legal or not legal, have affected badly the existing sewerage network, causing danger for the habitants and making the environment dirty. The maintenance is very poor. Sewerage problems are getting bigger as Tirana is growing and the individuals do not always respect the technical criterion for connection of maintenance.

In general, people are conscientious for the importance of having water of good quality and for the need of better hygienic and sanitarian conditions, as well as for water that they drink, or cleanness of environment where they live. But they don't have the power to act on their own or in group with other habitants, to solve the problems. It is necessary for them to co-operate with local power to treat and solve these problems. In general the habitants are apathetic, but they don't know how and where to deal with these problems.

The creation of administrative structures (the information for these structures, if they exist) which will deal in local level, the increase of attention from these structures for the part of the problems they are responsible, it is necessary. It is not that habitants don't want to pay or can't pay for the different services that offer to them. But they have to be convinced for the efficiency of putting the money in.

At the same time it is necessary to reinforce the execution of laws and rules that affect this area.

It is needed the engagement of the media, associations and the environment foundations, to take care about informing the habitants for the situation, for the expected bad consequences, for the importance of having good water supply or sewerage,
for the measurements that should be taken by government or by informal institutions.

All these issues are not separated from a good education policy that should be improved in each level of education system in Albania.

Fig.1

Number of families interviewed

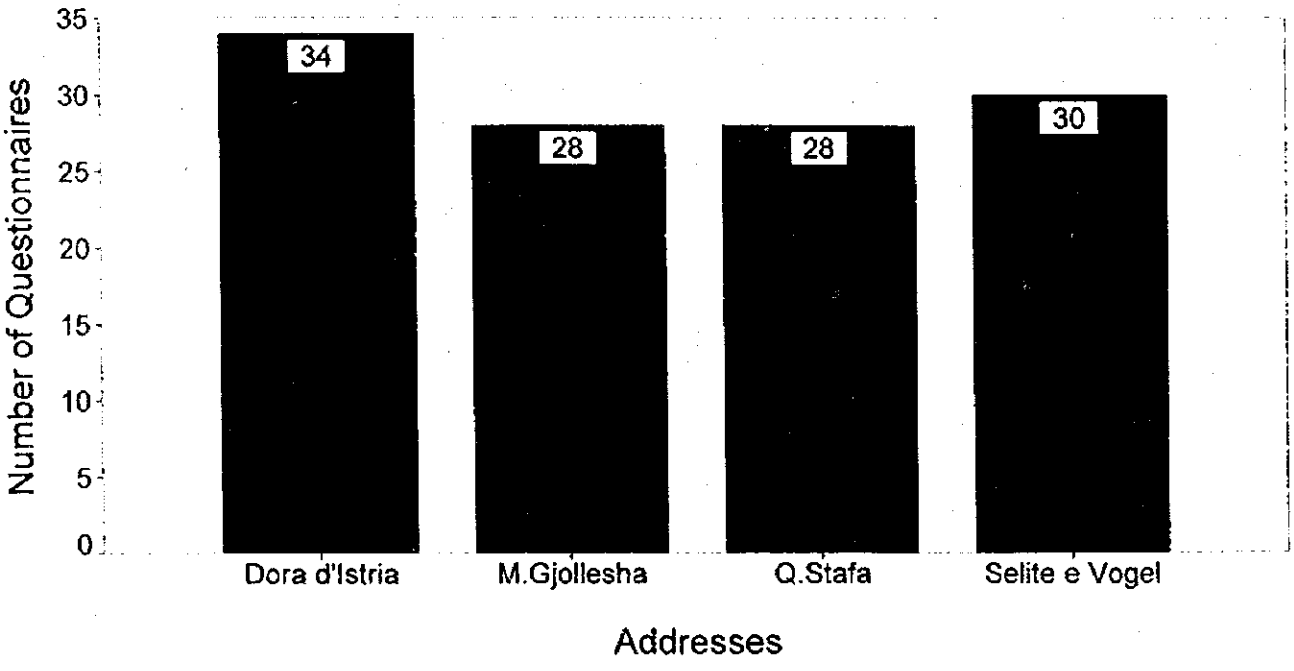


Fig. 2

Year of construction

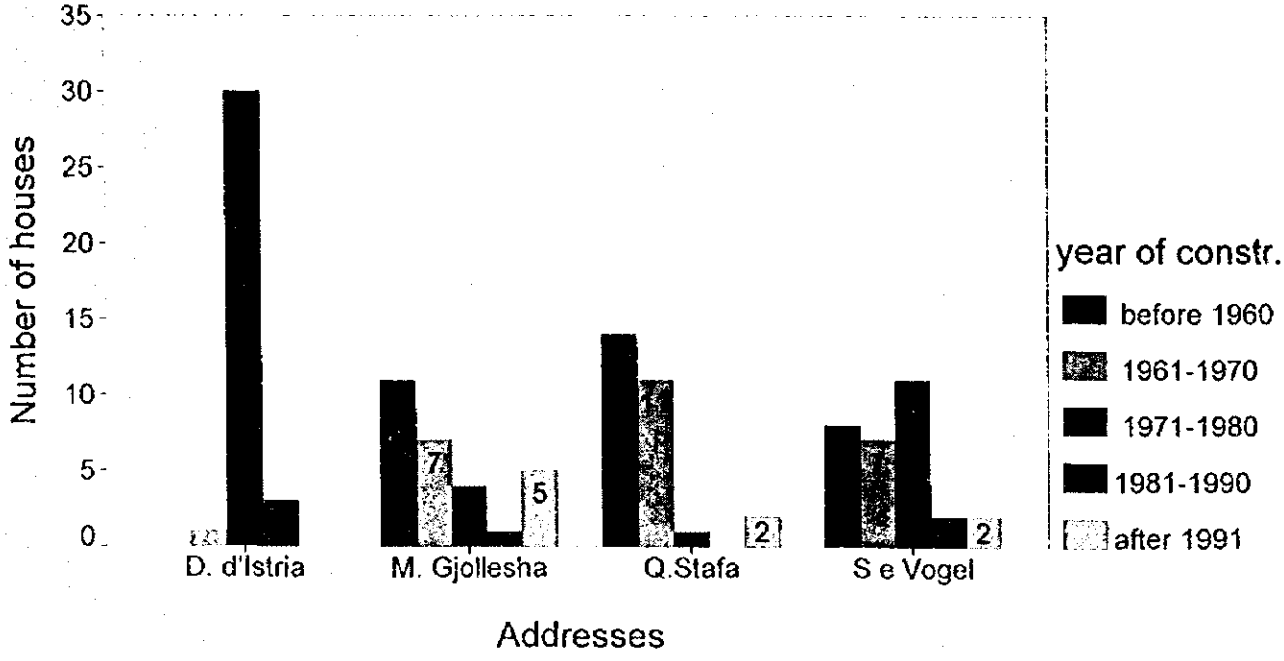


Fig.1

Number of families interviewed

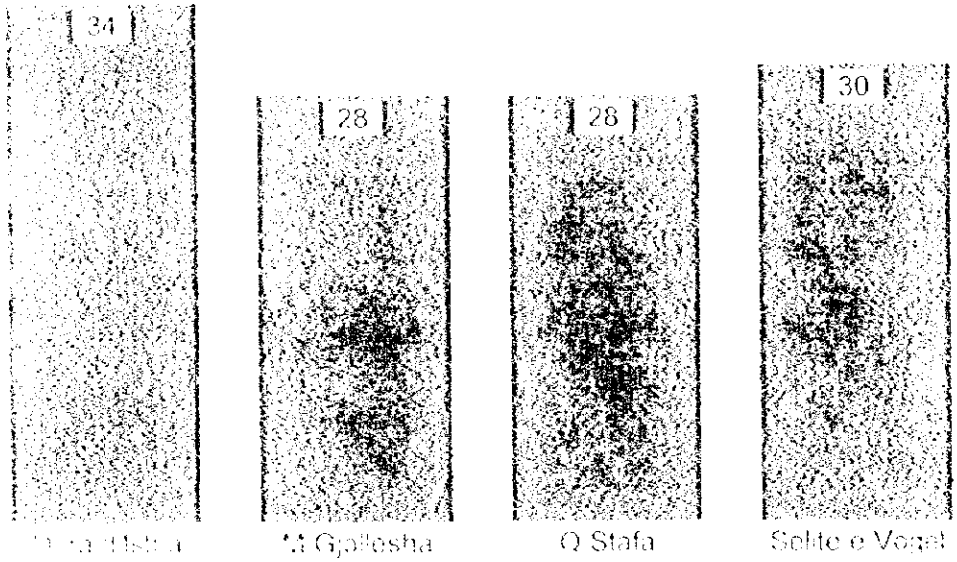


Fig. 2

Year of construction

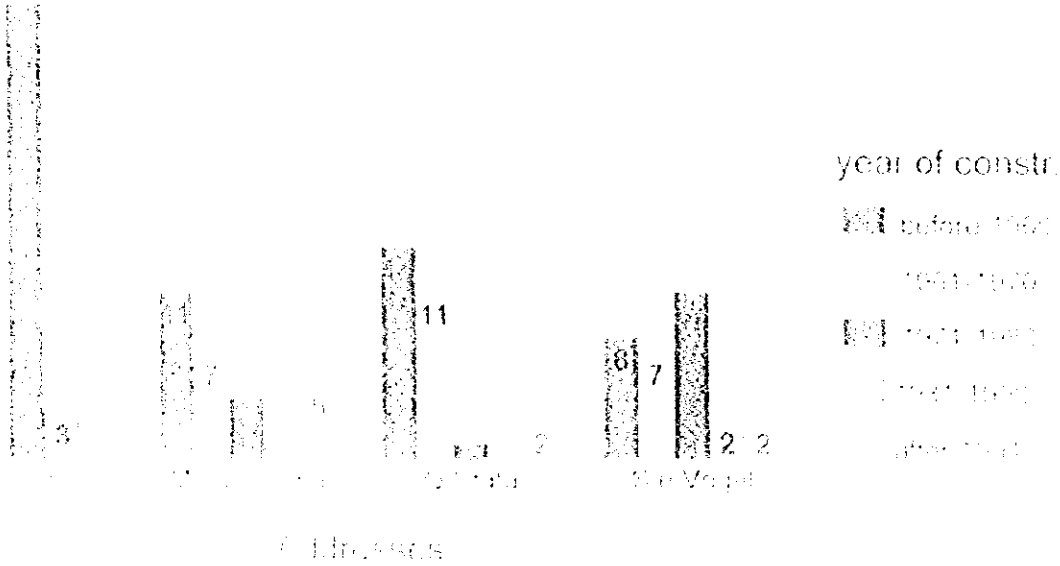
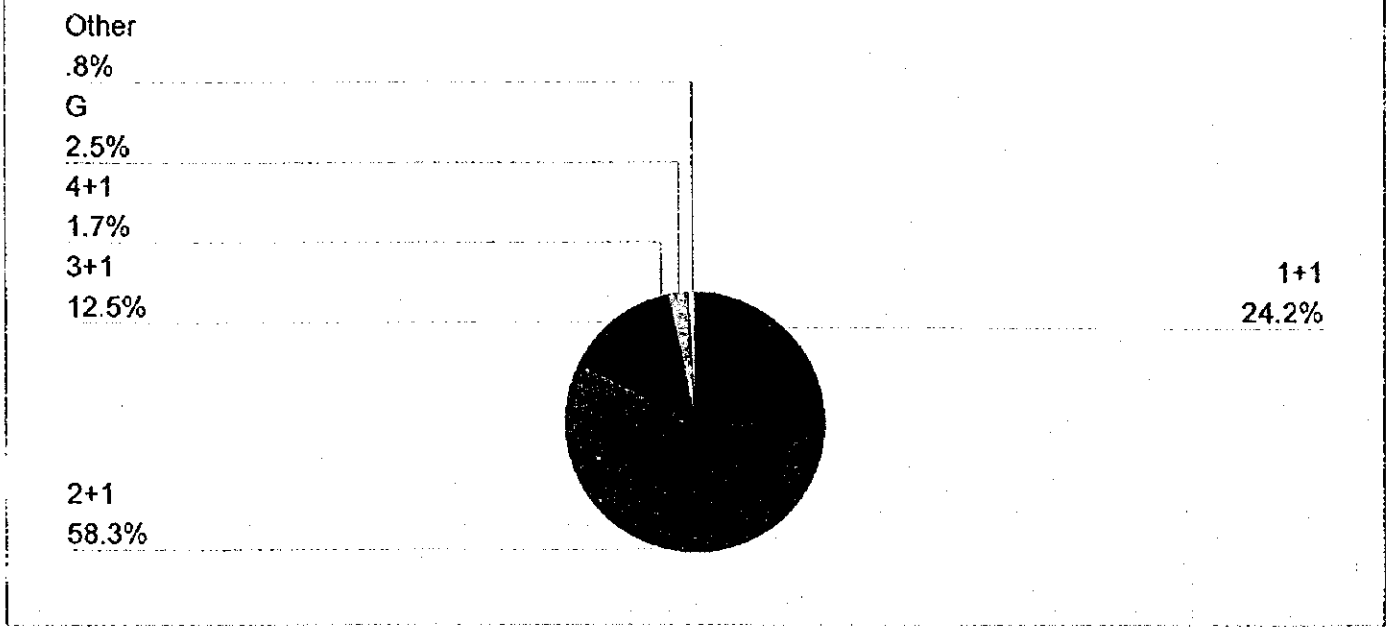


Fig. 3
House configuration



House configuration

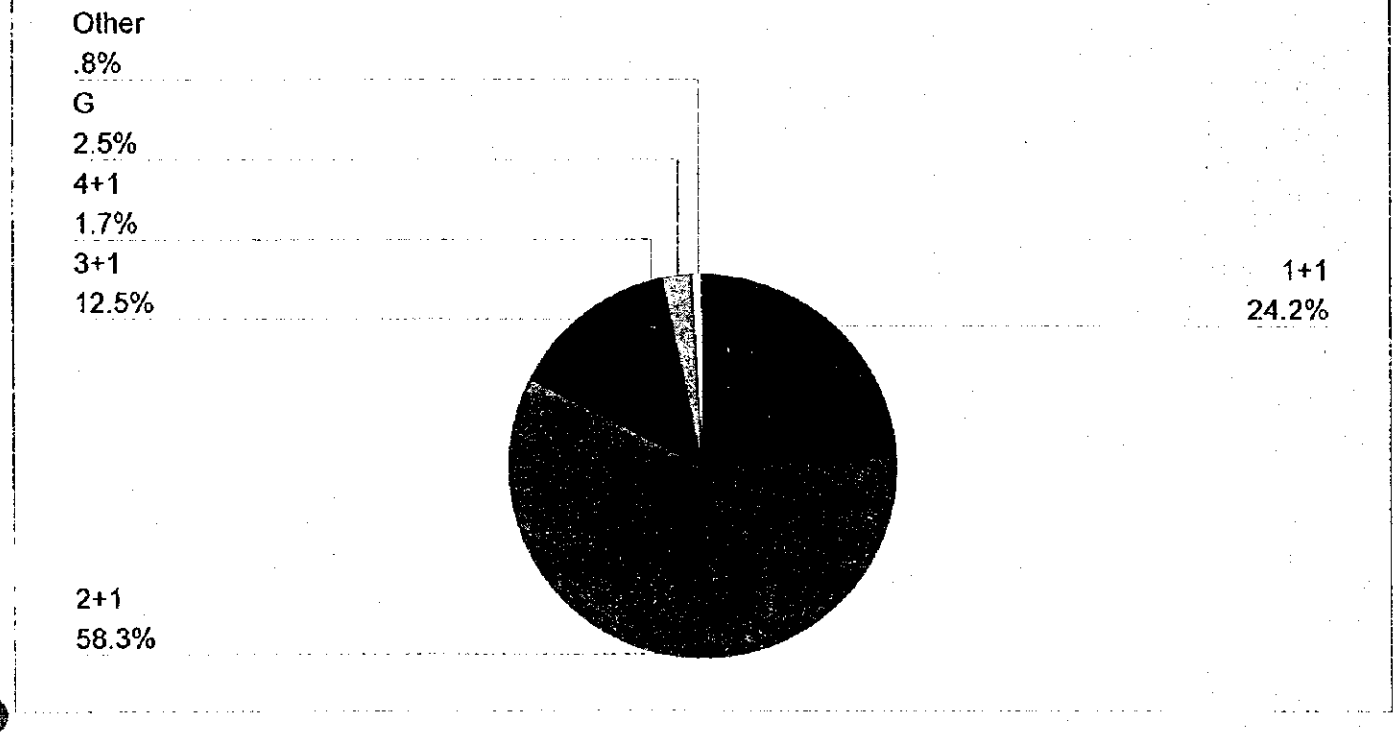
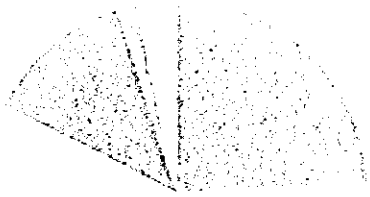


Fig. 3
House configuration

House configuration



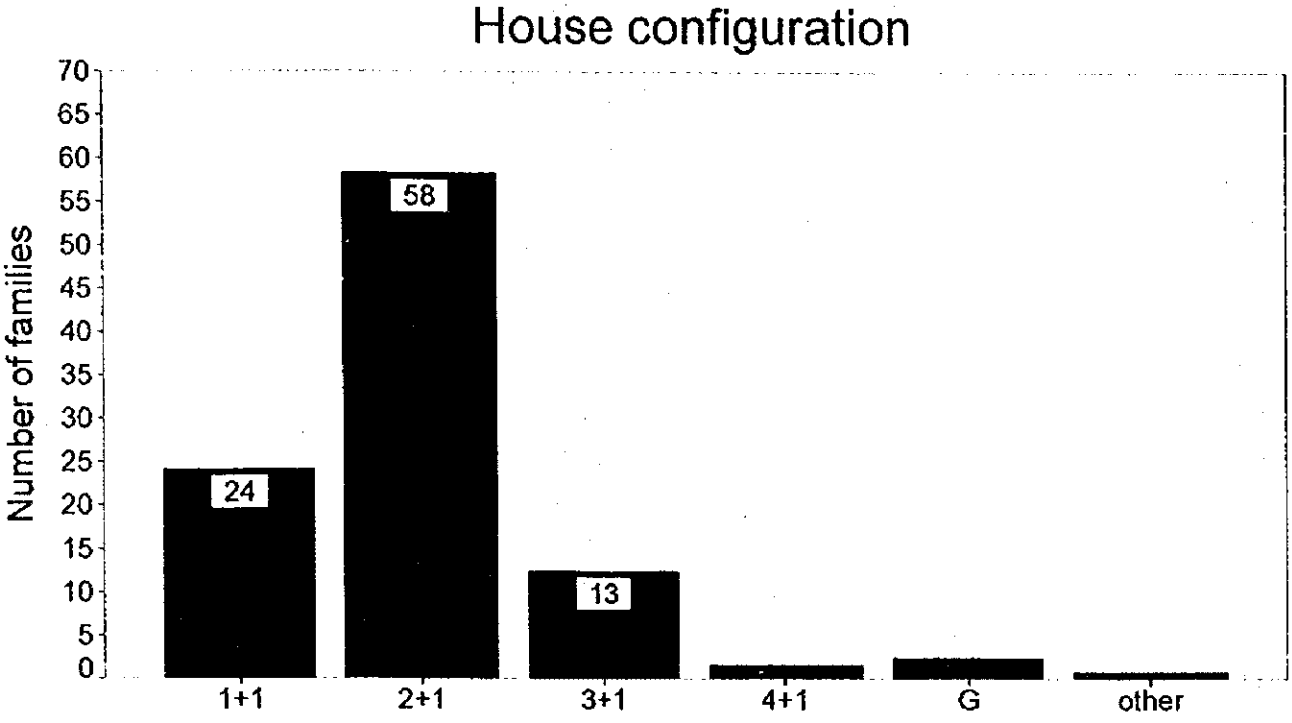

House configuration
Number of families
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
58
24
13
1+1
2+1
3+1
4+1
G
other

Fig.3

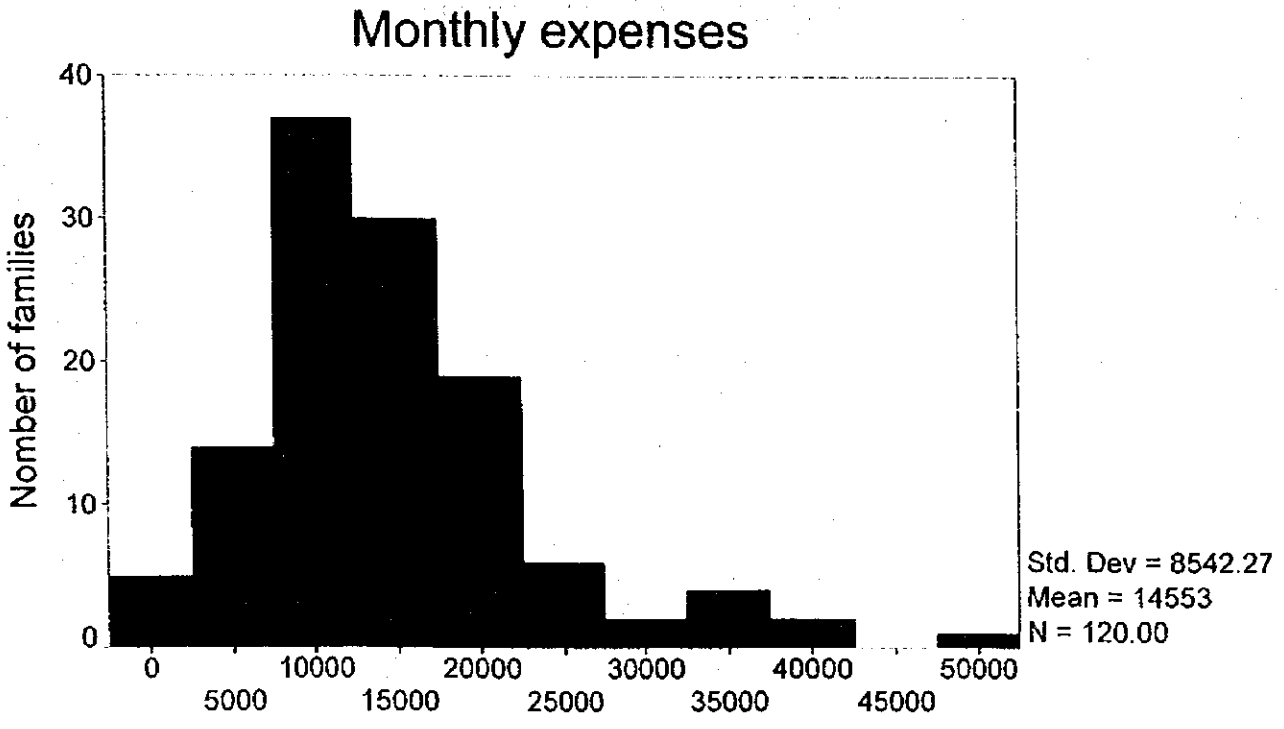

Monthly expenses
Nomber of families
40
30
20
10
0
0
5000
10000
15000
20000
25000
30000
35000
40000
45000
50000
Std. Dev = 8542.27
Mean = 14553
N = 120.00

Fig. 4

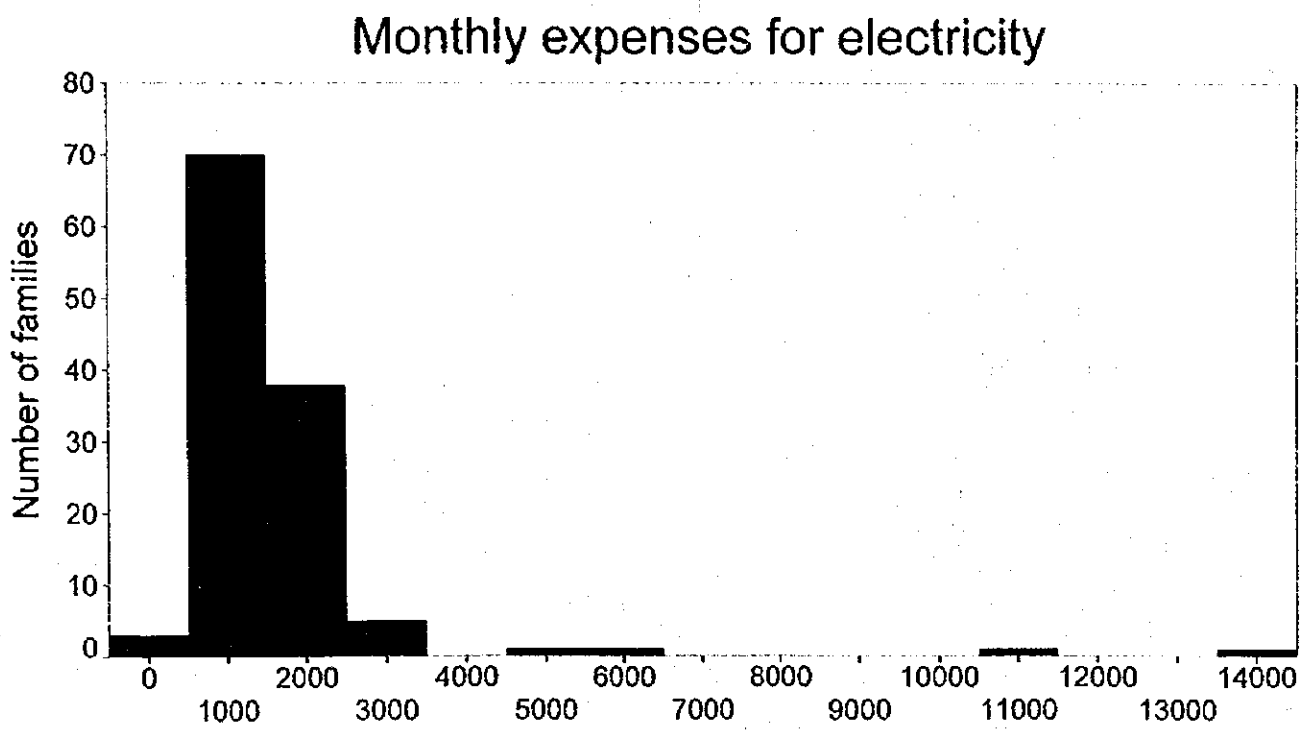

Monthly expenses for electricity
Number of families
80
70
60
50
40
30
20
10
0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
11000
12000
13000
14000

Fig. 5

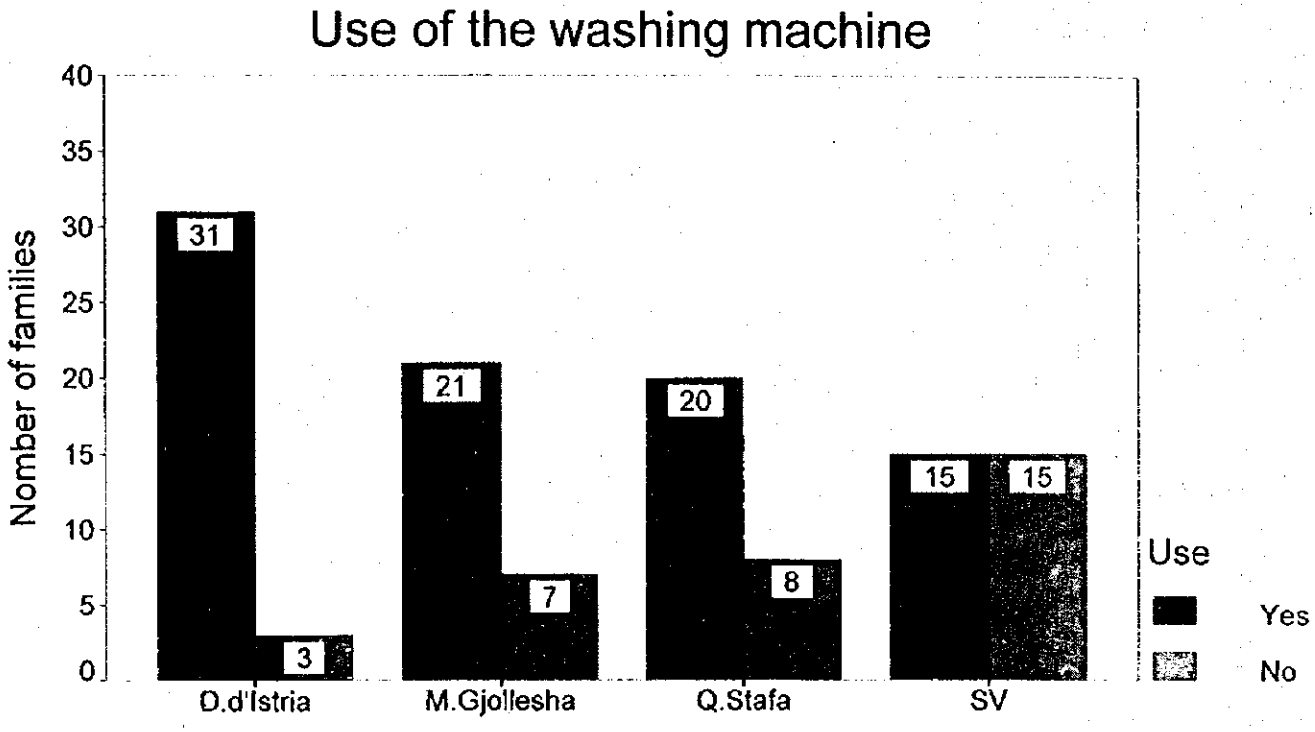

Use of the washing machine
Nomber of families
40
35
30
25
20
15
10
5
0
31
3
21
7
20
8
15
15
D.d'Istria
M.Gjollesha
Q.Stafa
SV
Use
Yes
No

Fig. 6

Fig. 7
Watermeter

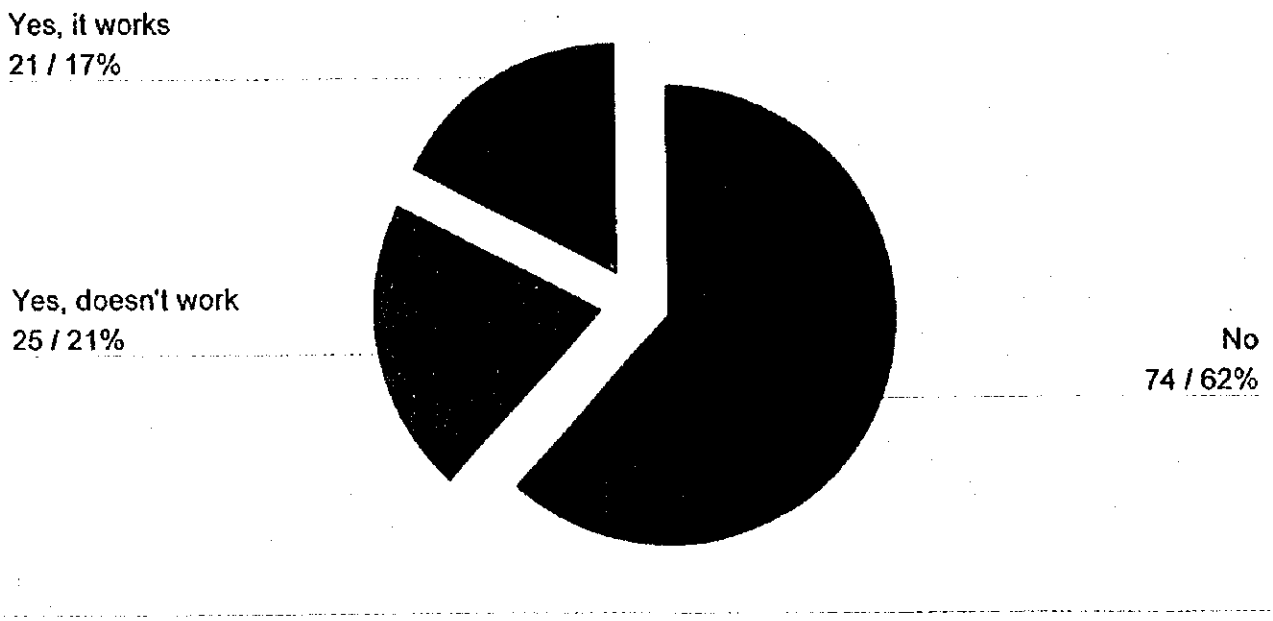


Fig. 8
Use of electric pumps

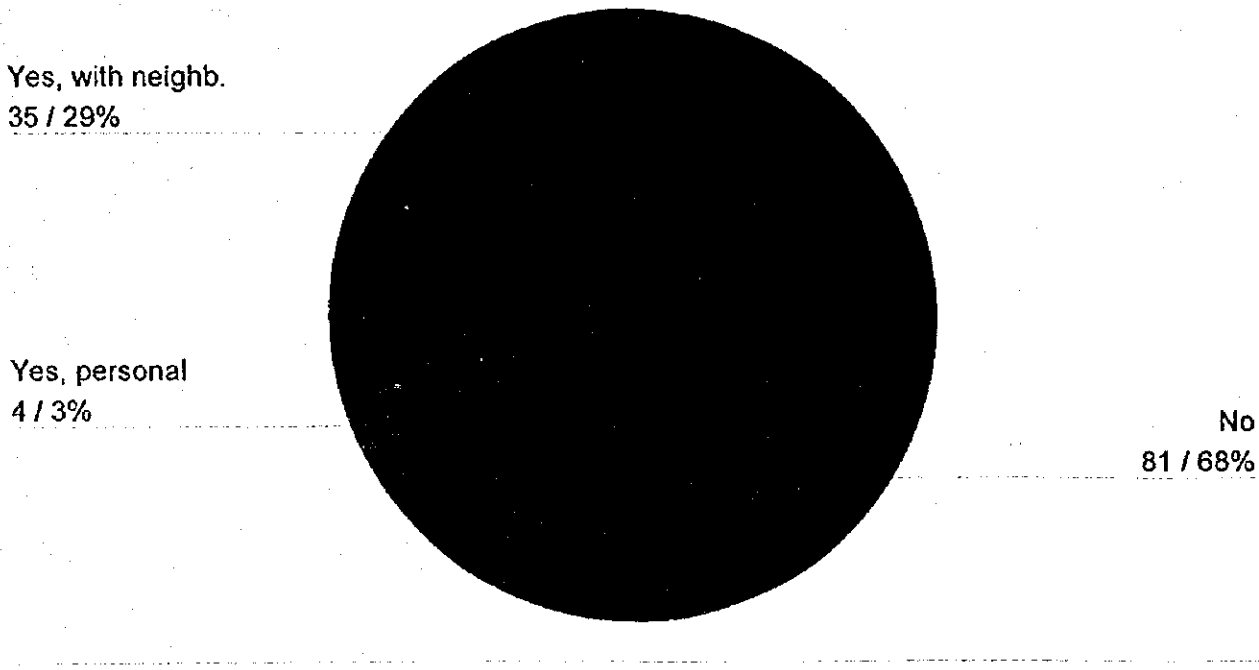


Fig. 7
Watermeter

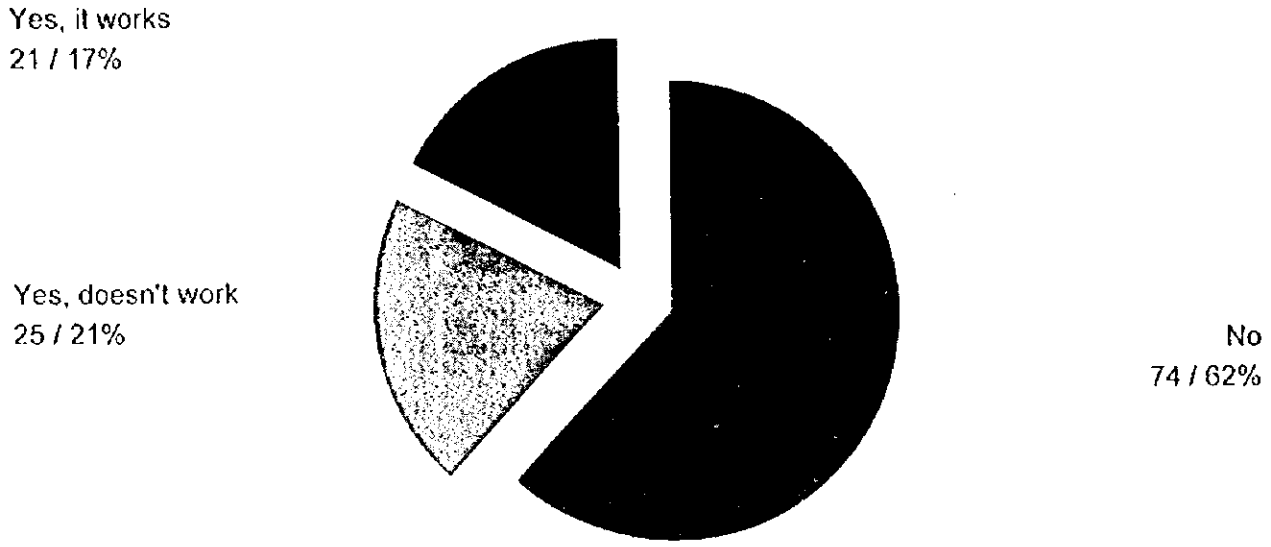


Fig. 8
Use of electric pumps

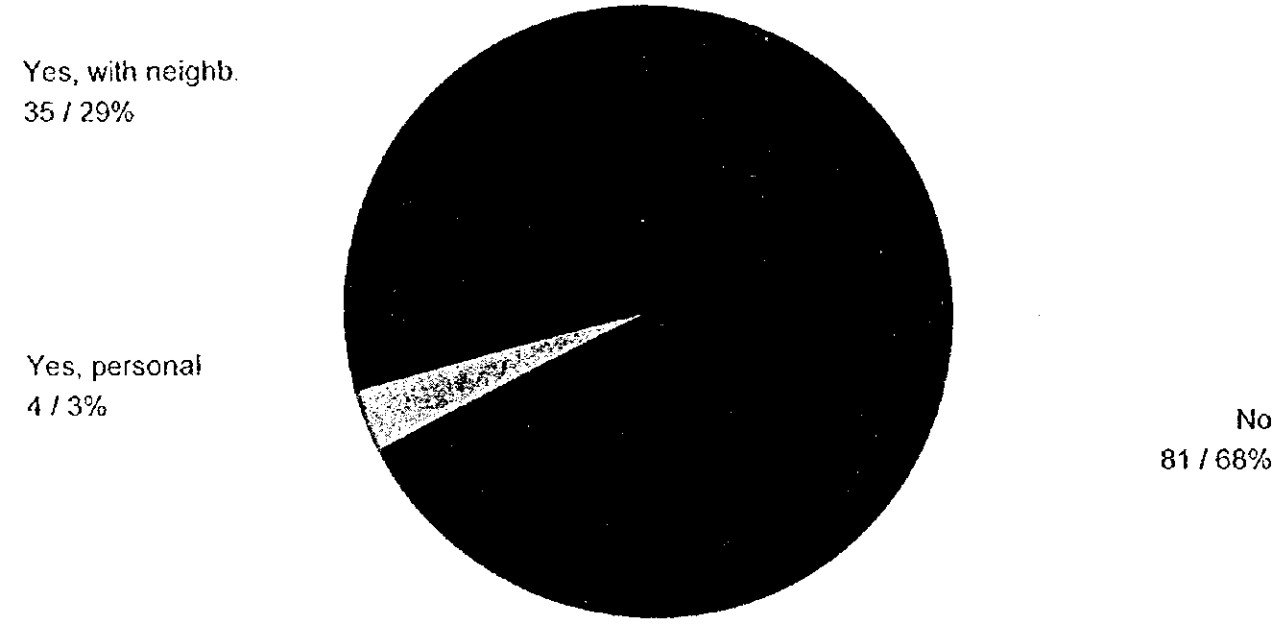


Fig. 9

Kind of toilette

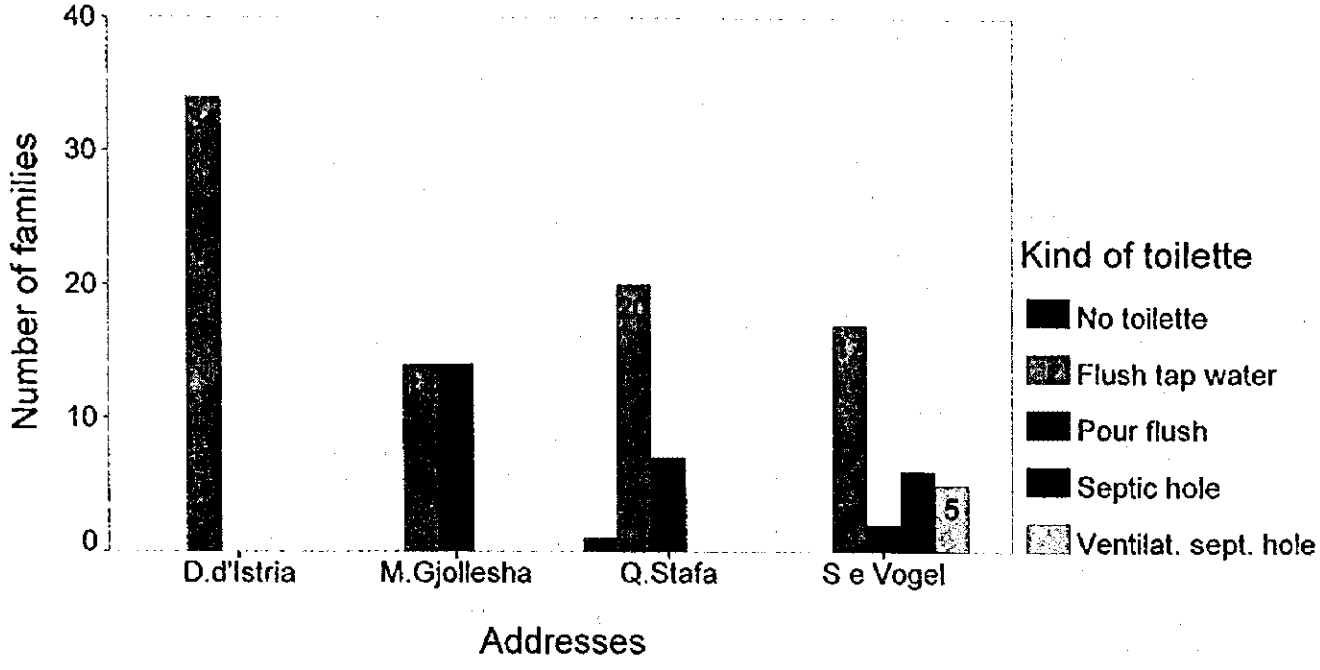


Fig. 10

Place of discharge

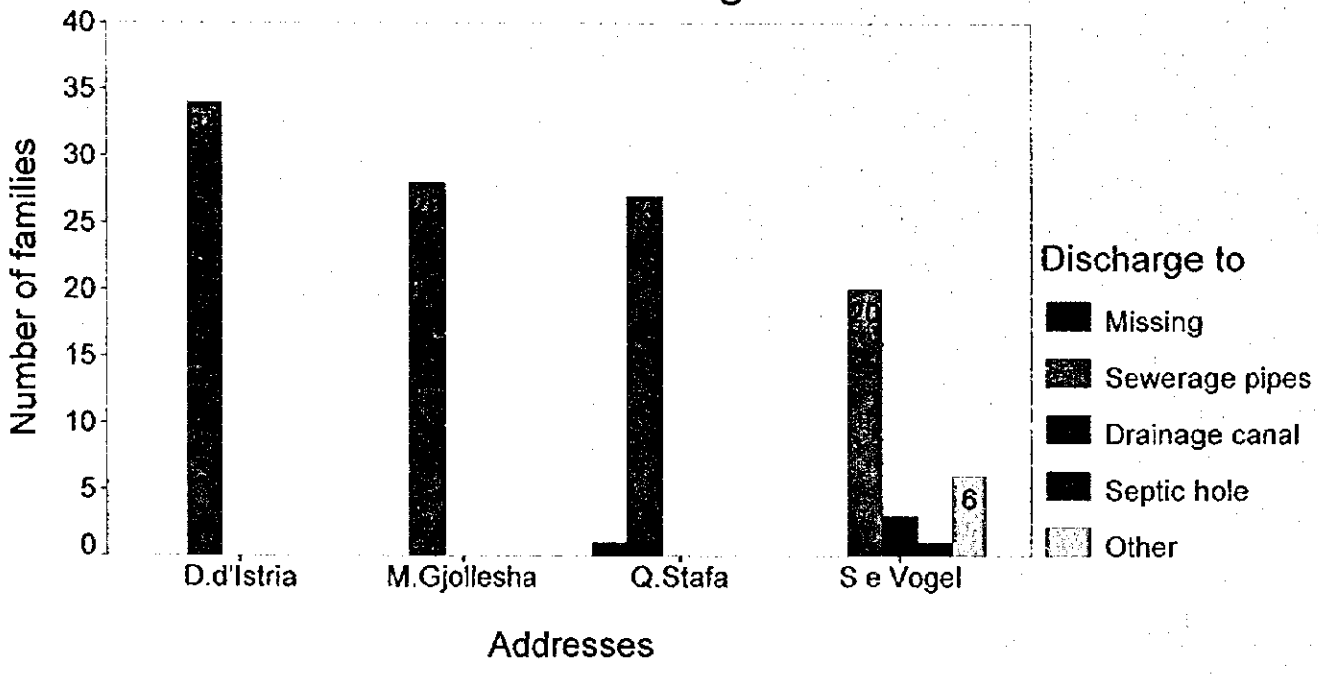


Fig. 9
Kind of toilette

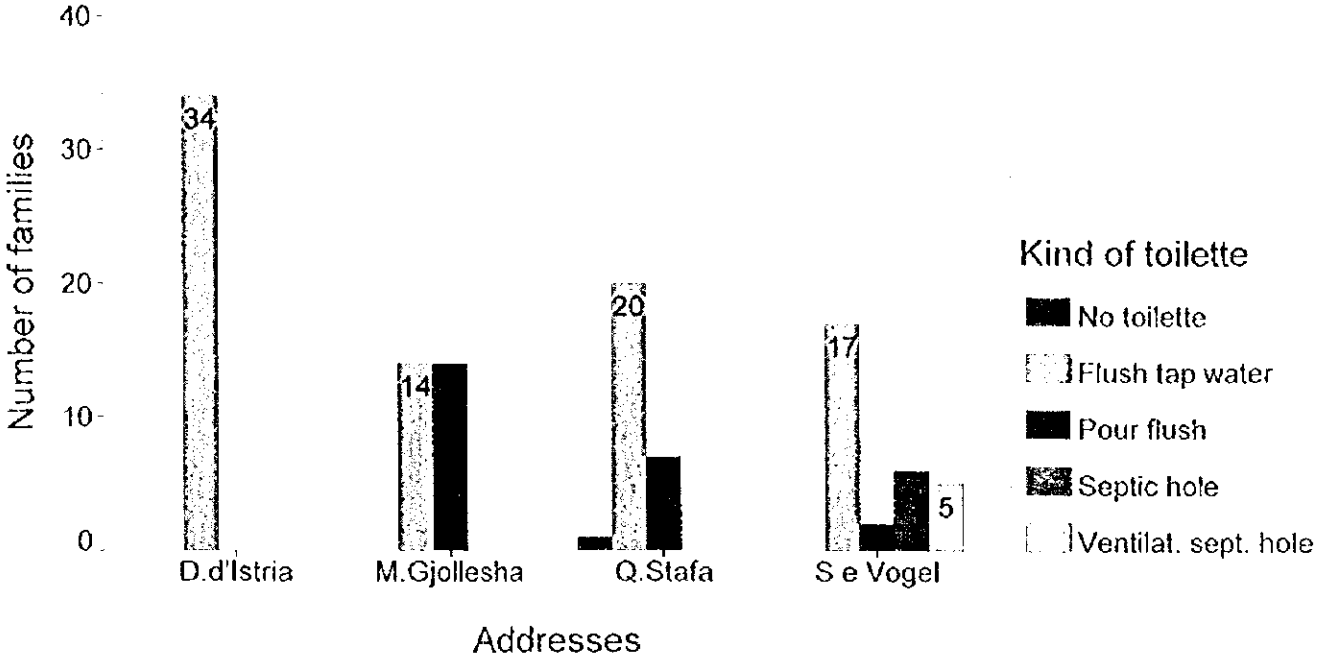
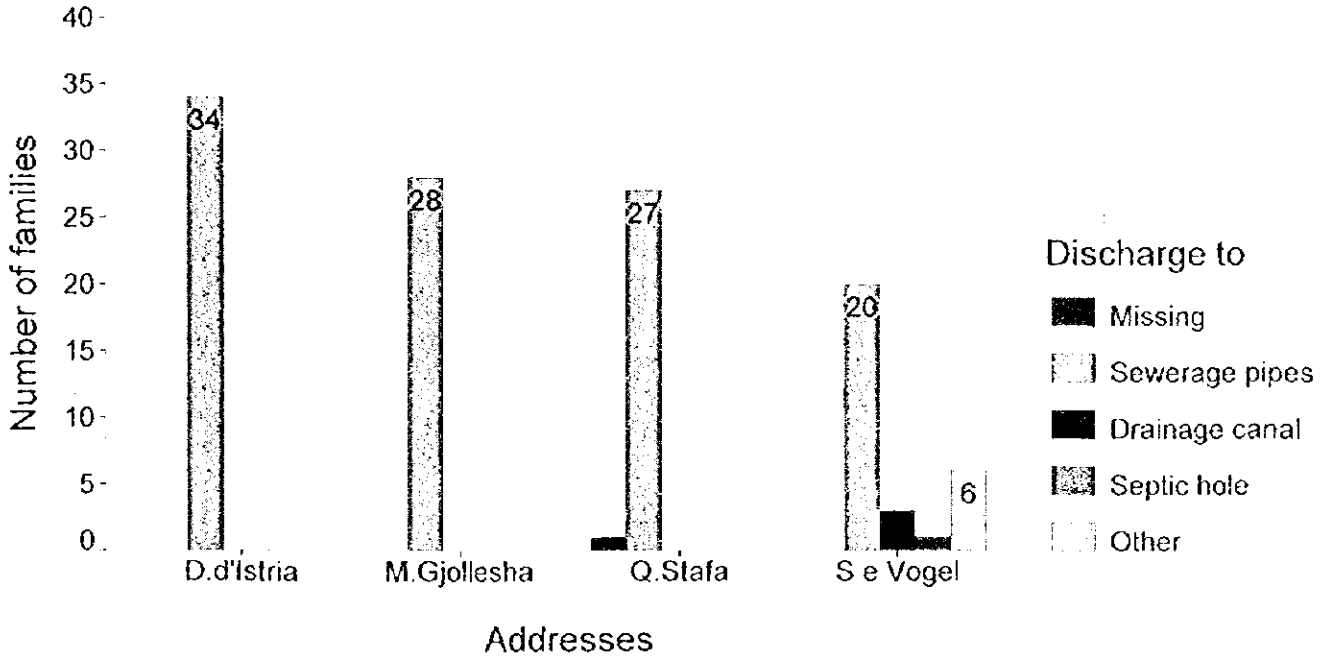


Fig. 10
Place of discharge



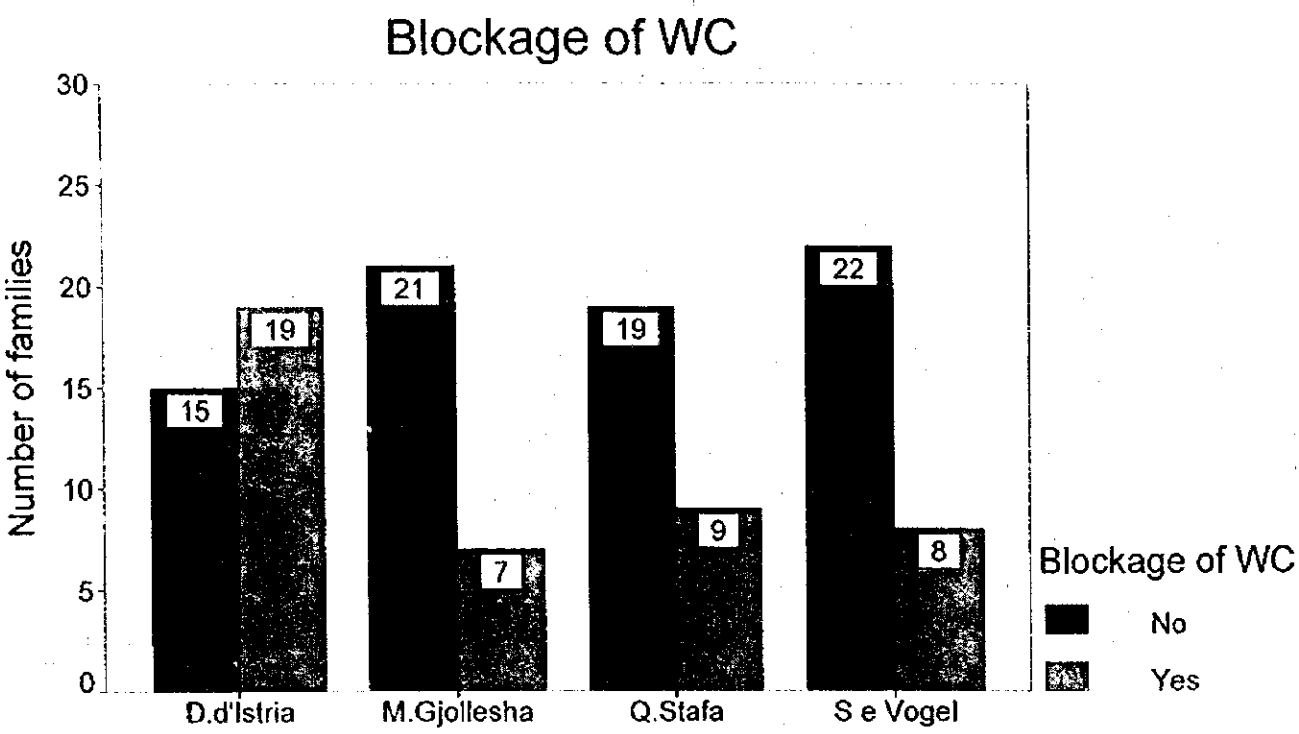
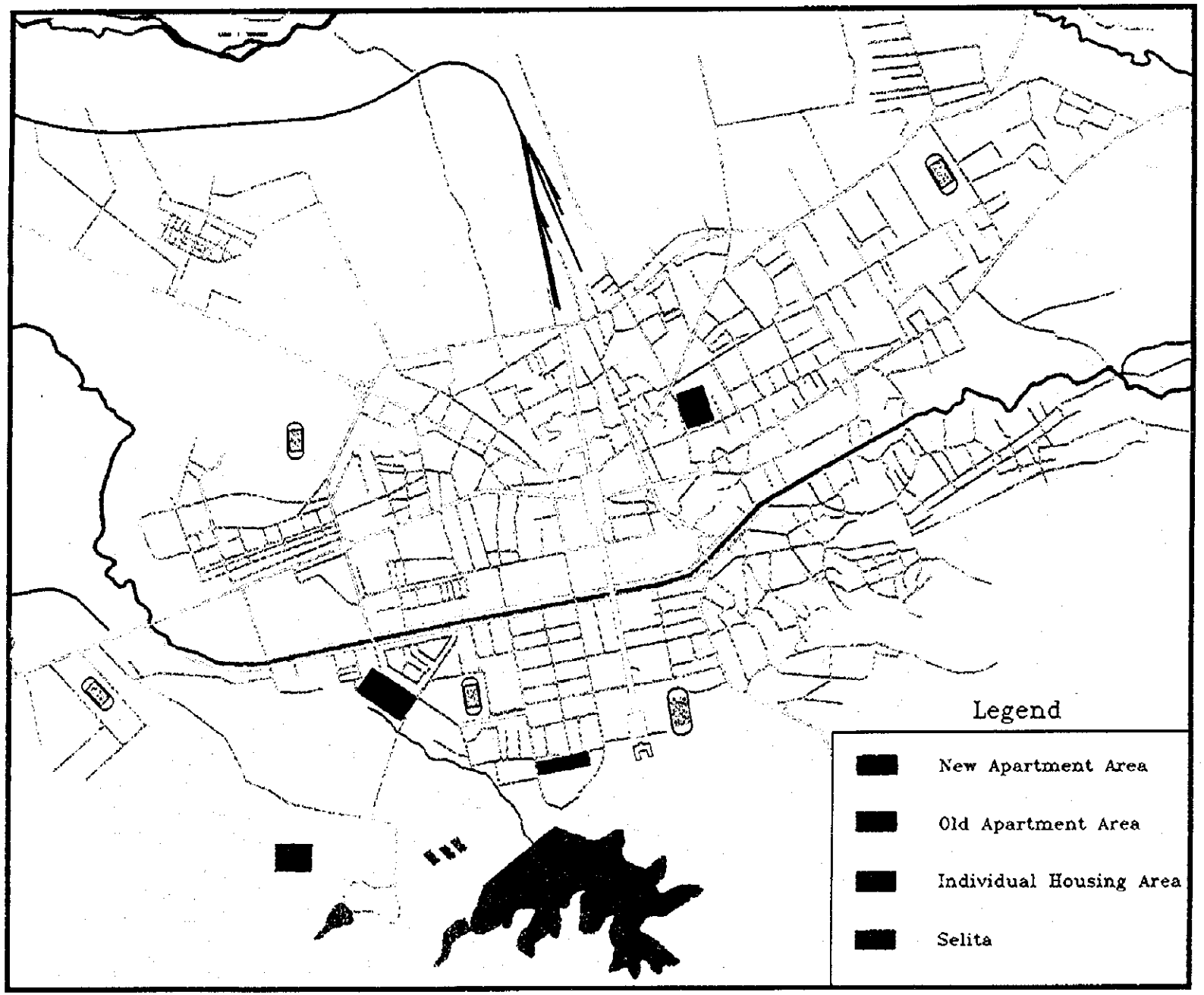
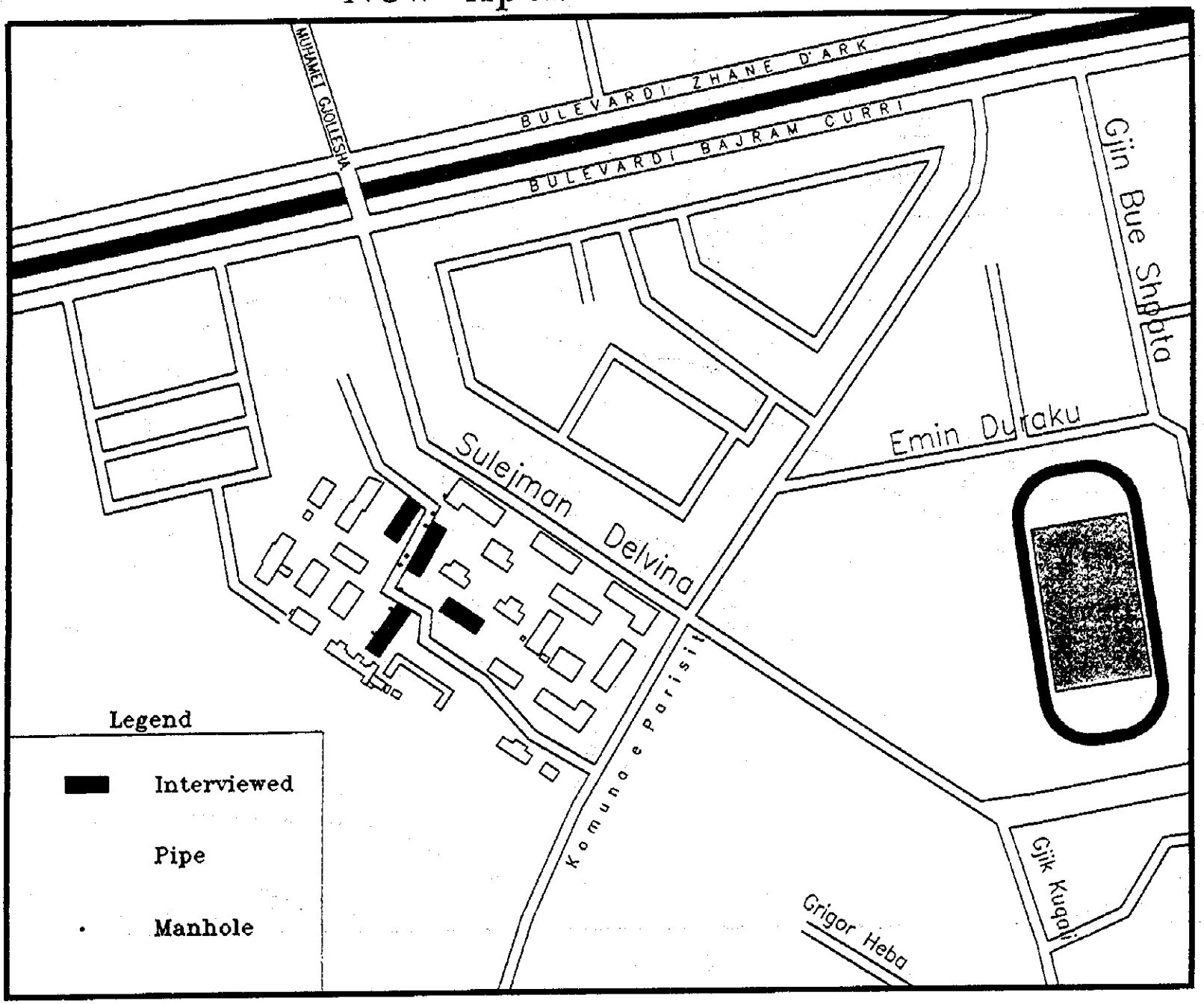

Blockage of WC
Number of families
30
25
20
15
10
5
0
15
19
21
7
19
9
22
8
D.d'Istria
M.Gjollesha
Q.Stafa
S e Vogel
Blockage of WC
No
Yes

Fig. 11

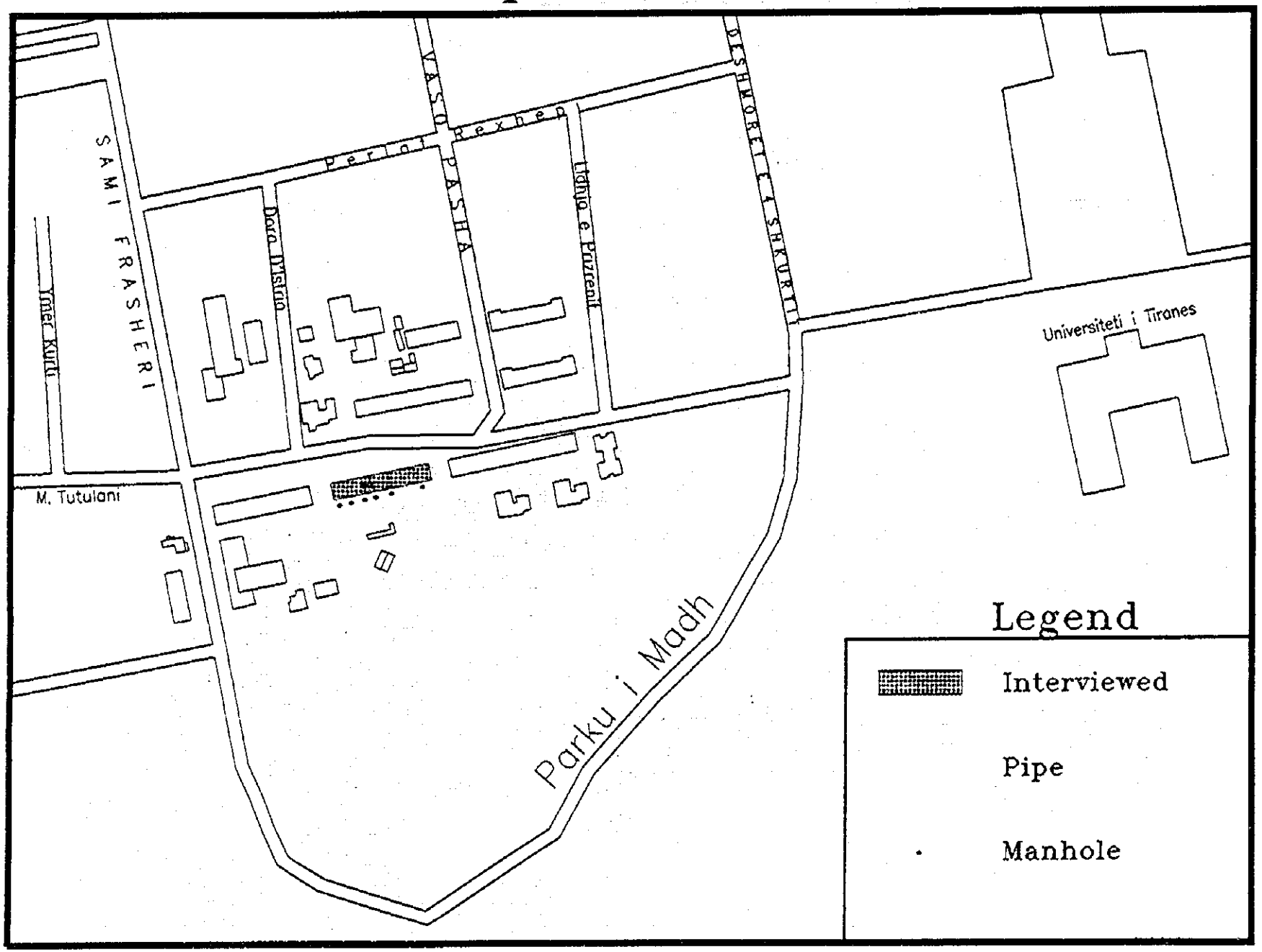
T I R A N A


Legend
New Apartment Area
Old Apartment Area
Individual Housing Area
Selita

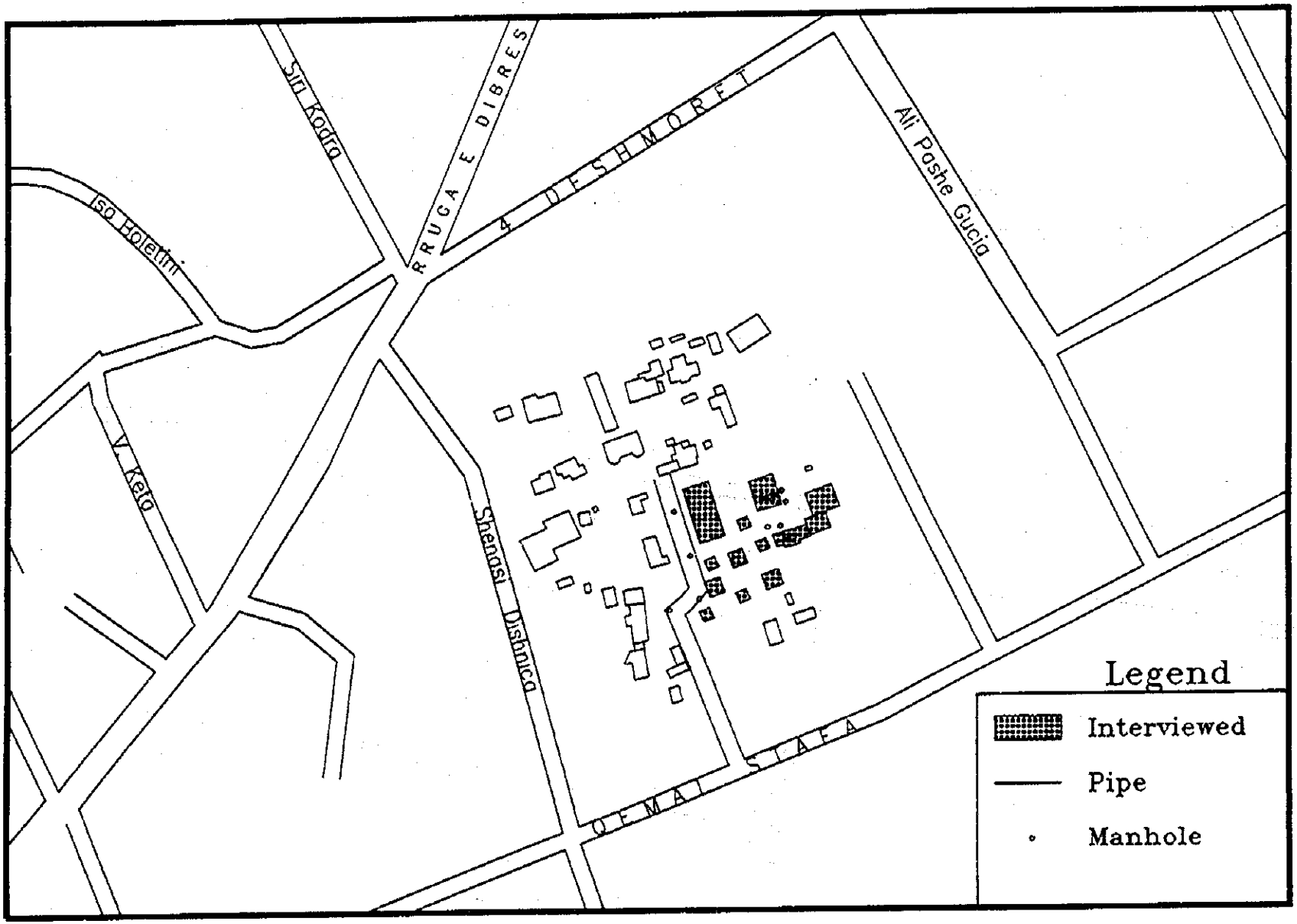
New Apartment Area



Old Apartment Area



Individual Area



The Study on the Sewerage System in Metropolitan Tirana
by the JICA and the MOPWT

Questionnaire Form
"Citizen's Awareness on Environmental Sanitation"

To the people of Tirana,

This questionnaire survey is intended to obtain information on awareness, willingness and affordability, as well as actual conditions of Tirana people for preparation of the plan to improve existing sanitation conditions in the Metropolitan Tirana being undertaken by the joint effort of the Japan International Cooperation Agency (JICA) and the Ministry of Public Works, Tourism and Territory Adjustment (MOPWT).

Any answer to this questionnaire survey will not be used other than the above mentioned purpose.

Thank you,
JICA Study Team and MOPWT

1. Location of Residence

Zone, Block, Name of Street:

_____

2. Type of Residence

2.1 Ownership of Residence

[ ] (1) Owned by resident/s

[ ] (2) Rental from private owner

[ ] (3) Rental from public authority/government

2.2 Structure of Residence

[ ] (1) Independent house

[ ] (2) Apartment type (residing on _____th floor)

[ ] 1 storey [ ] 2 storey [ ] 3 storey
[ ] 4 storey [ ] 5 storey [ ] 6 storey

[ ] (3) Other (please specify; _____)

2.3 Year of Construction

[ ] (1) Built before 1960 [ ] (2) Built between 1961 and 1970
[ ] (3) Built between 1971 and 1980 [ ] (4) Built between 1981 and 1990
[ ] (5) Built after 1991

2.4 Room Composition

(1) Number of bed rooms: _____ rooms

(2) Living room, dining room, kitchen

[ ] Independent living room
[ ] Combined living and dining room
[ ] Combined dining room and kitchen
[ ] Combined living and dining room and kitchen

(3) Shower room: [ ] Yes [ ] No

(4) Toilet: [ ] Yes [ ] No

(5) Combined shower room and toilet
[ ] Yes [ ] No

3. Family Composition and Way of Living

3.1 Family Composition

(1) Number of family members residing at your residence persons _____

(2) Age Composition
Below 18 years old _____ persons

18 years old and above _____ persons

3.2 Family Income and Expenditure

(1) Family income
1) How many persons are working to earn income? _____ persons

2) What is major income source of your family?
[ ] a. Salary as a government employee
[ ] b. Salary as an employee of private business
[ ] c. Income from own private business

3) Does your family receive remittance of money from abroad?
[ ] Yes or [ ] No

If yes, how much amount does your family receive?

Approximately _____ Lek per month.

3) How much is average monthly income of your family?

_____ Lek per month

(2) Family expenditure

1) How much is your average monthly expenditure?
_____ Lek per month

2) Water charge _____ Lek per month

3) Electricity _____ Lek per month

4. Water Supply and Hygiene

4.1 Water Faucet

(1) Number of water faucet/s in the residence: _____ faucet/s

4.2 Water Use

(1) Do you use tap water for gardening? [ ] Yes or [ ] No

(2) Do you use washing machine for laundry? [ ] Yes or [ ] No

4.3 Water Supply Conditions

(1) Do you have water meter at your residence? [ ] Yes or [ ] No

If yes, is it functioning? [ ] Yes or [ ] No

(2) Do you encounter water supply interruption?

[ ] No

[ ] 2 - 3 days a week

[ ] Once a week

[ ] Everyday
(No water from ___:___ to ___:
from ___:___ to ___:
from ___:___ to ___:___)

(3) Do you have water source other than city water supply?

[ ] Yes or [ ] No (If yes, what is your water source?
[ ] shallow well or [ ] deep well)

(4) Usage of electric motor pump to directly suck water from distribution pipeline

1) Do you use the electric motor pump for direct suction of water from distribution pipeline?

[ ] Yes or [ ] No

2) Do you know the direct suction from distribution pipeline with the use of electric motor pump is generally prohibited to avoid unsanitary water supply?

[ ] Yes or [ ] No

4.4 Water Related Hygiene Conditions

Seepage of wastewater from septic tank and leakage of sewage from sewer pipeline are causing groundwater pollution.

Shallow well (usually less than 10 meter depth) is endangered to pump polluted groundwater.

Intermittent city water supply is also encountering seepage of polluted water into distribution pipeline.

(1) Does your family member have experience of sickness (e.g. diarrhea, dysentery, skin disease) by the use of tap water?

[ ] Yes or [ ] No

If yes, what type of sickness and how often?

Name of sickness: _____

Frequency: _____ times per ____ month or ___ year

(2) Do you have experience with red water from your faucet?

[ ] Yes or [ ] No

If yes, how often? _____ times per ____ month or ___ year

(3) Do you have experience with strange odor/taste from your faucet?

[ ] Yes or [ ] No

If yes, how often? _____ times per ____ month or ___ year

(4) Do you know occurrence of health hazard being caused by unsanitary water source (e.g. shallow well nearby septic tank) or by polluted city water?

[ ] Yes or [ ] No

5. Sanitary Conditions

5.1 Toilet Facility

(1) Type of toilet

☐ Flushing by tap water ☐ Pour flush

☐ Pit latrine ☐ Ventilated pit latrine

☐ No toilet

(2) Disposal of wastewater from toilet

☐ Discharge to sewer line ☐ Discharge to septic tank

☐ Discharge to drainage canal

5.2 Disposal of wastewater from kitchen and bath room

(1) Where do you dispose your wastewater?

☐ Discharge to sewer line ☐ Discharge to septic tank

☐ Discharge to drainage canal

5.3 Sewer Pipeline/Drainage Facility

(1) Is there sewer pipeline nearby your house? ☐ Yes or ☐ No

If there is sewer pipeline and if your house is connected to sewer pipeline, why don't you connect to sewer pipeline?

☐ Too expensive to connect ☐ I don't feel such necessity.

☐ I don't spend money for it.

☐ Others (please specify the reason,

_____)

(2) Do you have experience of overflowing or flooding from sewer pipeline or drainage facility?

☐ Yes or ☐ No

If yes, how often and how long does it happen?

_____ times a year _____ days for every flooding

5.4 Sanitary Practice

(1) When flooding occur, do you clean up sewer line/drainage canal?

[ ] Yes or [ ] No

If yes, do your neighbors cooperate for it? [ ] Yes or [ ] No

If not, do you ask local authority to remedy it? [ ] Yes or [ ] No

(2) Do you dispose your garbage at designated place for its collection?

[ ] Yes or [ ] No

If not, where do you dispose your garbage?

[ ] Street nearby house [ ] Drainage canal

6. Water Supply and Sanitation Improvement

6.1 Water Supply Improvement

Presently, the Government is constructing new water source and extending water transmission line to increase water supply capacity to the Metropolitan Tirana. This Project will be completed within 2 years. When it is completed, the present water supply conditions will be improved drastically.

(1) Upon improvement of water supply conditions, do you wish to pay water charge as you consume based on the water meter reading?

[ ] Yes or [ ] No

1) If yes, how much will you pay for it?

[ ] Up to 200 Lek per month [ ] Up to 400 Lek per month

[ ] Up to 600 Lek per month [ ] Up to 800 Lek per month

[ ] As charged by water authority

2) If not, what is the reason?

[ ] Water shall be free of charge.

[ ] Water shall be flat rate at about _____ Lek per month per family.

Other (please describe; _____

_____)

3) If you pay water charge more than what you are paying, will you become careful to reduce wastage of water?

☐ Yes or ☐ No

If yes, where will you pay attention for water conservation?

Please describe: _____

If no, what is your reason?

Please describe: _____

(2) Upon improvement of water supply conditions, do you wish to use city water supply other than shallow/deep wells?

☐ Yes or ☐ No

What is the reason of your choice?

Please describe: _____

(3) What is the most important improvement of water supply conditions for you? (more than one answer shall be given priority)

☐ Continuous supply (no interruption)

☐ Enough water pressure to reach your floor

☐ Safe for drinking

☐ Cheap water charge