

## APPENDIX 1

### Groundwater contamination index (C<sub>fi</sub>) scores and the maximum values of selected 5 parameters measured in all piezometers of the monitoring network, Tychy-Urbanowice landfills, southern Poland

Piezometer	Parameter and its maximum value			Partial groundwater contamination indices [-]			Number of samples
	Parameter	Maximum value	Units	Max C <sub>fi</sub>	Min C <sub>fi</sub>	Mean C <sub>fi</sub>	
P1	EC	1898	( $\mu\text{S/cm}$ )	9.31	0.54	5.31	85
	N <sub>in</sub>	31.96	( $\text{mg/dm}^3$ )	31.96	-0.92	3.87	36
	Cl <sup>-</sup>	467.5	( $\text{mg/dm}^3$ )	44.26	5.87	22.23	37
	SO <sub>4</sub> <sup>2-</sup>	445	( $\text{mg/dm}^3$ )	5.65	0.52	1.73	37
	HCO <sub>3</sub> <sup>-</sup>	686	( $\text{mg/dm}^3$ )	17.48	-0.84	5.96	67
P2	EC	2105	( $\mu\text{S/cm}$ )	7.77	-0.6	3.12	85
	N <sub>in</sub>	24.92	( $\text{mg/dm}^3$ )	24.92	0.72	11.55	36
	Cl <sup>-</sup>	247	( $\text{mg/dm}^3$ )	22.91	1.7	9.82	37
	SO <sub>4</sub> <sup>2-</sup>	270	( $\text{mg/dm}^3$ )	3.03	0.4	1.57	37
	HCO <sub>3</sub> <sup>-</sup>	448	( $\text{mg/dm}^3$ )	10.63	-0.84	3.04	67
P3	EC	828	( $\mu\text{S/cm}$ )	2.45	-0.43	0.89	70
	N <sub>in</sub>	77.83	( $\text{mg/dm}^3$ )	13.77	-0.63	7.13	37
	Cl <sup>-</sup>	210	( $\text{mg/dm}^3$ )	19.33	0.03	4.72	68
	SO <sub>4</sub> <sup>2-</sup>	225	( $\text{mg/dm}^3$ )	2.36	-0.98	0.08	68
	HCO <sub>3</sub> <sup>-</sup>	61.03	( $\text{mg/dm}^3$ )	0.58	-0.99	-0.56	62
P4	EC	1560	( $\mu\text{S/cm}$ )	5.5	-0.73	1.22	70
	N <sub>in</sub>	21.19	( $\text{mg/dm}^3$ )	6.82	-0.99	0.51	37
	Cl <sup>-</sup>	462	( $\text{mg/dm}^3$ )	43.72	-0.61	6.84	68
	SO <sub>4</sub> <sup>2-</sup>	401	( $\text{mg/dm}^3$ )	4.99	-0.92	0.27	68
	HCO <sub>3</sub> <sup>-</sup>	155.58	( $\text{mg/dm}^3$ )	3.04	-0.84	0.79	68
P5	EC	338	( $\mu\text{S/cm}$ )	0.41	-0.55	0.01	12
	N <sub>in</sub>	8.98	( $\text{mg/dm}^3$ )	2.31	-0.98	0.69	12
	Cl <sup>-</sup>	18	( $\text{mg/dm}^3$ )	0.74	-0.56	0.19	12
	SO <sub>4</sub> <sup>2-</sup>	161	( $\text{mg/dm}^3$ )	1.41	-0.44	0.07	12
	HCO <sub>3</sub> <sup>-</sup>	18.3	( $\text{mg/dm}^3$ )	-0.53	-0.86	-0.66	12
P5'	EC	1197	( $\mu\text{S/cm}$ )	3.98	-0.73	1.04	54
	N <sub>in</sub>	19.15	( $\text{mg/dm}^3$ )	0.78	-0.64	0.46	6
	Cl <sup>-</sup>	92.2	( $\text{mg/dm}^3$ )	7.93	-0.4	1	52
	SO <sub>4</sub> <sup>2-</sup>	519	( $\text{mg/dm}^3$ )	6.75	-0.48	1.24	52
	HCO <sub>3</sub> <sup>-</sup>	347.15	( $\text{mg/dm}^3$ )	8	-0.92	0.57	44
P6	EC	390	( $\mu\text{S/cm}$ )	0.64	-0.46	0.09	13
	N <sub>in</sub>	8.73	( $\text{mg/dm}^3$ )	2.22	-0.44	0.37	8
	Cl <sup>-</sup>	64.4	( $\text{mg/dm}^3$ )	5.23	0.18	1.95	13
	SO <sub>4</sub> <sup>2-</sup>	184	( $\text{mg/dm}^3$ )	1.75	-0.6	0.03	13
	HCO <sub>3</sub> <sup>-</sup>	110	( $\text{mg/dm}^3$ )	1.85	-0.83	-0.03	13
P7	EC	968	( $\mu\text{S/cm}$ )	3.03	0.48	1.78	13
	N <sub>in</sub>	6	( $\text{mg/dm}^3$ )	1.21	-0.73	-0.23	13
	Cl <sup>-</sup>	84	( $\text{mg/dm}^3$ )	7.13	1.9	4.7	13
	SO <sub>4</sub> <sup>2-</sup>	281	( $\text{mg/dm}^3$ )	3.2	-0.07	1.88	13

	HCO <sub>3</sub> <sup>-</sup>	67.1	(mg/dm <sup>3</sup> )	0.74	-0.21	0.26	13
P8	EC	920	(μS/cm)	2.83	-0.5	1.24	66
	N <sub>in</sub>	3.87	(mg/dm <sup>3</sup> )	0.42	-0.88	-0.51	36
	Cl <sup>-</sup>	136	(mg/dm <sup>3</sup> )	12.17	1.7	4.98	36
	SO <sub>4</sub> <sup>2-</sup>	256	(mg/dm <sup>3</sup> )	2.82	-0.04	0.97	36
	HCO <sub>3</sub> <sup>-</sup>	145.25	(mg/dm <sup>3</sup> )	2.77	-0.97	0.58	62
P9	EC	2500	(μS/cm)	9.41	-0.99	2.86	66
	N <sub>in</sub>	73.35	(mg/dm <sup>3</sup> )	26.06	-0.75	7.32	36
	Cl <sup>-</sup>	312	(mg/dm <sup>3</sup> )	29.2	0.85	10.38	38
	SO <sub>4</sub> <sup>2-</sup>	219	(mg/dm <sup>3</sup> )	2.27	-0.07	0.62	38
	HCO <sub>3</sub> <sup>-</sup>	1016	(mg/dm <sup>3</sup> )	25.37	-0.68	5.27	50
P10	EC	10 340	(μS/cm)	42.06	0.33	0.76	66
	N <sub>in</sub>	313.97	(mg/dm <sup>3</sup> )	114.86	0.94	41.2	38
	Cl <sup>-</sup>	970	(mg/dm <sup>3</sup> )	92.9	2.01	42.8	66
	SO <sub>4</sub> <sup>2-</sup>	676	(mg/dm <sup>3</sup> )	9.1	-0.78	0.77	66
	HCO <sub>3</sub> <sup>-</sup>	2757	(mg/dm <sup>3</sup> )	70.55	-0.69	34.57	50
P11	EC	568	(μS/cm)	1.37	-0.85	-0.01	50
	N <sub>in</sub>	5.13	(mg/dm <sup>3</sup> )	0.89	-0.87	-0.39	48
	Cl <sup>-</sup>	54.48	(mg/dm <sup>3</sup> )	4.27	-0.8	1.45	48
	SO <sub>4</sub> <sup>2-</sup>	107	(mg/dm <sup>3</sup> )	0.6	-0.93	-0.32	48
	HCO <sub>3</sub> <sup>-</sup>	295.90	(mg/dm <sup>3</sup> )	6.67	-0.92	0.24	40
P12	EC	1088	(μS/cm)	3.53	-0.7	0.83	49
	N <sub>in</sub>	9.18	(mg/dm <sup>3</sup> )	2.39	-1	0.41	20
	Cl <sup>-</sup>	42.8	(mg/dm <sup>3</sup> )	3.14	-0.26	0.37	20
	SO <sub>4</sub> <sup>2-</sup>	183	(mg/dm <sup>3</sup> )	1.73	-0.55	0.33	20
	HCO <sub>3</sub> <sup>-</sup>	176.93	(mg/dm <sup>3</sup> )	3.59	-0.84	0.98	47
P13	EC	1188	(μS/cm)	3.95	-0.65	1.34	49
	N <sub>in</sub>	5.28	(mg/dm <sup>3</sup> )	0.95	-1	-0.3	20
	Cl <sup>-</sup>	82	(mg/dm <sup>3</sup> )	6.94	2.22	4.9	20
	SO <sub>4</sub> <sup>2-</sup>	329	(mg/dm <sup>3</sup> )	3.92	-0.34	2.77	20
	HCO <sub>3</sub> <sup>-</sup>	335.56	(mg/dm <sup>3</sup> )	7.7	-1	0.54	47
P14	EC	790	(μS/cm)	2.29	0.9	1.74	14
	N <sub>in</sub>	6.12	(mg/dm <sup>3</sup> )	1.26	-0.78	0.32	14
	Cl <sup>-</sup>	58.5	(mg/dm <sup>3</sup> )	4.66	2.19	3.07	14
	SO <sub>4</sub> <sup>2-</sup>	219	(mg/dm <sup>3</sup> )	2.27	0.82	1.62	14
	HCO <sub>3</sub> <sup>-</sup>	238	(mg/dm <sup>3</sup> )	5.18	1.82	3.77	14
P15	EC	1005	(μS/cm)	3.19	-0.52	0.82	56
	N <sub>in</sub>	6.28	(mg/dm <sup>3</sup> )	1.32	-0.85	0.28	11
	Cl <sup>-</sup>	131.2	(mg/dm <sup>3</sup> )	11.7	-0.08	4.59	11
	SO <sub>4</sub> <sup>2-</sup>	169.5	(mg/dm <sup>3</sup> )	1.53	-0.54	0.3	11
	HCO <sub>3</sub> <sup>-</sup>	209.3	(mg/dm <sup>3</sup> )	4.43	-0.84	2.2	25
P16	EC	872	(μS/cm)	2.63	-0.58	1.13	66
	N <sub>in</sub>	77.73	(mg/dm <sup>3</sup> )	27.68	-0.87	8.92	39
	Cl <sup>-</sup>	113	(mg/dm <sup>3</sup> )	9.94	0.38	2.27	64
	SO <sub>4</sub> <sup>2-</sup>	160	(mg/dm <sup>3</sup> )	1.39	-0.5	0.44	64
	HCO <sub>3</sub> <sup>-</sup>	319	(mg/dm <sup>3</sup> )	7.28	-0.84	0.52	56
P17	EC	3074	(μS/cm)	11.8	1.17	7.63	16
	N <sub>in</sub>	25.25	(mg/dm <sup>3</sup> )	8.32	-0.7	1.31	16

	Cl <sup>-</sup>	692	(mg/dm <sup>3</sup> )	65.99	2.98	39.97	16
	SO <sub>4</sub> <sup>2-</sup>	221.2	(mg/dm <sup>3</sup> )	2.3	0.49	1.56	16
	HCO <sub>3</sub> <sup>-</sup>	378	(mg/dm <sup>3</sup> )	8.81	1.17	4.92	16
P17A	EC	6885	(μS/cm)	27.67	6.72	19.77	16
	N <sub>in</sub>	253.53	(mg/dm <sup>3</sup> )	92.55	35.99	63.03	16
	Cl <sup>-</sup>	1030	(mg/dm <sup>3</sup> )	98.7	53.4	74.3	16
	SO <sub>4</sub> <sup>2-</sup>	203	(mg/dm <sup>3</sup> )	2.03	0.26	0.5	16
	HCO <sub>3</sub> <sup>-</sup>	2879	(mg/dm <sup>3</sup> )	73.72	26.25	52.52	16
P18	EC	37 500	(μS/cm)	155.17	34.63	128.36	16
	N <sub>in</sub>	3091.26	(mg/dm <sup>3</sup> )	1139.88	285.64	797.03	16
	Cl <sup>-</sup>	6630	(mg/dm <sup>3</sup> )	640.82	392.99	487.56	16
	SO <sub>4</sub> <sup>2-</sup>	250	(mg/dm <sup>3</sup> )	2.74	-0.92	0.67	16
	HCO <sub>3</sub> <sup>-</sup>	18 060	(mg/dm <sup>3</sup> )	467.73	68.04	358.19	16
P19	EC	1898	(μS/cm)	6.9	4.12	5.21	16
	N <sub>in</sub>	39.71	(mg/dm <sup>3</sup> )	13.65	0.34	5.17	16
	Cl <sup>-</sup>	200	(mg/dm <sup>3</sup> )	18.36	4.61	8.98	16
	SO <sub>4</sub> <sup>2-</sup>	25.4	(mg/dm <sup>3</sup> )	-0.63	-0.95	-0.8	16
	HCO <sub>3</sub> <sup>-</sup>	1198	(mg/dm <sup>3</sup> )	30.09	16.88	21.39	16
P19A	EC	5736	(μS/cm)	22.89	4.84	17.5	16
	N <sub>in</sub>	1410.22	(mg/dm <sup>3</sup> )	519.38	25.61	179.6	16
	Cl <sup>-</sup>	850	(mg/dm <sup>3</sup> )	81.23	29	61.92	16
	SO <sub>4</sub> <sup>2-</sup>	130	(mg/dm <sup>3</sup> )	0.94	-0.58	-0.01	16
	HCO <sub>3</sub> <sup>-</sup>	2721	(mg/dm <sup>3</sup> )	66.62	23.21	53.56	16