RESEARCH AND DEVELOPMENT DEPARTMENT

REPORT NO. 08-51

TUNNEL AND RESERVOIR PLAN
DES PLAINES TUNNEL SYSTEM
2007 ANNUAL GROUNDWATER MONITORING REPORT

SEPTEMBER 2008

Protecting Our Water Environment

Metropolitan Water Reclamation District of Greater Chicago

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September 19, 2008

Ms. Marcia Willhite, Chief
Bureau of Water
Illinois Environmental Protection Agency
P. O. Box 19276
Springfield, IL 62794–9276

Dear Ms. Willhite:

Subject: Tunnel and Reservoir Plan, Des Plaines Tunnel System, 2007 Annual Groundwater Monitoring Report

Enclosed are three copies of the "Tunnel and Reservoir Plan, Des Plaines Tunnel System, 2007 Annual Groundwater Monitoring Report."

Very truly yours,

Louis Kollias
Director
Research and Development

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TUNNEL AND RESERVOIR PLAN
DES PLAINES TUNNEL SYSTEM
2007 ANNUAL GROUNDWATER MONITORING REPORT

Research and Development Department
Louis Kollias, Director

September 2008

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INTRODUCTION

This report contains 2007 data for the Tunnel and Reservoir Plan Des Plaines Tunnel System compiled from the monitoring of the 40 groundwater quality monitoring wells QD–21 through QD–60 located along the Des Plaines Tunnel alignment. The water quality monitoring wells are located along the 13A Extension, south leg, middle leg, and north leg of the Des Plaines Tunnel System. These water quality monitoring wells were sampled either three times per year or six times per year. Water quality monitoring wells QD–21 through QD–26, QD–28 through QD–32, QD–35, QD–36, and QD–38 through QD–60 were sampled three times per year (Illinois Environmental Protection Agency [IEPA] memoranda July 9, 2004, and February 23, 2006). Water quality monitoring wells QD–27, QD–33, QD–34, and QD–37 were sampled six times per year (IEPA memorandum July 9, 2004, and February 23, 2006).

Monitoring Data. Appendix AI contains a map showing all 40 water quality monitoring wells along the 13A extension, south leg, middle leg, and north leg of the Des Plaines Tunnel System.

Tables AII–1 and AII–2 in Appendix AII contain groundwater quality data for 2007 pertaining to the 40 water quality monitoring wells QD–21 through QD–60 in the Des Plaines Tunnel System.

All of the wells in the Des Plaines Tunnel System were visited for the required number of samples. However, in some instances the well could not be sampled. Water quality monitoring well QD–34 could not be sampled on February 15, 2007, because the pump was inoperable. Water quality monitoring well QD–43 could not be sampled on April 17, 2007, or July 27, 2007, because the pump was inoperable. Water quality monitoring well QD–47 could not be sampled on January 30, 2007, because the pump was inoperable.

Summary of Data. Tables 1 through 8 contain summary statistics of the water quality parameters for 2007 for all 40 water quality monitoring wells QD–21 through QD–60 in the Des Plaines Tunnel System. These statistics are computed from the data collected from each well in 2007. The summary statistics include minimum, mean, maximum, standard deviation (Std. Dev.), median, and coefficient of variation (Coeff. Var.) for all nine water quality parameters analyzed during 2007. The nine water quality parameters are: chloride (Cl), conductivity (Cond.), fecal coliform (FC), hardness as $CaCO_3$ (Hard.), ammonia as NH_4^+–N, pH, sulfate (SO_4), total dissolved solids (TDS), and total organic carbon (TOC).

TABLE 1: SUMMARY STATISTICS OF THE 2007 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE DES PLAINES TUNNEL SYSTEM: WELLS QD–21 THROUGH QD–25

Parameter		Well Number				
		QD–21	QD–22	QD–23	QD–24	QD–25
Cl	Minimum	239	115	153	79	380
mg/L	Mean	245	131	164	96	402
	Maximum	251	152	173	106	436
	Std. Dev.	6	19	10	15	30
	Median	246	126	167	104	389
	Coeff. Var.	2	15	6	16	7
Cond.	Minimum	1,748	1,112	1,277	819	1,515
µmhos/cm	Mean	1,981	1,431	1,459	1,196	1,925
	Maximum	2,375	1,864	1,696	1,460	2,144
	Std. Dev.	343	389	215	335	355
	Median	1,820	1,316	1,405	1,310	2,115
	Coeff. Var.	17	27	15	28	18
FC[1]	Minimum	1	1	1	1	1
cfu/100 mL	Geo. Mean	1	1	1	1	1
	Maximum	1	1	1	1	1
	Geo. Std. Dev.	0	0	0	0	0
	Median	1	1	1	1	1
	Coeff. Var.	0	0	0	0	0
Hard.	Minimum	663	692	709	420	554
mg/L	Mean	716	709	736	487	568
	Maximum	783	721	784	547	585
	Std. Dev.	61	15	41	64	16
	Median	701	713	716	494	564
	Coeff. Var.	9	2	6	13	3
NH_4^+–N	Minimum	0.17	0.28	0.39	0.39	0.68
mg/L	Mean	0.19	0.32	0.42	0.41	0.69
	Maximum	0.20	0.36	0.44	0.44	0.71
	Std. Dev.	0.02	0.04	0.03	0.03	0.02
	Median	0.19	0.31	0.42	0.41	0.69
	Coeff. Var.	8.18	12.76	6.04	6.09	2.20

TABLE 1 (Continued): SUMMARY STATISTICS OF THE 2007 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE DES PLAINES TUNNEL SYSTEM: WELLS QD–21 THROUGH QD–25

Parameter		Well Number				
		QD–21	QD–22	QD–23	QD–24	QD–25
pH	Minimum	6.8	7.0	6.9	7.0	7.0
	Mean	6.9	7.1	7.0	7.2	7.1
	Maximum	7.0	7.4	7.0	7.5	7.2
	Std. Dev.	0.1	0.2	0.1	0.3	0.1
	Median	6.9	7.0	7.0	7.2	7.1
	Coeff. Var.	1.4	3.2	0.8	3.5	1.4
SO_4	Minimum	298	271	324	145	169
mg/L	Mean	326	290	334	166	200
	Maximum	347	303	352	184	218
	Std. Dev.	25	17	15	20	27
	Median	334	297	327	168	212
	Coeff. Var.	8	6	5	12	13
TDS	Minimum	1,298	1,050	1,148	762	1,246
mg/L	Mean	1,471	1,229	1,337	871	1,460
	Maximum	1,638	1,354	1,512	1,016	1,636
	Std. Dev.	170	159	182	131	198
	Median	1,476	1,284	1,350	836	1,498
	Coeff. Var.	12	13	14	15	14
TOC	Minimum	0.7	0.9	1.4	1.3	1.6
mg/L	Mean	0.8	0.9	1.5	1.5	1.9
	Maximum	0.9	0.9	1.5	1.8	2.3
	Std. Dev.	0.1	0.0	0.1	0.3	0.4
	Median	0.9	0.9	1.5	1.5	1.9
	Coeff. Var.	13.9	0.0	3.9	16.4	18.2

[1]For purposes of statistical evaluation, fecal coliform values less than 1 were set equal to 1.

TABLE 2: SUMMARY STATISTICS OF THE 2007 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE DES PLAINES TUNNEL SYSTEM: WELLS QD–26 THROUGH QD–30

Parameter		Well Number				
		QD–26	QD–27	QD–28	QD–29	QD–30
Cl	Minimum	16	286	322	120	134
mg/L	Mean	29	318	328	129	135
	Maximum	55	354	337	140	136
	Std. Dev.	23	25	8	10	1
	Median	16	312	326	128	136
	Coeff. Var.	78	8	2	8	1
Cond.	Minimum	492	830	1,622	921	717
µmhos/cm	Mean	618	1,540	1,765	1,161	982
	Maximum	710	2,272	1,986	1,475	1,462
	Std. Dev.	113	635	194	284	417
	Median	652	1,423	1,687	1,088	766
	Coeff. Var.	18	41	11	24	42
FC[1]	Minimum	1	1	1	1	1
cfu/100 mL	Geo. Mean	1	1	1	1	1
	Maximum	1	1	1	1	1
	Geo. Std. Dev.	0	0	0	0	0
	Median	1	1	1	1	1
	Coeff. Var.	0	0	0	0	0
Hard.	Minimum	386	477	678	604	693
mg/L	Mean	395	504	721	635	711
	Maximum	401	528	794	657	724
	Std. Dev.	8	17	64	27	16
	Median	397	505	690	643	715
	Coeff. Var.	2	3	9	4	2
NH_4^+–N	Minimum	0.29	23.16	0.45	0.31	0.25
mg/L	Mean	1.38	24.99	0.51	0.34	0.28
	Maximum	3.53	27.67	0.55	0.37	0.30
	Std. Dev.	1.86	1.69	0.06	0.03	0.03
	Median	0.31	24.51	0.54	0.35	0.30
	Coeff. Var.	135.46	6.77	10.73	8.90	10.19

TABLE 2 (Continued): SUMMARY STATISTICS OF THE 2007 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE DES PLAINES TUNNEL SYSTEM: WELLS QD–26 THROUGH QD–30

Parameter		Well Number				
		QD–26	QD–27	QD–28	QD–29	QD–30
pH	Minimum	7.5	7.2	6.4	6.3	7.8
	Mean	7.7	7.6	6.8	6.8	7.9
	Maximum	7.8	8.1	7.2	7.1	7.9
	Std. Dev.	0.2	0.3	0.4	0.4	0.1
	Median	7.7	7.7	6.8	7.0	7.9
	Coeff. Var.	2.0	4.3	5.9	6.4	0.7
SO_4	Minimum	104	43	278	224	313
mg/L	Mean	112	52	281	263	334
	Maximum	125	58	286	300	351
	Std. Dev.	11	7	4	38	19
	Median	108	55	279	265	337
	Coeff. Var.	10	14	2	14	6
TDS	Minimum	562	1,144	1,462	1,084	1,178
mg/L	Mean	591	1,224	1,604	1,138	1,190
	Maximum	648	1,314	1,834	1,212	1,212
	Std. Dev.	50	70	201	66	19
	Median	562	1,212	1,516	1,118	1,180
	Coeff. Var.	8	6	13	6	2
TOC	Minimum	0.6	15.4	0.9	1.4	0.9
mg/L	Mean	0.6	16.0	1.0	1.5	0.9
	Maximum	0.6	16.5	1.1	1.6	1.0
	Std. Dev.	0.0	0.4	0.1	0.1	0.1
	Median	0.6	16.1	0.9	1.4	0.9
	Coeff. Var.	0.0	2.3	11.9	7.9	6.2

[1]For purposes of statistical evaluation, fecal coliform values less than 1 were set equal to 1.

TABLE 3: SUMMARY STATISTICS OF THE 2007 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE DES PLAINES TUNNEL SYSTEM: WELLS QD–31 THROUGH QD–35

Parameter		Well Number				
		QD–31	QD–32	QD–33	QD–34	QD–35
Cl	Minimum	122	493	346	105	111
mg/L	Mean	129	525	360	119	117
	Maximum	140	550	371	132	120
	Std. Dev.	10	29	10	10	5
	Median	124	531	361	119	119
	Coeff. Var.	8	6	3	8	4
Cond.	Minimum	682	221	1,052	795	1,114
µmhos/cm	Mean	997	1,642	1,699	1,277	1,286
	Maximum	1,433	3,254	2,408	1,572	1,489
	Std. Dev.	390	1,526	550	291	189
	Median	875	1,450	1,728	1,303	1,255
	Coeff. Var.	39	93	32	23	15
FC[1]	Minimum	1	1	1	1	1
cfu/100 mL	Geo. Mean	1	1	1	1	1
	Maximum	1	1	1	3	1
	Geo. Std. Dev.	0	0	0	1	0
	Median	1	1	1	1	1
	Coeff. Var.	0	0	0	120	0
Hard.	Minimum	240	36	24	724	645
mg/L	Mean	251	37	27	738	672
	Maximum	261	38	29	750	717
	Std. Dev.	11	1	2	10	39
	Median	251	37	28	738	653
	Coeff. Var.	4	3	6	1	6
NH_4^+–N	Minimum	0.15	0.15	0.14	0.29	0.25
mg/L	Mean	0.97	0.18	1.11	0.39	0.31
	Maximum	2.58	0.24	3.04	0.55	0.38
	Std. Dev.	1.39	0.05	1.47	0.11	0.07
	Median	0.19	0.15	0.19	0.34	0.31
	Coeff. Var.	142.97	28.87	132.00	29.12	20.77

TABLE 3 (Continued): SUMMARY STATISTICS OF THE 2007 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE DES PLAINES TUNNEL SYSTEM: WELLS QD–31 THROUGH QD–35

Parameter		Well Number				
		QD–31	QD–32	QD–33	QD–34	QD–35
pH	Minimum	7.4	8.5	7.7	6.8	6.7
	Mean	7.6	8.8	8.1	7.2	7.0
	Maximum	7.8	9.2	8.4	7.6	7.2
	Std. Dev.	0.2	0.4	0.2	0.4	0.3
	Median	7.6	8.6	8.2	7.1	7.0
	Coeff. Var.	2.6	4.3	3.1	5.0	3.6
SO_4	Minimum	181	228	179	313	291
mg/L	Mean	183	231	201	444	300
	Maximum	186	233	236	768	305
	Std. Dev.	3	3	21	184	8
	Median	183	232	193	383	303
	Coeff. Var.	1	1	11	41	3
TDS	Minimum	922	1,890	1,582	1,046	1,070
mg/L	Mean	933	1,999	1,655	1,198	1,179
	Maximum	940	2,054	1,716	1,284	1,346
	Std. Dev.	9	94	54	94	147
	Median	936	2,052	1,666	1,210	1,122
	Coeff. Var.	1	5	3	8	12
TOC	Minimum	0.5	0.3	0.3	1.0	1.5
mg/L	Mean	0.6	0.3	0.4	1.1	2.3
	Maximum	0.6	0.3	0.5	1.3	2.7
	Std. Dev.	0.1	0.0	0.1	0.1	0.7
	Median	0.6	0.3	0.4	1.1	2.6
	Coeff. Var.	10.2	0.0	15.8	11.1	29.4

[1]For purposes of statistical evaluation, fecal coliform values less than 1 were set equal to 1.

TABLE 4: SUMMARY STATISTICS OF THE 2007 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE DES PLAINES TUNNEL SYSTEM: WELLS QD–36 THROUGH QD–40

Parameter		Well Number				
		QD–36	QD–37	QD–38	QD–39	QD–40
Cl	Minimum	120	261	184	27	14
mg/L	Mean	129	282	191	34	15
	Maximum	138	303	204	47	16
	Std. Dev.	9	16	11	11	1
	Median	129	283	185	28	15
	Coeff. Var.	7	6	6	33	7
Cond.	Minimum	1,234	1,062	732	860	553
µmhos/cm	Mean	1,436	1,472	884	902	771
	Maximum	1,641	1,969	1,059	960	883
	Std. Dev.	204	362	165	52	189
	Median	1,434	1,462	860	885	876
	Coeff. Var.	14	25	19	6	24
FC[1]	Minimum	1	1	1	1	1
cfu/100 mL	Geo. Mean	1	1	1	1	1
	Maximum	1	1	1	1	1
	Geo. Std. Dev.	0	0	0	0	0
	Median	1	1	1	1	1
	Coeff. Var.	0	0	0	0	0
Hard.	Minimum	742	385	223	18	22
mg/L	Mean	753	499	237	18	23
	Maximum	768	587	256	18	24
	Std. Dev.	13	88	17	0	1
	Median	750	534	233	18	24
	Coeff. Var.	2	18	7	0	5
NH_4^+–N[2]	Minimum	0.23	0.10	0.29	0.02	0.03
mg/L	Mean	0.26	0.21	0.31	0.05	0.07
	Maximum	0.30	0.30	0.35	0.08	0.13
	Std. Dev.	0.04	0.08	0.03	0.03	0.05
	Median	0.24	0.24	0.30	0.07	0.05
	Coeff. Var.	14.75	38.06	10.26	66.69	75.59

TABLE 4 (Continued): SUMMARY STATISTICS OF THE 2007 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE DES PLAINES TUNNEL SYSTEM: WELLS QD–36 THROUGH QD–40

Parameter		Well Number				
		QD–36	QD–37	QD–38	QD–39	QD–40
pH	Minimum	6.9	7.3	7.7	8.1	8.3
	Mean	7.4	7.6	7.8	8.4	8.7
	Maximum	7.7	8.0	7.9	8.6	9.5
	Std. Dev.	0.4	0.2	0.1	0.3	0.7
	Median	7.5	7.6	7.8	8.4	8.4
	Coeff. Var.	5.7	3.2	1.3	3.0	7.6
SO_4	Minimum	307	317	97	91	382
mg/L	Mean	340	372	105	94	385
	Maximum	376	416	115	96	390
	Std. Dev.	35	34	9	3	4
	Median	336	372	102	94	383
	Coeff. Var.	10	9	9	3	1
TDS	Minimum	1,070	1,434	830	812	762
mg/L	Mean	1,163	1,469	849	834	773
	Maximum	1,232	1,492	876	870	794
	Std. Dev.	84	25	24	31	18
	Median	1,188	1,476	840	820	764
	Coeff. Var.	7	2	3	4	2
TOC	Minimum	1.2	0.5	0.4	0.4	0.7
mg/L	Mean	1.2	0.6	0.5	0.4	0.7
	Maximum	1.3	1.0	0.5	0.5	0.8
	Std. Dev.	0.1	0.2	0.1	0.1	0.1
	Median	1.2	0.5	0.5	0.4	0.7
	Coeff. Var.	4.7	33.3	12.4	13.3	7.9

[1]For purposes of statistical evaluation, fecal coliform values less than 1 were set equal to 1.
[2]For purposes of statistical evaluation, ammonium nitrogen values less than 0.02 mg/L were set equal to 0.02 mg/L.

TABLE 5: SUMMARY STATISTICS OF THE 2007 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE DES PLAINES TUNNEL SYSTEM: WELLS QD–41 THROUGH QD–45

Parameter		Well Number				
		QD–41	QD–42	QD–43	QD–44	QD–45
Cl	Minimum	18	19	44	14	17
mg/L	Mean	20	19	44	20	18
	Maximum	22	20	44	30	19
	Std. Dev.	2	1	0	9	1
	Median	19	19	44	15	17
	Coeff. Var.	11	3	0	46	7
Cond.	Minimum	489	482	460	580	635
µmhos/cm	Mean	726	699	460	621	663
	Maximum	868	812	460	645	687
	Std. Dev.	206	188	0	35	26
	Median	820	802	460	637	666
	Coeff. Var.	28	27	0	6	4
FC[1]	Minimum	1	1	1	1	1
cfu/100 mL	Geo. Mean	1	1	1	1	1
	Maximum	1	1	1	2	1
	Geo. Std. Dev.	0	0	0	1	0
	Median	1	1	1	2	1
	Coeff. Var.	0	0	0	106	0
Hard.	Minimum	422	371	445	197	86
mg/L	Mean	430	394	445	267	91
	Maximum	435	409	445	311	99
	Std. Dev.	7	20	0	61	7
	Median	433	403	445	292	88
	Coeff. Var.	2	5	0	23	8
NH_4^+–N	Minimum	0.23	0.29	0.25	0.26	0.20
mg/L	Mean	0.27	0.31	0.25	0.30	0.24
	Maximum	0.31	0.32	0.25	0.33	0.26
	Std. Dev.	0.04	0.02	0.00	0.04	0.03
	Median	0.26	0.31	0.25	0.32	0.26
	Coeff. Var.	15.16	4.98	0.00	12.48	14.43

TABLE 5 (Continued): SUMMARY STATISTICS OF THE 2007 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE DES PLAINES TUNNEL SYSTEM: WELLS QD–41 THROUGH QD–45

Parameter		Well Number				
		QD–41	QD–42	QD–43	QD–44	QD–45
pH	Minimum	7.5	7.5	7.9	7.6	8.3
	Mean	7.6	7.6	7.9	7.7	8.6
	Maximum	7.9	7.8	7.9	7.7	8.8
	Std. Dev.	0.2	0.2	0.0	0.1	0.3
	Median	7.5	7.6	7.9	7.7	8.6
	Coeff. Var.	3.0	2.0	0.0	0.8	2.9
SO_4	Minimum	311	279	206	163	185
mg/L	Mean	339	296	206	190	194
	Maximum	361	324	206	215	201
	Std. Dev.	26	25	0	26	8
	Median	346	284	206	191	195
	Coeff. Var.	8	8	0	14	4
TDS	Minimum	802	780	728	534	578
mg/L	Mean	813	787	728	592	583
	Maximum	830	796	728	638	594
	Std. Dev.	15	8	0	53	9
	Median	808	786	728	604	578
	Coeff. Var.	2	1	0	9	2
TOC	Minimum	1.1	0.9	0.8	0.8	0.8
mg/L	Mean	1.3	1.0	0.8	0.9	0.9
	Maximum	1.4	1.0	0.8	1.0	1.2
	Std. Dev.	0.2	0.1	0.0	0.1	0.2
	Median	1.3	1.0	0.8	1.0	0.8
	Coeff. Var.	12.1	6.0	0.0	12.4	24.7

[1]For purposes of statistical evaluation, fecal coliform values less than 1 were set equal to 1.

TABLE 6: SUMMARY STATISTICS OF THE 2007 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE DES PLAINES TUNNEL SYSTEM: WELLS QD–46 THROUGH QD–50

Parameter		Well Number				
		QD–46	QD–47	QD–48	QD–49	QD–50
Cl	Minimum	13	15	12	13	13
mg/L	Mean	16	16	15	13	14
	Maximum	22	16	20	14	14
	Std. Dev.	5	1	4	1	1
	Median	14	16	13	13	14
	Coeff. Var.	30	5	29	4	4
Cond.	Minimum	443	597	745	647	476
µmhos/cm	Mean	605	649	779	668	631
	Maximum	851	701	801	691	811
	Std. Dev.	217	74	30	22	169
	Median	520	649	791	666	607
	Coeff. Var.	36	11	4	3	27
FC[1]	Minimum	1	1	1	1	1
cfu/100 mL	Geo. Mean	1	1	1	1	1
	Maximum	1	1	1	1	1
	Geo. Std. Dev.	0	0	0	0	0
	Median	1	1	1	1	1
	Coeff. Var.	0	0	0	0	0
Hard.	Minimum	75	233	266	239	6
mg/L	Mean	80	235	315	276	7
	Maximum	85	237	359	326	7
	Std. Dev.	5	0	47	45	1
	Median	80	235	320	262	7
	Coeff. Var.	6	0	15	16	9
NH_4^+–N	Minimum	0.19	0.21	0.22	0.10	0.09
mg/L	Mean	0.21	0.23	0.27	0.14	0.10
	Maximum	0.24	0.25	0.32	0.18	0.11
	Std. Dev.	0.03	0.03	0.05	0.04	0.01
	Median	0.19	0.23	0.28	0.14	0.10
	Coeff. Var.	13.97	12.30	18.41	28.57	10.00

TABLE 6 (Continued): SUMMARY STATISTICS OF THE 2007 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE DES PLAINES TUNNEL SYSTEM: WELLS QD–46 THROUGH QD–50

Parameter		Well Number				
		QD–46	QD–47	QD–48	QD–49	QD–50
pH	Minimum	7.6	7.6	7.5	7.5	8.0
	Mean	7.8	7.8	7.9	8.1	8.5
	Maximum	7.9	7.9	8.1	8.7	9.2
	Std. Dev.	0.2	0.2	0.3	0.6	0.6
	Median	7.9	7.8	8.0	8.2	8.4
	Coeff. Var.	2.2	2.7	4.1	7.4	7.2
SO_4	Minimum	129	138	275	211	245
mg/L	Mean	133	157	295	242	254
	Maximum	142	175	312	266	261
	Std. Dev.	8	26	19	28	8
	Median	129	157	299	250	257
	Coeff. Var.	6	17	6	12	3
TDS	Minimum	594	512	570	522	684
mg/L	Mean	629	517	637	559	698
	Maximum	674	522	702	620	714
	Std. Dev.	41	7	66	53	15
	Median	620	517	640	534	696
	Coeff. Var.	6	1	10	10	2
TOC	Minimum	0.6	0.8	1.1	1.0	0.8
mg/L	Mean	0.7	0.8	1.2	1.3	1.0
	Maximum	0.9	0.8	1.4	1.6	1.2
	Std. Dev.	0.2	0.0	0.2	0.3	0.2
	Median	0.6	0.8	1.2	1.3	0.9
	Coeff. Var.	24.7	0.0	12.4	23.1	21.5

[1]For purposes of statistical evaluation, fecal coliform values less than 1 were set equal to 1.

TABLE 7: SUMMARY STATISTICS OF THE 2007 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE DES PLAINES TUNNEL SYSTEM: WELLS QD–51 THROUGH QD–55

Parameter		Well Number				
		QD–51	QD–52	QD–53	QD–54	QD–55
Cl	Minimum	12	15	19	17	18
mg/L	Mean	12	16	20	18	19
	Maximum	13	17	20	18	20
	Std. Dev.	1	1	1	1	1
	Median	12	15	20	18	19
	Coeff. Var.	5	7	3	3	5
Cond.	Minimum	502	452	571	401	423
µmhos/cm	Mean	594	538	639	499	562
	Maximum	658	593	719	579	663
	Std. Dev.	82	76	75	90	125
	Median	622	570	626	518	601
	Coeff. Var.	14	14	12	18	22
FC[1]	Minimum	1	1	1	1	1
cfu/100 mL	Geo. Mean	1	1	1	1	1
	Maximum	1	1	1	1	1
	Geo. Std. Dev.	0	0	0	0	0
	Median	1	1	1	1	1
	Coeff. Var.	0	0	0	0	0
Hard.	Minimum	4	21	8	35	161
mg/L	Mean	5	22	9	38	180
	Maximum	5	23	9	41	214
	Std. Dev.	1	1	1	3	30
	Median	5	22	9	39	165
	Coeff. Var.	12	5	7	8	16
NH_4^+–N[2]	Minimum	0.02	0.10	0.02	0.16	0.30
mg/L	Mean	0.04	0.10	0.02	0.18	0.32
	Maximum	0.06	0.11	0.03	0.19	0.35
	Std. Dev.	0.02	0.01	0.00	0.02	0.03
	Median	0.05	0.10	0.02	0.18	0.31
	Coeff. Var.	48.04	5.59	0.00	8.65	8.27

TABLE 7 (Continued): SUMMARY STATISTICS OF THE 2007 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE DES PLAINES TUNNEL SYSTEM: WELLS QD–51 THROUGH QD–55

Parameter		Well Number				
		QD–51	QD–52	QD–53	QD–54	QD–55
pH	Minimum	8.1	7.8	7.8	8.2	7.7
	Mean	8.6	8.4	8.4	8.5	7.9
	Maximum	9.1	8.9	8.8	8.7	8.1
	Std. Dev.	0.5	0.6	0.5	0.3	0.2
	Median	8.7	8.4	8.6	8.6	7.8
	Coeff. Var.	5.8	6.6	6.3	3.1	2.6
SO_4	Minimum	109	127	146	120	189
mg/L	Mean	136	157	179	146	194
	Maximum	150	182	210	172	200
	Std. Dev.	23	28	32	26	6
	Median	149	163	181	146	193
	Coeff. Var.	17	18	18	18	3
TDS	Minimum	472	472	576	424	502
mg/L	Mean	544	489	590	445	524
	Maximum	614	514	616	474	548
	Std. Dev.	71	22	23	26	23
	Median	546	480	578	436	522
	Coeff. Var.	13	5	4	6	4
TOC	Minimum	0.8	0.8	0.9	0.5	0.8
mg/L	Mean	0.9	0.9	1.1	0.5	0.9
	Maximum	1.0	0.9	1.5	0.6	1.1
	Std. Dev.	0.1	0.1	0.3	0.1	0.2
	Median	0.8	0.9	1.0	0.5	0.8
	Coeff. Var.	13.3	6.7	28.4	10.8	19.2

[1]For purposes of statistical evaluation, fecal coliform values less than 1 were set equal to 1.
[2]For purposes of statistical evaluation, ammonium nitrogen values less than 0.02 mg/L were set equal to 0.02 mg/L.

TABLE 8: SUMMARY STATISTICS OF THE 2007 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE DES PLAINES TUNNEL SYSTEM: WELLS QD–56 THROUGH QD–60

Parameter		Well Number				
		QD–56	QD–57	QD–58	QD–59	QD–60
Cl	Minimum	12	12	10	112	40
mg/L	Mean	13	13	13	120	57
	Maximum	13	15	16	129	85
	Std. Dev.	1	2	3	9	25
	Median	13	13	13	119	45
	Coeff. Var.	5	11	23	7	44
Cond.	Minimum	333	372	232	422	303
µmhos/cm	Mean	415	468	291	511	410
	Maximum	504	563	324	649	514
	Std. Dev.	86	96	51	121	106
	Median	409	469	316	461	412
	Coeff. Var.	21	20	18	24	26
FC[1]	Minimum	1	1	1	1	1
cfu/100 mL	Geo. Mean	1	1	1	1	1
	Maximum	1	1	1	1	1
	Geo. Std. Dev.	0	0	0	0	0
	Median	1	1	1	1	1
	Coeff. Var.	0	0	0	0	0
Hard.	Minimum	42	17	114	269	237
mg/L	Mean	44	18	115	272	240
	Maximum	46	19	116	277	243
	Std. Dev.	2	1	1	4	3
	Median	45	18	114	270	240
	Coeff. Var.	5	6	1	2	1
NH_4^+–N	Minimum	0.19	0.17	0.25	0.32	0.25
mg/L	Mean	0.21	0.20	0.27	0.33	0.31
	Maximum	0.23	0.22	0.29	0.34	0.36
	Std. Dev.	0.02	0.03	0.02	0.01	0.06
	Median	0.22	0.22	0.28	0.33	0.32
	Coeff. Var.	9.76	14.20	7.62	3.03	17.96

TABLE 8 (Continued): SUMMARY STATISTICS OF THE 2007 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE DES PLAINES TUNNEL SYSTEM: WELLS QD–56 THROUGH QD–60

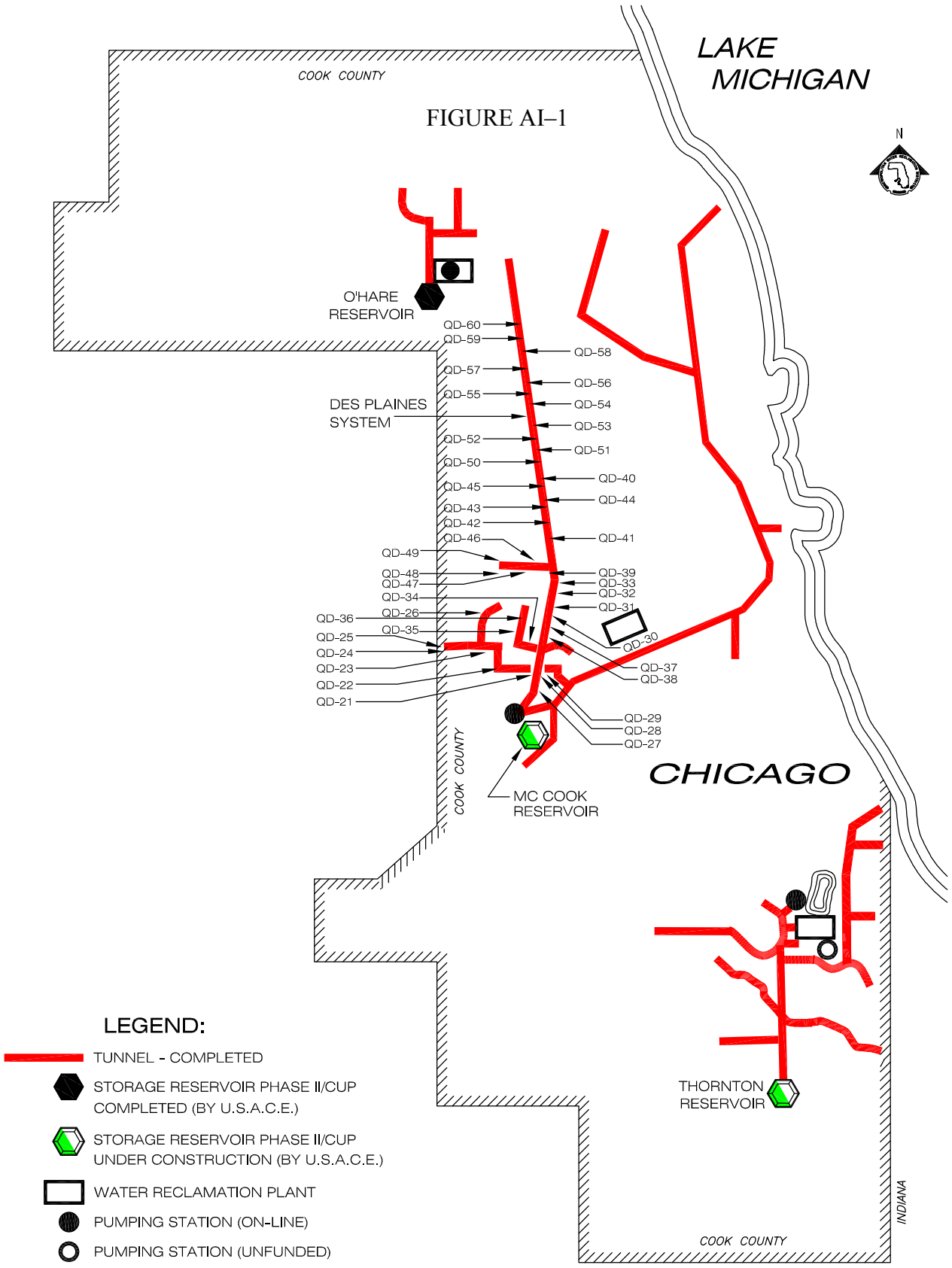
Parameter		Well Number				
		QD–56	QD–57	QD–58	QD–59	QD–60
pH	Minimum	8.1	8.0	7.7	7.6	7.4
	Mean	8.2	8.3	7.8	7.7	7.7
	Maximum	8.4	8.6	7.9	7.8	7.9
	Std. Dev.	0.2	0.3	0.1	0.1	0.3
	Median	8.1	8.3	7.9	7.7	7.7
	Coeff. Var.	2.1	3.6	1.5	1.3	3.3
SO_4	Minimum	6	47	1	47	80
mg/L	Mean	7	54	3	54	89
	Maximum	8	61	5	63	102
	Std. Dev.	1	7	2	8	12
	Median	7	55	2	52	85
	Coeff. Var.	14	13	78	15	13
TDS	Minimum	324	362	282	442	442
mg/L	Mean	338	383	389	483	454
	Maximum	356	418	602	534	476
	Std. Dev.	16	30	184	47	19
	Median	334	370	284	472	444
	Coeff. Var.	5	8	47	10	4
TOC[2]	Minimum	0.4	0.6	0.3	0.6	0.2
mg/L	Mean	0.5	0.6	0.4	0.7	0.2
	Maximum	0.7	0.7	0.5	0.7	0.2
	Std. Dev.	0.2	0.1	0.1	0.1	0.0
	Median	0.5	0.6	0.4	0.7	0.2
	Coeff. Var.	28.6	9.1	0.0	8.7	0.0

[1]For purposes of statistical evaluation, fecal coliform values less than 1 were set equal to 1.
[2]For purposes of statistical evaluation, total organic carbon values less than 0.2 mg/L were set equal to 0.2 mg/L.

APPENDIX AI

LOCATION MAP OF GROUNDWATER QUALITY MONITORING WELLS QD–21 THROUGH QD–60 IN THE DES PLAINES TUNNEL SYSTEM

FIGURE AI–1



DES PLAINES TUNNEL SYSTEM LOCATION MAP OF GROUNDWATER QUALITY MONITORING WELLS

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

I:\DMAC\DesPlainesMonitor Updated.dwg, 08/16/06 at 14.53

APPENDIX AII

2007 GROUNDWATER QUALITY DATA FOR MONITORING WELLS QD–21 THROUGH QD–60 IN THE DES PLAINES TUNNEL SYSTEM

TABLE AII–1: 2007 pH, CONDUCTIVITY, TEMPERATURE, HARDNESS, AMMONIA NITROGEN, AND CHLORIDE DATA FOR WATER QUALITY MONITORING WELLS QD–21 THROUGH QD–60 IN THE DES PLAINES TUNNEL SYSTEM

Well	Date of Sampling	pH[1]	Cond.[1] µmhos/cm	Temp. °C	Hard. mg/L	NH_4^+–N mg/L	Cl mg/L
QD–21	4/11/07	7.0	1,748	12	663	0.19	246
QD–21	6/27/07	6.9	1,820	16	783	0.17	251
QD–21	10/24/07	6.8	2,375	12	701	0.20	239
QD–22	4/11/07	7.0	1,112	12	692	0.31	126
QD–22	6/27/07	7.0	1,316	13	713	0.28	115
QD–22	10/24/07	7.4	1,864	11	721	0.36	152
QD–23	4/11/07	7.0	1,277	13	709	0.42	167
QD–23	6/27/07	7.0	1,405	14	784	0.39	173
QD–23	10/24/07	6.9	1,696	13	716	0.44	153
QD–24	4/11/07	7.5	819	11	494	0.39	79
QD–24	6/27/07	7.0	1,310	14	547	0.41	106
QD–24	10/24/07	7.2	1,460	11	420	0.44	104
QD–25	2/7/07	7.1	1,515	9	554	0.71	389
QD–25	6/27/07	7.0	2,115	13	585	0.68	436
QD–25	10/24/07	7.2	2,144	11	564	0.69	380
QD–26	6/7/07	7.7	652	12	401	0.29	16
QD–26	10/18/07	7.5	710	13	386	0.31	16
QD–26	11/8/07	7.8	492	12	397	3.53	55
QD–27	3/1/07	7.8	1,050	12	504	23.16	286
QD–27	3/29/07	7.5	2,272	12	496	24.16	309
QD–27	5/17/07	7.4	1,753	12	512	23.82	304
QD–27	8/16/07	7.8	830	12	528	26.29	341
QD–27	10/18/07	7.2	2,240	14	477	27.67	354
QD–27	11/8/07	8.1	1,092	12	506	24.85	315
QD–28	5/31/07	6.4	1,687	15	690	0.45	337
QD–28	7/25/07	7.2	1,622	14	794	0.55	322
QD–28	10/29/07	6.8	1,986	13	678	0.54	326

TABLE AII–1 (Continued): 2007 pH, CONDUCTIVITY, TEMPERATURE, HARDNESS, AMMONIA NITROGEN, AND CHLORIDE DATA FOR WATER QUALITY MONITORING WELLS QD–21 THROUGH QD–60 IN THE DES PLAINES TUNNEL SYSTEM

Well	Date of Sampling	pH[1]	Cond.[1] µmhos/cm	Temp. °C	Hard. mg/L	NH_4^+–N mg/L	Cl mg/L
QD–29	5/31/07	6.3	921	15	657	0.31	140
QD–29	7/25/07	7.1	1,088	14	604	0.35	120
QD–29	10/29/07	7.0	1,475	12	643	0.37	128
QD–30	6/7/07	7.9	766	13	693	0.25	136
QD–30	8/16/07	7.9	717	13	715	0.30	134
QD–30	11/1/07	7.8	1,462	12	724	0.30	136
QD–31	3/1/07	7.6	682	11	261	2.58	140
QD–31	6/7/07	7.8	875	12	251	0.15	124
QD–31	11/1/07	7.4	1,433	11	240	0.19	122
QD–32	3/1/07	8.6	1,450	11	38	0.15	493
QD–32	6/7/07	8.5	221	12	37	0.15	531
QD–32	11/1/07	9.2	3,254	11	36	0.24	550
QD–33	3/1/07	8.2	1,052	10	27	0.15	370
QD–33	3/29/07	7.7	2,408	11	28	3.04	346
QD–33	5/17/07	8.4	2,008	12	27	2.98	371
QD–33	6/28/07	8.3	1,180	13	28	0.14	353
QD–33	8/16/07	8.0	1,448	13	29	0.22	359
QD–33	10/18/07	8.1	2,100	14	24	0.15	362
QD–34	1/23/07	6.9	1,415	11	724	0.46	117
QD–34	2/15/07	Well could not be sampled					
QD–34	5/31/07	6.8	1,299	14	742	0.29	132
QD–34	6/6/07	7.6	1,303	12	750	0.30	122
QD–34	8/23/07	7.5	795	13	734	0.55	105
QD–34	10/29/07	7.1	1,572	12	738	0.34	119
QD–35	5/31/07	6.7	1,255	14	645	0.25	120
QD–35	7/25/07	7.2	1,114	13	717	0.38	111
QD–35	10/29/07	7.0	1,489	12	653	0.31	119

TABLE AII–1 (Continued): 2007 pH, CONDUCTIVITY, TEMPERATURE, HARDNESS, AMMONIA NITROGEN, AND CHLORIDE DATA FOR WATER QUALITY MONITORING WELLS QD–21 THROUGH QD–60 IN THE DES PLAINES TUNNEL SYSTEM

Well	Date of Sampling	pH[1]	Cond.[1] µmhos/cm	Temp. °C	Hard. mg/L	NH_4^+–N mg/L	Cl mg/L
QD–36	5/16/07	7.7	1,434	12	750	0.23	120
QD–36	6/6/07	7.5	1,234	13	742	0.24	129
QD–36	10/29/07	6.9	1,641	11	768	0.30	138
QD–37	2/1/07	7.4	1,682	11	395	0.10	296
QD–37	3/29/07	7.3	1,969	12	385	0.12	303
QD–37	5/17/07	7.7	1,704	12	553	0.24	286
QD–37	6/28/07	8.0	1,174	14	560	0.24	267
QD–37	8/16/07	7.6	1,242	13	587	0.30	261
QD–37	10/18/07	7.6	1,062	13	515	0.24	280
QD–38	5/17/07	7.9	1,059	12	233	0.29	204
QD–38	8/16/07	7.8	860	13	256	0.35	185
QD–38	10/18/07	7.7	732	12	223	0.30	184
QD–39	4/19/07	8.6	960	12	18	0.07	27
QD–39	6/28/07	8.1	885	12	18	<0.02	28
QD–39	12/20/07	8.4	860	10	18	0.08	47
QD–40	2/1/07	8.3	553	11	22	0.03	15
QD–40	6/28/07	8.4	876	12	24	0.05	14
QD–40	12/20/07	9.5	883	12	24	0.13	16
QD–41	2/1/07	7.9	489	11	435	0.23	22
QD–41	4/19/07	7.5	820	12	433	0.26	19
QD–41	7/26/07	7.5	868	20	422	0.31	18
QD–42	2/1/07	7.8	482	10	409	0.29	20
QD–42	4/19/07	7.5	812	11	403	0.31	19
QD–42	7/26/07	7.6	802	13	371	0.32	19
QD–43	2/1/07	7.9	460	10	445	0.25	44
QD–43	4/17/07	Well could not be sampled					
QD–43	7/27/07	Well could not be sampled					

TABLE AII–1 (Continued): 2007 pH, CONDUCTIVITY, TEMPERATURE, HARDNESS, AMMONIA NITROGEN, AND CHLORIDE DATA FOR WATER QUALITY MONITORING WELLS QD–21 THROUGH QD–60 IN THE DES PLAINES TUNNEL SYSTEM

Well	Date of Sampling	pH[1]	Cond.[1] µmhos/cm	Temp. °C	Hard. mg/L	NH_4^+–N mg/L	Cl mg/L
QD–44	5/16/07	7.7	645	11	197	0.26	30
QD–44	7/26/07	7.6	637	12	292	0.33	15
QD–44	12/6/07	7.7	580	9	311	0.32	14
QD–45	2/1/07	8.6	635	11	99	0.26	19
QD–45	4/19/07	8.3	666	12	86	0.26	17
QD–45	6/21/07	8.8	687	13	88	0.20	17
QD–46	2/15/07	7.9	443	10	85	0.19	14
QD–46	5/16/07	7.6	851	12	80	0.19	13
QD–46	10/3/07	7.9	520	12	75	0.24	22
QD–47	1/30/07	Well could not be sampled					
QD–47	6/21/07	7.9	597	15	237	0.21	16
QD–47	11/28/07	7.6	701	10	233	0.25	15
QD–48	2/1/07	8.1	745	11	359	0.28	20
QD–48	6/21/07	8.0	791	14	320	0.22	13
QD–48	11/28/07	7.5	801	10	266	0.32	12
QD–49	2/1/07	8.2	666	11	326	0.10	14
QD–49	6/21/07	8.7	647	16	262	0.14	13
QD–49	11/28/07	7.5	691	10	239	0.18	13
QD–50	5/10/07	8.4	811	13	7	0.11	14
QD–50	8/2/07	9.2	607	14	7	0.09	14
QD–50	10/17/07	8.0	476	12	6	0.10	13
QD–51	5/10/07	8.7	658	12	5	0.06	12
QD–51	8/2/07	9.1	622	14	5	0.02	13
QD–51	10/17/07	8.1	502	12	4	0.05	12
QD–52	5/10/07	8.4	593	14	23	0.10	15
QD–52	8/2/07	8.9	570	14	22	0.10	17
QD–52	10/17/07	7.8	452	14	21	0.11	15

TABLE AII–1 (Continued): 2007 pH, CONDUCTIVITY, TEMPERATURE, HARDNESS, AMMONIA NITROGEN, AND CHLORIDE DATA FOR WATER QUALITY MONITORING WELLS QD–21 THROUGH QD–60 IN THE DES PLAINES TUNNEL SYSTEM

Well	Date of Sampling	pH[1]	Cond.[1] µmhos/cm	Temp. °C	Hard. mg/L	NH_4^+–N mg/L	Cl mg/L
QD–53	5/10/07	8.6	719	13	9	0.03	19
QD–53	8/2/07	8.8	626	15	9	<0.02	20
QD–53	10/17/07	7.8	571	13	8	<0.02	20
QD–54	3/22/07	8.2	401	13	39	0.18	17
QD–54	5/10/07	8.7	518	14	41	0.19	18
QD–54	8/2/07	8.6	579	19	35	0.16	18
QD–55	3/22/07	7.8	423	12	165	0.30	19
QD–55	5/10/07	7.7	601	13	161	0.31	18
QD–55	8/2/07	8.1	663	13	214	0.35	20
QD–56	3/22/07	8.1	333	11	45	0.19	12
QD–56	5/10/07	8.1	409	12	46	0.23	13
QD–56	8/2/07	8.4	504	12	42	0.22	13
QD–57	3/22/07	8.0	372	11	17	0.17	12
QD–57	5/10/07	8.3	469	13	18	0.22	13
QD–57	8/2/07	8.6	563	12	19	0.22	15
QD–58	5/2/07	7.9	324	16	116	0.25	16
QD–58	8/2/07	7.9	316	12	114	0.28	13
QD–58	12/5/07	7.7	232	10	114	0.29	10
QD–59	5/2/07	7.7	649	11	270	0.32	112
QD–59	8/2/07	7.8	461	14	277	0.33	129
QD–59	12/5/07	7.6	422	11	269	0.34	119
QD–60	5/2/07	7.9	514	12	243	0.25	85
QD–60	8/2/07	7.7	412	13	240	0.32	45
QD–60	12/5/07	7.4	303	11	237	0.36	40

[1]Unfiltered samples, all others were filtered through 0.45 µm membrane.

TABLE AII–2: 2007 SULFATE, TOTAL ORGANIC CARBON, TOTAL DISSOLVED SOLIDS, FECAL COLIFORM, WATER ELEVATION, AND RECHARGE DATA FOR WATER QUALITY MONITORING WELLS QD–21 THROUGH QD–60 IN THE DES PLAINES TUNNEL SYSTEM

Well	Date of Sampling	SO_4 mg/L	TOC mg/L	TDS mg/L	FC[1] cfu/100 mL	Water Elevation[2] Feet	Recharge[3] Hours
QD–21	4/11/07	347	0.9	1,298	<1	-72	<4
QD–21	6/27/07	334	0.9	1,638	<1	-72	<4
QD–21	10/24/07	298	0.7	1,476	<1	-73	<4
QD–22	4/11/07	297	0.9	1,050	<1	-30	<4
QD–22	6/27/07	271	0.9	1,284	<1	-32	<4
QD–22	10/24/07	303	0.9	1,354	<1	-34	<4
QD–23	4/11/07	324	1.4	1,148	<1	-35	<4
QD–23	6/27/07	327	1.5	1,512	<1	-36	<4
QD–23	10/24/07	352	1.5	1,350	<1	-38	<4
QD–24	4/11/07	168	1.3	762	<1	18	<4
QD–24	6/27/07	184	1.8	1,016	<1	13	<4
QD–24	10/24/07	145	1.5	836	<1	15	<4
QD–25	2/7/07	169	1.9	1,246	<1	25	<4
QD–25	6/27/07	218	2.3	1,636	<1	28	<4
QD–25	10/24/07	212	1.6	1,498	<1	27	<4
QD–26	6/7/07	104	0.6	562	<1	-16	<48
QD–26	10/18/07	125	0.6	562	<1	-18	<48
QD–26	11/8/07	108	0.6	648	<1	-19	<48
QD–27	3/1/07	43	16.2	1,144	<1	-200	<48
QD–27	3/29/07	58	16.0	1,206	1	-194	<48
QD–27	5/17/07	53	16.5	1,164	<1	-185	<48
QD–27	8/16/07	43	15.8	1,300	<1	-189	<48
QD–27	10/18/07	58	16.1	1,314	<1	-188	<48
QD–27	11/8/07	57	15.4	1,218	<1	-197	<48
QD–28	5/31/07	278	0.9	1,516	<1	-132	<4
QD–28	7/25/07	279	1.1	1,834	<1	-127	<4
QD–28	10/29/07	286	0.9	1,462	<1	-129	<4

TABLE AII–2 (Continued): 2007 SULFATE, TOTAL ORGANIC CARBON, TOTAL DISSOLVED SOLIDS, FECAL COLIFORM, WATER ELEVATION, AND RECHARGE DATA FOR WATER QUALITY MONITORING WELLS QD–21 THROUGH QD–60 IN THE DES PLAINES TUNNEL SYSTEM

Well	Date of Sampling	SO_4 mg/L	TOC mg/L	TDS mg/L	FC[1] cfu/100 mL	Water Elevation[2] Feet	Recharge[3] Hours
QD–29	5/31/07	300	1.4	1,118	<1	-188	<4
QD–29	7/25/07	224	1.6	1,212	<1	-189	<4
QD–29	10/29/07	265	1.4	1,084	<1	-189	<4
QD–30	6/7/07	337	0.9	1,178	<1	-129	<48
QD–30	8/16/07	313	1.0	1,212	<1	-129	<48
QD–30	11/1/07	351	0.9	1,180	<1	-129	<48
QD–31	3/1/07	181	0.6	940	<1	-200	<48
QD–31	6/7/07	183	0.6	936	<1	-191	<48
QD–31	11/1/07	186	0.5	922	<1	-190	<48
QD–32	3/1/07	228	0.3	1,890	<1	-215	<48
QD–32	6/7/07	233	0.3	2,052	<1	-214	<48
QD–32	11/1/07	232	0.3	2,054	<1	-212	<48
QD–33	3/1/07	198	0.4	1,684	<1	-170	<48
QD–33	3/29/07	179	0.3	1,582	<1	-178	<48
QD–33	5/17/07	215	0.5	1,602	<1	-174	<48
QD–33	6/28/07	188	0.4	1,648	<1	-171	<48
QD–33	8/16/07	188	0.4	1,698	<1	-173	<48
QD–33	10/18/07	236	0.4	1,716	<1	-168	<48
QD–34	1/23/07	768	1.3	1,046	2	-115	<4
QD–34	2/15/07	Well could not be sampled					
QD–34	5/31/07	395	1.1	1,266	<1	-118	<4
QD–34	6/6/07	361	1.0	1,184	<1	-116	<4
QD–34	8/23/07	313	1.0	1,284	3	-108	<4
QD–34	10/29/07	383	1.1	1,210	<1	-113	<4
QD–35	5/31/07	305	2.6	1,122	<1	-110	<4
QD–35	7/25/07	291	1.5	1,346	<1	-106	<4
QD–35	10/29/07	303	2.7	1,070	<1	-108	<4

TABLE AII–2 (Continued): 2007 SULFATE, TOTAL ORGANIC CARBON, TOTAL DISSOLVED SOLIDS, FECAL COLIFORM, WATER ELEVATION, AND RECHARGE DATA FOR WATER QUALITY MONITORING WELLS QD–21 THROUGH QD–60 IN THE DES PLAINES TUNNEL SYSTEM

Well	Date of Sampling	SO_4 mg/L	TOC mg/L	TDS mg/L	FC[1] cfu/100 mL	Water Elevation[2] Feet	Recharge[3] Hours
QD–36	5/16/07	307	1.2	1,070	<1	-133	<4
QD–36	6/6/07	336	1.2	1,188	<1	-116	<4
QD–36	10/29/07	376	1.3	1,232	<1	-120	<4
QD–37	2/1/07	358	1.0	1,434	<1	-212	<48
QD–37	3/29/07	317	0.5	1,444	<1	-209	<48
QD–37	5/17/07	398	0.5	1,464	<1	-207	<48
QD–37	6/28/07	374	0.5	1,490	<1	-208	<48
QD–37	8/16/07	370	0.6	1,492	<1	-207	<48
QD–37	10/18/07	416	0.5	1,488	<1	-209	<48
QD–38	5/17/07	102	0.5	876	<1	-203	<48
QD–38	8/16/07	97	0.5	840	<1	-206	<48
QD–38	10/18/07	115	0.4	830	<1	-205	<48
QD–39	4/19/07	91	0.5	820	<1	-142	<48
QD–39	6/28/07	94	0.4	812	<1	-142	<48
QD–39	12/20/07	96	0.4	870	<1	-139	<48
QD–40	2/1/07	390	0.8	794	<1	-84	<48
QD–40	6/28/07	383	0.7	764	<1	-87	<48
QD–40	12/20/07	382	0.7	762	<1	-84	<48
QD–41	2/1/07	361	1.4	830	<1	-135	<48
QD–41	4/19/07	346	1.1	808	<1	-133	<48
QD–41	7/26/07	311	1.3	802	<1	-129	<48
QD–42	2/1/07	324	0.9	796	<1	-127	<48
QD–42	4/19/07	279	1.0	786	<1	-125	<48
QD–42	7/26/07	284	1.0	780	<1	-122	<48
QD–43	2/1/07	206	0.8	728	<1	-136	<48
QD–43	4/17/07	Well could not be sampled					
QD–43	7/27/07	Well could not be sampled					

TABLE AII–2 (Continued): 2007 SULFATE, TOTAL ORGANIC CARBON, TOTAL DISSOLVED SOLIDS, FECAL COLIFORM, WATER ELEVATION, AND RECHARGE DATA FOR WATER QUALITY MONITORING WELLS QD–21 THROUGH QD–60 IN THE DES PLAINES TUNNEL SYSTEM

Well	Date of Sampling	SO_4 mg/L	TOC mg/L	TDS mg/L	FC[1] cfu/100 mL	Water Elevation[2] Feet	Recharge[3] Hours
QD–44	5/16/07	163	1.0	534	2	-15	<4
QD–44	7/26/07	191	1.0	604	<1	-10	<4
QD–44	12/6/07	215	0.8	638	<1	-10	<4
QD–45	2/1/07	201	1.2	578	<1	-8	<48
QD–45	4/19/07	185	0.8	594	<1	-10	<48
QD–45	6/21/07	195	0.8	578	<1	-9	<48
QD–46	2/15/07	142	0.9	594	<1	-189	<4
QD–46	5/16/07	129	0.6	620	<1	-165	<4
QD–46	10/3/07	129	0.6	674	<1	-172	<4
QD–47	1/30/07			Well could not be sampled			
QD–47	6/21/07	138	0.8	512	<1	4	<48
QD–47	11/28/07	175	0.8	522	<1	-1	<48
QD–48	2/1/07	312	1.4	702	<1	-176	<48
QD–48	6/21/07	275	1.1	640	<1	-176	<48
QD–48	11/28/07	299	1.2	570	<1	-178	<48
QD–49	2/1/07	266	1.6	620	<1	-182	<48
QD–49	6/21/07	211	1.3	534	<1	-181	<48
QD–49	11/28/07	250	1.0	522	<1	-179	<48
QD–50	5/10/07	261	0.8	684	<1	-139	<48
QD–50	8/2/07	245	1.2	714	<1	-136	<48
QD–50	10/17/07	257	0.9	696	<1	-133	<48
QD–51	5/10/07	150	0.8	546	<1	-103	<48
QD–51	8/2/07	109	1.0	614	<1	-105	<48
QD–51	10/17/07	149	0.8	472	<1	-103	<48

TABLE AII–2 (Continued): 2007 SULFATE, TOTAL ORGANIC CARBON, TOTAL DISSOLVED SOLIDS, FECAL COLIFORM, WATER ELEVATION, AND RECHARGE DATA FOR WATER QUALITY MONITORING WELLS QD–21 THROUGH QD–60 IN THE DES PLAINES TUNNEL SYSTEM

Well	Date of Sampling	SO_4 mg/L	TOC mg/L	TDS mg/L	FC[1] cfu/100 mL	Water Elevation[2] Feet	Recharge[3] Hours
QD–52	5/10/07	163	0.8	480	<1	-56	<48
QD–52	8/2/07	127	0.9	514	<1	-59	<48
QD–52	10/17/07	182	0.9	472	<1	-60	<48
QD–53	5/10/07	181	1.0	578	<1	-146	<48
QD–53	8/2/07	146	1.5	616	<1	-167	<48
QD–53	10/17/07	210	0.9	576	<1	-160	<48
QD–54	3/22/07	146	0.5	424	<1	-20	<48
QD–54	5/10/07	172	0.5	474	<1	-19	<48
QD–54	8/2/07	120	0.6	436	<1	-21	<48
QD–55	3/22/07	193	0.8	502	<1	-139	<48
QD–55	5/10/07	200	0.8	522	<1	-134	<48
QD–55	8/2/07	189	1.1	548	<1	-133	<48
QD–56	3/22/07	6	0.4	324	<1	-67	<48
QD–56	5/10/07	8	0.5	334	<1	-63	<48
QD–56	8/2/07	7	0.7	356	<1	-66	<48
QD–57	3/22/07	55	0.6	370	<1	-101	<48
QD–57	5/10/07	61	0.6	362	<1	-107	<48
QD–57	8/2/07	47	0.7	418	<1	-101	<48
QD–58	5/2/07	5	0.5	282	<1	-101	<48
QD–58	8/2/07	1	0.4	602	<1	-100	<48
QD–58	12/5/07	2	0.3	284	<1	-100	<48
QD–59	5/2/07	47	0.7	472	<1	-35	<48
QD–59	8/2/07	52	0.7	442	<1	-35	<48
QD–59	12/5/07	63	0.6	534	<1	-34	<48

TABLE AII–2 (Continued): 2007 SULFATE, TOTAL ORGANIC CARBON, TOTAL DISSOLVED SOLIDS, FECAL COLIFORM, WATER ELEVATION, AND RECHARGE DATA FOR WATER QUALITY MONITORING WELLS QD–21 THROUGH QD–60 IN THE DES PLAINES TUNNEL SYSTEM

Well	Date of Sampling	SO_4 mg/L	TOC mg/L	TDS mg/L	FC[1] cfu/100 mL	Water Elevation[2] Feet	Recharge[3] Hours
QD–60	5/2/07	80	0.2	476	<1	-110	<48
QD–60	8/2/07	85	0.2	442	<1	-111	<48
QD–60	12/5/07	102	<0.2	444	<1	-107	<48

[1]Unfiltered samples, all others were filtered through 0.45 µm membrane.
[2]Water level elevations are relative to Chicago City Datum.
[3]Refers to elapsed time after initial drawdown before the well recovered sufficiently for sampling.