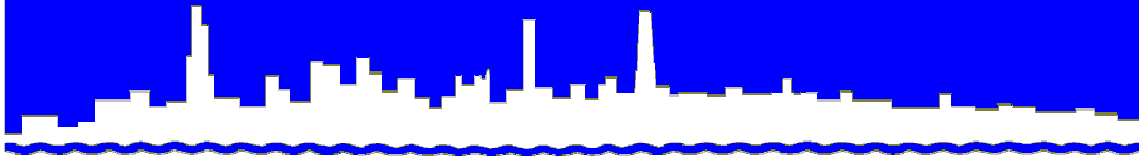


Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

***MONITORING AND RESEARCH
DEPARTMENT***

REPORT NO. 10-30

TUNNEL AND RESERVOIR PLAN

MAINSTREAM TUNNEL SYSTEM

2009 ANNUAL GROUNDWATER MONITORING REPORT

June 2010

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Mariyana T. Spyropoulos

Metropolitan Water Reclamation District of Greater Chicago

100 East Erie Street

Chicago, Illinois 60611-3154

312.751.5190

Louis Kollias, P.E., BCEE

Director of Monitoring and Research

louis.kollias@mwr.org

June 18, 2010

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, Mainstream Tunnel System, 2009 Annual
Groundwater Monitoring Report

Enclosed are three copies of "Tunnel and Reservoir Plan, Mainstream Tunnel System,
2009 Annual Groundwater Monitoring Report."

Very truly yours,

Louis Kollias
Director
Monitoring and Research

LK:HZ:lf
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TUNNEL AND RESERVOIR PLAN
MAINSTREAM TUNNEL SYSTEM
2009 ANNUAL GROUNDWATER MONITORING REPORT

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2009 MONITORING RESULTS

Introduction

This report contains 2009 data for the Tunnel and Reservoir Plan Mainstream Tunnel System compiled from monitoring of groundwater level elevations in observation wells, and monitoring of groundwater quality in water quality monitoring wells. The observation wells are all sampled once every two months while the monitoring wells are sampled at varying frequency. Monitoring wells QM-53, QM-56, QM-58, QM-61, QM-66, QM-68 through QM-74, QM-76, QM-77, and QM-81 are sampled three times per year (Illinois Environmental Protection Agency [IEPA] memoranda July 9, 2004, and February 23, 2006). Monitoring wells QM-62 through QM-65, QM-67, QM-75, QM-78 through QM-80, and QM-82 are sampled six times per year (IEPA memorandum July 9, 2004). Sampling of water quality monitoring wells QM-51, QM-52, QM-54, QM-55, QM-57, and QM-60 was discontinued with the approval of the IEPA (memorandum dated May 4, 1994). Water quality monitoring well QM-59 has been dry since February 1995 and is no longer being monitored. The observation wells and water quality monitoring wells are located along the length of the Mainstream Tunnel between Morton Grove and Hodgkins.

Monitoring Data

Appendix AI contains a location map of observation wells OM-1 through OM-23 located along the Mainstream Tunnel System.

Table AII-1 in Appendix AII contains groundwater level elevation data for the year 2009 for observation wells OM-1 through OM-23 located along the Mainstream Tunnel System. Table AII-1 also contains the yearly minimum, mean, and maximum water level elevations of each observation well.

Appendix AIII contains a location map of water quality monitoring wells QM-53 through QM-82 located along the Mainstream Tunnel System.

Tables AIV-1 and AIV-2 of Appendix AIV contain water quality data for the year 2009 pertaining to water quality monitoring wells QM-53 through QM-82 located along the Mainstream Tunnel System. Ten water quality parameters were monitored: chloride (Cl), conductivity (Cond.), fecal coliform (FC), hardness as CaCO₃ (Hard.), ammonia nitrogen (NH₃-N), pH, sulfate (SO₄), total dissolved solids (TDS), total organic carbon (TOC), and temperature (Temp.). Water elevation in each water quality monitoring well as measured at the time of sampling is also included in Table AIV-2. The recharge time after initial drawdown in each monitoring well prior to sampling is also provided in Table AIV-2.

All of the wells in the Mainstream system were visited for the required number of samples. However, in some instances the samples could not be collected for various reasons. Water quality well QM-56 could not be sampled on April 9, 2009, because the pump could not be

activated. Water quality monitoring well QM-58 could not be monitored during 2009 because access to the well has been denied by the landowner. The Metropolitan Water Reclamation District of Greater Chicago is seeking to reestablish access to this well. Water quality well QM-61 could not be sampled on November 4, 2009, because construction on the site blocked access to the well. Water quality well QM-62 could not be sampled on January 27, 2009, because access to the well was blocked by heavy snow, or on April 2, 2009, and June 4, 2009, because muddy conditions blocked access to the well. Water quality well QM-64 could not be sampled on April 4, 2009, or June 3, 2009, because construction blocked access to the wells. Water quality monitoring well QM-66 could not be sampled June 4, 2009, or August 20, 2009, because there was insufficient water in the well to collect a sample. Water quality well QM-74 could not be sampled on March 26, 2009, because the pump was inoperable. Water quality monitoring well QM-79 could not be sampled on January 27, 2009, because heavy snow blocked access to the well. Water quality monitoring well QM-82 could not be sampled on June 18, 2009, July 28, 2009, or October 6, 2009, because the pump was inoperable. A work order has been generated to repair the pump.

Summary of Data

Observation Well Water Level Elevation Data. In Figure 1, the 2009 groundwater level elevation data for the observation wells (OM-1 through OM-23) of the Mainstream Tunnel System have been plotted. In this figure, minimum, mean, and maximum water level elevations of all the observation wells are plotted to show fluctuations in water level elevations during 2009. Table AII-1 in Appendix AII contains the groundwater level elevation data for the year 2009 for the observation wells located in the Mainstream Tunnel System.

Water Quality Monitoring Well Data. Tables 1 through 5 contain summary statistics of the water quality parameters for the year 2009 for water quality monitoring wells QM-53 through QM-82 in the Mainstream Tunnel System. These statistics are computed from the 2009 data collected from each water quality monitoring well. The summary statistics include minimum, mean, maximum, standard deviation (Std. Dev.), median and coefficient of variation (Coeff. Var.) for eight of the nine water quality parameters analyzed during 2009. These eight water quality parameters are: chloride (Cl), conductivity (Cond.), hardness as CaCO₃ (Hard.), ammonia nitrogen (NH₃-N), pH, sulfate (SO₄), total dissolved solids (TDS), and total organic carbon (TOC). For fecal coliform (FC), the summary statistics include minimum, geometric mean (Geo. Mean), maximum, and median. Median values were calculated using the Microsoft[®] Excel function MEDIAN. In instances where an even number of samples were collected and analyzed, the reported median is the average of the two numbers in the middle of the series.

FIGURE 1: 2009 MINIMUM, MEAN, AND MAXIMUM WATER LEVEL ELEVATIONS FOR THE MAINSTREAM TUNNEL SYSTEM OBSERVATION WELLS

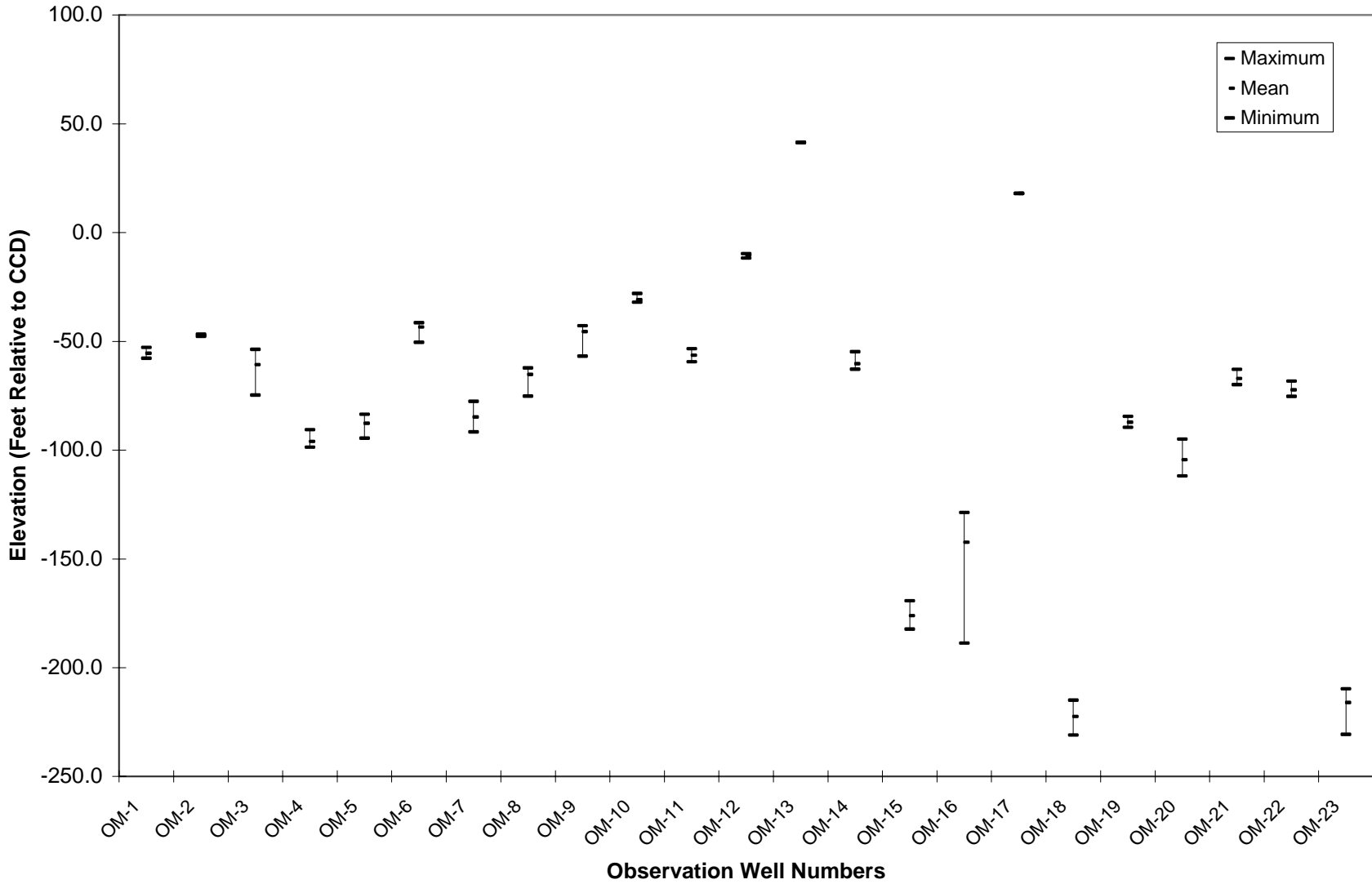


TABLE 1: SUMMARY STATISTICS OF THE 2009 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE MAINSTREAM TUNNEL SYSTEM: WELLS QM-53, QM-56, QM-61, QM-62, AND QM-63

Parameter ¹		Well Number				
		QM-53	QM-56	QM-61	QM-62	QM-63
Cl mg/L	Minimum	15	36	70	56	50
	Mean	19	37	117	72	59
	Maximum	21	37	163	93	78
	Std. Dev.	3	1	66	19	10
	Median	20	37	117	68	57
	Coeff. Var. (%)	17	2	56	26	16
FC cfu/100 mL	Minimum	1	1	2	1	1
	Geo. Mean	1	1	7	4	5
	Maximum	1	1	27	89	64
	Median	1	1	15	1	3
SO ₄ mg/L	Minimum	34.8	12.3	23.5	30.5	786.3
	Mean	35.1	14.5	25.9	36.8	863.4
	Maximum	35.3	16.7	28.3	44.9	936.2
	Std. Dev.	0.2	3.1	3.4	7.4	58.2
	Median	35.1	14.5	25.9	35.0	853.6
	Coeff. Var. (%)	0.7	21.5	13.0	20.1	6.7
NH ₃ -N mg/L	Minimum	0.10	0.48	0.23	0.59	1.86
	Mean	0.10	0.49	0.63	0.64	1.96
	Maximum	0.10	0.49	1.02	0.68	2.09
	Std. Dev.	0.00	0.01	0.56	0.05	0.09
	Median	0.10	0.49	0.63	0.65	1.94
	Coeff. Var. (%)	0.00	1.46	89.38	7.16	4.79
TOC mg/L	Minimum	1.0	1.0	1.0	1.3	2.2
	Mean	1.5	1.0	1.2	1.4	2.3
	Maximum	2.1	1.0	1.3	1.6	2.3
	Std. Dev.	0.6	0	0.2	0.0	0.1
	Median	1.3	1.0	1.2	1.3	2.3
	Coeff. Var. (%)	38.8	0	18.4	3.3	2.3

TABLE 1 (Continued): SUMMARY STATISTICS OF THE 2009 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE MAINSTREAM TUNNEL SYSTEM: WELLS QM-53, QM-56, QM-61, QM-62, AND QM-63

Parameter ¹		Well Number				
		QM-53	QM-56	QM-61	QM-62	QM-63
TDS mg/L	Minimum	204	274	382	428	1,630
	Mean	229	283	455	445	1,683
	Maximum	270	292	528	460	1,746
	Std. Dev.	36	13	103	16	44
	Median	212	283	455	446	1,676
	Coeff. Var. (%)	16	4	23	4	3
Hard. mg/L as CO ₃	Minimum	118	121	132	158	812
	Mean	125	124	150	164	835
	Maximum	131	127	168	168	862
	Std. Dev.	7	4	25	5	19
	Median	127	124	150	165	835
	Coeff. Var. (%)	5	3	17	3	2
Cond. µmhos/cm	Minimum	225	304	396	408	799
	Mean	241	405	516	571	1,075
	Maximum	273	505	635	725	1,929
	Std. Dev.	27	142	169	159	448
	Median	226	405	516	579	849
	Coeff. Var. (%)	11	35	33	28	42
pH unit	Minimum	7.8	7.6	7.5	7.4	7.2
	Mean	8.1	7.7	7.5	7.7	7.4
	Maximum	8.3	7.8	7.5	8.1	7.7
	Std. Dev.	0.3	0.1	0.0	0.4	0.2
	Median	8.2	7.7	7.5	7.7	7.5
	Coeff. Var. (%)	3.3	1.4	0.1	4.9	2.4

¹For purpose of statistical evaluation, any value less than the appropriate MDL or LOQ was set equal to the value of the MDL or LOQ.

TABLE 2: SUMMARY STATISTICS OF THE 2009 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE MAINSTREAM TUNNEL SYSTEM: WELLS QM-64 THROUGH QM-68

Parameter ¹		Well Number				
		QM-64	QM-65	QM-66	QM-67	QM-68
Cl mg/L	Minimum	58	84	194	185	30
	Mean	64	402	194	228	32
	Maximum	74	524	194	255	35
	Std. Dev.	9	159	N/C ²	29	3
	Median	61	453	194	230	31
	Coeff. Var. (%)	13	40	N/C	13	8
FC cfu/100 mL	Minimum	1	1	1	120	1
	Geo. Mean	3	4	1	405	2
	Maximum	19	330	1	2,000	3
	Median	2	2	1	310	3
SO ₄ mg/L	Minimum	32.8	50.2	208.6	2.0	35.4
	Mean	36.1	156.6	208.6	12.0	35.9
	Maximum	41.0	204.6	208.6	26.1	36.2
	Std. Dev.	4.3	54.5	N/C	7.9	0.4
	Median	34.6	170.9	208.6	10.8	36.0
	Coeff. Var. (%)	11.9	34.8	N/C	65.7	1.2
NH ₃ -N mg/L	Minimum	1.65	2.05	1.81	7.84	0.56
	Mean	1.71	10.00	1.81	8.55	0.59
	Maximum	1.76	12.74	1.81	8.83	0.61
	Std. Dev.	0.06	4.02	N/C	0.36	0.03
	Median	1.72	11.16	1.81	8.68	0.59
	Coeff. Var. (%)	3.26	40.16	N/C	4.26	4.29
TOC mg/L	Minimum	1.3	2.2	2.6	2.7	1.0
	Mean	1.4	6.1	2.6	3.0	1.0
	Maximum	1.5	7.5	2.6	3.5	1.0
	Std. Dev.	0.1	2.0	N/C	0.3	0.0
	Median	1.4	6.7	2.6	3.0	1.0
	Coeff. Var. (%)	7.1	32.5	N/C	9.3	0.0

TABLE 2 (Continued): SUMMARY STATISTICS OF THE 2009 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE MAINSTREAM TUNNEL SYSTEM: WELLS QM-64 THROUGH QM-68

Parameter ¹		Well Number				
		QM-64	QM-65	QM-66	QM-67	QM-68
TDS mg/L	Minimum	428	502	1,984	660	280
	Mean	439	1,315	1,984	746	293
	Maximum	458	1,588	1,984	808	310
	Std. Dev.	16	403	N/C	59	15
	Median	432	1,450	1,984	752	290
	Coeff. Var. (%)	4	31	N/C	8	5
Hard. mg/L	Minimum	162	221	9	205	164
	Mean	180	474	9	243	168
	Maximum	190	563	9	257	171
	Std. Dev.	16	126	N/C	19	4
	Median	188	518	9	251	170
	Coeff. Var. (%)	9	27	N/C	8	2
Cond. µmhos/cm	Minimum	440	750	3,120	756	300
	Mean	586	1,446	3,120	1,108	359
	Maximum	710	2,012	3,120	1,975	403
	Std. Dev.	136	484	N/C	440	53
	Median	608	1,379	3,120	988	375
	Coeff. Var. (%)	23	33	N/C	40	15
pH unit	Minimum	7.6	6.8	10.5	7.2	7.5
	Mean	7.7	7.2	10.5	7.5	7.6
	Maximum	7.7	7.5	10.5	7.9	7.6
	Std. Dev.	0.1	0.3	N/C	0.2	0.1
	Median	7.6	7.3	10.5	7.5	7.6
	Coeff. Var. (%)	0.9	3.8	N/C	2.9	0.8

¹For purpose of statistical evaluation, any value less than the appropriate MDL or LOQ was set equal to the value of the MDL or LOQ.

²N/C stands for no calculation due to single value.

TABLE 3: SUMMARY STATISTICS OF THE 2009 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE MAINSTREAM TUNNEL SYSTEM: WELLS QM-69 THROUGH QM-73

Parameter ¹		Well Number				
		QM-69	QM-70	QM-71	QM-72	QM-73
Cl mg/L	Minimum	36	47	126	132	34
	Mean	37	49	129	136	36
	Maximum	38	50	133	141	37
	Std. Dev.	1	2	4	5	2
	Median	37	50	128	135	36
	Coeff. Var. (%)	3	4	3	3	4
FC cfu/100 mL	Minimum	1	1	1	1	1
	Geo. Mean	1	2	1	1	1
	Maximum	1	5	1	1	1
	Median	1	1	1	1	1
SO ₄ mg/L	Minimum	41.9	51.7	67.4	2.3	2.0
	Mean	42.7	52.2	69.6	2.6	2.2
	Maximum	43.1	52.9	71.2	3.2	2.4
	Std. Dev.	0.7	0.6	2.0	0.5	0.2
	Median	43.1	52.0	70.1	2.3	2.3
	Coeff. Var. (%)	1.5	1.2	2.9	20.6	9.2
NH ₃ -N mg/L	Minimum	0.94	0.36	0.44	0.34	0.23
	Mean	0.96	0.38	0.44	0.35	0.26
	Maximum	0.99	0.40	0.45	0.37	0.27
	Std. Dev.	0.03	0.02	0.01	0.02	0.02
	Median	0.95	0.37	0.44	0.35	0.27
	Coeff. Var. (%)	2.76	5.53	1.30	4.32	9.00
TOC mg/L	Minimum	1.1	1.0	1.0	1.0	1.3
	Mean	1.2	1.0	1.0	1.0	1.4
	Maximum	1.2	1.0	1.0	1.0	1.4
	Std. Dev.	0.1	0.0	0.0	0.0	0.1
	Median	1.2	1.0	1.0	1.0	1.4
	Coeff. Var. (%)	4.9	0.0	0.0	0.0	4.2

TABLE 3 (Continued): SUMMARY STATISTICS OF THE 2009 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE MAINSTREAM TUNNEL SYSTEM: WELLS QM-69 THROUGH QM-73

Parameter ¹	Well Number					
	QM-69	QM-70	QM-71	QM-72	QM-73	
TDS mg/L	Minimum	310	318	486	410	286
	Mean	321	343	502	435	300
	Maximum	338	368	510	458	310
	Std. Dev.	15	25	14	24	12
	Median	316	342	510	438	304
	Coeff. Var. (%)	5	7	3	6	4
Hard. mg/L	Minimum	141	140	189	199	139
	Mean	144	145	192	203	141
	Maximum	150	149	198	208	142
	Std. Dev.	5	5	5	5	2
	Median	142	146	189	201	142
	Coeff. Var. (%)	3	3	3	2	1
Cond. µmhos/cm	Minimum	293	325	406	351	332
	Mean	317	350	458	393	437
	Maximum	348	367	491	453	545
	Std. Dev.	28	22	46	53	106
	Median	311	359	479	375	435
	Coeff. Var. (%)	9	6	10	14	24
pH unit	Minimum	7.3	7.0	7.4	7.5	7.9
	Mean	7.7	7.5	7.7	7.7	8.0
	Maximum	8.2	8.0	7.9	7.9	8.1
	Std. Dev.	0.5	0.5	0.3	0.2	0.1
	Median	7.7	7.6	7.9	7.6	7.9
	Coeff. Var. (%)	5.8	6.9	4.1	2.6	1.4

¹For purpose of statistical evaluation, any value less than the appropriate MDL or LOQ was set equal to the value of the MDL or LOQ.

TABLE 4: SUMMARY STATISTICS OF THE 2009 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE MAINSTREAM TUNNEL SYSTEM: WELLS QM-74 THROUGH QM-78

Parameter ¹		Well Number				
		QM-74	QM-75	QM-76	QM-77	QM-78
Cl mg/L	Minimum	48	13	12	11	13
	Mean	50	14	13	12	14
	Maximum	52	15	15	13	16
	Std. Dev.	3	1	2	1	1
	Median	50	14	13	11	13
	Coeff. Var. (%)	6	5	11	10	10
FC cfu/100 mL	Minimum	1	1	1	1	1
	Geo. Mean	1	2	1	7	1
	Maximum	1	9	3	80	1
	Median	1	2	1	4	1
SO ₄ mg/L	Minimum	2.0	8.0	15.1	2.0	41.3
	Mean	2.0	15.2	47.7	2.2	45.4
	Maximum	2.0	42.4	64.9	2.5	52.0
	Std. Dev.	0.0	13.4	28.2	0.3	4.0
	Median	2.0	10.5	63.1	2.0	44.1
	Coeff. Var. (%)	0.0	88.3	59.2	13.6	8.8
NH ₃ -N mg/L	Minimum	0.16	0.21	0.20	0.14	0.10
	Mean	0.20	0.24	0.24	0.16	0.10
	Maximum	0.23	0.25	0.31	0.19	0.11
	Std. Dev.	0.05	0.02	0.06	0.03	0.00
	Median	0.20	0.24	0.20	0.14	0.10
	Coeff. Var. (%)	25.38	6.45	26.83	18.43	4.02
TOC mg/L	Minimum	1.6	1.0	1.0	1.0	1.0
	Mean	1.7	1.0	1.0	1.4	1.0
	Maximum	1.7	1.0	1.1	1.7	1.0
	Std. Dev.	0.1	0.0	0.1	0.4	0.0
	Median	1.7	1.0	1.0	1.4	1.0
	Coeff. Var. (%)	4.3	0.0	5.6	25.7	0.0

TABLE 4 (Continued): SUMMARY STATISTICS OF THE 2009 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE MAINSTREAM TUNNEL SYSTEM: WELLS QM-69 THROUGH QM-73

Parameter ¹		Well Number				
		QM-74	QM-75	QM-76	QM-77	QM-78
TDS mg/L	Minimum	248	198	274	172	288
	Mean	262	230	345	183	310
	Maximum	276	268	394	206	334
	Std. Dev.	20	23	63	20	18
	Median	262	227	368	172	306
	Coeff. Var. (%)	8	10	18	11	6
Hard. mg/L	Minimum	91	56	24	40	9
	Mean	92	59	46	40	10
	Maximum	92	63	64	41	12
	Std. Dev.	1	3	20	1	1
	Median	92	59	50	40	10
	Coeff. Var. (%)	1	5	44	1	10
Cond. µmhos/cm	Minimum	315	261	400	199	341
	Mean	380	358	429	215	416
	Maximum	445	402	480	247	491
	Std. Dev.	91	52	45	27	53
	Median	380	371	406	200	420
	Coeff. Var. (%)	24	15	10	13	13
pH unit	Minimum	8.1	7.6	8.1	8.0	7.6
	Mean	8.2	8.0	8.5	8.2	8.7
	Maximum	8.2	8.2	9.2	8.4	9.2
	Std. Dev.	0.1	0.2	0.6	0.2	0.6
	Median	8.2	8.1	8.2	8.3	9.0
	Coeff. Var. (%)	0.8	2.8	7.3	2.7	7.3

¹For purpose of statistical evaluation, any value less than the appropriate MDL or LOQ was set equal to the value of the MDL or LOQ.

TABLE 5: SUMMARY STATISTICS OF THE 2009 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE MAINSTREAM TUNNEL SYSTEM: WELLS QM-79 THROUGH QM-82

Parameter ¹		Well Number			
		QM-79	QM-80	QM-81	QM-82
Cl mg/L	Minimum	19	14	21	22
	Mean	20	15	25	30
	Maximum	23	18	32	36
	Std. Dev.	2	1	6	7
	Median	20	15	21	32
	Coeff. Var. (%)	7	10	26	24
FC cfu/100 mL	Minimum	1	1	1	1
	Geo. Mean	1	1	1	1
	Maximum	1	1	1	1
	Median	1	1	1	1
SO ₄ mg/L	Minimum	16.1	2.1	9.8	6.0
	Mean	18.4	2.6	12.5	8.5
	Maximum	20.8	3.0	17.0	12.3
	Std. Dev.	2.0	0.4	3.9	3.4
	Median	19.3	2.5	10.8	7.1
	Coeff. Var. (%)	11.1	15.0	31.1	39.5
NH ₃ -N mg/L	Minimum	0.10	0.10	0.10	0.10
	Mean	0.10	0.10	0.10	0.10
	Maximum	0.10	0.10	0.10	0.10
	Std. Dev.	0.00	0.00	0.00	0.00
	Median	0.10	0.10	0.10	0.10
	Coeff. Var. (%)	0.00	0.00	0.00	0.00
TOC mg/L	Minimum	1.0	1.0	1.0	1.0
	Mean	1.0	1.0	1.0	1.1
	Maximum	1.2	1.0	1.1	1.2
	Std. Dev.	0.1	0.0	0.1	0.1
	Median	1.0	1.0	1.0	1.2
	Coeff. Var. (%)	8.6	0.0	5.6	10.2

TABLE 5 (Continued): SUMMARY STATISTICS OF THE 2009 DATA FOR THE WATER QUALITY MONITORING WELLS IN THE MAINSTREAM TUNNEL SYSTEM: WELLS QM-79 THROUGH QM-82

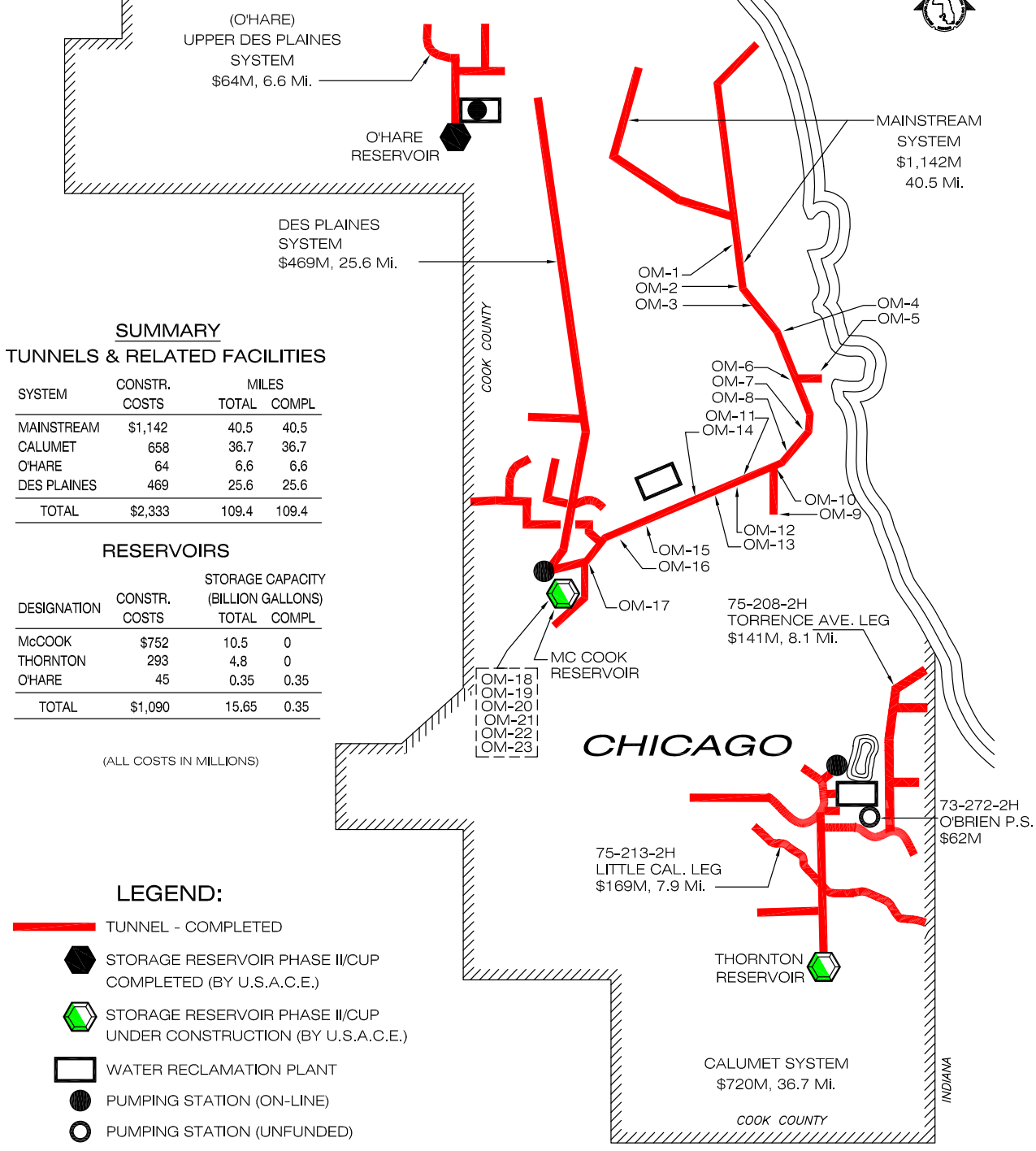
Parameter ¹		Well Number			
		QM-79	QM-80	QM-81	QM-82
TDS mg/L	Minimum	294	188	222	226
	Mean	314	196	261	269
	Maximum	338	202	304	292
	Std. Dev.	16	5	41	37
	Median	310	197	256	288
	Coeff. Var. (%)	5	3	16	14
	Hard. mg/L	Minimum	9	19	13
Mean		10	20	20	19
Maximum		11	21	26	28
Std. Dev.		1	1	7	8
Median		10	20	21	15
Coeff. Var. (%)		7	4	33	39
Cond. µmhos/cm		Minimum	399	251	301
	Mean	461	283	344	392
	Maximum	490	303	366	413
	Std. Dev.	36	22	38	31
	Median	472	289	366	406
	Coeff. Var. (%)	8	8	11	8
	pH unit	Minimum	7.5	7.7	7.4
Mean		8.3	8.2	8.1	8.6
Maximum		9.2	8.8	8.6	8.7
Std. Dev.		0.8	0.5	0.6	0.1
Median		8.2	8.2	8.3	8.6
Coeff. Var. (%)		9.5	5.9	7.7	1.0

¹For purpose of statistical evaluation, any value less than the appropriate MDL or LOQ was set equal to the value of the MDL or LOQ.

APPENDIX AI

LOCATION MAP OF GROUNDWATER OBSERVATION WELLS
OM-1 THROUGH OM-23 IN THE MAINSTREAM TUNNEL SYSTEM

FIGURE AI-1



SUMMARY

TUNNELS & RELATED FACILITIES

SYSTEM	CONSTR. COSTS	MILES	
		TOTAL	COMPL.
MAINSTREAM	\$1,142	40.5	40.5
CALUMET	658	36.7	36.7
O'HARE	64	6.6	6.6
DES PLAINES	469	25.6	25.6
TOTAL	\$2,333	109.4	109.4

RESERVOIRS

DESIGNATION	CONSTR. COSTS	STORAGE CAPACITY (BILLION GALLONS)	
		TOTAL	COMPL.
McCOOK	\$752	10.5	0
THORNTON	293	4.8	0
O'HARE	45	0.35	0.35
TOTAL	\$1,090	15.65	0.35

(ALL COSTS IN MILLIONS)

LEGEND:

- TUNNEL - COMPLETED
- STORAGE RESERVOIR PHASE II/CUP COMPLETED (BY U.S.A.C.E.)
- STORAGE RESERVOIR PHASE II/CUP UNDER CONSTRUCTION (BY U.S.A.C.E.)
- WATER RECLAMATION PLANT
- PUMPING STATION (ON-LINE)
- PUMPING STATION (UNFUNDED)

**MAINSTREAM TUNNEL SYSTEM
LOCATION MAP OF
GROUNDWATER OBSERVATION WELLS**

METROPOLITAN WATER RECLAMATION
DISTRICT OF GREATER CHICAGO

APPENDIX AII

2009 GROUNDWATER LEVEL ELEVATION DATA FOR OBSERVATION WELLS
OM-1 THROUGH OM-23 IN THE MAINSTREAM TUNNEL SYSTEM

TABLE AII-1: 2009 GROUNDWATER LEVEL ELEVATION DATA FOR OBSERVATION WELLS OM-1 THROUGH OM-23
IN THE MAINSTREAM TUNNEL SYSTEM

Date	Observation Well											
	OM-1	OM-2	OM-3	OM-4	OM-5	OM-6	OM-7	OM-8	OM-9	OM-10	OM-11	OM-12
2/6/09	-54.7	**	-59.7	-98.6	-94.5	-50.4	-91.6	-75.2	-56.8	-31.0	-55.4	-9.7
4/17/09	-57.8	-47.7	-55.7	-96.6	-87.5	-41.4	-83.6	-64.2	-42.8	-31.0	-56.4	-11.7
6/5/09	**	-47.7	-55.7	-96.6	-86.5	**	-82.6	-63.2	-43.8	-31.0	-56.4	-10.7
8/7/09	-56.8	-46.7	-74.7	-97.6	-83.5	-41.4	-82.6	-63.2	-43.8	-32.0	-57.4	-9.7
11/13/09	-52.8	-46.7	-53.7	-90.6	-88.5	-41.4	-77.6	-62.2	-42.8	-28.0	-53.4	-9.7
12/11/09	**	-47.7	-64.7	**	-85.5	-42.4	-90.6	-63.2	-42.8	-32.0	-59.4	-10.7
Minimum	-57.8	-47.7	-74.7	-98.6	-94.5	-50.4	-91.6	-75.2	-56.8	-32.0	-59.4	-11.7
Mean	-55.5	-47.3	-60.7	-96.0	-87.7	-43.4	-84.8	-65.2	-45.5	-30.8	-56.4	-10.4
Maximum	-52.8	-46.7	-53.7	-90.6	-83.5	-41.4	-77.6	-62.2	-42.8	-28.0	-53.4	-9.7

I-II-1

TABLE AII-1 (Continued): 2009 GROUNDWATER LEVEL ELEVATION DATA FOR OBSERVATION WELLS OM-1 THROUGH OM-23 IN THE MAINSTREAM TUNNEL SYSTEM

Date	Observation Well										
	OM-13	OM-14	OM-15	OM-16	OM-17	OM-18	OM-19	OM-20	OM-21	OM-22	OM-23
2/6/09	41.4	-59.8	-182.3	-137.7	***	-231.0	-84.5	-109.9	-66.9	-75.3	-230.7
4/17/09	41.4	-61.8	-177.3	-128.7	***	-221.0	-87.5	-111.9	-69.9	-68.3	-211.7
6/5/09	41.4	-54.8	-172.3	-132.7	***	-215.0	-89.5	-103.9	-62.9	-71.3	-210.7
8/7/09	41.4	-60.8	-169.3	-132.7	***	-223.0	**	-105.9	-69.9	-71.3	-209.7
11/13/09	41.4	-61.8	-175.3	-133.7	***	-221.0	**	-99.9	-66.9	-75.3	-215.7
12/11/09	41.4	-62.8	-180.3	-188.7	18.0	-224.0	**	-94.9	-65.9	-72.3	-217.7
Minimum	41.4	-62.8	-182.3	-188.7	18.0	-231.0	-89.5	-111.9	-69.9	-75.3	-230.7
Mean	41.4	-60.3	-176.1	-142.4	18.0	-222.5	-87.2	-104.4	-67.1	-72.3	-216.0
Maximum	41.4	-54.8	-169.3	-128.7	18.0	-215.0	-84.5	-94.9	-62.9	-68.3	-209.7

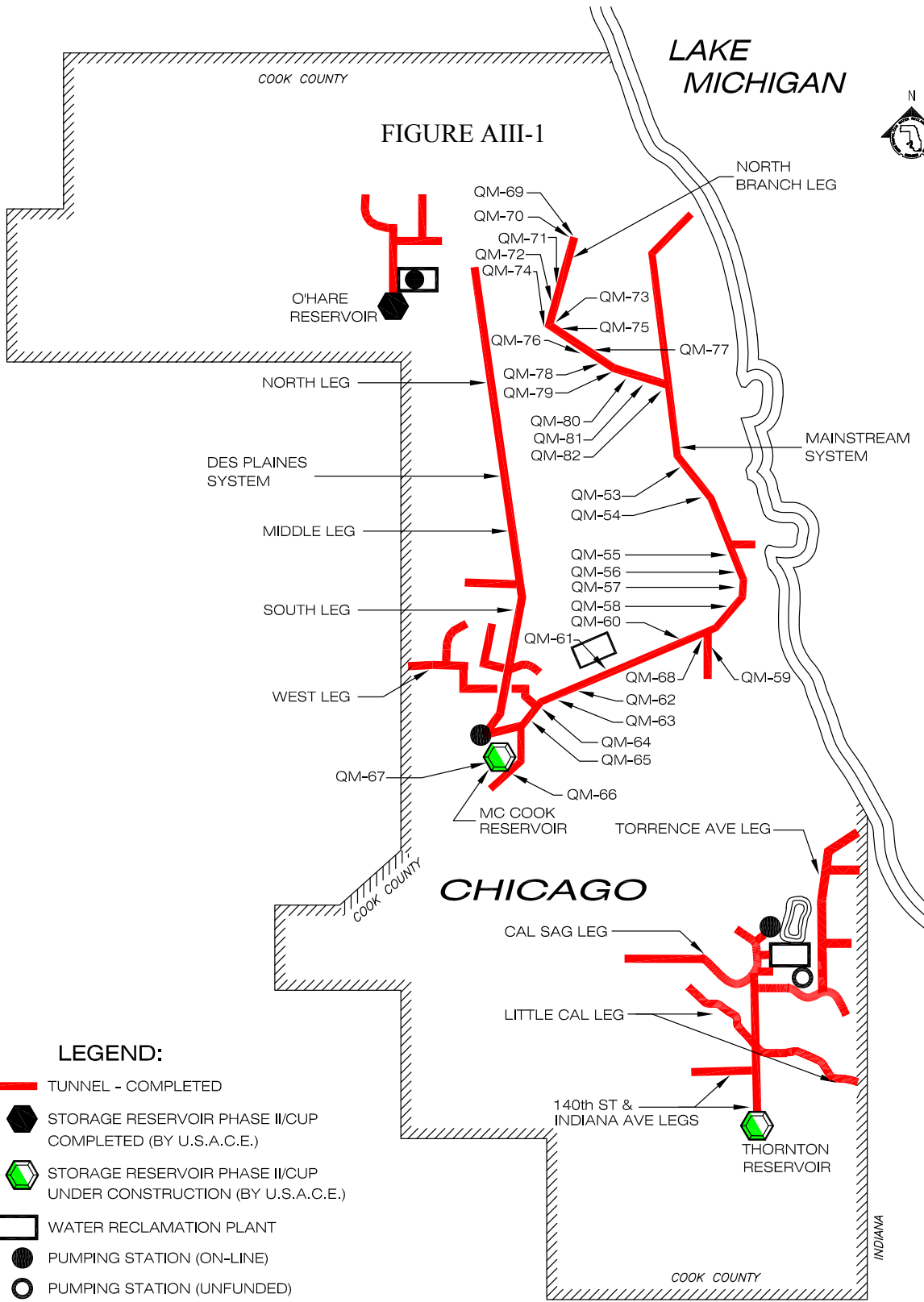
*Elevation in feet relative to Chicago City Datum.

**Well inaccessible.

***Elevation was not measured due to broken well head.

APPENDIX AIII

LOCATION MAP OF GROUNDWATER QUALITY MONITORING WELLS
QM-53 THROUGH QM-82 IN THE MAINSTREAM TUNNEL SYSTEM



**MAINSTREAM TUNNEL SYSTEM
LOCATION MAP OF GROUNDWATER
QUALITY MONITORING WELLS**

METROPOLITAN WATER RECLAMATION
DISTRICT OF GREATER CHICAGO

APPENDIX AIV

2009 GROUNDWATER QUALITY MONITORING DATA FOR WELLS
QM-53 THROUGH QM-82 IN THE MAINSTREAM TUNNEL SYSTEM

TABLE AIV-1: 2009 CHLORIDE, FECAL COLIFORM, SULFATE, AMMONIA NITROGEN, TOTAL ORGANIC CARBON, AND TOTAL DISSOLVED SOLIDS DATA FOR WATER QUALITY MONITORING WELLS QM-53 THROUGH QM-82 IN THE MAINSTREAM TUNNEL SYSTEM

Well	Date of Sampling	Cl ¹ mg/L	FC ^{1,2} cfu/100 mL	SO ₄ ¹ mg/L	NH ₃ -N ¹ mg/L	TOC ¹ mg/L	TDS mg/L
QM-53	4/9/09	20	<1	34.8	<0.10	1.3	204
QM-53	6/4/09	21	<1	35.3	<0.10	<1.0	212
QM-53	8/13/09	15	<1	35.1	<0.10	2.1	270
QM-56	4/9/09			Well could not be sampled			
QM-56	8/13/09	37	<1	16.7	0.49	<1.0	274
QM-56	10/8/09	36	<1	12.3	0.48	<1.0	292
QM-58	6/4/09			Well could not be sampled			
QM-58	8/13/09			Well could not be sampled			
QM-58	10/6/09			Well could not be sampled			
QM-61	2/19/09	70	2	23.5	0.23	1.0	382
QM-61	4/2/09	163	27	28.3	1.02	1.3	528
QM-61	11/4/09			Well could not be sampled			
QM-62	1/27/09			Well could not be sampled			
QM-62	4/2/09			Well could not be sampled			
QM-62	5/14/09	93	89	44.9	0.68	1.3	460
QM-62	6/4/09			Well could not be sampled			
QM-62	9/3/09	68	1	35.0	0.65	1.6	446
QM-62	12/3/09	56	<1	30.5	0.59	1.3	428
QM-63	1/29/09	56	3	870.4	1.91	2.3	1,690
QM-63	4/2/09	78	8	827.2	2.04	2.3	1,746
QM-63	5/14/09	60	64	923.7	1.87	2.2	1,652
QM-63	6/4/09	58	2	786.3	1.86	2.2	1,662
QM-63	9/3/09	54	<1	936.2	1.97	2.3	1,720
QM-63	11/18/09	50	3	836.7	2.09	2.3	1,630
QM-64	2/19/09	61	19	41.0	1.76	1.3	428
QM-64	4/2/09			Well could not be sampled			
QM-64	6/3/09			Well could not be sampled			
QM-64	9/10/09	74	<1	32.8	1.65	1.4	432
QM-64	11/4/09	55	460	44.8	1.66	1.3	454
QM-64	12/9/09	58	2	34.6	1.72	1.5	458

TABLE AIV-1 (Continued): 2009 CHLORIDE, FECAL COLIFORM, SULFATE, AMMONIA NITROGEN, TOTAL ORGANIC CARBON, AND TOTAL DISSOLVED SOLIDS DATA FOR WATER QUALITY MONITORING WELLS QM-53 THROUGH QM-82 IN THE MAINSTREAM TUNNEL SYSTEM

Well	Date of Sampling	Cl ¹ mg/L	FC ^{1,2} cfu/100 mL	SO ₄ ¹ mg/L	NH ₃ -N ¹ mg/L	TOC ¹ mg/L	TDS mg/L
QM-65	1/29/09	461	2	204.6	12.58	6.7	1,482
QM-65	4/2/09	84	330	50.2	2.05	2.2	502
QM-65	5/14/09	435	2	183.3	10.64	6.7	1,416
QM-65	6/4/09	465	<1	159.9	11.67	7.5	1,464
QM-65	11/18/09	445	3	176.2	10.33	6.2	1,436
QM-65	12/30/09	524	<1	165.6	12.74	7.5	1,588
QM-66	1/29/09	194	<1	208.6	1.81	2.6	1,984
QM-66	6/4/09		Well could not be sampled				
QM-66	8/20/09		Well could not be sampled				
QM-67	1/29/09	212	920	10.4	8.49	2.9	716
QM-67	4/2/09	247	2,000	11.1	8.75	3.0	808
QM-67	5/14/09	255	270	9.2	8.71	2.8	794
QM-67	6/4/09	255	210	26.1	7.84	3.5	788
QM-67	8/20/09	213	120	<2.0	8.83	2.7	708
QM-67	9/3/09	185	350	13.1	8.65	3.0	660
QM-68	4/9/09	31	3	36.0	0.56	<1.0	280
QM-68	6/4/09	35	3	35.4	0.59	<1.0	310
QM-68	8/20/09	30	<1	36.2	0.61	<1.0	290
QM-69	4/30/09	38	<1	41.9	0.95	1.2	338
QM-69	8/20/09	37	<1	43.1	0.99	1.2	310
QM-69	10/22/09	36	<1	43.1	0.94	1.1	316
QM-70	4/30/09	50	<1	52.0	0.36	<1.0	368
QM-70	8/20/09	47	5	51.7	0.37	<1.0	318
QM-70	10/22/09	50	<1	52.9	0.40	<1.0	342
QM-71	4/30/09	133	<1	67.4	0.45	<1.0	510
QM-71	8/20/09	126	<1	70.1	0.44	<1.0	510
QM-71	10/22/09	128	<1	71.2	0.44	<1.0	486

TABLE AIV-1 (Continued): 2009 CHLORIDE, FECAL COLIFORM, SULFATE, AMMONIA NITROGEN, TOTAL ORGANIC CARBON, AND TOTAL DISSOLVED SOLIDS DATA FOR WATER QUALITY MONITORING WELLS QM-53 THROUGH QM-82 IN THE MAINSTREAM TUNNEL SYSTEM

Well	Date of Sampling	Cl ¹ mg/L	FC ^{1,2} cfu/100 mL	SO ₄ ¹ mg/L	NH ₃ -N ¹ mg/L	TOC ¹ mg/L	TDS mg/L	
QM-72	4/30/09	135	<1	2.3	0.34	1.0	458	
QM-72	8/20/09	132	<1	2.3	0.35	<1.0	438	
QM-72	10/22/09	141	<1	3.2	0.37	<1.0	410	
QM-73	3/26/09	34	<1	<2.0	0.27	1.4	286	
QM-73	6/18/09	37	<1	2.4	0.27	1.3	304	
QM-73	8/27/09	36	<1	2.3	0.23	1.4	310	
QM-74	3/26/09		Well could not be sampled					
QM-74	6/18/09	52	<1	<2.0	0.23	1.6	276	
QM-74	8/27/09	48	<1	<2.0	0.16	1.7	248	
QM-75	1/29/09	14	<1	11.2	0.25	<1.0	230	
QM-75	3/26/09	14	9	9.9	0.23	<1.0	224	
QM-75	5/21/09	15	2	11.1	0.23	1.0	198	
QM-75	6/18/09	14	<1	8.0	0.25	<1.0	222	
QM-75	7/23/09	13	3	42.4	0.24	<1.0	268	
QM-75	9/24/09	13	<1	8.5	0.21	<1.0	236	
QM-76	3/26/09	15	<1	15.1	0.31	1.0	274	
QM-76	6/18/09	13	<1	64.9	0.20	1.1	394	
QM-76	7/23/09	12	3	63.1	0.20	<1.0	368	
QM-77	3/26/09	13	80	<2.0	0.14	1.4	172	
QM-77	7/23/09	11	4	<2.0	0.19	1.7	206	
QM-77	8/27/09	11	<1	2.5	0.14	<1.0	172	
QM-78	1/29/09	15	<1	43.2	0.11	<1.0	296	
QM-78	3/26/09	13	<1	42.8	<0.10	<1.0	302	
QM-78	5/21/09	16	<1	48.0	<0.10	<1.0	288	
QM-78	6/18/09	13	<1	52.0	<0.10	<1.0	328	
QM-78	7/23/09	13	<1	45.1	<0.10	<1.0	334	
QM-78	9/24/09	13	<1	41.3	<0.10	<1.0	310	
QM-79	1/27/09		Well could not be sampled					
QM-79	3/26/09	20	<1	19.3	<0.10	<1.0	308	

TABLE AIV-1 (Continued): 2009 CHLORIDE, FECAL COLIFORM, SULFATE, AMMONIA NITROGEN, TOTAL ORGANIC CARBON, AND TOTAL DISSOLVED SOLIDS DATA FOR WATER QUALITY MONITORING WELLS QM-53 THROUGH QM-82 IN THE MAINSTREAM TUNNEL SYSTEM

Well	Date of Sampling	Cl ¹ mg/L	FC ^{1,2} cfu/100 mL	SO ₄ ¹ mg/L	NH ₃ -N ¹ mg/L	TOC ¹ mg/L	TDS mg/L
QM-79	5/21/09	23	<1	20.8	<0.10	1.2	310
QM-79	6/18/09	20	<1	16.1	<0.10	<1.0	338
QM-79	7/30/09	20	<1	19.4	<0.10	<1.0	294
QM-79	9/24/09	19	<1	16.5	<0.10	<1.0	318
QM-80	1/29/09	15	<1	2.9	<0.10	<1.0	188
QM-80	3/26/09	15	<1	2.7	<0.10	<1.0	196
QM-80	5/21/09	18	<1	2.1	<0.10	<1.0	200
QM-80	6/18/09	14	<1	2.3	<0.10	<1.0	202
QM-80	7/30/09	15	<1	2.3	<0.10	<1.0	194
QM-80	9/24/09	14	<1	3.0	<0.10	<1.0	198
QM-81	3/26/09	32	<1	9.8	<0.10	1.1	304
QM-81	7/30/09	21	<1	10.8	<0.10	<1.0	222
QM-81	8/27/09	21	<1	17.0	<0.10	<1.0	256
QM-82	1/29/09	32	<1	6.0	<0.10	1.2	292
QM-82	3/26/09	22	<1	12.3	<0.10	<1.0	226
QM-82	5/21/09	36	<1	7.1	<0.10	1.2	288
QM-82	6/18/09			Well could not be sampled			
QM-82	7/28/09			Well could not be sampled			
QM-82	10/6/09			Well could not be sampled			

¹The method detection limit (MDL) or limit of quantification (LOQ) is 10 mg/L for Cl (LOQ), 2.0 mg/L for SO₄ (LOQ), 0.10 mg/L for NH₃-N (LOQ), 1.0 mg/L for TOC (LOQ), and 40 mg/L for TDS (LOQ). The detection limit for the FC analysis using the membrane filter method varies with actual sampling volume analyzed.

²Unfiltered samples, all others were filtered through 0.45 μm membrane.

TABLE AIV-2: 2009 HARDNESS, CONDUCTIVITY, pH, TEMPERATURE, ELEVATION, AND RECHARGE DATA FOR WATER QUALITY MONITORING WELLS QM-51 THROUGH QM-82 IN THE MAINSTREAM TUNNEL SYSTEM

Well	Date of Sampling	Hard. mg/L	Cond. ¹ μmhos/cm	pH ¹ Unit	Temp. °C	Elevation ² Feet	Recharge ³ Hours
QM-53	4/9/09	118	226	8.3	12.1	-38	<4
QM-53	6/4/09	131	273	7.8	11.9	-42	<4
QM-53	8/13/09	127	225	8.2	12.6	-40	<4
QM-56	4/9/09			Well could not be sampled			
QM-56	8/13/09	121	304	7.8	14.5	-77	<4
QM-56	10/8/09	127	505	7.6	13.2	-76	<4
QM-58	6/4/09			Well could not be sampled			
QM-58	8/13/09			Well could not be sampled			
QM-58	10/6/09			Well could not be sampled			
QM-61	2/19/09	132	396	7.5	12.1	-173	<4
QM-61	4/2/09	168	635	7.5	12.3	-159	<4
QM-61	11/4/09			Well could not be sampled			
QM-62	1/27/09			Well could not be sampled			
QM-62	4/2/09			Well could not be sampled			
QM-62	5/14/09	165	725	7.7	14.1	-180	<4
QM-62	6/4/09			Well could not be sampled			
QM-62	9/3/09	168	408	7.4	14.3	-192	<4
QM-62	12/3/09	158	579	8.1	13.2	-200	<4
QM-63	1/29/09	840	822	7.4	12.7	-197	<4
QM-63	4/2/09	830	799	7.5	12.8	-168	<4
QM-63	5/14/09	818	1,220	7.7	13.9	-180	<4
QM-63	6/4/09	812	875	7.5	13.5	-183	<4
QM-63	9/3/09	847	807	7.3	13.8	-186	<4
QM-63	11/18/09	862	1,929	7.2	12.9	-207	<4
QM-64	2/19/09	190	440	7.6	12.5	-165	<4
QM-64	4/2/09			Well could not be sampled			
QM-64	6/3/09			Well could not be sampled			
QM-64	9/10/09	162	608	7.7	13.8	-167	<4
QM-64	11/4/09	187	627	7.5	13.5	-162	<4
QM-64	12/9/09	188	710	7.6	12.3	-170	<4

TABLE AIV-2 (Continued): 2009 HARDNESS, CONDUCTIVITY, pH, TEMPERATURE, ELEVATION, AND RECHARGE DATA FOR WATER QUALITY MONITORING WELLS QM-51 THROUGH QM-82 IN THE MAINSTREAM TUNNEL SYSTEM

Well	Date of Sampling	Hard. mg/L	Cond. ¹ μmhos/cm	pH ¹ Unit	Temp. °C	Elevation ² Feet	Recharge ³ Hours
QM-65	1/29/09	530	1,282	7.2	12.1	-202	<48
QM-65	4/2/09	221	750	7.4	10.9	-182	<48
QM-65	5/14/09	492	1,967	7.1	13.8	-174	<48
QM-65	6/4/09	526	1,190	7.3	13.8	-196	<48
QM-65	11/18/09	510	2,012	7.5	13.0	-192	<48
QM-65	12/30/09	563	1,476	6.8	12.6	-198	<48
QM-66	1/29/09	9	3,120	10.5	11.1	-315	<48
QM-66	6/4/09			Well could not be sampled			
QM-66	8/20/09			Well could not be sampled			
QM-67	1/29/09	251	756	7.2	12.0	-167	<48
QM-67	4/2/09	257	856	7.5	13.5	-160	<48
QM-67	5/14/09	254	1,975	7.6	13.5	-174	<48
QM-67	6/4/09	239	983	7.9	14.6	-157	<48
QM-67	8/20/09	250	1,087	7.4	13.7	-172	<48
QM-67	9/3/09	205	992	7.5	14.6	-158	<48
QM-68	4/9/09	164	300	7.6	12.8	-134	<48
QM-68	6/4/09	171	375	7.5	13.4	-120	<48
QM-68	8/20/09	170	403	7.6	14.2	-126	<48
QM-69	4/30/09	141	311	8.2	11.5	-33	<48
QM-69	8/20/09	142	293	7.7	12.9	-33	<48
QM-69	10/22/09	150	348	7.3	11.1	-33	<48
QM-70	4/30/09	146	325	8.0	12.4	-59	<48
QM-70	8/20/09	140	367	7.6	12.5	-63	<48
QM-70	10/22/09	149	359	7.0	11.4	-64	<48
QM-71	4/30/09	189	406	7.9	15.0	-58	<48
QM-71	8/20/09	189	491	7.9	12.8	-61	<48
QM-71	10/22/09	198	479	7.4	11.2	-60	<48
QM-72	4/30/09	201	351	7.6	11.8	-66	<48
QM-72	8/20/09	199	453	7.9	13.5	-77	<48
QM-72	10/22/09	208	375	7.5	11.6	-75	<48

TABLE AIV-2 (Continued): 2009 HARDNESS, CONDUCTIVITY, pH, TEMPERATURE, ELEVATION, AND RECHARGE DATA FOR WATER QUALITY MONITORING WELLS QM-51 THROUGH QM-82 IN THE MAINSTREAM TUNNEL SYSTEM

Well	Date of Sampling	Hard. mg/L	Cond. ¹ μmhos/cm	pH ¹ Unit	Temp. °C	Elevation ² Feet	Recharge ³ Hours
QM-73	3/26/09	142	435	8.1	12.3	-125	<48
QM-73	6/18/09	139	545	7.9	13.8	-153	<48
QM-73	8/27/09	142	332	7.9	13.4	-164	<48
QM-74	3/26/09			Well could not be sampled			
QM-74	6/18/09	91	445	8.2	12.8	-30	<48
QM-74	8/27/09	92	315	8.1	11.7	-18	<48
QM-75	1/29/09	63	381	8.0	11.0	-66	<48
QM-75	3/26/09	61	402	8.2	12.6	-64	<48
QM-75	5/21/09	56	361	7.9	13.5	-67	<48
QM-75	6/18/09	57	399	8.1	12.9	-63	<48
QM-75	7/23/09	56	261	8.2	12.1	-67	<48
QM-75	9/24/09	61	348	7.6	12.1	-68	<48
QM-76	3/26/09	24	400	9.2	12.0	-155	<48
QM-76	6/18/09	50	480	8.2	13.3	-182	<48
QM-76	7/23/09	64	406	8.1	13.0	-184	<48
QM-77	3/26/09	41	247	8.4	11.6	-180	<48
QM-77	7/23/09	40	199	8.0	12.9	-180	<48
QM-77	8/27/09	40	200	8.3	12.8	-181	<48
QM-78	1/29/09	12	382	8.9	10.4	-157	<48
QM-78	3/26/09	10	437	9.2	11.3	-125	<48
QM-78	5/21/09	10	491	8.3	12.8	-160	<48
QM-78	6/18/09	10	341	9.0	12.1	-157	<48
QM-78	7/23/09	10	403	9.1	12.2	-155	<48
QM-78	9/24/09	9	445	7.6	12.0	-159	<48
QM-79	1/27/09			Well could not be sampled			
QM-79	3/26/09	10	467	9.2	11.4	-147	<48
QM-79	5/21/09	11	490	8.2	12.9	-141	<48
QM-79	6/18/09	9	399	9.1	11.8	-143	<48
QM-79	7/30/09	10	477	7.5	11.7	-145	<48
QM-79	9/24/09	10	472	7.7	11.4	-150	<48

TABLE AIV-2 (Continued): 2009 HARDNESS, CONDUCTIVITY, pH, TEMPERATURE, ELEVATION, AND RECHARGE DATA FOR WATER QUALITY MONITORING WELLS QM-51 THROUGH QM-82 IN THE MAINSTREAM TUNNEL SYSTEM

Well	Date of Sampling	Hard. mg/L	Cond. ¹ μmhos/cm	pH ¹ Unit	Temp. °C	Elevation ² Feet	Recharge ³ Hours
QM-80	1/29/09	21	267	8.7	11.0	-140	<48
QM-80	3/26/09	19	251	8.0	11.9	-135	<48
QM-80	5/21/09	19	300	8.4	13.4	-136	<48
QM-80	6/18/09	20	278	8.8	12.6	-136	<48
QM-80	7/30/09	20	303	7.7	12.7	-133	<48
QM-80	9/24/09	21	300	7.7	12.8	-131	<48
QM-81	3/26/09	13	366	8.6	12.2	-129	<48
QM-81	7/30/09	26	366	7.4	13.3	-131	<48
QM-81	8/27/09	21	301	8.3	13.6	-133	<48
QM-82	1/29/09	15	356	8.6	11.8	-182	<48
QM-82	3/26/09	28	406	8.7	12.2	-185	<48
QM-82	5/21/09	15	413	8.5	13.4	-187	<48
QM-82	6/18/09			Well could not be sampled			
QM-82	7/28/09			Well could not be sampled			
QM-82	10/6/09			Well could not be sampled			

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

²Water level elevations are relative to Chicago City Datum.

³Refers to elapsed time after initial drawdown before the well recovered sufficiently for sampling.