

Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

***MONITORING AND RESEARCH
DEPARTMENT***

REPORT NO. 25-15

*THORNTON COMPOSITE RESERVOIR
GROUNDWATER MONITORING REPORT
FOURTH QUARTER 2024*

May 2025

Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

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February 28, 2025

Mr. Michael Brown
Division Manager Bureau of Water
Division of Public Water Supplies
Illinois Environmental Protection Agency
2520 W. Iles Avenue
Springfield, IL 62794

Dear Mr. Brown:

Subject: Transmittal of the Report “Thornton Composite Reservoir Groundwater Monitoring Report Fourth Quarter 2024”

Please find attached the report entitled “Thornton Composite Reservoir Groundwater Monitoring Report Fourth Quarter 2024” transmitted electronically. The report is prepared for transmittal to the Illinois Environmental Protection Agency (IEPA) in accordance with the Thornton Composite Reservoir Groundwater Monitoring Plan. Also attached is the Excel spreadsheet of the Thornton Composite Reservoir raw data as required by the IEPA.

If you have any questions or would like to have additional information, please contact Mr. Benjamin Morgan at (708) 588-3743 or MorganB@mwr.org.

Very truly yours,

Albert Cox, Ph.D.
Environmental Monitoring and Research Manager
Monitoring and Research Department

AC:BM:lf
Attachment
cc: E. Podczewinski

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**THORNTON COMPOSITE RESERVOIR
GROUNDWATER MONITORING REPORT
FOURTH QUARTER 2024**

By

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LIST OF ABBREVIATIONS

Acronym	Definition
CCD	Chicago City Datum
CFU	colony forming unit
CSF	combined sewer flow
EC	electrical conductivity
GMP	Groundwater Monitoring Plan
GPS	Groundwater Protection System
IAC	Illinois Administrative Code
TCR	Thornton Composite Reservoir
TDS	total dissolved solids
TOC	total organic carbon

ACKNOWLEDGMENTS

This report for the Thornton Composite Reservoir Groundwater Monitoring was generated by the Monitoring and Research Department. All samples were collected by A3 Environmental Consultants (contractor) under Thornton Composite Reservoir Contract 21-100-11. Analyses were performed by the Analytical Laboratories Division and the Analytical Microbiology Laboratory of the Metropolitan Water Reclamation District of Greater Chicago (District). Special thanks are due to Ms. Laura Franklin for typing and formatting this report.

DISCLAIMER

Mention of proprietary equipment and chemicals in this report does not constitute endorsement by the District.

INTRODUCTION

A Groundwater Protection System (GPS) was constructed for the Thornton Composite Reservoir (TCR) to protect against the exfiltration of combined sewer flow (CSF) into the surrounding dolomite aquifers. The CSF and minimal amounts of stormwater are stored in the reservoir during and after large storm events. To monitor the performance of the GPS, a network of monitoring wells located outside the perimeter of the GPS is being monitored as discussed in the Revised Groundwater Monitoring Plan (GMP) (Black & Veatch, 2016). As explained in the Revised GMP, one sample of reservoir water, one from the Main Quarry Sump, and one from each of the seven wells are collected annually and analyzed for the Illinois Administrative Code (IAC) Title 35 Part 620 Class I groundwater constituents. In addition, following a reservoir fill event or during a routine quarterly event, groundwater is sampled from the seven wells and the Main Quarry Sump and tested for a targeted list of parameters that are more likely to be detected in CSF water.

The monitoring well system consists of one deep well, TB-124, which monitors the underlying Galena Aquifer, and six vertical Westbay multi-level monitoring wells, TB-118, TB-119, TB-120, TB-121, TB-122, and TB-123, which monitor the Silurian dolomite aquifers. As discussed in the Revised GMP, following a reservoir fill event, sampling is required every two weeks while the water in the reservoir remains above an elevation of -280 feet Chicago City Datum (CCD). Groundwater is sampled from each well at the first sample interval port immediately below the reservoir water elevation. Each of the multilevel monitoring wells is capable of monitoring four distinct 20-foot intervals in the Silurian dolomite aquifer.

The locations of the monitoring wells, the quarry sump, the TCR, and the GPS are presented in [Figure 1](#). The Main Quarry Sump is located beyond the south boundary of the GPS and is not a component of the TCR but is an integral part of the Hanson Material Services mining quarry to the south of the TCR. This sump facilitates mining operations by minimizing the water level at the bottom of the quarry. It is possible that the bottom of this sump could extend beyond the lowest depth of the TCR (-297.5 feet CCD). The sump contains mainly groundwater and small quantities of surface runoff, and it is sampled quarterly and during fill events, along with the wells, to evaluate the potential migration of contaminants from the TCR to the sump.

[Table 1](#) lists the characteristics of all wells at the TCR site (well location coordinates, elevations, and depths, and the sampling port interval elevations).

Prior to the TCR becoming operational in November 2015, eight (8) sampling events were conducted on a quarterly basis for two years (May 2012 through March 2014) to provide background data on the existing groundwater quality. In order to evaluate the effectiveness of the grout curtain and the GPS, the Revised GMP (2016) presents the analysis of data for all samples collected during the background monitoring period and provides a baseline for comparison with routine monitoring data. Changes over time in groundwater calcium and magnesium concentrations would also be useful in tracking the occurrence of infiltration/exfiltration. Groundwater analytical data routinely generated for the monitoring wells, reservoir, and sump will also be compared with the IAC Title 35 Part 620 Class I Groundwater Standards (Illinois Pollution Control Board, Illinois Environmental Protection Agency, 2013) to evaluate any exceedances in groundwater standards.

FIGURE 1: MONITORING WELL AND MAIN QUARRY SUMP LOCATIONS

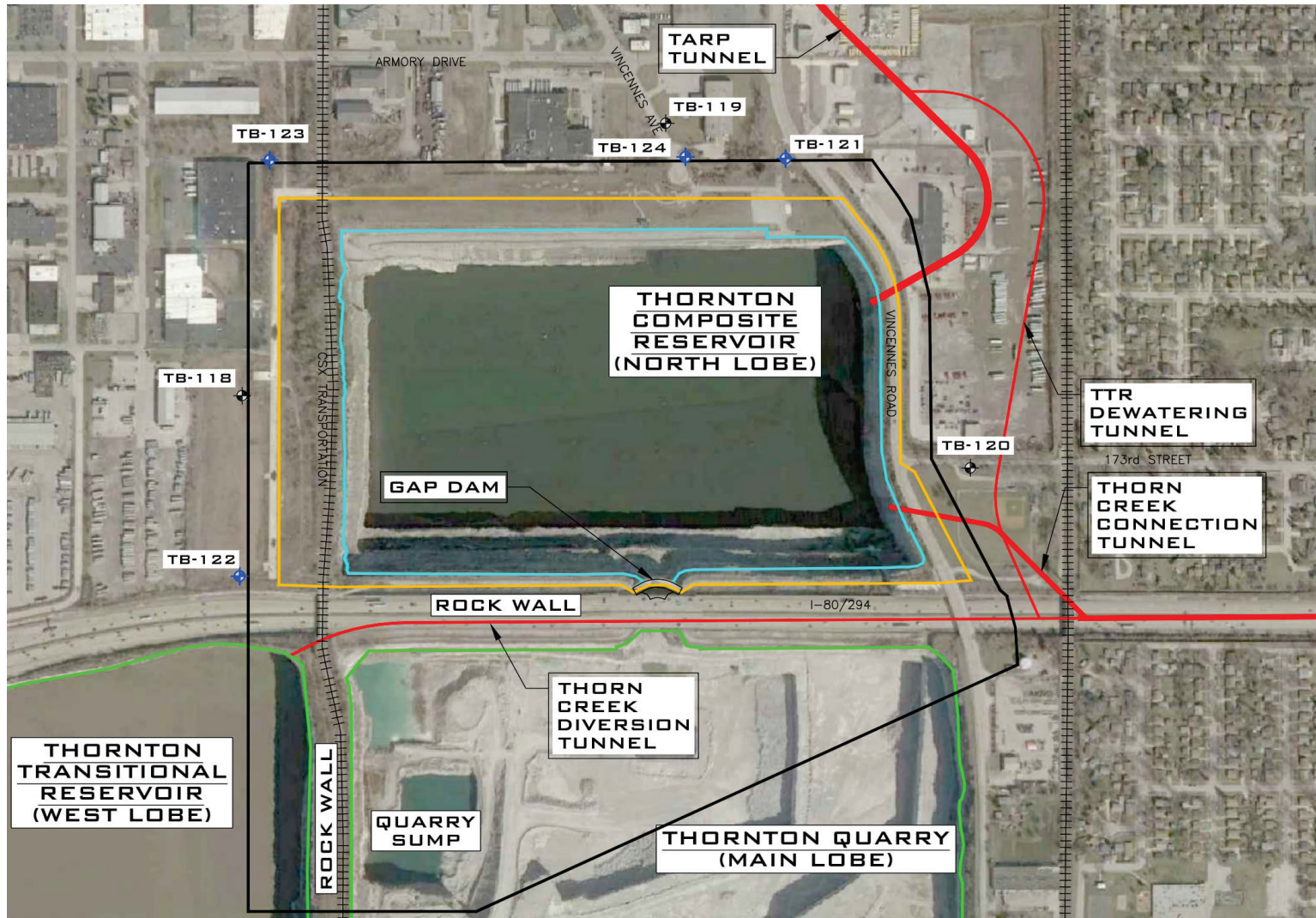


TABLE 1: CHARACTERISTICS OF MONITORING WELLS TB-118 THROUGH TB-124 AT THE THORNTON COMPOSITE RESERVOIR SITE

Well ID	Coordinates ¹		Ground Surface Elevation (ft, CCD ²)	Top of Riser Elevation (ft, CCD)	Depth of Well (ft)	Sampling Port Interval (ft, CCD)			
	Northing (ft)	Easting (ft)				Interval 1	Interval 2	Interval 3	Interval 4
TB-118	1,791,110.38	693,560.44	38.5	41.5	532	-85 to -105	-212 to -232	-283 to -303	-392 to -412
TB-119	1,792,316.63	695,509.39	27.9	29.5	529	-85 to -105	-212 to -232	-283 to -303	-392 to -412
TB-120	1,790,782.31	696,888.93	40.0	42.1	540	-86 to -106	-213 to -233	-284 to -304	-393 to -413
TB-121	1,792,193.10	696,044.98	29.4	30.4	461	-84 to -104	-211 to -231	-282 to -302	-391 to -411
TB-122	1,790,288.61	693,549.38	48.8	51.7	480	-85 to -105	-212 to -232	-283 to -303	-392 to -412
TB-123	1,792,185.60	693,685.69	28.9	31.8	460	-84 to -104	-211 to -231	-282 to -302	-391 to -411
TB-124 ³	1,792,200.77	695,591.56	29.6	29.2	728			-663 to -698	

¹Illinois State Plane Coordinate System (NAD 1927).

²Chicago City Datum (CCD).

³TB-124 is a conventional well screened from -663 to -698 ft CCD. Samples are taken at approximately 650 ft below ground surface.

There were no fill events during the fourth quarter of 2024. Per the Revised GMP, one complete set of annual monitoring event samples was collected during November 12 – 20, 2024, at the Reservoir, the Main Quarry Sump, and all monitoring wells.

This report presents field activities, observations, and analytical data for surface and groundwater monitoring samples taken at the Main Quarry Sump, the TCR, and at all monitoring wells from November 12 – 20, 2024.

FIELD ACTIVITIES

For this report period, one complete set of samples for the annual monitoring event was collected at the TCR, the Main Quarry Sump, the deep well, and at sampling port 3 of all multilevel wells from November 12 – 20, 2024. Sample collection dates are shown in Table 2.

Using a Hanna Instruments 991301 pH/conductivity/TDS/temperature meter, the pH, electrical conductivity (EC), and temperature of each sample were measured and recorded immediately after collection.

Prior to sampling of monitoring wells, hydrostatic pressure was measured, at Port 3 in multilevel wells, or at 650 feet below surface level in well TB-124, to calculate the groundwater elevation. Table 3 lists the elevations at Port 3 of each well and the corresponding groundwater elevations during the annual monitoring event sampling in November 2024.

All samples were packed in ice and transported to the Metropolitan Water Reclamation District of Greater Chicago's (District's) Analytical Laboratories Division for the analysis of selected inorganic constituents (IAC Title 35 Part 620 Class I Groundwater Standards) in accordance with the Revised GMP. Additional aliquots were also prepared in the field and transported in ice to the District's Analytical Microbiology Laboratory for fecal coliform (FC) analysis. An additional set of aliquots was prepared in the field and transported in ice to a contract laboratory for analysis of selected organic constituents (IAC Title 35 Part 620 Class I Groundwater Standards) in accordance with the Revised GMP.

TABLE 2: DEVICES AND CORRESPONDING DATES OF SAMPLING DURING THE ANNUAL MONITORING EVENT IN NOVEMBER 2024

Date of Sampling	Device/Structure Sampled
11/12/24	TB-119, Main Quarry Sump
11/13/24	TB-123, TB-124
11/14/24	TB-118, TB-121
11/15/24	TB-120, Thornton Composite Reservoir
11/20/24	TB-122, TB-122 Duplicate

TABLE 3: SUMMARY OF ELEVATIONS AT SAMPLING PORT 3 OF EACH WELL AND CORRESPONDING GROUNDWATER ELEVATIONS DURING ANNUAL MONITORING EVENT SAMPLING IN NOVEMBER 2024

Sample Date	Well ID	Groundwater Elevation	
		----- (ft CCD ¹) -----	
11/14/24	TB-118	-289	-81
11/12/24	TB-119	-289	-164
11/15/24	TB-120	-290	-218
11/14/24	TB-121	-288	-166
11/20/24	TB-122	-288	-154
11/13/24	TB-123	-288	-51
11/13/24	TB-124 ²	NA ³	-339

¹Chicago City Datum.

²TB-124 is a conventional well screened from -663 to -698 ft CCD. Samples were taken at approximately 650 ft below ground surface during the annual monitoring event sampling in November 2024.

³Not applicable.

ANALYTICAL RESULTS

Table 4 lists the analytical methods used by the laboratory for measured parameters. Analytical results were reviewed to identify any analytes that exceeded the Illinois Class I Groundwater Standards (35 IAC Part 620).

The analytical data for all well samples, the Main Quarry Sump, and the TCR collected during the annual monitoring event from November 12 – 20, 2024, are presented in Table 5. There were a few exceedances of the Class I Groundwater Standards, including total dissolved solids (TDS), chloride, sulfate, and boron, as indicated in bold font in Table 5. Among these parameters, none showed a value higher than the background maximum. Groundwater FC bacteria were detected during the annual monitoring event in wells TB-119 and TB-120 at 1 and 9 CFU/100 mL, respectively (Table 5).

Almost all organic parameters were undetectable in the annual monitoring event samples (Table 5). There were no exceedances of Class I Groundwater Standards for any organic parameter in the annual monitoring samples. Benzo[k]fluoranthene in samples TB-120 and TB-122, benzo[a]anthracene in samples TB-120, TB-122, and TB-123, 2,4-dinitrotoluene in samples TB-119, TB-120, TB-122, and TB-124, and mecoprop, simazine, 1,4-dioxane, bis(2-ethylhexyl)phthalate, and all PCBs in all samples were below the laboratory reporting limits, but the reporting limits were higher than the Class I Groundwater Standards. Laboratory reporting limits for bis(2-ethylhexyl)phthalate in all samples were also higher than the background maximum concentration of 0.0052 mg/L. There were no exceedances of Class I Groundwater Standards for radioactivity parameters in the annual monitoring event samples.

TABLE 4: ANALYTICAL METHODS USED FOR REQUIRED PARAMETERS

Parameters	Analytical Method
Inorganic	
Chloride, fluoride, sulfate	USEPA 300.0
Total dissolved solids	SM 2540C (Rev 2015/2020)
Boron and Target Analyte List metals except calcium, magnesium, and mercury	USEPA 200.8
Hardness (as calcium and magnesium)	USEPA 200.7
Mercury	SM 3112B
Ammonia (as N)	USEPA 350.1
Total organic carbon	SM 5310B (Rev 2014)
Cyanide	USEPA Kelada-01
Organic	
Herbicides including 2,4-D, 2,4,5-TP (Silvex), dalapon, dicamba, dinoseb, mecoprop, pentachlorophenol, and picloram	SW-846 8151A
Endothall	USEPA 548.1
Polychlorinated biphenyls	SW-846 8082A
Pesticides including alachlor, alpha-BHC, chlordane, endrin, gamma-BHC, heptachlor, heptachlor epoxide, methoxychlor, and toxaphene; simazine	SW-846 8081B
Aldicarb and carbofuran	USEPA 531.2
All explosives	SW-846 8330B
1,2-dibromo-3-chloropropane and ethylene dibromide	USEPA 504.1
All other volatile organic compounds	SW-846 8260D
Phenolics, total recoverable	SW-846 9066
All other semivolatile volatile organic compounds and atrazine	SW-846 8270E
Radiological	
Radium-226 (pCi/L ¹)	USEPA 903.0
Radium-228 (pCi/L)	USEPA 904.0
Others	
Fecal coliform	SM 9222D

¹pCi/L = picocuries per liter.

TABLE 5: ANALYSIS OF GROUNDWATER SAMPLED AT MONITORING WELLS TB-118 THROUGH TB-124, THE MAIN QUARRY SUMP, AND THE THORNTON COMPOSITE RESERVOIR DURING THE ANNUAL MONITORING EVENT IN NOVEMBER 2024

Parameter	Part 620 Groundwater			Well								Sump	Reservoir
	Standard	Background	Lab RL ¹	TB-118	TB-119	TB-120	TB-121	TB-122	TB-122-D ²	TB-123	TB-124		
pH	6.5 – 9.0	8.4	NL ³	7.1	7.2	7.8	7.4	7.7	7.7	7.7	8.3	8.0	8.1
EC (mS/m)	NL	415	NL	267	121	130	211	173	173	83	282	214	184
Fecal coliform (CFU/100 mL)	NL	<1	1	<1	1	9	<1	<1	<1	<1	<1	<1	180
-----Concentration (mg/L)-----													
TDS	1,200	2,960	25	1,662	600	636	1,070	686	1,056	376	1,522	1,342	1,006
TOC	NL	1	5	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	73.1
Cyanide, Total	0.2	BRL ⁴	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007
Fluoride	4	3.2	2	<2.0	<1.0	<1.0	<2.0	1.09	1.08	<1.0	<2.0	<1.0	<1.0
Chloride	200	1,230	0.5	587	99	122	333	319	326	69	288	225	206
Sulfate	400	890	1.0	210	119	72	180	110	112	128	NRR ⁵	506	193
Ammonia as N	NL	ND ⁶	0.3	0.52	0.64	0.42	0.64	0.66	0.73	0.64	NDR ⁷	<0.30	5.43
10 Metals													
Ag	0.05	0.003	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
As	0.01	0.025	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.009	<0.002	0.005
B	2	3.78	0.005	0.635	0.873	0.904	0.928	2.32	2.22	1.59	1.01	0.387	0.244
Ba	2	0.217	0.002	0.040	0.034	0.032	0.084	0.021	0.021	0.046	0.012	0.025	0.062
Be	0.004	0.0002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cd	0.005	0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Co	1	0.035	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.010	0.004
Cr	0.1	86.4	0.004	<0.004	<0.004	0.023	<0.004	0.010	<0.004	<0.004	<0.004	<0.004	<0.004
Cu	0.65	0.004	0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.010
Fe	5	3.23	0.02	0.110	0.093	0.199	0.083	0.088	0.037	0.032	0.405	0.081	6.41
Hg	0.002	0.0007	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Mn	0.15	0.183	0.002	0.005	0.005	0.006	0.003	0.003	0.003	0.002	0.003	0.006	0.226
Ni	0.1	0.093	0.002	0.006	<0.002	0.017	NDR ⁸	0.008	0.002	<0.002	0.008	0.031	0.015
Pb	0.0075	0.006	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003
Sb	0.006	0.012	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Se	0.05	0.008	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Tl	0.002	0.013	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
V	0.049	BRL	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zn	5	9.95	0.01	<0.010	<0.010	0.014	0.024	0.037	0.016	0.010	0.535	<0.010	0.078
Ca	NL	276	0.5	182	93.5	84.0	138	80.5	78.5	78.3	69.7	140	127
Mg	NL	153	0.5	89.3	48.8	43.2	72.5	42.1	41.9	42.3	69.0	117	61.3

TABLE 5 (Continued): ANALYSIS OF GROUNDWATER SAMPLED AT MONITORING WELLS TB-118 THROUGH TB-124, THE MAIN QUARRY SUMP, AND THE THORNTON COMPOSITE RESERVOIR DURING THE ANNUAL MONITORING EVENT IN NOVEMBER 2024

Parameter	Part 620 Groundwater			Well								Sump	Reservoir
	Standard	Background	Lab RL ¹	TB-118	TB-119	TB-120	TB-121	TB-122	TB-122-D ²	TB-123	TB-124		
-----Concentration (mg/L)-----													
<u>Herbicides</u>													
2,4-D	0.07	BRL	0.0013	<0.0013	<0.0012	<0.0013	<0.0012	<0.0013	<0.0011	<0.0011	<0.00099	<0.0011	<0.0013
2,4,5-TP (Silvex)	0.05	BRL	0.001	<0.0010	<0.00092	<0.0010	<0.00093	<0.0010	<0.00085	<0.00081	<0.00077	<0.00084	<0.0010
Atrazine	0.003	BRL	0.0023	<0.0020	<0.0020	<0.0023	<0.0021	<0.0022	<0.0021	<0.0021	<0.0021	<0.0018	<0.0020
Dalapon	0.2	BRL	0.0067	<0.0067	<0.0060	<0.0065	<0.0060	<0.0066	<0.0055	<0.0053	<0.0050	<0.0054	<0.0065
Dicamba	0.21	BRL	0.00061	<0.00061	<0.00054	<0.00059	<0.00055	<0.00060	<0.00050	<0.00048	<0.00045	<0.00049	<0.00059
Dinoseb	0.007	BRL	0.00061	<0.00061	<0.00054	<0.00059	<0.00055	<0.00060	<0.00050	<0.00048	<0.00045	<0.00049	<0.00059
Endothal ⁸	0.1	BRL	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Mecoprop	0.007	BRL	0.24	<0.24	<0.22	<0.24	<0.22	<0.24	<0.20	<0.19	<0.18	<0.20	<0.24
Picloram	0.5	BRL	0.00061	<0.00061	<0.00054	<0.00059	<0.00055	<0.00060	<0.00050	<0.00048	<0.00045	<0.00049	<0.00059
Simazine	0.004	BRL	0.014	<0.013	<0.012	<0.014	<0.013	<0.013	<0.013	<0.013	<0.013	<0.012	<0.013
<u>Polychlorinated Biphenyls</u>													
PCB-1016	0.0005	BRL	0.0011	<0.0011	<0.00092	<0.0011	<0.0010	<0.0011	<0.0011	<0.0011	<0.0010	<0.00097	<0.0011
PCB-1221	0.0005	BRL	0.0011	<0.0011	<0.00092	<0.0011	<0.0010	<0.0011	<0.0011	<0.0011	<0.0010	<0.00097	<0.0011
PCB-1232	0.0005	BRL	0.0011	<0.0011	<0.00092	<0.0011	<0.0010	<0.0011	<0.0011	<0.0011	<0.0010	<0.00097	<0.0011
PCB-1242	0.0005	BRL	0.0011	<0.0011	<0.00092	<0.0011	<0.0010	<0.0011	<0.0011	<0.0011	<0.0010	<0.00097	<0.0011
PCB-1248	0.0005	BRL	0.0011	<0.0011	<0.00092	<0.0011	<0.0010	<0.0011	<0.0011	<0.0011	<0.0010	<0.00097	<0.0011
PCB-1254	0.0005	BRL	0.0011	<0.0011	<0.00092	<0.0011	<0.0010	<0.0011	<0.0011	<0.0011	<0.0010	<0.00097	<0.0011
PCB-1260	0.0005	BRL	0.0011	<0.0011	<0.00092	<0.0011	<0.0010	<0.0011	<0.0011	<0.0011	<0.0010	<0.00097	<0.0011
Total PCB	0.0005	ND	0.0011	<0.0011	<0.00092	<0.0011	<0.0010	<0.0011	<0.0011	<0.0011	<0.0010	<0.00097	<0.0011
<u>Pesticides</u>													
Alachlor	0.002	BRL	0.0011	<0.0011	<0.00092	<0.0011	<0.0010	<0.0011	<0.0011	<0.0011	<0.0010	<0.00097	<0.0011
Aldicarb	0.003	0.0048	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
alpha-BHC	0.00011	BRL	0.00011	<0.00011	<0.000092	<0.00011	<0.00010	<0.00011	<0.00011	<0.00011	<0.00010	<0.000097	<0.00011
Carbofuran	0.04	BRL	0.0009	<0.00090	<0.00090	<0.00090	<0.00090	<0.00090	<0.00090	<0.00090	<0.00090	<0.00090	<0.00090
Chlordane	0.002	BRL	0.00022	<0.00021	<0.00018	<0.00022	<0.00021	<0.00021	<0.00021	<0.00021	<0.00021	<0.00019	<0.00021
Endrin	0.002	BRL	0.00011	<0.00011	<0.000092	<0.00011	<0.00010	<0.00011	<0.00011	<0.00011	<0.00010	<0.000097	<0.00011
gamma-BHC	0.0002	BRL	0.00011	<0.00011	<0.000092	<0.00011	<0.00010	<0.00011	<0.00011	<0.00011	<0.00010	<0.000097	<0.00011
Heptachlor	0.0004	BRL	0.00011	<0.00011	<0.000092	<0.00011	<0.00010	<0.00011	<0.00011	<0.00011	<0.00010	<0.000097	<0.00011
Heptachlor epoxide	0.0002	BRL	0.00011	<0.00011	<0.000092	<0.00011	<0.00010	<0.00011	<0.00011	<0.00011	<0.00010	<0.000097	<0.00011
Methoxychlor	0.04	BRL	0.00022	<0.00021	<0.00018	<0.00022	<0.00021	<0.00021	<0.00021	<0.00021	<0.00021	<0.00019	<0.00021
Toxaphene	0.003	BRL	0.0011	<0.0011	<0.00092	<0.0011	<0.0010	<0.0011	<0.0011	<0.0011	<0.0010	<0.00097	<0.0011
<u>Explosives</u>													
1,3-Dinitrobenzene	0.0007	BRL	0.00012	<0.00011	<0.00012	<0.00012	<0.00012	<0.00012	<0.00012	<0.00011	<0.00012	<0.00011	<0.00012
2,4-Dinitrotoluene	0.0001	0.0684	0.00011	<0.00010	<0.00011	<0.00011	<0.00010	<0.00011	<0.00010	<0.00010	<0.00011	<0.00010	0.00064

TABLE 5 (Continued): ANALYSIS OF GROUNDWATER SAMPLED AT MONITORING WELLS TB-118 THROUGH TB-124, THE MAIN QUARRY SUMP, AND THE THORNTON COMPOSITE RESERVOIR DURING THE ANNUAL MONITORING EVENT IN NOVEMBER 2024

Parameter	Part 620 Groundwater			Well								Sump	Reservoir
	Standard	Background	Lab RL ¹	TB-118	TB-119	TB-120	TB-121	TB-122	TB-122-D ²	TB-123	TB-124		
-----Concentration (mg/L)-----													
2,6-Dinitrotoluene	0.0003	0.0197	0.00011	<0.00010	<0.00011	<0.00011	<0.00010	<0.00011	<0.00010	<0.00010	<0.00011	<0.00010	<0.00011
1,3,5-Trinitrobenzene	0.84	BRL	0.00022	<0.00022	<0.00022	<0.00022	<0.00022	<0.00022	<0.00022	<0.00022	<0.00022	<0.00021	<0.00022
2,4,6-Trinitrotoluene	0.014	BRL	0.00012	<0.00011	<0.00012	<0.00012	<0.00012	<0.00012	<0.00012	<0.00011	<0.00012	<0.00011	<0.00012
Nitrobenzene	0.014	BRL	0.00022	<0.00022	<0.00022	<0.00022	<0.00022	<0.00022	<0.00022	<0.00022	<0.00022	<0.00021	<0.00022
HMX	1.4	0.044	0.00022	<0.00022	<0.00022	<0.00022	<0.00022	<0.00022	<0.00022	<0.00022	<0.00022	<0.00021	0.00069
RDX	0.084	0.00021	0.00022	<0.00022	<0.00022	<0.00022	<0.00022	0.00032	<0.00022	<0.00022	<0.00022	<0.00021	<0.00022
<u>Volatile Organic Compounds</u>													
1,1,1-Trichloroethane	0.2	BRL	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,1,2-Trichloroethane	0.005	BRL	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,1-Dichloroethane	1.4	BRL	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,1-Dichloroethene	0.007	BRL	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,2-Dichloroethane	0.005	BRL	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,2-Dichloropropane	0.005	BRL	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,2-Dibromo-3-Chloropropane	0.0002	BRL	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Ethylene Dibromide	0.00005	BRL	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
1,4-Dioxane	0.0077	BRL	0.018	<0.016	<0.016	<0.018	<0.017	<0.018	<0.016	<0.017	<0.017	<0.015	<0.016
2-Butanone	4.2	BRL	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acetone	6.3	BRL	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzene	0.005	BRL	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Carbon disulfide	0.7	0.008	0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Carbon tetrachloride	0.005	BRL	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorobenzene	0.1	BRL	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chloroform	0.07	BRL	0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
cis-1,2-Dichloroethene	0.07	BRL	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dichlorodifluoromethane	1.4	BRL	0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Ethylbenzene	0.7	BRL	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Isopropylbenzene	0.7	BRL	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Methylene Chloride	0.005	BRL	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Methyl tert-butyl ether	0.07	BRL	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Styrene	0.1	BRL	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Tetrachloroethene	0.005	BRL	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Toluene	1	0.008	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
trans-1,2-Dichloroethene	0.1	BRL	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Trichloroethene	0.005	BRL	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Trichlorofluoromethane	2.1	BRL	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Vinyl chloride	0.002	BRL	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Xylenes, Total	10	BRL	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

TABLE 5 (Continued): ANALYSIS OF GROUNDWATER SAMPLED AT MONITORING WELLS TB-118 THROUGH TB-124, THE MAIN QUARRY SUMP, AND THE THORNTON COMPOSITE RESERVOIR DURING THE ANNUAL MONITORING EVENT IN NOVEMBER 2024

Parameter	Part 620 Groundwater			Well								Sump	Reservoir
	Standard	Background	Lab RL ¹	TB-118	TB-119	TB-120	TB-121	TB-122	TB-122-D ²	TB-123	TB-124		
-----Concentration (mg/L)-----													
<u>Semivolatile Organic Compounds</u>													
1,2,4-Trichlorobenzene	0.07	0.05	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,2-Dichlorobenzene	0.6	0.049	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,4-Dichlorobenzene	0.075	0.048	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
2-Methylnaphthalene	0.028	0.034	0.0018	<0.0016	<0.0016	<0.0018	<0.0017	<0.0018	<0.0016	<0.0017	<0.0017	<0.0015	<0.0016
2-Methylphenol	0.35	BRL	0.0018	<0.0016	<0.0016	<0.0018	<0.0017	<0.0018	<0.0016	<0.0017	<0.0017	<0.0015	<0.0016
Acenaphthene	0.42	0.077	0.00091	<0.00079	<0.00080	<0.00091	<0.00083	<0.00090	<0.00082	<0.00085	<0.00083	<0.00074	<0.00079
Anthracene	2.1	BRL	0.00091	<0.00079	<0.00080	<0.00091	<0.00083	<0.00090	<0.00082	<0.00085	<0.00083	<0.00074	<0.00079
Benzo[a]anthracene	0.00013	BRL	0.00015	<0.00013	<0.00013	<0.00015	<0.00013	<0.00015	<0.00013	<0.00014	<0.00013	<0.00012	0.00017
Benzo[a]pyrene	0.0002	BRL	0.00018	<0.00016	<0.00016	<0.00018	<0.00017	<0.00018	<0.00016	<0.00017	<0.00017	<0.00015	0.00018
Benzo[b]fluoranthene	0.00018	BRL	0.00018	<0.00016	<0.00016	<0.00018	<0.00017	<0.00018	<0.00016	<0.00017	<0.00017	<0.00015	0.00032
Benzo[k]fluoranthene	0.00017	BRL	0.00018	<0.00016	<0.00016	<0.00018	<0.00017	<0.00018	<0.00016	<0.00017	<0.00017	<0.00015	<0.00016
Benzoic acid	28	BRL	0.018	<0.016	<0.016	<0.018	<0.017	<0.018	<0.016	<0.017	<0.017	<0.015	<0.016
Bis(2-ethylhexyl)phthalate	0.006	0.0052	0.0091	<0.0079	<0.0080	<0.0091	<0.0083	<0.0090	<0.0082	<0.0085	<0.0083	<0.0074	<0.0079
Chrysene	0.012	BRL	0.00018	<0.00016	<0.00016	<0.00018	<0.00017	<0.00018	<0.00016	<0.00017	<0.00017	<0.00015	0.00021
Dibenz[a,h]anthracene	0.0003	BRL	0.00027	<0.00024	<0.00024	<0.00027	<0.00025	<0.00027	<0.00025	<0.00026	<0.00025	<0.00022	<0.00024
Diethyl phthalate	5.6	BRL	0.0045	<0.0039	<0.0040	<0.0045	<0.0041	<0.0045	<0.0041	<0.0043	<0.0041	<0.0037	<0.0040
Di-n-butyl phthalate	0.7	BRL	0.0045	<0.0039	<0.0040	<0.0045	<0.0041	<0.0045	<0.0041	<0.0043	<0.0041	<0.0037	<0.0040
Fluoranthene	0.28	0.113	0.00091	<0.00079	<0.00080	<0.00091	<0.00083	<0.00090	<0.00082	<0.00085	<0.00083	<0.00074	<0.00079
Fluorene	0.28	BRL	0.00091	<0.00079	<0.00080	<0.00091	<0.00083	<0.00090	<0.00082	<0.00085	<0.00083	<0.00074	<0.00079
Hexachlorocyclopentadiene	0.05	BRL	0.018	<0.016	<0.016	<0.018	<0.017	<0.018	<0.016	<0.017	<0.017	<0.015	<0.016
Indeno[1,2,3-cd]pyrene	0.00043	BRL	0.00018	<0.00016	<0.00016	<0.00018	<0.00017	<0.00018	<0.00016	<0.00017	<0.00017	<0.00015	<0.00016
Naphthalene	0.14	BRL	0.00091	<0.00079	<0.00080	<0.00091	<0.00083	<0.00090	<0.00082	<0.00085	<0.00083	<0.00074	<0.00079
Pentachlorophenol	0.001	0.169	0.0003	<0.00030	<0.00027	<0.00030	<0.00027	<0.00030	<0.00025	<0.00024	<0.00023	<0.00025	<0.00030
Phenolics, Total	0.1	0.062	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pyrene	0.21	0.126	0.00091	<0.00079	<0.00080	<0.00091	<0.00083	<0.00090	<0.00082	<0.00085	<0.00083	<0.00074	<0.00079
-----pCi/L-----													
<u>Radioactivity</u>													
Radium-226	20	4.31	0.287	1.98	1.4	0.903	2.29	1.48	1.47	1.13	5.78	0.471	0.212
Radium-228	20	2.58	1.94	1.5	1.35	1.19	1.11	1.8	1.2	<1.02	<1.14	<0.731	<1.94

¹RL: Laboratory reporting limit. Minimum detectable concentration shown for Radioactivity parameters. Where analyses for the same parameter had different RL/MDCs, the maximum is shown.

²Duplicate sample.

³NL: No existing limit.

⁴BRL: Below reporting limit in background monitoring samples.

⁵NRR: No reportable result due to likely sample misidentification and contamination.

⁶ND: Not determined during background monitoring.

⁷NDR: No data reportable because sample preservation did not meet quality assurance/quality control requirements.

⁸NDR: No data reportable because quality assurance/quality control sample failed and sample could not be re-run due to insufficient volume.

REFERENCES

- Black & Veatch, 2014, “Background Groundwater Quality Report for Thornton Composite Reservoir,” prepared for the Metropolitan Water Reclamation District of Greater Chicago, July 2014.
- Black & Veatch, 2016, “Revised Groundwater Monitoring Plan, Groundwater Protection System for Thornton Composite Reservoir,” prepared for the Metropolitan Water Reclamation District of Greater Chicago, May 2016.
- Illinois Environmental Protection Agency, 2012, 35 Illinois Administrative Code (IAC) Part 620 Class I Groundwater Standards, 2012.
- Illinois Pollution Control Board, 2013, Illinois Administrative Code Title 35: Environmental Protection, Subtitle F: Potable Water Supplies, Chapter I: Pollution Control Board, Part 620 – Groundwater Quality, October 7, 2013.