November 22, 2019 Reference No. 7987

Mr. Brian Sadowski
Project Manager
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Sadowski

Re: Response to NYSDEC Comments Regarding Annual PRR
Gratwick-Riverside Park Site, North Tonawanda, New York

This letter serves as a Corrective Action Work Plan and response to the letter from the New York State Department of Environmental Conservation (NYSDEC) dated September 23, 2019. Per the letter, it is the opinion of the NYSDEC that the Groundwater Withdrawal System (GWS) at the Gratwick Riverside Park Site has failed. This is based on the review of the PRR which, among other factors, shows an extended period of time in which water levels in select wells have been rising or high enough for outward gradients to be present between the GWS and the Niagara River. Additionally, select locations have seen increases in chemical concentrations during annual monitoring events in recent years.

GHD is of the opinion that the GWS has not failed, and continues to contain the impacted groundwater in the area; however, performance of the GWS could be improved. This is based on the following:

- Despite the outward gradients between two of the four monitoring points inside and outside the barrier wall, the extremely low hydraulic conductivity in the barrier wall clay and the much higher conductivity in the gravel on the interior side provides an effective preferential pathway for groundwater to migrate towards the pumping wells, due to the horizontal gradients present throughout the collection pipe. Due to this, even extended periods of outward gradients between the GWS and the Niagara River do not pose a significant risk of chemical migration. Additionally, while there have been instances of water levels above the barrier wall (greater than 568.5 ft AMSL), these instances have been for short periods of time only.
- The brief periods of water levels above the barrier wall at select location was likely due to a pump operational issue at MH-15 (Pump Station #3). This has been repaired and is now functioning and additional procedures have been implemented to insure the issue does not reoccur. Water levels in this well have dropped since August 2019 following the repair and water levels in the GWS are all now below the top of the barrier wall. This is expected to improve overall performance of the GWS. Water levels since May 2019 are presented on **Table 1**.
- Recent elevated chemical concentrations are present only in wells on the interior of the barrier wall. This is to be expected since the Site cap was designed to be permeable such that chemicals remaining would be flushed toward and captured by the GWS. Additionally, recent years have seen increased total groundwater extracted from the GWS, as presented in **Table 2**. This indicates that

GHD
455 Phillip Street Unit #100A Waterloo Ontario N2L 3X2 Canada
T 519 884 0510 **F** 519 884 0525 **W** www.ghd.com

increases in concentrations of phenolic compounds in these wells are not indicative of outward migration, but rather flushing of chemicals toward the GWS as intended.

- Monitoring wells exterior of the barrier wall have continue to have decreasing, low or non-detect chemical concentrations during monitoring events.

Corrective measures to improve performance of the GWS will be implemented in a phased approach. The first phase will consist of the following:

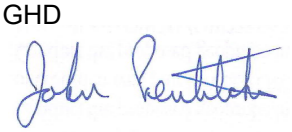
- Clean out and inspect via video the collection pipe of the GWS.
- Monitor effect of the cleanout on GWS performance for 3 months. Three monthly hydraulic monitoring events will be performed during this period.
- Submit report presenting the results on the cleanout/video inspection, impact on GWS performance and water levels, and recommendations for additional work if necessary (second phase). The report will be submitted within 30 days of the third hydraulic monitoring event.

Should you have any questions or would like to discuss further, please do not hesitate to contact me or Dale Marshall.

Sincerely,

John Pentilchuk

GHD



JP/jp/8

Encl.

cc: Dale Marshall (City of North Tonawanda)

Table 1

Water Levels (FT AMSL)
Gratwick-Riverside Park Site
North Tonawanda, New York

Date	MH2	MH3	MH6	OGC-1	MW-6	OGC-5	River North	OGC-6	MH8	MW-7	OGC-2	River Middle	OGC-7
RIM Elevation	**573.28**	**573.81**	**572.03**						**572.37**				
TOC Elevation (ft amsl)				**575.01**	**575.40**	**573.82**	**566.80**	**576.65**		**575.57**	**574.08**	**566.48**	**572.49**
January 28, 2019	568.38	560.20	562.06	565.87	567.80	565.80	565.30	565.73	566.89	567.44	565.90	(2)	565.91
February 28, 2019	568.33	559.05	561.94	565.27	567.68	565.06	(2)	565.06	566.76	567.40	565.52	(2)	565.26
March 26, 2019	568.15	560.19	561.77	565.10	567.53	565.04	564.95	564.94	566.58	567.22	565.18	564.72	565.18
April 26, 2019	568.56	558.73	562.30	565.72	567.96	565.56	565.71	565.54	566.96	567.80	565.64	565.48	565.67
May 29, 2019	568.71	559.20	562.49	565.74	568.13	565.72	565.42	565.70	567.30	568.02	566.05	565.20	565.86
June 26, 2019	568.68	558.83	562.39	566.33	568.04	566.24	566.11	566.22	567.16	567.93	566.47	565.89	566.40
July 24, 2019	568.45	560.45	562.12	565.70	567.82	565.70	565.58	565.69	566.89	567.69	566.15	565.38	565.83
August 28, 2019	568.32	558.55	561.99	565.66	567.73	565.60	565.44	565.56	566.76	567.55	565.98	565.28	565.77
September 25, 2019	568.31	558.86	561.93	565.61	567.69	565.49	565.47	565.48	566.68	567.48	565.87	565.27	565.72
October 30, 2019	568.37	559.29	561.96	565.48	567.74	565.26	565.04	565.33	566.74	567.52	565.71	564.79	565.45

Date	MH9	OGC-3	MH11	MW-8	River South	MH12	OGC-8	OGC-4	MW-9	MH14	MH15	MH16
RIM Elevation			**572.11**			**572.37**				**574.30**	**575.84**	**574.82**
TOC Elevation (ft amsl)	**572.55**	**573.35**		**574.37**	**568.46**		**574.01**	**574.66**	**576.23**			
January 28, 2019	559.32	565.93	567.32	567.95	565.31 (3)	565.17	562.9	566.05	568.07	568.16	567.15	568.11
February 28, 2019	561.46	565.25	567.29	567.85	(2)	565.15	562.33	565.38	568.05	568.19	567.22	568.18
March 26, 2019	559.16	565.33	567.08	567.63	565.08	564.95	562.4	565.4	567.81	567.97	566.94	567.94
April 26, 2019	560.44	565.97	567.62	568.15	566.06	565.48	563.05	565.75	568.31	568.43	567.39	568.37
May 29, 2019	560.75	565.88	567.78	568.3	565.73	565.58	562.91	565.95	568.48	568.51	567.48	568.47
June 26, 2019	560.32	566.52	567.58	568.09	566.44	565.41	563.53	566.56	568.28	568.37	567.32	568.31
July 24, 2019	560.5	565.95	567.3	567.82	565.82	565.16	563	566.03	567.95	568.08	567.06	568.01
August 28, 2019	559.82	565.87	567.13	567.66	565.78	564.98	562.88	565.93	567.73	567.87	566.22	567.81
September 25, 2019	559.65	565.86	567.05	567.56	565.78	564.91	562.89	565.8	567.63	567.64	560.23	567.74
October 30, 2019	559.31	565.49	567.09	567.61	565.37	564.94	562.5	565.53	567.71	567.63	559.85	567.74

Notes:

(1) River level too low to obtain a measurement at the measuring location.
(2) Unable to access.
(3) Top of ice

Table 2

Groundwater Volumes Discharged to North Tonawanda POTW Gratwick-Riverside Park Site North Tonawanda, New York

Month	Volumes (gallons) Monthly	Total
January 2017	1,662,500	127,022,100
February 2017	1,549,600	128,571,700
March 2017	1,840,700	130,412,400
April 2017	1,486,100	131,898,500
May 2017	1,625,700	133,524,200
June 2017	1,355,300	134,879,500
July 2017	1,181,800	136,061,300
August 2017	1,102,300	137,163,600
September 2017	1,014,200	138,177,800
October 2017	1,469,000	139,646,800
November 2017	822,400	140,469,200
December 2017	1,045,800	141,515,000
January 2018	962,100	142,477,100
February 2018	936,100	143,413,200
March 2018	1,102,800	144,516,000
April 2018	1,063,300	145,579,300
May 2018	1,049,300	146,628,600
June 2018	867,200	147,495,800
July 2018	994,300	148,490,100
August 2018	813,200	149,303,300
September 2018	828,800	150,132,100
October 2018	1,022,700	151,154,800
November 2018	960,684	152,115,484
December 2018	986,000	153,101,484
January 2019	1,045,300	154,146,784
February 2019	951,000	155,097,784
March 2019	1,059,600	156,157,384
April 2019	1,031,825	157,189,209
May 2019	1,016,178	158,205,387
June 2019	944,848	159,150,235
July 2019	900,583	160,050,818
August 2019	1,005,082	161,055,900
September 2019	997,105	162,053,005
October 2019	1,090,791	163,143,796