



9375 Chillicothe Road
Kirtland, OH 44094-8501

T (440) 256-6500

www.sme-usa.com

September 19, 2025

Mr. Imad El Hajjar, PE
Verdantas
8150 Sterling Court
Mentor, Ohio 44060

Via Email: ihajjar@ctconsultants.com

RE: Groundwater Monitoring Letter
Lakeshore East EQ Basin Phase 1
Forest Drive
Eastlake, Ohio 44095
SME Project No. 100677.00

Dear Mr. Hajjar:

This letter presents the results of our groundwater monitoring observations for the Lakeshore East EQ Basin project in Eastlake, Ohio. We performed this evaluation in general accordance with SME Proposal P02520.25. Our services for this evaluation were authorized by Muhammad Shahid Iqbal with Verdantas through Task Order number 230664.

SITE CONDITIONS AND PROJECT DESCRIPTION

The project site is located along Forest Drive in Eastlake, Ohio. The site currently consists of a grass-covered lot with residential and commercial properties on the north, east, and south sides. Based on Google Earth, the site decreases in elevation by about 3 feet from the Forest Drive to the east end of the property.

We understand the project will consist of the construction of an equalization basin with a 100-foot inside diameter and 105.5-foot outside diameter. A 15-foot widening track is planned around the outside of the tank, with the support excavation outside of that. The bottom of the tank will have a finished floor elevation of 579.0 feet, or about 33 feet below the existing ground surface. The widening track will be at an elevation of 578.5 feet.

We understand that previous subsurface explorations were performed at this project site on April 17, 2023 and October 8, 2024. Four borings were drilled and the borings encountered predominately lean clay, silty clay, and sandy silt. Groundwater was not encountered in the boreholes. A PVC groundwater monitoring well was installed at B4. Verdantas obtained four groundwater level measurements between November 11, 2024 and February 3, 2024, which ranged from 1.3 to 4.4 feet below the ground surface. These logs were referenced to provide guidance on our exploration plan and anticipated soil conditions.

GROUNDWATER EVALUATION PROCEDURES

The proposed number, locations, and depths of the piezometers were determined by SME with input from Verdantas. SME marked the piezometer locations in field and obtained the existing ground surface elevations at the boring locations using our hand-held global positioning system (GPS). The elevations are rounded to the nearest 1/2-foot. The approximate piezometer locations are shown on the attached Piezometer Location Diagram.

SME mobilized a drill rig to the site on August 18, 2025, to install two vibrating wire piezometers. At each location we blind drilled without sampling to an approximate depth of 40 feet below the ground surface. A piezometer was installed at the bottom of each borehole. The piezometers were grouted in place. Calibration records for each sensor are attached to this report.

We returned to the site on August 22, 2025, to connect data loggers to each piezometer. The data loggers were stored in temporary protective casing and kept on site to collect readings between August 22 and September 18, 2025. After obtaining our final readings on September 18, 2025, we disconnected the dataloggers and removed the temporary protective casing. The ends of each piezometer were covered with duct tape and left in place to be used for future monitoring, if necessary.

GROUNDWATER CONDITIONS

The piezometer data shows that pore water pressures in each location are relatively stable, indicating average total head elevations of 606.8 feet in P-1 and 605.4 feet in P-2, or about 5 and 5.6 feet below the ground surface. During the collection period of about four weeks, the total head varied by a foot or less in each location. The attached figure shows the total head elevations based on the measured pore water pressure readings over the collection period, the ground surface elevations, and the piezometer sensor elevations for each location.

Total head and groundwater levels should be expected to fluctuate during the year. The total head elevations presented in this report represent conditions at the time the readings were taken. Total head and the groundwater level at other times and locations may vary from those measured during our evaluation. Piezometer readings taken over time are a more accurate indication of total head and groundwater levels and the changes that may occur seasonally. Pore water pressures need to be monitored for longer periods to determine these seasonal fluctuations.

SIGNATURES

PREPARED BY:



Thomas P. Olding, PE
Project Engineer

REVIEWED BY:



Brendan P. Lieske, PE
Senior Consultant

Attachments: Piezometer Location Diagram
Piezometer Data Plot
Piezometer Calibration Records

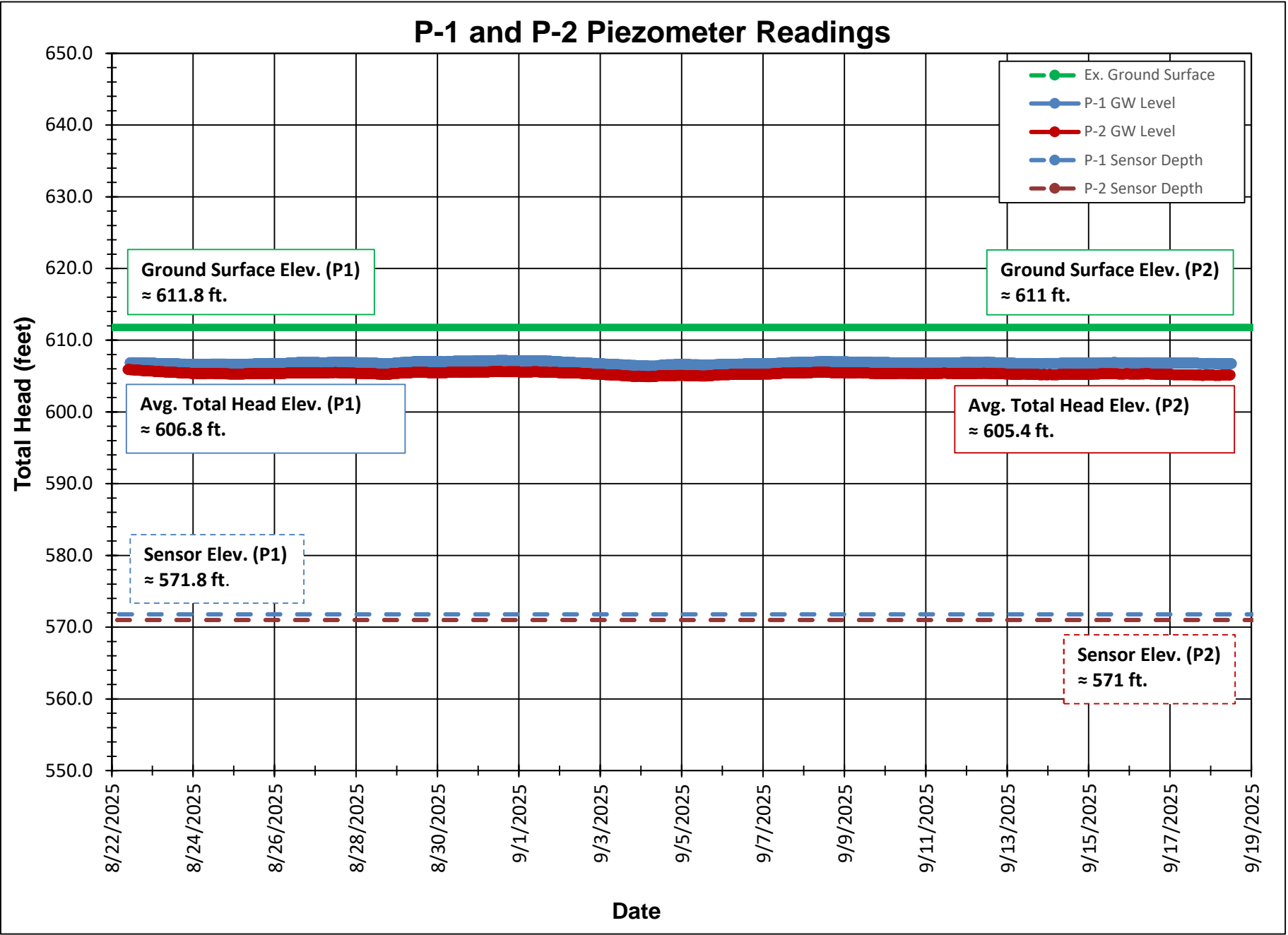
Lakeshore EQ Basin Phase 1

Piezometer Location Plan

Legend

● Piezometer Location







Monitor
with
Confidence

Calibration Record

RST Instruments Ltd., 11545 Kingston St., Maple Ridge, British Columbia, Canada V2X 0Z5
Tel: 604 540 1100 • Fax: 604 540 1005 • Toll Free: 1 800 665 5599 (North America only)
e-mail: info@rstinstruments.com • Website: www.rstinstruments.com

Vibrating Wire Piezometer

Customer: _____
Sales Order: _____
Customer ID: _____
Model: VW2100-0.35-L20
Serial Number: VW207076
Mfg Number: P207076
Range: 350 kPa
Cable Length: 20 meters
Cable Marking: 12456 m to 12476 m
Cable Type: EL380004
Cable Colour Code: Red/Black (Coil) Green/White (Thermistor)
Thermistor Type: 3K

Applied Pressure (kPa)	First Reading (B units)	Second Reading (B units)	Average Reading (B units)	Calculated Linear (kPa)	Linearity Error (%FS)	Calculated Polynomial (kPa)	Polynomial Error (%FS)
0.0	8510	8511	8510	-0.7	-0.19	0.1	0.04
70.0	7802	7803	7802	70.0	-0.00	69.8	-0.05
140.0	7096	7096	7096	140.5	0.14	139.8	-0.04
210.0	6391	6392	6392	210.8	0.23	210.2	0.05
280.0	5695	5696	5695	280.3	0.08	280.1	0.04
350.0	5006	5006	5006	349.1	-0.26	349.9	-0.03
Max Error (%)					0.26		0.05

Linear Calibration Factor: CF = 9.9803e-02 kPa/B unit

Temperature Correction Factor: Tk = -2.2331e-02 kPa/°C rise

Polynomial Gauge Factor:

A = 4.8531e-07 kPa/(B unit)² B = -1.0636e-01 kPa/B unit C = calculate (see below) kPa

Users must establish site zero readings for calculation purposes

Polynomial C = $-[A(L_0^2) + B(L_0)]$

Pressure is calculated with the following equations:

Linear: $P = CF(L_0 - L) - Tk(T_0 - T) + (S_0 - S)$

Polynomial: $P = A(L^2) + B(L) + C - Tk(T_0 - T) + (S_0 - S)$

L_0 , L = initial (installation) and current readings, in B units

T_0 , T = initial (installation) and current temperature, in °C

S_0 , S = initial (installation) and current barometric pressure readings, in kPa

B units = Hz²/1000 ie: 1700 Hz = 2890 B units

Shipped Zero Readings:	Date	VW Reading (B Units)	Temperature (°C)	Baro (mbar)
	01 Aug 2025	8521	21.4	1020.0

This instrument has been calibrated using standards traceable to the NIST in compliance with ANSI Z540-1

Technician: Dong Trang

Date: 01/08/2025

Approved: Mackenzey Landry

Date: 01/08/2025



Monitor
with
Confidence

Calibration Record

RST Instruments Ltd., 11545 Kingston St., Maple Ridge, British Columbia, Canada V2X 0Z5
Tel: 604 540 1100 • Fax: 604 540 1005 • Toll Free: 1 800 665 5599 (North America only)
e-mail: info@rstinstruments.com • Website: www.rstinstruments.com

Vibrating Wire Piezometer

Customer: -
Sales Order: -
Customer ID: -
Model: VW2100-0.35-L20
Serial Number: VW207066
Mfg Number: P207066
Range: 350 kPa
Cable Length: 20 meters
Cable Marking: 10013 m to 10033 m
Cable Type: EL380004
Cable Colour Code: Red/Black (Coil) Green/White (Thermistor)
Thermistor Type: 3K

Applied Pressure (kPa)	First Reading (B units)	Second Reading (B units)	Average Reading (B units)	Calculated Linear (kPa)	Linearity Error (%FS)	Calculated Polynomial (kPa)	Polynomial Error (%FS)
0.0	8622	8622	8622	-0.6	-0.18	-0.0	-0.00
70.0	7967	7968	7967	70.2	0.04	70.0	0.01
140.0	7317	7318	7317	140.5	0.13	140.0	-0.01
210.0	6669	6670	6670	210.5	0.15	210.0	0.01
280.0	6026	6026	6026	280.1	0.04	280.0	0.00
350.0	5386	5386	5386	349.3	-0.19	350.0	-0.00
Max Error (%)					0.19		0.01

Linear Calibration Factor: CF = 1.0817e-01 kPa/B unit

Temperature Correction Factor: Tk = -5.8142e-03 kPa/°C rise

Polynomial Gauge Factor:

A = 4.5759e-07 kPa/(B unit)² B = -1.1458e-01 kPa/B unit C = calculate (see below) kPa

Users must establish site zero readings for calculation purposes

Polynomial C = $-[A(L_0^2) + B(L_0)]$

Pressure is calculated with the following equations:

Linear: $P = CF(L_0 - L) - Tk(T_0 - T) + (S_0 - S)$

Polynomial: $P = A(L^2) + B(L) + C - Tk(T_0 - T) + (S_0 - S)$

L_0 , L = initial (installation) and current readings, in B units

T_0 , T = initial (installation) and current temperature, in °C

S_0 , S = initial (installation) and current barometric pressure readings, in kPa

B units = Hz²/1000 ie: 1700 Hz = 2890 B units

Shipped Zero Readings:	Date	VW Reading (B Units)	Temperature (°C)	Baro (mbar)
	01 Aug 2025	8630	21.5	1020.0

This instrument has been calibrated using standards traceable to the NIST in compliance with ANSI Z540-1

Technician: Dong Trang

Date: 01/08/2025

Approved: Mackenzey Landry

Date: 01/08/2025

