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August 15, 2023
File No. 05.0047039.00

Mr. Ryan J. Curley, First Selectman
c/o Finance Department Office, Room 204
Portland Town Hall
33 East Main Street
Portland, CT 06480

Re: Test Well Summary of Results
Portland Recreational Complex

Dear Mr. Curley:

In accordance with contract dated October 4, 2022, GZA GeoEnvironmental, Inc. (GZA) is pleased to provide a brief summary of the test well drilling results recently completed at the Portland Recreational Complex (PRC), located east of Gospel Lane. This letter is subject to the limitations in Appendix A.

The objective of installing test wells was to better understand the underlying geologic formations. Data collected from logging these borings were used to determine where to install well screens in the more favorable water bearing deposits. This allowed us to conduct preliminary pumping tests to estimate potential yields and collect groundwater samples for laboratory analyses comparing the results to the Connecticut Department of Public Health Drinking Water Action Levels.

Test Wells

Prior to selecting the PRC locations to drill two (2) exploratory test wells, GZA conducted geophysical studies at other locations within Portland. While other locations were considered equally favorable locations (Portland Golf Course, the property at 157 Ames Hollow Road and the sand and gravel pit near the Portland/Glastonbury town lane) to develop groundwater supplies, it was determined that the PRC was the more favorable location due to the following:

- The Town of Portland owned the property.
- There is an 8-inch water main located on Gospel Lane.
- Besides the ballfields/parking lots there are no other developments on site.
- The property was a former farming field and remediation was completed to remove the pesticides chlordane and dieldrin which were reported above the Residential Direct Exposure Criteria (R-DEC) of the Connecticut Department of Environmental Protections (DEEP) Remedation Standard Regulations (RSRs). However, the concentrations reported did not exceed The RSR criteria for leaching to the groundwater (Pollutant Mobility Criteria).
 - These soils were stockpiled around the perimeter of the field. It is unclear if an Environmental Land Use Restriction was applied to the deed.



Two (2) test wells were drilled between May 22nd through the 26th and the wells were developed on May 31, 2023.

- Test well Port-REC-1 was drilled to a depth of 332 feet below grade and 20-feet of a 20-slot well screen was installed from 297 feet to 317 feet.
- Test well PORT-REC-2 was drilled 10-feet south of PORT-REC-1 to a depth of 237 feet and 20-feet of a 20-slot well screen was installed from 179 feet to 199 feet.
- Both well were developed on May 31, 2023, using a surge and purge techniques to remove any fines that accumulated in the well, improve yield and lower turbidity.

Pumping Tests

Upon completion of the test Wells, GZA mobilized to the site and installed pressure transducers (to monitor water levels) and a Grundfos SQ-20 pump to conduct the pumping tests. Prior to the pumping test there was a significant rain event resulting in flooding to the Connecticut River and the adjacent wetlands located to the north of these wells. The results of the pumping tests are summarized below:

- PORT-REC-2 was pumped on July 12th, 2023, from approximately 7:15 am to approximately 4:36 pm. Drawdown was measured during three flow rates (steps) with the last flow rate being 33 gallons per minute. Flow was measured from a calibrated flow meter and checked using a bucket test. The maximum drawdown was measured at 7.73 feet from static water level (27.3 feet at top of PVC pipe).
 - The specific capacity of PORT-REC-2 is calculated to be 4.3 gallons per minute per foot of drawdown (gpm/ft).
 - Assuming a pump is set at 149 feet (30 feet above the well screen) this would result in 119 feet of water above the pump (assuming a static level of 30-feet below grade). However, there needs to be a safety column of water above the pump of 10 to 15 feet leaving approximately 104 feet of available water column for pumping.
 - At a specific capacity of 4.3 gpm/ft, PORT-REC-2 could yield approximately 3500 gallons per minute or approximately 500,000 gallons per day with a drawdown of approximately 81.5 feet.
- PORT-REC-1 was pumped on July 13th, from approximately 8:15 am (after moving the pump from PORT-REC-2 to PORT-REC-1) to approximately 4:15 pm. Drawdown was measured during three flow rates (steps) with the last flow rate being 33 gallons per minute. Flow was measured from a calibrated flow meter and checked using a bucket test. The maximum drawdown was 2.18 feet from static level (27.15 feet from the top of the PVC pipe).
 - The specific capacity of PORT-REC-2 was 15.1 gpm/ft.
 - Assuming a pump is set at 267 feet (30 feet above the well screen) this would result in 237 feet of water above the pump (assumes static at 30 feet below grade). However, there needs to be a safety column of water above the pump of 10 to 15 feet leaving approximately 222 feet of available water column for pumping.

At a specific capacity of 15.1 gallons per minute per foot, PORT-REC-2 could potentially yield approximately 1-2 million gallons per day depending upon aquifer performance under long term pumping.



- During the period when the pressure transducers were installed in both test wells, the town shut down their production well at the DPW. The period when the well was shut down and turned back on influenced the water level slightly at PORT-REC-2 but was negligible at PORT-REC-1.

Given the town’s water supply needs of approximately 0.75 to 1.25 million gallons per day. PORT-REC-1 would likely be capable of providing the yield required to meet these and future water requirements. A long-term pumping test will be required to assess how the aquifer will respond to sustained groundwater withdrawals. This will be part of the next work scope that will be required once production wells are designed and installed.

Water Quality

As part of the well installation and preliminary pumping test program, GZA collected water quality samples. The final water quality test results identified the following in comparison with the DWAL.

Parameters	PORT-REC-1	PORT-REC-2
Volatile Organic Compounds	non-detect	non-detect
Pesticides	non-detect (includes chlordane & dieldrin)	non-detect (includes chlordane & dieldrin)
Herbicides (2,4-D and 2,4,5-TP)	non-detect	non-detect
pH	7.99	7.73
Metals	Arsenic – non-detect Iron – non-detect Magnesium – 6.93 mg/L Manganese – 0.0167 mg/L Sodium – 12.02 mg/L Chloride – 25.5 mg/L Calcium – 53.7 mg/L	Arsenic – non-detect Iron – non-detect Magnesium – 6.31 mg/L Manganese – 0.0086 mg/L Sodium – 11.78 mg/L Chloride – 23.4 mg/L Calcium – 52.8 mg/L
Others	Nitrogen, Nitrate – 1.94 mg/L Nitrogen, Nitrite – non-detect Sulfate – 18.5 mg/L Chloride, total residual – non-detect Coliform, total – positive E – Coli negative Fecal Coliform – non-detect Odor – no odor Turbidity – 0.35 NTUs Color – non-detect	Nitrogen, Nitrate – 2.95 mg/L Nitrogen, Nitrite – non-detect Sulfate – 16.3 mg/L Chloride, total residual – non-detect Coliform, total – positive E – Coli negative Fecal Coliform – non-detect Odor – no odor Turbidity – 1.0 NTUs Color – non-detect
Hardness	163 mg/L	158 mg/L
Total dissolves solids	210 mg/L	210 mg/L
Radiochemistry	Uranium 0.360 +/- 1.010 Radon 261.3 +/- 0.906 Gross Alpha -1.14 +/- 0.906 Gross Bete 0.448 +/- 0.395	Uranium 0.736 +/- 0.024 Radon 347.6 +/- 43.1 Gross Alpha -0.202 +/- 1.04 Gross Bete 1.27 +/- 0.552
10-CTDPH - PFAS (Method 533)	Non-detect	PFOA – 2.2 ng/L

The results of the analytical data did not detect any constituents that exceeded the CT DPH Actin Limit. The only parameter that may require more attention is hardness which was reported from 158 to 163 mg/L, indicating that the groundwater is moderately hard.



The next steps will include the development of the engineering report and to provide more detailed recommendations for the next steps in this groundwater development program. We will also be working with the Town to determine a suitable location to tie into the water mains, to construct a pump house and treatment building. GZA appreciates the opportunity to be of continued service. If you have any questions, please do not hesitate to contact us.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

A handwritten signature in blue ink that reads "Richard J. Desrosiers".

Richard J. Desrosiers, LEP, PG
Associate Principal

A handwritten signature in blue ink that reads "James Emery".

James Emery, PG
Principal/Consultant Reviewer

Attachments:

Appendix A Limitations



APPENDIX A LIMITATIONS



USE OF REPORT

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

STANDARD OF CARE

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Proposal for Services and/or Report and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. Conditions other than described in this report may be found at the subject location(s).
3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made. Specifically, GZA does not and cannot represent that the Site contains no hazardous material, oil, or other latent condition beyond that observed by GZA during its study. Additionally, GZA makes no warranty that any response action or recommended action will achieve all of its objectives or that the findings of this study will be upheld by a local, state or federal agency.
4. In conducting our work, GZA relied upon certain information made available by public agencies, Client and/or others. GZA did not attempt to independently verify the accuracy or completeness of that information. Inconsistencies in this information which we have noted, if any, are discussed in the Report.

SUBSURFACE CONDITIONS

5. The generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs. The nature and extent of variations between these explorations may not become evident until further exploration or construction. If variations or other latent conditions then become evident, it will be necessary to reevaluate the conclusions and recommendations of this report.
6. Water level readings have been made, as described in this Report, in and monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The observed water table may be other than indicated in the Report.

COMPLIANCE WITH CODES AND REGULATIONS

7. We used reasonable care in identifying and interpreting applicable codes and regulations necessary to execute our scope of work. These codes and regulations are subject to various, and possibly contradictory, interpretations. Interpretations and compliance with codes and regulations by other parties is beyond our control.

**SCREENING AND ANALYTICAL TESTING**

8. GZA collected environmental samples at the locations identified in the Report. These samples were analyzed for the specific parameters identified in the report. Additional constituents, for which analyses were not conducted, may be present in soil, groundwater, surface water, sediment and/or air. Future Site activities and uses may result in a requirement for additional testing.
9. Our interpretation of field screening and laboratory data is presented in the Report. Unless otherwise noted, we relied upon the laboratory's QA/QC program to validate these data.
10. Variations in the types and concentrations of contaminants observed at a given location or time may occur due to release mechanisms, disposal practices, changes in flow paths, and/or the influence of various physical, chemical, biological or radiological processes. Subsequently observed concentrations may be other than indicated in the Report.

INTERPRETATION OF DATA

11. Our opinions are based on available information as described in the Report, and on our professional judgment. Additional observations made over time, and/or space, may not support the opinions provided in the Report.

ADDITIONAL INFORMATION

12. In the event that the Client or others authorized to use this report obtain additional information on environmental or hazardous waste issues at the Site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this evaluation, may modify the conclusions stated in this report.

ADDITIONAL SERVICES

13. GZA recommends that we be retained to provide services during any future investigations, design, implementation activities, construction, and/or property development/ redevelopment at the Site. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.