



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Central Regional Office • 8 New Bond Street, Worcester MA 01606 • 508-792-7650

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July 26, 2021

Daniel Ruiz, Manager
702, LLC
259 Turnpike Road, Suite 100
Southborough, MA 01772

City/Town: Lancaster
Re: Hydrogeologic Evaluation
Program Identifier: BRP WP 83
Transmittal No.: X287241
Facility Name: Capital Commerce Center
Authorization Type: **Approval**

Dear Mr. Ruiz:

The Central Regional Office of the Massachusetts Department of Environmental Protection ("MassDEP") has completed its Technical Review of the application for the above referenced hydrogeologic evaluation report dated January 13, 2021, with an addendum dated June 2, 2021, submitted on your behalf by GeoHydroCycle, Inc. The report is titled Hydrogeologic Evaluation, Capital Commerce Center, 1428 Lunenburg Road, Lancaster, MA 01523 and summarizes the results of the hydrogeologic evaluation to support a future Groundwater Discharge Permit application for Capital Commerce Center (i.e., 702, LLC). A scoping meeting was held at MassDEP Central Regional Office on October 24, 2018. Notice of the availability of the scope of work was published in the Environmental Monitor on October 23, 2018.

The proposed project consists of a 348-acre business park development including 2.7 million square feet of distribution space, retail, and commercial pad sites along with future residential housing. The project is located at 1428 Lunenburg Road in Lancaster at the intersections of Route 2 and Route 190. Current plans are to design a wastewater treatment plant that will treat and discharge approximately 99,465 gallons per day (gpd) of effluent to the ground. The hydrogeologic analysis used a 140' x 200' (28,000 sf) disposal area for modeling. The proposed soil absorption system (SAS) will consist of four (4) open sand beds.

Potable water will be provided to the site through a intermunicipal agreement between the town of Lancaster and the City of Leominster. A water line will be extended from Johnny Appleseed Lane to the project site. There are no known private or public water supply wells within ½ mile radius of the proposed groundwater discharge. There are three PWS wells located within a 1-mile radius of the proposed groundwater discharge (#2147013-01G, 2147012-01G, 2147011-02G). The SAS is not located within a nitrogen sensitive area or Zone II.

Subsurface Explorations

Subsurface explorations included seven test pit excavations in and around the new proposed effluent disposal location witnessed by GeoHydroCycle, Mount Hope Engineering and MassDEP on January 23, 2020. Percolation test was performed in Test Pit 20-3 and showed a percolation rate of less than 2 minutes per inch. Soil materials from the outwash consisted mainly of fine to coarse sand with some fine loamy sand in test pit 20-5 and loamy sand in test pit 20-4.

A total of five soil borings and the installation of five groundwater monitoring wells (MW-1, MW-2, MW-3, MW-4, MW-5) were performed at the site. Bedrock was not encountered in the wells. Soil mottling was not observed in the test pits; however, groundwater was observed at varying depths of the monitoring wells between approximately 11 and 18 feet. The Frimpter Method was implemented to estimate the seasonal high groundwater elevation. The Frimpter adjustment at the Acton, MA USGA observation well and groundwater elevation data March 13, 2021. The Frimpter method predicted a 7.16' adjustment in the predicted seasonal high groundwater.

Monitoring Well	Measuring point Elevation (feet, MSL)	Depth to Groundwater (feet)	Groundwater Elevation (MSL)	Adjusted Seasonal High Groundwater (MSL)
MW-1	366.80	7.98	358.82	365.98
MW-2	360.25	10.17	350.08	357.24
MW-3	365.49	15.90	349.59	356.75
MW-4	359.18	9.51	349.67	356.83
MW-5	359.11	15.52	343.59	350.75

The average saturated thickness over the five monitoring wells calculated to be 20.3 feet. Groundwater flows to the south and discharges to wetlands that are tributary to the North Nashua River.

Hydraulic conductivity was estimated using aquifer slug tests in the five installed monitoring wells. Falling head and rising head using the Bouwer & Rice and Hvorslev analysis methods. A range of 119 and 1,140 feet per day were calculated which is consistent with types of soils encountered during the drilling. A value of 216 feet per day was selected using a statistical evaluation.

Groundwater Mounding

MODFLOW groundwater model was used for mounding analysis for the site with input parameters obtained from drilling logs, field observations and slug test data. An effluent loading of 99,465 gallons per day with a loading rate of 3.4 gpd/sf and 28,000 sf of area was analyzed. A saturated thickness of 20.3 feet with an application rate of 80% of the daily rate (i.e., 79,572 gallons) over a 90-day transient simulation resulted in a simulated peak mounded groundwater elevation beneath the proposed disposal area of 367.0'. Based upon the green-lined contours depicting revised peak mounding conditions during adjusted seasonal high groundwater conditions that are shown in Drawing 1A, MassDEP finds the following highest mounded groundwater elevations for each of the four proposed beds: 367.0 feet at bed #1; 364.0 feet at bed #2, 365.8 feet at bed #3; and, 363.0 feet at bed #4. The bottom of each sand bed shall be 4' above the mounded groundwater; therefore, the open sand bed #1 will need to be no lower than 371.0, open sand bed #2 will be no lower than 368.00, open sand bed #3 no lower than 369.8, open sand bed #4 no lower than 367.0'.

The revised mounded groundwater contours under adjusted seasonal high groundwater conditions (green contour lines shown in Drawing 1A) indicate that in order to avoid potential breakout, the ground surface elevation shall require mounding in the following areas:

- to the northeast and west of the SAS in the vicinity of the green-lined 364 and 366-foot groundwater (gw) contours;
- to the west of the SAS in the vicinity of the 362-foot gw contour;
- to the southwest of the SAS along portions of the 358-foot and 360-foot gw contours; and,
- in the vicinity of MW-4 where, based upon the following, the mounded groundwater elevation at MW-4 would be approximately 1.6 feet above ground surface:
 - the ground surface elevation at MW-4 is approximately 355.76 feet [359.18 ft measuring point elevation (assumed top of casing) minus 3.42 ft casing stickup (from MW-4 log)]
 - the MW-4 adjusted seasonal high groundwater conditions elevation of 356.83 feet plus the approximately 0.5 foot of mounding shown in revised Figure 9 would place the mounded groundwater elevation at approximately 357.33 ft, or 1.57 feet above existing grade (355.76 ft) at MW-4.

Pursuant to 314 CMR 5.09 (1) (f), MassDEP hereby **approves** the hydrogeologic report and authorizes the applicant to apply for an **Individual Groundwater Discharge Permit (BWR WP 79)** subject to the following conditions:

1. The proposed SAS is approved for a maximum discharge of 99,465 gallons per day to 4 open sand beds (#1 through #4). The maximum loading rate used for the design was 3.55 gpd/sf. The SAS will be installed within a total footprint of approximately 28,000 sf as shown on Figure 1B, “Effluent Disposal Area Plan” dated 1/11/21 by Mount Hope Engineering.
2. Within thirty (30) days of the date of this approval, the applicant shall submit a plan depicting the reserve area of two additional and identical sand beds (7,000 sf each) to accommodate 50% of the flow in order for a number of the primary sand beds to be taken off line for scheduled maintenance. The reserve sand beds shall be 70’ x 100’ and located to the east of, and immediately adjacent to, the 4 primary sand beds.
3. This hydrogeologic permit specifies the size of the open sand beds, reserve areas, monitoring wells, and the method of disposal. Should you elect to make disposal changes at a later date, a new permit will need to be submitted to MassDEP for review/approval.
4. No construction of the SAS may occur until MassDEP has issued a groundwater discharge permit.
5. MassDEP approves the proposed monitoring well locations shown on Figure 12 “Proposed Locations of Compliance Wells,” dated 5/18/21. The monitoring plan consists of the following:
 - a. Up-gradient well CMW-1
 - b. Down-gradient wells CMW-2 and CMW-3.
 - c. In the future should any of the approved monitoring wells be compromised or destroyed, the well(s) must be replaced. The permittee shall notify MassDEP of this occurrence and obtain prior approval for the replacement monitoring well location and construction.
 - d. When monitoring wells are installed, they should have a 15-foot screen with 10-feet below the water table and 5-feet above. If this is not possible at the site due to the lack of a water table in the unconsolidated materials, the screen interval should start as close to refusal or the clay layer as possible. The screen should be 15-feet long, or as long as is feasible given the site constraints.
 - e. Note that the Lancaster Board of Health and Nashoba Associated Boards of Health may request inclusion of additional monitoring wells as part of their permitting process.

6. All loamy sand material located in C1 soil horizon in vicinity of test pit 20-5 beneath the proposed sand beds and reserve sand beds shall be removed and replaced with Title 5 fill material that complies with the requirements of 310 CMR 15. 255. Sieve analyses of the material shall be provided to MassDEP verifying compliance with the specifications of the material. Permittee shall contact MassDEP for an inspection to witness removal of the material.
7. Prior to any discharge of treated wastewater to the SAS, the permittee shall collect baseline water quality samples from each groundwater monitoring well and submit the results to MassDEP. Each monitoring well shall be sampled for the parameters to be specified in the groundwater discharge permit.
8. The Groundwater Discharge permit application must include cross-sections that clearly show the depth of the A/B/C horizons to be removed and the depth of the Title 5 sand to be placed within the primary and reserve areas.

The applicant is hereby advised that this approval **is not** a Groundwater Discharge Permit for 99,465 gpd. It does, however, authorize the project proponent to submit an application for an **Individual Groundwater Discharge Permit (BWR WP79)**. The application shall be accompanied by a MassDEP Transmittal form, application fee and all required supporting documentation. Included in the supporting documentation shall be a certification from a Massachusetts Registered Professional Engineer that the approved Hydrogeological Reports have been reviewed and accurately reflect site conditions as of the date of the permit application. Information on any changes noted during the review shall be included in the Engineering Report that accompanies the application.

If you have questions regarding this letter, please contact Joseph Cerutti at joseph.cerutti@mass.gov or me at David.boyer@mass.gov.

Sincerely,



David Boyer, P.E.
Section Chief
Wastewater Program

X287241ap (Lancaster)-147

cc: Lancaster Board of Health
Nashoba Associated Boards of Health
Stephen Smith Steve, GeoHydroCycle, Inc.
CERO Permit Administrator