CONSULTING GROUP

April 2, 2025

Mr. Jason Bing, RA, LEED AP
Director, Capitol Programs
Ann Arbor Public Schools
2555 South State Street
Ann Arbor, Michigan 48104

c/o Mr. Kevin Stansbury
Program Design Manager
Gilbane Building Company
1435 Randolph Street, Suite 405
Detroit, Michigan 48226

RE: Addendum to Report of Geotechnical Investigation
Ann Arbor Public Schools
Lakewood Elementary School
344 Gralake Avenue
City of Ann Arbor, Washtenaw County, Michigan 48103
G2 Project No. 243117

Dear Mr. Bing:

We understand below-grade walls will be constructed in association with the redevelopment of the Lakewood Elementary School located in Ann Arbor, Michigan.

We performed a geotechnical investigation associated with the proposed project and we presented the results of our findings within the report titled "Report of Geotechnical Investigation – Lakewood Elementary School – G2 Project No.: 243117" dated August 1, 2024. Please refer to our previous report for comprehensive recommendations related to the geotechnical conditions of the site. Following the issuance of our report, we were requested to provide geotechnical recommendations for below-grade walls.

## BELOW-GRADE WALL RECOMMENDATIONS

It was reported to us that the basement and 1st floor slabs associated with the proposed structure will have finished floor elevations of 946 and 958 feet, respectively. As such, we anticipate 12 foot tall below-grade walls will be constructed.

### Foundations

We recommend below-grade wall foundations be designed to extend through the existing fill soils, where present, and bear within the underlying native stiff to hard cohesive soils. Foundations bearing within the native stiff to hard cohesive soils or engineered fill placed above these materials may be designed using a net allowable soil bearing pressure of 3,000 psf.

Exterior footings must bear at a minimum depth of 3-1/2 feet below the proposed finished grade for protection against frost heave. Interior footings may bear at shallower depths provided they extend through the existing fill soils, suitable materials are available for support, and the foundations are continuously protected from frost penetration during construction. We recommend G2 be on-site for during the construction of foundations to observe the foundation excavations and observe the adequacy of the bearing soils.

To achieve a change in the level of a strip footing, the footing should be gradually stepped at a grade no steeper than two horizontal units to one vertical unit (2H:1V). If required to construct foundations at different levels, adjacent spread footings should be designed and constructed so the least lateral distance between the foundations is equivalent to or more than the difference in their bearing levels. We recommend all foundations be suitably reinforced to minimize the effects of differential settlements associated with localized variations in the subsoil conditions.

If the recommendations outlined in this report are adhered to, total and differential settlements for the completed below-grade walls supported on shallow spread footings should be within 1 and ½ inch respectively. We expect settlements of these magnitudes are within the tolerable limits for the types of retaining walls proposed.

**Lateral Earth Pressure Design Parameters**

Below-grade walls should be designed to withstand lateral earth pressures due to the soil backfill and adjacent traffic loads. Below grade walls considered to fixed at the top should be designed on the basis of at-rest lateral earth pressures corresponding to an equivalent fluid pressure of 55 pounds per cubic foot ($K_0$ = 0.46) for drained granular backfill. Below grade walls considered to be free at the top should be designed on the basis of active lateral earth pressures corresponding to an equivalent fluid pressure of 35 pounds per cubic foot ($K_a$ = 0.29) for drained granular backfill. We recommend the below grade walls be backfilled with free-draining granular soils such as MDOT 2NS to maintain drained conditions.

We recommend the proposed below grade walls be designed neglecting the passive pressure in front of the wall. If depth of the soil at the front of the wall can be maintained throughout the life of the wall, the below grade wall may be designed using passive pressure. For below grade walls having either the native stiff to hard cohesive soils or engineered fill in front of the wall, for the life of the wall, the passive resistance may be designed using an equivalent fluid pressure of 200 pounds per cubic foot ($K_p$ = 1.67) to a maximum of 2,000 psf. The frictional resistance along the base of the wall may be modeled with a coefficient of friction of 0.35. Lateral earth pressures are significantly influenced by the type and intensity of backfill compaction. We recommend thin lifts of approximately 6 inches of backfill be placed and relatively small compaction equipment be used to compact backfill placed against below-grade walls.

To prevent the development of hydrostatic pressures on below-grade foundation walls, a sub drain system should be installed at the foundation level. The perforated or slotted sub drains should be encased with at least 12 inches of clean gravel or pea gravel, and the gravel and pipe together should be wrapped with a suitable non-woven filter fabric, such as Mirafi 140N, to prevent the migration of surrounding soil fines into the gravel and drainpipe. The sub drain system should outlet water to a point that will promote effective drainage away from the structure.

**GENERAL COMMENTS**

If changes occur in the design, location, or concept of the project, conclusions and recommendations contained in this report are not valid unless G2 Consulting Group, LLC reviews the changes. G2 Consulting Group, LLC will then confirm any assumptions regarding the project scope presented herein or make changes in writing. The scope of the present investigation was limited to evaluation of

subsurface conditions at the proposed test pit locations. No chemical or environmental testing or analyses were included in the scope of this investigation.

We base the analyses and recommendations submitted in this report upon the data from the test pit performed at the approximate locations shown on the Infiltration Boring Location Plan, Plate No. 1. This report does not reflect variations that may occur between the actual test pit location and the actual stormwater management structure location. The nature and extent of any such variations may not become clear until the time of construction. We recommend G2 Consulting Group, LLC observe all geotechnical related work, including subgrade preparation and engineered fill placement.

We appreciate the opportunity to be of service to you on this project and look forward to discussing the results presented. In the meantime, if you have any questions regarding this report or any other matter pertaining to the project, please call us.

Sincerely,

**G2 Consulting Group, LLC**

Michael G. Dagher, P.E.
Project Consultant

Tyler S. Hesse, P.E.
Project Engineer

Jason B. Stoops, P.E.
Office Manager / Associate

MGD/TSH/jbs