SOIL-MAT ENGINEERS & CONSULTANTS LTD.

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PROJECT NO.: SM 260221.GEO May 25, 2026

SVEDAS ARCHITECTS INC.
3600 Billings Court
Burlington, Ontario
L7N 3N6

Attention: Monika Maxwell

GEOTECHNICAL CONSIDERATIONS
PROPOSED NEW ELEVATOR
BISHOP TONNOS CSS – 100 PANABAKER DRIVE
ANCASTER, ONTARIO

Dear Ms. Maxwell,

Further to your authorisation, SOIL-MAT ENGINEERS has prepared this Geotechnical Considerations letter in connection with the above noted project. The purpose of this Geotechnical Considerations letter is to provide our comments and recommendations with respect to the excavations and site preparation during construction of the foundations for the proposed elevator, from a geotechnical point of view.

BACKGROUND

We understand that it is proposed to construct a new elevator located at the southeast corner of the Cafetorium within the existing Bishop Tonnos Catholic Secondary School located at 100 Panabaker Drive in Ancaster, Ontario. It is noted that our office has completed numerous geotechnical investigations on the property previously, with the investigation for the wind turbine being in closest proximity to the project area [Project No. SM 103806-G, Memo dated July 16, 2010]. One borehole was advanced during the investigation and the soils encountered included dense to compact brown sand/sand and gravel with some silt and occasional cobbles in the upper approximately 2.0 metres overlying brown sand/silty fine sand in a loose to compact state and noted as 'wet' at a depth of 4.5 metres and below. The sand/silty fine sand was proven to a depth of approximately 7.0 metres, where grey silt with traces of clay and fine sand in a compact state was encountered and proven to termination at approximately 8.0 metres. It should be noted that the borehole was advanced at the exterior of the school to the south of the building and as such, subsurface soil conditions at the proposed elevator location within the school may vary from those encountered in the previous investigation. Where project specific data is desired, advancement of a borehole in close proximity to the project area would be recommended.

PRELIMINARY FOUNDATION CONSIDERATIONS

On a preliminary basis, footings within the undisturbed native sand/silty fine sand soils, below any fill or otherwise unsuitable soils, may be designed on the basis of a bearing value of 150 kPa [3,000 psf] SLS, 225 kPa [4,500 psf] ULS. However, should boreholes be advanced and conditions differ from what is anticipated, the design should be altered to reflect the differing conditions. Nonetheless, the founding conditions should be reviewed by a senior member of this office at the time of construction to review the founding soils in comparison to the assumptions of this report and the findings of our investigation. The founding surfaces must be hand cleaned of any loose or disturbed material, along with any ponded water, immediately prior to placement of foundation concrete.

It is noted that the SLS value represents the Serviceability Limit State, which is governed by the tolerable deflection [settlement] based on the proposed building type, using unfactored load combinations. The ULS value represents the Ultimate Limit State and is intended to reflect an upper limit of the available bearing capacity of the founding soils in terms of geotechnical design, using factored load combinations. There is no direct relationship between ULS and SLS; rather they are a function of the soil type and the tolerable deflections for serviceability, respectively. Evidently, the bearing capacity values would be lower for very settlement sensitive structures and larger for more flexible buildings.

In areas where it will be necessary to provide adjacent footings at different founding elevations, the lower footing should be constructed before the higher footing is constructed, if possible, and the higher footing should be set below an imaginary line drawn up from the edge of the lower footing at 10 horizontal to 7 vertical. This practice will limit stress transfer from the higher footings to lower footings. The founding level of the proposed foundations should be designed to ‘match’ the existing structure, stepping up or down as necessary.

As some differential movement is expected between the addition and the existing building, expansion/movement joints should be provided where connections are made to the existing structure to allow for differential movements to occur, both vertically due to compression of the soil under the weight of the addition, and horizontally as the walls expand and contract with fluctuations in humidity and temperature. The foundations should be structurally reinforced to account for such movements, as well as variability in loading and support conditions.

Depending on the depth of the existing founding elevations and the depth of the elevator pits, there may be a need for some limited underpinning of the existing foundations, though the depth of underpinning is generally anticipated to be relatively minor. Nonetheless, it should be understood that underpinning within granular sand/sandy soils can present challenges and increased settlement risks when completed with conventional concrete panel underpinning, with the challenges and risks increasing as the underpinning panel depth increases. Given the uncertainty of subsurface soils in the project area, and the granular sand/silty sand soils encountered elsewhere on site, the onsite soils should not strictly be expected to remain stable at vertical inclinations, and could slump in to 1 horizontal to 1 vertical or flatter. While it is possible that for relatively short underpinning excavations above the groundwater level, excavations may remain stable at near vertical for a short period to allow for placement of underpinning concrete, it is still recommended a contingency plan be in place. As such, it is recommended that the initial plan have the maximum underpinning panel width should be limited to a maximum of 600 millimetres wide instead of the typical 1.2 metres wide, to account for some slumping. The sides of the panel should be formed/supported with plywood immediately following excavation of the panel. Underpinning panels should be excavated using the "A, B, C, D" method, such that only 'A' panels are excavated and poured at once, followed by C, B, and then D. Concrete should be allowed to reach sufficient strength prior to excavation of the next panel. As with all underpinning, there is risk of associated settlements. Extra care in excavations and monitoring of existing foundations will be required for completing underpinning in granular soils. Where feasible or practical within project constraints, underpinning via helical piers may be considered to aid in risk reduction in underpinning efforts.

Similar to above, excavations for the proposed elevator should be planned considering Type 3 soils, such that they'd remain stable at inclinations of 1 horizontal to 1 vertical from the base of the excavation. Where steeper inclinations are required, excavation support should be provided.

All footings exposed to the environment must be provided with a minimum of 1.2 meters of earth or equivalent insulation to protect against frost penetration. This frost protection would also be required if construction were undertaken during the winter months. All footings must be proportioned to satisfy the requirements of the Ontario Provincial Building Code.

It is imperative that a soils engineer be retained from this office to provide geotechnical engineering services during the excavation and foundation construction phases of the project. This is to observe compliance with the design concepts and recommendations outlined in this report, and to allow changes to be made in the event that subsurface conditions differ from the conditions noted in this letter.

We trust that this information is satisfactory for your purposes. Should you have any queries please do not hesitate to contact the undersigned.

Yours very truly,
SOIL-MAT ENGINEERS & CONSULTANTS LTD.

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Project Engineer

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