Revised Report on
Preliminary Geotechnical Investigation
And Slope Stability Assessment
Proposed Residential Subdivision
12909 Kennedy Road North
Caledon, Ontario

Prepared For:
Trend Developments Inc.
& Trend 12909 Kennedy Developments Inc.

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DS CONSULTANTS LTD.
6221 Highway 7, Unit 16
Vaughan, Ontario, L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

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1. INTRODUCTION

DS Consultants Ltd. (DS) was retained by Trend Developments Inc. & Trend 12909 Kennedy Developments Inc. to undertake a preliminary geotechnical investigation for the proposed development located at 12909 Kennedy Road North, in the Town of Caledon, Ontario.

It is understood that the proposed development will consist of low-rise house units. A network of underground utilities and roads will be constructed for the proposed development. No design details of the proposed development were available when preparing this report.

A creek was observed running through the north/northeast portion of the site. Slope stability assessment is presented in **Appendix B**.

The purpose of this preliminary geotechnical investigation was to obtain information about the subsurface conditions at twelve (12) borehole locations and from the findings in the boreholes to provide preliminary recommendations pertaining to the geotechnical design of underground utilities, subdivision roads, and to comment on the foundation conditions for general house construction.

This report is provided on the basis of the terms of reference presented above and, on the assumption, that the design will be in accordance with the applicable codes and standards. If there are any changes in the design features relevant to the geotechnical analyses, or if any questions arise concerning the geotechnical aspects of the codes and standards, this office should be contacted to review the design. It may then be necessary to carry out additional borings and reporting before the recommendations of this office can be relied upon.

The site investigation and recommendations follow generally accepted practice for geotechnical consultants in Ontario. Laboratory testing for most part follows ASTM or CSA Standards or modifications of these standards that have become standard practice.

This report has been prepared for Trend Developments Inc. & Trend 12909 Kennedy Developments Inc., and its architect and designers, as well as Review Agencies. Third party use of this report without DS consent is prohibited.

2. FIELD AND LABORATORY WORK

A total of twelve (12) boreholes (BH22-1 to BH22-12, see **Drawing 1** for borehole locations) were drilled to depths ranging from 6.7 to 9.1 m below existing grade.

The boreholes were drilled with solid stem continuous flight augers equipment by a drilling sub-contractor under the direction and supervision of DS personnel. Samples were retrieved at regular intervals with a 50 mm O.D. split-barrel sampler driven with a hammer weighing 624 N and dropping 760 mm in accordance with the Standard Penetration Test (SPT) method. The samples were logged in

the field and returned to the DS laboratory for detailed examination by the project engineer and for laboratory testing.

In addition to visual examination in the laboratory, all soil samples were tested for water contents. Selected five (5) soil samples were subjected to grain size analyses and four (4) samples were submitted for Atterberg Limits testing. The results of lab testing are provided on the respective borehole logs and presented on **Drawings 14** and **15**.

Water level observations were made during drilling and in the open boreholes at the completion of the drilling operations. Monitoring wells were installed in six (6) boreholes for the long-term groundwater level monitoring and hydrogeological study.

The elevation surveying of the borehole locations was undertaken by DS personnel, using the differential GPS unit. It should be noted that the elevations at the as-drilled borehole/well locations were not provided by a professional surveyor and should be considered to be approximate. Contractors performing any work referenced to the borehole elevations should confirm the borehole elevations for their work.

3. SUBSURFACE CONDITIONS

The site is a parcel of land situated within a mixed residential and agricultural neighbourhood in the Town of Caledon, Ontario. It is located at the southeast quadrant of Kennedy Road North and Old School Road. A portion of the site near Kennedy Road and about mid-way of the property is occupied by some small structures used for residential and agricultural purposes. The remainder of the site is vacant agricultural land, and a creek is present running through the north/northeast portion of the site.

The borehole location plan is shown on **Drawing 1**. General notes on sample description are provided on **Drawing 1A**. The subsurface conditions in the boreholes are presented in the individual borehole logs presented on **Drawings 2 to 20**.

The following is a summarized account of the subsurface conditions encountered in the boreholes, followed by more detailed descriptions of the major soil strata and the groundwater conditions encountered in the boreholes drilled at the site.

3.1 SOIL CONDITIONS

In summary, underlying the topsoil, weathered/disturbed soils were encountered in all boreholes and extended to depths ranging from about 0.8 m to 1.5 m below existing ground surface. The native soils encountered at the site consisted mainly of clayey silt to silty clay (till) overlain by cohesionless deposits of sandy silt to silty sand, gravelly sand, and sandy silt (till) and/or underlain by sandy silt till at some borehole locations.

Topsoil:

A surficial topsoil layer, ranging in thickness from 200 to 430 mm was encountered at all borehole locations.

It should be noted that the thickness of the topsoil explored at the borehole locations may not be representative for the site and should not be relied on to calculate the amount of topsoil at the site. Shallow test-pits, closely spaced, should be carried out to further explore the topsoil conditions.

Weathered/Disturbed Soils:

Weathered/disturbed soils generally consisting of sandy silt to silty sand were encountered in all boreholes and extended to depths ranging from about 0.8 to 1.5 m below existing ground surface. Some reworked (weathered/disturbed) soils might be fill materials. These materials typically contain trace to some organic matter, trace gravel and trace clay to clayey. Standard penetration tests carried out within the weathered/disturbed sandy silt to silty sand gave N values ranging from 0 to 11 blows per 0.3 m penetration, indicating a very loose to compact relative density.

Silty Sand:

Below weathered/disturbed soils, a cohesionless silty sand deposit was encountered in boreholes BH22-5, BH22-6, and BH22-9 extended to depths ranging from 1.7 to 7.8 m below existing ground surface. The silty sand deposit was present in a loose to compact state, with measured SPT 'N' values ranging from 8 to 21 blows per 300 mm of penetration.

Grain size analysis of one (1) soil sample from silty sand deposit (BH22-9/SS3) was conducted and the results are provided on the respective borehole log and on **Drawing 14**, with the following fractions:

Clay: 3%
Silt: 37%
Sand: 60%
Gravel: 0%

Gravelly Sand / Sandy Gravel to Sand and Gravel:

Deposits of gravelly sand and sandy gravel to sand and gravel were encountered below the weathered/disturbed soils in boreholes BH22-1 and BH22-2, below a sandy silt till deposit in boreholes BH22-3 and below the silty sand deposit in BH22-9 and extended to depths ranging from 1.4 to 8.1 m below existing ground surface, i.e., depth explored in BH22-9. The gravelly sand and sandy gravel to sand and gravel deposits were present in a compact to very dense state, with measured SPT 'N' values ranging from 14 to over 50 blows per 300 mm of penetration.

Silt:

A deposit of silt material with trace to some sand, trace clay and trace gravel was encountered below the silty sand deposit in borehole BH22-5 and extended to a depth of 2.8 m below existing ground

surface. The silt deposit was present in a compact state, with measured SPT 'N' values ranging from 16 to 24 blows per 300 mm of penetration.

Upper Sandy Silt to Silty Sand (Till):

Sandy silt to silty sand till deposits were encountered below the gravelly sand in BH22-1 and below the weathered/disturbed soils in BH22-3, BH22-7 and BH22-8 and extended to depths ranging from 1.0 to 2.4 m below existing ground surface. The sandy silt to silty sand till deposits were present in a loose to compact state, with measured SPT 'N' values ranging from 6 to 16 blows per 300 mm of penetration.

Clayey Silt to Silty Clay (Till):

Below the upper sandy silt to silty sand till in boreholes BH22-1, BH22-7 and BH22-8, the weathered/disturbed soils in boreholes BH22-4, BH22-8 and BH22-10 to BH22-12, the gravelly sand in boreholes BH22-2 and BH22-3, the silt deposit in borehole BH22-5 and the silty sand deposit in borehole BH22-6, clayey silt to silty clay (till) deposits were encountered and extended to depths ranging from 6.3 to 9.1 m below existing ground surface. Boreholes BH22-1, BH22-3, BH22-4, BH22-5, BH22-6, BH22-8, and BH22-10 to BH22-12 were terminated in the clayey silt to silty (till) deposits. The clayey silt to silty clay (till) deposits were present in a stiff to hard consistency, with measured SPT 'N' values ranging from 11 to 61 blows per 300 mm of penetration. Cobbles/boulders were inferred within the till deposits during drilling.

Grain size analyses of four (4) soil samples from clayey silt to silty clay (till) (BH22-1/SS5, BH22-2/SS5, BH22-45/SS6 and BH22-12/SS5) were conducted and the results are provided on the respective borehole logs and on **Drawing 14**, with the following fractions:

Clay: 17 to 22%
Silt: 40 to 55%
Sand: 23 to 35%
Gravel: 3 to 8%

Atterberg limits tests of the above noted same samples (BH22-1/SS5, BH22-2/SS5, BH22-45/SS6 and BH22-12/SS5) were conducted. The results are shown on the borehole logs and on **Drawing 15**, and are summarized as follows:

Liquid limit (W_L): 18.3 to 21.7%
Plastic limit (W_P): 12.1 to 13.4%
Plasticity index (PI): 5.7 to 8.7

Lower Sandy Silt (Till):

A lower sandy silt (till) deposit was encountered below the clayey silt to silty clay till in boreholes BH22-2 and BH22-7 and extended to depths of 9.6 and 6.7 m below existing ground surface, respectively, i.e.,

depth explored in the two boreholes. The lower sandy silt (till) was present in a compact to very dense state, with measured SPT 'N' value ranging from 26 to over 50 blows per 300 mm of penetration.

3.2 GROUNDWATER CONDITIONS

Water was observed during drilling at boreholes BH22-5, BH22-6 and BH22-9 at depths ranging from 1.7 to 4.6 m below existing ground surface.

Monitoring wells were installed in boreholes BH22-1, BH22-2, BH22-4, BH22-10, BH22-11 and BH22-12 for the long-term groundwater level monitoring and hydrogeological study. The groundwater levels in the monitoring wells were measured on November 4, 2022. The groundwater levels measured in the monitoring wells are summarized in **Table 1**. BH22-11 was dry and water levels in the remaining monitoring wells ranged from a depth of 1.91 to 6.10 m below existing ground surface, i.e., Elev. 265.3 to 270.0 m.

Table 1: Summary of Groundwater Level Measurements in Monitoring Wells

Borehole No.	Ground Surface Elev. (m)	Date of Observation	Depth of Groundwater (m)	Elevation of Groundwater (m)
BH22-1	272.1	Nov. 4, 2022	2.10	270.0
BH22-2	271.4	Nov. 4, 2022	6.10	265.3
BH22-4	268.3	Nov. 4, 2022	1.91	266.4
BH22-10	272.6	Nov. 4, 2022	6.10	266.5
BH22-11	272.5	Nov. 4, 2022	dry	Not Applicable
BH22-12	272.3	Nov. 4, 2022	3.47	268.9

Further measurements of groundwater levels in the monitoring wells are recommended.

It should be noted that the groundwater levels can vary and are subject to seasonal fluctuations in response to major weather events.

4. GEOTECHNICAL RECOMMENDATIONS FOR RESIDENTIAL DEVELOPMENT

Based on the borehole information, preliminary geotechnical discussion and recommendations for the proposed development are presented as follows.

4.1 SITE GRADING AND ENGINEERED FILL

The development of the site may require cut and fill operations to meet the design grading plans. In the areas where earth fill is required for the site grading purposes, an engineered fill can be constructed below foundations, roads/driveways, parking lots, etc.

Prior to the placement of engineered fill, all the existing topsoil, fills (if any) and weathered/disturbed native soils must be removed, and the exposed undisturbed native surface proof rolled. Any soft spots

revealed during proof rolling must be sub-excavated and re-engineered. The engineered fill consisting of approved inorganic material must be compacted to 100% Standard Proctor Maximum Dry Density (SPMDD) throughout. To reduce the risk of improperly placed engineered compacted fill, full-time supervision of the contractor is essential.

General guidelines and requirements for the placement and preparation of engineered fill are presented on **Appendix A**. Bearing capacity values of 150 kPa at SLS and 225 kPa at ULS can be used on engineered fill, provided that all requirements in **Appendix A** are adhered to. To reduce the risk of improperly placed engineered compacted fill, full-time supervision of the contractor is essential.

The following is a recommended procedure for an engineered fill:

1. Prior to site work involving engineered fill, a site meeting to discuss all aspects must be convened. The surveyor, contractor, design engineer and geotechnical engineer must attend the meeting. At this meeting, the limits of the engineered fill will be defined. The contractor must make known where all fill material will be obtained and samples must be provided to the geotechnical engineer for review, and approval before filling begins.

2. Detailed drawings indicating the lower boundaries as well as the upper boundaries of the engineered fill must be available at the site meeting and be approved by the geotechnical engineer.

3. The building footprint and base of the pad, including basements, garages, etc. must be defined by offset stakes that remain in place until the footings and service connections are all constructed. Confirmation that the footings are within the pad, service lines are in place, and that the grade conforms to drawings, must be obtained by the owner in writing from the surveyor and DS. Without this confirmation no responsibility for the performance of the structure can be accepted by DS. Survey drawing of the pre, and post fill location and elevations will also be required.

4. The area must be stripped of all topsoil and fill materials. Subgrade must be proof-rolled. Soft spots must be dug out. The stripped native subgrade must be examined and approved by a DS engineer prior to placement of fill.

5. The approved engineered fill must be compacted to 100% Standard Proctor Maximum Dry Density throughout. Granular Fill preferred. Engineered fill should not be placed (where it will support footings) during the winter months. Engineered fill compacted to 100% SPMDD will settle under its own weight approximately 0.5% of the fill height and the structural engineer must be aware of this settlement. In addition to the settlement of the fill, additional settlement due to consolidation of the underlying soils from the structural and fill loads will occur.

6. Full-time geotechnical inspection by DS during placement of engineered fill is required. Work cannot commence or continue without the presence of the DS representative.

7. The fill must be placed such that the specified geometry is achieved. Refer to sketches for minimum requirements. Take careful note that the projection of the compacted pad beyond the footing at footing level is a minimum of 2 m. The base of the compacted pad extends 2 m plus the depth of excavation beyond the edge of the footing.

8. Bearing capacity values of 150 kPa at SLS and 225 kPa at ULS may be used provided that all conditions outlined above are adhered to. A minimum footing width of 500 mm (20 inches) is suggested, and footings should be provided with nominal steel reinforcement.

9. All excavations must be done in accordance with the Occupational Health and Safety Regulations of Ontario.

10. After completion of the pad a second contractor may be selected to install footings. All excavations must be backfilled under full time supervision by DS to the same degree as the engineered fill pad. Surface water cannot be allowed to pond in excavations or to be trapped in clear stone backfill. Clear stone backfill can only be used with the approval of DS.

11. After completion of compaction, the surface of the pad must be protected from disturbance from traffic, rain, and frost.

12. If there is a delay in construction, the engineered fill pad must be inspected and accepted by the geotechnical engineer. The location of the structure must be reconfirmed that it remains within the pad.

The native soils free from topsoil and organics to be excavated from cut-areas are considered suitable for re-use as engineered fill, provided that their moisture contents at the time of construction are at or near optimum. Clayey tills are likely to be excavated in cohesive chunks or blocks and will be difficult to compact. They should be pulverized and placed in thin layers not exceeding 150 to 200 mm and compacted using heavy equipment suitable for these types of soils (e.g., heavy sheepsfoot compactors).

4.2 ROADS

The investigation has shown that the predominant subgrade soil, after stripping the topsoil, weathered/disturbed soils and any other organic and otherwise unsuitable subsoil, will generally consist of clayey silt to silty clay (till), sandy silt to silty sand till or cohesionless silty sand, gravelly sand or silt.

Based on the above and assuming that traffic usage will be residential within the sub-division, the following minimum pavement thicknesses are recommended for the local and collector roads to be constructed within the development:

Local Roads: 40 mm HL3 Asphaltic Concrete

80 mm HL8 Asphaltic Concrete

150 mm Granular ‘A’ or 130 mm of 19 mm Crusher Run Limestone (CRL)

300 mm Granular 'B' or 225 mm of 50 mm Crusher Run Limestone (CRL)

Collector (Access) Roads: 40 mm HL3 HS Asphaltic Concrete

90 mm HL8 Asphaltic Concrete

150 mm Granular 'A' or 130 mm of 19 mm Crusher Run Limestone (CRL)

450 mm Granular 'B' or 300 mm of 50 mm Crusher Run Limestone (CRL)

Roads and driveway pavements/aprons should be constructed as per the Town of Caledon standards.

The site subgrade and weather conditions (i.e., if wet) at the time of construction may necessitate the placement of thicker granular sub-base layer in order to facilitate the construction. The need for filter fabric/geo-grid can be evaluated during construction stage. Furthermore, heavy construction equipment may have to be kept off the newly constructed roads before the placement of asphalt and/or immediately thereafter, to avoid damaging the weak subgrade by heavy truck traffic.

4.2.1. STRIPPING, SUB-EXCAVATION AND GRADING

Presuming that the conventional practice of cut/fill operation to achieve proposed grades includes all roads, the site should be stripped of all topsoil, fill (if any), disturbed/weathered native and any organic, or otherwise unsuitable soils to the full depth of the roads, both in cut and fill areas. Following stripping, the site should be graded to the subgrade level and approved. The subgrade should then be proof-rolled, in the presence of the Geotechnical Engineer, by at least several passes of a heavy compactor having a rated capacity of at least 8 tonnes. Any soft spots thus exposed should be removed and replaced by select fill material, similar to the existing subgrade soil and approved by the Geotechnical Engineer. The subgrade should then be re-compacted from the surface to at least 98% of its Standard Proctor Maximum Dry Density (SPMDD). The final subgrade should be cambered or otherwise shaped properly to facilitate rapid drainage and to prevent the formation of local depressions in which water could accumulate.

Proper cambering is required to allow the surface water to escape towards the sides, where it can be removed by means of subdrains. Otherwise, any water collected in the granular sub-base materials could be trapped thus causing problems due to softened subgrade, differential frost heave, etc. For the same reason damaging the subgrade during and after placement of the granular materials by heavy construction traffic should be avoided. If the moisture content of the local material cannot be maintained at ±2% of the optimum moisture content, imported granular material may need to be used.

Any fill required for re-grading the site or backfill should be select, clean material, free of topsoil, organic or other foreign and unsuitable matter. The fill should be placed in thin layers and compacted to at least 98% of its SPMDD or as per Town Standards. The compaction of the new fill should be checked by frequent field density tests.

4.2.2. ROAD CONSTRUCTION

Once the subgrade has been inspected and approved, the granular base and sub-base course materials should be placed in layers not exceeding 200 mm (uncompacted thickness) and should be compacted to 100% of their respective SPMDD. The grading of the material should conform to current OPS Specifications.

The placing, spreading and rolling of the asphalt should be in accordance with OPS Specifications or, as required by the local authorities.

Frequent field density tests should be carried out on both the asphalt and granular base and sub-base materials to ensure that the required degree of compaction is achieved.

4.2.3. DRAINAGE

The installation of full-length subdrains is required on all roads. The subdrains should be properly filtered to prevent the loss of (and clogging by) soil fines.

All paved surfaces should be sloped to provide satisfactory drainage towards catch-basins. As discussed in Section 4.2.1, by means of good planning any water trapped in the granular sub-base materials should be drained rapidly towards subdrains or other interceptors.

4.3 SEWERS

As a part of the site development, a network of new sewers will be constructed. The inverts of utility pipes are unknown at the time of preparing this report. For the discussion purpose of this report, the invert of utility pipes is assumed not greater than 4 m below existing grade.

4.3.1. TRENCHING

Excavations can be carried out with heavy hydraulic backhoe. Cobbles and boulders are present at the site as evidence of auger grinding. Provisions should be provided in the contractor documents to deal with the boulders and cobbles encountered at the site.

Groundwater seepage within the clayey silt to silty clay (till) is expected to be slow and manageable by gravity drainage and pumping from filtered sumps. Positive dewatering will be required prior to any excavation in the cohesionless gravelly sand / sandy gravel to sand and gravel, silty sand, sandy silt to silty sand (till) and zone of sandy soils within the clayey silt to silty clay (till) below groundwater table. The groundwater level should be lowered to at least 1 m below the excavation base to maintain the stability of the base and side slopes of the trench excavations in these areas. To minimize any related problems, backfilling operations must follow closely after excavation and pipe installation. Surface water should be directed away from the open excavations. It should be recognized that groundwater

and saturated soil levels may be influenced by the effects of precipitation as well as seasonal fluctuations. It is recommended that the construction be carried out during the dry seasons.

DS is currently completing a hydrogeological assessment at the subject site. More comments regarding the type and extent of groundwater control required during construction and permanent drainage will be addressed in our hydrogeological report.

All excavations must be carried out in accordance with the most recent Occupational Health and Safety Act (OHSA). In accordance with OHSA, any fill, weathered/disturbed native and firm to stiff clayey silt to silty clay (till) can be classified as Type 3 Soil above groundwater table and Type 4 Soil below groundwater table. Very stiff to hard clayey silt to silty clay (till) deposits can be classified as Type 2 Soil above groundwater table and Type 3 Soil below groundwater table. Cohesionless silty sand, gravelly sand/sandy gravel to sand and gravel, and sandy silt to silty sand (till) can be classified as Type 3 Soil above groundwater table and Type 4 Soil below groundwater table.

The sides of excavations in the natural strata can be expected to be temporarily stable at relatively steep side slopes above the groundwater table for short periods of time but they should be cut back at slopes no steeper than 1V:1.5H in weathered/disturbed native soil or fill (if any) material and 1V:1H in clayey silt/silty clay till in order to comply with the safety regulations. The OHSA stipulates that any excavation deeper than 1.2 m must be shored or cut back at a slope of 1V:1H or flatter, depending on the soil type and groundwater conditions.

It should be noted that the till is a non-sorted sediment and therefore contain cobble and boulders. Possible obstructions may be present in any areas that have been filled. Provisions must be made in the excavation contract for the removal of possible boulders in the till and obstructions in the fill material.

4.3.2. BEDDING

The undisturbed native soils and/or engineered fill will provide adequate support for the sewer pipes and allow the use of normal Class B type bedding. The bedding should conform to the current Ontario Provincial Standard specifications (OPSS 401/OPSD 802) and/or standards set by the local municipality.

The recommended minimum thickness of Class B bedding below the invert of the pipes is 150 mm. The thickness of the bedding may, however, have to be increased depending on the pipe diameter or in accordance with local standards or if wet or weak subgrade conditions or fill materials are encountered at the trench base level. The bedding material should consist of well-graded granular material such as Granular ‘A’ or equivalent.

After installing the pipe on the bedding, a granular surround of approved bedding material, which extends at least 300 mm above the obvert of the pipe, or as set out by the local Authority, should be placed.

To avoid the loss of soil fines from the subgrade, uniformly graded clear stone should not be used unless, below the granular bedding material, a suitable, approved filter fabric (geotextile) is placed. The geotextile should extend along the sides of the trench and should be wrapped all around the uniformly graded bedding material.

4.3.3. BACKFILLING OF TRENCHES

Based on visual and tactile examination, the existing weathered/disturbed native material free from topsoil/organics and undisturbed native soils can be reused as backfill material provided its water content is within 2 percent of optimum moisture content. Significant aeration of the wet excavated soils will be required prior to their use as backfill material.

The clayey deposits especially when its consistency is hard is likely to be excavated in cohesive chunks or blocks and will be difficult to compact in confined areas. For use as backfill, the clayey material will have to pulverized and placed in thin layers. The clayey soils will have to be compacted using heavy equipment suitable for these soils which may be difficult to operate in the narrow confines of the trenches. Unless the clayey materials are properly pulverized and compacted in sufficiently thin lifts post-construction settlements could occur. Their use in narrow trenches such as laterals (where heavy compaction equipment cannot be operated) may not be feasible.

Loose lifts of soil, which are to be compacted, should not exceed 200 mm. Depending on the time of construction and weather, some excavated material may be too wet to compact and will require aeration prior to its use.

The backfill should be placed in maximum 200 mm thick layers at or near (±2%) their optimum water content and each layer should be compacted to at least 95% SPMDD. In the upper 1.0 m of the subgrade, underneath the road base, the compaction should be increased to 98% SPMDD. Unsuitable materials such as organic soils, boulders, cobbles, frozen soils, etc. should not be used for backfilling.

Granular B material should be used as backfill for trenches located under slab on grade or paved areas. Compaction of the granular soils should be carried out with vibratory compactors and loose lifts not exceeding about 200 mm.

Imported granular fill, which can be compacted with handheld equipment, should be used in confined areas.

The excavated soils are not considered to be free draining. Where free draining backfill is required, imported granular fill such as OPSS Granular B should be used.

It should be noted that the excavated soils are subject to moisture content increase during wet weather which would make these materials too wet for adequate compaction. Stockpiles should be compacted at the surface or be covered with tarpaulins to minimize moisture uptake.

cannot be reused as foundation or trench backfill material.

4.3.4. ANTI SEEPAGE COLLARS/TRENCH PLUGS

For pipes installed under the groundwater table, seepage between the trench backfill material and the trench wall may cause erosion of the backfill materials. it is recommended that nominal anti-seepage collars (maximum spacing 50 m) be provided to prevent erosion of the backfill materials. Anti seepage collar should not be located at pipe joint.

The anti-seepage collar may consist of a clay plug surrounding the sewer pipe. A typical clay plug will be about 1 m thick and extends laterally to a minimum distance of 0.5 m from the pipe circumference with a minimum of 0.3 m embedment into the shale or native sub-grade. Typical (not to scale) anti-seepage collar conceptual detail is provided on **Drawing 16.**

The on-site native clayey soils may be suitable for such purpose subject to additional sampling and testing.

4.3.5. THRUST BLOCKS AND JOINT RESTRAINTS

An allowable (or SLS) bearing resistance of 150 kPa and factored ULS bearing resistance of 225 kPa can be used in the design of thrust blocks constructed on undisturbed native soils or engineered fill.

4.4 FOUNDATION CONDITIONS

It is understood that the proposed subdivision will consist of single-family homes with a basement. The finish floor elevations of these proposed houses were not known to us at the time of writing this report.

The boreholes show that provided the foundation soil is undisturbed during the construction, in general, bearing capacity values of 150 kPa at SLS (Serviceability Limit State), and 225 kPa at ULS (Ultimate Limit State) are feasible on the undisturbed inorganic natural (native) soils below any fill (if any) and weathered/disturbed soil. These values would be suitable for the use of normal spread footing foundations to support normal single-family dwellings. All footings must be founded below the weathered/disturbed soils and any loose or soft soils.

Where the grade needs to be raised, the proposed structures can be supported by spread and strip footings founded on engineered fill for bearing capacity values of 150 kPa at SLS (Serviceability Limit State), and for a factored geotechnical resistance of 225 kPa at ULS (Ultimate Limit State). The engineered fill supporting footings should be constructed in accordance with the guidelines presented in **Appendix A** and in Section 4.1.

Variations in the soil conditions are expected in between the borehole locations, and during construction, the soil bearing pressures should be confirmed by the Geotechnical Engineer.

Foundations designed to the specified bearing capacities at the serviceability limit states (SLS) are expected to settle less than 25 mm total and 19 mm differential.

All footings exposed to seasonal freezing conditions must have at least 1.4 metres of soil cover for frost protection.

Where it is necessary to place footings at different levels, the upper footing must be founded below an imaginary 10 horizontal to 7 vertical line drawn up from the base of the lower footing. The lower footing must be installed first to help minimize the risk of undermining the upper footing.

It should be noted that the recommended bearing capacities have been calculated by DS from the borehole information for the design stage only. The investigation and comments are necessarily on-going as new information of the underground conditions becomes available. For example, more specific information is available with respect to conditions between boreholes when foundation construction is underway. The interpretation between boreholes and the recommendations of this report must therefore be checked through field inspections provided by DS to validate the information for use during the construction stage.

4.5 EARTH PRESSURES

The lateral earth pressures acting on retaining walls or underground structures may be calculated from the following expression:

$$p = k(\gamma h + q)$$

where, p = Lateral earth pressure in kPa acting at depth h

K = Earth pressure coefficient, assumed to be 0.40 for vertical walls and horizontal backfill for permanent construction

γ = Unit weight of backfill, a value of 21 kN/m^3 may be assumed

h = Depth to point of interest in metres

q = Equivalent value of surcharge on the ground surface in kPa

The above expression assumes that the perimeter drainage system prevents the build up of any hydrostatic pressure behind the wall.

4.6 STORMWATER MANAGEMENT POND

It is understood that a storm water management pond will be constructed for the proposed subdivision. Two boreholes BH22-1 and BH22-2 were drilled to a depth of 8.2 and 9.6 m below existing ground surface, respectively in the area of the proposed pond.

The pond design grades are not available at this stage. Due to the variable soil conditions and the presence of different types of soils at different depths, recommendations will be provided at a later stage including the clay liner recommendations, if required, when design information is available.

Based on the subsurface conditions encountered in boreholes BH22-1 and BH22-2 and subject to design grades, the soils at the pond sides and base after removing the existing weathered/disturbed native materials will consist of gravelly sand, sandy silt till and clayey silt/silt till. The groundwater levels measured in the monitoring wells within the pond areas ranged from 2.10 (BH22-1) to 6.10 m (BH22-2) below the existing grade, corresponding to Elevations 270.0 and 265.3 m, in boreholes BH22-1 and BH22-2, respectively. Further measurements of groundwater levels in the monitoring wells are recommended.

Where the pond bottom and sides consist of cohesionless (sandy) soils, a clay liner will be required to retain water in the pond. The required thickness and uplift stability of the liner must be estimated and analyzed when the design information for the pond is available.

Dewatering system will be required for excavations below groundwater levels, subject to depth of excavations and type of soils encountered, to be confirmed during design stage.

Anti-seepage collars should be considered for outlet works that direct flow out of the SWM pond as these outlet works are subject to hydraulic heads directly from the pond. The provision of anti-seepage collars would increase the seepage path along the outlet works and therefore reduce the quantity of potential seepage.

5. SLOPE STABILITY ASSESSMENT

Slope stability assessment for the site is presented in the letter report attached in **Appendix B**.

6. GENERAL COMMENTS AND LIMITATIONS OF REPORT

DS Consultants Ltd. (DS) should be retained for a general review of the final design and specifications to verify that this report has been properly interpreted and implemented. If not accorded the privilege of making this review, DS will assume no responsibility for interpretation of the recommendations in the report.

This report is intended solely for the Client named. The material in it reflects our best judgment in light of the information available to DS at the time of preparation. Unless otherwise agreed in writing by DS, it shall not be used to express or imply warranty as to the fitness of the property for a particular purpose. No portion of this report may be used as a separate entity, it is written to be read in its entirety.

The conclusions and recommendations given in this report are based on information determined at the test hole locations. The information contained herein in no way reflects on the environment aspects of

the project, unless otherwise stated. Subsurface and groundwater conditions between and beyond the test holes may differ from those encountered at the test hole locations, and conditions may become apparent during construction, which could not be detected or anticipated at the time of the site investigation. The benchmark and elevations used in this report are primarily to establish relative elevation differences between the test hole locations and should not be used for other purposes, such as grading, excavating, planning, development, etc.

The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report.

The comments made in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of test holes may not be sufficient to determine all the factors that may affect construction methods and costs. For example, the thickness of surficial topsoil or fill layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the subsurface conditions may affect their work. This work has been undertaken in accordance with normally accepted geotechnical engineering practices.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. DS accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. We accept no responsibility for any decisions made or actions taken as a result of this report unless we are specifically advised of and participate in such action, in which case our responsibility will be as agreed to at that time.

We trust that the information contained in this report is satisfactory. Should you have any questions, please do not hesitate to contact this office.

DS CONSULTANTS LTD

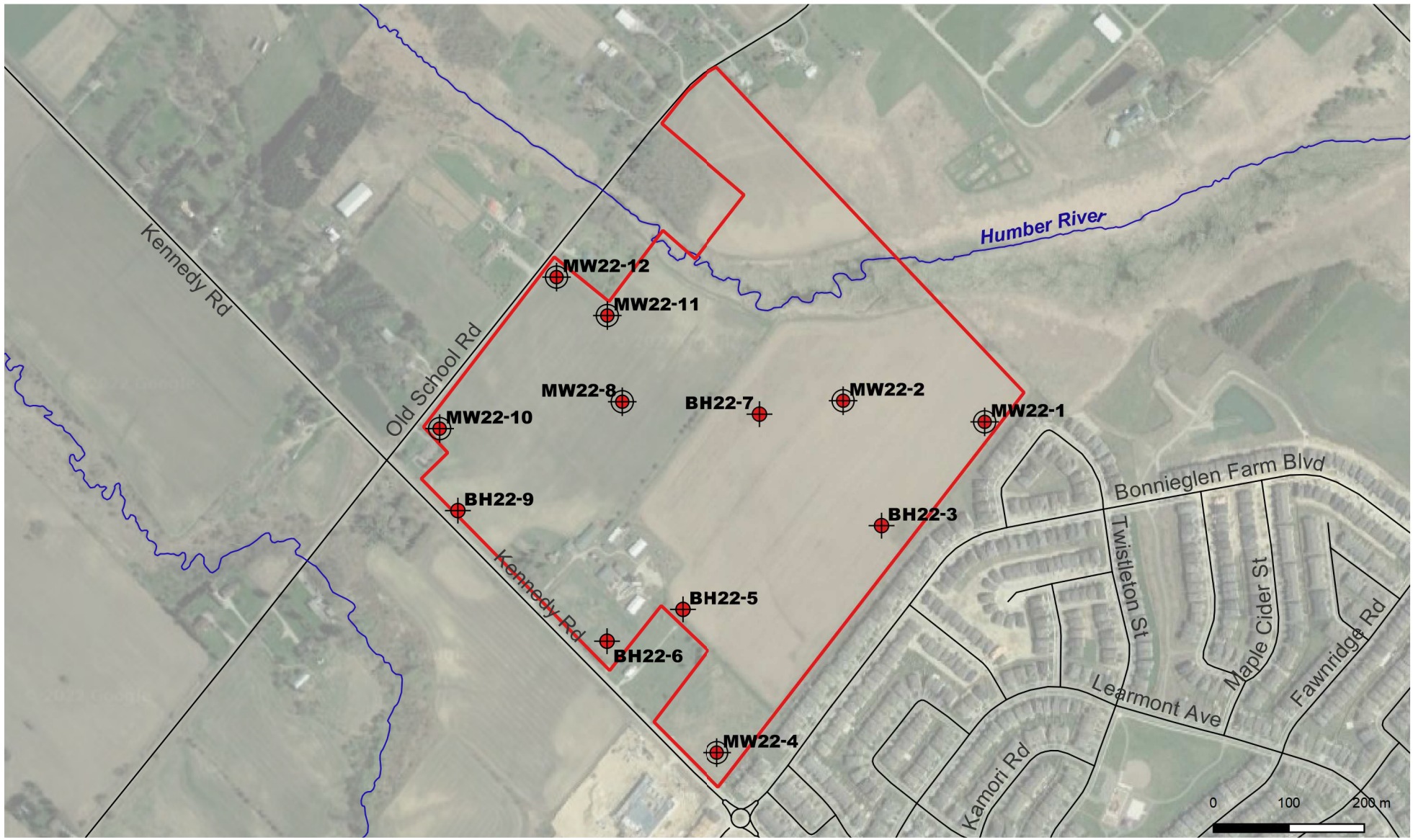
Osbert (Ozzie) Benjamin, P.Eng.
Senior Geotechnical Engineer

Fanyu Zhu, Ph.D., P.Eng.
Principal Engineer

Shabbir Bandukwala, M.Eng., P.Eng.
Principal Engineer

Drawings

J:\-GIS\2022 PROJECTS\22-371-100 12909 Kennedy Road, Caledon\1-QGIS\Geo\Drawing 1 – Borehole and Monitoring Well Locations.qgs Jan-11 15:49



Legend

- Russell Property Boundary
- Borehole
- Monitoring Well

DS CONSULTANTS LTD.
6221 Highway 7, UNIT 16
Vaughan, Ontario L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

Project: GEOTECHNICAL INVESTIGATION
12909 Kennedy Road, Caledon, ON

Title: **BOREHOLE AND MONITORING WELL LOCATIONS**

N

Client: TREND DEVELOPMENTS INC. & TREND 12909 KENNEDY DEVELOPMENTS INC.

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	O.B	S.Y / P.P.	January 2023
Rev: 0	Scale: As Shown	Project No.: 22-371-100	Drawing No.: 1

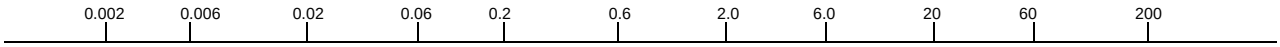
Image/Map Source: *Google Satellite Image*

Drawing 1A: Notes On Sample Descriptions

1. All sample descriptions included in this report generally follow the Unified Soil Classification. Laboratory grain size analyses provided by DS also follow the same system. Different classification systems may be used by others, such as the system by the International Society for Soil Mechanics and Foundation Engineering (ISSMFE). Please note that, with the exception of those samples where a grain size analysis and/or Atterberg Limits testing have been made, all samples are classified visually. Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems.

ISSMFE SOIL CLASSIFICATION

CLAY	SILT			SAND			GRAVEL			COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE		



EQUIVALENT GRAIN DIAMETER IN MILLIMETRES

CLAY (PLASTIC) TO	FINE	MEDIUM	CRS.	FINE	COARSE
SILT (NONPLASTIC)	SAND			GRAVEL	

UNIFIED SOIL CLASSIFICATION

2. Fill: Where fill is designated on the borehole log it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of site fill materials. All fills should be expected to contain obstruction such as wood, large concrete pieces or subsurface basements, floors, tanks, etc., none of these may have been encountered in the boreholes. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant ongoing and future settlements. Fill at this site may have been monitored for the presence of methane gas and, if so, the results are given on the borehole logs. The monitoring process does not indicate the volume of gas that can be potentially generated nor does it pinpoint the source of the gas. These readings are to advise of the presence of gas only, and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic/hazardous waste that renders it unacceptable for deposition in any but designated land fill sites; unless specifically stated the fill on this site has not been tested for contaminants that may be considered toxic or hazardous. This testing and a potential hazard study can be undertaken if requested. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common and are generally not detected in a conventional preliminary geotechnical site investigation.

3. Till: The term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process the till must be considered heterogeneous in composition and as such may contain pockets and/or seams of material such as sand, gravel, silt or clay. Till often contains cobbles (60 to 200 mm) or boulders (over 200 mm). Contractors may therefore encounter cobbles and boulders during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size or type of any obstruction. Because of the horizontal and vertical variability of till, the sample description may be applicable to a very limited zone; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till materials.

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LOG OF BOREHOLE BH22-1

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846306.45 E 594064.95

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-27-2022

REF. NO.: 22-371-100
ENCL NO.: 2

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS "N" 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT (w_P w w_L) WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
272.1								20 40 60 80 100	10 20 30			
270.0	**TOPSOIL:** 200mm						272					
0.2	**WEATHERED/DISTURBED SOIL:** sandy silt, trace clay, trace rootlets, trace gravel, brown, moist, loose		1	SS	7							
271.3												
1 0.8	**GRAVELLY SAND:** trace silt, angular pieces of gravel, brown, moist, compact		2	SS	14		271					
270.5												
1.6	**SANDY SILT TILL:** trace clay, trace gravel, brown, moist, compact		3	SS	16	▽						
2 269.7							270					
2.4	**CLAYEY SILT TO SILTY CLAY TILL:** some sand to sandy, trace gravel, grey, moist, very stiff		4	SS	29		W. L. 270.0 m Nov 04, 2022					
3			5	SS	27		269					8 35 40 17
4							268					
5			6	SS	24		267					
6			7	SS	21		266					
7							265					
8 263.9			8	SS	16		264					
8.2	**END OF BOREHOLE:** Notes: 1) 50mm dia. monitoring well installed upon completion. 2) Water Level Readings: Date: Water Level(mbgl): Nov. 4, 2022 2.1											

DS SOIL LOG-2021-FINAL 22-371-100 GEO COPY.GPJ DS.GDT 23-1-11

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES + 3, × 3: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH22-2

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846290.7 E 593872.09

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-27-2022

REF. NO.: 22-371-100
ENCL NO.: 3

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
271.4 / 0.0	**TOPSOIL:** 300mm						
271.1 / 0.3	**WEATHERED/DISTURBED SOIL:** sandy silt, trace clay, trace organics, trace rootlets, brown, moist, loose		1	SS	5		271
270.6 / 0.8	**GRAVELLY SAND:** trace silt, brown, moist, compact		2	SS	17		270
269.9 / 1.5	**CLAYEY SILT TO SILTY CLAY TILL:** some sand to sandy, trace gravel, brown, moist, stiff to hard		3	SS	18		
	grey below 2.3m		4	SS	43		269
			5	SS	27		268
			6	SS	32		267
	with sandy silt to silt pockets @6.1m		7	SS	37	W. L. 265.3 m Nov 04, 2022	266
			8	SS	45		264
262.3 / 9.1	**SANDY SILT TILL:** trace clay, trace gravel, grey, wet, very dense		9	SS	50/ 130mm		263
261.8 / 9.6	**END OF BOREHOLE:** Notes: 1) 50mm dia. monitoring well installed upon completion. 2) Water Level Readings: Date: Water Level(mbgl): Nov. 4, 2022 6.1						262

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)	GR	SA	SI	CL
	5	33	41	21

DS SOIL LOG-2021-FINAL 22-371-100 GEO COPY.GPJ DS.GDT 23-1-11

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH22-3

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846159.17 E 593933.78

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-27-2022

REF. NO.: 22-371-100
ENCL NO.: 4

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION
270.9							
0.0 / 270.5	**TOPSOIL:** 350mm		1	SS	7		
0.4 / 270.1	**WEATHERED/DISTURBED SOIL:** sandy silt, trace clay, trace organics, trace rootlets, brown, moist, loose		2	SS	15		270
0.8 / 269.5	**SANDY SILT TO SILTY SAND TILL:** trace clay, trace gravel, brown, moist, compact		3	SS	13		269
1.4 / 269.2	**GRAVELLY SAND:** trace silt, brown, moist, compact						
1.7	**CLAYEY SILT TO SILTY CLAY TILL:** some sand to sandy, trace gravel, occasional cobble, brown, moist, stiff to hard grey below 2.3m		4	SS	32		268
			5	SS	28		267
			6	SS	31		266
			7	SS	32		265
264.2							
6.7	**END OF BOREHOLE:** Notes: 1) Auger grinding @ 4.6m due to possible cobble/boulder. 2) No water observed in borehole upon completion of drilling.						

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH22-4

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4845863.99 E 593715.76

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-28-2022

REF. NO.: 22-371-100
ENCL NO.: 5

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
268.3												
268.0 / 0.0	**TOPSOIL:** 250mm											
0.3 / 267.5	**WEATHERED/DISTURBED SOIL:** clayey silt, some sand, trace organics, trace rootlets, brown, moist, firm		1	SS	6		268					
1 / 0.8	**CLAYEY SILT TILL:** some sand to sandy, trace gravel, brown, moist, very stiff		2	SS	22		267					
2			3	SS	17	▽ W. L. 266.4 m Nov 04, 2022						
	grey below 2.3m		4	SS	28							
265.4 / 3 / 2.9	**CLAYEY SILT TO SILTY CLAY TILL:** sandy, trace gravel, grey, moist, stiff to very stiff		5	SS	24		265					
4							264					
5	Wet Silt Layer at 5.0m		6	SS	16		263					3 23 55 19
6			7	SS	14		262					
261.6 / 6.7	**END OF BOREHOLE:**											

Notes:
1) 50mm dia. monitoring well installed upon completion.
2) Water Level Readings:

Date:	Water Level(mbgl):
Nov. 4, 2022	1.91

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

DS SOIL LOG-2021-FINAL 22-371-100 GEO COPY.GPJ DS.GDT 23-1-11

DS CONSULTANTS LTD.
Geotechnical ◆ Environmental ◆ Materials ◆ Hydrogeology

LOG OF BOREHOLE BH22-5

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846054.38 E 593671.47

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-27-2022

REF. NO.: 22-371-100
ENCL NO.: 6

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
272.9								20 40 60 80 100	10 20 30			
272.7 0.0	**TOPSOIL:** 230mm											
0.2	**WEATHERED/DISTURBED SOIL:** sandy silt to silty sand, trace clay, trace organics, trace rootlets, brown, moist, loose		1	SS	6							
271.9							272					
1.0	**SILTY SAND:** trace clay, trace gravel, brown, moist, loose to compact		2	SS	8							
271.2												
1.7	**SILT:** trace to some sand, trace clay, trace gravel, brown, wet, compact		3	SS	16		271					
2	grey, fine sand pockets@2.3m											
270.1			4	SS	24							
2.8	**CLAYEY SILT TO SILTY CLAY TILL:** some sand, trace gravel, occasional cobble, grey, moist, very stiff		5	SS	18		270					
4							269					
5			6	SS	19		268					Auger grinding, possible cobble/boulder
6							267					
266.2			7	SS	18							
6.7	**END OF BOREHOLE:** Notes: 1) Water encountered at 1.7 m depth during drilling.											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

DS SOIL LOG-2021-FINAL 22-371-100 GEO COPY.GPJ DS.GDT 23-1-11

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LOG OF BOREHOLE BH22-6

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846011.11 E 593571.54

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-28-2022

REF. NO.: 22-371-100
ENCL NO.: 7

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
272.9												
0.0 / 272.6	**TOPSOIL:** 330mm		1	SS	5		272					
0.3	**WEATHERED/DISTURBED SOIL:** silty sand, trace clay, trace organics, trace rootlets, brown to orange brown, moist, very loose to loose		2	SS	0							
1 / 271.4							271					
1.5	**SILTY SAND:** trace clay, brown, moist, loose to compact		3	SS	9							
2			4	SS	14		270					
3			5	SS	14							
4							269					
	saturated at 4.6m		6	SS	8		268					
5												
6 / 266.8							267					
6.1	**CLAYEY SILT TO SILTY CLAY TILL:** some sand, trace gravel, occasional cobbles, grey, moist, hard		7	SS	30							
7							266					
8 / 264.7			8	SS	34		265					
8.2	**END OF BOREHOLE:** 1) Water encountered at 4.6 m depth during drilling.											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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Geotechnical ◆ Environmental ◆ Materials ◆ Hydrogeology

LOG OF BOREHOLE BH22-7

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846267 E 593724.46

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-27-2022

REF. NO.: 22-371-100
ENCL NO.: 8

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
271.5							
0.0 / 271.1	**TOPSOIL:** 430mm		1	SS	9		271
0.4 / 270.7	**WEATHERED/DISTURBED SOIL:** sandy silt, trace clay, trace rootlets, brown, moist, loose						
0.8 / 270.3	**SILTY SAND TO SANDY SILT TILL:** trace clay, trace gravel, brown, moist, loose		2	SS	6		
1.2	**CLAYEY SILT TO SILTY CLAY TILL:** some sand, occasional sand pockets, occasional cobbles, brown, moist, very stiff to hard		3	SS	22		270
	grey below 2.3m		4	SS	33		269
			5	SS	25		268
			6	SS	21		267
							266
265.2							
6.3 / 264.8	**SANDY SILT TILL:** some clay to clayey, trace gravel, grey, moist, compact		7	SS	26		265
6.7	**END OF BOREHOLE:**						

Notes:
1) No water observed in borehole upon completion of drilling.

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

Auger grinding @3.0m due to cobble/boulder

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH22-8

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846277.26 E 593579.21

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-27-2022

REF. NO.: 22-371-100
ENCL NO.: 9

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION
272.6							
0.0 / 272.3	**TOPSOIL:** 300mm		1	SS	5		272
0.3 / 271.8	**WEATHERED DISTURBED SOIL:** sandy silt, trace clay, trace rootlets, trace gravel, brown, moist, loose						
270.8			2	SS	15		
1.0	**SILTY SAND TO SANDY SILT TILL:** trace clay, trace gravel, brown, moist, compact						271
	CLAYEY SILT TO SILTY CLAY TILL: some sand, trace gravel, brown, moist, stiff to very stiff		3	SS	14		
			4	SS	17		270
	grey below 2.9m		5	SS	11		269
			6	SS	11		268
			7	SS	12		267
			8	SS	18		266
264.4							265
8.2	**END OF BOREHOLE:** Notes: 1) No water observed in borehole upon completion of drilling.						

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

DS SOIL LOG-2021-FINAL 22-371-100 GEO COPY.GPJ DS.GDT 23-1-11

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Geotechnical ◆ Environmental ◆ Materials ◆ Hydrogeology

LOG OF BOREHOLE BH22-9

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846189.91 E 593373.22

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-28-2022

REF. NO.: 22-371-100
ENCL NO.: 10

ELEV / DEPTH (m)	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS "N" 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
273.5												
273.2 / 0.0	**TOPSOIL:** 250mm											
0.3 / 272.7	**WEATHERED/DISTURBED SOIL:** silty sand, trace clay, trace organics, trace rootlets, brown, moist, loose		1	SS	5		273					
0.8	**SILTY SAND:** trace clay, brown, moist, loose to compact		2	SS	12							
			3	SS	9		272					0 60 37 3
			4	SS	14		271					
			5	SS	18		270					
	wet below 4.6m		6	SS	21		269					
			7	SS	10		268					
265.7							267					
7.8 / 265.4	**SANDY GRAVEL TO SAND AND GRAVEL:** trace silt, brown, wet, very dense		8	SS	50/ 130mm		266					
8.1	**END OF BOREHOLE:** Notes: 1) Water encountered at 4.6 m depth during drilling.											

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH22-10

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846287.34 E 593341.04

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-28-2022

REF. NO.: 22-371-100
ENCL NO.: 11

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION
272.6							
0.0 / 272.3	**TOPSOIL:** 300mm						
0.3 / 271.8	**WEATHERED/DISTURBED SOIL:** sandy silt, some clay to clayey, trace organics, trace rootlets, brown, moist, compact		1	SS	11		272
0.8	**CLAYEY SILT TO SILTY CLAY TILL:** some sand, trace gravel, brown to greyish brown, moist, very stiff to hard		2	SS	25		
			3	SS	26		271
			4	SS	36		270
	grey below 3.1m		5	SS	30		269
			6	SS	17		268
			7	SS	15	W. L. 266.5 m Nov 04, 2022	267
265.9							266
6.7	**END OF BOREHOLE:**						

Notes:
1) 50mm dia. monitoring well installed upon completion.
2) Water Level Readings:

Date:	Water Level(mbgl):
Nov. 4, 2022	6.1

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
SHEAR STRENGTH (kPa) (20 40 60 80 100)
○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%) (10 20 30)

POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)
REMARKS AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

DS SOIL LOG-2021-FINAL 22-371-100 GEO COPY.GPJ DS.GDT 23-1-11

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH22-11

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846440.01 E 593561.37

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-28-2022

REF. NO.: 22-371-100
ENCL NO.: 12

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	"N" BLOWS 0.3 m	ELEVATION
272.5 / 0.0	**TOPSOIL:** 250mm				
272.2 / 0.3	**WEATHERED/DISTURBED SOIL:** sandy silt, trace clay, trace organics, trace rootlets, brown, moist, loose	1	SS	4	272
271.7 / 0.8	**CLAYEY SILT TO SILTY CLAY TILL:** some sand, trace gravel, brown, moist, very stiff to hard	2	SS	17	
		3	SS	21	271
		4	SS	22	270
	greyish brown@3.1m	5	SS	34	269
	grey below 4.6m	6	SS	25	268
		7	SS	18	267
265.8 / 6.7	**END OF BOREHOLE:**				266

Notes:
1) 50mm dia. monitoring well installed upon completion.
2) Water Level Readings:

Date:	Water Level(mbgl):
Nov. 4, 2022	dry

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH22-12

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846489.9 E 593493.3

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-28-2022

REF. NO.: 22-371-100
ENCL NO.: 13

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION
272.3							
0.0 / 272.0	**TOPSOIL:** 350mm		1	SS	7		272
0.4 / 271.5	**WEATHERED/DISTURBED SOIL:** sandy silt, trace to some clay, trace organics, trace rootlets, brown, moist, loose						
0.8	**CLAYEY SILT TO SILTY CLAY TILL:** some sand, trace gravel, brown, moist, very stiff to hard		2	SS	32		271
			3	SS	25		
	cobble/boulder@2.3m		4	SS	61		270
	sandy, grey below 3.1m		5	SS	39	▽ W. L. 268.9 m Nov 04, 2022	269
			6	SS	18		268
							267
265.6			7	SS	18		266
6.7	**END OF BOREHOLE:** Notes: 1) 50mm dia. monitoring well installed upon completion. 2) Water Level Readings: Date: Water Level(mbgl): Nov. 4, 2022 3.47						

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)

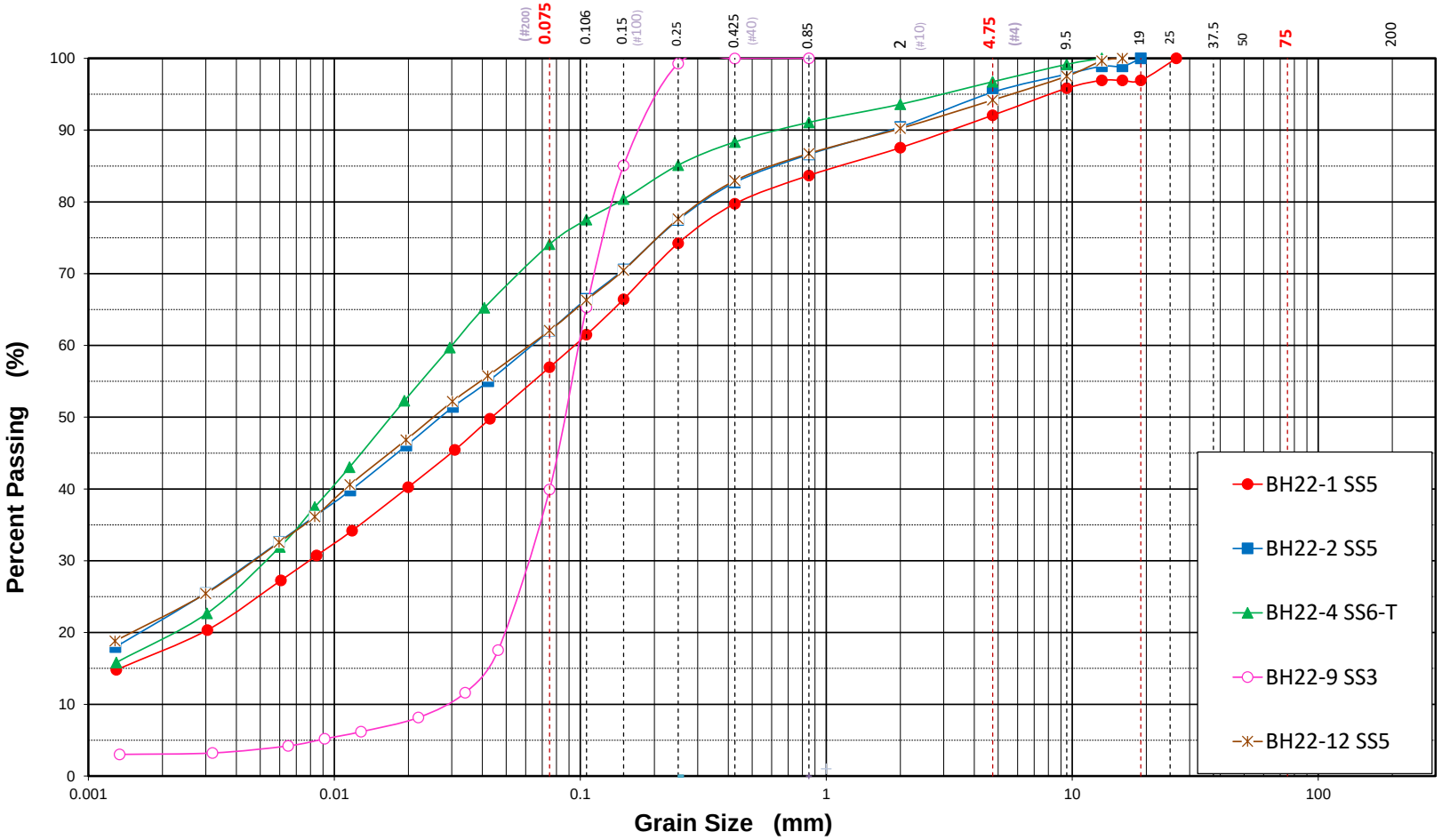
GR	SA	SI	CL
6	32	40	22

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

DS SOIL LOG-2021-FINAL 22-371-100 GEO COPY.GPJ DS.GDT 23-1-11

Particle Size Distribution (ASTM-D421/D422)

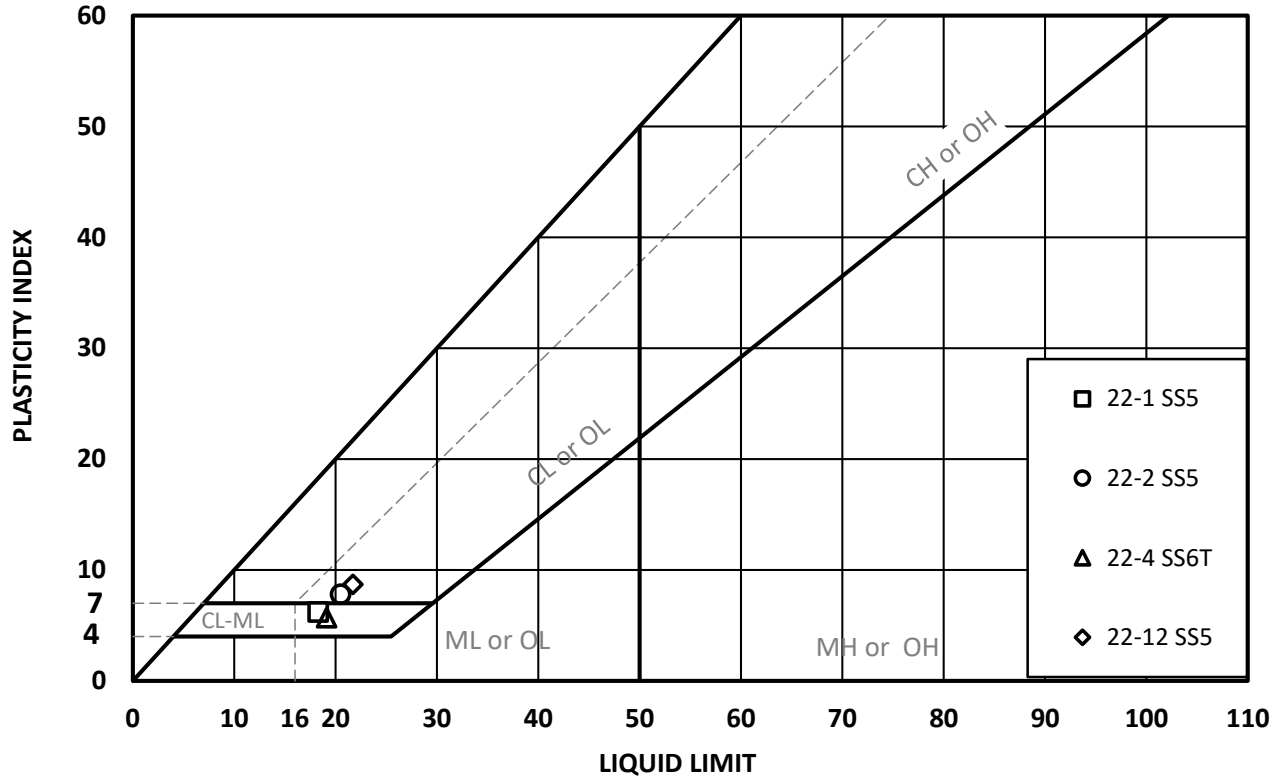


Silt and Clay		Sand			Gravel		Cobble +
Clay	Silt	Fine	Medium	Coarse	Fine	Coarse	

DS CONSULTANTS LTD.
6221 Highway 7, Unit 16
Vaughan, Ontario, L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

Project	**Geotechnical Investigation**	Project No	**22-371-100**
Location	**12909 Kennedy Rd., Caledon, ON**	Date	**Nov-01-2022**
Client	**Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.**	Figure No	14

Atterberg Test (ASTM D-4318)



Code	Sample ID	Sample No.		Moisture Contant (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	**USCS Symbol**
1	□	22-1	SS5	11	18.3	12.1	6.2	CL-ML
2	○	22-2	SS5	9	20.5	12.7	7.8	CL
3	△	22-4	SS6T	12	19.1	13.4	5.7	CL-ML
4	◇	22-12	SS5	11	21.7	13	8.7	CL

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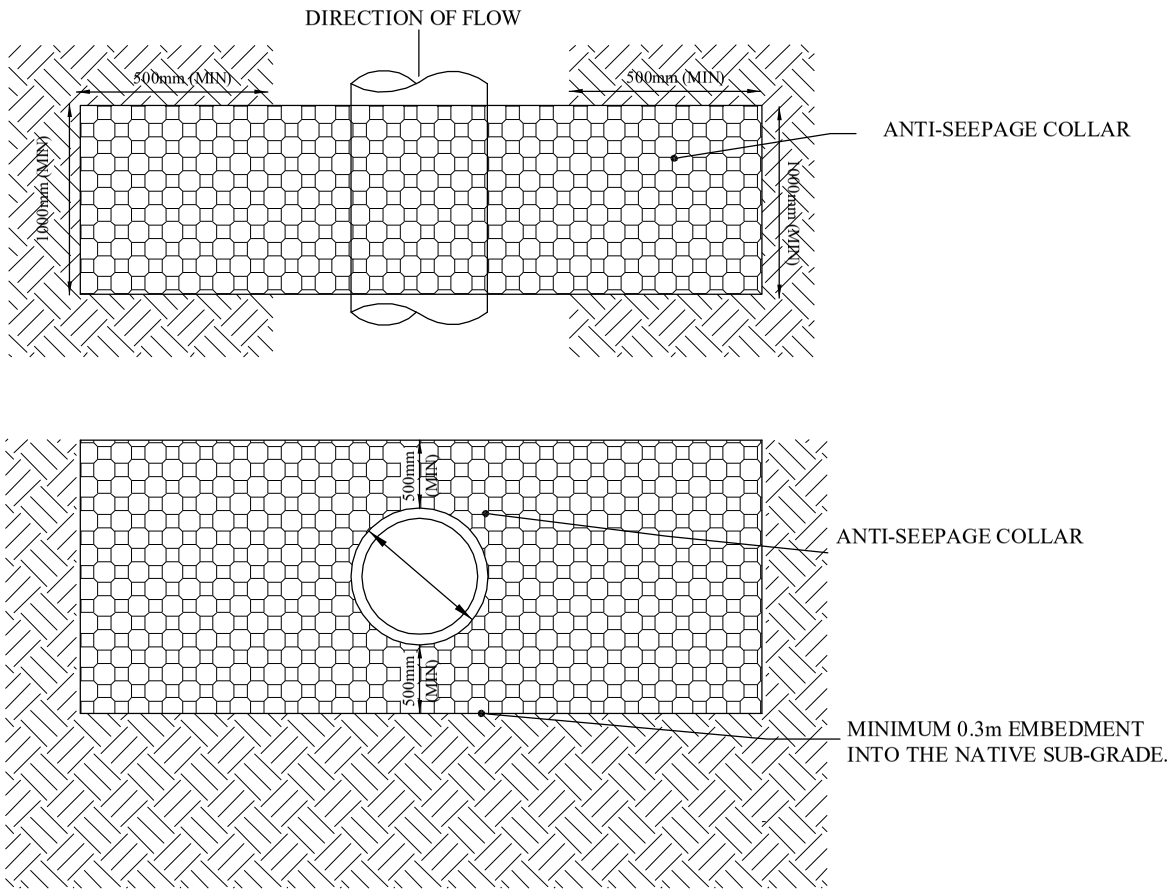
Project	**Geotechnical Investigation**	Project No	**22-371-100**
Location	**12909 Kennedy Rd., Caledon, ON**	Date	**Nov-01-2022**
Client	**Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.**	Figure No	15

Drawing No. 16: TYPICAL TRENCH PLUG INSTALLATION



ANTI-SEEPAGE COLLAR DETAIL

SCALE: N.T.S.

Appendix A

General Requirements for Engineered Fill

GENERAL REQUIREMENTS FOR ENGINEERED FILL

Compacted imported soil that meets specific engineering requirements and is free of organics and debris and that has been continually monitored on a full-time basis by a qualified geotechnical representative is classified as engineered fill. Engineered fill that meets these requirements and is bearing on suitable native subsoil can be used for the support of foundations.

Imported soil used as engineered fill can be removed from other portions of a site or can be brought in from other sites. In general, most of Ontario soils are too wet to achieve the 100% Standard Proctor Maximum Dry Density (SPMDD) and will require drying and careful site management if they are to be considered for engineered fill. Imported non-cohesive granular soil is preferred for all engineered fill. For engineered fill, we recommend use of OPSS Granular 'B' sand and gravel fill material.

Adverse weather conditions such as rain make the placement of engineered fill to the required degree of density difficult or impossible; engineered fill cannot be placed during freezing conditions, i.e. normally not between December 15 and April 1 of each year.

The location of the foundations on the engineered fill pad is critical and certification by a qualified surveyor that the foundations are within the stipulated boundaries is mandatory. Since layout stakes are often damaged or removed during fill placement, offset stakes must be installed and maintained by the surveyors during the course of fill placement so that the contractor and engineering staff are continually aware of where the engineered fill limits lie. Excavations within the engineered fill pad must be backfilled with the same conditions and quality control as the original pad.

To perform satisfactorily, engineered fill requires the cooperation of the designers, engineers, contractors and all parties must be aware of the requirements. The minimum requirements are as follows; however, the geotechnical report must be reviewed for specific information and requirements.

1. Prior to site work involving engineered fill, a site meeting to discuss all aspects must be convened. The surveyor, contractor, design engineer and geotechnical engineer must attend the meeting. At this meeting, the limits of the engineered fill will be defined. The contractor must make known where all fill material will be obtained from and samples must be provided to the geotechnical engineer for review, and approval before filling begins.

2. Detailed drawings indicating the lower boundaries as well as the upper boundaries of the engineered fill must be available at the site meeting and be approved by the geotechnical engineer.

3. The building footprint and base of the pad, including basements, garages, etc. must be defined by offset stakes that remain in place until the footings and service connections are all constructed. Confirmation that the footings are within the pad, service lines are in place, and that the grade conforms to drawings, must be obtained by the owner in writing from the surveyor and DS Consultants Ltd (DSCL). Without this confirmation no responsibility for the performance of the structure can be accepted by DSCL. Survey drawing of the pre and post fill location and elevations will also be required.

4. The area must be stripped of all topsoil and fill materials. Subgrade must be proof-rolled. Soft spots must be dug out. The stripped native subgrade must be examined and approved by a DSCL engineer prior to placement of fill.

5. The approved engineered fill material must be compacted to 100% Standard Proctor Maximum Dry Density throughout. Engineered fill should not be placed during the winter months. Engineered fill compacted to 100% SPMDD will settle under its own weight approximately 0.5% of the fill height and the structural engineer must be aware of this settlement. In addition to the settlement of the fill, additional settlement due to consolidation of the underlying soils from the structural and fill loads will occur and should be evaluated prior to placing the fill.

6. Full-time geotechnical inspection by DSCL during placement of engineered fill is required. Work cannot commence or continue without the presence of the DSCL representative.

7. The fill must be placed such that the specified geometry is achieved. Refer to the attached sketches for minimum requirements. Take careful note that the projection of the compacted pad beyond the footing at footing level is a minimum of 2 m. The base of the compacted pad extends 2 m plus the depth of excavation beyond the edge of the footing.

8. A bearing capacity of 150 kPa at SLS (225 kPa at ULS) can be used provided that all conditions outlined above are adhered to. A minimum footing width of 500 mm (20 inches) is suggested and footings must be provided with nominal steel reinforcement.

9. All excavations must be done in accordance with the Occupational Health and Safety Regulations of Ontario.

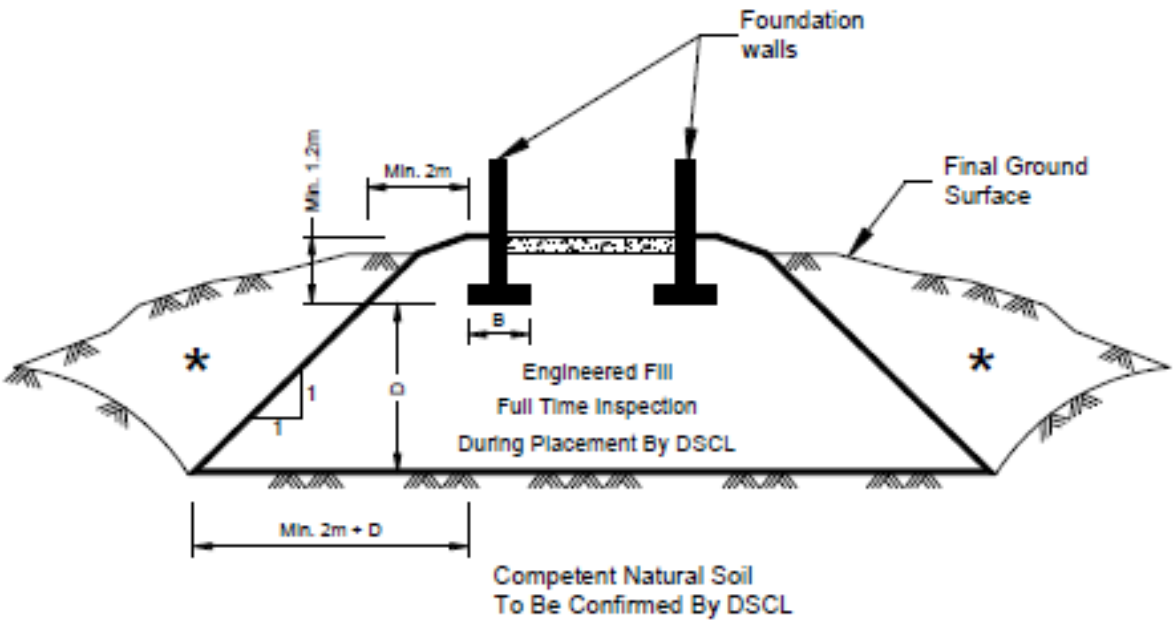
10. After completion of the engineered fill pad a second contractor may be selected to install footings. The prepared footing bases must be evaluated by engineering staff from DSCL prior to footing concrete placements. All excavations must be backfilled under full time supervision by DSCL to the same degree as the engineered fill pad. Surface water cannot be allowed to pond in excavations or to be trapped in clear stone backfill. Clear stone backfill can only be used with the approval of DSCL.

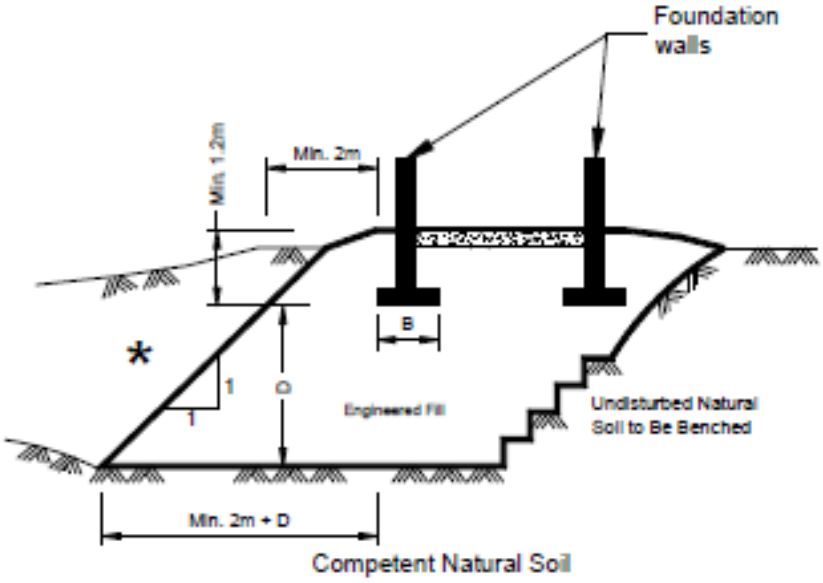
11. After completion of compaction, the surface of the engineered fill pad must be protected from disturbance from traffic, rain and frost. During the course of fill placement, the engineered fill must be smooth-graded, proof-rolled and sloped/crowned at the end of each day, prior to weekends and any stoppage in work in order to promote rapid runoff of rainwater and to avoid any ponding surface water. Any stockpiles of fill intended for use as engineered fill must also be smooth-bladed to promote runoff and/or protected from excessive moisture take up.

12. If there is a delay in construction, the engineered fill pad must be inspected and accepted by the geotechnical engineer. The location of the structure must be reconfirmed that it remains within the pad.

13. The geometry of the engineered fill as illustrated in these General Requirements is general in nature. Each project will have its own unique requirements. For example, if perimeter sidewalks are to be constructed around the building, then the projection of the engineered fill beyond the foundation wall may need to be greater.

14. These guidelines are to be read in conjunction with DS Consultants Ltd report attached.





* Backfill in this area to be as per the DSCL report.

Appendix B

Slope Stability Assessment Letter Report

Project: 22-371-100-R January 11, 2023

Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
c/o Candevcon Limited
9350 Goreway Drive
Brampton, Ontario
L6P 0M7
Attention: Maria Jones, MCIP, RPP, Project Planner
By email: maria@candevcon.com

RE: Slope Stability Assessment
Trend Developments Inc. & Trend 12909 Kennedy Developments Inc. - 12909 Kennedy Road
Southeast of Kennedy Road and Old School Road
Caledon, Ontario

Dear Sir:

A slope stability assessment for the slopes at the Trend Developments Inc. & Trend 12909 Kennedy Developments Inc. property was carried out by DS Consultants Ltd. (DS).

A site visit was made on August 8, 2022 by a senior geotechnical engineer from DS to visually examine the slope conditions at the above noted site.

Selected photographs (**Photos P1 to P8**) taken during the site visit are presented in **Appendix I**. A Google image of the site and slope area is also shown in **Appendix I**.

Based on our site observations, the slope conditions are described as follows:

- The slope area is located at the northeast part of the subject site.
- There is a wide flood plain in the creek area, where the ground is covered with bushes and high grasses etc. The creek is typically 1 to 3 m wide and is about 1 to 2 m below the flood plain level (**Photo P3**). There are also some water areas in the middle part of the flood plain (**Photo P4**).
- The subject slopes are located to the south of the flood plain area. The slopes are generally gentle in steepness, flatter than 5 horizontal to 1 vertical (5H:1V). The slopes generally consist of farmlands, with grass areas at the lower portion of the slopes.
- It is difficult to accurately estimate the height of the slopes, as the top of slope locations are not obvious, and the slopes are gentle is steepness. Typically, the elevation between and flood plain level and the farmland line is approximately 2 to 4 m.

- The toe areas of the slopes near the flood plain are well covered with bushes and grasses and are well protected from erosions. No evidence of slope failure was observed at the site during our site visit.

Based on our site observations, the subject slopes are considered stable in terms of long-term stability.

We trust that the information contained in this letter is satisfactory. Should you have any questions, please do not hesitate to contact this office.

Yours Very Truly,
DS Consultants Ltd.

Alka Sangar, M.Eng., P.Eng.

Fanyu Zhu, Ph.D., P.Eng.

Attachments:
Appendix I – Site Google Image and Site Photographs (Photos P1 to P8)

Appendix I

Site Google Image and
Site Photographs (Photos P1 to P8, taken on Aug.8, 2022)

Site Google Image:

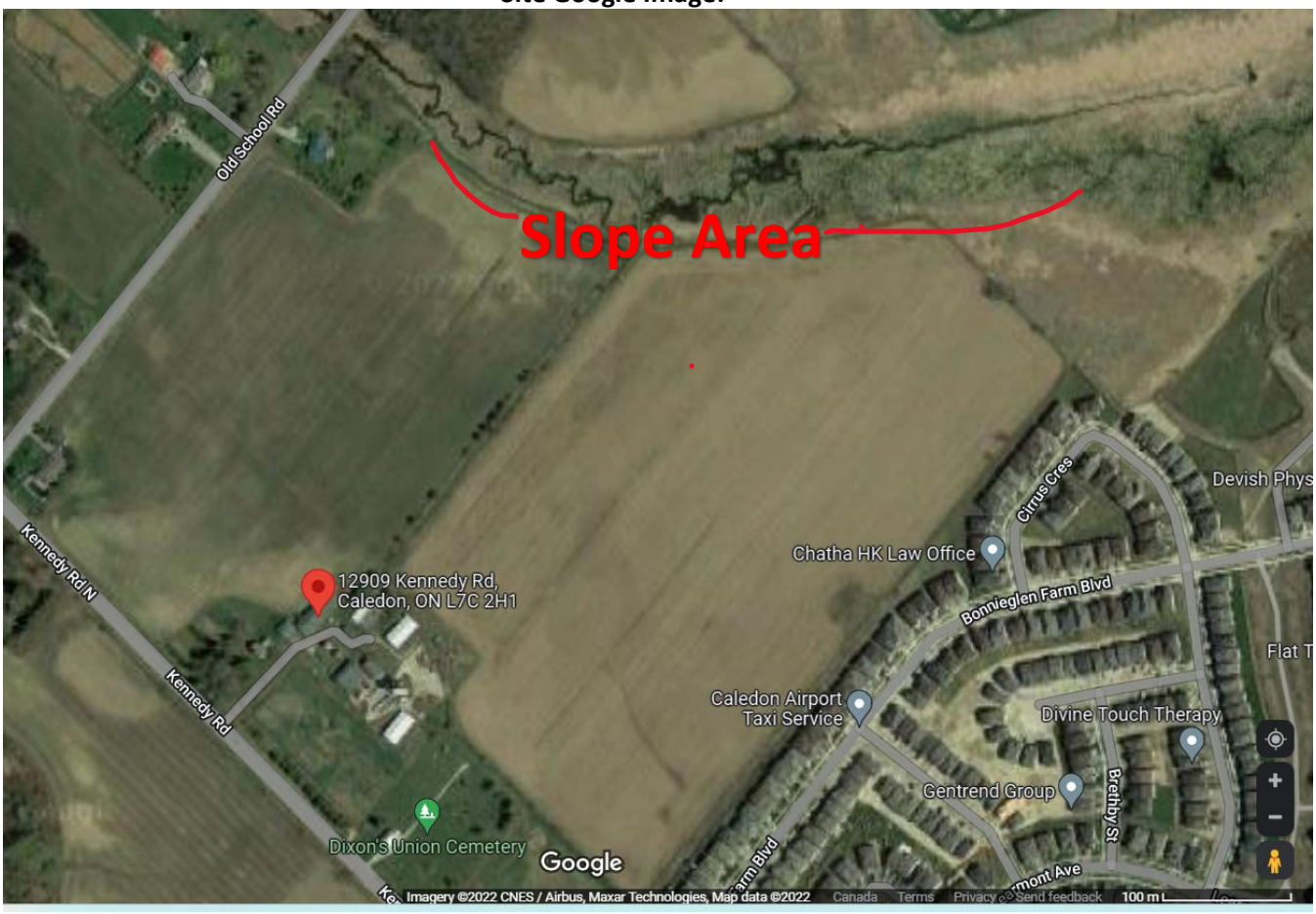


Photo P1: Flood plain area and slope (looking east – downstream from west part of site)

Photo P2: Flood plain area at west part of site (looking north)

Photo P3: Creek in Flood plain area at west part of site (looking east - downstream)

Photo P4: Water area in flood plain area at middle part of site (looking north)

Photo P5: West part slope and flood plain area (looking northwest from middle part of site)

Photo P6: East part slope and flood plain area (looking east from middle part of site)

Photo P7: General slope and flood plain conditions
(looking northwest toward Old School Rd from high area at the middle-east part of site)

Photo P8: General slope and flood plain conditions
(looking northeast from high area at the middle-east part of site)