Slope Stability Assessment

Forever Homes Inc.

Project Name:
Slope Stability Assessment
Proposed Residential Development
168 Meadowlily Road South,
London, Ontario

Project Number:
LON-22019965-A0

Prepared By:
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Date Submitted:
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Type of Document:

Geotechnical Report

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Date Submitted:

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1. Introduction and Background

1.1 Introduction

EXP Services Inc. (EXP) was retained by **Forever Homes Inc.** (Client) to carry out a slope stability assessment and prepare a report relating to the proposed residential development to be located at 168 Meadowlily Road South in London, Ontario, hereinafter referred to as the 'Site'.

Based on an interpretation of the factual test hole data, a review of soil and groundwater information from the test holes advanced at the Site, topographic data and surveyed sections, EXP has provided geotechnical comments and recommendations with regards to the slope stability assessment.

The proposed development is within an area regulated by the Upper Thames Conservation Authority (UTRCA). As a result, consent from the Conservation Authority is required prior to construction of the proposed development.

1.2 Terms of Reference

The slope stability assessment was generally completed in accordance with the scope of work outlined through email correspondence. Authorization to proceed with this investigation was received from Mr. Jeff Fung of **Forever Homes Inc.** through email correspondence.

The purpose of the assessment was to review the subsoil and groundwater conditions at the Site, assess the stability of the slopes within the vicinity of the Site and determine the recommended development setback limit, in accordance with the Ontario Ministry of Natural Resources (MNR) Technical Guide – River & Streams Systems: Erosion Hazard Limit and the Upper Thames Conservation Authority guidelines.

Based on a site reconnaissance, interpretation of the factual test hole data, and a review of soil and groundwater information from test hole advanced at the Site, EXP has provided geotechnical comments and recommendations on slope stability and development setback associated with the ravine slope located on the south side of the Site.

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 applicable codes and standards. If there are any changes in the design features relevant to the geotechnical analyses, or if any questions arise concerning geotechnical aspects of the codes and standards, this office should be contacted to review the design.

The information in this report in no way reflects on the environmental aspects of the soil. Should specific information in this regard be needed, additional testing may be required.

2. Methodology

2.1 Field Work

The fieldwork was carried out on September 1st and 8th, 2022. In general, the geotechnical investigation consisted of the advancement of eleven (11) boreholes at the locations denoted on **Drawing 1** as BH1 to BH11, inclusive. MW was suffixed to the borehole symbol (BH) where monitoring wells were installed.

Prior to the investigation, buried service clearances were obtained for the boreholes.

The boreholes were advanced using a locally contracted track mounted drilling unit equipped with solid and hollow stem augers, soil sampling and soil testing equipment. Within each borehole, disturbed samples were recovered at regular intervals using conventional split spoon sampling equipment. Standard Penetration Tests (SPT's) were also performed throughout each borehole to assess the compactness or consistency of the underlying soils, and to obtain representative samples. The boreholes are described on the borehole logs (**Appendix A**).

During the drilling, the stratigraphy within each borehole was examined and logged in the field by EXP geotechnical personnel. Observations of the groundwater level was also noted in the open test holes and were recorded on the borehole logs. Following the drilling, the boreholes were backfilled with bentonite hole plug and excavated material, to satisfy the requirements of O. Reg. 903.

Representative samples of the various soil strata encountered at the test location was taken to our laboratory in London for further examination by a Geotechnical Engineer and laboratory classification testing. Laboratory testing for this investigation comprised routine moisture content determinations with the results presented on the borehole logs.

Samples remaining after the classification testing will be stored for a period of three months following the date of reporting. After this time, they will be discarded unless prior arrangements are made for longer storage.

Borehole locations were established in the field by EXP personnel, and the borehole ground surface elevations were interpreted from City of London Digital Mapping (2017).

2.2 Site Reconnaissance

A site meeting was held on September 29th, 2022. EXP's technical staff was accompanied by members of the UTRCA. The purpose of the meeting was to discuss the current site conditions and EXP's approach for the assessment. Some of the technical comments in this report were incorporated to reflect our discussions.

A site reconnaissance survey was carried out on October 6th, 2022, by EXP technical staff. The purpose of the reconnaissance was to examine the existing conditions of the erosional gullies on the north side of the Site.

During the site reconnaissance, the 'Slope Stability Rating Chart', which was developed by MNR, was utilized to score a number of site characteristics, to determine the potential for slope instability. Site conditions which were reviewed include: slope height and inclination, soil stratigraphy, the presence and location of seepage zones, vegetative cover, overland drainage, and evidence of previous instability or landslide activity. Rating charts were completed for the slope profiles at four (4) locations. The rating charts for the cross sections examined are provided in **Appendix C** for

review and consideration. Based on the values recorded on the Slope Stability Rating Charts, the existing Site slopes are considered to have a slight to moderate potential for instability indicated by Slope Instability Ratings of 35 to 37.

At the time of the investigation, the erosional gully surfaces were typically vegetated with occasional trees and shrubbery with some unvegetated patches. The existing grade of the agricultural field generally coveys drainage towards the main erosional gully in concentrated areas where additional washout fingers were observed. Undercutting of the toe of the slope was observed at select locations of the gully. No previous surficial sliding failures were observed. Select photographs of the Site are provided in **Appendix B**.

A Site elevation survey carried out by EXP of the gully profiles at four (4) locations was also completed during the Site reconnaissance by EXP personnel on October 6th, 2022.

2.3 Review of Topographic Data and Analysis

Topographic data of the Site obtained from the site elevation survey completed at four (4) sections by EXP combined with Ontario Digital Terrain Model (Lidar-Derived) data was utilized to create the cross sections for use in establishing the location of the Erosion Hazard Limit for the proposed development on the north side of the Site. Using engineering judgement and technical experience, the various cross sections (which are considered to be representative of typical Site conditions) have been reviewed.

Examination of factors of safety using Morgenstern Price methods were carried out and analyzed by computer methods utilizing the Slope/W computer program. Using engineering judgement and technical experience, various cross sections (which are considered to be representative of typical site conditions) have been reviewed. Consideration has also been given to incorporate slope sections which have a higher potential for slope instability indicated by the presence of more steeply inclined slopes. Soil strength parameters used in the analyses were based on our observations and experience with similar soil and groundwater conditions and are consistent with typical values in literature sources.

3. Site and Subsurface Conditions

3.1 Site Description

The Site is located at 168 Meadowlily Road South in London, Ontario. The subject area is currently generally occupied by an agricultural field with a small section of vacant grassland. The Site is generally bounded by a woodlot and residence to the north, Meadowlily Road South to the west, Commissioners Road East to the south and a parking lot (City Wide Sports Park) to the east. The Site is generally graded down to the south.

A gully is located within the woodlot on the northwest side of the Site. The gully is generally 2.4 to 5.1 m in height in the vicinity of the Site and is vegetated by occasional trees and shrubbery with some bare patches. The ravine has a maximum inclination of 0.9H:1V and undercutting of the toe was observed in select locations. The surface runoff from the table lands convey water to the gullies.

The following sections provide a summary of the soil conditions and groundwater conditions.

3.2 Soil Stratigraphy

The detailed stratigraphy encountered in the borehole sand the results of routine laboratory testing carried out on representative samples of the subsoil are given on the borehole logs presented in **Appendix A** and summarized in the following paragraphs. It must be noted that the boundaries of the soil indicated on the borehole logs are inferred from non-continuous sampling and observations during drilling. These boundaries are intended to reflect transition zones for geotechnical design and should not be interpreted as exact planes of geological change.

3.2.1 Topsoil

Each borehole was surfaced with a layer of topsoil. The topsoil thickness ranged between 180 mm and 350 mm.

It should be noted that topsoil quantities should not be established from the information provided at the test hole locations only. If required, a more detailed analysis (involving additional shallow test pits) is recommended to accurately quantify the amount of topsoil to be removed for construction purposes.

3.2.2 Fill

Beneath the topsoil and extending to 1.4 m below ground surface (bgs) in Borehole BH10 was a layer of fill. The composition of the fill was sandy silt, trace clay and was typically brown in colour. The sandy silt fill contained trace organics, was loose (based on Standard Penetration Test (SPT) N Values of 9 blow per 300 mm split spoon sampler penetration) and moist (based on tactile examination and *in situ* moisture content of 18 percent).

3.2.3 Sandy Silt

Underlying the topsoil and extending to 0.6 m to 2.1 m below ground surface (bgs) in Boreholes BH1 to BH4, BH8 and BH11 was a layer of sandy silt. The brown sandy silt contained trace clay, trace to some gravel and was compact in relative density (based on SPT N Values of 18 and 26). Laboratory testing of the sandy silt yielded *in situ* moisture contents of 5 and 7 percent, indicative of damp to moist conditions.

3.2.4 Clayey Silt Till

Each borehole except BH1/MW terminated in a stratum of clayey silt till. The clayey silt till was brown becoming grey in colour with depth. The clayey silt till contained trace to some sand, trace gravel, was stiff to hard in consistency (SPT N Values of 10 to 39) and damp to moist (tactile examination and *in situ* moisture contents of 10 to 20 percent).

3.2.5 Silt

Borehole BH1/MW terminated in a stratum of silt. The silt was grey and contained trace clay, some sand and was dense in consistency (SPT N Values of 38 to 45) and wet (tactile examination and *in situ* moisture contents of 18 and 19 percent).

3.3 Groundwater Conditions

Details of the groundwater conditions observed within the test holes are provided on the attached borehole logs. Upon completion of drilling, the open boreholes were examined for the presence of groundwater and groundwater seepage.

Four (4) monitoring wells were installed during the drilling on September 1 and 8, 2022 at the Site. The wells were installed to a depth of approximately 6.6 m to 11.1 m bgs. The summary of well construction details and stabilized groundwater levels are presented in Tables 1 and 2.

Table 1 – Monitoring Well Construction Details

Well ID	Inferred Ground Surface Elevation (m)	Completion Depth (m bgs)	Screen Length (m)
BH1/MW	276.6	5.5	1.5
BH4/MW	281.5	6.1	1.5
BH9/MW	282.5	6.1	1.5
BH11/MW	283.9	6.3	1.5

Table 2 – Stabilized Groundwater Levels

Well ID	Inferred Ground Surface Elevation (m)	Depth to Groundwater, m bgs (Inferred Groundwater Elevation, m)	
		14 Sep 22	12 Oct 22
BH1/MW	276.6	Dry	Dry
BH4/MW	281.5	Dry	Dry
BH9/MW	282.5	Dry	5.1 (277.4)
BH11/MW	283.9	Dry	6.2 (277.7)

The monitoring wells have been registered with the Ministry of the Environment, Conservation and Parks (MECP), in accordance with Ontario Regulation 903, and remain intact for the purposes of ongoing monitoring of stabilized groundwater conditions, as required. The measurements in Tables 2 (above) indicate that the water levels in the monitoring wells have yet to recover to static levels. Groundwater level monitoring is planned to take place on a monthly basis until the Spring of 2023. Further interpretation in this regard is provided in EXP's Hydrogeological Assessment under a separate cover.

Details of the groundwater conditions observed within the test holes are provided on the attached test hole logs. Upon completion of drilling, the open boreholes were examined for the presence of groundwater and groundwater seepage. Each borehole without a monitoring well installed was dry upon completion of drilling.

It is noted that insufficient time was available for the measurement of the depth to the stabilized groundwater table prior to backfilling the boreholes without monitoring wells.

It is also noted that the depth to the groundwater table may vary in response to climatic or seasonal conditions, and, as such, may differ at the time of construction, with higher levels in wet seasons. Capillary rise effects should also be anticipated in fine-grained soil deposits.

4. Slope Stability

4.1 General

The purpose of this investigation was to determine a safe setback distance from the existing gully on the northwest side of the Site.

The slope was evaluated using the method prescribed by Ministry of Natural Resources in the Technical Guide for assessing the Erosion Hazard Limit for River and Stream Systems. The overall Erosion Hazard Limit (Development Setback) for the site slope is determined by evaluating the slope stability, considering surficial seepage and various failures methods, allowance for potential flooding hazards, and an erosion allowance.

Slope Stability Rating Charts have been completed for four (4) slope profiles at the Site (**Appendix C**). Based on the value recorded on the Slope Stability Rating Charts, the ratings suggest that a slight to moderate potential of slope instability exists.

4.2 Erosion Hazard Limit

As defined by the MNR Technical Guide, based on the type of river and stream system landform (confined or unconfined) the following figure provides guidance on which factors (hazard allowances) should be used in defining the erosion hazard limits.

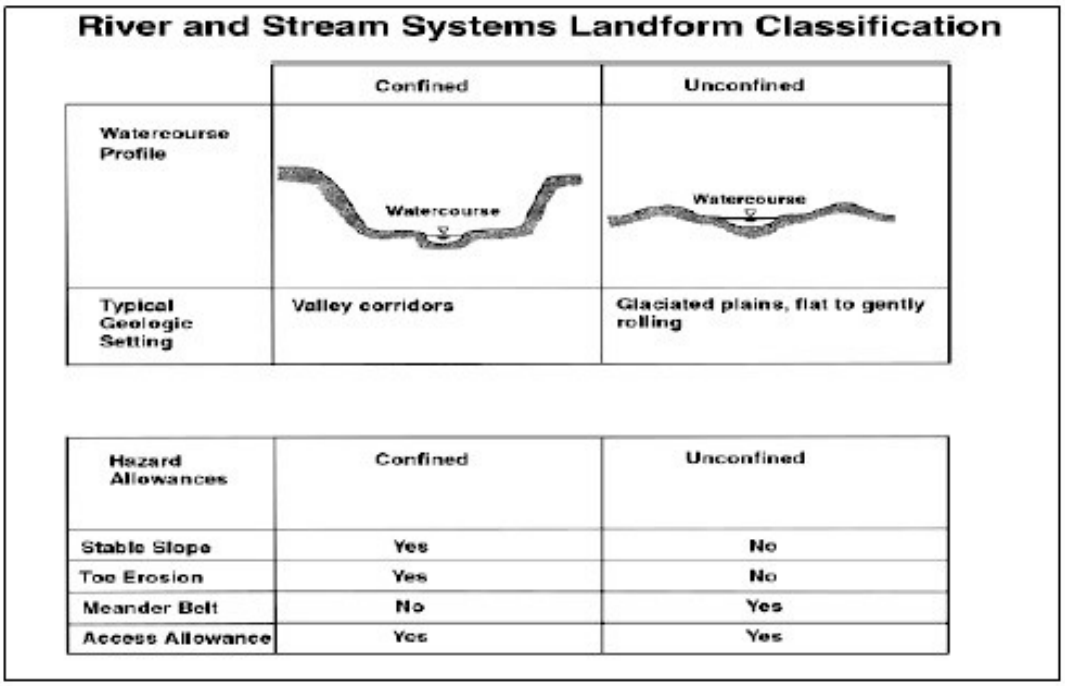

Figure obtained from page 35 of MNR Technical Guide – River and Stream Systems: Erosion Hazard Limit

As defined by the MNR Technical Guide, confined river and stream systems are ones in which the physical presence of a valley corridor containing a river or stream channel, which may or may not contain flowing water, is visibly discernable from the surrounding landscape by either field investigations, aerial photography and or map interpretation. The Erosion Hazard Limit for a confined system consists of the following hazard allowances:

- Toe Erosion Allowance
- Stable Slope Allowance
- Access Allowance

The gully system at the Site is considered to be a confined system. Ultimately, the Erosion Hazard Limit generally defines the development limit for the Site. Additional setbacks may also be required based on local Municipal and Conservation Authority requirements.

The setback distance from the slope crest varies slightly along the slope, based on the overall slope height and inclination. Four cross sections (Cross Sections A-A' through D-D') have been shown on **Drawing 1** along the existing slope profile and were used for establishing the location of the Erosion Hazard Limit. Additionally, the extrapolated location of the Erosion Hazard Limit, top of existing slope, top of stable slope, toe erosion allowance and toe of slope are also provided on **Drawing 1** and on cross sectional **Drawings 2, 3, 4** and **5**.

4.2.1 Toe Erosion Allowance

No water course was observed in the gully during the Site reconnaissance, however, undercutting of the toe was observed at select locations. The catchment area on the table lands currently conveys runoff towards the gully in 3 separate locations which, causing undercutting of the toe in select areas during periods of intense rainfall. Development of the Site is anticipated to control surface water flows and direct water away from the gully which will significantly reduce any further erosion of the gully.

The soils at the base of the gully are expected to comprise clayey silt till, as encountered in the boreholes. Given the soil conditions and anticipated future stormwater control as part of site development, a conservative toe erosion allowance of 1.0 metres has been assigned from the toe of the gully or edge of the undercut slope, as measured, to account for potential future toe erosion.

4.2.2 Stable Slope Geometry

The stability of the existing slopes were investigated for a number of different Factors of Safety (FOS). The various types of failures resulting include shallow, moderate depth and deep rotational failures, occasionally through the entire height of the slope.

The deterministic analysis was undertaken by computer methods utilizing the Slope/W computer program for select slope profile. The soil and groundwater parameters used in the deterministic analyses are conservative therefore the slopes factors of safety against failure are considered conservative.

The following table summarizes the parameters for the predominant soils which were used in EXP's evaluation of the stable slope configuration:

Table 3 – Soil Parameters

Soil Type	Density	Cohesion	Angle of Internal Friction
Clayey Silt Till	21.0 kN/m^3	5 kPa	30°
Sandy Silt	18.5 kN/m^3	1 kPa	30°
Silt	20.0 kN/m^3	2 kPa	32°

Minimum factors of safety are provided in the report "Geotechnical Principles for Stable Slopes" prepared for the Ministry of Natural Resources, for infrastructure and public use (Section 4.3.3.1 in the MNR Technical Guide).

In order to determine a stable slope, a minimum factor of safety of 1.40 was used during the computerized for long term stable slope analyses. The following table from the MNR Technical Guide provides guidance on how to select a minimum factor of safety based on the intended land use above or below the slope.

Table 4 – Design Minimum Factor of Safety

	LAND-USES	FACTOR OF SAFETY
A	**PASSIVE**; no buildings near slope; farm field, bush, forest, timberland, woods, wasteland, badlands, tundra	1.10
B	**LIGHT**; no habitable structures near slope; recreational parks, golf courses, buried small utilities, tile beds, barns, garages, swimming pools, sheds, satellite dishes, dog houses	1.20 to 1.30
C	**ACTIVE**; habitable or occupied structures near slope; residential, commercial, and industrial buildings, retaining walls, storage/warehousing of non-hazardous substances	1.30 to 1.50
D	**INFRASTRUCTURE and PUBLIC USE**; public use structures or buildings (i.e., hospitals, schools, stadiums), cemeteries, bridges, high voltage power transmission lines, towers, storage/warehousing of hazardous materials, waste management areas	1.40 to 1.50

Table obtained from page 60 of MNR Technical Guide – River and Stream Systems: Erosion Hazard Limit

The two critical cross sections were assessed (Cross Section A-A' and C-C') using Slope/W software and provides adequate coverage of the slope. The sections evaluated were selected to represent the worst-case-scenario of the gully profiles. The failures at the cross sections consisted of shallow, moderate depth and deep rotational failures for both current and post development conditions. Summarized results are provided in the following table:

Table 5 - Summary of Pertinent Slope Stability Analyses

Cross Section Condition	Description of Failure Mode	Computed Factor of Safety
Slope Section, A-A'	Shallow Depth Failure	1.89
Slope Section, A-A'	Moderate Depth Failure	2.02
Slope Section, A-A'	Deep Rotational Failure	2.20
Slope Section, C-C'	Shallow Depth Failure	2.01
Slope Section, C-C'	Moderate Depth Failure	1.83
Slope Section, C-C'	Deep Rotational Failure	2.30

The soil conditions at the Site generally consist of sandy silt overlying clayey silt till deposits based on the boreholes advanced near the crest of the slope. In determining suitable input soil and groundwater parameters, consideration has been given to incorporating the presence of groundwater within the subsurface soil strata. The water level used in the slope model was conservatively estimated from observations recorded on the borehole logs. The influence of potential building loads was also considered in the analyses.

A slope inclination of 2.0H:1V is considered stable for all cross sections based on the slope analysis carried out. To ensure that a satisfactory factor of safety (FOS) is applied for the Erosion Hazard Limit along the slopes at the Site, the stable slope setback line should be drawn from the toe erosion allowance. The stable slope allowance of 2.0H:1V has been applied based on a conservative evaluation and to exceed the minimum target FOS of 1.40.

It should be noted that the theoretical calculations for FOS are considered conservative.

In addition to the stable slope geometry, an erosion access allowance should also be applied. This is described in the following section.

4.2.3 Erosion Access Allowance

The Erosion Access Allowance as specified in Section 3.4 of the MNR Technical Guide is generally a distance of 6 m from the top of the stable slope. This allowance is required in order to provide emergency access to erosion prone areas, construction access for regular maintenance and access to the Site in the event of an erosion event of failure and provide protection against unforeseen or predicted external conditions.

EXP recommends that a distance of 6 m for the erosion access allowance be provided on the table land. No permanent structures should be constructed within the 6 m of the erosion access allowance.

4.2.4 Erosion Hazard Limit

The Erosion Hazard Limit is defined by the sum of the Stable Slope Setback plus the Toe Erosion Component plus the Erosion Access Allowance. The table below summarizes the 3 components to the Recommended Development Limit Setback.

Table 6 – Erosion Hazard Limit Components

Cross Section	Toe Erosion Allowance (m)	Stable Slope Allowance (From Top of Slope, m)	Erosion Access Allowance (m)	Erosion Hazard Limit (From Top of Slope, m)
A-A'	1.0	2.5	6.0	8.5
B-B'	1.0	3.2	6.0	9.2
C-C'	1.0	3.8	6.0	9.8
D-D'	1.0	2.6	6.0	8.6

The Erosion Hazard Limit is shown on **Drawings 1** to **5**. Any proposed buildings part of the development should not encroach on the Erosion Hazard Limit.

4.3 General Comments for Site Works

It is imperative that future changes to the development footprint not occur within the Erosion Hazard Limit identified at the Site. To this end, the following comments are provided and measures are recommended.

1. The site should be graded such that surface water is directed away from the slope. No water from the table land should be out-letted down the slope.

2. Where possible, uncontrolled surface water flows over the face of the slope should be minimized, to reduce the risk of surface erosion. Erosion control measures may be required during construction, to reduce the risk of surface water flows from washing out non-vegetated surfaces.

3. Indiscriminate stockpiling of fill or construction materials near the crest of the slope should be avoided. In the event that stockpiling of material is proposed in the vicinity of the slope crest, a review by the Geotechnical consultant is required.

4. Any buildings and permanent structures associated with the proposed site development must be located outside of the Erosion Hazard Limit, which is identified on the Site Plan. The Cross Section drawing helps identify the location of this line.

5. Water from downspouts and perimeter weeping tile etc. must also be collected in a controlled manner and re-directed away from the slope.

6. Existing vegetation on the slope should be maintained. Any bare spots should be re-vegetated.

7. A regular maintenance program should be implemented such as tree preservation, grading, and drainage control.

Final design drawings including building locations, services etc. should be reviewed by a geotechnical consultant to ensure that the Erosion Hazard Limit is properly interpreted. Geotechnical inspection and testing is recommended during construction to confirm that all recommendations set out will be followed.

5. General Comments

The information presented in this report is based on a limited investigation designed to provide information to support an assessment of the current geotechnical conditions within the subject property. The conclusions and recommendations presented in this report reflect site conditions existing at the time of the investigation. Consequently, during the future development of the property, conditions not observed during this investigation may become apparent. Should this occur, EXP Services Inc. should be contacted to assess the situation, and the need for additional testing and reporting. EXP has qualified personnel to provide assistance in regards to any future geotechnical and environmental issues related to this property.

Our undertaking at EXP, therefore, is to perform our work within limits prescribed by our clients, with the usual thoroughness and competence of the engineering profession.

The comments given in this report are intended only for the guidance of design engineers. The number of test holes required to determine the localized underground conditions between test holes affecting construction costs, techniques, sequencing, equipment, scheduling, etc. would be much greater than has been carried out for design purposes. Contractors bidding on or undertaking the works should in this light, decide on their own investigations, as well as their own interpretations of the factual borehole results, so that they may draw their own conclusions as to how the subsurface conditions may affect them.

EXP Services Inc. 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 afforded the privilege of making this review, EXP Services Inc. will assume no responsibility for interpretation of the recommendations in this report.

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We trust this report is satisfactory for your purposes. Should you have any questions, please do not hesitate to contact this office.

Drawings

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Appendix A – Borehole Logs

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Appendix B – Site Photographs

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Photo 1 – Near Cross Section A-A

Photo 2 – Cross Section A-A Slope Profile

Appendix C - Slope Stability Rating Charts

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Appendix D – Slope Stability Analyses

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Appendix E – Limitations and Use of Report

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LIMITATIONS AND USE OF REPORT

BASIS OF REPORT

This report ("Report") is based on site conditions known or inferred by the geotechnical investigation undertaken as of the date of the Report. Should changes occur which potentially impact the geotechnical condition of the site, or if construction is implemented more than one year following the date of the Report, the recommendations of EXP may require re-evaluation.

The Report is provided solely for the guidance of design engineers and on the assumption that the design will be in accordance with applicable codes and standards. Any changes in the design features which potentially impact the geotechnical analyses or issues concerning the geotechnical aspects of applicable codes and standards will necessitate a review of the design by EXP. Additional field work and reporting may also be required.

Where applicable, recommended field services are the minimum necessary to ascertain that construction is being carried out in general conformity with building code guidelines, generally accepted practices and EXP's recommendations. Any reduction in the level of services recommended will result in EXP providing qualified opinions regarding the adequacy of the work. EXP can assist design professionals or contractors retained by the Client to review applicable plans, drawings, and specifications as they relate to the Report or to conduct field reviews during construction.

Contractors contemplating work on the site are responsible for conducting an independent investigation and interpretation of the borehole results contained in the Report. The number of boreholes necessary to determine the localized underground conditions as they impact construction costs, techniques, sequencing, equipment and scheduling may be greater than those carried out for the purpose of the Report.

Classification and identification of soils, rocks, geological units, contaminant materials, building envelopment assessments, and engineering estimates are based on investigations performed in accordance with the standard of care set out below and require the exercise of judgment. As a result, even comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations or building envelope descriptions involve an inherent risk that some conditions will not be detected. All documents or records summarizing investigations are based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated. Some conditions are subject to change over time. The Report presents the conditions at the sampled points at the time of sampling. Where special concerns exist, or the Client has special considerations or requirements, these should be disclosed to EXP to allow for additional or special investigations to be undertaken not otherwise within the scope of investigation conducted for the purpose of the Report.

RELIANCE ON INFORMATION PROVIDED

The evaluation and conclusions contained in the Report are based on conditions in evidence at the time of site inspections and information provided to EXP by the Client and others. The Report has been prepared for the specific site, development, building, design or building assessment objectives and purpose as communicated by the Client. EXP has relied in good faith upon such representations, information and instructions and accepts no responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of any misstatements, omissions, misrepresentation or fraudulent acts of persons providing information. Unless specifically stated otherwise, the applicability and reliability of the findings, recommendations, suggestions or opinions expressed in the Report are only valid to the extent that there has been no material alteration to or variation from any of the information provided to EXP.

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The Report has been prepared in a manner consistent with the degree of care and skill exercised by engineering consultants currently practicing under similar circumstances and locale. No other warranty, expressed or implied, is made. Unless specifically stated otherwise, the Report does not contain environmental consulting advice.

COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment form part of the Report. This material includes, but is not limited to, the terms of reference given to EXP by its client ("Client"), communications between EXP and the Client, other reports, proposals or documents prepared by EXP for the Client in connection with the site described in the Report. In order to properly understand the suggestions, recommendations and opinions expressed in the Report, reference must be made to the Report in its entirety. EXP is not responsible for use by any party of portions of the Report.

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