92 Caplan Avenue, Suite 106
Barrie, Ontario, L4N 9J2
P: (705) 719-7994
F: (888) 558-9424
www.centralearth.ca

GEOTECHNICAL INVESTIGATION & REPORT

Proposed 55-Plus Building
100, 108 & 114 Emma Street South
Grand Valley, Ontario

Prepared For: Golden Canadian Homes Inc.
Type of Document: Final Report
Project Number: 17-1000A
Prepared By: Alexander Winkelmann, P.Eng
Date Issued: September 23, 2019 (Rev.2)

Table of Contents

Table of Contents (cont.)

Figures

Appendices

1 Introduction

Central Earth Engineering was retained by Golden Canadian Homes Inc. to complete a geotechnical investigation and report for the properties of 100, 108 and 114 Emma Street South in Grand Valley, Ontario. The location of the site is shown on the Site Location Plan included as Figure 1.

Central Earth Engineering was provided with the following drawings for review:

- "*Topographic Survey of Lots 26, 27 and 28, Block 7, Registered Plan 33A, Village of Grand Valley*", Project 17-186, by Cullen & Associates, dated November 13, 2017; and
- "*Emma- Grand, Mixed-Use Building, 100, 108 & 114 Emma St. South, Grand Valley, Ontario*", Drawing No. A001, A002, A101, A102, A301, A302, A401 and A501, by Line Architects, dated May 5, 2019 (provided for reference in Appendix E).

Based on Central Earth Engineering's correspondence and review of the above noted drawings, it is proposed to construct a combined commercial and 55-Plus residence at the site. The proposed 3-storey building will occupy an area of approximately 660 m^2. The main floor level will consist of retail space, while the 2nd and 3rd levels will consist of 18 apartment units. The building is currently positioned in the centre third of the site. The eastern third of the site abutting Emma Street South will consist of parking and driveways, whereas the western third of the site will be left undeveloped.

On the eastern portion of the building, the finished floor elevation of the buildings main floor will be set at Elev. 455.17 metres, which is close to existing grade. On the western side of the building, the building will be inset into the existing gradual slope by approximately 1.1 metres on the south side of the site and by approximately 2.6 metres on the north side of the site.

The purpose of this geotechnical investigation was to assess the soil and groundwater conditions at three (3) borehole locations spread across the site. Two (2) of the boreholes were advanced in the relatively flat area within the eastern half of the site, and one (1) borehole was advanced near the slope crest at the western property boundary. Two (2) monitoring wells were installed for longer term groundwater monitoring as part of the current investigation.

Based on the information obtained as part of the on-site investigation, geotechnical recommendations are provided for the proposed development concept.

2 Details of Revision

This revision (Revision 2, dated September 23, 2019) is being provided based on both the revised architectural drawing set being provided for the property (reference provided in Section 1) and comments of the submission by R.J. Burnside in a letter dated March 13, 2019.

The revised drawings have been provided as Appendix E. Changes to the borehole location plan and slope stability analyses from the previous revision have not been changed as the proposed location of the building has not materially shifted and the context of these figures/appendices has not been affected.

Three comments pertain to the geotechnical report as provided by the R.J. Burnside comments. The comments are provided below with CEE's corresponding response:

> *Question 22: What is the site proposing for the drainage of floor subdrains and foundation subdrains? The design should consider backup during flooding.*

CEE Response: Drainage outlet of floor/foundation subdrains (whether to sump pit and pumped out or gravity outlet) is not a geotechnical consideration but would be addressed by other members of design team (civil/structural/architectural), including requirements of backup prevention.

Question 23: The report indicated that the basement wall is to be provided with damp-proofing. This site should not have a basement due to its location and none is proposed based on the drawings submitted.

CEE Response: Though there is no basement per say, the rear of the building (on the west side) is inset into the slope by about 4 metres. Anytime that a building is below the prevailing ground surface, damp-proofing and drainage provisions must be included.

Note on Drawing: Geotech report notes 3.5:1 in Appendix B. Our typical max is 3:1. Geotech is to review proposed slopes. How is this being maintained? Based on the plans, only grass is proposed. How is the surface being stabilized after grading considering external drainage does appear to rundown this slope.

CEE Response: The 3.5:1 is in reference to the existing grading. Based on our review of the drawings, it is proposed to steepen the slope slightly to create a drainage swale which will redirect all surface water away from the building. In terms of slope stability, we can confirm that the inclinations proposed (as steep as 2.3H:1V) will have a factor of safety of at least 1.5, which is the regulatory factor of safety required, and is therefore acceptable. In terms of surface treatment of the slope, it is the responsibility of the civil designer to ensure that the slope surface is being adequately stabilized (e.g. with erosion control blankets/turf reinforcement mats, grasses, shrubs, live staking, etc.). This is imperative to ensure that surficial erosion does not occur which can cause detrimental effects to the neighbouring properties to the north.

3 Site Description

The site is located within the Town of Grand Valley, and consists of the three municipal addresses of 100, 108 and 114 Emma Street South. The site is located directly west of Emma Street South and is located approximately 75 metres west of the Grand River. In between the Grand River and the site are two roadways, and residential properties.

The site is currently vacant, with much of the site consisting of low-lying grasses and shrubs, along with some localized tree stands. The eastern half of the site is relatively flat with an elevation ranging between 454 to 455 metres. The western half of the site then slopes up at an inclination of about 3.5 Horizontal to 1 Vertical to approximately elevation 463 metres at the western property boundary. Photographs of the site are provided in Appendix C.

Central Earth Engineering has reviewed publicly available information from the Ontario Geological Survey. This review indicates that the eastern half of the site is within the floodplain of the Grand River and consists of glaciofluvial deposits (river deposits and delta topset facies that typically consist of silts, sands and gravels). The western half of the site consists of a clay to silt textured glacial till (derived from glaciolacustrine deposits or shale). Dolostone bedrock of the Guelph Formation is expected to be present, but at significant depth.

The area surrounding the site is generally low density commercial and residential. Businesses and dwellings are serviced by municipally owned water, sanitary and storm services.

4 Procedures and Methodology

Prior to the commencement of drilling activities, the locations of underground utilities including telephone, natural gas, electrical lines, etc. were marked out by public and private utility locating companies. The results of the private utility locates are provided in Appendix D. Both the private and public utility locates indicated no utilities on site, with public water services terminating at the eastern property line, bell cables and storm sewers running within the easement to the north of the property, and hydro services going from overhead to buried near the southeast corner of the site. The private utility locate sheet indicates more than 3 borehole locations were cleared. This was to provide flexibility in case one of the locations was inaccessible at the time of drilling.

The fieldwork for the drilling program was carried out on December 7, 2017. A total of three boreholes (Boreholes 1 through 3) were advanced at the site by Pontil Drilling using a track-mounted drill rig. To advance the boreholes, a combination of continuous flight, solid and hollow stem augers, and standard soil sampling equipment was utilized. All samples were collected as per ASTM D1586 to assess the strength characteristics of the substrate. The approximate borehole locations are shown in Figure 2A overlaying an aerial photograph, Figure 2B overlaying the topographic survey of the site, and Figure 2C overlaying the proposed site plan.

The boreholes were advanced from 5.0 metres (Boreholes 2 and 3) to 12.2 metres (Borehole 1) below existing grade. The horizontal locations were laid out in the field by Central Earth Engineering at the time of the drilling operations. The borehole locations were determined in conjunction with a proposed development plan that has since been superseded. All elevation and GPS measurements were measured though the use of a laser level and handheld GPS unit, and referenced to the NAD 83 geodetic datum.

The field staff examined and classified characteristics of the soils encountered in the boreholes, including the presence of fill materials, made groundwater observations during and upon completion of the drilling, recorded observations of borehole construction, and processed the recovered samples. Soil sampling was conducted at regular intervals for the full depth of all boreholes.

The boreholes were backfilled at the completion of each borehole. All recovered soil samples were logged in the field, carefully packaged and transported to the laboratory for more detailed examination and classification. In the laboratory, the samples were classified as to their olfactory, visual and textural characteristics. Stabilized groundwater levels were measured in the installed monitoring wells on the site on December 12, 2017.

5 Subsurface Conditions

5.1 General Overview

The detailed soil profiles encountered in the boreholes are indicated on the attached borehole logs in Appendix A.

It should be noted that the conditions indicated on the borehole logs are for specific locations only, and can vary between and beyond the borehole locations. It should be noted that the soil boundaries indicated on the borehole logs are inferred from non-continuous sampling and observations during drilling. These boundaries are intended to reflect approximate transition zones and should not be interpreted as exact planes of geological change.

In addition, the descriptions provided in the borehole logs are inferred from a variety of factors, including: visual observations of the soil samples retrieved, laboratory testing, measurements prior to and after drilling, and the drilling process itself (speed of drilling, shaking/grinding of the augers, etc.). The passage of time also may result in changes in conditions interpreted to existing at locations where sampling was conducted.

5.2 Stratigraphy

The results of the boreholes indicate that the slope in the western half of the site consists of a cohesive sandy silt glacial till, whereas the flat area in the eastern half of the site contains earth fill, overlying a cohesionless deposit, overlying the same cohesive glacial till present within the slope. The conditions encountered on site match closely with the publicly available geological mapping for this site as outlined in Section 2. A cross-section of the inferred stratigraphic boundaries is included within the slope stability analysis included in Appendix B.

5.2.1 Earth Fill

Earth fill was encountered in Boreholes 2 and 3 from surface (Elev. 454.5 and 453.9 metres) to 2.3 and 2.5 metres below existing grade (Elev. 452.2 and 451.4 metres). The earth fill ranges in composition, but generally consists of a sandy silt with some clay to being clayey, and trace to some gravel. Some samples obtained within the earth fill contained trace to some organics, particularly near surface. Auger grinding during drilling indicates that cobbles or boulders may be present within the earth fill. The earth fill was typically brown to black and in a moist condition.

5.2.2 Cohesionless Soils (Sands and Gravels)

Underlying the earth fill in Boreholes 2 and 3, a cohesionless deposit was encountered from 2.3 and 2.5 metres below existing grade (Elev. 452.2 and 451.4 metres) to 3.8 metres below existing grade (450.7 and 450.1 metres). In Borehole 2, this cohesionless deposit consisted of a sand and gravel with trace silt. In Borehole 3, this cohesionless deposit consisted of a sand and silt with some clay and some gravel.

The cohesionless deposits are typically loose to dense with SPT “N” Values ranging between 7 to 33 blows per 300 mm of penetration. Borehole 3 had on average lower SPT “N” Values than Borehole 2. This may be attributable to cobbles within the cohesionless deposit in Borehole 2 (as evidenced by auger grinding during the drilling process) that may have given erroneously high SPT “N” Values. The cohesionless deposits are typically brown and in a wet condition.

5.2.3 Cohesive Sandy Silt Glacial Till

A cohesive sandy silt glacial till was encountered at surface in Borehole 1 (Elev. 462.6 metres), and was encountered underlying the cohesionless soils at 3.8 metres below existing grade (Elev. 450.7 and 450.1 metres). The cohesive sandy silt glacial till extended beyond the vertical extent of investigation in Borehole 1 at 12.2 metres below existing grade (Elev. 450.4 metres) and in Boreholes 2 and 3 at 5.0 metres below existing grade (Elev. 449.5 and 448.9 metres).

The cohesive sandy silt glacial till is typically hard with SPT “N” Values ranging between 33 to greater than 100 blows per 300 mm of penetration. Portions of the cohesive sandy silt glacial till in Borehole 1 above Elev. 457 metres is firm to very stiff, with SPT “N” Values ranging from 6 to 35 blows per 300 mm of penetration. The cohesive sandy silt glacial till is typically brown and in a moist condition.

5.3 Ground Water

Monitoring wells were installed in Boreholes 1 and 2 to allow for measurement of the stabilized groundwater elevation. A summary of the groundwater level measurements is presented below:

Monitoring Well	Screened Location		Strata Screened	Depth to Water Upon Completion of Drilling (m)	Water Level in Well on December 12, 2017	
	Depth (m)	Elevation (m)			Depth (m)	Elevation (m)
1	8.2 to 11.3	454.4 to 451.3	Sandy Silt Glacial Till	Dry	5.5	457.1
2	3.0 to 4.5	450.9 to 449.4	Sand and Gravel	3.8 (Elev. 451.7 m)	1.4	452.5
3	N/A			2.3 (Elev. 452.2 m)	N/A	

Based on the above groundwater level measurements, the prevailing surficial groundwater table in the eastern half of the site is approximately 1.5 to 2.0 metres below existing grade (Elev. 452.5 to 452.0 metres). The ground water table increases in elevation in the western portion of the site, as the ground surface elevation increases in this area, and the ground water table loosely mimics the topography of the site.

Groundwater levels are expected to show seasonal fluctuations and vary in response to prevailing climate conditions. In particular, the cohesionless nature of the near surface soils on the eastern half of the site will likely be hydraulically connected with the water level in the Grand River. Increases in the water level of the Grand River will likely play a significant role in the depth to the prevailing ground water table at the site.

6 Engineering Design Parameters & Analysis

6.1 Foundation Design Parameters

The earth fill encountered at the site is not suitable for the support of spread or strip footing foundations. All foundations must extend a minimum of 0.3 metres into the undisturbed cohesionless deposits encountered at 2.3 and 2.5 metres below existing grade (Elev. 452.2 to 451.4 metres) in the eastern portion of the building footprint, and on the exposed sandy silt glacial till in the western portion of the building footprint. Spread or strip footing foundations at these approximate depths and elevations, and bearing on these deposits, can be designed using a geotechnical reaction at **SLS of 100 kPa** for 25 mm of settlement. The factored geotechnical resistance at **ULS is 150 kPa**.

The foundation design parameters provided above are predicated on the assumption that the foundation subgrade surface is undisturbed, and that all deleterious, softened, disturbed and caved material is removed. The foundation excavation must be done in such a way that ground water is controlled to prevent any disturbance to the foundation base.

The foundation subgrade must be reviewed prior to concrete placement to ensure the above foundation design parameters are applicable, and to provide remedial recommendations if necessary. If the foundation excavation will be open for a prolonged period of time, the foundation subgrade should be protected with a skim coat of lean mix concrete (after inspection by the geotechnical engineer), to ensure that no deterioration due to weather effects occur. If foundation construction occurs in freezing conditions, the foundation subgrade must be protected from freezing.

Footings stepped from one level to another should be at a slope no steeper than 7 vertical to 10 horizontal. This concept should also be applied to excavations for new foundations in relation to existing footings or underground services, unless rigid shoring is provided. All footings and pile caps exposed to freezing conditions must be provided with a minimum of 1.2 metres of earth cover or equivalent insulation for frost protection.

6.2 Seismic Site Classification

Section 4.1.8.4 of the Ontario Building Code (2012) provides values of the acceleration and velocity based site coefficients (F_a and F_v) for various time periods, associated with specific Site Classes. These Site Classes are based on the energy-corrected Average Standard Penetration Resistance values and undrained shear strength within the upper 30 metres of soil underlying the grade beams or foundations of the proposed structure. As the boreholes were advanced less than this depth at the site, the site classification recommendation provided below is based on the assumption that the soil conditions are similar below the drilled depth.

Underneath the proposed foundations, the subsoil consists of approximately 2 metres of generally cohesionless soils with SPT "N" Values of on average 20, overlaying generally cohesive glacial tills with SPT "N" Values on average greater than 50 and undrained shear strength in excess of 100 kPa. Based on this, the **Site Classification for Seismic Site Response is "C".**

6.3 Earth Pressure Design Parameters

Underground levels, basements, retaining walls and cantilevered shoring walls all must be designed to resist unbalanced lateral earth pressures imparted from the weight of adjacent soils. Lateral earth pressures are calculated using the following equation:

$$\boldsymbol{P = K[\gamma h + q]}$$

where, **P** = the horizontal pressure at depth, **h** (m)
K = the earth pressure coefficient (dimensionless)

Soil Type	- Bulk Unit Weight (kN/m3)	- Friction Angle (degrees)	Earth Pressure Coefficient (dimensionless)		
			K_a - Active	K_o – At-Rest	K_p - Passive
Earth Fill	19.0	28	0.36	0.53	2.77
Cohesionless Soils	19.0	32	0.31	0.47	3.25
Cohesive Glacial Till	21.0	35	0.27	0.60[Note 1]	3.69

Note 1: As the glacial till is likely overconsolidated, a higher at-rest earth pressure coefficient should be used than what would be applicable for a normally consolidated soil.

The calculation of the earth pressure coefficients is based on Rankine theory, which provides a conservative estimate as no friction between the soil and the structure is accounted for. The earth pressure coefficients provided above are only applicable for flat ground surfaces beyond the structure and must be increased for sloping ground surfaces. As part of the proposed development scheme, the western portion of the building will be inset into the cohesive glacial till slope with an backslope inclination of approximately 3.5H to 1V. The at-rest earth pressure coefficient in this case should be taken as 0.77.

The earth pressure coefficients referenced within the above table are a function of the friction angle of the adjacent soil, and both the degree and direction of movement of the structure subjected to unbalanced lateral earth pressures. For structures that are restrained at the top (such as basement walls), the at-rest earth pressure coefficient will apply. For structures that allow for 0.1 to 1% of movement away from the soil, the full active earth pressure coefficient will apply. For structures that allow for 1 to 10% of movement into the soil, the full passive earth pressure coefficient will apply. The percentage movement is based on the height of the structure.

Other types of structures such as shoring walls with multiple rows of tiebacks and soil nail walls are subject to different loading conditions and must be analyzed separately.

6.4 Permanent Drainage

A typical detail sketch is provided within Figure 3A of basement wall drainage, and within Figure 3B of subfloor drainage.

Where possible, the ground surface should be sloped on a positive grade away from the structure to promote surface water run-off and to reduce groundwater infiltration adjacent to underground levels and foundations. At the rear of the building, sheet drainage from the slope should be collected in a swale and directed to either side of the building. To minimize infiltration of surface water, the upper 150 mm of backfill should comprise compacted relatively impervious soil material. The cohesive sandy silt glacial till material would be suitable for re-use in this capacity.

The basement wall must be provided with damp-proofing provisions in conformance to Section 5.8.2 of the Ontario Building Code (2012). Backfill along the foundation wall must consist of Granular 'B' Type 1 (OPSS 1010) for a minimum lateral distance of 600 mm out from the foundation wall. Alternatively, if a filtered cellular drainage media is provided adjacent to the foundation wall, the backfill may consist of common earth fill.

Subdrains must be provided around the perimeter of the building, and under the basement slab on grade, to collect and remove the water that infiltrates at the building perimeter and under the floor. The subdrains must consist of minimum 100 mm diameter perforated pipes sufficiently covered on all sides by freely draining granular material (19 mm clear stone surrounded by filter fabric). Under slab subdrains must be

set at a maximum spacing of 6 metres on centre (depending on column spacing). Where possible, it is recommended that the perimeter drainage system be connected directly to the municipal storm system, and not directed into the building sumps or drainage layer. If this is not the case, the perimeter drainage must be conveyed directly to the building sumps in non-perforated pipes.

The size of the sump should be adequate to accommodate the water seepage. The subfloor drainage system should be designed to prevent the possibility of back-flow. Since this is a critical building system the storm sump must be duplexed for 100% redundant pumping capacity and the pumps must be on emergency power. Typical commercially available sump pumps are designed to handle approximately 200 litres per minute of water flow, which would be adequate for the structure at this site. This flow is not anticipated to be a sustained flow, but could be achieved under certain peak flow conditions, particularly during or directly after high precipitation events.

This system must be carefully designed and executed to ensure that no sand or silt particles can be mobilized and removed. If this were to happen the building foundations would be loosened and/or undermined which would compromise the integrity of the structural support. It cannot be over emphasised that the subfloor drainage and the filters that protect it are critical building systems and failure to design and execute these systems correctly would compromise the building.

6.5 Floor Slab

The subgrade for the basement slab on grade must be assessed by the geotechnical engineer, prior to the placement of an aggregate base. If any soft or weak subgrade areas are identified, or if there are areas containing excessive amounts of deleterious/organic material, they must be locally sub-excavated and backfilled with approved clean earth fill or imported granular material compacted to a minimum of 98% Standard Proctor Maximum Dry Density (SPMDD).

The modulus of subgrade reaction appropriate for design of the basement slab on proof-rolled and approved existing earth fill is 20,000 kPa/m. This modulus should be used as well for the western portion of the building founded on sandy silt glacial till for consistency.

It is necessary that the floor slabs be provided with a capillary moisture barrier and drainage layer. This is made by placing the slab on a minimum 200 mm layer of clear stone compacted by vibration to a dense state. The upper 50 mm of clear stone can be replaced with 19 mm crusher run limestone for a working surface.

Regardless of the approach to slab construction, the floor slabs that are to have bonded floor finishes (such as tiles with adhesives) should be provided with a vapour barrier. The floor manufacturers have specific requirements for moisture/vapour barriers, therefore, the floor designer/architect must ensure that a provision of an appropriate moisture/vapour barrier conforming to the specific floor finish product requirements is incorporated in the project specifications. Adequate testing must be carried out to ensure acceptable levels of moisture/relative humidity in the concrete slab prior to the installation of the floor finish.

The basement area may expose a cohesionless soil subgrade. These soils can potentially migrate into the subfloor drainage layer if it is not adequately separated from the native soils using a non-woven geotextile filter such as Terrafix 360R (or approved equivalent). The exposed subgrade must be evaluated by the geotechnical engineer to determine if a geotextile filter is required prior to placing the subfloor drainage layer.

6.6 Site Servicing

6.6.1 Bedding

The type of material and depth of granular bedding below the pipe will, to some extent, depend on the method of construction used by the contractor. Pipe bedding for flexible pipes should follow the requirements in Ontario Provincial Standard Drawing 802.010. Pipe bedding for rigid pipes should follow the requirements in Ontario Provincial Standard Drawings 802.030 to 802.032.

The earth fills (with inspection and approval), the cohesionless deposit, and the sandy silt glacial till subgrades will provide adequate support for pipes with the bedding requirements laid out in these OPSD's. Where disturbance of the trench base has occurred, such as due to groundwater seepage or construction traffic, the disturbed soils should be sub-excavated and replaced with suitably compacted granular fill.

Regardless of whether flexible or rigid pipes are implemented, granular bedding and cover material should consist of a well graded, free draining material, such as Granular "A" (OPSS.MUNI 1010). All granular bedding must be placed in 200 mm loose lifts and compacted to a minimum of 95% of Standard Proctor Maximum Dry Density (SPMDD). Clear stone or high-performance bedding on cohesionless soil (silt/sand/ gravel) subgrade is prohibited unless used in conjunction with an approved adequate filter fabric. In both cases, particular care must be taken to ensure adequate compaction below the haunches of the new pipe.

6.6.2 Backfill

The majority of the soils encountered on site are expected to be suitable as backfill in trenches. The backfill should be placed in maximum 200 mm thick loose lifts and compacted to a minimum of 95% SPMDD to within 1.2 metres of the final subgrade. The upper 1.2 metres below the final subgrade should be compacted to a minimum of 98% SPMDD. In confined areas the layer thickness will have to be reduced to utilize smaller compaction equipment efficiently.

Any backfill that is frozen, contains a high percentage of organic material (topsoil, peat, etc.), or has otherwise unsuitable deleterious inclusion should not be used as backfill. The maximum cobble or boulder size should not exceed half of the loose lift thickness (i.e. all particles with a diameter greater than 100 mm should be removed).

To achieve adequate compaction, backfill material should be placed within ±2% of optimum moisture content. In general, the soils encountered on site above the ground water table can be re-used without significant moisture conditioning. Soil material with a higher in-situ moisture content can be put aside to dry, mixed with drier soils, or be tilled to reduce the moisture content so that it can be effectively compacted. Alternatively, materials of higher moisture content could be wasted and replaced with imported material which can be readily compacted.

Where trenches are within the traveled portions of a parking lot or driveway, backfill within the frost penetration depth of 1.2 metres should consist of native, non-organic, excavated material consistent with the soils surrounding the trench. If this technique is not undertaken, then frequently problems arise with yearly differential frost heave movements between the trench backfill and the adjacent native soil. This would occur, for example, if imported granular fill was used to backfill the trenches, which would be less frost susceptible than the majority of the earth fill and glacial till soils currently underlying the proposed parking and driveway areas.

6.7 Pavement Design

6.7.1 Subgrade Preparation

A review of the borehole data in the area of the proposed driveway and parking areas indicates that the pavement subgrade will either consist of firm earth fill, or a hard cohesive glacial till. Both the earth fill and glacial till are adequate subgrades for the support of a pavement structure provided the subgrade is approved by a geotechnical engineer at the time of construction, and does not contain excessive amounts of organics or deleterious materials.

The subgrade must be exposed by the removal of any vegetation, topsoil, or disturbed soil. The pavement subgrade should be proof-rolled. Any loose, soft, wet or unstable areas should be sub-excavated, and backfilled with clean earth fill placed in 150 mm thick lifts and compacted to a minimum of 98% SPMDD. The earth fill materials may require localized sub-excavation and re-compaction to support pavement structure, as identified during proof roll and subgrade preparation. These areas must be sub-excavated and backfilled with clean, approved and compacted earth fill as noted above. The upper 1.2 metres of the pavement subgrade fill should be compacted to a minimum of 98% SPMDD and the remaining (below 1.2 metres depth below grade) to a minimum of 95% SPMDD.

It is anticipated that the subgrade bearing modulus for the native deposits will be 40,000 kPa/m and will be 20,000 kPa/m for any existing proof-rolled earth fill or compacted earth fill used to raise the grade per the compaction specifications above.

The long-term performance of the pavement structure is highly dependent upon the subgrade support conditions. Stringent construction control procedures must be maintained to ensure that uniform subgrade moisture and density conditions are achieved as much as possible when fill is placed, and the natural subgrade is not disturbed or weakened after it is exposed.

6.7.2 Drainage

Typical pavement drainage details are provided within Figure 3C.

Control of surface water is an important factor in achieving a good pavement life. The need for adequate subgrade drainage cannot be over-emphasized. The subgrade must be free of depressions and sloped (preferably at a minimum grade of 2 percent) to provide effective drainage toward subgrade drains. Grading adjacent to pavement areas should be designed to ensure that water is not allowed to pond adjacent to the outside edges of the pavement.

Continuous pavement subdrains should be provided along both sides of the driveway/access routes and drained into respective catchbasins to facilitate drainage of the subgrade and the granular materials. The subdrain invert should be maintained at least 0.3 metres below subgrade level. To minimize the problems of differential movement between the pavement and catchbasins/manhole due to frost action, the backfill around the structures should consist of free-draining granulars. In addition, the catchbasin should be perforated just above the drain and the holes screened with filter cloth.

The concrete surface sidewalk and entrance slabs (near flush-doors) must be supported on a minimum of 1.2 metres thick non-frost susceptible material (Granular “B”, OPSS 1010 or clearstone separated by a geotextile) provided with a provision of a subdrain with positive outlet to help minimize slab heave due to freezing weather conditions.

6.7.3 Pavement Structure

The industry pavement design methods are based on a design life of 15 to 20 years for typical weather conditions depending on actual traffic volumes. The following pavement thickness design is provided on the above noted considerations and subgrade basis.

Pavement Layer	Compaction Requirements	Minimum Component Thickness	
		Light-Duty	Heavy-Duty
Surface Course Asphaltic Concrete: HL3 (OPSS 1150) with PG 58-28 Asphalt Cement (OPSS.MUNI 1101)	OPSS 310	40 mm	40 mm
Binder Course Asphaltic Concrete: Medium Density Binder Course (OPSS 1150) with PG 58-28 Asphalt Cement (OPSS.MUNI 1101)	OPSS 310	50 mm	80 mm
Base Course: Granular A (OPSS.MUNI 1010)	100% Standard Proctor Maximum Dry Density (ASTM-D698)	150 mm	150 mm
Subbase Course: Granular B Type I or II (OPSS.MUNI 1010)	98% Standard Proctor Maximum Dry Density (ASTM- D698)	300 mm	450 mm

The granular materials should be placed in lifts 150 mm thick or less and be compacted to a minimum of 100% and 98% SPMDD for granular base and granular subbase, respectively. Asphalt materials should be rolled and compacted as per OPSS 310. The granular and asphalt pavement materials and their placement should conform to OPSS 310, 501, 1010 and 1150.

If the pavement construction occurs in wet, winter or inclement weather, it may be necessary to provide additional subgrade support for heavy construction traffic by increasing the thickness of the granular subbase, base or both. Further, traffic areas for construction equipment may experience unstable subgrade conditions. These areas may be stabilized utilizing additional thickness of granular materials.

It should be noted that in addition to adherence of the above pavement design recommendations, a close control on the pavement construction process will also be required in order to obtain the desired pavement life. Therefore, it is recommended that regular inspection and testing should be conducted during the pavement construction to confirm material quality, thickness, and to ensure adequate compaction.

6.8 Slope Stability Analysis

6.8.1 Subsurface Conditions

Soil strength parameters for the soil stratum encountered on site were estimated based on published information, empirical correlations for cohesionless soils relating SPT “N” values, soil type, unit weight and effective friction angle, and our experience on other slope evaluation projects. The following average soil properties were utilized in the slope stability analysis:

Stratum	- Bulk Unit Weight (kN/m^3)	- Friction Angle (degrees)	c – Effective Cohesion (kPa)
Earth Fill	19.0	28	0
Cohesionless Soils	20.0	32	0
Cohesive Glacial Till	21.5	35	5

The estimated soil strength parameters are also indicated on the results of the slope stability analyses within Appendix B. The above soil strength parameters are based on effective stress analysis for long-term slope stability. It is considered that these soil properties are conservative, and the site soils are stronger. Furthermore, other effects which can increase the stability of the slope, such as negative pore water pressures within unsaturated soils, and root mat reinforcement, have not been modelled.

The ground water level was modelled based on the results of the two monitoring wells installed on site. The ground water within the floodplain is at approximately Elev. 452 metres, with the ground water table loosely mimicking the topography of the site to match the ground water level obtained from near the top of the slope.

6.8.2 Analysis of Existing Conditions

Stability analyses were carried out using the commercially available computer program *Slide* provided by RocScience Inc. The slope stability analyses were based on a force and moment limit equilibrium analysis using the Morgenstern-Price method. This method of analysis calculates the minimum factor of safety (resisting versus driving forces) for numerous circular surfaces. The circular surfaces are centred on points on a grid with a set number of radius distances to be calculated for each centre. A factor of safety of 1.0 indicates the slope is at a point of pending failure since the resisting forces are equal to the driving forces.

To assess the existing slope stability conditions, a slope profile was modelled based on the topographic cross-section provided within the architectural drawings referenced in Appendix E. As the slope is relatively uniform across the site, the critical cross-section was chosen that represented the largest proposed cut of 2.6 metres into the existing slope to accommodate building construction. This cross-section is located along the northern portion of the property, running east-west. The first figure provided in Appendix B shows details of both how the slope was modelled, and the results of the analyses.

The stability analyses indicate that the existing slope, which has an overall slope of approximately 3.5H:1V, has a factor of safety of 3.27. Based on the relatively shallow nature of the slope, and the fact that there are no signs of slope stability issues or erosion, this result matches expectations.

6.8.3 Proposed Development Concept

Due to the significant grade difference between the eastern and western property boundaries, the proposed development scheme involves essentially leaving the existing slope in the western third of the site untouched, with the exception of a cut of up to 2.6 metres into the slope to accommodate construction of the building in the centre of the site. The cut within the existing slope cannot be done vertically, and must be cut no steeper than a 1H : 1V slope inclination, as per OHSA standards, to accommodate footing and building wall construction.

The second figure in Appendix B shows the slope stability analysis during excavation of the proposed building at the location of the largest cut of 2.6 metres into the slope. During this temporary condition, a minimum factor of safety of 1.68 is obtained. Once the building is completed, a minimum factor of safety of

3.07 is obtained. Typically a minimum factor of safety of 1.5 must be achieved for residential developments during permanent conditions, and a minimum factor of safety of 1.1 during temporary conditions. As such, the slope stability conditions for the proposed development concept both during and after construction is considered adequate and acceptable.

7 Constructability Considerations

7.1 Excavations

Excavations must be carried out in accordance with the Occupational Health and Safety Act, Ontario Regulation 213/91 (as amended), Construction Projects, Part III - Excavations, Section 222 through 242.

Where workers must enter a trench or excavation the soil must be suitably sloped and/or braced in accordance with the OHSA. These regulations designate four (4) broad classifications of soils to stipulate appropriate measures for excavation safety. The regulation stipulates safe slopes of excavation by soil type as follows:

- **Type 2 Soils – Sandy Silt Glacial Till:** Requires trench sidewalls to be constructed no steeper than 1 horizontal to 1 vertical from a point 1.2 metres above the base of the excavation. The bottom 1.2 metres of the excavation can be constructed with vertical walls.
- **Type 3 Soils - Earth Fill and Cohesionless Soils (when dewatered or above the ground water table):** Requires trench sidewalls to be constructed no steeper than 1 horizontal to 1 vertical from the base of the excavation.
- **Type 4 Soils – Earth Fill and Cohesionless Soils (within the ground water table):** Requires trench sidewalls to be constructed no steeper than 3 horizontal to 1 vertical from the base of the excavation. Below the ground water table in cohesionless soils, this may not be possible.

Section 227.3 of the OHSA stipulates that if an excavation contains more than one type of soil, the soil within the excavation will all be classified as the highest number (i.e. if the excavation contains both Type 3 and 4 Soils, the excavation will be constructed as per the requirements of a Type 4 soil). Minimum support system requirements for steeper excavations are stipulated in Sections 235 through 238 and 241 of the OHSA and include provisions for timbering, shoring and moveable trench boxes.

In order to reduce the potential for instability of the trench excavations, materials excavated from the service trenches and/or other fill materials or heavy equipment should not be placed near the crest of the trench excavations.

It is important to note that soils encountered in the construction excavations may vary significantly across the site. Our preliminary soil classifications are based solely on the materials encountered in widely spaced explorations. The contractor should verify that similar conditions exist throughout the proposed area of excavation. If different subsurface conditions are encountered at the time of construction, we recommend that Central Earth Engineering be contacted immediately to evaluate the conditions encountered.

7.2 Temporary Construction Ground Water Control

The static groundwater table generally ranges between 1.5 to 2.0 metres below existing grade, expected to be generally around Elev. 452.5 to 452.0 metres. The proposed lowest building level will be situated at Elev. 454.5 metres. Founding soils on the eastern half of the building footprint were encountered at Elev. 452.2 to 451.4 metres.

Based on the above elevations, the excavation for the building itself will be approximately 2 metres above the prevailaing ground water table, and there should be limited ground water control issues present. The excavation for foundations may extend 0.5 to 1.0 metres into the prevailing ground water table.

The cohesionless deposits will allow the free flow of water when wet. Local sumps placed at the base of the excavation can typically control groundwater seepage where excavations extend no more than 0.5 metres into the prevailing groundwater table in cohesionless deposits. Sumps created with a corrugated steel pipe filled with gravel which allows the water to enter the sumps and continuously pumping the sumps until all the water stored within the cohesionless soils are drained can typically control groundwater seepage where excavations extend no more than 1.0 metres into the prevailing groundwater table in cohesionless deposits. The exact depth where these groundwater control techniques are estimates only, and are directly correlated to how coarse or fine the native soils encountered are.

Positive methods for control of groundwater seepages may be required for deeper excavation, which may include, although may not necessarily be limited to, lowering the groundwater table a minimum of 0.5 metres below the proposed underside of footing elevation prior to construction using a system such as well-points. If the groundwater table is not controlled during construction, for excavations in excess of some 1.0 metres below the groundwater table, the excavation will be unstable, and the foundation subgrade will be disturbed to such an extent that the foundation design parameters given in Section 5.2 will not be applicable.

Construction in the areas where cohesionless deposits are present should preferably be scheduled during the dry months of the year when the groundwater table is usually the lowest, in order to minimize the quantity of groundwater to be handled. A test dig is recommended to permit prospective contractors an opportunity to view and assess the conditions likely to be encountered and the preferred means of construction cognizant of their own experience and available experience. Additional monitoring of the well installed on site during different seasons can also provide insight onto the best times of year to do foundation excavation.

It is expected that due to the relatively limited extent of excavation required for the foundations, and provided the foundation excavations are done in drier times of the year, ground water inflows can be adapted to ensure that water takings are less than 50,000 L/day. For construction dewatering that is less than 50,000 L/day, the takings of both ground water and storm water does not require a Construction Dewatering Assessment Report (CDAR) and does not require a Permit to Take Water (PTTW) from the Ministry of the Environment and Climate Change (MOECC).

7.3 Quality Verification Services

On-site quality verification services are an integral part of the geotechnical design function, and for foundations and retaining walls, are required under the Ontario Building Code. Quality verification services are used to confirm that construction is being conducted in general conformance with the requirements as outlined in the drawings, reports and specifications prepared for the proposed development.

Central Earth Engineering can provide all the on-site quality verification services outlined below:

- The subgrade for shallow foundations must be field reviewed by the geotechnical engineer as required by Section 4.2.2.2 of the Ontario Building Code (2012).
- Installation of retaining structures and related backfilling operations must be field reviewed on a continuous basis by the geotechnical engineer as required by Section 4.2.2.2 of the Ontario Building Code (2012).

- The performance of the slab-on-grade and the pavement structure is dependent upon the consistency of the subgrade support conditions. Proof-rolling of the subgrade is recommended to ensure that the assumptions of the subgrade support capabilities indicated by the borings are consistent with site conditions.
- The performance of the pavement structure, and the bedding/backfilling of site servicing, is dependant on the material quality and degree of compaction during construction. To ensure these structures are constructed as per the recommendations within this report, part-time monitoring of the material quality, lift thickness, moisture contact, degree of compaction, etc. is recommended.
- Testing of the concrete (compressive strength, slump, air content, etc.) and testing of the asphalt (asphalt content and gradation) are recommended to ensure that the quality of the materials being brought to site meet the requirements of the project.

7.4 Site Work

The soils found at this site will become weakened when subjected to traffic, particularly when wet. If there is site work carried out during periods of wet weather, then it can be expected that the subgrade will be disturbed unless an adequate granular working surface is provided to protect the integrity of the subgrade soils from construction traffic. Subgrade preparation works cannot be adequately accomplished during wet weather and the project must be scheduled accordingly. The disturbance caused by the traffic can result in the removal of disturbed soil and use of granular fill material for site restoration or underfloor fill that is not intrinsic to the project requirements.

The most severe loading conditions on the subgrade may occur during construction. Consequently, special provisions such as end dumping and forward spreading of earth and aggregate fills, restricted construction lanes, and half-loads during paving and other work may be required, especially if construction is carried out during unfavourable weather.

If construction proceeds during freezing weather conditions, adequate temporary frost protection for the founding subgrade and concrete must be provided. The soil at this site is highly susceptible to frost damage. Consideration must be given to frost effects, such as heave or softening, on exposed soil surfaces in the context of this particular project development.

8 Limitations and Conclusion

8.1 Limitations

The investigation and comments are necessarily on-going as new information of underground conditions becomes available. More specific information with respect to the conditions between samples, or the lateral and vertical extent of materials may become apparent during excavation operations. The interpretation of the borehole information must, therefore, be validated during excavation operations. Consequently, during the future development of the property, conditions not observed during this investigation may become apparent. Should this occur, Central Earth Engineering should be contacted to assess the situation and additional testing and reporting may be required.

Central Earth Engineering should be retained for a general review of the final design drawings and specifications to verify that this report has been properly interpreted and implemented. If not accorded the privilege of making this review, Central Earth Engineering will assume no responsibility for interpretation of the recommendations in the report. For example, it should be appreciated that modifications to bearing

levels may be required if unforeseen subsoil conditions are revealed after the excavation is exposed to full view or if final design decisions differ from those assumed in this report.

The comments given in this report are intended only for the guidance of the design engineers. The number of boreholes required to determine the localized underground conditions between boreholes affecting construction costs, techniques, sequencing, equipment, scheduling, etc. could be 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.

This report was prepared by Central Earth Engineering for the account of Golden Canadian Homes Inc. 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. Central Earth Engineering accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this project

8.2 Conclusion

We trust this report is complete within our terms of reference, and the information presented is sufficient for your present purposes. If you have any questions, or when we may be of further assistance, please do not hesitate to contact our office.

Yours Truly,

Central Earth Engineering

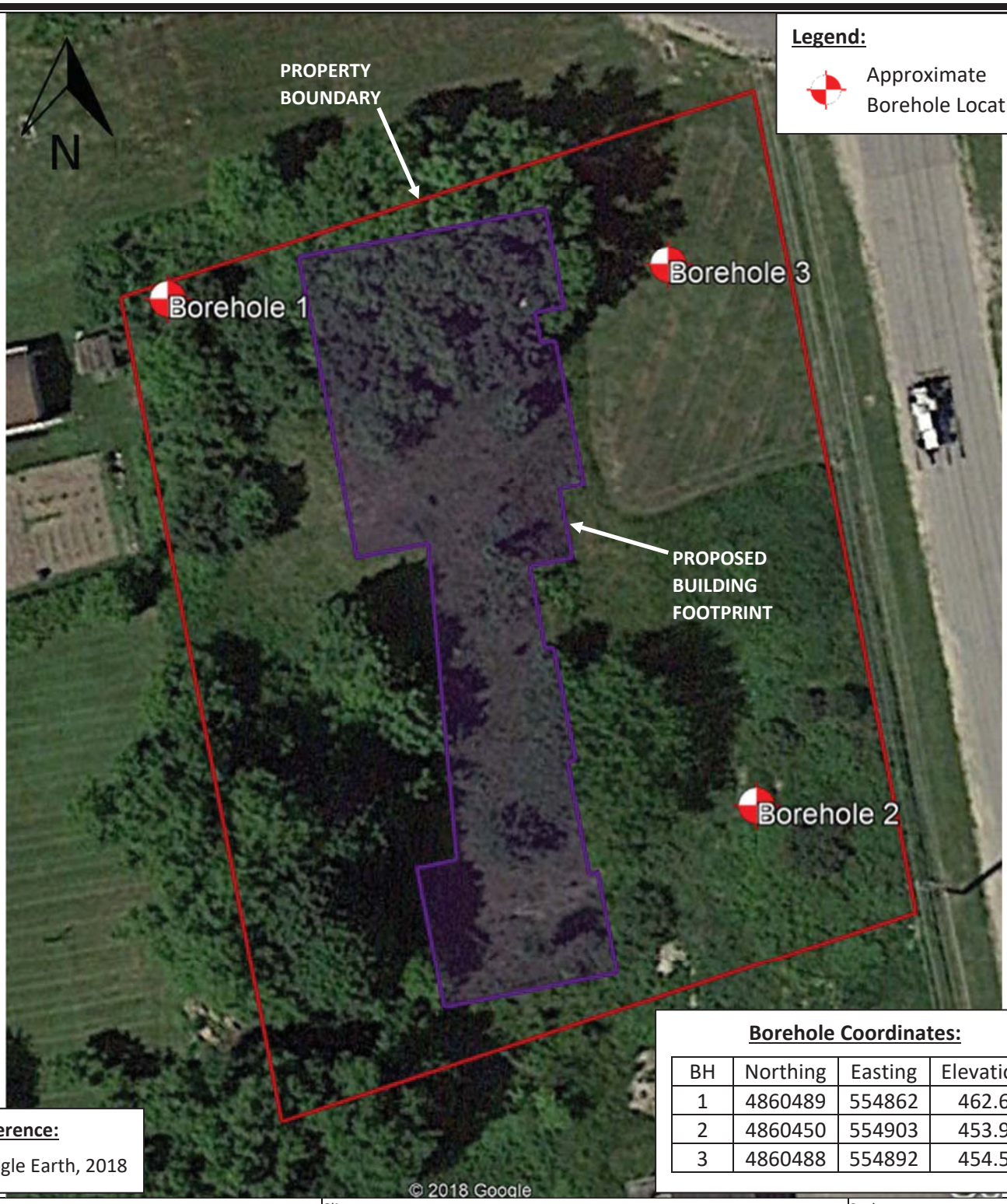
Alexander Winkelmann, P.Eng.
President, Geotechnical Engineer

Figures –

Central Earth ENGINEERING

Geotechnical Engineering and Construction Materials Testing & Inspection Services

Client: Golden Canadian Homes Inc.	Scale: See Drawing
	Date: Jan. 2018
Project: 100, 108 & 114 Emma St. S., Grand Valley	Drawn By: A.W.
	Project No: 17-1000A
Title: SITE LOCATION PLAN	FIGURE 1



Legend:

Approximate Borehole Location

Reference:

Google Earth, 2018

Borehole Coordinates:

BH	Northing	Easting	Elevation
1	4860489	554862	462.6
2	4860450	554903	453.9
3	4860488	554892	454.5

Central Earth ENGINEERING

Geotechnical Engineering and Construction Materials Testing & Inspection Services

Client: Golden Canadian Homes Inc.

Project: 100, 108 & 114 Emma St. S., Grand Valley

Title: BOREHOLE LOCATION PLAN - AERIAL

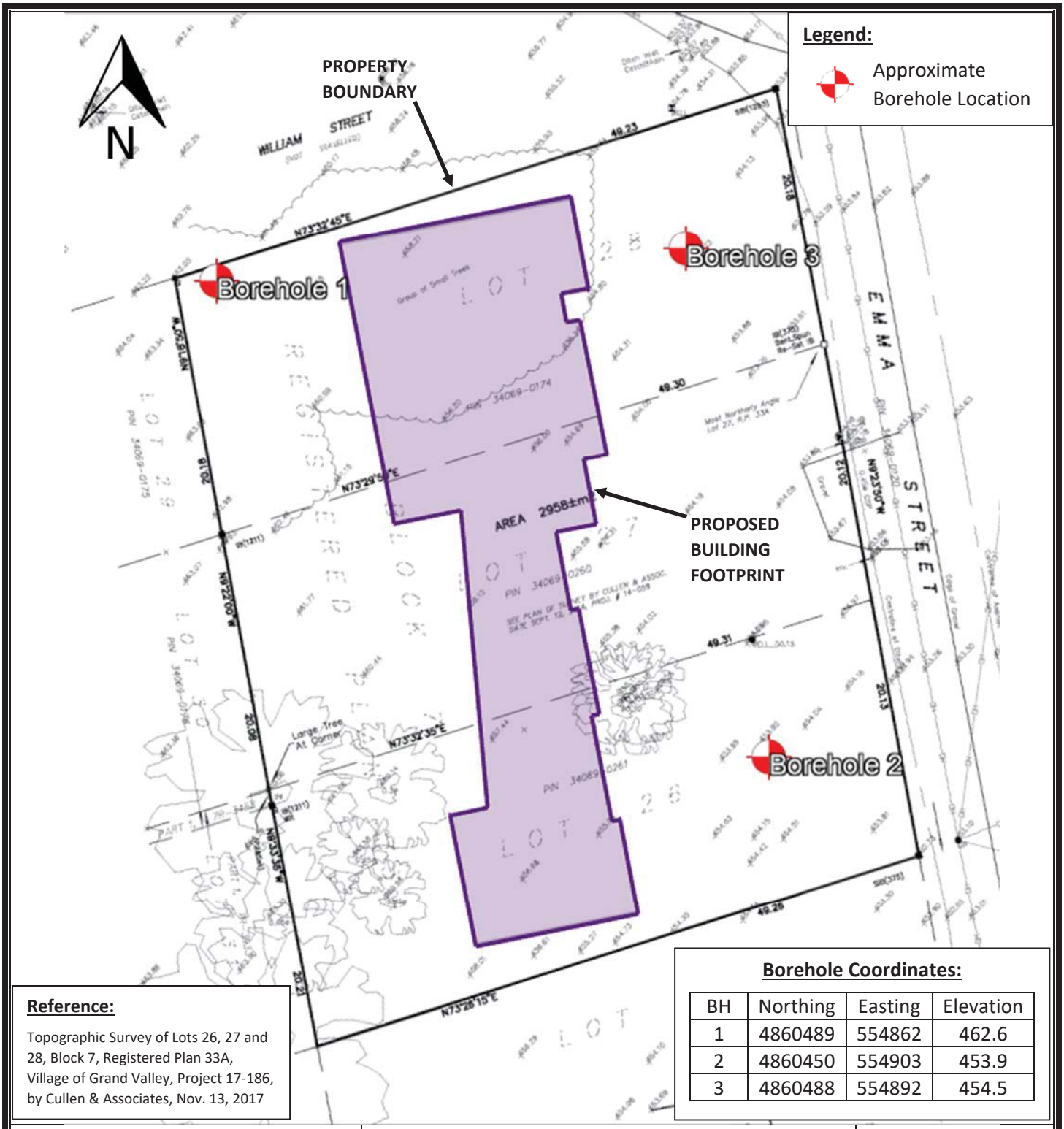
Scale: See Drawing

Date: Jan. 2018

Drawn By: A.W.

Project No: 17-1000A

FIGURE 2A



Legend:

Approximate Borehole Location

Reference:

Topographic Survey of Lots 26, 27 and 28, Block 7, Registered Plan 33A, Village of Grand Valley, Project 17-186, by Cullen & Associates, Nov. 13, 2017

Borehole Coordinates:

BH	Northing	Easting	Elevation
1	4860489	554862	462.6
2	4860450	554903	453.9
3	4860488	554892	454.5

Central Earth ENGINEERING

Geotechnical Engineering and Construction Materials Testing & Inspection Services

Client: Golden Canadian Homes Inc.

Scale: See Drawing

Date: Jan. 2018

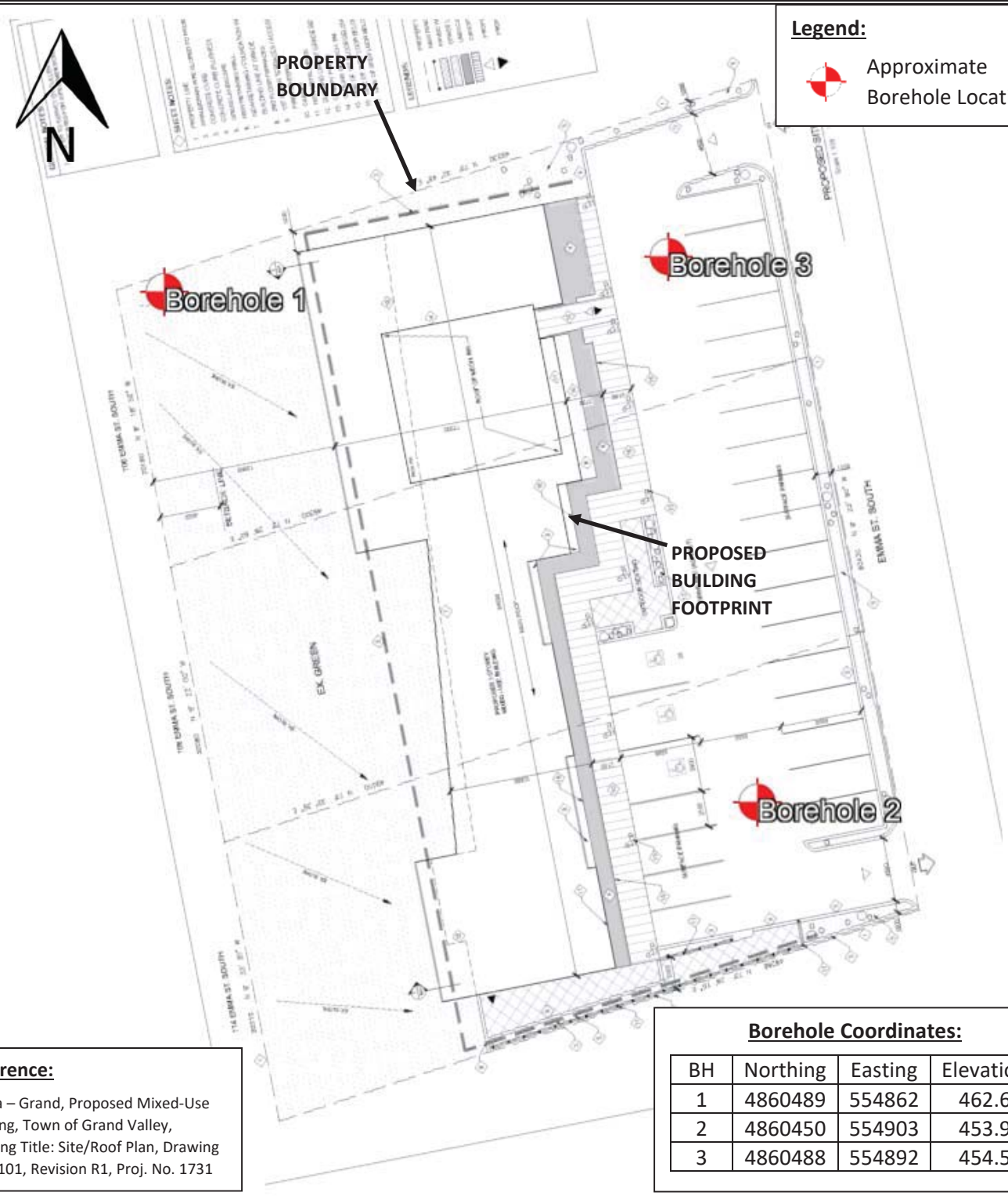
Project: 100, 108 & 114 Emma St. S., Grand Valley

Drawn By: A.W.

Project No: 17-1000A

Title: BOREHOLE LOCATION PLAN - SURVEY

FIGURE 2B



Legend:

Approximate Borehole Location

Reference:

Emma – Grand, Proposed Mixed-Use Building, Town of Grand Valley, Drawing Title: Site/Roof Plan, Drawing No. A101, Revision R1, Proj. No. 1731

Borehole Coordinates:

BH	Northing	Easting	Elevation
1	4860489	554862	462.6
2	4860450	554903	453.9
3	4860488	554892	454.5

Central Earth ENGINEERING

Geotechnical Engineering and Construction Materials Testing & Inspection Services

Client: Golden Canadian Homes Inc.

Scale: See Drawing

Date: Jan. 2018

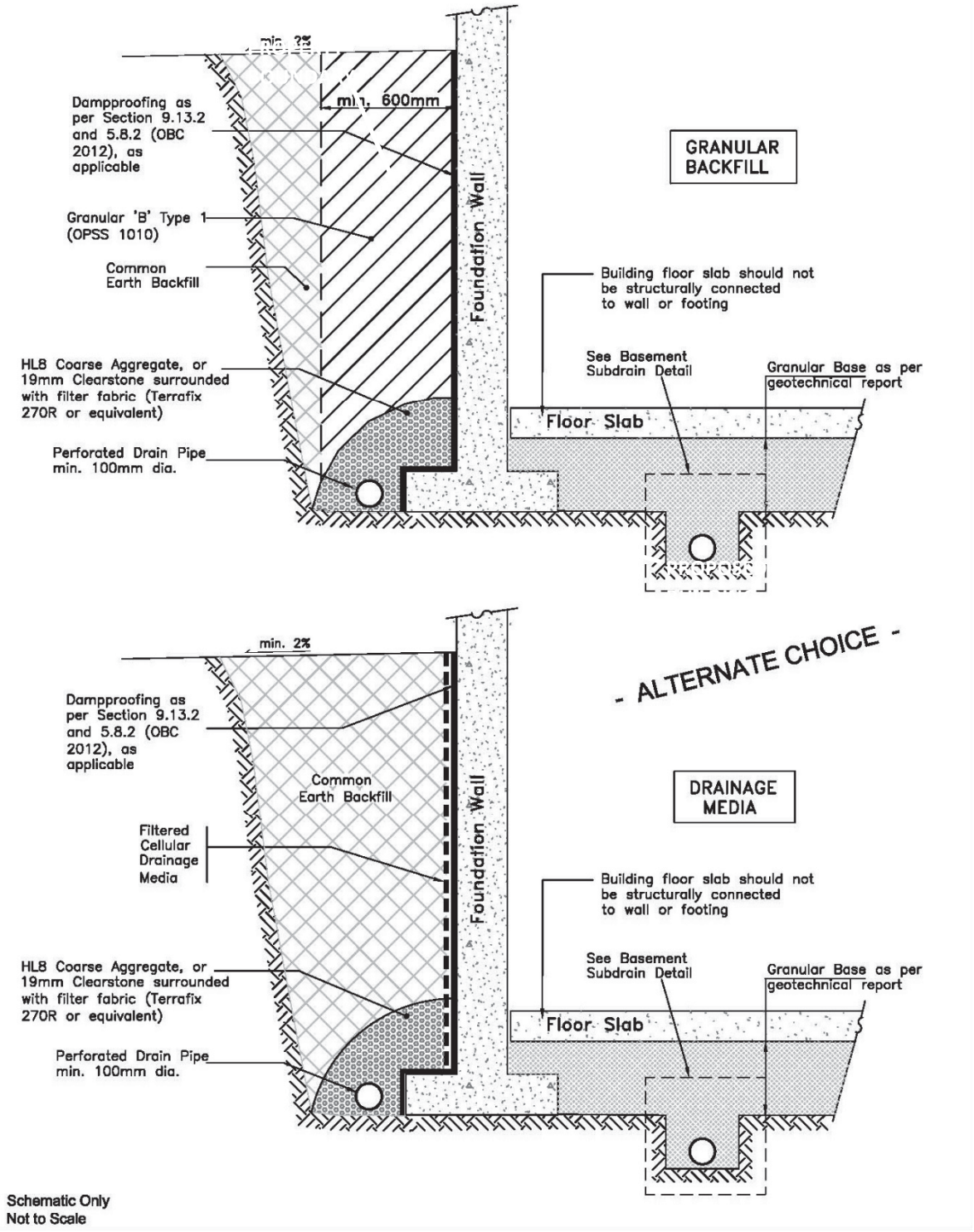
Project: 100, 108 & 114 Emma St. S., Grand Valley

Drawn By: A.W.

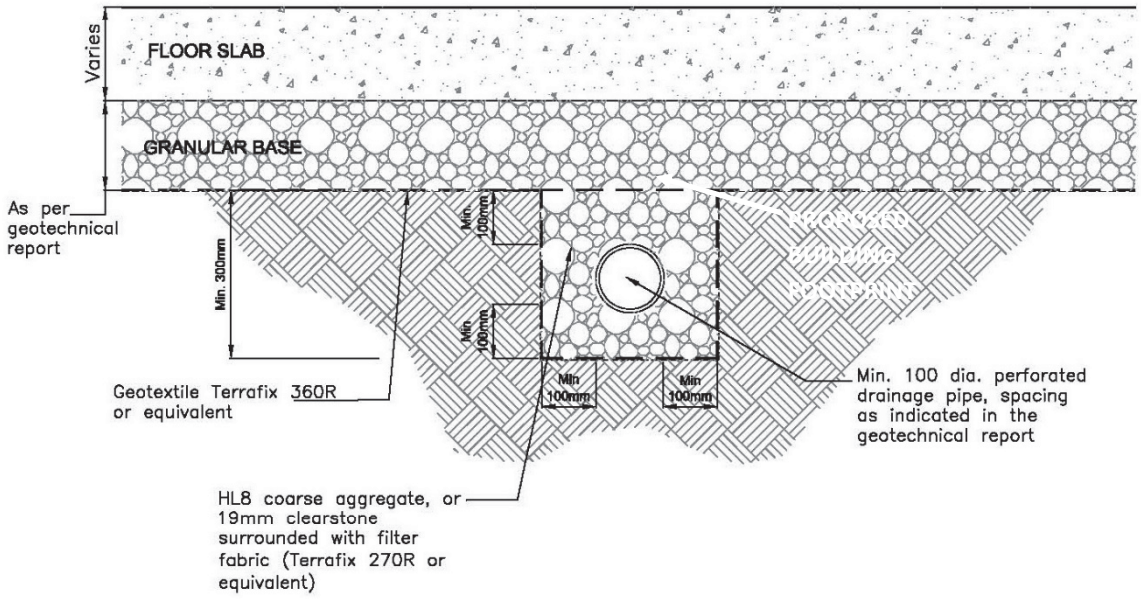
Project No: 17-1000A

Title: BOREHOLE LOCATION PLAN – SITE PLAN

FIGURE 2C



Central Earth ENGINEERING *Geotechnical Engineering and Construction Materials Testing & Inspection Services*	Client: Golden Canadian Homes Inc.	Scale: See Drawing Date: Jan. 2018
	Project: 100, 108 & 114 Emma St. S., Grand Valley	Drawn By: A.W. Project No: 17-1000A
	Title: PAVEMENT DRAINAGE – TYPICAL DETAIL	FIGURE 3A

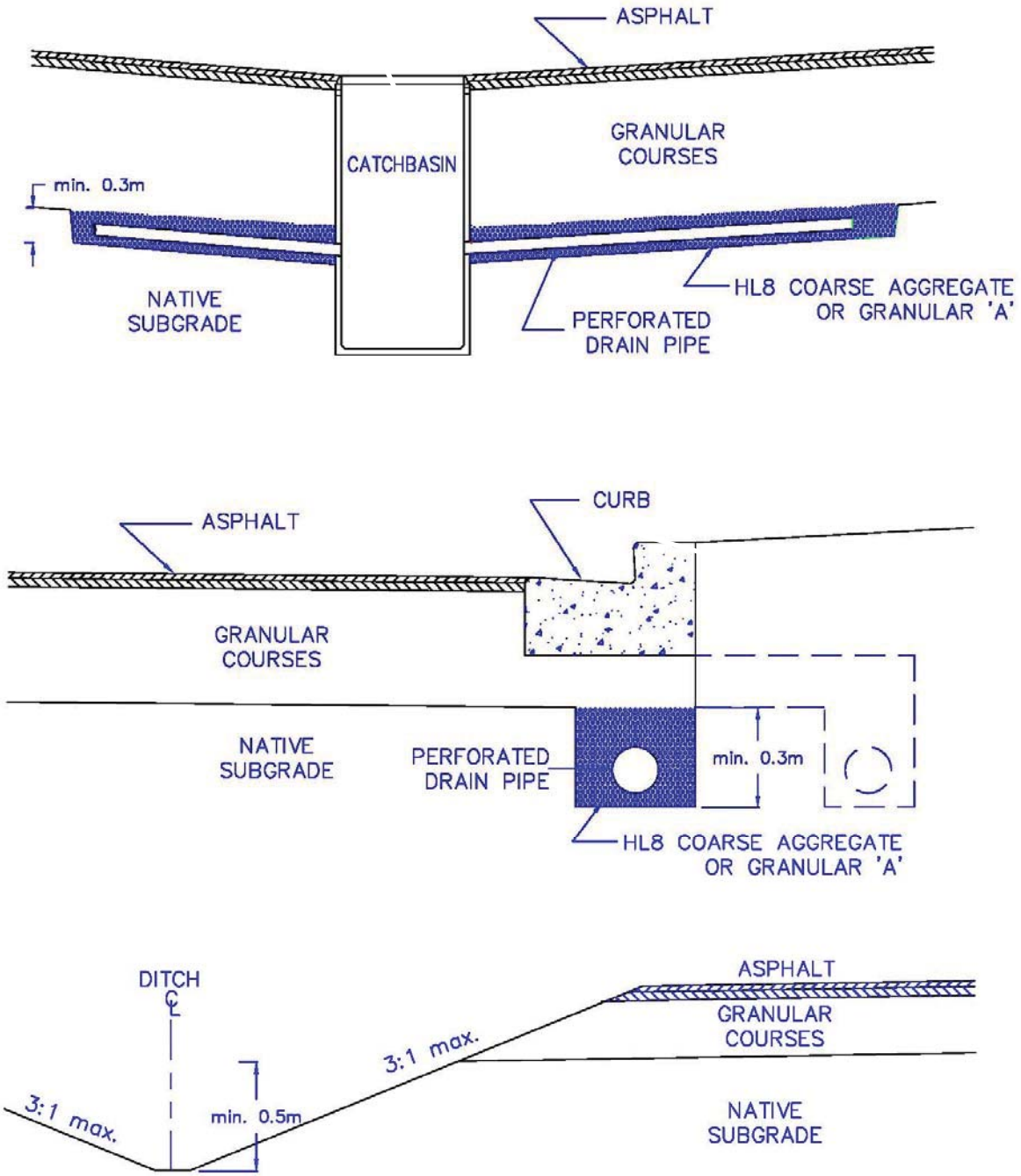


Schematic Only
Not to Scale

Central Earth ENGINEERING

Geotechnical Engineering and Construction Materials Testing & Inspection Services

Client: Golden Canadian Homes Inc.		Scale: See Drawing
		Date: Jan. 2018
Project: 100, 108 & 114 Emma St. S., Grand Valley		Drawn By: A.W.
		Project No: 17-1000A
Title: SUBFLOOR DRAINAGE – TYPICAL DETAIL		FIGURE 3B



Central Earth ENGINEERING

Geotechnical Engineering and Construction Materials Testing & Inspection Services

Client: Golden Canadian Homes Inc.		Scale: See Drawing
		Date: Jan. 2018
Project: 100, 108 & 114 Emma St. S., Grand Valley		Drawn By: A.W.
		Project No: 17-1000A
Title: PAVEMENT DRAINAGE – TYPICAL DETAIL		FIGURE 3C

Appendix A –

Central Earth ENGINEERING	**Client:** Golden Canadian Homes Inc. **Project:** 17-1000A **Address:** 100, 108 and 114 Emma St. S, Grand Valley, ON	**WELL LOG** **Well No.** 1 **Page:** 1 of 3

Drilling Start Date:	**12/07/2017 12:30**	Boring Depth (m):	**12.2**	Well Depth (m):	**11.3**
Drilling End Date:	**12/07/2017 15:30**	Boring Diameter (mm):	**150.00**	Well Dia. (mm):	**50.0**
Drilling Company:	**Pontil Drilling**	Sampling Method(s):	**Split Spoon**	Screen Slot (mm):	**1.000**
Drilling Method:	**Solid Stem Auger**	DTW After Drilling (m):	**Dry**	Riser Material:	**Sch 40 PVC**
Drilling Equipment:	**CME 55**	DTW Dec. 12, 2017 (m):	**5.5**	Screen Material:	**Sch 40 PVC Slotted**
Driller:	**S. Belanger**	Ground Elev. (m):	**462.6**	Seal Material(s):	**Other/Bent. Chips**
Logged By:	**A. Winkelmann**	Location (X,Y):	**N 4860489, E 554862**	Filter Pack:	**Sand Pack**

DEPTH (m)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Time	COLLECT: Blow Counts	COLLECT: "N" Value	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: WC (%)	MEASURE: Lab Sample	DEPTH (m)
0				SS		1 3 3 4	6	(0m) NATIVE: Sandy Silt, clayey, trace gravel, trace organics and rootlets, firm to stiff, mottled black, moist (Glacial Till)	15	S-1	0
				SS		2 5 7	12	(0.8m) no rootlets, dark brown	10	S-2	
1				SS		4 4 4	8	(1.5m) no organics ...grinding from 1.5 to 2.5 m	20	S-3	1
2				SS		6 10 12	22	(2.3m) very stiff to hard, brown	9	S-4	2
3				SS		7 15 20	35		10	S-5	3
4				SS		6 13 12	25		10	S-6	4
5											5

NOTES:

Central Earth ENGINEERING	Client:	Golden Canadian Homes Inc.	WELL LOG
	Project:	17-1000A	Well No. 1
	Address:	100, 108 and 114 Emma St. S, Grand Valley, ON	Page: 2 of 3

Drilling Start Date:	12/07/2017 12:30	Boring Depth (m):	12.2	Well Depth (m):	11.3
Drilling End Date:	12/07/2017 15:30	Boring Diameter (mm):	150.00	Well Dia. (mm):	50.0
Drilling Company:	Pontil Drilling	Sampling Method(s):	Split Spoon	Screen Slot (mm):	1.000
Drilling Method:	Solid Stem Auger	DTW During Drilling (m):	Dry	Riser Material:	Sch 40 PVC
Drilling Equipment:	CME 55	DTW Dec. 12, 2017 (m):	5.5	Screen Material:	Sch 40 PVC Slotted
Driller:	S. Belanger	Ground Elev. (m):	462.6	Seal Material(s):	Other/Bent. Chips
Logged By:	A. Winkelmann	Location (X,Y):	N 4860489, E 554862	Filter Pack:	Sand Pack

DEPTH (m)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Time	COLLECT: Blow Counts	COLLECT: "N" Value	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: WC (%)	MEASURE: Lab Sample	DEPTH (m)
5								Stratigraphy continued from previous page			5
6				SS		11 27 27	54	(6.1m) hard	8	S-7	6
7				SS		5 50	50 / 150 mm		8	S-8	7
8											8
9				SS		13 31 44	75	...wet spoon at 9.1 m	8	S-9	9
10											10

NOTES:

Central Earth ENGINEERING	**Client:** Golden Canadian Homes Inc. **Project:** 17-1000A **Address:** 100, 108 and 114 Emma St. S, Grand Valley, ON	**WELL LOG** **Well No.** 1 **Page:** 3 of 3

Drilling Start Date:	**12/07/2017 12:30**	Boring Depth (m):	**12.2**	Well Depth (m):	**11.3**
Drilling End Date:	**12/07/2017 15:30**	Boring Diameter (mm):	**150.00**	Well Dia. (mm):	**50.0**
Drilling Company:	**Pontil Drilling**	Sampling Method(s):	**Split Spoon**	Screen Slot (mm):	**1.000**
Drilling Method:	**Solid Stem Auger**	DTW During Drilling (m):	**Dry**	Riser Material:	**Sch 40 PVC**
Drilling Equipment:	**CME 55**	DTW Dec. 12, 2017 (m):	**5.5**	Screen Material:	**Sch 40 PVC Slotted**
Driller:	**S. Belanger**	Ground Elev. (m):	**462.6**	Seal Material(s):	**Other/Bent. Chips**
Logged By:	**A. Winkelmann**	Location (X,Y):	**N 4860489, E 554862**	Filter Pack:	**Sand Pack**

DEPTH (m)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Time	COLLECT: Blow Counts	COLLECT: "N" Value	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: WC (%)	MEASURE: Lab Sample	DEPTH (m)
10								Stratigraphy continued from previous page			10
11											11
12				SS		50	50 / 25 mm		7	S-10	12
								(12.2m) Boring terminated			
13											13
14											14
15											15

NOTES:

Central Earth ENGINEERING	**Client:** Golden Canadian Homes Inc. **Project:** 17-1000A **Address:** 100, 108 and 114 Emma St. S, Grand Valley, ON	**WELL LOG** **Well No.** 2 **Page:** 1 of 1

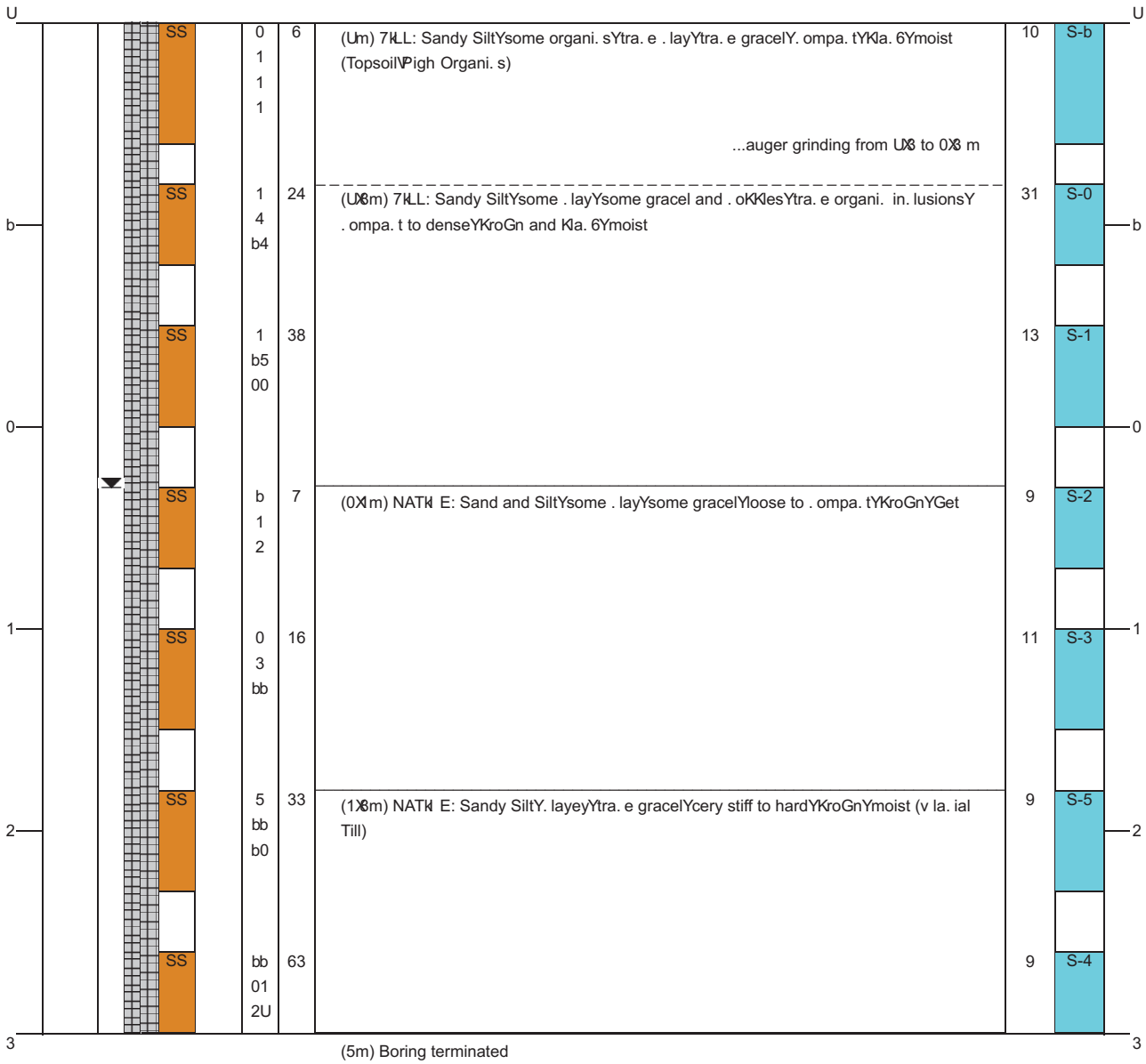
Drilling Start Date:	**12/07/2017 10:30**	Boring Depth (m):	**5.0**	Well Depth (m):	**4.6**
Drilling End Date:	**12/07/2017 11:30**	Boring Diameter (mm):	**200.00**	Well Dia. (mm):	**50.0**
Drilling Company:	**Pontil Drilling**	Sampling Method(s):	**Split Spoon**	Screen Slot (mm):	**1.000**
Drilling Method:	**Hollow Stem Auger**	DTW During Drilling (m):	**3.8**	Riser Material:	**Sch 40 PVC**
Drilling Equipment:	**CME 55**	DTW Dec. 12, 2017 (m):	**1.4**	Screen Material:	**Sch 40 PVC**
Driller:	**S. Belanger**	Ground Elev. (m):	**453.9**	Seal Material(s):	**Slotted Other/Bent.**
Logged By:	**A. Winkelmann**	Location (X,Y):	**N 4860450, E 554903**	Filter Pack:	**Chips Sand Pack**

DEPTH (m)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Time	COLLECT: Blow Counts	COLLECT: "N" Value	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: WC (%)	MEASURE: Lab Sample	DEPTH (m)
0				SS		2 4 4 5	8	(0m) FILL: Sandy Silt, clayey, some organics, trace gravel, trace rootlets, loose, black, moist (Topsoil/High Organics)	48	S-1	0
				SS		2 3 5	8		40	S-2	
1				SS		2 4 4	8	(1.5m) FILL: Sandy Silt, clayey, trace gravel, loose, mottled brown and black, moist ...auger grinding 1.5 to 2.5 m	28	S-3	1
2				SS		1 11 22	33	(2.3m) brown (2.5m) NATIVE: Sand and Gravel, trace silt, compact to dense, brown, moist ...auger grinding 2.7 to 3.0 m	21 7	S-4A S-4B	2
3				SS		30 17 10	28	(3m) wet	10	S-5	3
4				SS		6 12 21	33	(3.7m) NATIVE: Sandy Silt, clayey, trace gravel, hard, brown, moist (Glacial Till)	9	S-6	4
				SS		10 17 26	44		11	S-8	
5								(5m) Boring terminated			5

NOTES:

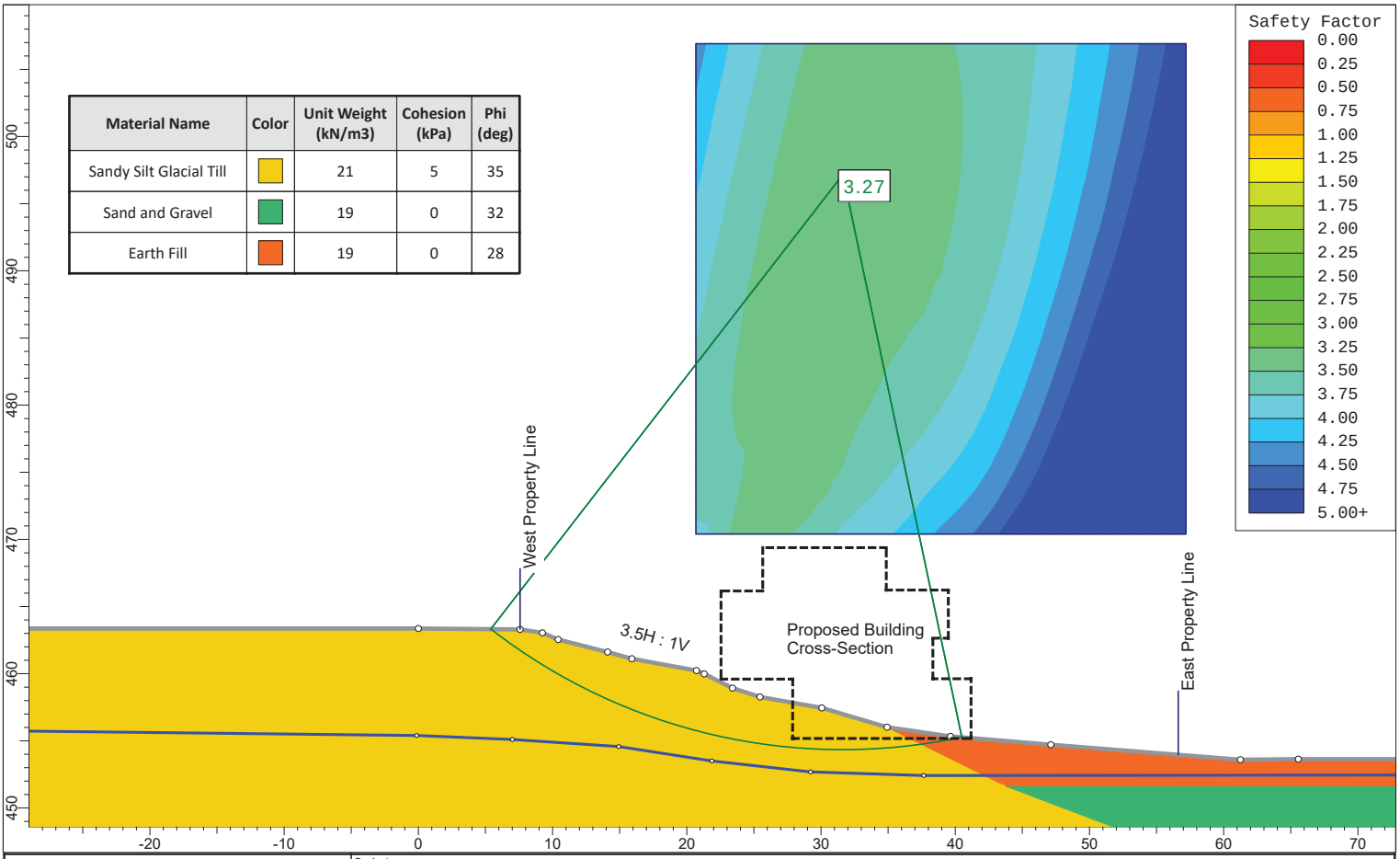
Central Earth ENGINEERING	Client: Golden Canadian Homes Inc.	BORING LOG
	Project: 17-1000A	Boring No. 3
	Address: 100, 108 and 114 Emma St. S, Grand Valley, ON	Page: 1 of 1

Drilling Start Date:	**12/07/2017 09:00**	Boring Depth (m):	**5.0**
Drilling End Date:	**12/07/2017 10:00**	Boring Diameter (mm):	**150.00**
Drilling Company:	**Pontil Drilling**	Sampling Method(s):	**Split Spoon**
Drilling Method:	**Solid Stem Auger**	DTW During Drilling (m):	**2.3**
Drilling Equipment:	**CME 55**	DTW Dec. 12, 2017 (m):	**N/A**
Driller:	**S. Belanger**	v round ElecX(m):	**454.5**
Logged By:	**A. Winkelmann**	Lo. ation (, YR):	**N 4860488, E 554892**



NOTES:

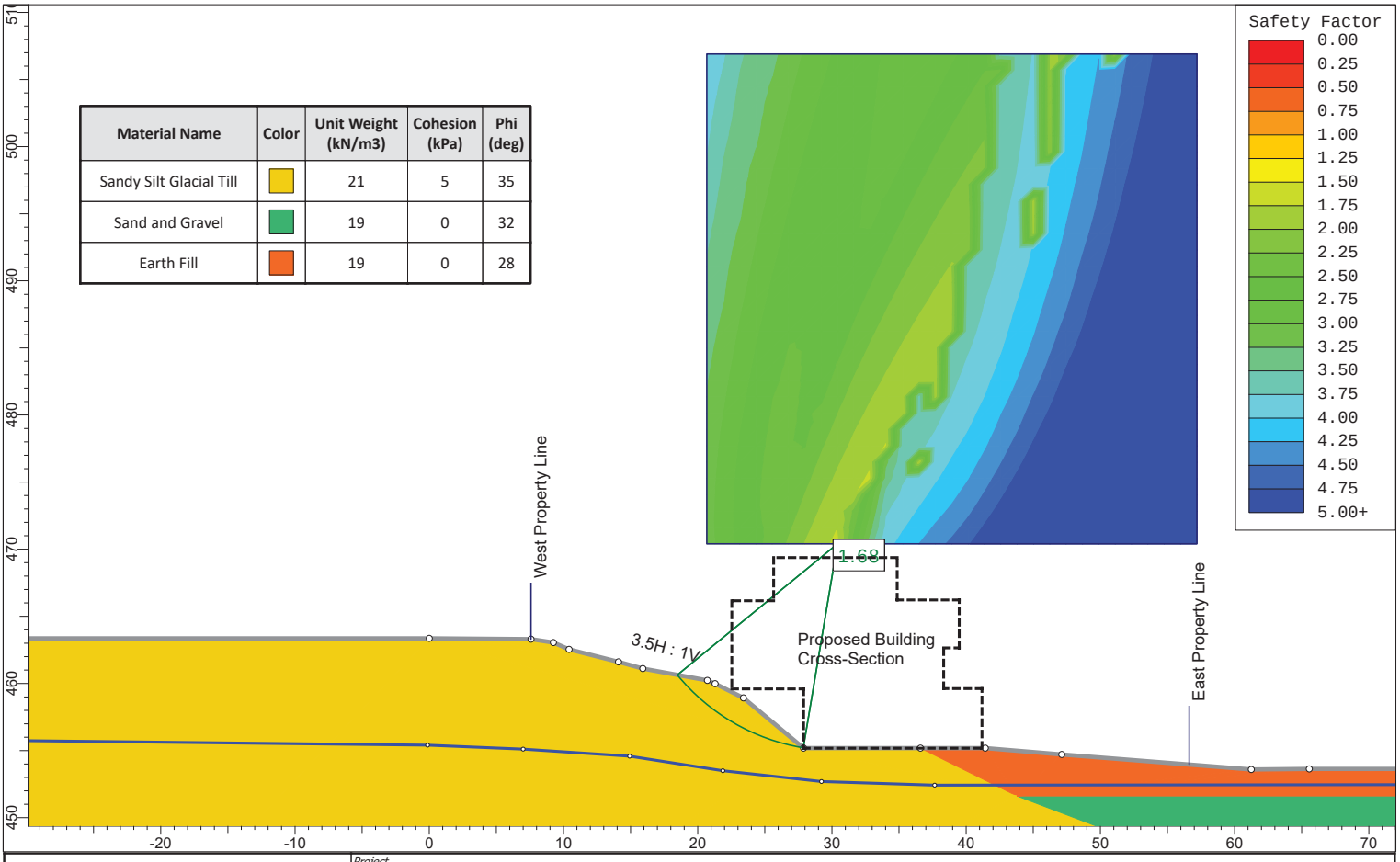
Appendix B –



Central Earth ENGINEERING

SLIDEINTERPRET 7.030

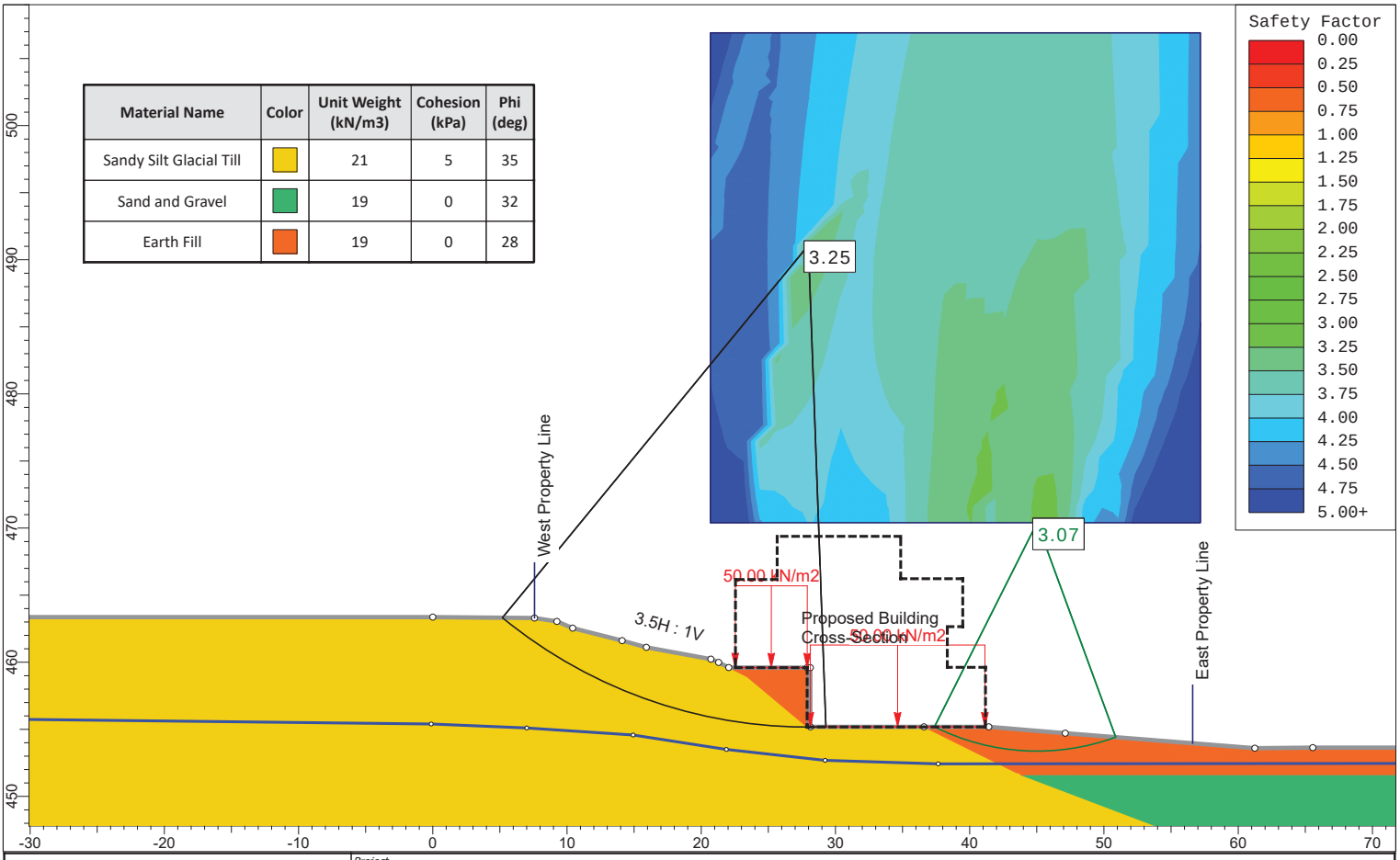
Project	100, 108 & 114 Emma St. S., Grand Valley		
Analysis Description	Existing Conditions		
Drawn By	A. Winkelmann	*Scale* 1:400	*Company* Central Earth Engineering
Date	2017-12-10, 1:38:44 PM		*File Name* Slope Analysis - Existing Conditions.slim



Central Earth ENGINEERING

SLIDEINTERPRET 7.030

Project	100, 108 & 114 Emma St. S., Grand Valley		
Analysis Description	Temporary Construction Conditions		
Drawn By	A. Winkelmann	Scale 1:400	Company Central Earth Engineering
Date	2017-12-10, 1:38:44 PM		File Name Slope Analysis - Temporary Construction Conditions.slim



Central Earth ENGINEERING	Project	100, 108 & 114 Emma St. S., Grand Valley	
	Analysis Description	Proposed Conditions	
	Drawn By: A. Winkelmann	Scale: 1:400	Company: Central Earth Engineering
	Date: 2017-12-10, 1:38:44 PM		File Name: Slope Analysis - Proposed Conditions.slim

SLIDEINTERPRET 7.030

Appendix C –

PHOTOGRAPH 1

Description:

View of the centre portion of the site, as viewed from Emma St. S.

PHOTOGRAPH 2

Description:

View of the southern portion of the site, as viewed from Emma St. S.

PHOTOGRAPH 3

Description:

View of the northern portion of the site, as viewed from Emma St. S.

PHOTOGRAPH 4

Description:

View of the flat area on the eastern portion of the site.

PHOTOGRAPH 5

Description:

View of the slope profile on the western portion of the site.

PHOTOGRAPH 6

Description:

View of the slope crest, coincident with the western property boundary.

PHOTOGRAPH 7

Description:

View of looking down the slope from the western property boundary towards Emma St. S.

Appendix D –

OnSite LOCATES

1-800-805-6155
digsafe@onsitelocates.ca
www.onsitelocates.ca

PRIVATE UTILITY LOCATE REPORT

Primary Locate Sheet

v. 10/16

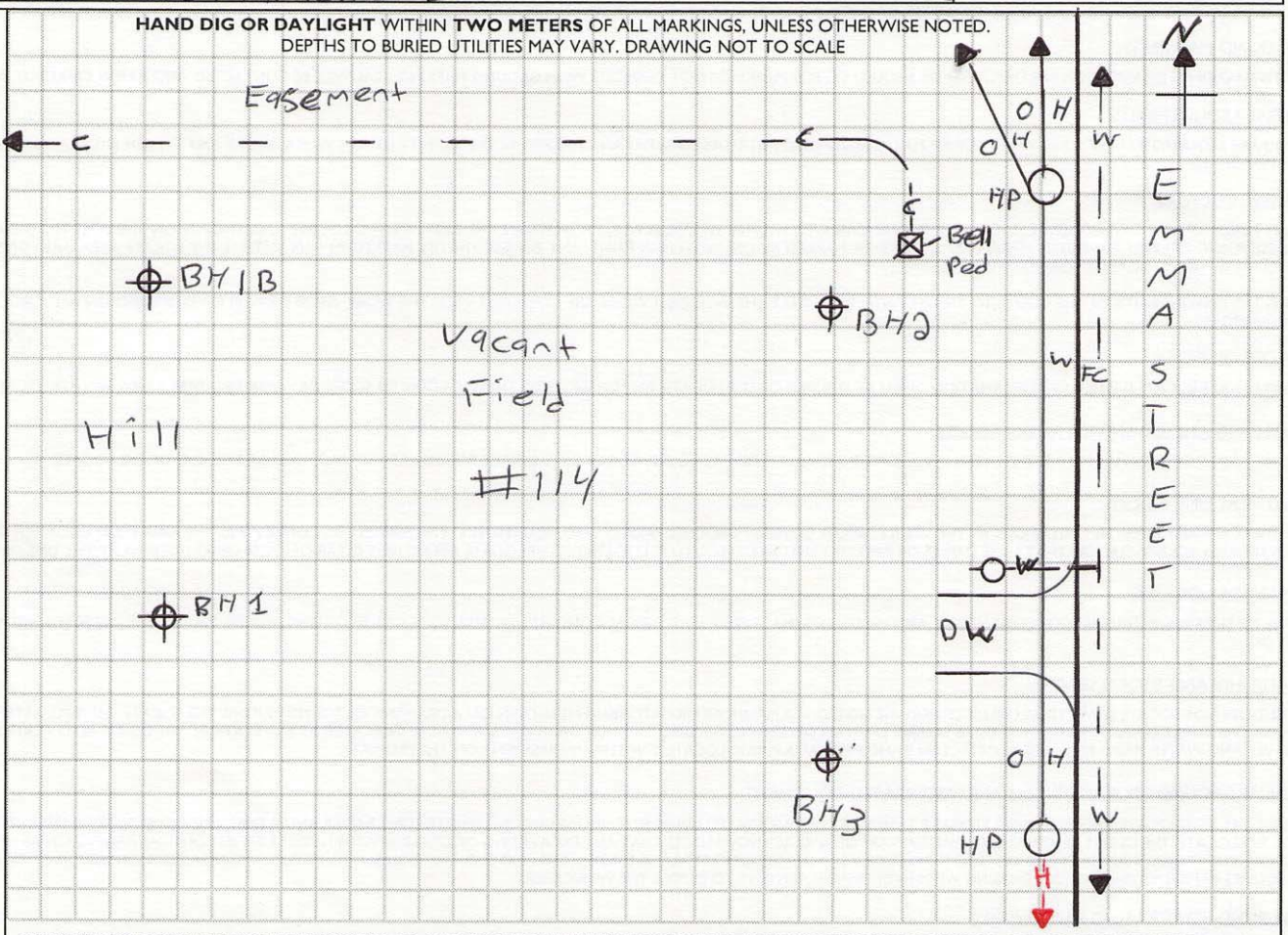
PAGE 1 OF 2

CLIENT COMPANY: Central Earth Engineering	DATE: 11-23-17 (Valid for 30 days from this date.)
CLIENT REPRESENTATIVE: Alexander Winkelmann	CLIENT PHONE: 705-229-4298
CLIENT ADDRESS: 42 Rundle Cres, Barrie, ON	P.O. / JOB #: 17-1000
SITE ADDRESS / NEAREST INTERSECTION: 114 Emma St, Grand Valley, ON	WEATHER: -1° Cloudy
LOCATE AREA / LIMIT OF LOCATE: FROM: Im ground marked BH's	FROM:
TO: Im Radius ground marked BHS	TO:
	PURPOSE OF LOCATE: BH's
	PROJECT #: 17-46-24768

LEGEND

LIMIT OF LOCATE	LOL
BOREHOLE	⊕
TEST PIT	⊞
BUILDING LINE	
PROPERTY LINE	PL
FENCE LINE	FL
STANDARD IRON BAR	SIB
BOLLARD	B
POST INDICATOR VALVE	PIV
FACE CURB LINE	FC
ROAD EDGE	RE
BUILDING LINE	BL
CRITICAL ZONE	CZ
RAILWAY	
SIDEWALK	SW
HYDRO POLE	HP
LIGHT STANDARD	LS
SIGN POST	SP
MANHOLE	MH
HAND HOLE	HH
CATCH BASIN	CB
FIRE HYDRANT	FH
TRANSFORMER	TX or ⊠
VAULT	V
WATER VALVE	WV
HAND WELL	HW
WATER	WS
HYDRO	H
GAS	G
ELECTRICAL	E
COMMUNICATION	C
FIBRE OPTIC	FO
TELEPHONE	T
CABLE TV	TV
SEWER	S
SPRINKLER	SP
PIPELINE	P
SANITARY	SAN
STORM	STM
UNKNOWN TYPE	?
KIOSK	K
OVERHEAD	OH
PHONE BOOTH	PB
BELL PEDESTAL	⊠

HAND DIG OR DAYLIGHT WITHIN **TWO METERS** OF ALL MARKINGS, UNLESS OTHERWISE NOTED.
DEPTHS TO BURIED UTILITIES MAY VARY. DRAWING NOT TO SCALE



PRIVATE LOCATORS ARE NOT AUTHORIZED TO MARK PUBLIC UTILITIES FOR EXCAVATION PURPOSES UNLESS UNDER CONTRACT WITH THE PUBLIC UTILITY OWNER. THE PUBLIC UTILITIES SHOWN ABOVE HAVE BEEN MARKED BY OTHERS OR MARKED BY ONSITE LOCATES WITH PINK PAINT OR FLAGS FOR REFERENCE AND SURVEY PURPOSES ONLY. ANY BURIED UTILITIES MARKED WITH PINK WITHIN THE LOCATE AREA BY ONSITE LOCATES, REQUIRE A LOCATE FROM THE PUBLIC UTILITY OWNER OR THEIR AUTHORIZED CONTRACTOR.

NOTES: Utility Locate Methods Used: ☑ Active ☑ Passive ☐ Inductive Sweep ☐ Ground Penetrating Radar (GPR 1000 MHz) ☐ GPR (250 MHz) ☐ EM61 ☐ Camera with Sonde
Sewer Lines: ☐ Traced ☑ Not Traced ☐ Inverts Marked Where Visible Private Detectable Services Found: ☐ As Shown Above ☐ None

LIMITATIONS / SPECIAL INSTRUCTIONS : IF THERE IS A LIMITATION INDICATED HERE, THERE IS AN **ELEVATED RISK** OF STRIKING A BURIED UTILTY. THE CLIENT REPRESENTATIVE IS TO NOTIFY ALL INVOLVED WITH THE PROJECT (INCLUDING AND NOT LIMITED TO ALL FIELD STAFF, PROJECT MANAGERS, THEIR CLIENT AND/OR PROPERTY OWNER OF THE SUBJECT PROPERTY IF THE SAME). A "NO" CHECKED INDICATES A LIMITATION, WHICH TRANSLATES INTO AN INCREASED RISK OF NOT FINDING ALL BURIED UTILITIES WITHIN THE WORK AREA.

As-Built or Utility Drawings requested from: Alexander Winkelmann

Site Plan (showing work area): ☑ Yes ☐ No As-Built or Utility Drawings: ☑ Yes ☐ No Survey: ☐ Yes ☑ No Building Access: ☐ Yes ☐ No ☑ NA Ground Snow Covered: ☐ Yes ☑ No

LIST ALL OTHERS:

EQUIP. USED: ☑ Transmitter/Receiver ☐ GPR 250 MHz ☐ SEWER CREW ☐ GPR 1000 MHz ☐ EM61 ☐ MAGNOMETER

START TIME: 2:30 TRAVEL TIME: 2.5
FINISH TIME: 4:00 OTHER:

TECH 1: M.K 4 hrs. TECH 3: ____ hrs.
TECH 2: ____ hrs. TECH 4: ____ hrs.

THE CLIENT HAS BEEN MADE AWARE AND ACKNOWLEDGES THAT ANY **PUBLIC UTILITY OWNED** SERVICES (GAS, TELEPHONE, CABLE TV, HYDRO, WATER, SEWER, ETC.) WITHIN THE LIMITS OF THIS LOCATE AND MARKED BY ONSITE LOCATES INC., ARE FOR SURVEY PURPOSES ONLY AND REQUIRE PUBLIC LOCATES.
BY SIGNING BELOW, THE CLIENT AGREES TO ALL THE TERMS AND CONDTIONS AND LIMITATIONS ON ALL PAGES AND REVERSE OF THE LOCATE REPORTS.

☑ Client Requested Email Delivery

awinkelmann@centralearth.ca	Alexander Winkelmann	Emailed	
Email Delivery Address	Print Name of Client Representative	Client Representative's Signature	Locate Technician Signature

MUST BE SIGNED BY CLIENT TO BE VALID OR THE CLIENT IS IN AGREEMENT AND ACKNOWLEDGES THE TERMS OF THIS REPORT IF THIS REPORT WAS EMAILED AND NOT SIGNED.
A COPY OF THIS LOCATE REPORT MUST BE ON-SITE AND IN THE HANDS OF THE PERSON EXCAVATING DURING WORK OPERATIONS.

CLIENT COMPANY ACKNOWLEDGEMENTS

BY SIGNING OR RECEIVING AN EMAILED COPY OF THIS LOCATE REPORT, THE CLIENT HAS READ, ACKNOWLEDGES AND AGREES TO THE FOLLOWING:

EXCAVATE / EXCAVATOR:

"EXCAVATE" OR "EXCAVATOR" MEANS ANY OPERATION OR OPERATOR USING NON-MECHANICAL OR MECHANICAL EQUIPMENT OR EXPLOSIVE TO MOVE OF EARTH, ROCK OR OTHER MATERIAL BELOW EXISTING GRADE. THIS INCLUDES, BUT IS NOT LIMITED TO AUGERING, BLASTING, BORING, DIGGING, DITCHING, DREDGING, DRILLING, DRIVING-IN, GRADING, PLOWING-IN, PULLING-IN, RIPPING, SCRAPING, TRENCHING, AND TUNNELING.

LIMIT OF LOCATE:

THE EXCAVATOR MUST NOT WORK OUTSIDE THE INDICATED DIG AREA OR LIMIT OF THE LOCATE WITHOUT FURTHER LOCATES BY ONSITE LOCATES INC. (OSL).

MULTIPLE EXCAVATORS:

WHEN A LOCATE IS BEING PROVIDED FOR MORE THAN ONE PARTY WORKING ON THE PROJECT, ALL EXCAVATORS ARE TO BE NAMED ON THE LOCATE REPORT AND THE CLIENT IS CONSIDERED TO BE ACTING ON THE BEHALF OF THE EXCAVATOR IN ACCEPTING AND ENSURING THE EXCAVATOR RECEIVES A COPY OF THIS LOCATE.

VALIDITY OF LOCATE:

THIS LOCATE IS ONLY VALID FOR 30 DAYS UNLESS STATED OTHERWISE ON THE STAKEOUT REPORT. A RE-MARK OF SURFICIAL MARKINGS PLACED ON THE SITE BY OSL MUST BE OBTAINED PRIOR TO ANY EXCAVATION IF: MARKINGS BECOME UNCLEAR, DISAPPEAR, ARE DISTURBED OR DISPLACED; THE SKETCH AND SITE MARKINGS DO NOT COINCIDE; THE WORK LOCATION HAS CHANGED; AND, IF ANYTHING OCCURS WHICH MAY INDICATE THAT A NEW OR BETTER OR DIFFERENT LOCATE SERVICE IS NEEDED.

GROUND MARKINGS:

IF THE MARKINGS DISAPPEAR OR ARE DISPLACED OR SHOULD SKETCH MARKINGS NOT COINCIDE WITH GROUND MARKINGS, OSL WILL BE CONTACTED AND A NEW STAKEOUT WILL BE OBTAINED.

LEGAL REQUIREMENTS:

YOU ARE REQUIRED BY LAW TO HAVE ALL BURIED PUBLIC AND PRIVATE UTILITIES LOCATED AND MARKED IN THE VICINITY OF ANY WORK BEFORE ANY TYPE OF EXCAVATION OR DRILLING ACTIVITIES ARE TO BE PERFORMED.

PUBLIC LOCATES:

ANY PUBLIC UTILITY OWNED SERVICES (GAS, TELEPHONE, CABLE TV, HYDRO, WATER, SEWER, ETC.) WITHIN THE LIMITS OF THIS LOCATE AND SHOWN ON THE LOCATE REPORT, ARE FOR REFERENCE ONLY. THESE PUBLIC UTILITIES HAVE BEEN MARKED BY OTHERS OR MARKED BY OSL WITH PINK PAINT. ANY BURIED UTILITIES MARKED IN PINK WITHIN THE LOCATE AREA, ARE FOR SURVEY PURPOSES ONLY, AND REQUIRE A PUBLIC LOCATE BEFORE EXCAVATING.

IT IS THE RESPONSIBILITY OF THE CLIENT TO ENSURE AND VERIFY THAT THE INTENDED WORK ARE COINCIDES WITH THE WORK AREAS DRAWN OR DESCRIBED ON ALL PUBLIC AND PRIVATE UTILITY STAKEOUT REPORTS.

SCOPE OF WORK:

THIS PRIVATE LOCATE IS BASED ON INFORMATION GIVEN AT THE TIME OF THE LOCATE. ANY CHANGES TO THE LOCATION OR SCOPE OF WORK REQUIRES A NEW PRIVATE LOCATE.

BUILDING AND/OR SERVICE ROOM ACCESS:

SOME CABLES OR PIPES MAY NOT BE DETECTED OR LOCATED IF DIRECT PHYSICAL ACCESS TO BUILDING SERVICE ROOMS ARE NOT PROVIDED AT THE TIME OF THE LOCATE.

PHYSICAL LIMITATIONS:

IF THERE ARE ANY PHYSICAL LIMITATIONS AT THE SITE (I.E., SNOW COVERED GROUND, PARKED CARS, EQUIPMENT OR MATERIALS ETC. CONGESTING THE AREA TO BE LOCATED), THE CLIENT IS HEREBY MADE AWARE AND ACKNOWLEDGES THAT SOME CABLES OR PIPES MAY NOT BE DETECTED OR LOCATED IF THE LOCATE AREA IS NOT CLEAR OF THESE OBSTRUCTIONS AT THE TIME OF THE LOCATE.

INTERIOR LOCATES:

DUE TO BUILDING INTERFERENCES, CONGESTION, AND HIDDEN OR INACCESSIBLE ELECTRICAL CONDUITS OR PIPES, SOME CABLES OR PIPES MAY OR MAY NOT BE DETECTED WITH THE EQUIPMENT EMPLOYED BY OSL.

SANITARY AND STORM SEWERS:

OSL DOES NOT LOCATE SEWER LINES UNLESS OTHERWISE NOTED. IF A MANHOLE OR CATCHBASIN IS SHOWN ON A DRAWING OR FOUND DURING THE LOCATE, OSL WILL ATTEMPT TO OPEN THEM AND MARK THE INVERT DIRECTIONS ONLY. IF OSL IS UNABLE OPEN OR DETERMINE THE DIRECTION OF THE INVERTS, IT WILL BE INDICATED AS A LIMITATION. THE CLIENT ALSO ACKNOWLEDGES THAT TRUNK SEWER AND WATER MAINS MAY NOT BE DETECTABLE AND REQUIRE A PUBLIC LOCATE IF WITHIN AN EASEMENT ON THE PROPERTY.

UNDERGROUND STORAGE TANKS AND ASSOCIATED EQUIPMENT:

OSL DOES NOT LOCATE UNDERGROUND STORAGE TANKS OR ANY ASSOCIATED EQUIPMENT UNLESS GROUND PENETRATING RADAR AND A EM61 TIME DOMAIN METAL DETECTOR IS EMPLOYED AT THE TIME OF THE LOCATE. THE CLIENT ALSO HAS BEEN MADE AWARE OF AND ACKNOWLEDGES THAT ANY EXCAVATING OR DRILLING WITHIN POST DEFINED CRITICAL AREAS SUCH AS 3 METERS AROUND ANY UNDERGROUND PETROLEUM EQIUPMENT AND STRUCTURES SUCH AS UNDERGROUND STORAGE TANKS (USTS) AND FUEL DISPENSERS; AND, WITHIN THE AREA BETWEEN USTS, PUMP DISPENSERS AND FUEL KIOSK, REQUIRES HAND DIGGING OR SOFT DIGGING WITH HYDROVAC EQUIPMENT TO EXPOSE THE WORK AREA.

GROUND PENETRATING RADAR (GPR):

THE CLIENT HAS BEEN MADE AWARE AND ACKNOWLEDGES THAT GPR HAS PERFORMANCE LIMITATIONS SUCH AS HIGH-CONDUCTIVITY MATERIALS SUCH AS CLAY AND SILTS SOILS AND SOLIDS THAT ARE SALT CONTAMINATED. PERFORMANCE IS ALSO LIMITED BY SIGNAL SCATTERING IN HETEROGENEOUS CONDTIONS (e.g. ROCKY SOILS, LARGE TREE ROOTS, CONTRUCTION DEBRIS, REBAR etc.)

LIMITATIONS:

THE TECHNOLOGIES EMPLOYED BY OSL TO TRACE AND MARK BURIED UTILITIES ARE COMPLIENT WITH ACSE STANDARD 38-02 LEVEL B WHICH ARE ASSIGNED TO HAVE A MODERATE RISK. THESE GEOPHYSICAL METHODS ARE NOT 100% EFFECTIVE AND CANNOT DETECT ALL BURIED SERVICES SINCE THERE ARE TOO MANY VARIABLES THAT CAN WORK AGAINST THE EQUIPMENT. IT MAY NOT BE POSSIBLE TO ABSOLUTELY "CLEAR" REGARDLESS OF THE SKILL, EFFORT OR TECHNOLOGIES USED BY OSL. LOCATING METHODS USED BY OSL ONLY HELPS REDUCE RISK OF STRIKING A BURIED UTILITY AND DOES NOT ELIMINATE THE RISK. IF PRECISE HORIZONTAL AND VERTICAL LOCATIONS OF UTILITIES ARE NEEDED, THEN ACSE STANDARD 38-02 QUALITY LEVEL A METHODS WOULD NEET TO BE EMPLOYED. QUALITY LEVEL A METHODS INVOLVE THE ACTUAL EXPOSURE OF A UTILITY BY MEANS OF EITHER HAND DIGGING OR THE USE OF A HYDROVAC OR OTHER DAYLIGHTING SYSTEMS.

SOME CABLES OR PIPES MAY NOT BE DETECTABLE OR LOCATED ACCURATELY DUE TO DEPTH, LACK OF OR MALFUNCTIONING TRACER WIRES, MATERIAL MAKEUP, CONFINED SPACES, OR INABILITY TO CONNECT PROPERLY. THIS MAY BE COMPOUNDED BY THE LACK OF ACCESS OR ACCESS TOO FAR FROM THE AREA TO BE TRACED.

THE LOCATION AND MARKING OF BURIED UTILITIES BY THE OSL LOCATE TECHNICIAN FOR THE CLIENT REPRESENTATIVE IS FOR THE CONVENIENCE OF THAT SAID APPLICANT ONLY AND DOES NOT RELIEVE SAID APPLICANT, OR ANY PERSON OR CORPORATION, FROM LIABILITY FOR DAMAGES OR PERSONAL INJURY INCLUDING DEATH TO ANY PERSON OR FOR PROPERTY DAMAGE CAUSED TO THE SAID PLANT OR TO ANY OTHER PROPERTY, BY REASON OF THE SAID APPLICANT, OR ANY OTHER PERSON OR CORPORATION, HAVING RELIED UPON THE LOCATION AND MARKING OF FACILITIES BY OSL.

IF THERE ARE ANY LIMITATIONS NOTED ON THE LOCATE REPORT AND/OR SITE SERVICES CHECKLIST, THE CLIENT REPRESENTATIVE WILL NOTIFY ALL INVOLVED WITH THE PROJECT INCLUDING AND NOT LIMITED TO ALL FIELD STAFF, PROJECT MANAGER, THE CLIENT'S AND CLIENT AND/OR PROPERTY OWNER OF THE SUBJECT PROPERTY IF THE SAME.

THE UTILITY LOCATE PREPARED BY OSL IS FOR THE USE OF THE CLIENT AND NOT THEIR SUB-CONTRACTORS. UNLESS THE SUB-CONTRACTORS ARE NAMED ON THE LOCATE REPORT, THE SAID SUB-CONTRACTOR IS GIVEN A COPY OF THE LOCATE REPORT, AND IS NOTIFIED OF ANY LIMITATIONS NOTED WITHIN THE STAKEOUT REPORT.

BY SIGNING THE LOCATE REPORT, HE OR SHE FULLY UNDERSTANDS ALL OF THE INFORMATION PRESENTED IN THE LOCATE REPORT, SITE SERVICES CHECKLIST AND CLIENT COMPANY ACKNOWLEDGEMENT.

THE CLIENT WARRANTS THAT OSL IS NOT LIABLE FOR ANY CLAIMS FOR DAMAGES TO ANY UNDERGROUND PLANT WHERE OSL WAS NOT NOTIFIED OF SUCH DAMAGE FORTHWITH SUCH THAT OSL CAN COMPLETE A DAMAGE INVESTIGATION TO PHYSICALLY VIEW ANY SUCH DAMAGED UNDERGROUND PLANT WHETHER OR NOT ANY SUCH DAMAGE MAY ATTRIBUTED TO ERRORS OR OMISSIONS COMMITTED BY OSL IN PERFORMING THE WORK.

OSL SHALL NOT BE LIABLE FOR ANY AMOUNT IN EXCESS OF THE FEES PAID BY THE CLIENT TO OSL FOR THE SERVICE ON ACCOUNT OF ANY LOSS, INJURY, DEATH OR DAMAGE WHETHER RESULTING DIRECTLY OR INDIRECTLY TO A PERSON OR PROPERTY IRRESPECTIVE OF THE CAUSE OR ORIGIN OF SUCH LOSS, INJURY, DEATH OR DAMAGE INCLUDING, WITHOUT LIMITATION, LOSS, INJURY, DEATH OR DAMAGE ATTRIBUTABLE TO THE NEGLIGENCE OF OSL, ITS EMPLOYEES AND AGENTS IN THE PERFORMANCE OR NON-PERFORMANCE OF THE SERVICE.

OnSite LOCATES