CHUNG & VANDER DOELEN
ENGINEERING LTD.

GEOTECHNICAL INVESTIGATION

PROPOSED RESIDENTIAL SUBDIVISION

BONNER PROPERTY

TOWNSHIP OF GUELPH-ERAMOSA, ONTARIO

Submitted to:

Charleston Homes
P. O. Box 760
143 Dennis Street
Rockwood, Ontario
N0B 2K0

Attention:
Mr. Charlie Kuiken
President

FILE NO / 14-05-K02 / February 25, 2016

CHUNG & VANDER DOELEN
ENGINEERING LTD.

311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 5E1
519-742-8979

February 25, 2016
File No.: 14-05-K02

Charleston Homes
P. O. Box 760
143 Dennis Street
Rockwood, Ontario
N0B 2K0

Attention: Mr. Charlie Kuiken

Re: **GEOTECHNICAL INVESTIGATION**
PROPOSED RESIDENTIAL SUBDIVISION
BONNER PROPERTY
TOWNSHIP OF GUELPH-ERAMOSA, ONTARIO

We take pleasure in enclosing two (2) copies of our Geotechnical Investigation Report carried out at the above-mentioned location and we will be glad to discuss any questions arising from this work.

Soil samples will be retained for a period of three (3) months and will thereafter be disposed of unless we are otherwise instructed.

We thank you for giving us this opportunity to be of service to you.

Yours truly,
CHUNG & VANDER DOELEN ENGINEERING LTD.

Robert Vander Doelen, P. Eng.
Senior Engineer

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1.0 INTRODUCTION

CHUNG & VANDER DOELEN ENGINEERING LTD. (CVD) has been retained by Charleston Homes to conduct a geotechnical investigation for a proposed residential development to be constructed at Part of Lots 6 and 7, Concession 4 (Bonner Property), Township of Guelph-Eramosa in the County of Wellington. The site is located in the northwest area of the Village of Rockwood.

It is understood that the site is 12.4± hectares in size and is proposed to be developed with one hundred and sixty-two (162) individual house lots and five (5) blocks of townhouses (total of 52 units). Site grading operations involving cut and fill procedures of up to 3.5 ± m are proposed to balance site grades. It is expected that municipal water and sewer servicing will be in the range of 2 to 3 m deep. Two (2) storm water management (SWM) features are proposed in the northeast and southwest areas of the site.

The purpose of this investigation has been to characterize the subsurface conditions at the subject site in order to provide geotechnical recommendations for the design and construction of site grading operations, municipal site servicing, proposed roadway, and future building foundation design.

2.0 FIELD AND LABORATORY WORK

The initial field investigation was conducted on May 8 and 9, 2014 and consisted of drilling/excavating and sampling seventeen (17) boreholes and three (3) test pits to depths between 0.71 and 5.0 m below existing grades across the site. The drilling rig and backhoe were arranged by the client.

The locations of the test holes were selected by CVD staff in advance of conducting the field investigation program and were based upon review of a development concept plan forwarded to our office. No specific engineering design information existed at the time. The locations of the proposed test holes were forwarded to the client's surveyor (Van Harten Surveying Inc.) who then pre-located the various locations and determined their associated ground surface elevations in advance of conducting the field investigation program. Borehole 16 was eliminated from the initial program due to its close proximity to an existing active buried culvert. Test Pit 2.5 was added to the initial program after encountering bedrock at very shallow depth at Test Pit 2 and was located approximately midway between Test Pits 2 and 3.

A supplementary investigation program occurred on September 25, 2015 when additional lands were acquired to enlarge the overall development as well as alter the location of the entrance to the development directly from Wellington County Road 27. An additional six (6) test pit locations were

selected during pre-consultation discussions with the client's municipal engineer (Braun Consulting Engineers). The locations of the additional test pits were forwarded to the client's surveyor who pre-located the various locations and determined their associated ground surface elevations in advance of conducting the supplementary field investigation program.

The locations of all boreholes and test pits are illustrated on the appended Drawing No. 1.

The two (2) field investigation programs were conducted under the supervision of the field engineer who logged the subsurface conditions encountered in the field, effected the subsurface sampling and testing, and monitored the groundwater conditions.

The boreholes were advanced to the sampling depths using a power auger drilling rig, equipped with continuous flight augers and standard soil sampling equipment. Standard penetration tests were carried out at frequent intervals of depth and the results are shown on the Borehole Log Sheets as penetration resistance or "N" values. The compactness condition or consistency of the soil strata has been inferred from these test results. The test pits were excavated using a rubber tired backhoe.

Samples obtained from the in situ tests were examined in the field and subsequently taken to our laboratory for detailed description and moisture content determinations. Additional geotechnical laboratory testing included six (6) gradational analyses which were conducted on representative soil samples collected during the initial field investigation program.

3.0 SITE CONDITION

The site is bounded by the Gray Municipal Drain, cropland and treed lands to the north; Wellington County Road 27 and multiple developed residential lots to the east; community/park lands and crop land to the south; and cropland to the west. The site is also recessed back from Wellington County Road 27 in the central area and surrounds future school land on three sides.

The site is primarily comprised farmed cropland with existing residential properties and a short piece of the Gray Municipal Drain in the northeast corner. A pocket of trees containing exposed rock outcrops existed along the eastern portion of the south site boundary which is understood to have since been altered by initiating grading procedures. A natural grassed parcel exists east of the altered feature.

The site is topographically high in the northwest corner and southeastern portion near Elevation 370 m and gently undulates otherwise with a site low near Elevation 360 m in the southwestern portion of the site. The elevations at the various borehole and test pit locations varied between 359.67 and 367.02 m.

4.0 SUBSURFACE CONDITION

The conditions encountered in the boreholes and test pits are detailed on the Borehole and Test Pit Log Sheets, Enclosures 1 to 26 of this report. The following notes are intended to amplify and comment on the subsurface data.

4.1 Fill

Borehole 7 was located in an existing farm laneway and contacted sand and gravel fill with frequent cobbles which extended to a depth of 1.2 m below existing grade.

4.2 Topsoil

Topsoil was contacted at the ground surface of all test hole locations (except Borehole 7) with measured thicknesses generally varying between 200 and 375 mm. Locally at Test Pit D, the surficial topsoil was measured 50 mm thick, directly overlying bedrock.

4.3 Sand and Silt to Silty Sand

The topsoil at Boreholes 4 to 6, 15, 17 and 19 and Test Pits 2, 2.5, 3, A, B, C, E and F was underlain by orangy brown to brown sand and silt to silty sand with varying percentages of gravel and clay which extended to depths between 0.4 and 1.8 m below existing grades. Test Pits 2, 2.5, B, C and F were terminated at the base of this deposit at depths between 0.4 and 1.2± m below existing grades and were underlain by carbonate bedrock. The deposit was typically mottled in topographically low areas of the site. A grain size distribution analysis was conducted on a retrieved sample collected from Test Pit 3 and the results are graphically presented on Enclosure 27.

Standard penetration testing conducted at the borehole locations yielded “N”-values between 8 and 28 blows per 300 mm, indicating a loose to compact compactness condition. Natural moisture contents were measured between 12 and 20%, indicating a moist to saturated moisture condition.

4.4 Sand

The sand and silt deposit at Boreholes 4 to 6 and 19 and Test Pit 3 was underlain by brown fine to coarse sand with varying percentages of gravel which extended to depths between 1.7 and 4.0 m below existing grades. Test Pit 3 was terminated within the sand deposit at 2.45 m below existing grade due to severe collapsing of the test pit sidewalls. A grain size distribution analysis was conducted on a retrieved sample collected from Borehole 5 and the results are graphically presented on Enclosure 28.

Standard penetration testing conducted at the borehole locations yielded "N"-values between 8 and 74 blows per 300 mm, indicating a compact to very dense compactness condition. Natural moisture contents were measured between 13 and 20%, indicating a saturated moisture condition.

4.5 Sand and Gravel

Boreholes 1, 8, 11 to 14, 18 and 20, the sand and silt at Test Pit E, and the sand at Borehole 19 were underlain by brown sand and gravel with varying percentages of silt and cobbles which extended to depths between 0.9 and 3.3 m below existing grades. Test Pit E was terminated at the base of the sand and gravel deposit at 1.8± m depth and was further underlain by carbonate bedrock. Two (2) grain size distribution analyses were performed on representative samples of the sand and gravel deposit and are graphically presented on Enclosures 29 and 30.

Standard penetration testing conducted at the borehole locations yielded "N"-values between 9 and 74 blows per 300 mm, indicating a compact to very dense compactness condition. Natural moisture contents were measured between 5 and 15%, indicating a damp to saturated moisture condition.

4.6 Sand and Silt Till

The above described deposits at Boreholes 7 to 13 and Test Pit A were underlain by brown sand and silt till with varying percentages of gravel, cobbles, clay and boulders. Locally at Borehole 10, the texture of the till beneath 2.2 m depth became more silty with some clay and was grey in colour. Occasional wet to saturated sand lenses/pockets were encountered within the till at Boreholes 10 and 13. Boreholes 7 to 13 and Test Pit A were terminated within the till deposit at depths between 2.2 and 4.8 m below existing grades. Two (2) grain size distribution analyses were performed on representative samples of the till deposit and are graphically presented on Enclosures 31 and 32.

Standard penetration testing conducted at the borehole locations yielded "N"-values between 10 and greater than 100 blows per 300 mm, indicating a compact to very dense compactness condition. Natural moisture contents were measured between 7 and 12%, indicating a generally damp to moist moisture condition with occasional wet to saturated seams.

4.6 Bedrock

The above described deposits were underlain by carbonate bedrock at eighteen (18) of the twenty-six (26) test hole locations. Boreholes 1, 4 to 6 and 14 to 20 were advanced into the underlying bedrock by the 100 mm diameter solid stem drilling augers. Coring of the bedrock formation was not performed.

The following table provides inferred bedrock contact depths, the maximum depth penetrated, and the thickness of bedrock penetrated at each borehole location which encountered bedrock during the investigation program:

Borehole No.	Inferred Bedrock Contact Depth (mbeg)	Maximum Depth Penetrated (mbeg)	Thickness of Bedrock Penetrated (m)
1	1.05±	4.55±	3.5±
4	4.0±	4.55±	0.55±
5	2.9±	4.55±	1.65±
6	2.1±	2.29±	0.19±
14	2.7±	3.65±	0.95±
15	0.6±	1.53±	0.93±
17	0.75±	1.37±	0.62±
18	4.0±	4.55±	0.55±
19	2.6±	3.05±	0.45±
20	2.4±	3.2±	0.8±

Note: mbeg = metres below existing grade

The bedrock is reported to be grey and blue-grey, medium crystalline crinoidal dolomite containing small bioherm reefs of the Amabel Group of Middle Silurian Age according to the Geological Survey of Canada, Map 1263A entitled "Geology, Toronto-Windsor Area" dated 1969 (geology compiled by B.V. Sanford).

4.7 Groundwater Condition

Groundwater conditions were monitored during and following withdrawal of the drilling augers at the boreholes and in the test pits during and following their excavation. Groundwater was encountered at ten (10) of the twenty-six (26) test hole locations at depths between 0.74 and 2.29 m below existing grade generally corresponding to elevations between 363.3 and 358.9 m.

It is noted that the groundwater conditions will fluctuate in response to major weather events and seasonally.

5.0 DISCUSSION AND RECOMMENDATIONS

It is understood that the site is 12.4± hectares in size and is proposed to be developed with one hundred and sixty-two (162) individual house lots and five (5) blocks of townhouses (total of 52 units). Site grading operations involving cut and fill procedures of up to 3.5 ± m are proposed to balance site grades. It is expected that municipal water and sewer servicing will be in the range of 2 to 3 m deep. Two (2) storm water management (SWM) features are proposed in the northeast and southwest areas of the site.

5.1 Site Grading and Engineered Fill Construction

Site grading operations involving cut and fill procedures of up to 3.5 ± m are proposed to balance site grades. It is recommended to construct engineered fill in areas to be raised in order to suitably support the future roadway, infrastructure servicing and building structures.

The surficial topsoil layer generally varies in thickness between 200 and 375 mm at the test hole locations. It should be noted that the thickness of the topsoil layer could vary drastically across the site from those reported at the test pit locations.

It is noted that topsoil stripping operations should be conducted when the ground is not wet and will support large scraper equipment. Over-stripping will result when the ground is wet and unstable.

The inorganic deposits of sand and silt, silty sand, sand, sand and gravel and sand and silt till encountered across the site may be used to construct engineered fill capable of supporting the future roadway, infrastructure servicing and building structures. The natural moisture content of the cut soils to be used as engineered fill should be within 3% below their optimum moisture contents to achieve the specified degree of compaction. *It is recommended that engineered fill construction be conducted during the summer and early fall months when drier warmer weather conditions typically exist as the onsite soils are sensitive to moisture and will become difficult to handle and compact to the specified degree of compaction when wet.*

The onsite soils are frost-susceptible. Constructing engineered fill, backfilling footings, foundation walls and service trenches using this soil during the winter months is not advisable, unless suitable weather conditions prevail, the soils are at suitable moisture content, and strict procedures are followed and monitored on a full-time basis by the geotechnical engineer.

The onsite soils are susceptible to softening and deformation when exposed to excessive moisture and construction traffic. As a result, it is imperative that the grading/filling operations are planned and maintained to direct surface water run-off to low points and then be positively drained by suitable means. During periods of wet weather, construction traffic should be directed along the designated construction routes so as not to disturb and rut the exposed subgrade soil. Temporary construction roads consisting of clear crushed material (such as crushed stone or recycled concrete) may be required during poor weather conditions such as wet Spring or Fall.

Engineered fill should be constructed in accordance with the following procedures in order to support future buildings, infrastructure servicing and roadway pavements.

1. All fill, topsoil, organic and deleterious materials should be stripped from building and roadway areas. Generally, these excavated materials should be placed in non-structural areas, however, pre-existing fill may be potentially salvaged and reused as engineered fill conditional to review by the engineer;

2. The exposed inorganic subgrade surface is to be thoroughly recompacted by large heavy compaction equipment (10 tonne sheepsfoot compactor is recommended) and inspected by qualified geotechnical personnel. Any loose or soft areas identified should be excavated to the level of competent soil;

3. The required grades can then be achieved by placing approved inorganic onsite fill in maximum 200 to 300 mm thick lifts which are to be thoroughly compacted to at least 98% Standard Proctor maximum dry density (SPMDD) in future building, infrastructure servicing and roadway areas. The moisture content of the fill materials should be within 3% below their optimum moisture contents in order to achieve the specified degree of compaction;

4. Engineered fill used to support future buildings, infrastructure servicing and roadway pavements must be placed such that the fill pad extends horizontally outwards at least a distance equal to the depth of fill to be placed;

5. Overly wet and organic materials should be placed in non-structural areas and outside of SWM feature areas where 90% SPMDD is adequate. Alternatively, wet inorganic soils can be mixed with drier soils to produce a suitable moisture content to allow appropriate compaction to occur if conditions dictate;

6. All fill placement and compaction operations must be supervised on a full-time basis by qualified geotechnical personnel to approve fill material and ensure the specified degrees of compaction have been achieved.

Any shortfall of fill material required for site grading operations may be made with similarly graded imported soils or imported OPSS Granular B Type I. It is recommended that any proposed borrow source materials be tested prior to importing, in order to ensure that the environmental quality of the imported fill meets all environmental approval criteria and to ensure that the natural moisture content of the fill is suitable for compaction.

During construction, vibration could be generated from various construction equipment, such as compactors and rollers which could be harmful to surrounding structures and buildings. Peak particle velocity (PPV) of ground motion is widely accepted as the best descriptor of potential for vibration damage to structures. The safe vibration limit can be set to 10 to 20 mm/s PPV, depending on the sensitive of surrounding structures to vibration.

Vibration monitoring can be carried out to measure the PPV of ground motion from vibration generated from typical compaction equipment at the beginning of the project in the potentially critical areas. This will set criteria and establish the type of equipment to be used for this project. It is also recommended that a pre-construction condition survey be conducted to document the condition of the existing structures within the possible zone of influence.

5.2 Underground Servicing

It is expected that the invert levels of the municipal water and sewer servicing will be in the range of 2 to 3 m deep.

5.2.1 Excavation Conditions

Trenching can be carried out using conventional open cut procedures. The excavations will generally intersect native and/or re-compacted onsite fill soils. Inorganic compact soil will generally provide suitable subgrade support to sewer and watermain serving.

Any loose, unstable and/or organic soils encountered at the pipe invert should be sub-excavated and replaced with well compacted Granular "A" which should be placed in 150 mm thick layers and

compacted to at least 95% Standard Proctor Maximum Dry Density (SPMDD). The support of pipes in these areas can also be achieved with non-shrinkable fill, if poor soil is encountered at the subgrade level and fully removed.

Excavation side slopes should comply with the current "Regulations for Construction Projects Under The Ontario Occupational Health and Safety Act". The native or re-compacted sand, silt, sand and silt till soils can be generally classified as Type 3 soils. Excavation in the Type 3 soils should be cut to side slopes of 1H : 1V throughout. The excavation side slopes should be suitably protected from erosion processes. Should unstable and/or wet conditions be encountered, side slopes are to be flattened to a stable configuration.

Trench excavation into the upper portion of the bedrock unit is anticipated to occur in some areas of the site. For practical considerations, the bedrock surface can be defined as being that elevation which cannot be excavated using a mid sized tracked excavator operating at its full capacity. It is the opinion of CVD that although larger more powerful equipment may be capable of ripping the bedrock, where encountered, bedrock removal may require the additional use of mechanical means such as hoeram or drilling and splitting tools. Ground vibrations due to blasting will pose significant concerns to abutting properties and features and may not prove practical.

No major problems due to groundwater are expected within the anticipated servicing excavations. Perched water and surface runoff may be controlled by filtered sump pits and pumping when and where necessary. However, if any deep cuts are made into saturated sand or sand and gravel deposits, it is imperative that the groundwater within these saturated granular deposits be lowered prior to and during the excavation to facilitate pipe laying and backfilling operations and to ensure cut slope stability.

The geotechnical engineer should be retained to examine and inspect cut slopes to ensure construction safety.

Further, CVD recommends that test pits be dug during the tendering stage of the underground servicing, so that the potential contractors can examine the subsurface groundwater, soil and bedrock conditions and arrive at suitable methods of excavation, groundwater control and backfilling based on their experience and plant.

5.2.2 Pipe Bedding

As noted in Section 5.2.1, any unsuitable soils exposed at the pipe subgrade should be sub-excavated and replaced with imported Granular "A", placed in thin layers and compacted to at least 95% SPMDD, or can be removed and supported on non-shrinkable fill.

The bedding requirements for the services should be in accordance with Ontario Provincial Standard Drawings OPSD - 802 for flexible and rigid pipes. The bedding shall be a Class "B" and consist of at least 150 mm thick Granular "A" compacted to 95% SPMDD. Granular "A" should be used to backfill around the pipe to at least 150 mm above the top of the pipe.

This specific backfill should be placed in thin layers and each layer compacted to at least 95% SPMDD. Particular attention should be given to ensure material placed beneath the haunches of the pipe is adequately compacted. Recycled asphalt will not be allowed to be used in Granular “A” bedding material.

5.2.3 Trench Backfill

In general, excavated inorganic materials are considered suitable for reuse as trench backfill. If the excavated materials are allowed to dry too much during summer construction, mixing drier and wetter excavated soils is recommended to arrive at a more compactable moisture content.

The backfill should be placed in thin layers, 300 mm thick or less dependant on the demonstrated success of compaction based on in-situ density test results. Trench backfill should be compacted to a minimum 98% SPMDD. Other types of materials such as organic soils, overly wet soils, boulders and frozen materials (if work is carried out in the winter months) should not be used for backfilling.

Backfilling operations should follow closely after excavation so that only a minimal length of trench slope is exposed at any one time so as to minimize potential problems. This will minimize over-wetting of the subgrade material. Particular attention should be given to make sure frozen material is not used as backfill should construction extend into the winter season.

Frequent inspection by experienced geotechnical personnel should be carried out to examine and approve backfill material, to carefully inspect placement, and to verify that the specified degree of compaction has been obtained by in situ density testing.

5.3 Pavement Design and Construction

The predominant earth subgrade materials within the future roadway network are anticipated to consist of sand and silt to sand and silt till soil.

The following flexible pavement structure is recommended based on the results of the gradational analyses, assumed CBR values, groundwater table, frost susceptibility of subgrade soils and traffic volume.

Pavement Component	Component Thickness
HL3 Surface Asphaltic Concrete HL8 Binder Asphaltic Concrete	40 mm 50 mm
Granular "A" Base Course	150 mm
Granular "B" Sub-base Course	400 mm
Granular Base Equivalency (GBE)	598 mm

Note: GBE denotes Granular Base Equivalency which is calculated using factors of 2 for asphaltic concrete, 1 for Granular “A” base and 0.67 for Granular “B” sub-base.

The pavement design considers that road construction will be carried out during the drier time of the year and that the subgrade is stable, not heaving under construction equipment traffic. If the subgrade is wet or unstable, additional granular sub-base may be required.

Prior to placement of the granular base, the subgrade should be prepared in accordance with the recommendations outlined in Section 5.1, Site Grading and Engineered Fill Construction, and Section 5.2.3, Trench Backfill.

The base and sub-base materials should be produced in accordance with the current OPSS specifications, and placed and uniformly compacted to at least 100% SPMDD. The asphaltic concrete should be placed and compacted in accordance with OPSS Form 310 and to a minimum of 92% of the Marshall Density (MRD). Frequent in situ density testing by this office should be carried out to verify that the specified degree of compaction is being achieved and maintained.

It should be noted that even well-compacted trench backfill could settle for a period of time after construction. In this regard, the surface course of the asphaltic concrete should be placed at least one (1) year after trench backfill is completed so as to allow any minor settlements to occur within the trench backfill. The incomplete pavement structure may not be capable of supporting construction traffic. Consequently, minor repairs of the sub-base, base and asphaltic concrete may be required prior to paving with the base course and/or the surface course asphaltic concrete.

It is recommended that longitudinal sub-drains be installed along the edges of the roadways to enhance the performance of the pavement.

5.4 Foundations

5.4.1 Building Foundations

The native inorganic undisturbed soils encountered at the site are generally competent to support building foundations. Building foundations can be founded on native competent soils or well-compacted engineered fill. The native soils and approved engineered fill, which is constructed as per the procedures in Section 5.1, can be used to support footing foundations designed to a net soil bearing pressure of up to 120 kPa (2500 psf) at SLS and 200 kPa (4000 psf) at ULS.

Footing subgrade inspections are recommended to verify the bearing capacity of the soil prior to placement of the forms and concrete for the building foundations.

5.4.2 Lateral Earth Pressure

The basement walls should be designed to resist the lateral earth pressure acting against these walls. The following formula may be used for these calculations. The following formula may be used to calculate the unfactored earth pressure distribution. The factored resistance can be calculated by using a factor of 0.8.

$P = K(\gamma H + q)$

where:

P =	lateral earth pressure	kPa
K =	earth pressure coefficient, 0.5 for non-yielding foundation wall	
γ =	unit weight of granular backfill	21 kN/m^3
H =	unbalanced height of wall	m
q =	surcharge load at ground surface	kPa

The on-site soils are generally not considered to be free-draining material. A drainage core layer should be installed against basement walls in accordance with OBC requirements. The basement walls should be damp-proofed.

A perimeter drainage system is required to ensure hydrostatic pressure does not build up in the backfill against the foundation wall. The perimeter weeping tile system is to be installed at the base of the footing to direct the collected waters to sump pump installations or the storm sewer.

6.0 CLOSURE

The Limitations of Report, as quoted in Appendix "A", is an integral part of this report.

The information presented in this report is complete within our terms of reference. If there are any further questions concerning this report, please do not hesitate to contact our office.

Yours truly,
CHUNG & VANDER DOELEN ENGINEERING LTD.

Robert Vander Doelen, P. Eng.
Senior Engineer

Eric Y. Chung, M. Eng., P. Eng.
Principal Engineer

APPENDIX “A”

Statement of Limitations

APPENDIX "A"

LIMITATIONS OF REPORT

The conclusions and recommendations given in this report are based on information determined at the testhole locations. Subsurface and groundwater conditions between and beyond the testholes may differ from those encountered at the testhole locations, and conditions may become apparent during construction which could not be detected or anticipated at the time of the site investigation. It is recommended practice that the Soils Engineer be retained during construction to confirm that the subsurface conditions throughout the site do not deviate materially from those encountered in the testholes.

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

The benchmark and elevations mentioned in this report were obtained strictly for use in the geotechnical design of the project and by this office only, and should not be used by any other parties for any other purposes.

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. CHUNG & VANDER DOELEN ENGINEERING LIMITED accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

This report does not reflect the environmental issues or concerns unless otherwise stated in the report. The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report. Since all details of the design may not be known, we recommend that we be retained during the final design stage to verify that the design is consistent with our recommendations, and that assumptions made in our analysis are valid.

ENCLOSURES

FILE No: 14-05-K02

TEST PIT No. 1

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Diedrich D-50T**
Method: **Solid Stem Auger**
Size: **100mm**
Date: **May 09 14** TO **May 09 14**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE	REMARKS
	Ground Elevation: **363.35 m**					
363.12	225mm TOPSOIL					
0.23	Very dense brown SAND AND GRAVEL some silt	0.5				
	damp	1.0	1	ss	74	
362.30						
1.05	Weathered Carbonate BEDROCK	1.5	2	ss	50/ 100mm	
	weak --- slightly sounder	2.0				Water level at 1.9 m depth at withdrawal of augers
		2.5				
		3.0				Cave-in at 2.9 m depth
	bedrock penetrated by 100 mm diameter solid stem auger	3.5				
		4.0				
358.80		4.5				
4.55	End of Borehole	5.0				
		5.5				

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

PROJECT MANAGER: **RVD**

CHUNG & VANDER DOELEN ENGINEERING LTD.
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Kitchener, Ontario N2H 5E1
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FILE No: 14-05-K02

TEST PIT No. 2

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Backhoe**
Method: **Backhoe**
Size:
Date: **May 08 14** TO **May 08 14**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	SAMPLE TYPE	SAMPLE N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **364.77 m**						FIELD VANE: Peak ⊗ Rem. ×; LAB TEST: Unc. ■ P.P. □; 50 100 150 200; PENETRATION RESISTANCE STANDARD ● DYN. CONE ○; 20 40 60 80	W_P W W_L; 10 20 30			
364.52	250mm TOPSOIL										
0.25	Loose brown SAND AND SILT trace clay moist	0.5								0.5	
364.06											Test Pit dry at completion of excavation
0.71	Test Pit terminated on Carbonate Bedrock	1.0								1.0	
		1.5								1.5	
		2.0								2.0	
		2.5								2.5	
		3.0								3.0	
		3.5								3.5	
		4.0								4.0	
		4.5								4.5	
		5.0								5.0	
		5.5								5.5	

PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. 2.5

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Backhoe**
Method: **Backhoe**
Size:
Date: **May 08 14** TO **May 08 14**

ELEV./ DEPTH (m)	SOIL LITHOLOGY DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	SAMPLE TYPE	SAMPLE N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
Ground Elevation:							FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200; PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80	W_P W W_L 10 20 30			
	250mm TOPSOIL										
0.25	Loose brown SAND AND SILT some gravel trace clay	0.5								0.5	
	moist	1.0								1.0	
1.17	Test Pit terminated on Carbonate Bedrock	1.5								1.5	Test Pit dry at completion of excavation
		2.0								2.0	
		2.5								2.5	
		3.0								3.0	
		3.5								3.5	
		4.0								4.0	
		4.5								4.5	
		5.0								5.0	
		5.5								5.5	

PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. 3

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Backhoe**
Method: **Backhoe**
Size:
Date: **May 08 14** TO **May 08 14**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	SAMPLE TYPE	N-VALUE	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **359.89 m**								
359.69	200mm TOPSOIL								
0.20	Loose to compact mottled brown/grey SILTY SAND	0.5		1	BS			0.5	
		1.0					▼	1.0	Water level at 0.96 m depth after 0.3 hr
	moist to saturated	1.5						1.5	
358.09									
1.80	Compact brown Fine to medium SAND some gravelly layers saturated	2.0		2	BS			2.0	
357.44							▽		
2.45	End of Test Pit	2.5						2.5	Major upward influx of water seepage at 2.4 m depth during excavation - test pit advancement terminated due to immediate excavation deterioration
		3.0						3.0	
		3.5						3.5	
		4.0						4.0	
		4.5						4.5	
		5.0						5.0	
		5.5						5.5	

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. 4

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Diedrich D-50T**
Method: **Solid Stem Auger**
Size: **100mm**
Date: **May 09 14** TO **May 09 14**

Ground Elevation: **359.67 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE	WELL DATA	DEPTH (m)	REMARKS
359.32	350mm TOPSOIL							
0.35	Loose orangy brown to brown mottled SAND AND SILT; moist to wet	0.5				▼	0.5	Water level at 0.79 m depth at withdrawal of augers
358.62		1.0	1	ss	8		1.0	Cave-in at 0.91 m depth
1.05	Compact brown Fine SAND; saturated	1.5	2	ss	15		1.5	
	---------- inferred SAND	2.0					2.0	Major inward collapsing of borehole - cannot collect split spoon samples below 2 m depth
		2.5					2.5	
		3.0					3.0	
		3.5					3.5	
355.67		4.0					4.0	Increase in drilling resistance below 4 m depth
4.00	Inferred Weathered Carbonate BEDROCK							
355.12		4.5					4.5	
4.55	End of Borehole	5.0					5.0	
		5.5					5.5	

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. 5

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Diedrich D-50T**
Method: **Solid Stem Auger**
Size: **100mm**
Date: **May 09 14** TO **May 09 14**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **359.69 m**						FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ (50 100 150 200) PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ (20 40 60 80)	W_P W W_L (10 20 30)			
359.31	375mm TOPSOIL										
0.38	Loose to compact orangy brown to brown SAND AND SILT	0.5							▼	0.5	Water level at 0.74 m depth at withdrawal of augers
	wet to saturated	1.0		1	ss	10	●	○	▽	1.0	Cave-in at 1.0 m depth
358.49											
1.20	Compact brown Fine to Coarse SAND trace gravel and silt	1.5		2	ss	28	●	○		1.5	
		2.0								2.0	
		2.5		3	ss	18	●	○		2.5	
	saturated										
356.79											
2.90	Inferred Weathered Carbonate BEDROCK	3.0								3.0	
		3.5								3.5	
	bedrock penetrated by 100 mm diameter solid stem auger	4.0								4.0	
355.14		4.5								4.5	
4.55	End of Borehole										
		5.0								5.0	
		5.5								5.5	

PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. 6

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Diedrich D-50T**
Method: **Solid Stem Auger**
Size: **100mm**
Date: **May 09 14** TO **May 09 14**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE	REMARKS
	Ground Elevation: **359.90 m**					
359.60	300mm TOPSOIL					
0.30	Loose to compact orangy brown to brown mottled SAND AND SILT	0.5				
		1.0	1	ss	11	
	wet to saturated					
358.60						
1.30	Compact brown Fine to Coarse SAND	1.5				
	trace gravel		2	ss	16	
	saturated	2.0				
357.80						
2.10	Inferred Carbonate BEDROCK					
357.61			3	ss	50/ 12mm	
2.29	End of Borehole	2.5				
		3.0				
		3.5				
		4.0				
		4.5				
		5.0				
		5.5				

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

Water level at 0.76 m depth at withdrawal of augers

Cave-in at 2.0 m depth

PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. 7

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Diedrich D-50T**
Method: **Solid Stem Auger**
Size: **100mm**
Date: **May 09 14** TO **May 09 14**

Ground Elevation: **364.10 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE	REMARKS
	Compact brown sand and gravel FILL frequent cobbles	0.5				Borehole located in farm laneway
362.90 1.20		1.0				
	Compact to very dense brown SAND AND SILT TILL some gravel frequent cobbles and boulders	1.5	1	ss	18	
		2.0				
		2.5	2	ss	68	
		3.0				
	damp to moist	3.5	3	ss	69	
		4.0				
		4.5	4	ss	50/ 50mm	
359.40 4.70	End of Borehole	5.0				Borehole dry at withdrawal of augers
		5.5				

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. 8

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Diedrich D-50T**
Method: **Solid Stem Auger**
Size: **100mm**
Date: **May 09 14** TO **May 09 14**

Ground Elevation: **366.91 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE	REMARKS
366.68	225mm TOPSOIL	0.0				
0.23	Loose to compact brown SAND AND GRAVEL	0.5	1	ss	9	
	damp	1.0				
365.21		1.5	2	ss	10	
1.70	Compact to very dense brown SAND AND SILT TILL some gravel frequent cobbles and boulders	2.0				
		2.5	3	ss	48	
		3.0				
		3.5	4	ss	50/ 150mm	
	damp to moist	4.0				
		4.5				
362.11			5	ss	50/ 75mm	
4.80	End of Borehole	5.0				Borehole dry at withdrawal of augers
		5.5				

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. 9

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Diedrich D-50T**
Method: **Solid Stem Auger**
Size: **100mm**
Date: **May 08 14** TO **May 08 14**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE
	Ground Elevation: **366.61 m**					
366.36	250mm TOPSOIL					
0.25	Compact to very dense brown SAND AND SILT TILL some gravel and cobbles frequent cobbles and boulders	0.5				
		1.0		1	ss	13
		1.5		2	ss	25
		2.0				
		2.5		3	ss	87
		3.0				
		3.5		4	ss	72
	damp to wet	4.0				
		4.5		5	ss	50/ 75mm
361.81						
4.80	End of Borehole	5.0				
		5.5				

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

DEPTH (m)

REMARKS

Borehole dry at withdrawal of augers

PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. 10

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Diedrich D-50T**
Method: **Solid Stem Auger**
Size: **100mm**
Date: **May 08 14** TO **May 08 14**

Ground Elevation: **364.76 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE	REMARKS
364.48	275mm TOPSOIL					
0.28	Compact brown SAND AND SILT TILL; some gravel and cobbles occ. wet sand lenses	0.5				
		1.0	1	ss	17	Perched water at 0.91 m depth
		1.5	2	ss	16	
	moist to wet	2.0				
362.56						
2.20	Very dense grey SANDY CLAYEY SILT TILL; trace gravel	2.5	3	ss	55	Cave-in at 2.75 m depth
		3.0	4	ss	37	
	damp	3.5				
		4.0				
		4.5	5	ss	65	
359.76		5.0				
5.00	End of Borehole	5.5				

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. 11

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Diedrich D-50T**
Method: **Solid Stem Auger**
Size: **100mm**
Date: **May 08 14** TO **May 08 14**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE
	Ground Elevation: **367.02 m**				
366.74	275mm TOPSOIL				
0.28	Compact brown SAND AND GRAVEL trace to some silt damp to wet --------- silty sand	0.5 1.0 1.5	1	ss	17
365.42 1.60	Compact to very dense brown SAND AND SILT TILL some gravel frequent cobbles and boulders	2.0 2.5	2 3	ss ss	24 50/ 150mm
	damp	3.0 3.5 4.0 4.5	4 5	ss ss	50/ 125mm 50/ 150mm
362.32 4.70	End of Borehole	5.0 5.5			

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

DEPTH (m)

REMARKS

Borehole dry at withdrawal of augers

PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. 12

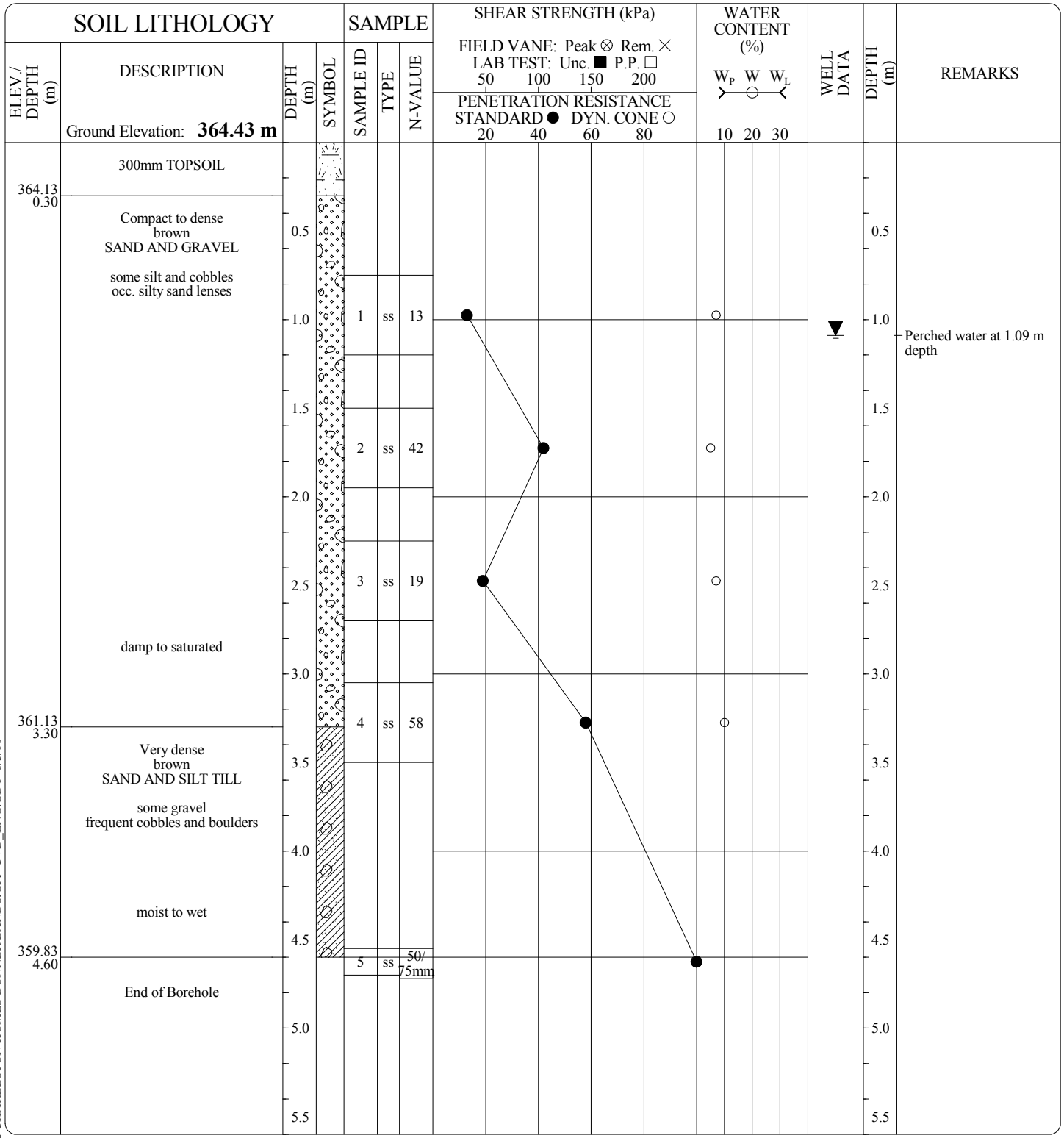
Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Diedrich D-50T**
Method: **Solid Stem Auger**
Size: **100mm**
Date: **May 08 14** TO **May 08 14**



PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. 13

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Diedrich D-50T**
Method: **Solid Stem Auger**
Size: **100mm**
Date: **May 08 14** TO **May 08 14**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **361.72 m**									
361.52	200mm TOPSOIL									
0.20	Compact brown SAND AND GRAVEL trace to some silt damp	0.5							0.5	
360.82										
0.90	Compact to very dense brown SAND AND SILT TILL some gravel and cobbles occ. wet sand lenses/pockets	1.0		1	ss	16			1.0	
		1.5		2	ss	17			1.5	
		2.0							2.0	
		2.5		3	ss	13		▽	2.5	Cave-in at 2.6 m depth at withdrawal of augers
		3.0							3.0	
				4	ss	32				
		3.5							3.5	
		4.0		5	ss	94			4.0	
	moist to wet	4.5							4.5	
357.12				6	ss	50/ 50mm				
4.60	End of Borehole	5.0							5.0	
		5.5							5.5	

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. 14

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Diedrich D-50T**
Method: **Solid Stem Auger**
Size: **100mm**
Date: **May 08 14** TO **May 08 14**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE
	Ground Elevation: **363.30 m**				
363.02	275mm TOPSOIL				
0.28	Compact to very dense brown SAND AND GRAVEL trace to some silt	0.5			
		1.0	1	ss	26
		1.5	2	ss	27
	damp to saturated	2.0			
		2.5	3	ss	50/ 150mm
360.60					
2.70	Inferred Weathered Carbonate BEDROCK bedrock penetrated by 100 mm diameter solid stem auger	3.0			
		3.5			
359.65					
3.65	End of Borehole	4.0			
		4.5			
		5.0			
		5.5			

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

DEPTH (m)

REMARKS

Water level at 1.98 m depth at withdrawal of augers

PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. 15

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Diedrich D-50T**
Method: **Solid Stem Auger**
Size: **100mm**
Date: **May 08 14** TO **May 08 14**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **362.89 m**						FIELD VANE: Peak ⊗ Rem. ×; LAB TEST: Unc. ■ P.P. □; 50 100 150 200; PENETRATION RESISTANCE STANDARD ● DYN. CONE ○; 20 40 60 80	W_P W W_L; 10 20 30			
362.69	200mm stoney TOPSOIL										
0.20	Mixed brown SILT, SAND AND GRAVEL some cobbles	0.5								0.5	
362.29											
0.60	Weathered Carbonate BEDROCK	1.0								1.0	
	bedrock penetrated by 100 mm diameter solid stem auger										
361.36		1.5								1.5	Borehole dry at withdrawal of augers
1.53		2.0								2.0	
		2.5								2.5	
		3.0								3.0	
		3.5								3.5	
		4.0								4.0	
		4.5								4.5	
		5.0								5.0	
		5.5								5.5	

PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. 17

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Diedrich D-50T**
Method: **Solid Stem Auger**
Size: **100mm**
Date: **May 08 14** TO **May 08 14**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	SHEAR STRENGTH (kPa) FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 / PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80	WATER CONTENT (%) W_P W W_L 10 20 30	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **363.05 m**										
362.82	225mm TOPSOIL										
0.23	Brown SAND AND SILT trace gravel	0.5								0.5	
362.30											
0.75	Weathered Carbonate BEDROCK	1.0								1.0	
361.68											
1.37	End of Borehole	1.5								1.5	Borehole dry at withdrawal of augers
		2.0								2.0	
		2.5								2.5	
		3.0								3.0	
		3.5								3.5	
		4.0								4.0	
		4.5								4.5	
		5.0								5.0	
		5.5								5.5	

PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. 18

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Diedrich D-50T**
Method: **Solid Stem Auger**
Size: **100mm**
Date: **May 08 14** TO **May 08 14**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **363.13 m**								
362.88	250mm TOPSOIL								
0.25	Dense brown SAND AND GRAVEL some silt frequent cobbles and boulders	0.5						0.5	
		1.0						1.0	
		1.5		1	ss	45		1.5	
		2.0						2.0	
		2.5		2	ss	44	▼	2.5	Water level at 2.29 m depth at withdrawal of augers
		3.0						3.0	
		3.5		3	ss	38		3.5	
	damp to saturated								
359.13		4.0						4.0	
4.00	Inferred Weathered Carbonate BEDROCK								
358.58		4.5						4.5	
4.55	End of Borehole								
		5.0						5.0	
		5.5						5.5	

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. 19

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Diedrich D-50T**
Method: **Solid Stem Auger**
Size: **100mm**
Date: **May 09 14** TO **May 09 14**

Ground Elevation: **359.81 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE
359.48	325mm TOPSOIL				
0.33	Loose to compact orangy brown to brown mottled SAND AND SILT wet to saturated	0.5			
358.71		1.0	1	ss	28
1.10	Compact brown Fine SAND saturated	1.5			
358.11			2	ss	40
1.70	Dense brown SAND AND GRAVEL saturated	2.0			
357.21		2.5	3	ss	63
2.60	Inferred Weathered Carbonate BEDROCK				
356.76		3.0			
3.05	End of Borehole	3.5			
		4.0			
		4.5			
		5.0			
		5.5			

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

DEPTH (m)

REMARKS

- Water level at 0.66 m depth at withdrawal of augers
- Cave-in at 1.2 m depth

PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. 20

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Diedrich D-50T**
Method: **Solid Stem Auger**
Size: **100mm**
Date: **May 09 14** TO **May 09 14**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **360.79 m**									
360.51	275mm TOPSOIL									
0.28	Dense to very dense brown SAND AND GRAVEL some silt	0.5		1	ss	28		▽	0.5	Cave-in at 0.89 m depth at withdrawal of augers
		1.0							1.0	
		1.5		2	ss	50/ 125mm			1.5	
	damp to saturated	2.0		3	ss	17			2.0	
358.39										
2.40	Inferred Weathered Carbonate BEDROCK bedrock penetrated by 100 mm diameter solid stem auger	2.5							2.5	
		3.0		4	ss	50/ 25mm			3.0	
357.59										
3.20	End of Borehole	3.5							3.5	
		4.0							4.0	
		4.5							4.5	
		5.0							5.0	
		5.5							5.5	

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

PROJECT MANAGER: **RVD**

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Enclosure No.: 21
Sheet 1 of 1

FILE No: 14-05-K02

TEST PIT No. A

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Backhoe**
Method: **Backhoe**
Size:
Date: **Sep 25 15** TO **Sep 25 15**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	SAMPLE TYPE	N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **362.76 m**						FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200; STANDARD ● DYN. CONE ○ 20 40 60 80	W_P W W_L 10 20 30			
362.43	325mm TOPSOIL										
0.33	Loose to compact orangy brown SAND AND SILT moist	0.5		1	BS					0.5	
361.71		1.0								1.0	
1.05	Compact brown SAND AND SILT TILL some to frequent gravel and cobbles moist	1.5		2	BS					1.5	
		2.0								2.0	
360.55											
2.21	Test Pit terminated on Bedrock	2.5								2.5	Test Pit dry at completion of excavation
		3.0								3.0	
		3.5								3.5	
		4.0								4.0	
		4.5								4.5	
		5.0								5.0	
		5.5								5.5	

PROJECT MANAGER: **RVD**

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Enclosure No.: 22
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FILE No: 14-05-K02

TEST PIT No. B

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Backhoe**
Method: **Backhoe**
Size:
Date: **Sep 25 15** TO **Sep 25 15**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	SAMPLE TYPE	N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **362.13 m**						FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ (50 100 150 200) PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ (20 40 60 80)	W_P W W_L (10 20 30)			
361.85	275mm TOPSOIL										
0.28	Loose to compact mottled brown/grey SANDY SILT trace gravel and clay moist	0.5		1	BS					0.5	
		1.0								1.0	Test Pit dry 0.5 hr following completion of excavation
360.99											
1.14	Test Pit terminated on Bedrock	1.5								1.5	
		2.0								2.0	
		2.5								2.5	
		3.0								3.0	
		3.5								3.5	
		4.0								4.0	
		4.5								4.5	
		5.0								5.0	
		5.5								5.5	

PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. C

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Backhoe**
Method: **Backhoe**
Size:
Date: **Sep 25 15** TO **Sep 25 15**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **363.26 m**						FIELD VANE: Peak ⊗ Rem. ×; LAB TEST: Unc. ■ P.P. □; 50 100 150 200; STANDARD ● DYN. CONE ○; 20 40 60 80	W_P W W_L; 10 20 30			
363.01	250mm TOPSOIL										
0.25		0.5								0.5	
	Loose orangy brown SAND AND SILT										
362.45											
0.81	some angular rock fragments	1.0								1.0	Test Pit dry at completion of excavation
	moist										
	Test Pit terminated on Bedrock	1.5								1.5	
		2.0								2.0	
		2.5								2.5	
		3.0								3.0	
		3.5								3.5	
		4.0								4.0	
		4.5								4.5	
		5.0								5.0	
		5.5								5.5	

PROJECT MANAGER: **RVD**

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Enclosure No.: 24
Sheet 1 of 1

FILE No: 14-05-K02

TEST PIT No. D

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Backhoe**
Method: **Backhoe**
Size:
Date: **Sep 25 15** TO **Sep 25 15**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	SAMPLE TYPE	N-VALUE	SHEAR STRENGTH (kPa) FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80	WATER CONTENT (%) W_P W W_L 10 20 30	WELL DATA	DEPTH (m)	REMARKS
364.20	Ground Elevation: **364.25 m**										
364.20 / 0.05	50mm TOPSOIL										
	Test Pit terminated on Bedrock										Test Pit dry at completion of excavation
		0.5								0.5	
		1.0								1.0	
		1.5								1.5	
		2.0								2.0	
		2.5								2.5	
		3.0								3.0	
		3.5								3.5	
		4.0								4.0	
		4.5								4.5	
		5.0								5.0	
		5.5								5.5	

PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. E

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Backhoe**
Method: **Backhoe**
Size:
Date: **Sep 25 15** TO **Sep 25 15**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	SAMPLE TYPE	N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **366.00 m**						FIELD VANE: Peak ⊗ Rem. ×; LAB TEST: Unc. ■ P.P. □; 50 100 150 200; PENETRATION RESISTANCE STANDARD ● DYN. CONE ○; 20 40 60 80	W_P W W_L; 10 20 30			
365.72 0.28	275mm TOPSOIL	0.5								0.5	
365.25 0.75	Loose to compact brown SAND AND SILT trace gravel and clay moist	1.0								1.0	
	Compact brown SAND AND GRAVEL frequent cobbles damp	1.5		1	BS					1.5	
364.17 1.83	Test Pit terminated on Bedrock	2.0								2.0	Test Pit dry at completion of excavation
		2.5								2.5	
		3.0								3.0	
		3.5								3.5	
		4.0								4.0	
		4.5								4.5	
		5.0								5.0	
		5.5								5.5	

PROJECT MANAGER: **RVD**

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FILE No: 14-05-K02

TEST PIT No. F

Client: **Charleston Homes**

Project: **Proposed Residential Subdivision**

Location: **Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa**

EQUIPMENT DATA

Machine: **Backhoe**
Method: **Backhoe**
Size:
Date: **Sep 25 15** TO **Sep 25 15**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **365.68 m**						FIELD VANE: Peak ⊗ Rem. ×; LAB TEST: Unc. ■ P.P. □; 50 100 150 200; PENETRATION RESISTANCE STANDARD ● DYN. CONE ○; 20 40 60 80	W_P W W_L; 10 20 30			
365.38	30mm TOPSOIL										
0.30											
365.28	Loose brown SAND AND SILT										
0.40	Test Pit terminated on Bedrock	0.5								0.5	Test Pit dry at completion of excavation
		1.0								1.0	
		1.5								1.5	
		2.0								2.0	
		2.5								2.5	
		3.0								3.0	
		3.5								3.5	
		4.0								4.0	
		4.5								4.5	
		5.0								5.0	
		5.5								5.5	

PROJECT MANAGER: **RVD**

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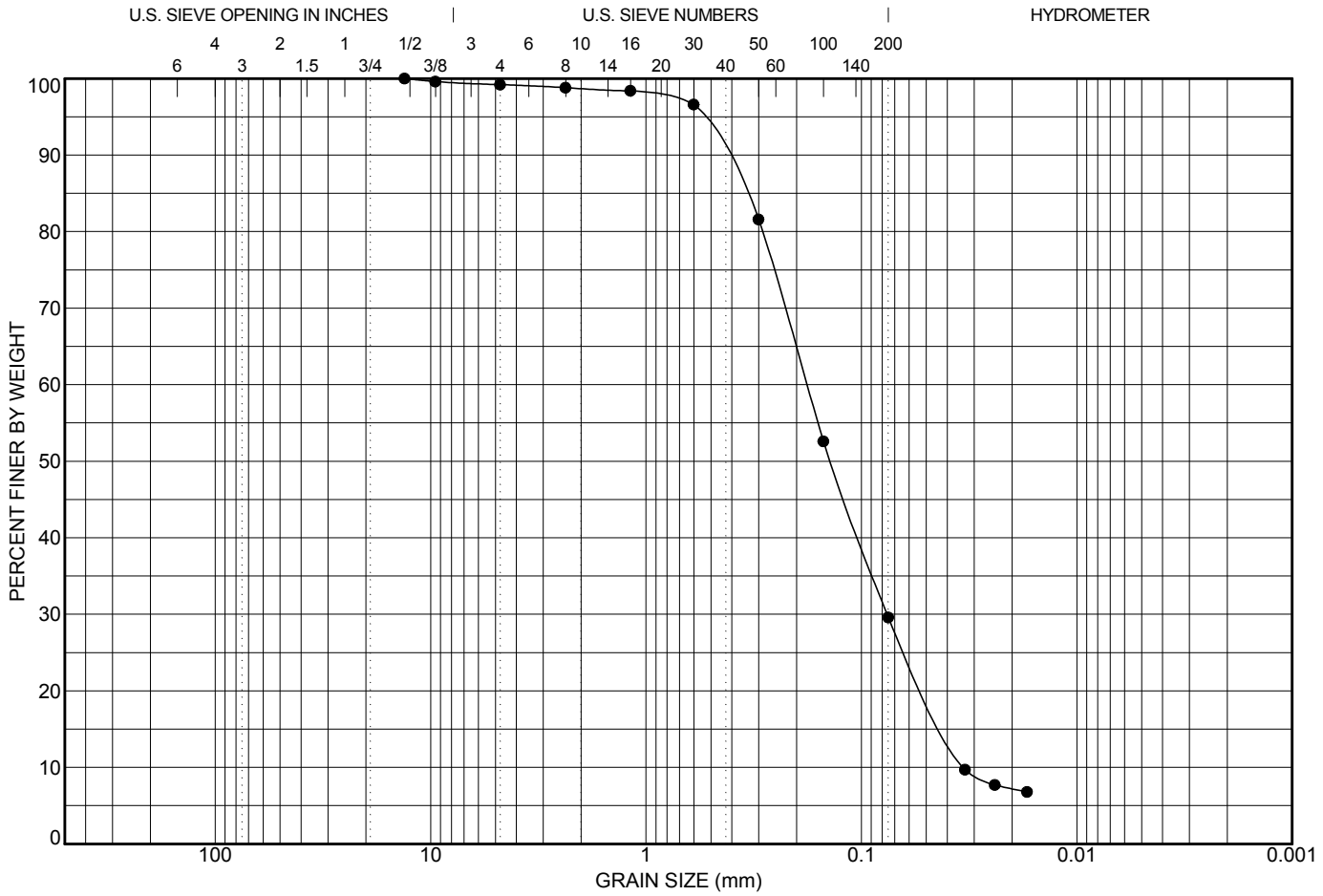

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			0.96	5.36	13.2	0.179	0.076	0.033	0.8	69.6	29.6	

Date: Nov. 26 / 2015
Client: Charleston Homes
Contractor:
Source:
Sampled From: TP-3, 0.6 to 0.9 m
Sample No.: 1
Date Sampled: May. 08 / 2014
Sampled By: RVD
Lab No.: 1384
Date Tested: Nov. 20 / 2015
Type of Material: Silty Sand

Sieve Size (mm)	Percent Passing	No Specifications

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e-mail: info@cvdengineering.com

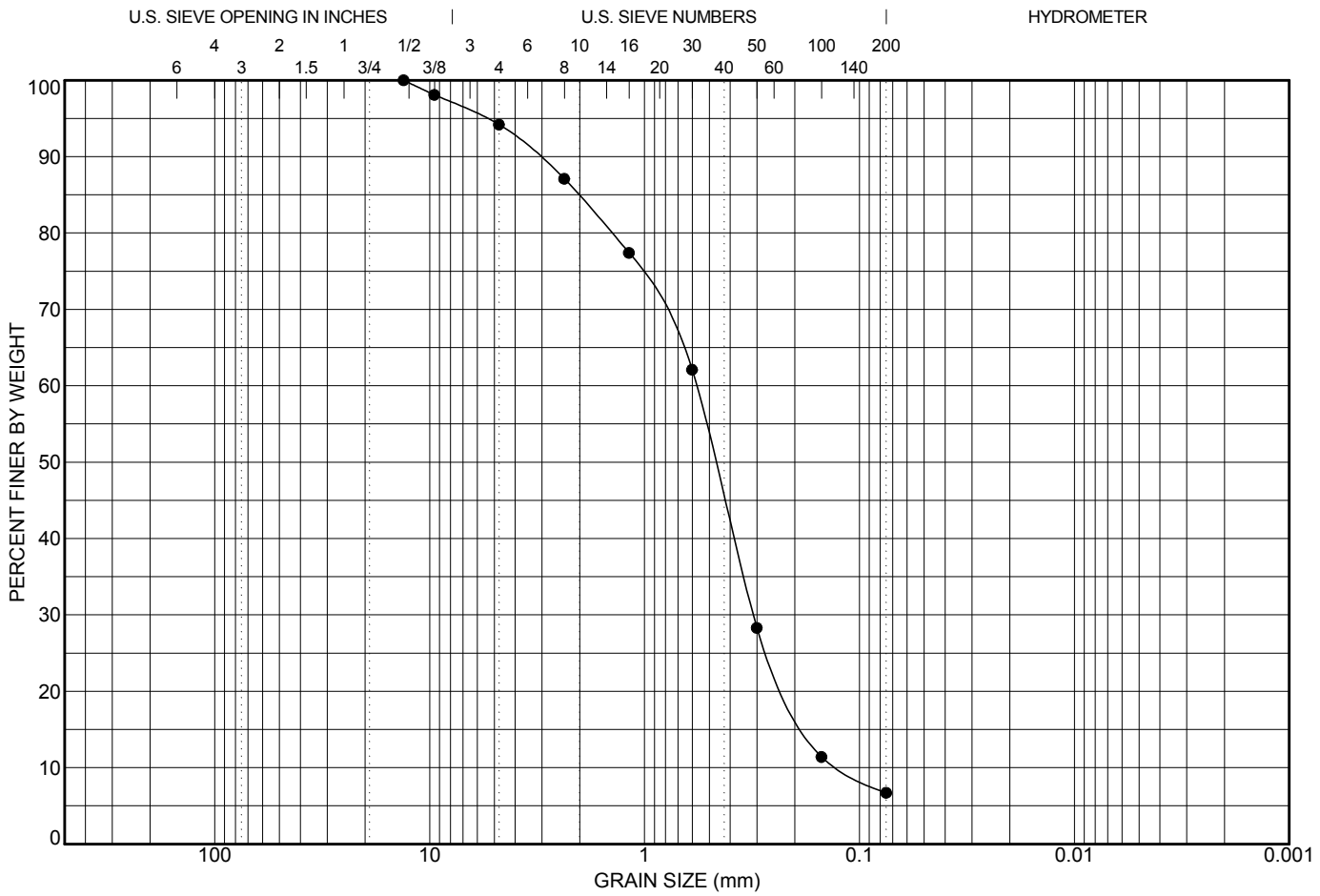
GRAIN SIZE DISTRIBUTION

Project: Proposed Residential Subdivision

Location: Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa

File No.: 14-05-K02

Enclosure No.: 27



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			1.38	4.71	13.2	0.575	0.311	0.122	5.8	87.5	6.7	

Date: Nov. 26 / 0205
Client: Charleston Homes
Contractor:
Source:
Sampled From: BH-5, 1.5 to 2.1 m
Sample No.: 2
Date Sampled: May. 09 / 2014
Sampled By: RVD
Lab No.: 1383
Date Tested: Nov. 23 / 0205
Type of Material: Fine to Coarse Sand, trace gravel and silt

Sieve Size (mm)	Percent Passing	No Specifications

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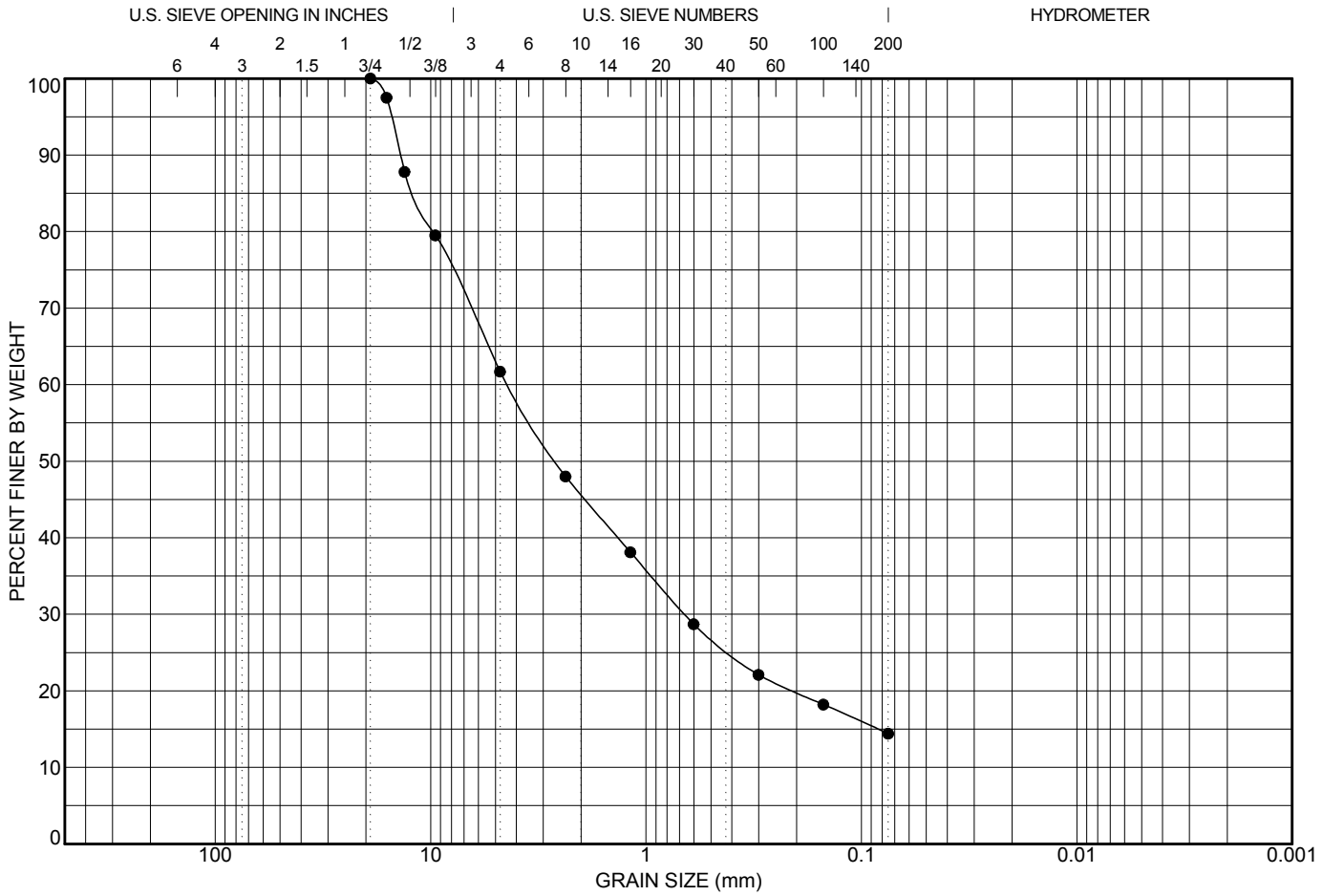
GRAIN SIZE DISTRIBUTION

Project: Proposed Residential Subdivision

Location: Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa

File No.: 14-05-K02

Enclosure No.: 28



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
					19	4.355	0.659		38.3	47.3	14.4	

Date: Nov. 26 / 2015
Client: Charleston Homes
Contractor:
Source:
Sampled From: BH-18, 1.2 to 1.65 m
Sample No.: 1
Date Sampled: May. 08 / 2014
Sampled By: RVD
Lab No.: 1387
Date Tested: Nov. 23 / 2015
Type of Material: Sand and Gravel, some silt

Sieve Size (mm)	Percent Passing	No Specifications

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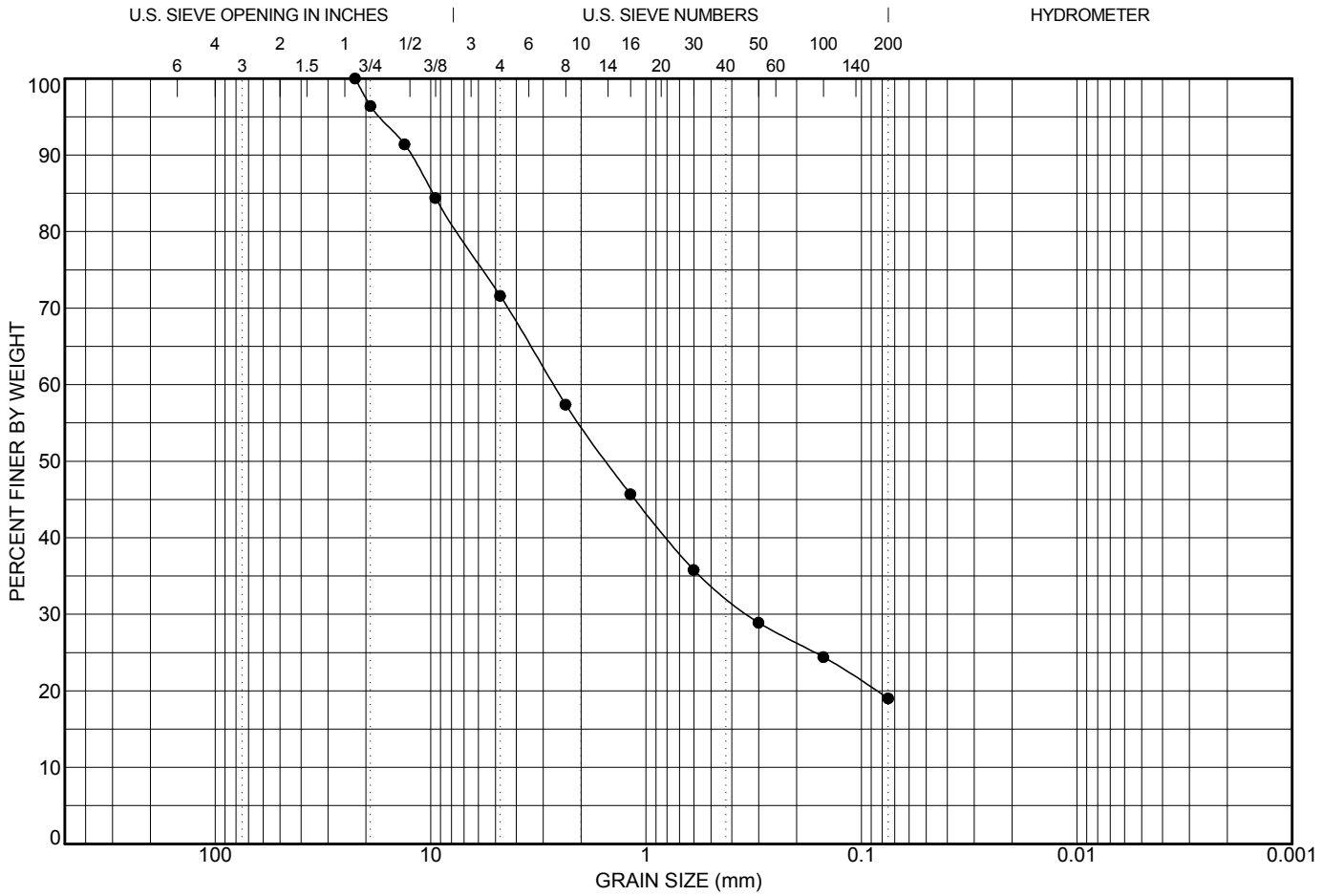
GRAIN SIZE DISTRIBUTION

Project: Proposed Residential Subdivision

Location: Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa

File No.: 14-05-K02

Enclosure No.: 29



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
					22.4	2.682	0.335		28.4	52.6	19.0	

Date: Nov. 26 / 2015
Client: Charleston Homes
Contractor:
Source:
Sampled From: BH-20, 0.75 to 1.2 m
Sample No.: 1
Date Sampled: May. 09 / 2014
Sampled By: RVD
Lab No.: 1388
Date Tested: Nov. 23 / 2015
Type of Material: Sand and Gravel, some silt

Sieve Size (mm)	Percent Passing	No Specifications

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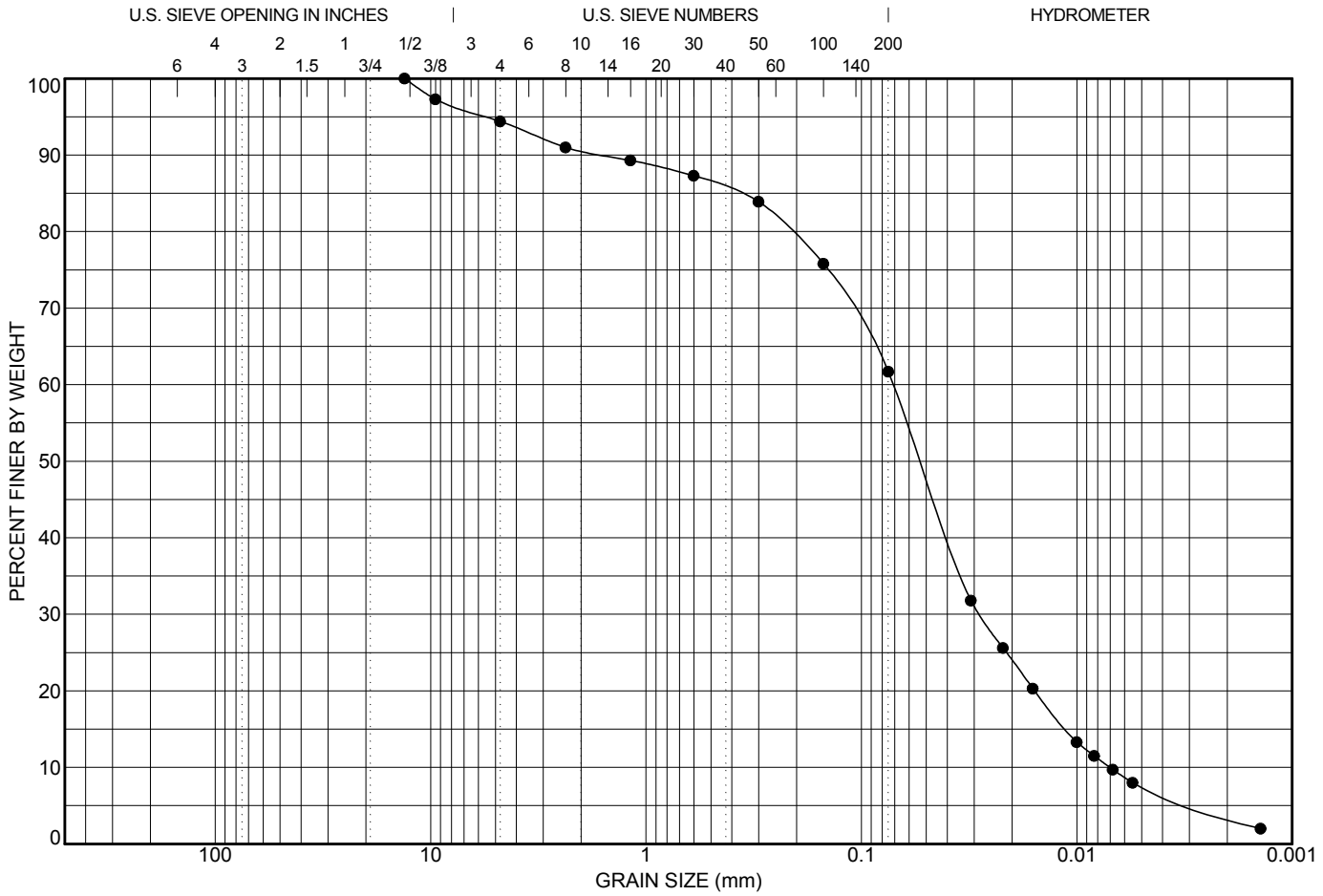
GRAIN SIZE DISTRIBUTION

Project: Proposed Residential Subdivision

Location: Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa

File No.: 14-05-K02

Enclosure No.: 30



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			1.57	10.15	13.2	0.071	0.028	0.007	5.6	32.7	61.7	

Date: Nov. 26 / 2015
Client: Charleston Homes
Contractor:
Source:
Sampled From: BH-8, 2.25 to 2.7 m
Sample No.: 3
Date Sampled: May. 09 / 2014
Sampled By: RVD
Lab No.: 1385
Date Tested: Nov. 23 / 2015
Type of Material: Sand and Silt Till, trace gravel and clay

Sieve Size (mm)	Percent Passing	No Specifications

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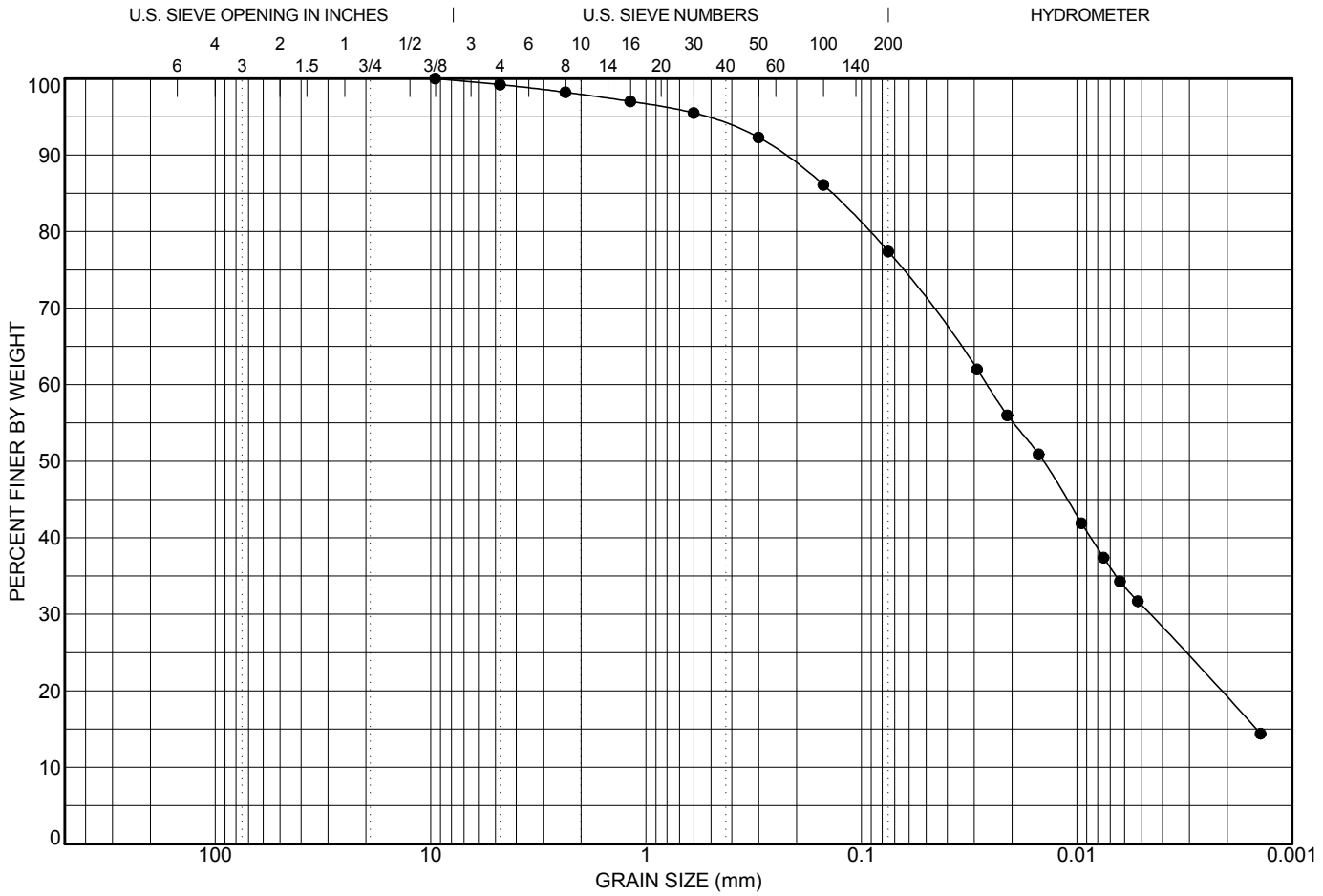
GRAIN SIZE DISTRIBUTION

Project: Proposed Residential Subdivision

Location: Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa

File No.: 14-05-K02

Enclosure No.: 31



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
					9.5	0.026	0.005		0.8	21.8	77.4	

Date: Nov. 26 / 2015
Client: Charleston Homes
Contractor:
Source:
Sampled From: BH-10, 2.25 to 2.7 m
Sample No.: 3
Date Sampled: May. 08 / 2014
Sampled By: RVD
Lab No.: 1386
Date Tested: Nov. 23 / 2015
Type of Material: Sandy Clayey Silt Till, trace gravel

Sieve Size (mm)	Percent Passing	No Specifications

CHUNG & VANDER DOELEN
ENGINEERING LTD.
311 Victoria Street North
Kitchener, Ontario N2H 5E1
Telephone: 519-742-8979
Fax: 519-742-7739
e-mail: info@cvdengineering.com

GRAIN SIZE DISTRIBUTION

Project: Proposed Residential Subdivision

Location: Part of Lots 6 and 7, Concession 4, Twp of Guelph-Eramosa

File No.: 14-05-K02

Enclosure No.: 32

30.0m BUFFER

WETLAND LIMIT FLAGGED BY NRSI AND CONFIRMED BY THE GRCA ON JULY 31, 2014 SURVEYED BY VAN HARTEN ON AUGUST 6, 2014

CONSTRUCTION NORTH

0 15 30 60m

BH 18
Elev: 363.13 m

BH 17
Elev: 363.05 m

BLOCK 169 STORMWATER MANAGEMENT 0.741ha

TP B
Elev: 362.13 m

TP A
Elev: 362.76 m

BH 15
Elev: 362.89 m

STREET B

BH 9
Elev: 366.61 m

BH 8
Elev: 366.91 m

BH 10
Elev: 364.76 m

TP E
Elev: 366.00 m

STREET A

BH 14
Elev: 363.30 m

TP C
Elev: 363.26 m

TP D
Elev: 364.25 m

PARK 4152m²

STREET C

BH 11
Elev: 367.02 m

TP F
Elev: 365.68 m

BH 7
Elev: 364.10 m

BH 12
Elev: 364.43 m

STREET B

BLOCK 167 PARK 368.81m²

MAJOR OVERLAND FLOW

BLOCK 161 ON-STREET

BH 6
Elev: 359.90 m

BH 19
Elev: 359.81 m

BLOCK 162 ON-STREET TOWNHOUSE 12 UNITS 0.25ha

BLOCK 163 ON-STREET TOWNHOUSE 11 UNITS ha

BLOCK 164 ON-STREET

STREET A

BH 13
Elev: 361.72 m

BLOCK 170 STORMWATER MANAGEMENT 0.527ha

BH 5
Elev: 359.69 m

BH 20
Elev: 360.79 m

BLOCK 165 ON-STREET TOWNHOUSE 7 UNITS - 0.17

BH 4
Elev: 359.67 m

STREET D

STREET

TP 3
Elev: 359.89 m

TP 2.5

TP 2
Elev: 364.77 m

BLOCK 166 PARK 420.7m²

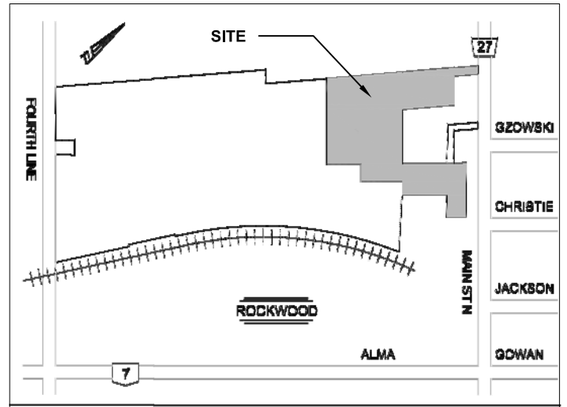
REVISED LOT LINE TO ACCOMMODATE DRAINAGE SWALE ON SCHOOL SITE AND PARK CONNECTION

BH 1
Elev: 363.35 m

WELLINGTON COUNTY ROAD No. 27

CONCESSION

CHRISTIE STREET



KEY MAP
N.T.S.

LEGEND

- Borehole Location
- Test Pit Location

BOREHOLE AND TEST PIT LOCATION PLAN

Proposed Residential Subdivision
Bonner Property

Township of Guelph-Eramosa, Ontario

CHUNG & VANDER DOELEN ENGINEERING LTD.

311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 5E1 / 519-742-8979

Drawn by: CS	Date: December, 2015	File No.: 14-05-K02
Checked by: RVD	Scale: As Shown	Drawing No.: 1