



Environmental Assessments & Approvals

May 26, 2023

AEC 20-397

Peter Raikes
c/o Raikes Geomatics Inc.
642 Welham Road
Barrie, ON
L4N 9A1

Re: **Servicing Feasibility Assessment**
Proposed 3-Lot Severance
1500 Sandy Bay Road, Town of Penetanguishene, Simcoe County

Dear Mr. Raikes

Azimuth Environmental Consulting, Inc. (Azimuth) is pleased to submit a Servicing Feasibility Study as it pertains to a private septic system and water well to support a proposed lot severance resulting in three new parcels for the above noted property. This report identifies our study approach, findings and conclusions for the Study.

The results of our Study concluded that the environmental conditions upon the Site support the development concepts with private septic and well, while meeting all OBC setbacks. The septic layout plans are conceptual and are subject to change following detailed design.

If you have any questions or require additional information please do not hesitate to contact the undersigned.

Yours truly,
AZIMUTH ENVIRONMENTAL CONSULTING, INC.



Jackie Coughlin, B.A.Sc., P.Eng.
Senior Environmental Engineer



1.0 INTRODUCTION

Azimuth Environmental Consulting, Inc. (Azimuth) was retained to prepare a Servicing Feasibility Study (Sewage and Water Supply) for the property located at 1500 Sandy Bay Road, Town of Penetanguishene, Simcoe County (the Site; Figure 1).

It is understood that the proponent is seeking to sever the Site resulting in three residential parcels (Parts 1, 2, and 3) and the retained parcel. As per the Plan of Survey (appended) the parcel dimensions are provided below:

1. Part 1 - 2,676.1 m²
2. Part 2 - 2,114.1 m²
3. Part 3 - 2,043.5 m²
4. Part 4 (retained parcel) - 6,315.8m²

Development concepts are preliminary in nature but would include a single residential three bedroom dwelling with associated garage, driveway, decks, etc. Each lot will be serviced via a private water well and septic system for the treatment of sewage (Figure 2).

The purpose of this evaluation is to confirm servicing feasibility for the three severed lots to provide water supply and septic suitability, while meeting all Ontario Building Code (OBC) separation requirements in the final design. The conceptual design and footprint of a typical septic system is provided and is based on conservative assumptions since a full site assessment has not been completed(Figure 3). The final design will be completed following more detailed site work and as part of the Town's building permit application process.

1.1 Study Approach

For this study, our focus was centered primarily upon the suitability of the prescribed lot area for the construction of on-site septic systems (as it relates to the requirements of the OBC) and location of the water supply well. This evaluation considered available literature data and augmented it with our existing knowledge and familiarity with the area. Information provided by the following sources was utilized in the course of this evaluation:

- Review of available geologic mapping from the Geological Survey of Canada (GSC) and the Ontario Geological Survey (OGS);



- Review of the Ministry of Environment, Conservation and Parks (MECP) Water Well Records, the Groundwater Information Network (GIN) and/ or the Oak Ridges Moraine Groundwater Program (ORMGP);
- Review of Azimuth's Natural Heritage Evaluation;
- Review of OBC septic bed calculations and separation distances to confirm that a disposal bed can be accommodated within each of the severed parcels while meeting all OBC separation distances in the final design; and
- Soil testing report (grain size analysis and percolation rates) for Part 3 only.

2.0 TOPOGRAPHY AND SOILS

The property slopes toward Georgian Bay from approx. 210 metres above sea level (masl) in the south to 190 masl to the north. As per Map 6 of the Town of Penetanguishene Natural Heritage Study Update there is a ridge on the southern third of the property that runs in a general east to west direction. Lands south of the ridge are relatively flat and are the site of the existing single-detached dwelling. Lands north of the ridge are also relatively flat (Azimuth, 2023).

Surficial soils of the property and adjacent lands are composed of VASEY series – sandy loam till (Soil Map of Simcoe County, Soil Survey Report No. 29, North Sheet). According to local well records, the surficial sandy loam is underlain by silt till. Site specific soil testing was completed for Part 3 only. Soils are described as either Sand with some silt and clay, trace gravel or clayey silt and sand, trace gravel. Soils of this nature have medium to low permeability. The estimated percolation rate for the above soil types was estimated to between 20min/cm and 50min/cm. For the purposes of the Study, a percolation of 45min/cm has been used in the design of the filter bed sand contact layer and loading area. However the soil beneath the actual disposal bed locations should be tested as part of detailed design.

Due to the presence of a high water table, a fully raised disposal bed will be required to meet the minimum 0.9m separation distance between the bottom of the filter bed stone layer and the high water table.

3.0 PRELIMINARY SERVICING FEASIBILITY

The following provides a preliminary septic evaluation for the design of the sewage systems for each of the proposed severed parcels.



3.1 Assumptions

For the purposes of sizing the septic system, a peak daily flow of ≤ 1600 L/day has been assumed and is based on the standards presented in the OBC for a three-bedroom dwelling. Assumptions used in the conceptual design of the disposal beds are summarized below:

- 3 bedroom dwelling - 1600Lpd;
- $\leq 200\text{m}^2$ dwelling;
- ≤ 20 fixture counts;
- high water table (near surface);
- soil percolation rate of 45 min/cm;
- fully raised filter bed with 15m mantle and 4:1 side slopes; and
- loading area ($35 < T \leq 50$) as per OBC.

3.2 Treatment and Disposal

The design of the system assumes a standard Class IV system consisting of a septic tank with a minimum volume of 3,600 Litres and a conventional filter bed. The filter bed will be fully raised due to the high water table present at the site during spring freshet.

The filter bed system requires even distribution of the treated effluent over an adsorption system consisting of a 300mm stone layer overlying 750mm of an unsaturated sand layer (sand contact area). The sand contact area between the filter medium and the native soil is sized so that its area is equivalent to the product of the peak flow and native soil percolation rate divided by 850 (i.e., $A = QT/850$). The overlying stone layer is designed to provide an area equal to 75L of treated water per square meter of stone ($A = Q/75$). A summary of the preliminary calculations is provided below:

- Stone Area (OBC Section 8.7.5.2(3)):
 - $Q/75$ ($Q < 3000\text{Lpd}$)
 $= 1,600/75$
 $= \text{min. } 21\text{m}^2$ (e.g., 4m by 5.3m)
- Extended sand contact Area (OBC Section 8.7.5.3(6)):
 - $QT/850 = 1,600 \times 45/850$
 $= \text{min. } 85\text{m}^2$ (e.g., 15.9m by 5.3m)



Since a raised bed is required due to the high water table, there is a requirement for a 15 m sand mantle extending in the direction of ground water flow and a loading area as stipulated in OBC Table 8.7.4.1.A (Q/6) for a percolation rate between 30 and ≤ 50 .

- Loading Area (OBC Section 8.7.5.2(2):
 - $Q/6$ (for $30 < T < 50$).
 $= 1,600 / 6$
 $= \text{min. } 267\text{m}^2$ (e.g., 22.2m by 12m)

Based on the above, the minimum required area of the filter bed contact area is approximately 270m^2 . For a fully raised bed with 4:1 side slopes, the total area of the septic bed footprint would increase to $\sim 700\text{m}^2$ (e.g., 28.2m by 24m). Figure 3 illustrates the layout of the proposed disposal bed footprint, which fits within the lot fabric while meeting OBC sewage setbacks from wells, property lines and/ or structures. The preliminary design basis is appended.

3.2.1 OBC Setbacks

With the above, the OBC requires specific minimum spacing requirements for both the treatment unit (includes septic tanks), as well as the distribution piping of the tile field. A summary of the standard OBC minimum spacing requirements is provided in Table 1.

Table 1- Standard OBC Setback Requirements

Site Feature	Treatment Unit (m)	Inground Bed	Raised Bed*
		Distribution Piping (m)	Distribution Piping (m)
Structure	1.5	5	8
Well (watertight casing >6 m)	15	15	18
Any other well	15	30	33
Lake	15	15	18
Pond	15	15	18
Reservoir	15	15	18
River	15	15	18
Spring not used as a source of potable water	15	15	18
Stream	15	15	18
Property Line	3	3	6
For raised bed systems, the setback increase by 2x height of the bed + standard setback			
Assumes height of bed is 1.5m above ground level			

In consideration of the minimum spacing distances stated, it should be noted that for raised-bed systems, Section 8.7.4.2.(11) of the OBC requires that the distances from distribution piping "...increased by twice the height that the leaching bed is raised above



the original grade”. As illustrated in Table 2, for a leaching bed that is raised by 1.5 m above the original grade, the minimum spacing from the property line to the distribution piping would increase from 3 m to 6.0 m.

3.3 Well Sitings

Well sitings must be upgradient of the on-Site disposal field, and must comply with the spacing requirements of the OBC, which stipulates a minimum distance of 15 m for drilled wells (assuming a minimum watertight casing length of 6 m) from an active septic system. In contrast, a minimum 30 m setback is required for dug wells (casing length <6 m). It is also recommended that wells not be located downgradient of septic systems on adjacent properties since this would increase the potential risk of contamination.

Figure 3 provides the location of the proposed well for the severed parcels. The proposed well location for each parcel was selected on the basis of maximizing OBC distances to the septic disposal bed and consideration of the shallow ground water flow direction from all proposed/ existing and septic beds as deemed applicable.

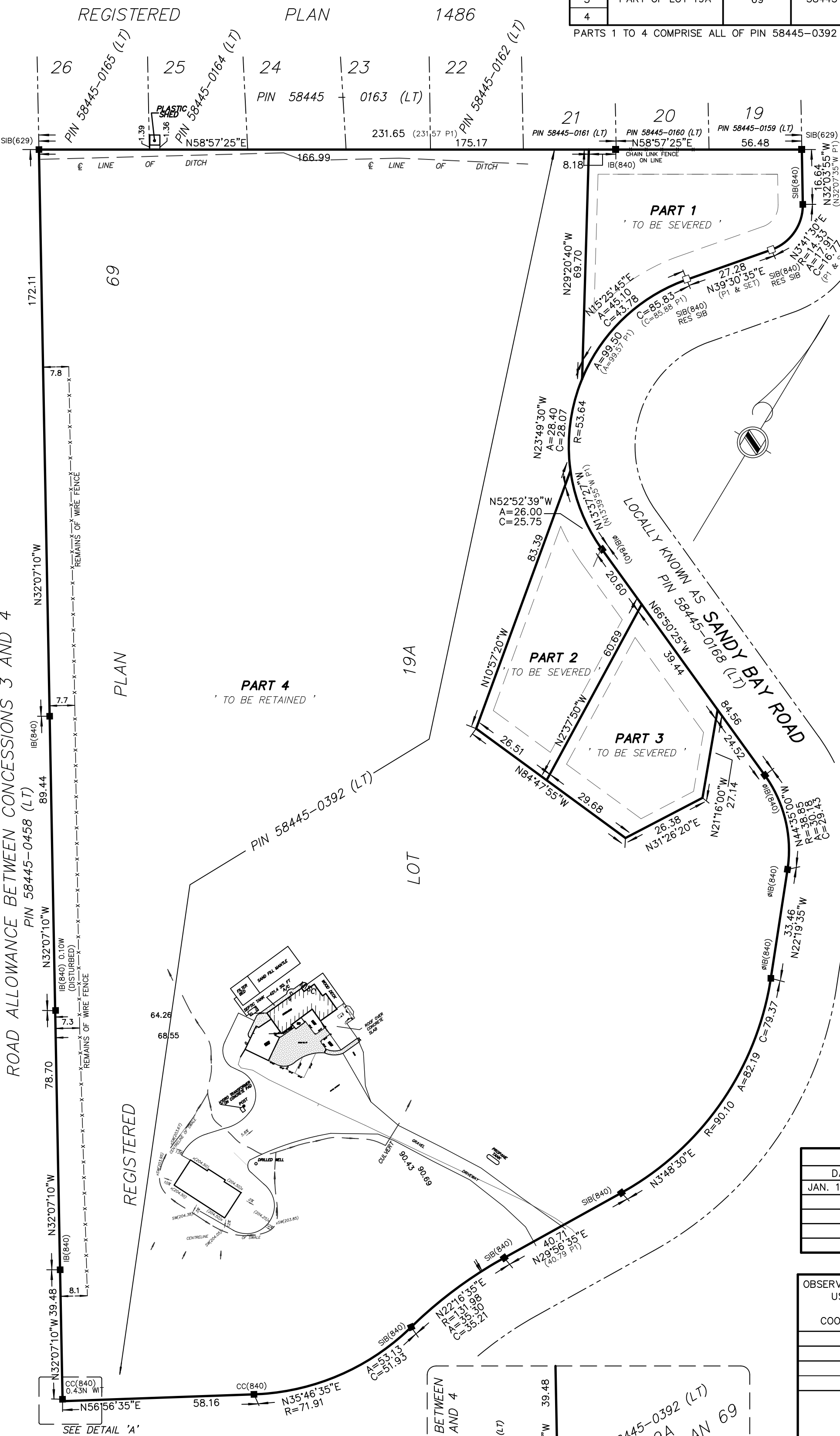
4.0 CLOSURE

Based upon our interpretation of the available data (as discussed), it is concluded that the hydrogeological conditions upon the Site are suitable for the proposed severance and development of three residential dwellings with a new potable water well and a conventional septic system. It is recognized that other septic systems such as tertiary treatment can be used which would decrease the overall size and height of the bed.

A review of OBC setback requirements and the conceptual design plan (including a recommended location for the proposed wells) indicates that all relevant setbacks can be maintained for the disposal bed and tanks. Further sampling is recommended to confirm the percolation rate of the native soils and the high water table elevation underneath each bed prior to detailed design.

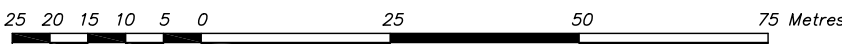
SCHEDULE				
PART	LOT / BLOCK	PLAN	PIN	AREA M ²
1	PART OF LOT 19A	69	58445-0392 (LT)	2676.1
2				2114.1
3				2043.5
4				63156.8

PARTS 1 TO 4 COMPRISE ALL OF PIN 58445-0392 (LT)



PLAN OF SURVEY
OF ALL OF
LOT 19A
REGISTERED PLAN 69
(GEOGRAPHIC TOWNSHIP OF TAY)
TOWN OF PENETANGUSHENE
COUNTY OF SIMCOE

SCALE 1 : 1000



THE INTENDED PLOT SIZE OF THIS PLAN IS 559mm IN WIDTH BY 432mm IN HEIGHT WHEN PLOTTED AT A SCALE OF 1: 1000.

RAIKES GEOMATICS INC.
2021

METRIC

DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

BEARING NOTE

BEARINGS HEREON ARE UTM GRID BEARINGS AND ARE DERIVED FROM OBSERVED REFERENCE POINTS (ORPs) A AND B BY REAL TIME NETWORK (RTN) OBSERVATIONS AND ARE REFERRED TO THE CENTRAL MERIDIAN 81°W IN ZONE 17 BASED ON NAD83 (CSRS) (2010 EPOCH).

BEARING ROTATION

FOR BEARING COMPARISONS, A ROTATION OF 0°48'25" COUNTERCLOCKWISE WAS APPLIED TO PLAN 51R-6181 (P1)

DISTANCE NOTE

DISTANCES SHOWN ON THIS PLAN ARE HORIZONTAL GROUND DISTANCES AND CAN BE CONVERTED TO GRID DISTANCES BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999667.

LEGEND

- DENOTES MONUMENT FOUND
- DENOTES MONUMENT PLANTED
- IB DENOTES IRON BAR
- SIB DENOTES STANDARD IRON BAR
- ØIB DENOTES ROUND IRON BAR
- CC DENOTES CUT CROSS
- Meas. DENOTES MEASURED
- 629 DENOTES V.R. DAVIES, OLS
- 840 DENOTES J.M. HARVEY, OLS
- P1 DENOTES PLAN 51R-6181
- RES DENOTES RESTORED IN ACCORDANCE WITH SECTION 1.5 OF THE NATIONAL STANDARDS FOR THE SURVEY OF CANADA LANDS
- WIT DENOTES WITNESS

ZONING INFORMATION

ZONE DESIGNATION	PERMITTED	PROVIDED PART 1	PROVIDED PART 2	PROVIDED PART 3
RURAL (RU)				
LOT AREA (sq.m.)	2000	2676	2134	2074
LOT FRONTAGE (m)	35.0	* > 35.0	35.0	35.0

* MAY REQUIRE FRONTAGE DEFINITION CLARIFICATION

REVISION TABLE

DATE	BY	COMMENT
JAN. 18, 2023		RELEASED FOR ENVIRONMENTAL IMPACT STUDY

OBSERVED REFERENCE POINTS (ORPs) ARE DERIVED FROM GPS OBSERVATIONS USING THE CAN-NET VRS NETWORK, UTM ZONE 17 (81° LONGITUDE) NAD 83 CSRS (1997 EPOCH) COORDINATES TO URBAN ACCURACY PER SEC. 14 (2) OF O.REG 216/10

UTM NAD 83 CSRS COORDINATE TABLE		
POINT ID	NORTHING	EASTING
ORP A	4962005.90	587279.61
ORP B	4962253.89	586998.50

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN

W:\PROJECTS\PROJECTS_2015\155314\MSCAD\155314_RP2.DWG

DRAWN BY :	EKU	PROJECT No.	155314
CHECKED BY :	PTR		



RAIKES
GEOMATICS INC.

Barrie Office: (705) 722 - 6222 642 Welham Road, Barrie, ON L4N 9A1
Midland Office: (705) 526 - 7552 529 Elizabeth Street, Midland, ON L4R 2A2
Email : info@survey4u.com

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

- THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT, THE LAND TITLES ACT, AND THE REGULATIONS MADE UNDER THEM.
- THE SURVEY WAS COMPLETED ON THE ##th DAY OF XXXX, 2021.

DATE

PETER T. RAIKES, BSc., CLS, MRICS
ONTARIO LAND SURVEYOR

THIS PLAN OF SURVEY RELATES TO AOLS PLAN SUBMISSION FORM NUMBER #####.

DETAIL 'A'

SCALE: NOT TO SCALE

APPENDICES

Appendix A: Site Figures

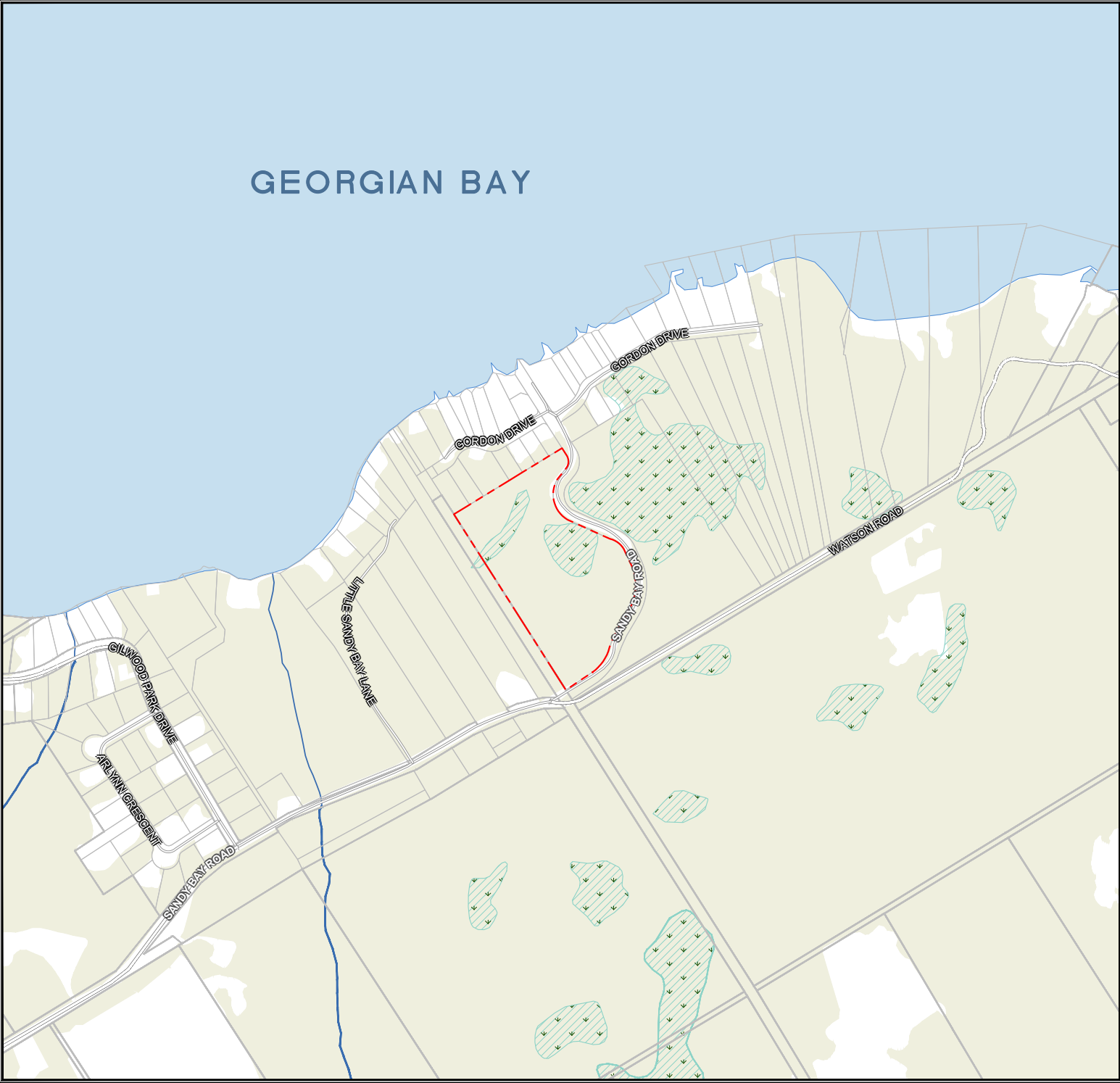
Appendix B: Conceptual Design

Appendix C: Soils Report

APPENDIX A

Site Figures

Plotted by: ALU on May 17, 2023 at 11:33am
File: Q:\20 projects\20-397 1500 sandy bay rd (onshore)\04.0 - draft\20-397 Site Location.dwg Layout: Site Location Plot scale: 1



LEGEND:

--- APPROX. PROPERTY BOUNDARY

REGIONAL MAP
SCALE 1:250000

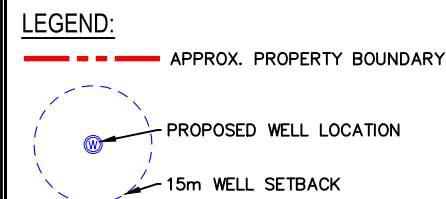
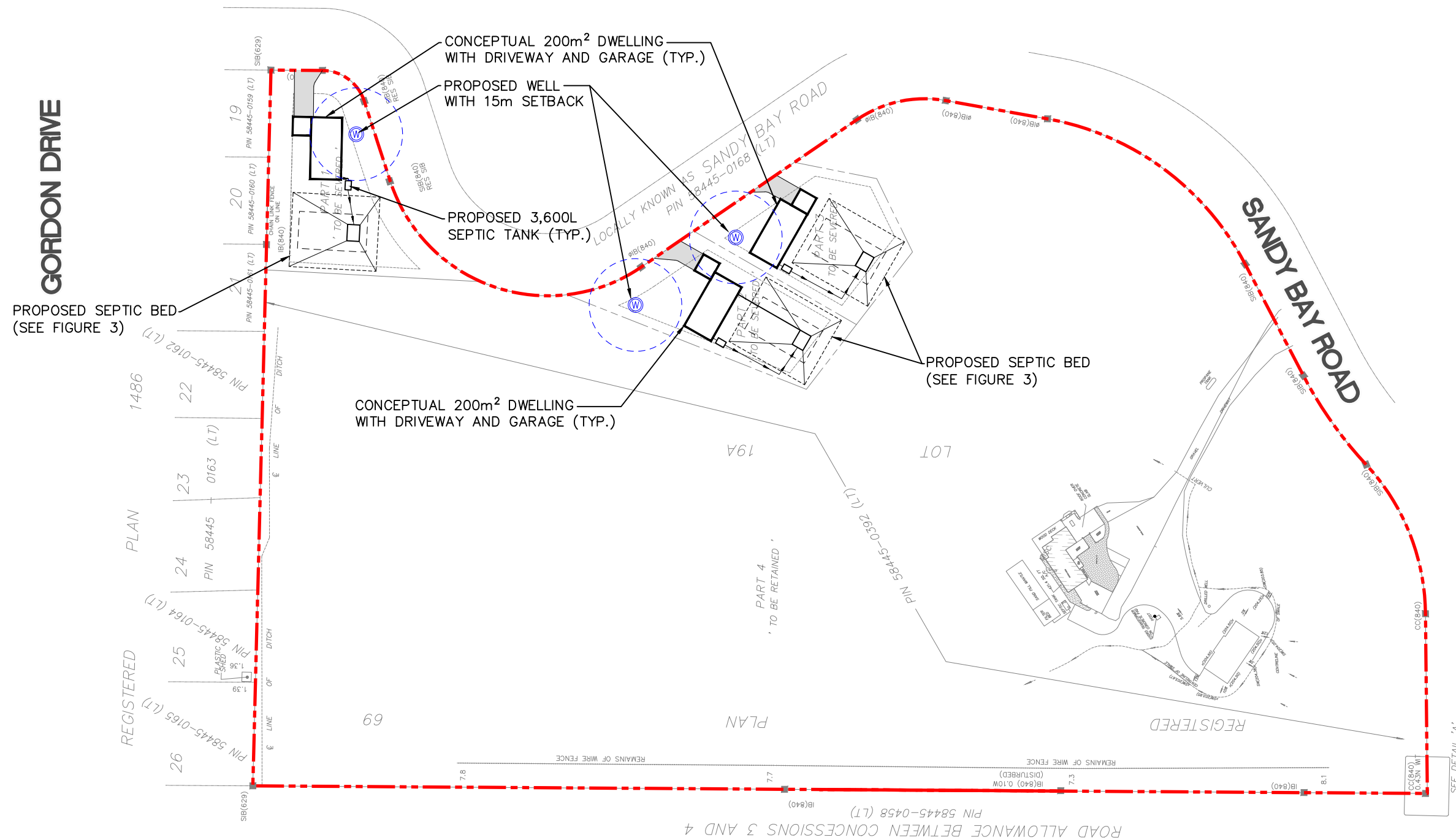
0 250.0 500.0
HORIZONTAL SCALE 1:10000

AZIMUTH ENVIRONMENTAL CONSULTING, INC.
ENVIRONMENTAL ASSESSMENTS & APPROVALS

SITE LOCATION

1500 SANDY BAY ROAD
PENETANGUISHENE, ON

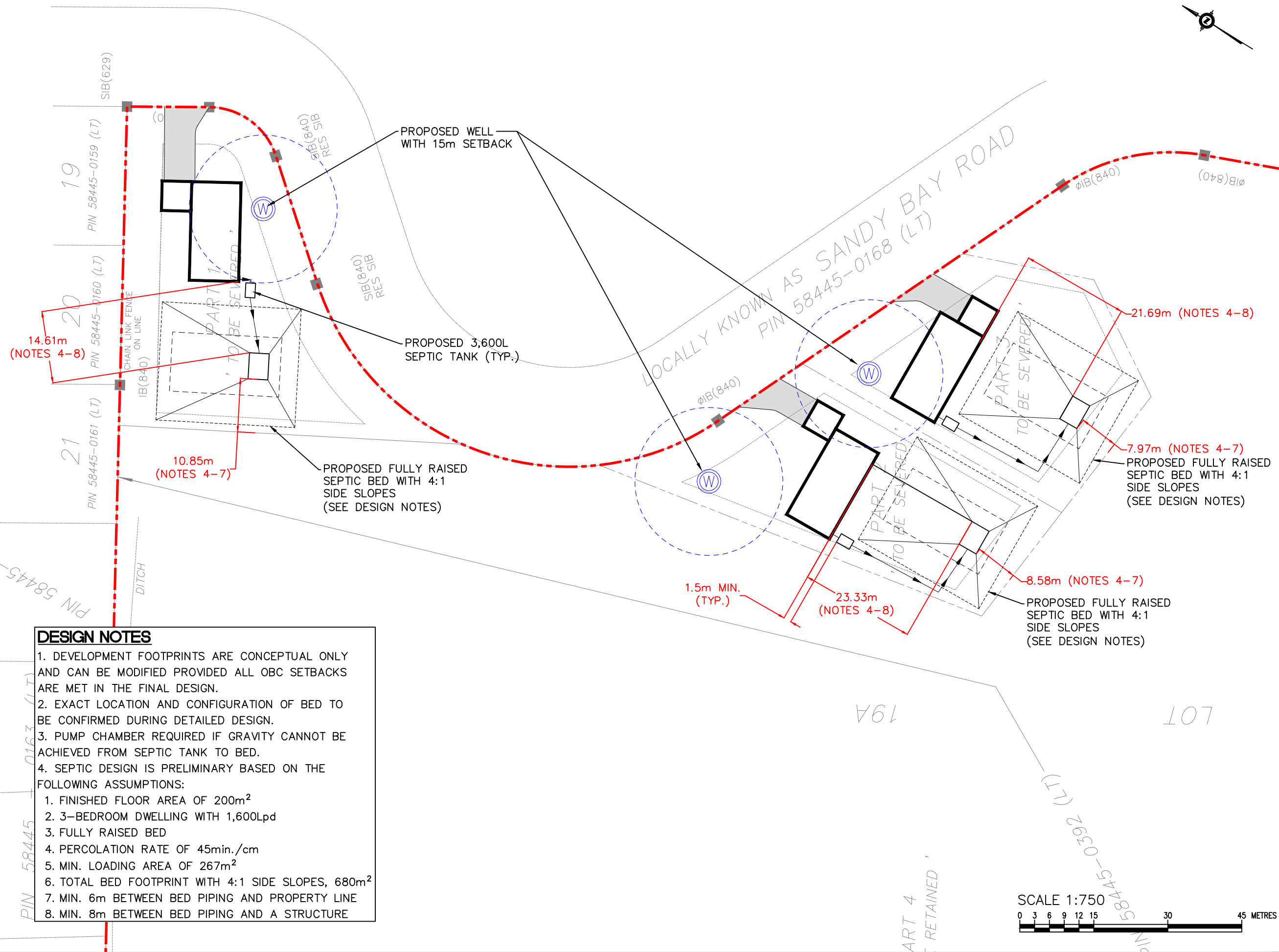
DATE ISSUED: MAY 2023	Figure No. 1
CREATED BY: A.L.	
PROJECT NO.: 20-397	
REFERENCE: SIMCOE COUNTY	



SITE LAYOUT PLAN

1500 SANDY BAY ROAD
PENETANGUISHENE, ON

DATE ISSUED:	MAY 2023	Figure No. 2
CREATED BY:	A.L.	
PROJECT NO.:	20-397	
REFERENCE:	SIMCOE COUNTY	



LEGEND:

— — — — — APPROX. PROPERTY BOUNDARY

PROPOSED WELL LOCATION

15m WELL SETBACK



LOCATION PLAN



SEPTIC LAYOUT PLAN

1500 SANDY BAY ROAD
PENETANGUISHENE, ON

DATE ISSUED:	MAY 2023	Figure No. 3
CREATED BY:	A.L.	
PROJECT NO.:	20-397	
REFERENCE:	SIMCOE COUNTY	

Figure No

3

REFERENCE:	SIMCOE COUNTY
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APPENDIX B

Conceptual Septic Design

SEWAGE SYSTEM DESIGN BASIS (PRELIMINARY)

1500 Sandy Bay Road, Town of Penetanguishene, Simcoe County

HOUSE DESCRIPTION

No. Of bedrooms	3
Finished floor area (excl basement) \leq	200
Finished floor area (excl basement) \leq	20

DESIGN FLOW:

Total Design Flow (Q) =	1,600	Lpd
additoinal flow for flor area =	0	
additional flow for fixture counts =	0	
additional flow for extra bedroom over 5 =	0	
Total Design Flow (Q) =	1,600	Lpd

SOIL AND GROUND WATER CONDITIONS (PRELIMINARY)

Percolation Rate =	50	min/cm
Depth of water table =	0	bgs
Raised bed =	yes	
Height of bed =	1.5	m agl

SEWAGE TREATMENT

Conventional	
Septic tank Volume (STV) =	Qx2 (residential)
Min. Septic Tank Volume =	3600 L

SEWAGE DISPOSAL

Filter Bed	
1) Surface Area of Filter Medium (stone layer) =	Q/75 (Q<3000)
Minimum Area =	21 m ²
2) Base of Filter medium (Contact area)	QT/850
Percolation Rate (T) =	45 min/cm
Contact Area =	85 m ²
3) Loading Area (raised bed) =	Q/6 30<T<50
Min. Area =	267 m ²
Total Area with 4:1 side slopes =	700 m ²

APPENDIX C

Soils Report



May 12, 2023

Azimuth Environmental Consulting Inc.
642 Welham Road
Barrie, Ontario
L4N 9A1

Attn: Brad Pettersone

RE: Determination of Estimated T-Time

GEI Consultants Ltd. (GEI) was provided with two (2) soil samples on April 20, 2023 to complete grain size analyses to determine the estimated percolation rate of the tested soils (T-Time analysis).

The delivered samples were identified as shown below.

- Project No. 20-397, TH1
- Project No. 20-397, TH2

Two grain size distribution curves were developed by testing the above referenced soil samples in accordance with ASTM D6913 Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis and ASTM D7928 Standard Test Methods for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis. The result of the laboratory test and graphical representation of the grain size analyses are enclosed.

Determination of percolation rate is based on the "*Ministry of Municipal Affairs and Housing (MMAH) Supplementary Guidelines SB-6, Percolation Time and Soil Descriptions, September 14, 2012*". Based on this document, a summary of the results and the estimated percolation rate of the soils are as follows:

Client Reference	GEI Lab No.	Soil Description (MIT)	USCS Soil Classification	Estimated Percolation Rate or "T-Time" (mins/cm)	Estimated Infiltration Rate (mm/hr)
Project No.20-397, TH1	5387	SAND, Some Silt, Some Clay, Trace Gravel	S.M.	20 mins/cm	30 mm/hour
Project No.20-397, TH2	5386	CLAYEY SILT AND SAND, Trace Gravel	M.L.	50 mins/cm	12 mm/hour

It is noted that percolation time not only varies based on the grain size distribution but is also influenced by other soil characteristics such as the density of the soil, the structure of the soil, the percentage/mineralogy of clay, the plasticity of the soil, the organic content of the soil, and the groundwater table level which are not expressly calculated as part of a grain size analysis.

No field investigation was conducted by GEI in conjunction with the above testing and did not witness the depth or location in which these samples were obtained. GEI is providing the percolation rates as factual information, to be used in design by a qualified professional with due regard to the limitations as indicated above.

We trust this information is sufficient for your present purposes. Should you have any questions concerning the above, or if we can be of any further assistance, please do not hesitate to contact the undersigned.

Yours truly,
GEI Consultants Ltd.



Donna Davidson-Gorry
Laboratory Testing Services Practice Lead
(705) 718-6604
ddavidsongorry@geiconsultants.com



Andrew Jones
Materials Testing and Inspection Practice Lead
(705) 220-0060
ajones@geiconsultants.com

Enclosures (2)

Grain Size Analysis (T-Time)

ENCLOSURE 1

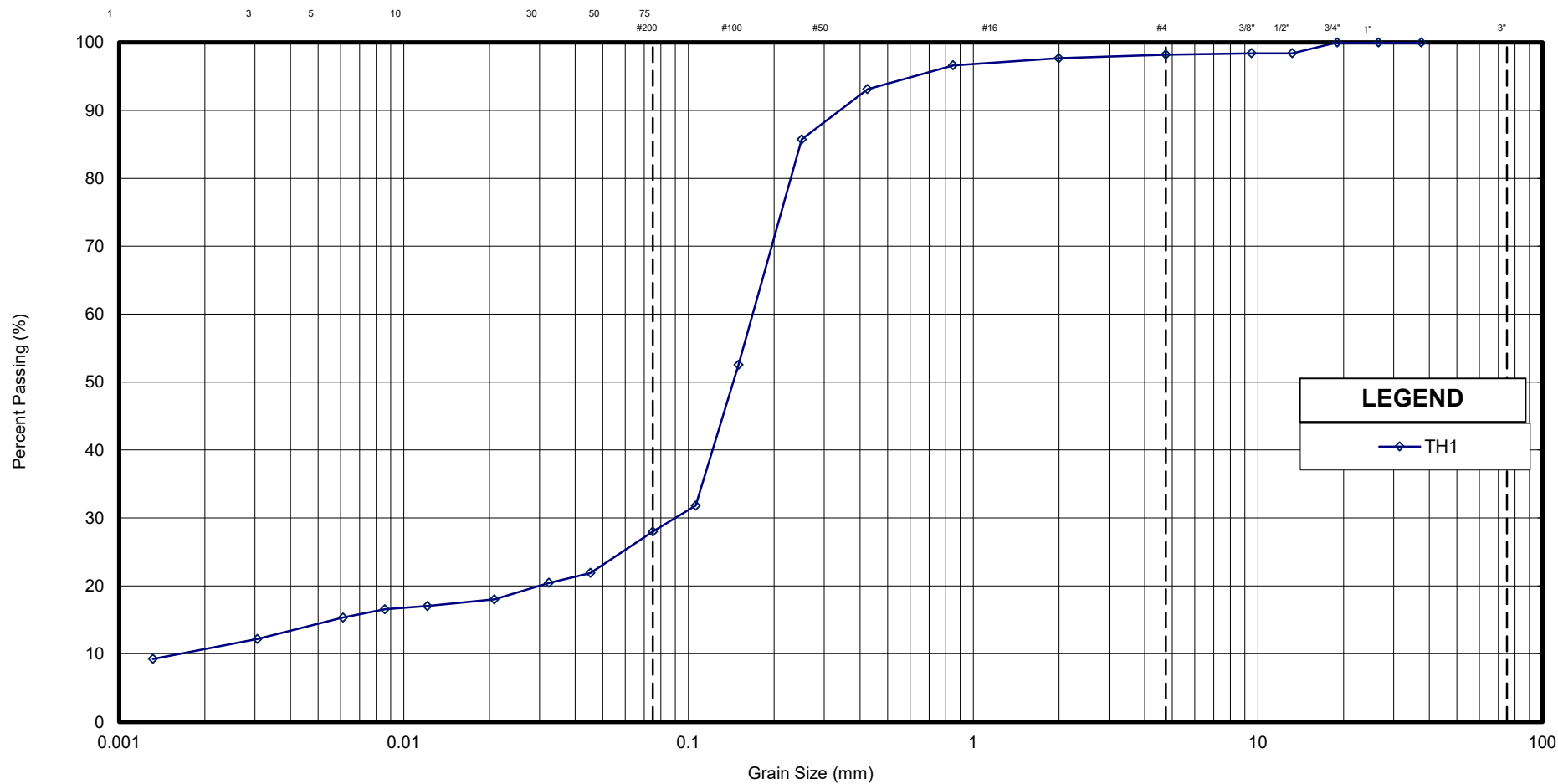
Grain Size Analysis (T-Time)

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY AND SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse

GRAIN SIZE IN MICROMETERS

SIEVE DESIGNATION (IMPERIAL)



LEGEND

—◆— TH1

Sample

Description

Gr.

Sa.

Si.

Cl.

D₁₀

D₃₀

D₆₀

C_u

C_c

TH1

SAND, Some Silt, Some Clay, Trace Gravel

2

70

17

11

0.002

0.090

0.168

102.9

29.4

GRAIN SIZE DISTRIBUTION - Project No. 20-397

FIGURE No. -

REF. No. 2005133

DATE May 2023

SAND

ENCLOSURE 2

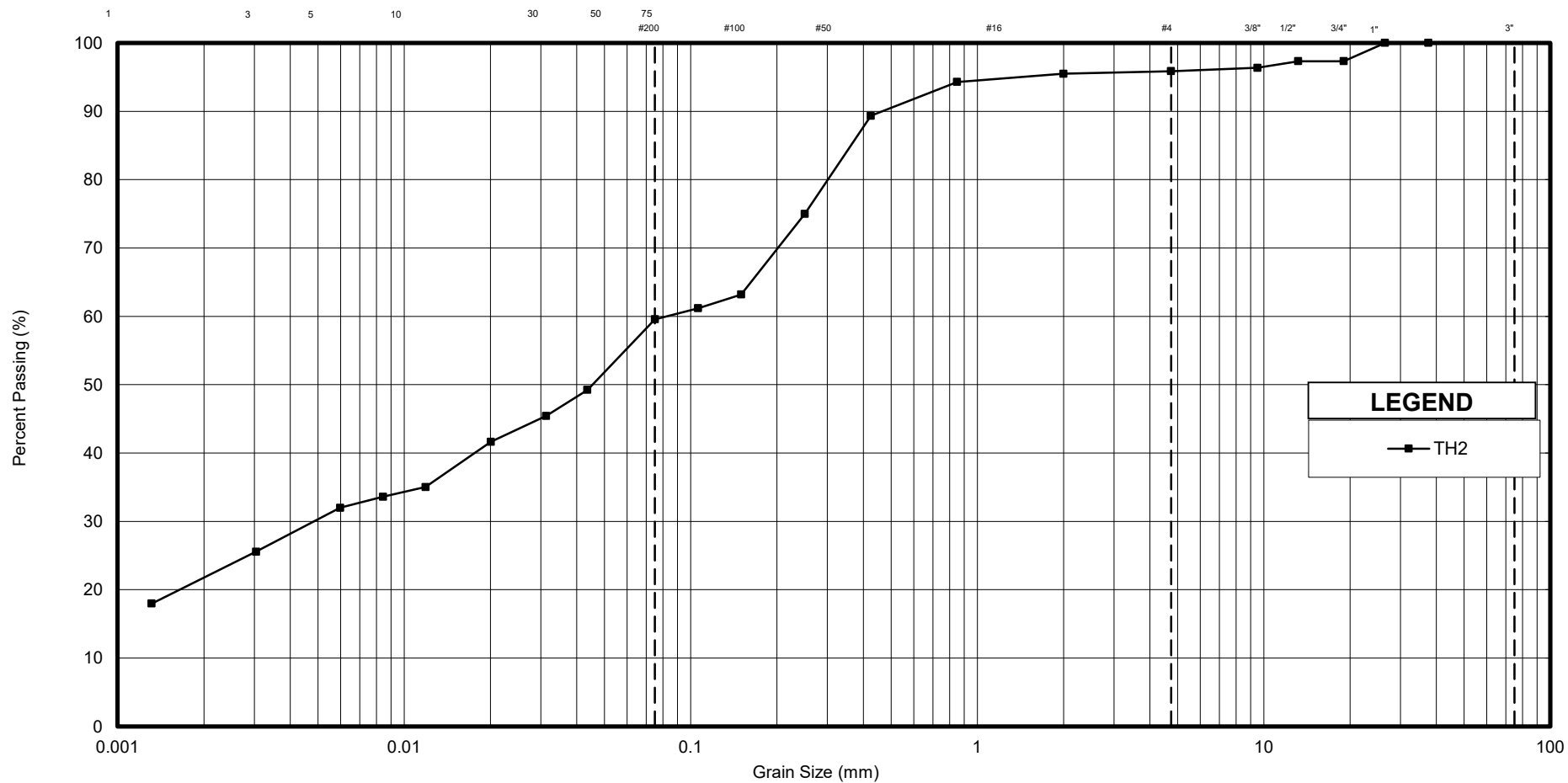
Grain Size Analysis (T-Time)

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY AND SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse

GRAIN SIZE IN MICROMETERS

SIEVE DESIGNATION (IMPERIAL)



Sample

Description

Gr.

Sa.

Si.

Cl.

D₁₀

D₃₀

D₆₀

C_u

C_c

TH2

CLAYEY SILT AND SAND, Trace Gravel

4

36

38

22

-

0.005

0.082

-

-

GRAIN SIZE DISTRIBUTION - Project No. 20-397

FIGURE No. -

REF. No. 2005133

DATE May 2023

CLAYEY SILT AND SAND