

TECHNICAL MEMORANDUM

DATE January 22, 2019

Project No. 07-1121-0037

TO Shawn Malhotra
Claridge Homes

FROM Alex Meacoe, P.Eng.

EMAIL Alex_Meacoe@golder.com

**GEOTECHNICAL CONSIDERATIONS – REVISED
BLOCK 14 – 25 OVERBERG WAY
BRIDLEWOOD TRAILS SUBDIVISION – PHASE 2
OTTAWA, ONTARIO**

This memo provides geotechnical guidelines on the grading for the parking lots and roadways and the grading and foundation design for Block 14 in Phase 2 of the Bridlewood Trails subdivision in Ottawa, Ontario.

The results of the geotechnical investigation for this project as well as guidelines on the geotechnical aspects of developing the site were provided in:

- Our technical memorandum of May 28, 2015 titled “*Response to City of Ottawa’s Questions, Block 14 – Bridlewood Trails Residential Subdivision, Ottawa, Ontario*” (project number 07-1121-0037).
- Our technical memorandum of June 25, 2013 titled “*Response to City of Ottawa’s Questions, Phase 2 – Bridlewood Trails Residential Subdivision, Ottawa, Ontario*” (project number 07-1121-0037).
- Our report of March 2011 titled “*Geotechnical Investigation, Proposed Residential Development, Fernbank Road and Terry Fox Drive, Kanata, Ontario*” (report number 07-1121-0037).

The guidelines provided in the above correspondence were however based on some assumptions regarding the founding levels and were generalized for broad areas of the site. The specific foundation and grading requirements are therefore being reviewed now that the final grading plans and lot site plans have been prepared.

Foundations

For Blocks A to F, the grading plan (Drawing No. 114013-GR, Revision 12 (dated January 18, 2019) prepared by Novatech Engineering Consultants Ltd. – Project No. 114013) indicate the following:

Block	Underside of Footing Elevation (metres)	Location	Original Grade (metres)	Proposed Finished Grade (metres)	Grade Raise (metres)
A	96.35	South	96.91	98.20	1.29
		West	96.93	98.25	1.32
		East	96.70	98.20	1.50
		North	96.65	98.25	1.60

Block	Underside of Footing Elevation (metres)	Location	Original Grade (metres)	Proposed Finished Grade (metres)	Grade Raise (metres)
B	96.35	South	96.70	98.20	1.50
		West	96.63	98.25	1.62
		East	96.64	98.20	1.56
		North	96.65	98.25	1.60
C	96.43	South	96.54	98.23	1.69
		West	96.56	98.23	1.67
		East	96.54	98.23	1.69
		North	96.52	98.23	1.71
D	96.40	South	96.56	98.25	1.69
		West	96.60	98.20	1.60
		East	96.55	98.25	1.70
		North	96.47	98.20	1.73
E	96.40	South	96.62	98.25	1.60
		West	96.61	98.20	1.59
		East	96.56	98.25	1.69
		North	96.60	98.20	1.60
F	96.40	South	96.93	98.25	1.32
		West	96.73	98.20	1.47
		East	96.65	98.25	1.60
		North	96.68	98.20	1.52

Based on the above grading plan and a review of the specific geotechnical data for this part of the site, the grade raise for these blocks exceeds the allowable grade raise at this site of 0.9 metres. Therefore, expanded polystyrene (EPS) Geofoam light weight fill **is** required in the **porch and above any exterior footing projections at the limits shown on GEO-01 (i.e., EPS should extend out from the foundation walls towards the edge of the footings)**; the EPS must extend a minimum of 1.0 metres out from the foundation walls, even if the footings do not. The EPS should extend from the top of the footings to at least the underside of the topsoil at the finished grade level, with a maximum topsoil thickness of 0.3 metres. A sketch showing the typical EPS placement is attached.

All exterior footings or footings in unheated areas should be provided with a minimum of 1.5 metres of earth cover (or equivalent) for frost protection purposes. Isolated, unheated footings adjacent to surfaces which are cleared of snow cover during winter months should be provided with a minimum of 1.8 metres of earth cover (or equivalent).

The table above summarizes the site-specific information gathered for Blocks A to F within Block 14 from the geotechnical investigation and available plans.

The finished grades, lightweight fill requirements, and underside of footing elevations were reviewed and are found to be in accordance with the guidelines and recommendations provided in the geotechnical report prepared for this site and, as such, are considered acceptable from a geotechnical point of view.

The following parameters may be used for the design of the foundations:

Strip footings up to 0.6 metres wide and interior pad footings up to 1.5 metres square can be designed using an allowable bearing pressure (i.e., SLS bearing resistance) of 75 kilopascals.

The post construction total and differential settlements for footings sized using the above allowable bearing pressures should be less than about 25 and 15 millimetres, respectively, provided that the soil at or below founding level is not disturbed during construction. Further, these maximum allowable bearing pressures correspond to a settlement resulting from consolidation of the silty clay. Consolidation of the silty clay is a process which takes months or longer and, as such, results from sustained loading. Therefore, the foundation loads to be used in conjunction with the allowable bearing pressures given above should be the full dead load plus sustained live load.

Given the thickness and compressibility of the silty clay deposit beneath this site, nominal amounts of reinforcing should be provided in the top and bottom of the foundation walls to make them more tolerant to settlements.

The foundation wall backfill and general grade raise fill adjacent to the houses should have a unit weight no greater than 18 kilonewtons per cubic metre.

Pavement Grading

In preparation for pavement construction, all topsoil, disturbed, or otherwise deleterious materials should be removed from the roadway areas.

Pavement areas requiring grade raising to proposed subgrade level should be filled using acceptable (compactable and inorganic) earth borrow or OPSS Select Subgrade Material. These materials should be placed in maximum 300 millimetre thick lifts and should be compacted to at least 95 percent of the standard Proctor maximum dry density using suitable compaction equipment.

For the pavement areas in Block 14, there are areas of the parking lots and roadways that exceed the 1.2 metre grade raise (for paved areas) as discussed in the geotechnical report. Where the grade raise exceeds 1.2 metres, the EPS Geofoam light weight fill will be required for the full plan area of the roadways and parking lots with a thickness such that the grade raise fill is limited to a thickness of 1.2 metres (i.e., about 0.3 to 0.5 metres thick).


To minimize the potential of differential frost heaving at the curbs, and transition zones where there is no EPS, the EPS Geofoam light weight fill should be placed at the lowest elevation possible (i.e., the EPS should be placed on the approved subgrade prior to filling) and should be tapered at the edges. The taper should consist of 50 percent of the total thickness of the EPS for a horizontal length of at least 3.0 metres surrounding the required EPS footprint. The limits of the EPS are provided in the attached figure, GEO-03.


The finished grades of the parking areas with the lightweight fill requirements, discussed above, were reviewed and are found to be in accordance with the guidelines and recommendations provided in the geotechnical report prepared for this site and, as such, are considered acceptable from a geotechnical point of view.


We trust that this memo provides sufficient information for your present requirements. If you have any questions concerning this memo, please contact the undersigned.

Yours truly,

GOLDER ASSOCIATES LTD.


Alex Meacoe, P.Eng.
Geotechnical Engineer



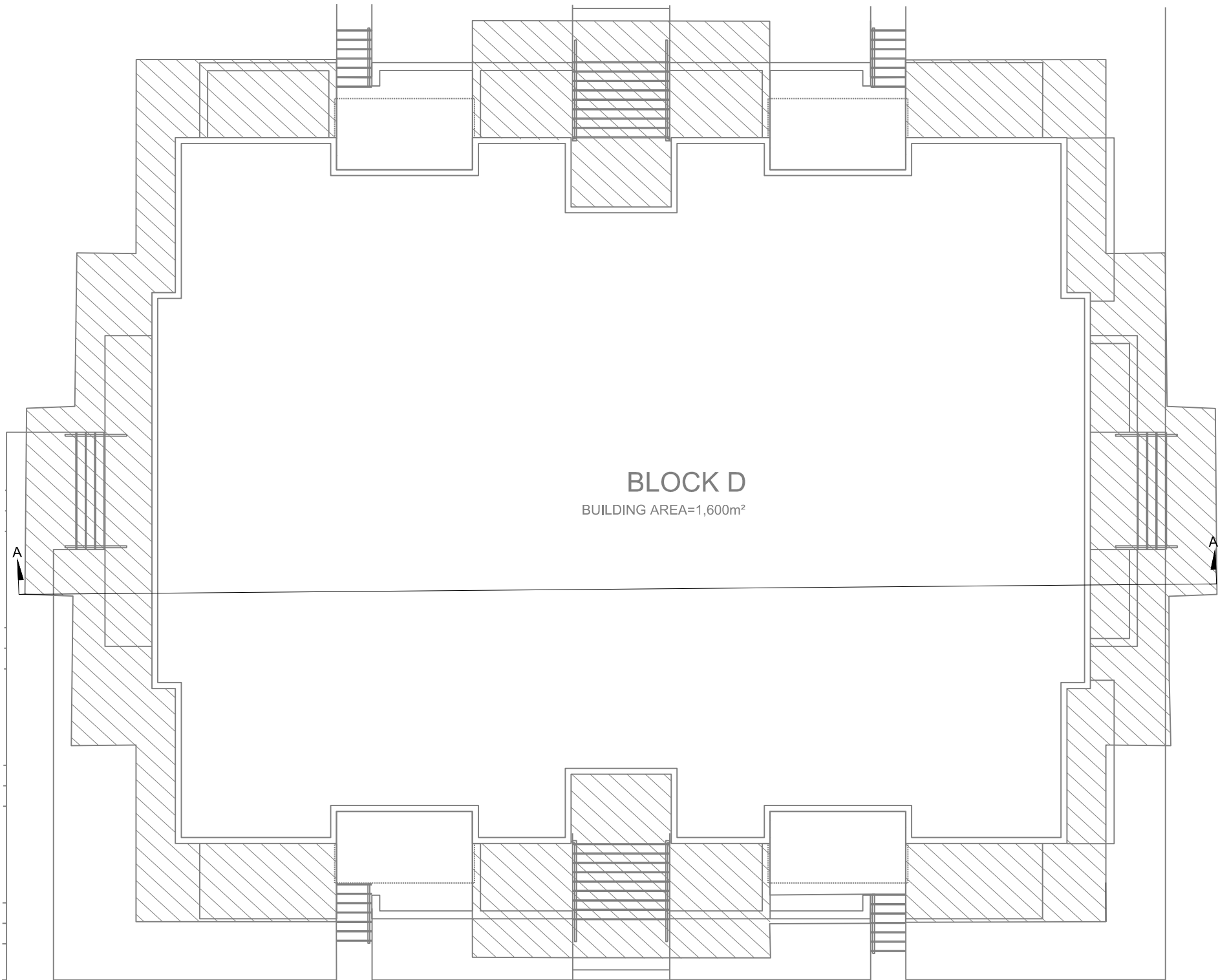
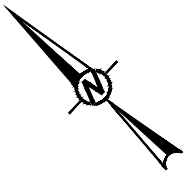

William Cavers, P.Eng.
Associate, Senior Geotechnical Engineer

WAM/WC/mvrd

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Attachments: GEO-01 – Typical Light Weight Fill Placement in Plan Block 14
 GEO-02 – Typical Light Weight Fill Placement Block 14
 GEO-03 – Light Weight Fill Placement Block 14 Parking Lots and Roadways

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KEY MAP



SCALE 1:25,000

LEGEND

LWF - LIGHT WEIGHT FILL, EXPANDED POLYSTYRENE (EPS)

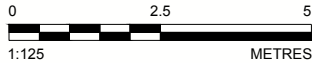
APPROXIMATE LOCATION OF LWF 'A'

NOTE(S)

1. FOR CROSS-SECTION LOCATIONS REFER TO FIGURE GEO-02

REFERENCE(S)

1. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: MTM ZONE 9, VERTICAL DATUM: CGVD28



CLIENT
CLARIDGE HOMES

PROJECT
BRIDLEWOOD TRAILS DEVELOPMENT
OTTAWA, ONTARIO

TITLE
TYPICAL LIGHT WEIGHT FILL PLACEMENT IN PLAN BLOCK 14

CONSULTANT	YYYY-MM-DD	2018-07-17
	DESIGNED	WAM
	PREPARED	ABD/JM
	REVIEWED	WAM
	APPROVED	MSS



PROJECT NO.
07-1121-0037

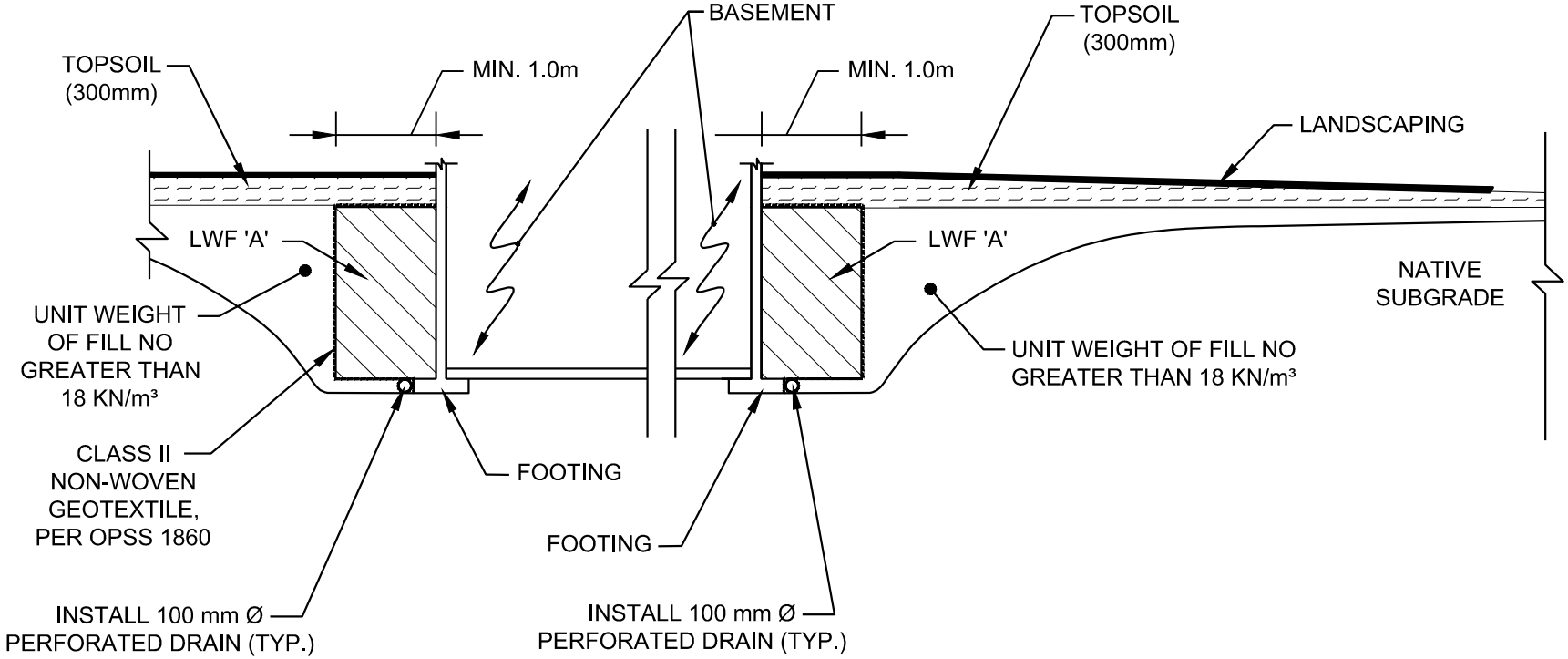
CONTROL
0001

REV.
A

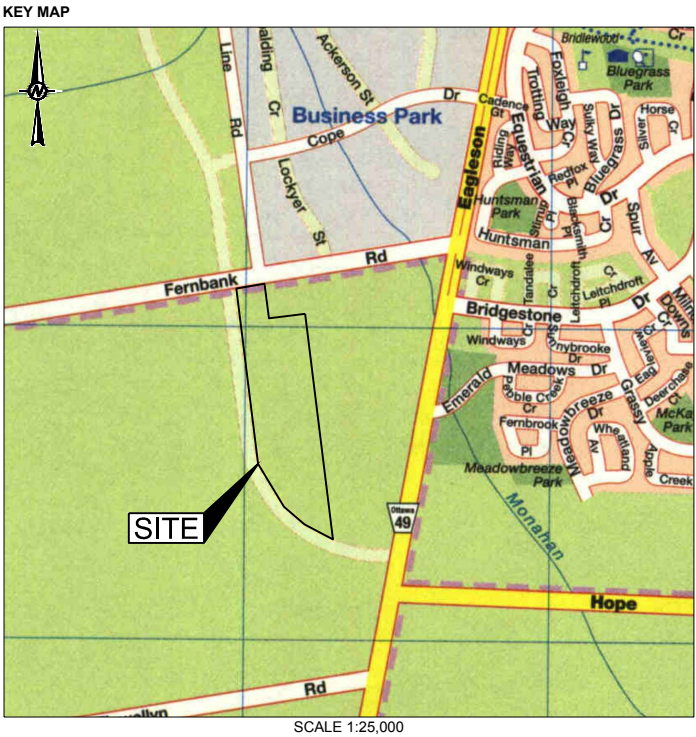
FIGURE
GEO-01

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM A3/B

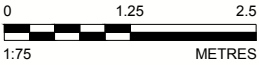
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SECTION A-A'



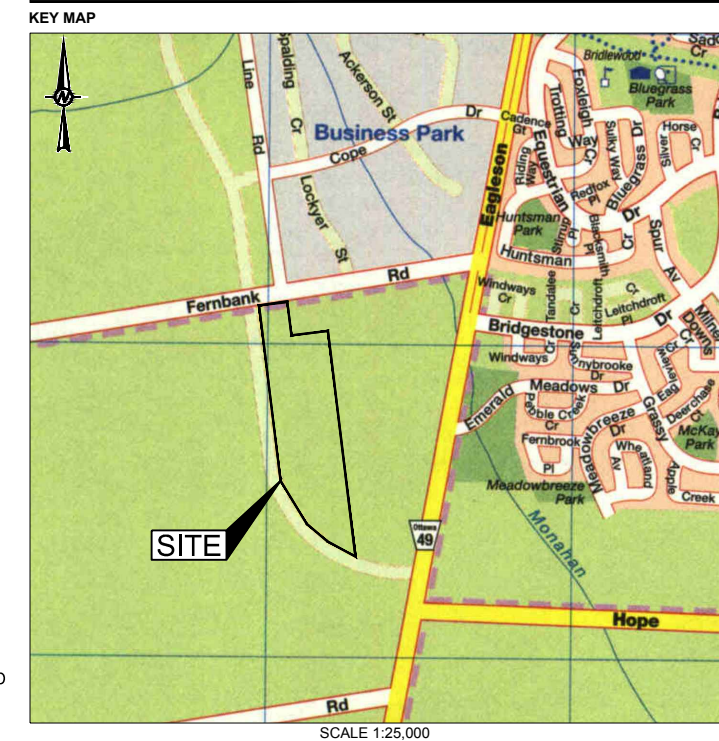
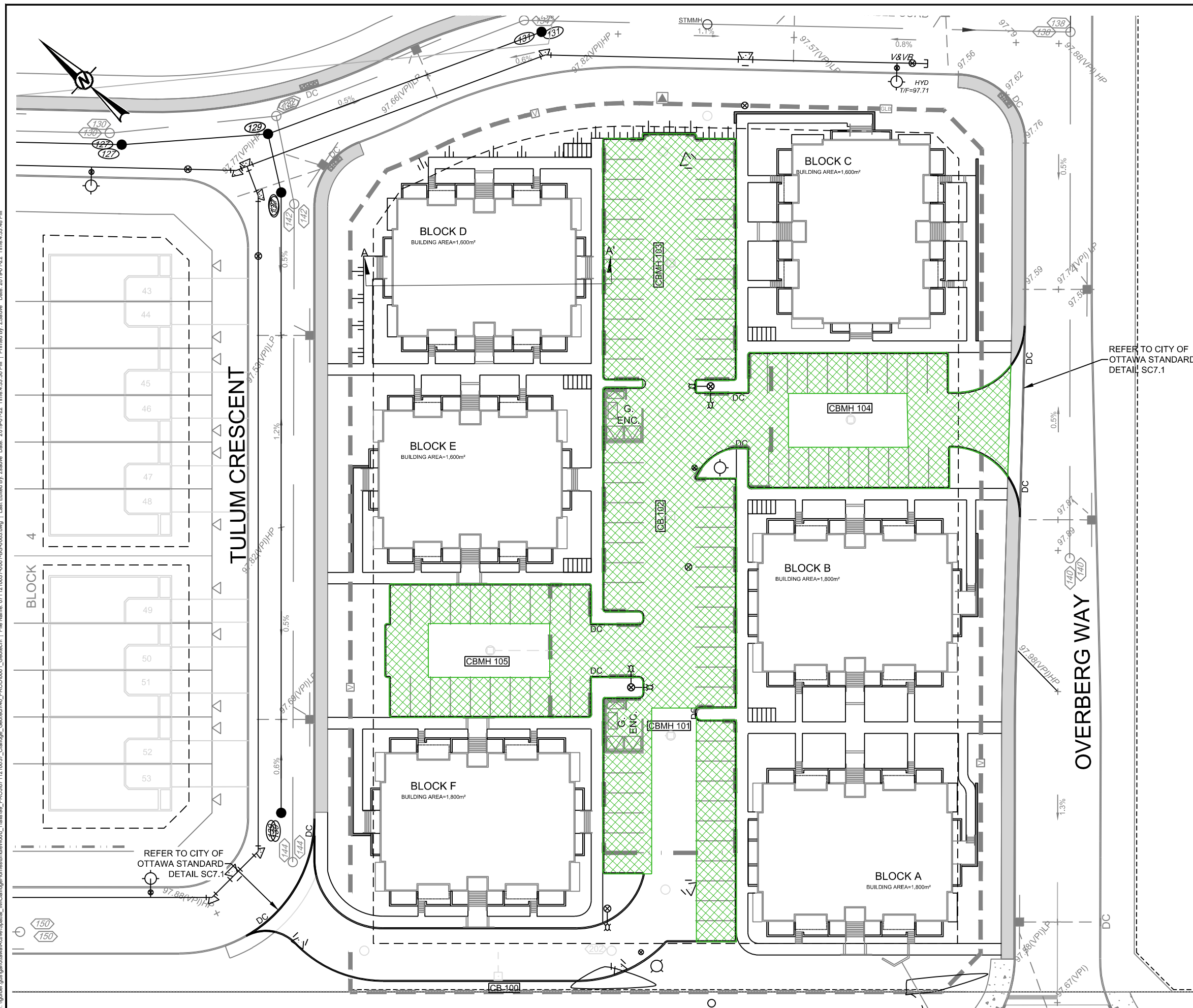
- LEGEND**
- LWF - LIGHT WEIGHT FILL, EXPANDED POLYSTYRENE (EPS)
- NOTE(S)**
- LWF TO CONSIST OF THE FOLLOWING
 - LWF 'A'- HAVING A COMPRESSIVE STRENGTH AT 5% STRAIN OF AT LEAST 55 kPa. TO BE PLACED:
 - *BENEATH FRONT AND REAR YARDS, NOT INCLUDING DRIVEWAYS
 - *BENEATH SIDE YARDS
 - *BENEATH PORCH SLAB
 - FOR CROSS-SECTION LOCATIONS REFER TO FIGURE GEO-01



CLIENT			CLARIDGE HOMES		
PROJECT			BRIDLEWOOD TRAILS DEVELOPMENT OTTAWA, ONTARIO		
TITLE			TYPICAL LIGHT WEIGHT FILL PLACEMENT BLOCK 14		
CONSULTANT			YYYY-MM-DD	2018-07-17	
			DESIGNED	WAM	
			PREPARED	ABD/JM	
			REVIEWED	WAM	
			APPROVED	MSS	
PROJECT NO.		CONTROL	REV.		FIGURE
07-1121-0037		0001	A		GEO-02



IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM A3/B



LEGEND

LWF - LIGHT WEIGHT FILL, EXPANDED POLYSTYRENE (EPS)

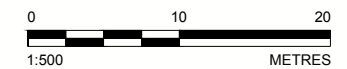
 APPROXIMATE LOCATION OF LWF

NOTE(S)

1. FOR CROSS-SECTION LOCATIONS REFER TO FIGURE GEO-02
2. LWF TO CONSIST OF THE FOLLOWING
 - LWF- HAVING A COMPRESSIVE STRENGTH AT 5% STRAIN OF AT LEAST 90 kPa. TO BE PLACED:
 - *BENEATH PAVEMENT STRUCTURES AND GRADE BASE FILL

REFERENCE(S)


1. BASE PLAN SUPPLIED BY NOVATECH ON JANUARY 17, 2019, FILE NO.
20190117-114013-GR.dwg
2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: MTM
ZONE 9, VERTICAL DATUM: CGVD28



CLIENT
CLARIDGE HOMES

PROJECT
BRIDLEWOOD TRAILS DEVELOPMENT
OTTAWA, ONTARIO

TITLE
**LIGHT WEIGHT FILL PLACEMENT IN PLAN BLOCK 14
PARKING LOTS AND ROADWAYS**

CONSULTANT	YYYY-MM-DD	2019-01-22
 GOLDER	DESIGNED	WAM
	PREPARED	ABD
	REVIEWED	WAM
	APPROVED	MSS

PROJECT NO.	CONTROL	REV.	FIGURE
07-1121-0037	0001	A	GEO-03