

SARAH PROPERTIES LTD

FUNCTIONAL SERVICING REPORT

DURHAM SUBDIVISION

MUNICIPALITY OF WEST GREY

FEBRUARY 2020

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1. INTRODUCTION

Cobide Engineering Inc. was retained by Sarah Properties Ltd. to provide engineering services in support of a Draft Plan Approval Application. The application will be to subdivide the property into a 118 lot subdivision.

A copy of the proposed Draft Plan has been included in Appendix A as Drawing DP1.

1.1 LOCATION

The proposed subdivision development is located Part of Divisions 2 and 3 of Lot 24, Concession 1, East of the Garafraxa Road, Former Geographic Township of Glenelg, Municipality of West Grey, County of Grey (described herein as the "site"). A Site Location Map is included as Figure 1. The subject property is approximately 13.8 hectares in area.

1.2 DEVELOPMENT PROPOSAL

The proposed development consists of 13.8 hectares of land within the Durham settlement area.

The proposed plan is to develop the site into a residential subdivision. The subdivision will involve the creation of a number of new streets as well as the extension of Jackson Street. The development will consist of the following:

- 118 Single Family Lots (Lots 1-118)
- Five (5) Street Townhouse Blocks (Blocks 119-123) resulting in 51 – 87 Townhouse Units
- One (1) Drainage Blocks for conveyance and stormwater quality and quantity control

The road network within the subdivision will include the extension of Jackson Street as well as the construction of Streets A-D. Street A will connect to Durham Road East in two locations.

The Draft Plan showing the lot and block configuration has been included in Appendix 1 and noted as DP1.

The proposed development is within the Durham Settlement Boundary of the current Official Plan of the Municipality of West Grey and thus is intended for servicing from municipal water and sewage systems.

Functional Servicing Report
Sarah Properties Subdivision

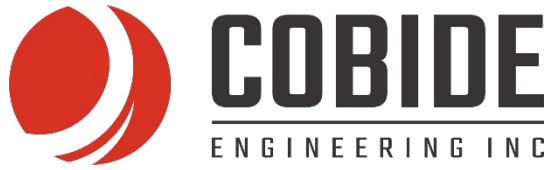


Figure 1 - Site Location Map

2. WATER DISTRIBUTION SYSTEM

The water distribution system will be sized based on the existing conditions at the connection to the municipal system and the subdivisions demands which are determined by the Ministry of the Environment (MOE) Design Guidelines for Drinking-Water Systems (2008).

2.1 DESIGN CRITERIA

The water distribution system will be design in accordance MOE guidelines which state the system “should be designed to satisfy the greater of the following demands:

- *Maximum day demand plus fire flow; or,*
- *Peak hour demand*

The maximum day demand and peak hour demand are based on the projected water consumption from the development and the fire flow is based on the type of the development.

The system will require modelling during the detailed design stage to ensure the water pressure throughout the system is within the requirements of the MOE.

Based on MOE guidelines, the minimum pressure at ground level at all points in the distribution system under maximum day demand plus fire flow conditions are to be 140 kPa (20 psi). The normal operation pressure should be between 350 kPa (50 psi) to 480 kPa (70 psi). There shall be no point in the distribution system that has a normal operating pressure of less than 275 kPa (40 psi). The maximum pressure in the pipe cannot exceed 700 kPa (100 psi).

2.2 WATER CONSUMPTION

The system will be designed based on a domestic water demand of 450 L/cap/day. The peaking factors will be derived from Table 3-1 of the MOE Design Guidelines. Based on the projected population of 631 people the peaking factor for the maximum day demand will be 2.75 and the peaking factor for the peak hour demand will be 4.13.

Table 1 below summarizes the projected maximum day and peak hour demands for the proposed development.

Table 1 - Proposed Water Demands

Demand	Population	Consumption (L/cap/day)	Peaking Factor	Peak Rate (L/day)	Peak Rate (L/s)
Maximum Day	631	450	2.75	780,863	9.04
Peak Hour	631	450	4.13	1,172,714	13.57

2.3 FIRE FLOW

The AWWA *Manual of Water Supply Practices M31 – Distribution System Requirements for Fire Protection* and the Fire Underwriters Survey document *Water Supply for Public Fire Protection* will determine the required fire flows.

The fire flows are dependent upon many factors including the type of construction materials, building height and density of the development.

The fire flow requirements for a typical single family home within the subdivision are expected to 4000 L/min which would need to be sustained for 1.5 hours.

2.4 DESIGN FLOW RATES

The watermain within the subdivision will be required to maintain the aforementioned pressure while supplying 75.7 L/s (MDD + Fire Flow). The pipes should be designed with a pipe roughness C-value of 130 which is typically used to represent moderately aged PVC pipe. This will ensure adequate pressure for the development in the future.

2.5 WATERMAIN CONFIGURATION

The proposed watermain will be connected to the municipal system at the proposed extension of Jackson Street within the neighbouring subdivision. The watermain on Jackson Street within the neighbouring development is proposed to be 250mm diameter. The watermain will also connect to the municipal system at Street A and Durham Road East in two locations. The Durham Road East watermain is a 250mm diameter watermain.

A single connection will be provided to each residential lot including individual services to the proposed street townhouse units.

A drawing showing the proposed watermain distribution network has been included in Appendix A as Map 1.

2.6 EXISTING CONCERNS

There have been issues reported with water pressure on Durham Road East in the past. The Municipality checked the pressure and at the easterly limit of the watermain the static pressure was reported as 40 psi at ground level which is at approximately 388 m. The highest existing ground elevation within the development is approximately 390 m. Therefore, there maybe locations in the subdivision where pressures are lower. The Municipality also checked the pressure at the intersection of Garafraxa Road and Jackson Street and the static pressure was reported as approximately 50 psi at ground level.

2.7 PROPOSED DEVELOPMENT

Based on an existing static pressure of 50 psi at Jackson Street and Garafraxa Road and a pressure loss of 14 psi due to elevation change, it is expected that a pressure of approximately 36 psi can be expected at the houses at the highest point of the development. The interconnection of the watermain at Durham Road East and the connection on Jackson Street will make a true loop of the watermain which should also help in maintaining pressure within the development. A pressure of 36 psi is below the minimum pressure. To provide higher pressure in the house each homeowner may need to install an in-line booster pump to increase the pressure. The Town indicated in pre-consultation meetings that they would add this watermain looping into their water model to confirm adequate pressures can be maintained.

Assuming static conditions at both connections to the existing system and under normal conditions (no fire flow), the velocities within the proposed system are all expected to be less than 0.3 m/s. Under fire flow conditions, the maximum velocity in the system is approximately 1.5 m/s which is still below the recommended maximum velocity during fire flow conditions.

3. SANITARY SEWER SYSTEM

The sanitary sewer system will be sized based on the existing conditions at the connection to the municipal system and the subdivisions demands which are determined by the Ministry of the Environment (MOE) Design Guidelines for Sewage Works (2008).

3.1 DESIGN CRITERIA

The sanitary sewer system will be design in accordance MOE guidelines.

The sanitary sewer will be designed to convey the projected peak flow based upon the projected population of the development, flows from future development to the north as well as extraneous flows.

3.2 DESIGN FLOW RATES

The sanitary sewer will be designed based on a peak flow of 450 L/cap/day and a peaking factor of 4.0 for the size of the development. Based on a population of 631 the projected residential flow is 13.15 L/s. The development will contribute 13.8 ha of extraneous flows to the sanitary sewer. This will contribute 1.98 L/s to the flow. Therefore, the peak flow from the development is 15.12 L/s.

3.3 SANITARY SEWER CONFIGURATION

There will be a sanitary sewer on all streets with a single connection to the existing sanitary sewer. Based on the sanitary sewer inventory mapping for West Grey, there are sanitary sewers on Durham Road that will be tied into for this development. A single connection will be provided to each residential lot.

All sanitary sewers are proposed to be 200mm diameter PVC pipe. The minimum slope considered will be 0.40% to maintain a minimum velocity at full flow to prevent sediment deposition and blockages. The furthest section upstream will be installed at 1.0% for that same reason where possible.

Based on information from the Municipality, there will be a bottleneck in the existing system as the development progresses. The bottleneck will be at the intersection of Durham Road East and Garafraxa Street where the existing sewer is at 0.31%. This gives the sewer a capacity of 18.1 L/s.

Based on discussions with the Municipality, the upgrades to accommodate the additional flows will be taken care of by the Municipality as part of works to upgrade Durham Road to an urban section that are currently in the design stage.

A drawing showing the proposed sanitary collection network has been included in Appendix A as Map 2.

4. STORM SEWER SYSTEM

The preliminary stormwater management report for this site is provided under separate cover. For existing and proposed drainage conditions including quality and quantity control provisions please refer to the preliminary stormwater management report. This section will pertain to collection of the storm drainage.

The storm sewer system will be design in accordance with the municipal and conservation authority guidelines including the Ministry of the Environment (MOE) Design Guidelines. The storm sewer system will use the rationale method to size the storm sewer to accommodate the 5 year peak flow from the development.

With the exception of sections of Street A as well as the rear of the lots along the east side of the development, the majority of the subdivision will discharge to the SWM facility. Minor flows will be collected and conveyed via the storm sewer system and the major flows will be conveyed overland within the Right of Way to the SWM facility.

A drawing showing the proposed stormwater collection network has been included in Appendix A as Map 3.

5. GRADING & EROSION AND SEDIMENT CONTROL

Erosion and sediment controls shall meet the requirements of the most recent version of the MOE *Stormwater Management Planning and Design Manual* at the time of construction.

5.1 CONSTRUCTION STAGE

Prior to the start of construction, appropriate sediment control facilities are to be in place. Following are details regarding erosion and sediment control that are to be implemented:

- Placement of heavy duty siltation fencing is required along the along the property boundary within the drainage corridor on the west side of the site to intercept sediment that could potentially be transported by sheet flow across the site. Light Duty Siltation fence will also be installed at any development grading limits where runoff may discharge from the site.
- It is proposed that the pond be constructed first to act as a sedimentation basin. A temporary outlet would be installed and surrounded in clear stone.
- Placement of temporary straw check dams within swales and any other locations where a concentrated flow of runoff may occur. All proposed drainage swales are to be seeded during construction;
- Installation of filter cloth under all new and existing catchbasin grates until paving of the subdivision streets is completed;
- Mud mats will be placed at construction accesses to keep public roadways free from debris during the construction period.
- Re-vegetate all disturbed areas after underground and surface works have been constructed.

Prior to removal of sediment control facilities, ensure that sediment that may have accumulated has been removed.

Once the area has been stabilized, the silt fencing can be removed.

5.2 LOT DEVELOPMENT

During individual construction of homes within the subdivision, silt barriers are to be constructed, as appropriate, to prevent the eroding of materials into the roadside drainage system. The sedimentation control can be in the form of siltation fences placed in the direction of flow from the construction site and shallow excavated sediment traps (moats) should be constructed around any stockpiled materials.

The responsibility for the individual lot sediment control is the landowner/builder constructing the dwelling.

The proposed development grading design will generally following the existing grade. The proposed grading design will match all existing grades at the property lines and will not alter or affect the drainage patterns of the neighbouring properties. The proposed site grading will drain the stormwater through side yard swales and a storm sewer system. The majority of the slopes found on site are proposed to be between 2.0% and 6.0%.

6. TRAFFIC

Access to the subdivision will be via three connection points. The first connection point will be the extension of Jackson Street. The second and third entrances will be two intersectiona of Durham Road East and Street 'A'.

Stop sign control at intersections will provide adequate traffic control for these local roads.

The internal streets will be designed to meet the municipal standard for an urban street. The following parameters are proposed:

- 20m road allowance;
- 4.25m asphalt lanes with 2% cross fall
- 600.100 OPSD mountable curb and gutter
- Sidewalk on one side of Jackson Street, Street A and Street B

7. UTILITIES

7.1 STREETLIGHTS

The configuration of the streetlights will be designed in accordance with municipal standards. Concrete poles shall be used with LED streetlights. LED streetlights will be Dark Sky Compliant fixtures.

7.2 ELECTRICITY

Hydro One Inc. will be responsible for completing the design of the electrical distribution system. Each lot will be individually serviced. Underground distribution lines will be utilized for this development.

7.3 NATURAL GAS

Union Gas will be responsible for completing the design of the natural gas distribution system. Each lot will be individually serviced. The proposed design configuration and trench locations will be dictated by the Municipality of West Grey standard cross section.

7.4 TELEPHONE/ CABLE TV/ INTERNET

Bell, Eastlink and Eh-Tel will be given the opportunity to provide telephone, cable TV and internet services to the development. They will complete their own design, based upon Hydro One's proposed design configuration along with trench locations dictated by the Municipality of West Grey standard cross section.

Sincerely,

Cobide Engineering Inc.



Travis Burnside, P. Eng.

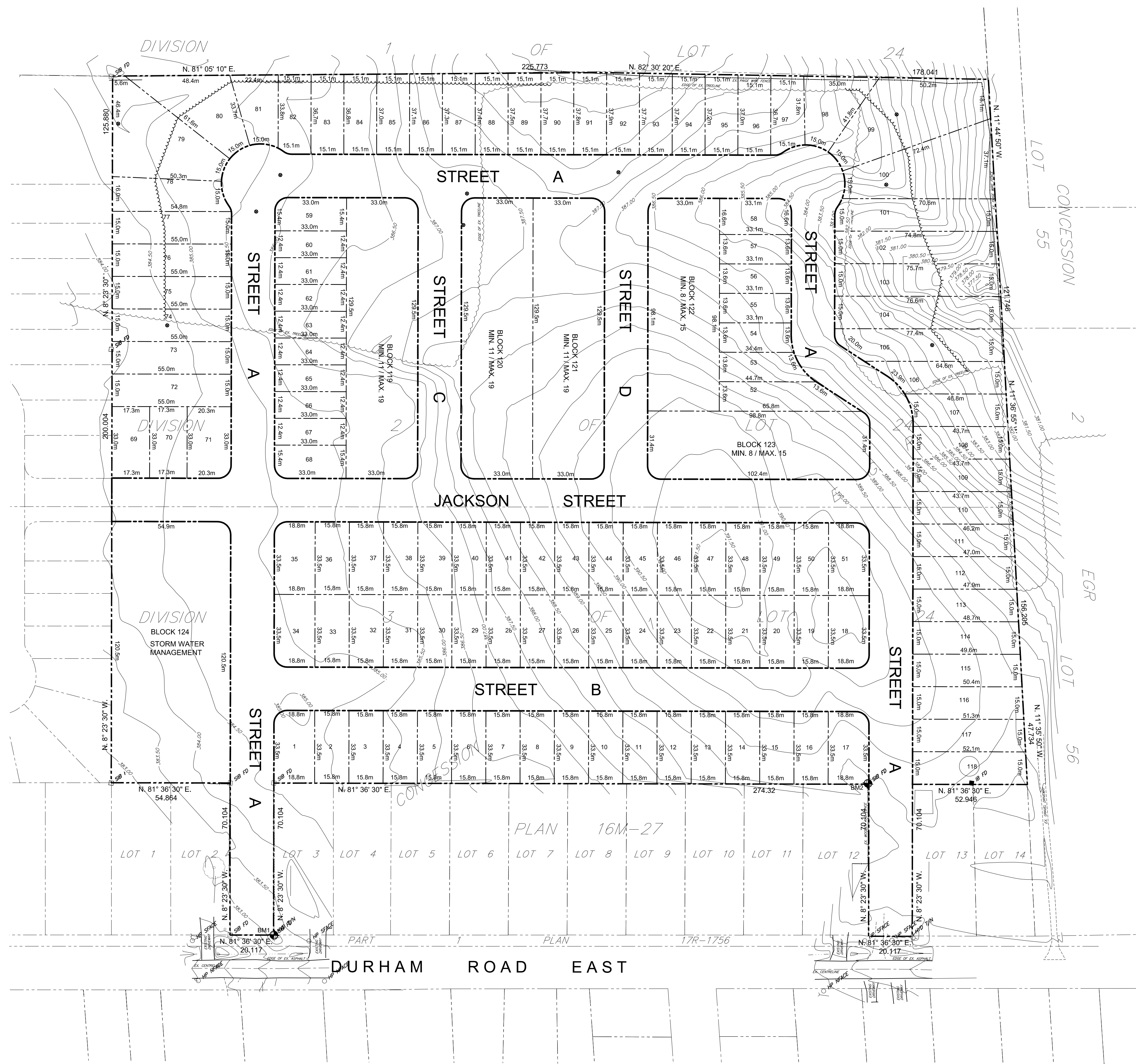
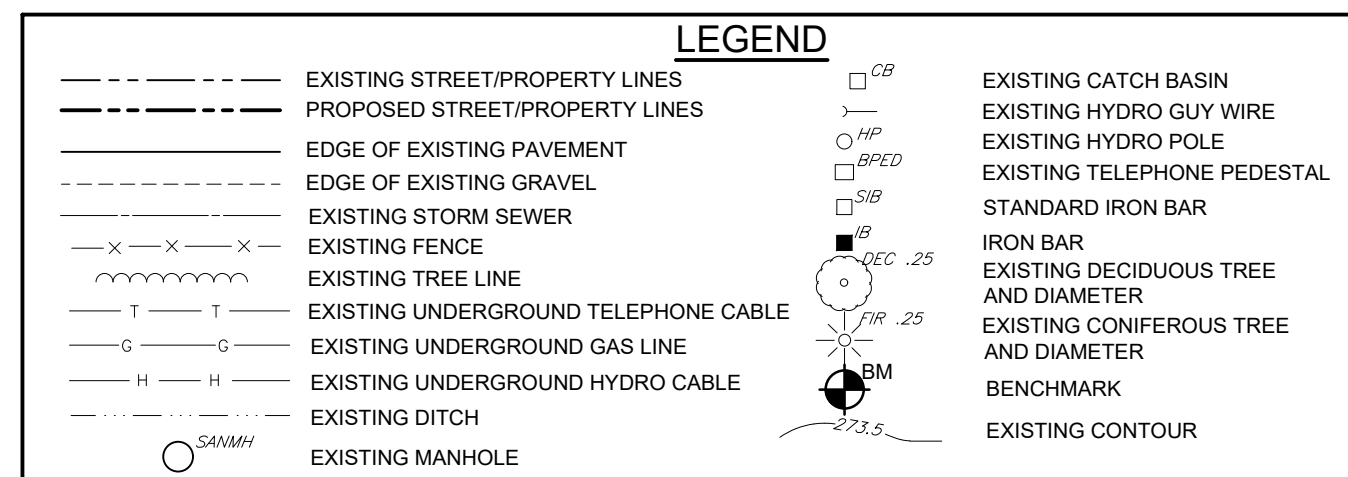
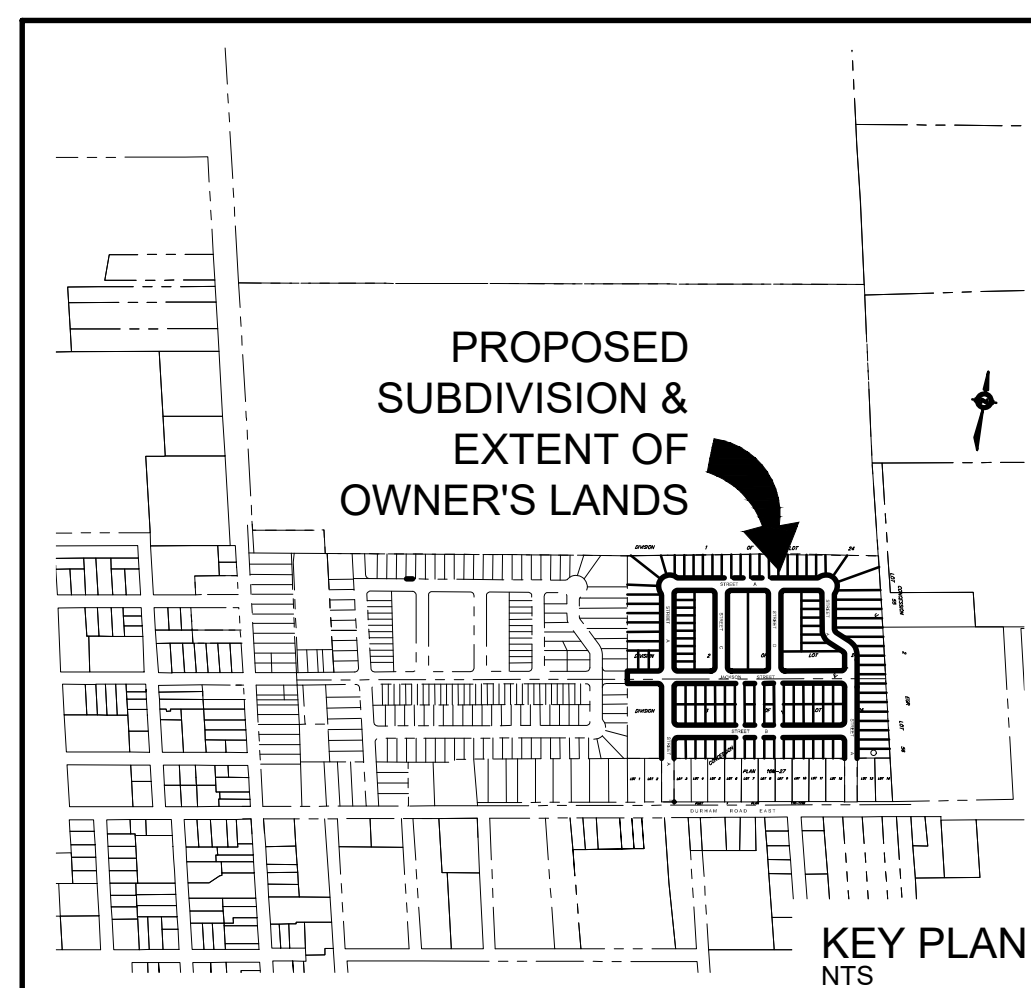


Appendix A

DRAWINGS

FUNCTIONAL SERVICING REPORT

**SARAH PROPERTIES DURHAM SUBDIVISION
MUNICIPALITY OF WEST GREY**



**DRAFT PLAN OF SUBDIVISION
PART OF DIVISIONS 2 AND 3 OF LOT 24
CONCESSION 1
EAST OF THE GARAFRAXA ROAD
GEOGRAPHIC TOWNSHIP OF GLENELG
MUNICIPALITY OF WEST GREY
COUNTY OF GREY**

RELEVANT SITE INFORMATION	
DETACHED RESIDENTIAL LOTS (LOTS 1 TO 118)	7,472 ha.
MULTI-FAMILY RESIDENTIAL LOTS (STREET TOWNHOUSES) (LOTS 119 TO 123)	1,920 ha.
MUNICIPAL STREET (JACKSON STREET, STREETS A TO D)	3,729 ha.
STORMWATER MANAGEMENT (BLOCK 124)	0.660 ha.
TOTAL PROPOSED SUBDIVISION	13,781 ha.

UNDER SECTION 51 OF THE PLANNING ACT

a. AS SHOWN	g. AS SHOWN
b. AS SHOWN	h. MUNICIPAL WATER SUPPLY
c. AS SHOWN	i. SANDY SILT & GRAVEL
d. SINGLE FAMILY RESIDENTIAL, SEMI-DETACHED RESIDENTIAL MULTI-FAMILY RESIDENTIAL	j. AS SHOWN
e. AS SHOWN	k. WATER, STORM SEWERS, SANITARY SEWERS, HYDRO, TELEPHONE
f. AS SHOWN	l. AS SHOWN

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:
THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED
AND THEIR RELATIONSHIP TO THE ADJACENT LANDS
ARE CORRECTLY SHOWN.

DATE _____

NEIL MILNE
ONTARIO LAND SURVEYOR
HEWETT AND MILNE LTD.
302 8TH STREET EAST
OWEN SOUND, ON N4K 5P1

OWNER'S CERTIFICATE

I, THE REGISTERED OWNER OF THESE LANDS, HEREBY
AUTHORIZE COBIDE ENGINEERING INC. TO SUBMIT
THIS DRAFT PLAN FOR APPROVAL.

FEBRUARY 21, 2020

DATE _____

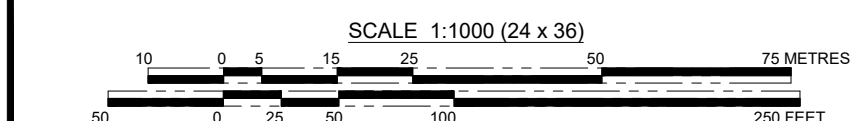
OWNER:
WALTER BROOS
I HAVE THE AUTHORIZATION TO BIND THE CORPORATION
SARAH PROPERTIES LTD.
836 NORMANDY DRIVE
WOODSTOCK, ON
N4T 0E6

Notes

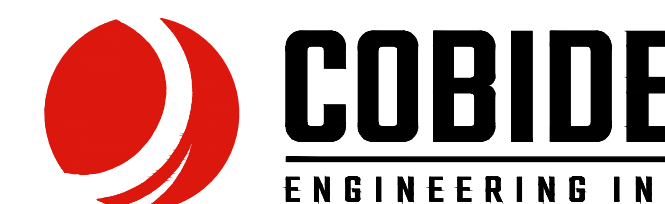
1. TOPOGRAPHICAL INFORMATION DERIVED FROM FIELD SURVEY BY COBIDE ENGINEERING COMPLETED ON NOVEMBER 11, 2019.
2. PROPERTY BOUNDARY DERIVED FROM INFORMATION SHOWN ON REGISTERED PLAN 16M-27 BY HEWETT AND MILNE LTD. DATED JUNE 2, 2009

Benchmark Information

- | | | |
|-----|---|---------|
| BM1 | SIB ON THE WEST SIDE OF THE PROPOSED WESTERLY INTERSECTION WITH DURHAM ROAD.
ELEVATION | 383.14m |
| BM2 | SIB LOCATED AT THE SOUTHEAST CORNER OF LOT 17.
ELEVATION | 388.89m |



0	FEB 21/20	FIRST SUBMISSION		TLB	
No.	DATE	DESCRIPTION		BY	A
REVISION / ISSUE					



517 - 10th STREET, Hanover, Ontario N4N 1R4
Telephone: (519) 506-5959
www.cobideeng.com

Client:

SARAH PROPERTIES LTD.

Design:	TLE
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Approved:

Checked: S. IC

Date: AUG 2016

Design Engineer

