FUNCTIONAL SERVICING REPORT

2076 & 2086 Meadowbrook Road

City of Burlington, Ontario

Prepared for:

1906452 Ontario Limited

1053052 Ontario Inc.

KWA SITE DEVELOPMENT CONSULTING INC.

Date: October 27, 2017

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1.0 Introduction

KWA Site Development Inc. has been retained by 1906452 Ontario Limited & 1053052 Ontario Inc. to provide a Functional Servicing Report (FSR) for the proposed development at 2076 and 2086 Meadowbrook Road in the City of Burlington. This FSR is in support of a rezoning application for four (4) street townhouse units proposed at 2076 Meadowbrook Road and three (3) street townhouse units proposed at 2086 Meadowbrook Road. Both parcels are currently vacant and are identified as surplus land adjacent to two existing apartment unit complexes with associated parking. Refer to Figure 1 – Location Plan

The properties shown in Figure 1 are as follows:

- Lot 32
  - Existing two storey apartment building
  - Parking Lot – 18 stalls
- Lot 33
  - Landscape Area - A=0.07 ha
  - Existing two storey brick building
  - Communal parking lot – 13 stalls
- Lot 34
  - Communal parking lot – 16 stalls
  - Existing two storey brick building
  - Landscape Area - A=0.11 ha

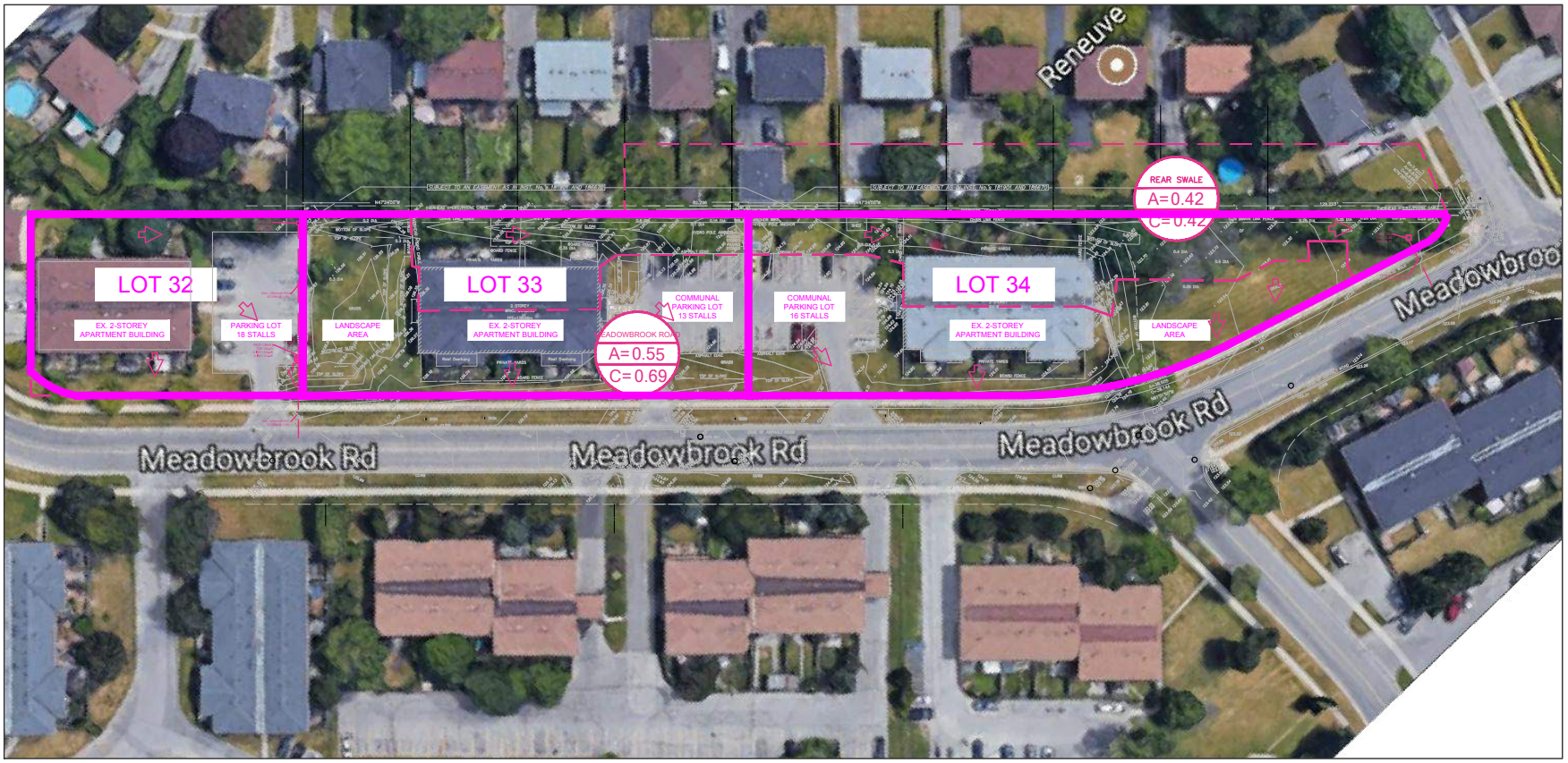
The new townhouse units are proposed within vacant areas of Lot 33 and Lot 34. Lots 32, 33 and 34 are owned under different company names.

This report will outline the functional servicing strategy for the proposed development.

1.1 Background Information / Design Criteria

The following documents were reviewed in the preparation of this report:

- City of Burlington Standard Drawings (City of Burlington, March 2004)
- Halton Region Water and Wastewater Linear Design Manual (Halton Region, May 2014)



REVISION BLOCK

#	DATE	DESCRIPTION
1.	10/24/17	ISSUED FOR ZBA

KWA SITE DEVELOPMENT CONSULTING INC.
2453 Auckland Drive
Burlington, ON L7L 7A9

Burlington Woodstock Vancouver

LOCATION PLAN

2076 & 2086 MEADOWBROOK ROAD

CITY OF BURLINGTON, ONTARIO

PROJECT No: 17314 | DRAWN BY: CSB | CHECKED BY: RA

FIGURE 1

- MOE Stormwater Management Practices Planning and Design Manual (Ministry of Environment, March 2003)

2.0 STORMWATER CONVEYANCE

To assess the stormwater impacts from the proposed development, a review of the adjacent lots and drainage areas were analyzed.

2.1 Existing Grading Conditions

Lots 32, 33 and 34 noted above currently split drain storm flows, the back areas draining to an existing rear swale and the front draining to Meadowbrook Road. The existing rear swale drains overland to the intersection of Charles Drive and Meadowbrook Road. There are existing 450mm, 525mm and 600mm diameter storm sewer fronting these lots on Meadowbrook Road draining to the east. Refer to attached Figure 2 – Drainage Plan.

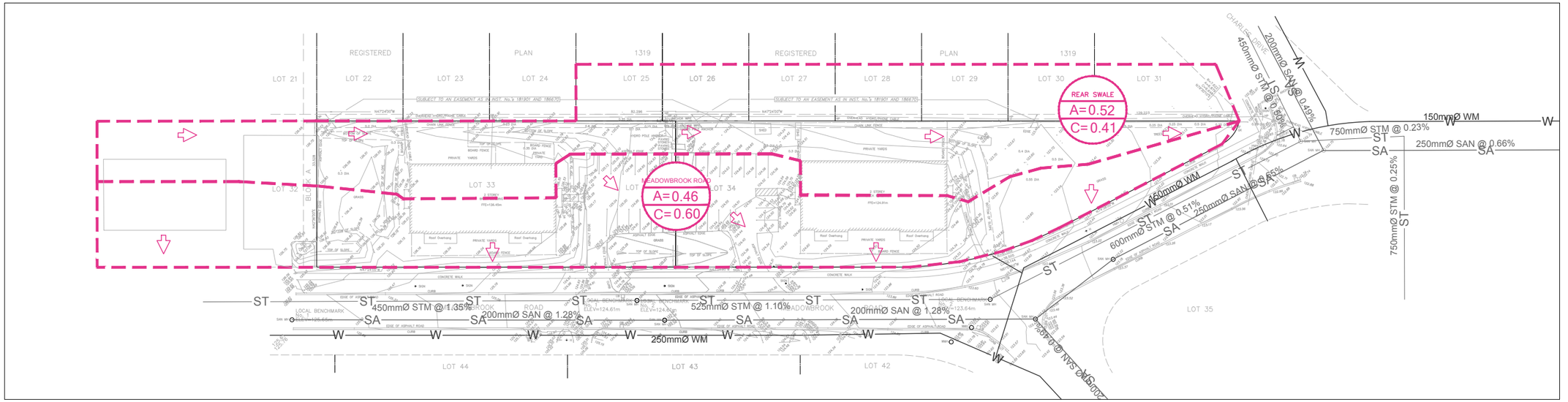
2.2 Proposed Grading Conditions

With the addition of 3 townhouse units within the vacant area of Lot 33 and 4 townhouse units within the vacant area of Lot 34, the following grading design will be implemented.

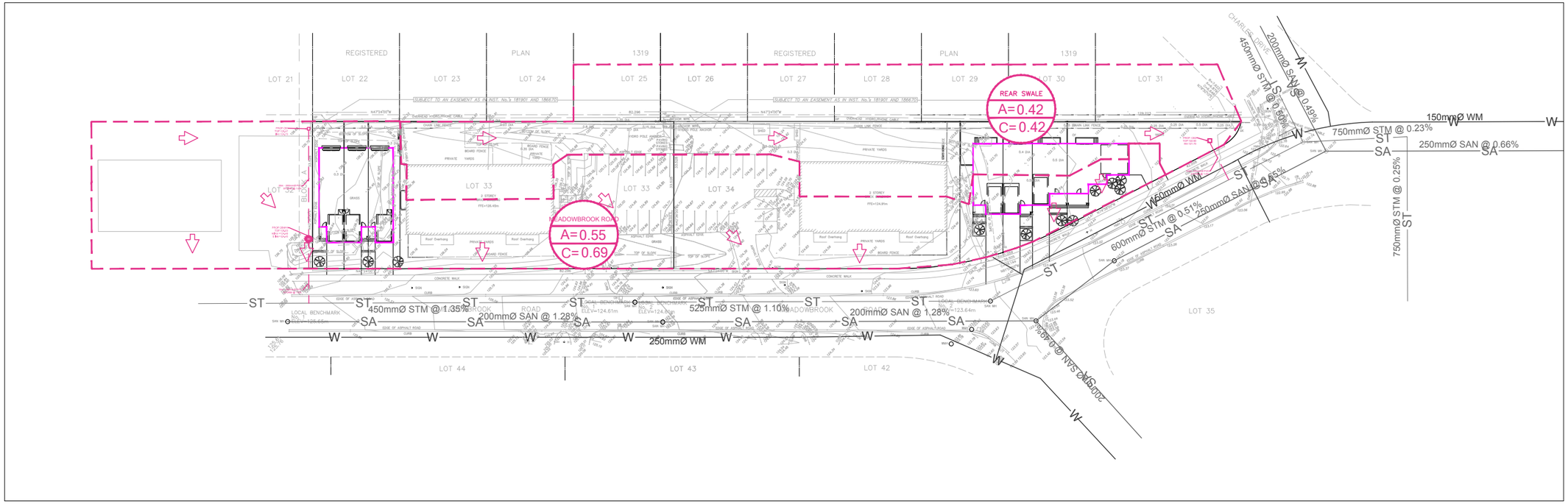
3 Townhouse Units – Lot 33 (2086 Meadowbrook Road)

This lot has been designed as a front draining lot. A catchbasin will be proposed at the northwest corner of the property, CB1, to capture and cut off Lot 32's rear yard storm flows. The existing parking lot currently drains through Lot 33 to Meadowbrook Road. To cutoff this parking lot from draining to Lot 33, a high curb will be installed at the existing edge of asphalt. A catchbasin manhole will be installed at the south end of this existing parking lot and will be connected to the rear yard catchbasin storm sewer that will outlet to the 450mm storm sewer on Meadowbrook Road. A conveyance swale draining the back and east side yard will drain overland to Meadowbrook Road. The residential lots will drain as per City of Burlington One-Way drainage standards, S-119. Refer to drawing SGSP – Site Grading and Servicing Plan

To accommodate the townhouse development the revised grading design reduces the overall drainage area contributing to the rear yard swale however increases the drainage area



EXISTING DRAINAGE AREAS



PROPOSED DRAINAGE AREAS

REVISION BLOCK

#	DATE	DESCRIPTION
1.	10/20/17	ISSUED FOR ZBA

KWA SITE DEVELOPMENT CONSULTING INC.
2430 Argentia Road, Unit 2
Burlington, ON L7L 7A9
Burlington Woodstock Vancouver

EXISTING AND PROPOSED DRAINAGE AREAS

2076 & 2086 MEADOWBROOK ROAD
CITY OF BURLINGTON, ONTARIO

PROJECT No: 1734 | DRAWN BY: CDB | CHECKED BY:

FIGURE 2

contributing to Meadowbrook Road. Refer to Figure 2 – Drainage plan showing the proposed drainage areas.

4 Townhouse Units – Lot 34 (2076 Meadowbrook Road)

This lot has been designed as a split draining lot. The existing rear yard swale, draining the back of Lots 33 and 34, will blend with a rear swale designed to drain the back of the 4 townhouse units. A catchbasin will be installed on the far east side of the lot to capture the rear yard drainage and outlet to the 600mm storm sewer on Meadowbrook Road via a new underground sewer connection. The front portion of these lots drain overland to Meadowbrook Road. Refer to drawing SGSP – Site Grading and Servicing Plan

2.3 Proposed Storm Servicing Lot Connections

Each of the seven (7) new townhouses will be serviced by a single 125mm diameter PVC underground storm connection as per City of Burlington Residential Service Locations Detail S-185 & S-185A. Refer to drawing SGSP – Site Grading and Servicing Plan. The minimum grade of the proposed 125mm storm service connections will be 2.0%. At this minimum grade, the storm sewer service connection will have a capacity of 13.2 L/s.

3.0 SANITARY SEWER SERVICING

3.1 Existing Conditions

There is an existing 200mm diameter sanitary sewer fronting 2086 Meadowbrook Road and a 250mm diameter sanitary sewer fronting 2076 Meadowbrook Road. Both pipes drain to the east.

3.2 Sanitary Demand

The design flows for the proposed development have been calculated as per the Region of Halton Water and Wastewater Linear Design Manual where:

$$Design\ Flow = Average\ Dry\ Flow\ x\ Peaking\ Factor + Infiltration$$

Using a multi family home rate of 120 people per hectare, the equivalent population of the development is:

- 2086 Lot Area (3 townhouse units) = 0.07 ha
- 2076 Lot Area (4 townhouse units) = 0.11 ha

$$Equivalent\ Pop = 110\ x\ \left(\frac{1800}{10000}\right) = 22\ people$$

The equates to approximately 3 persons per townhouse unit.

Using a residential rate of 0.275 m^3/capita/day, the average dry flow is:

$$Average\ Dry\ Flow = 0.275\ x\ 22$$
$$Average\ Dry\ Flow = 6.05\ m^3/day$$
$$Average\ Dry\ Flow = 0.07\ L/s$$

The peaking factor can be determined using the Harmon Equation as:

$$M = 1 + \left(\frac{14}{4 + \sqrt{P}}\right)$$

$$M = 1 + \left(\frac{14}{4 + 0.15}\right)$$

$$M = 4.37$$

Infiltration can be estimated at a rate of 0.286 L/s/ha.

$$I = 0.286x\left(\frac{1800}{10000}\right)$$
$$I = 0.051\ L/s$$

Therefore, the design flow for the proposed development is:

$$Design\ Flow = 0.07\ x\ 4.37 + 0.051$$
$$Design\ Flow = 0.36\ L/s$$

3.3 Proposed Sanitary Servicing Lot Connections and Capacity Analysis

Each of the seven (7) new townhouses will be serviced by a single 125mm diameter PVC underground sanitary connection as per City of Burlington Residential Service Locations Detail S-185: Service Location "B". Refer to drawing SGSP – Site Grading and Servicing Plan. Based on the total sanitary demand for the two lots, each townhouse units theoretical sanitary demand will be **0.05 L/s** (0.36 L/s divided by 7 townhouse units). The minimum grade of the proposed 125mm sanitary service connections will be 2.0%. At this minimum grade, the sanitary sewer service connection will have a capacity of 13.2 L/s. This capacity far exceeds the sanitary demand for each proposed townhouse units.

4.0 WATERMAIN

4.1 Existing Conditions

There is an existing 250mm diameter watermain fronting Lot 33 and a 150mm diameter watermain fronting Lot 34 on Meadowbrook Road.

4.2 Domestic Water Demand

The domestic demand can be estimated using the Region of Halton Water and Wastewater Linear Design Manual and an equivalent population of 120 people per hectare (22 people total) as noted in the Sanitary Services section above.

$$Average\ Daily\ Demand = \frac{0.275 m^3}{person}$$

$$Average\ Daily\ Demand = 0.275 * 22 = 6.05\ m^3/day$$

Using a peaking factor of 2.25, the Maximum Daily Demand is:

$$Maximum\ Daily\ Demand = 6.05\ m^3/day\ \ x\ 2.25$$

$$Maximum\ Daily\ Demand = 13.6\ m^3/day\ \ = 0.16\ L/s$$

Using a peaking factor of 4.00, the Maximum Hourly Demand is:

$$Maximum\ Hourly\ Demand = 6.05\ m^3/day\ x\ 4.00$$
$$Maximum\ Hourly\ Demand = 24.2\ m^3/day\ = 0.28\ L/s$$

4.3 Fire Flow Demand

In accordance with the Fire Underwriters Survey (1999), for groupings of multi family dwellings not exceeding 2 stories in height, the 'short method' may be used.

Table 1 - Fire Underwriters Survey – 'Short Method'

Exposure Distance	Suggested Required Fire Flow	
	Wood Frame	Masonry or Brick
Less than 3m	See Note "D"	**6,000 L/min**
3 to 10m	4,000 L/min	4,000 L/min
10.1 to 30m	3,000 L/min	3,000 L/min
Over 30m	2,000 L/min	2,000 L/min

Note D: Wood frame structures separated by less than 3 meters shall be considered as one fire area.

Using the minimum exposure distance for the governing building (2.5m separation from proposed neighbouring building), the required fire flow is **6,000 L/min (100 L/s)**.

In accordance with Region standards, watermain must be able to provide the greater of *maximum day + fire flow* or *peak hourly demand*. The maximum day plus fire flow rate is **100.16 L/s** (100 L/s + 0.16 L/s) while the peak hourly rate is **0.28 L/s**.

There are two hydrants on Meadowbrook Road adjacent to the proposed developments.

4.4 Proposed Water Servicing and Analysis

Each of the seven (7) new townhouse lots will be provided with a single 25mm diameter water service connection to this main as per Region standards. Refer to drawing SGSP – Site Grading and Servicing Plan.

5.0 CONCLUSIONS

Based on the information provided in this report it is concluded that the proposed development of 2076 and 2086 Meadowbrook Road can be constructed to meet the requirements of the City of Burlington and Region of Halton.

We trust this report satisfies the criteria for approval. Please do not hesitate to contact the undersigned if you have any questions or concerns.

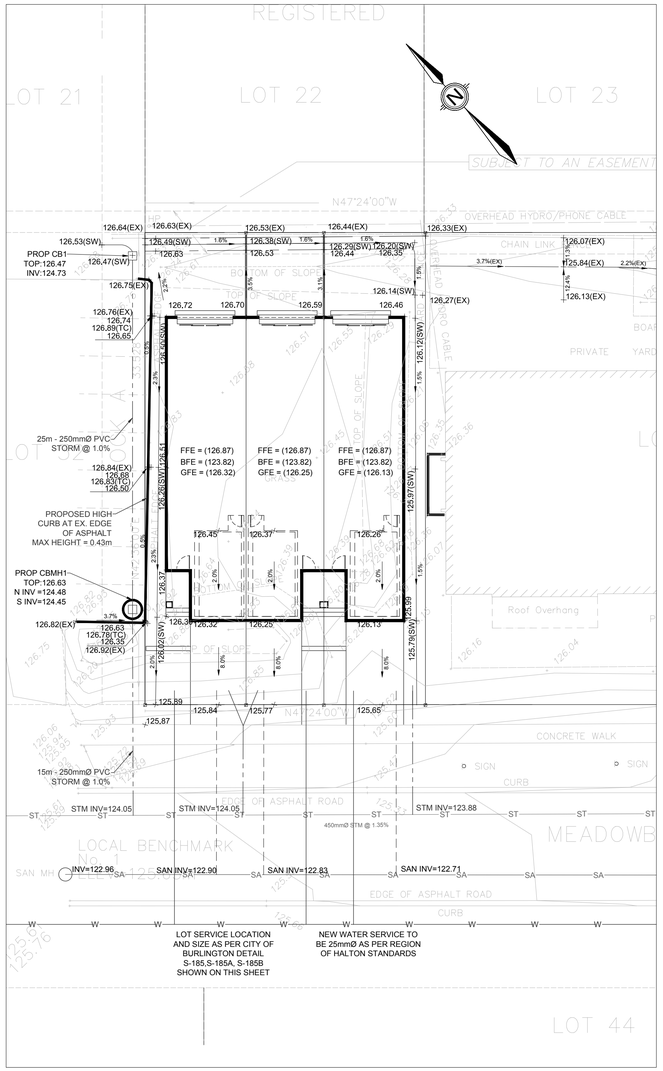
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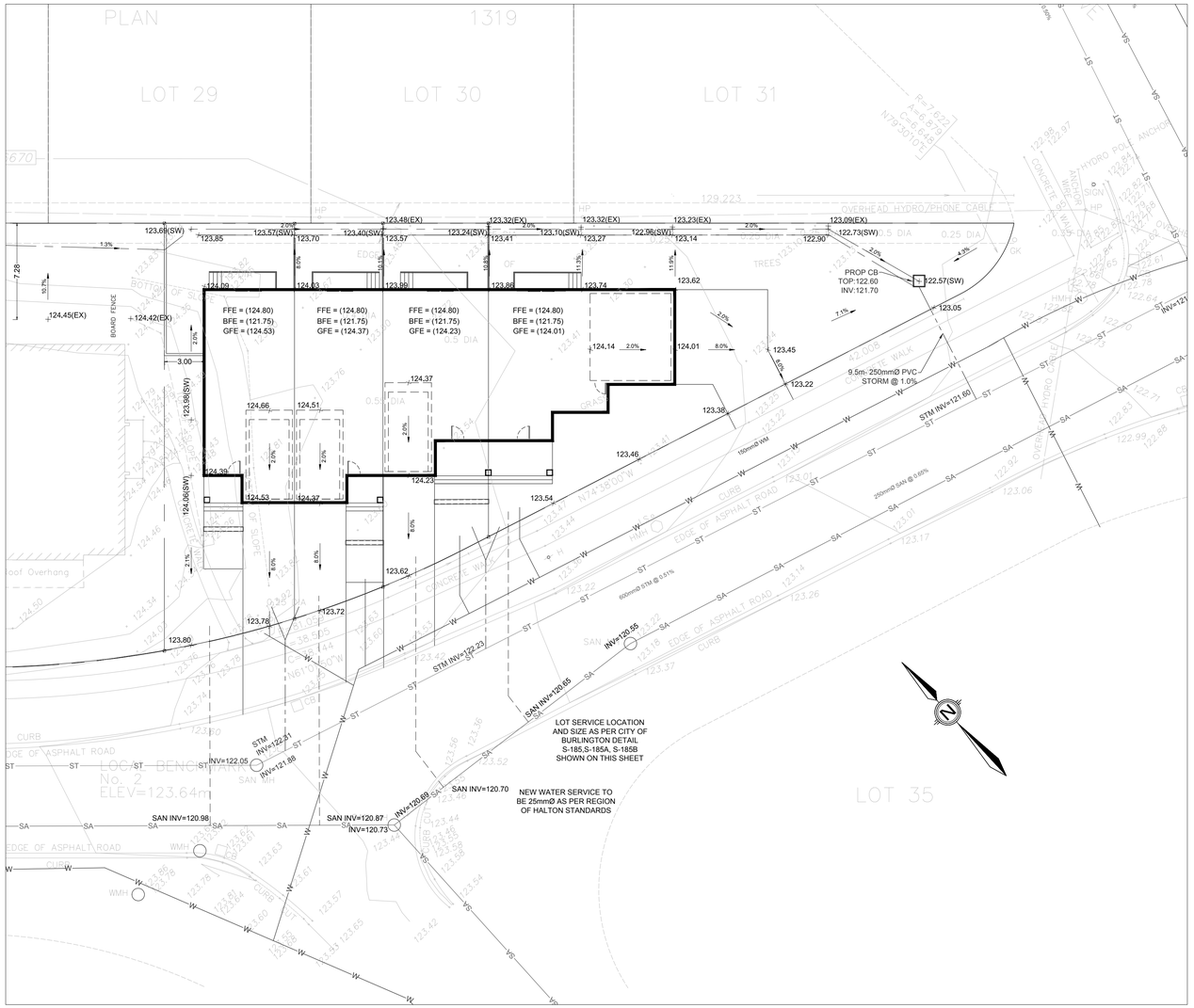


2086 MEADOWBROOK ROAD

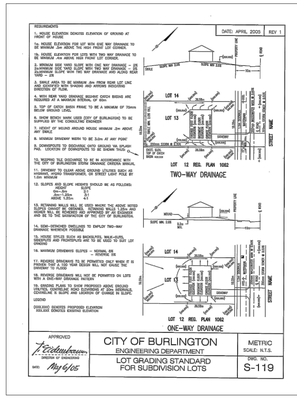


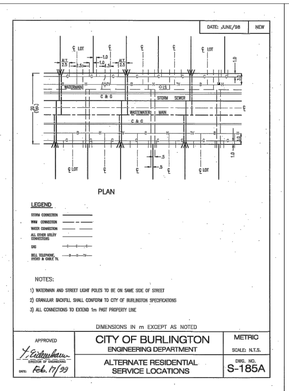
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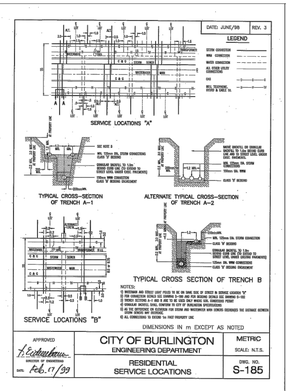
2076 MEADOWBROOK ROAD

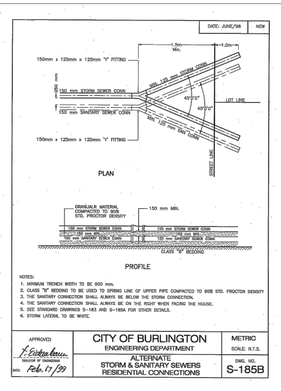


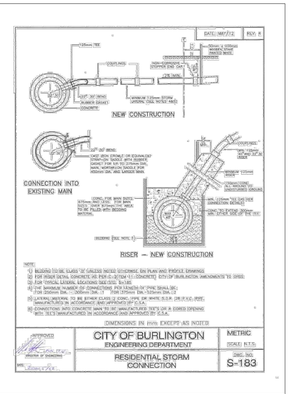
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GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE CITY OF BURLINGTON, REGION OF HALTON, ONTARIO PROVINCIAL STANDARD DRAWINGS AND SPECIFICATIONS (OPSD & OPSS). THE WATER RESOURCES ACT AND THE APPLICABLE ENVIRONMENTAL PROTECTION ACTS. WHERE A CITY STANDARD EXISTS, IT SHALL BE USED IN PLACE OF THE PROVINCIAL STANDARD. ALL WORK SHALL CONFORM TO THE APPLICABLE HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.
2. INFORMATION REGARDING ALL EXISTING UNDERGROUND UTILITIES AND SERVICES SHOWN ON THE DRAWINGS IS BASED ON INFORMATION PROVIDED BY OTHERS AND/OR AVAILABLE HISTORICAL DRAWINGS. THE ACCURACY OF THIS INFORMATION HAS NOT BEEN CONFIRMED BY KWA SITE DEVELOPMENT CONSULTING AND ALL UNDERGROUND INFORMATION NEEDS TO BE VERIFIED IN THE FIELD PRIOR TO BIDDING AND CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE TO ACQUIRE ALL UTILITY LOCATES PRIOR TO CONSTRUCTION AND TO NOTIFY THE ENGINEER OF ANY DISCREPANCIES. ANY LOST TIME DUE TO FAILURE TO IDENTIFY DISCREPANCIES OR NOTIFY THE ENGINEER SHALL BE AT THE CONTRACTOR'S EXPENSE.
3. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION AND ANY DISCREPANCIES REPORTED TO THE ENGINEER. INFORMATION REGARDING PRIVATE ROADS, PARKING LOT CURBS, BUILDING LOCATIONS, AND SETBACKS SHALL BE TAKEN FROM THE ARCHITECTURAL SITE PLAN.
4. NO SUBSTITUTIONS SHALL BE ALLOWED WITHOUT ENGINEERS APPROVAL.
5. ALL DISTURBED AREAS SHALL BE REPAIRED TO ORIGINAL CONDITION OR BETTER AND TO THE SATISFACTION OF THE ENGINEER.
6. THE CONTRACTOR IS RESPONSIBLE FOR ALL TRAFFIC AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD, INCLUDING ALL NECESSARY SIGNALS, SIGNS, DELINEATORS, MARKERS AND BARRIERS. ALL TRAFFIC AND SAFETY MEASURES SHALL CONFORM TO CITY STANDARDS AND THE ONTARIO TRAFFIC MANUAL, BOOK 7 - TEMPORARY CONDITIONS, LATEST EDITION.
7. THE CONTRACTOR SHALL COORDINATE ALL REQUIRED INSPECTIONS WITH THE CITY OF BURLINGTON AND ANY OTHER REGULATORY AGENCIES. ALL WORK ON CITY RIGHT-OF-WAY AND EASEMENTS SHALL BE INSPECTED BY THE CITY PRIOR TO BACKFILLING.
8. THE CONTRACTOR IS RESPONSIBLE TO INSTALL AND MAINTAIN EROSION AND SEDIMENT CONTROLS AS REQUIRED BY THIS CONTRACT AND CITY AND PROVINCIAL STANDARDS.
9. CONTRACTOR TO PROVIDE ALL SHOP DRAWINGS (i.e. ALL STORM, SANITARY AND WATERMAIN STRUCTURES) TO ENGINEER FOR APPROVAL PRIOR TO ORDERING MATERIAL AND DELIVERING TO SITE.

REGIONAL APPROVAL

REGION DESIGN OF WATER &/OR WASTEWATER SERVICES APPROVED SUBJECT TO DETAIL CONSTRUCTION CONFORMING TO HALTON REGION STANDARDS & SPECIFICATIONS & LOCATION APPROVAL FROM AREA MUNICIPALITY.

SIGNED: DATED:
INFRASTRUCTURE PLANNING & POLICY

The Applicant should be aware that the approval of the water system on private property is the responsibility of the Local Municipality. Regardless, the Applicant must ensure that the Region of Halton's standards and specifications are met. *(the Water and Wastewater Linear Design Manual may be obtained from the Data Management Group at 905.825-6021)* Furthermore, all water quality tests must be completed to the Region of Halton's satisfaction, before the water supply can be turned on.

REVISION BLOCK

#	DATE	DESCRIPTION
1.	10/24/17	ISSUED FOR ZBA

KWA SITE DEVELOPMENT CONSULTING INC.
2345 Cornwall Road, Unit 201
Burlington, ON L7L 7A9

Burlington Woodstock Vancouver

GRADING AND SERVICING PLAN
2076 & 2078 MEADOWBROOK ROAD
BURLINGTON, ONTARIO

PROJECT No: 17314 | DRAWN BY: CDB | CHECKED BY: RA

SGSP