Functional Servicing and Stormwater Management Report
Appleby Mall Residential
Burlington ON

Prepared By:

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Prepared for:

First Capital Asset Management LP

March 2014

File No: 300034551.0000

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Table of Contents

1.0 Introduction 1
1.1 General Information 1
1.2 Objectives 1
1.3 Existing Conditions 1
1.4 Proposed Development 4

2.0 Sanitary Servicing 6
2.1 Existing Sanitary Sewer Infrastructure 6
2.2 Proposed Sanitary Servicing 8

3.0 Water Supply and Distribution 10
3.1 Existing Water Infrastructure 10
3.2 Proposed Water Servicing 10

4.0 Stormwater Management Plan 12
4.1 Existing Storm Drainage System 12
4.2 Proposed Storm Drainage System 12
4.2.1 Quantity Control 13
4.2.2 Quality Control 13

5.0 Erosion and Sediment Control 14

6.0 Conclusions and Recommendations 15

Figures

Figure 1 Site Location 2
Figure 2 Existing Conditions 3
Figure 3 Proposed Development 5
Figure 4 Existing Servicing Plan 7
Figure 5 Proposed Servicing Plan 9

Drawing List

S1 Servicing Plan
G1 Grading Plan
D1 Details Plan
ES1 Erosion and Sediment Control Plan

Appendices

A Sanitary Design Information
B Fire Flow Information

1.0 Introduction

1.1 General Information

R.J. Burnside & Associates Limited (Burnside) has been retained by First Capital Asset Management LP to prepare a Functional Servicing and Stormwater Management Report for the proposed residential development at the north east corner of the Appleby Mall located in the City of Burlington. The subject property is the existing mall located between Appleby Mall to the west, Timber Lane to the east, Pinedale Avenue to the north and New Street to the south in the City of Burlington and the Region of Halton. The existing property is shown in **Figure 1**.

This Functional Servicing and Stormwater Management Report (FSR) will support the Re-zoning Application and subsequent Site Plan and Building Permit Applications for the proposed development of the site. Detailed engineering designs and drawings related to site servicing and grading will incorporate the functional concepts of the servicing measures outlined in this report.

1.2 Objectives

The objectives of this Functional Servicing and Stormwater Manangement Report are to:

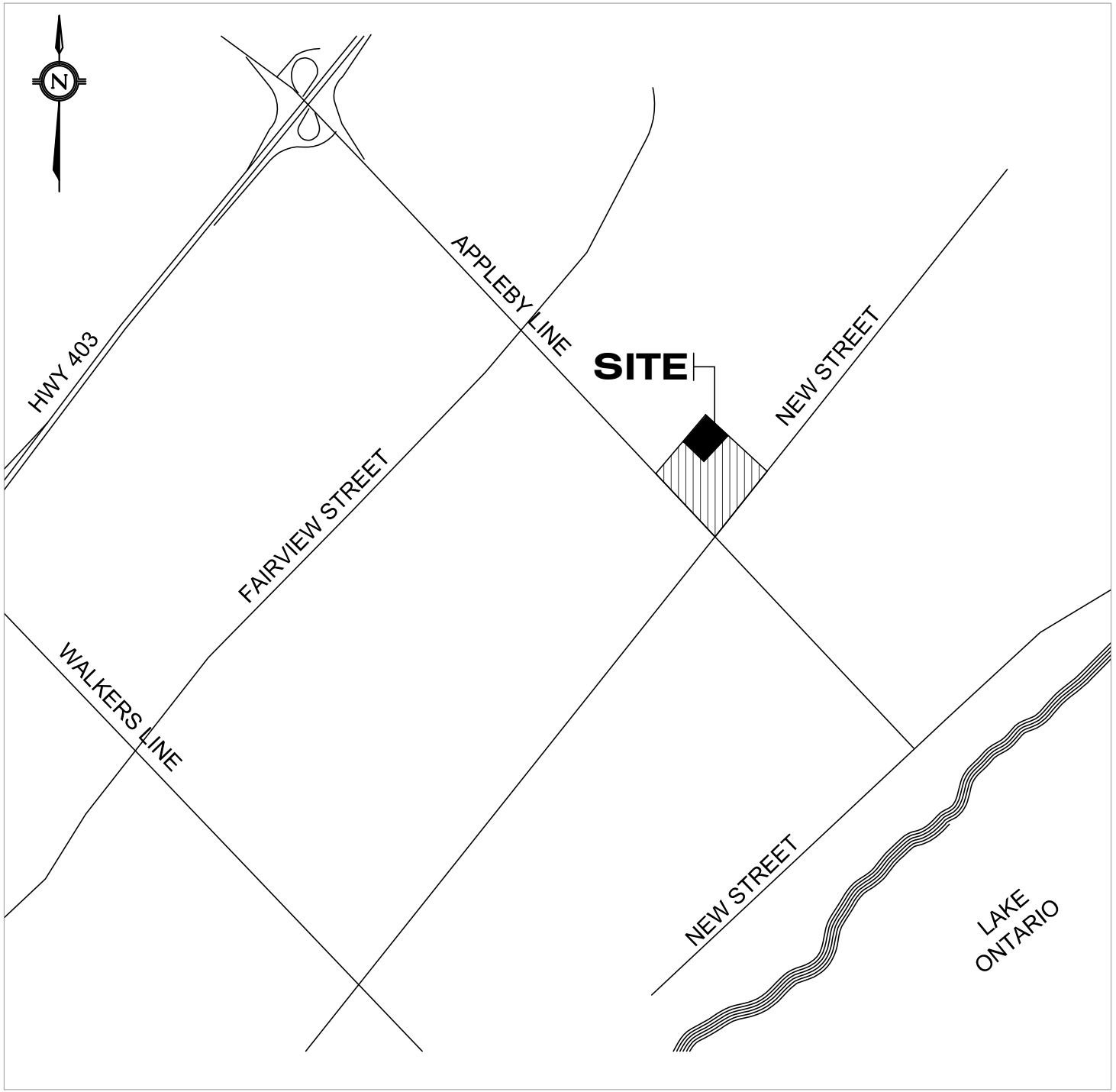
- Confirm the location of existing infrastructure both internal and adjacent to the subject site;
- Evaluate and confirm capacity for sanitary servicing;
- Evaluate and confirm adequate supply and on-site distribution of municipal water to meet domestic and fire flow requirements; and
- Evaluate storm water management opportunities and constraints and to design post development stormwater management controls to ensure the required post development runoff rates and quality controls are met.

All of the above will be done in accordance with accepted engineering practices and as per the City of Burlington and Region of Halton standards.

1.3 Existing Conditions

The subject site is bound by Appleby Line to the west, Pinedale Avenue to the north, Timber Lane to the east and New Street to the south. The proposed development is for the north east corner of the property only (refer to **Figure 1**).

The total subject site is 6.73 ha (16.63 acres). The subject site slopes mildly from north to south with existing commercial / retail buildings and corresponding at grade parking facilities. Refer to **Figure 2** for the Existing Development Plan.



SITE LOCATION

Client

FIRST CAPITAL

85 HANNA AVE.
TORONTO
M6K 3S3

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Pickering, Ontario, L1V 7G7
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Drawing/Project Title

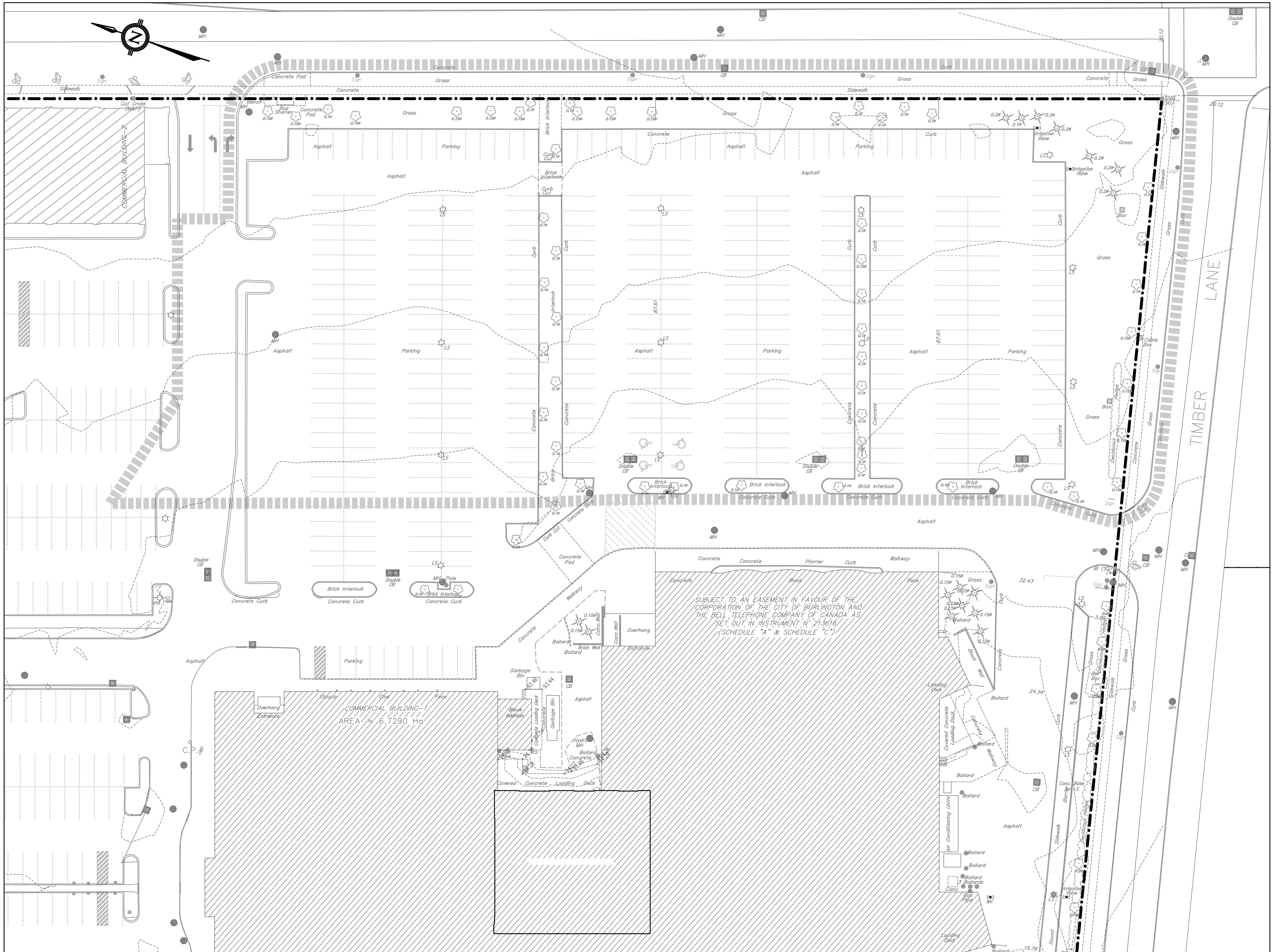
APPLEBY MALL RESIDENTIAL
5111 NEW STREET

BURLINGTON, ONTARIO

Drawn By	Checked By	
BB	BD	.
Scale	Project No.	
N.T.S.	300034551	FIG1

File Name: 034551_FIG1.dwg Date Plotted: March 05, 2014 - 9:39am

Plotted by:Bbabayan Paper size: ANSI Full Bleed A (8.50 X 11.00 Inches) Plot table: Rjb Full Scale-pickering.ctb



Title

EXISTING CONDITIONS

Client

FIRST CAPITAL

85 HANNA AVE.
TORONTO
M6K 3S3

LEGEND

Symbol	Description
dash-dot line	SITE PROPERTY LINE
grey dashed band	CONSTRUCTION LIMIT
shaded circle	MANHOLE
small square	CATCHBASIN
light symbol	LIGHT STANDARD
hatched area	EXISTING STRUCTURE
hydrant symbol	EXISTING HYDRANT
dot	EXISTING SIGN/POST

0 10 20 30 40 50 60
METERS 1:750

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Drawing Title

APPLEBY MALL RESIDENTIAL
5111 NEW STREET

Drawn	Checked	Drawing No.
BB	BD	FIG2
Scale: 1:750	Project No.: 300034551	

Plotted by:Bbabayan Paper size: ANSI Full Bleed B (11.00 X 17.00 Inches) Plot table: Rjb Full Scale-pickering 2013.ctb

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1.4 Proposed Development

The proposed development consists of the construction of two (2), mixed use buildings and corresponding at grade and underground parking facilities. The easterly building is proposed to have 497 m^2 of commercial / retail area at the ground floor and 192 residential units over 17 stories. The western proposed building is proposed to have 461 m^2 of commercial/retail space with 132 residential units over 12 stories. Refer to **Figure 3** for the proposed site plan layout.

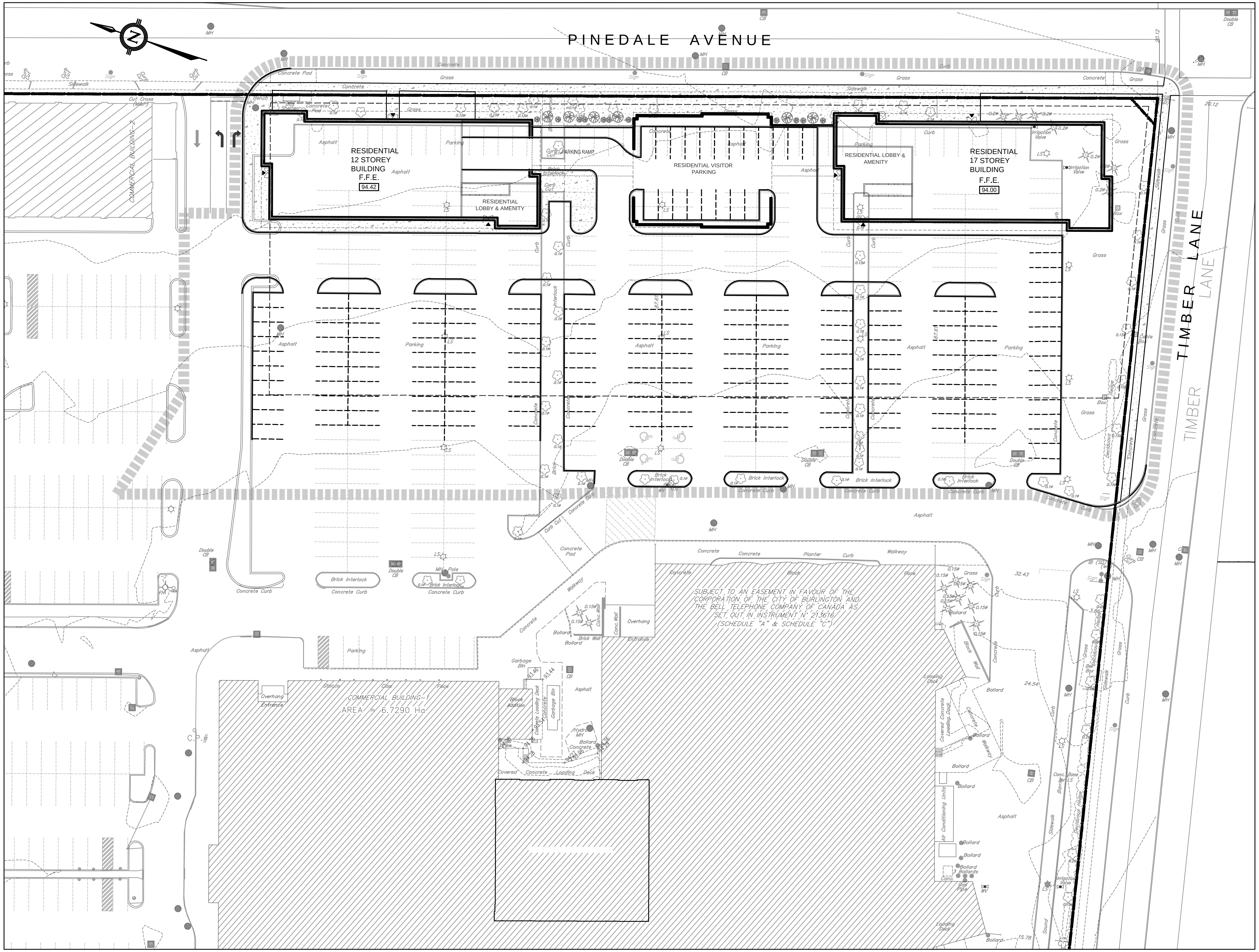
The commercial/retail GFA for the proposed buildings is 958 m^2, which is an increase of approximately 5.5% over the existing 17,700 m^2 of commercial/retail building GFA already on site.

Currently there is no residential GFA for the existing subject property. The proposed residential portion of the development includes 324 residential units over 27,964 m^2 of residential GFA, which is split over two (2) buildings. A 17 story, 192 unit development on the east side of the proposed development area and a 12 story, 132 unit development on the west side of the proposed development area.

To service the residential development, two storeys of underground parking are proposed to cover the development area with 514 underground parking spaces.

The proposed development will be graded to ensure that the impact of the development will not adversely affect the adjacent topography and that existing overland flow routes are maintained.

Refer to **Drawing G1** for the proposed Site Grading Plan.



Title

PROPOSED DEVELOPMENT

Client

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85 HANNA AVE.
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LEGEND

SITE PROPERTY LINE

CONSTRUCTION LIMIT

0 10 20 30 40 50 60

METERS 1:750

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APPLEBY MALL RESIDENTIAL
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Drawn	Checked	Drawing No.
BB	BD	FIG3
Scale	Project No.	
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2.0 Sanitary Servicing

2.1 Existing Sanitary Sewer Infrastructure

The existing site is a 6.73 ha (16.6 acres) retail mall development which is predominantly asphalt parking (approximately 75% parking) with 17,700 m^2 of commercial / retail building.

There are several sanitary sewers that surround the site, including an internal sanitary sewer system that captures the commercial buildings on site. The existing outfall for the subject site is at the southeast corner of the development. The internal sanitary sewer system connects into an existing 250 mm diameter sanitary sewer that runs south on Timber Lane.

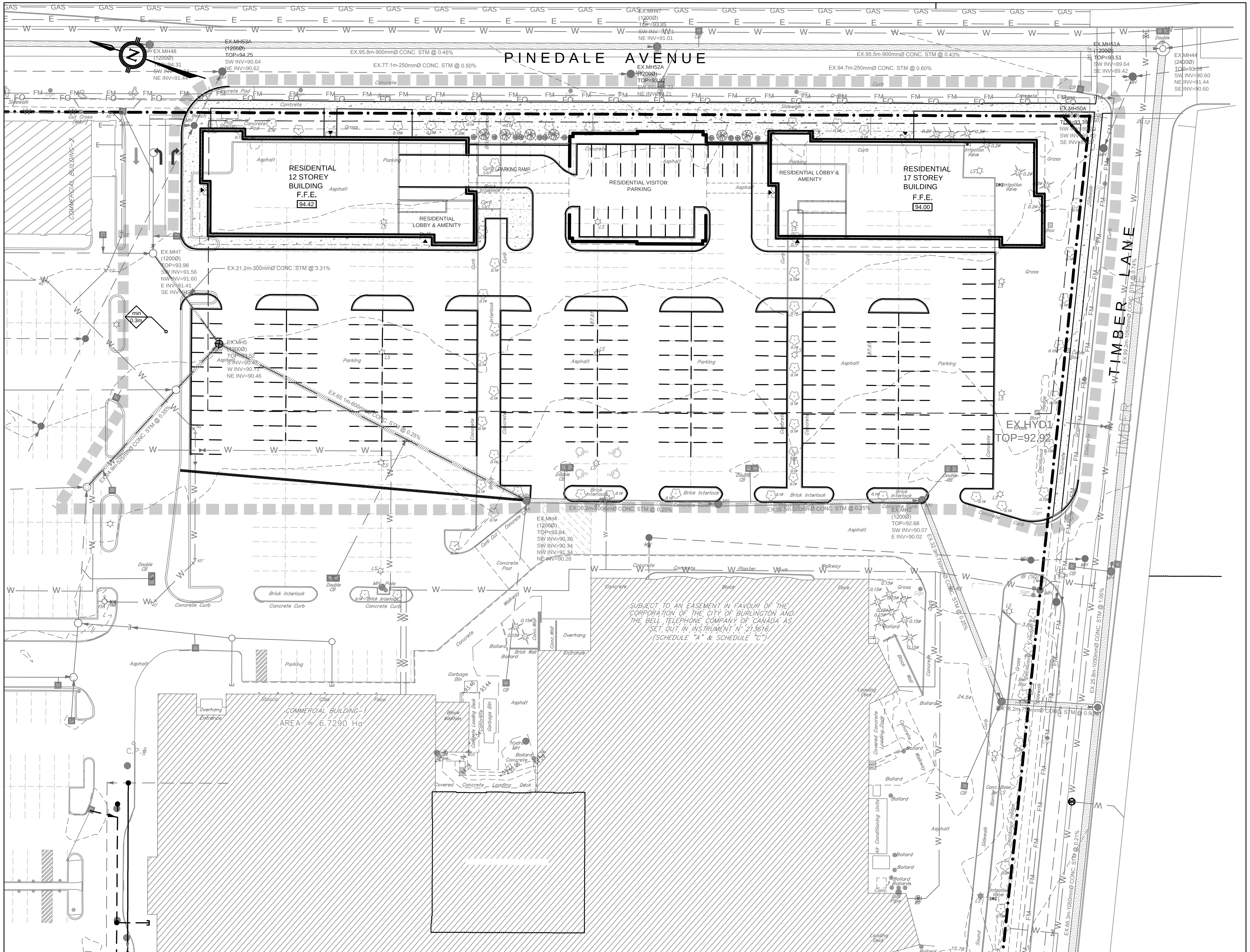
On Pinedale Drive, directly north of the proposed building, a 250 mm diameter sanitary sewer flows from west to east. This sewer combines with a 250 mm diameter sanitary sewer at Timber Lane coming from the east and is directed south in a 375 mm diameter sanitary sewer that continues south to New Street. At New Street, this sewer is directed east.

A second 250 mm diameter sanitary sewer starts directly adjacent to the proposed building on Timber Lane and travels south to New Street. This sewer turns west on New Street to Appleby Line. A service connection has already been extended from Timber Lane from the 250 mm diameter main into the subject site and a control manhole constructed near the property line.

In addition, a 450 mm diameter sanitary forcemain runs north on Timber Lane directly adjacent to the subject site. This forcemain travels north on Timber Lane to Pinedale Drive and East on Pinedale to Appleby Line.

Conversations with Region Staff have indicated that sanitary sewer design sheets for the sanitary sewers directly adjacent to the subject site are not available but that there are no known sanitary sewer issues in the area.

Refer to **Appendix A** for the sanitary design calculations, **Figure 4** and **Drawing S1** for the location of the existing sanitary infrastructure.



Title

EXISTING SERVICING

Client

FIRST CAPITAL

85 HANNA AVE.
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M6K 3S3

LEGEND

- SITE PROPERTY LINE
- CONSTRUCTION LIMIT
- EX. STORM MANHOLE
- EX. CATCHBASIN
- EX. SANITARY MANHOLE
- SEWER PIPE TO BE REMOVED

0 10 20 30 40 50 60
METERS 1:750

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Drawing Title

APPLEBY MALL RESIDENTIAL
5111 NEW STREET

Drawn	Checked	Drawing No.
BB	BD	FIG4
Scale	Project No.	
1:750	300034551	

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File Name: 034551_FIG4.dwg Date Plotted: March 05, 2014 - 9:39am

2.2 Proposed Sanitary Servicing

The peak sanitary flow from the proposed development based on the Region of Halton's design criteria of 0.275 m^3/person/day (0.003183 L/s/person). When a unit count is unknown for a proposed development the Region of Halton uses an equivalent population density of 285 persons per hectare for apartments over 6 storeys in height (Refer to Table 2.1 of the Regional Municipality of Halton's "Design Criteria, Contract Specifications and Standard Drawings").

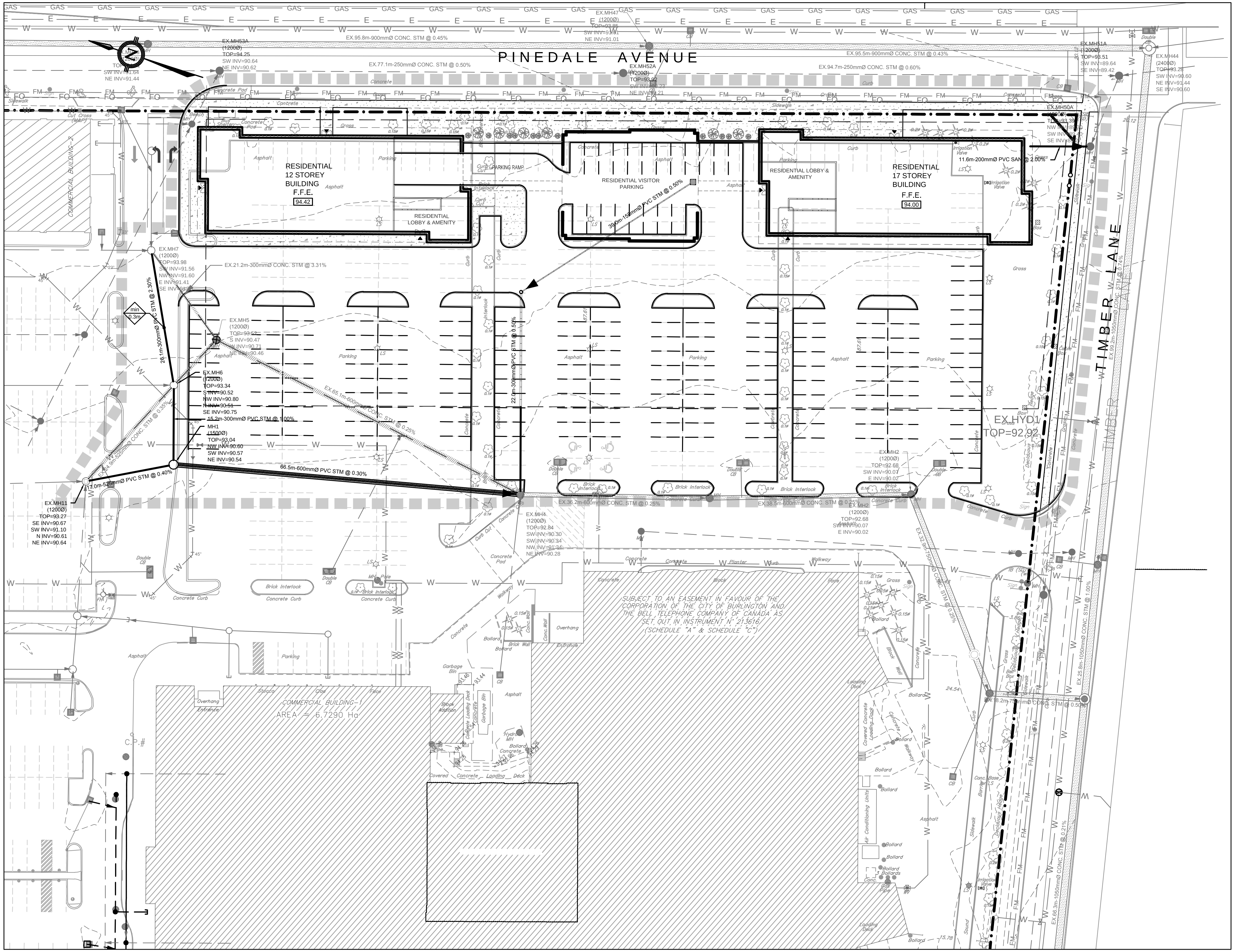
The proposed development is the 1.27 ha north east corner of the site. Using the Region's population density of 285 persons per hectare would give an equivalent population of 362 persons. Alternatively, assuming that each unit has a population of 2 persons per unit, the proposed development would contribute 648 new persons to the subject property.

Conversations with Region Staff have indicated that the proposed development has been included in the original review of the proposed upgrades to the Appleby Mall and that the existing servicing stub at the upstream limit is the preferred location for the outfall for the proposed residential building.

The proposed development has an equivalent population of 648 which has an equivalent residential peak flow of 8.07 L/s.

Analysing the sanitary sewers downstream of the building, the capacity of the proposed 200 mm diameter service connection at a slope of 2% is 48.4 L/s and the proposed peak flow to this service is 10.21 L/s. The first downstream sanitary sewer is a 375 mm diameter main at a slope of 1.08% and a capacity of 190.1 L/s. The proposed development increases flows within this municipal sewer by 5.4% of its available capacity.

Refer to **Appendix A** for the sanitary design calculations and **Figure 5** and **Drawing S1** for the location of the proposed servicing infrastructure and to **Drawing D1** for the servicing details.



Title

PROPOSED SERVICING

Client

FIRST CAPITAL

85 HANNA AVE.
TORONTO
M6K 3S3

LEGEND

- SITE PROPERTY LINE
- CONSTRUCTION LIMIT
- EX. STORM MANHOLE
- EX. CATCHBASIN
- EX. SANITARY MANHOLE
- SEWER PIPE TO BE REMOVED

0 10 20 30 40 50 60
METERS 1:750

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APPLEBY MALL RESIDENTIAL
5111 NEW STREET

Drawn	Checked	Drawing No.
BB	BD	FIG5
Scale: 1:750	Project No.: 300034551	

Plotted by:Bbabayan Paper size: ANSI Full Bleed B (11.00 X 17.00 Inches) Plot table: Rjb Full Scale-pickering 2013.ctb

File Name: 034551_FIG5.dwg Date Plotted: March 05, 2014 - 9:39am

3.0 Water Supply and Distribution

3.1 Existing Water Infrastructure

Currently, existing water infrastructure surrounds the site. The following is a brief description of the watermains in the general area of the subject site:

- 300 mm diameter watermain runs under the middle of Pinedale Avenue to the north;
- 300 mm diameter watermain runs along the west side of Timber Lane, and
- 150 mm diameter watermain runs internally through the subject property.

Refer to **Figure 4** and **Drawing S1** for the locations of existing watermains in the area.

3.2 Proposed Water Servicing

Fire and domestic connections for the proposed development are proposed to be fed from the watermain on Timber Lane and will be designed and constructed to meet the Region of Halton standards. Metering for the domestic lines will be provided inside the building and a Siamese connection will be placed at the main entrance of the easterly proposed building, within the maximum allowable distance from the existing fire hydrants (less than 45 m).

Due to the proximity of the proposed building to the existing municipal right-of-ways (less than 30 m) and the proximity of the proposed underground parking facility to the property line, the meter for the site will be required to be located within the building. Metering for both the fire and the domestic line will be provided inside the proposed building. As per Region of Halton's requirements the new private fire service connection will be installed with a detector check valve and water meter.

The internal onsite water supply and distribution system will be designed and specified to comply with the current standards and specifications of the Region of Halton, the Ontario Building Code and NFPA 13.

Fire protection for the proposed development will be achieved through the existing hydrants that surround the site.

Using the Fire Underwriters Survey and completing the fire protection calculations as per the "Water Supply for Public Fire Protection, a Guide to Recommended Practice", the proposed development requires a fire flow protection of approximately 841 L/min. Fire flow calculations for the proposed commercial building have been included in **Appendix B**. At the direction of our firm, Corix Water Services has been retained to complete a hydrant flow / pressure test for the adjacent infrastructure. The pressure tests on the surrounding infrastructure have been completed and are included in **Appendix B**.

The pressure test results indicate that there is more than sufficient capacity to service the proposed development from the existing surrounding infrastructure.

Refer to **Figure 5** for the proposed watermain system details and **Drawing S1** for the proposed watermain and water services for the proposed Appleby Mall Residential development. Refer to **Drawing D1** for the servicing details.

4.0 Stormwater Management Plan

4.1 Existing Storm Drainage System

Stormwater from the site is currently directed to the existing internal storm sewer system and ultimately drains out to the existing public storm sewer within the Timber Lane municipal right-of-way. Prior to being discharged to the municipal storm sewer system, on site stormwater is treated by a private oil / grit separator already installed within the Appleby Mall property.

The following storm sewers surround the site:

- A 900 mm diameter storm sewer at a slope of 0.45% runs east on Pinedale Drive, directly north of the proposed development;
- The storm sewer on Pinedale Drive connects into, and contributes flows to a 1050 mm diameter pipe at a slope of 0.95% that runs south on Timber Lane; and
- An existing internal 750 mm diameter storm sewer connects into the 1050 mm diameter storm sewer on Timber Lane after being treated by a private oil / grit separator within the subject property.

Refer to **Figure 4** and **Drawing S1** for the location of the existing storm sewers.

4.2 Proposed Storm Drainage System

The proposed commercial / residential development is part of the existing Appleby Mall development and has been taken into consideration as part of the Appleby Mall overall stormwater management plan.

The proposed development is to construct two residential / commercial buildings over an existing asphalt parking area. The proposed roof tops are to be controlled through the installation of Zurn Low Flow Roof Drains that can be controlled to a release rate of 42 L/s/ha.

The proposed development will further attenuate flows from the subject property above the current on site stormwater controls. In addition to reducing peak flows to the downstream sewer system, the proposed development will reduce dirty stormwater required to be treated prior to discharge to the municipal sewers.

Therefore it is proposed that no new quality or quantity controls are required for the proposed development.

Refer to **Drawing S1** and **Figure 5** for the location of the proposed internal storm sewers designed to be connected to the existing system and to **Drawing D1** for the servicing details.

4.2.1 Quantity Control

The proposed development is the addition of approximately 2,500 m^2 of new building and the removal of the same amount of paved asphalt. The proposed roofs are proposed to be controlled through the installation of Zurn Control Flow Roof drains and runoff from the roof will be reduced to 42 L/s/ha.

The existing internal storm sewer system and the corresponding surrounding municipal infrastructure has been designed to receive flows from the subject property and as the proposed development is a reduction in the peak flow rate from the subject property, no additional stormwater retention is proposed for the existing storm sewer system.

4.2.2 Quality Control

Stormwater quality controls are required for the site. A Total Suspended Solid (TSS) removal efficiency of 80% is targeted as per the Ministry of the Environment Stormwater Management Planning and Design Manual, dated March 2003.

The proposed development is the addition of the commercial / residential buildings in the north east corner of the existing Appleby Mall. The existing mall is currently controlled by oil / grit separators designed to treat stormwater runoff just upstream of the connection to the municipal storm sewer systems.

The proposed development will result in a decrease in uncovered paved parking areas and will increase rooftop area for the subject site. This will result in a reduction in 'dirty water' contributing flows to the oil / grit separator and will reduce the quality control requirements for the OGS unit. Therefore, additional quality controls will not be required for the proposed development.

5.0 Erosion and Sediment Control

Given the generally flat topography, the subject lands are considered to have a low to moderate erosive potential. Effective environmental and sedimentation controls must be in place on a temporary basis both during the construction period, and as permanent features of the completed development of the site.

To ensure stormwater quality control during construction, it is imperative that effective environmental and sedimentation control be in place on a temporary basis throughout the entire area prior to construction activities.

The construction of the proposed development will start with the excavation of the underground parking facilities. It is therefore recommended that during the construction phase the following practices be implemented and maintained throughout to mitigate the off-site transportation of eroded soils:

- Restoration of exposed surfaces with vegetative and non-vegetative material as soon as construction schedules permit;
- Provision of silt control fences for the duration of construction activities in all areas where surface drainage flows over disturbed areas and off the site; and
- Designation of fuelling areas and fuel storage areas, and ensuring that these areas are properly treated to contain leaks and other surface spills. Further, a maintenance plan will be prepared to ensure the up-keep of these designated areas.

During the majority of construction, protective hoarding fences (instead of siltation fences) will be required to protect the public from the construction activities involved with creating an underground parking facility. These hoarding fences will be constructed around the entire development area (the limit of the underground parking structure). Water that lands within the excavation will be required to be pumped and passed through a filtration system prior to being released to the adjacent storm sewer system and overland flow routes.

All proposed catchbasins and area drains on site shall have the underside of the grates covered with Terrafix 240R non-woven geotextile material during the construction period. The contractor shall regularly clean the sediment and debris filtered out by these structures. The contractor shall remove and dispose of the geotextile material at the end of the construction period.

Through the implementation of the proposed construction practices discussed above and regular maintenance of these controls, it can be ensured that satisfactory protection of the surrounding areas will occur during the construction stage of the proposed development. Refer to **Drawing ES1** for the proposed erosion and sediment control plan and to **Drawing D1** for the sediment control details.

6.0 Conclusions and Recommendations

The proposed development has been designed to adhere to the City of Burlington and Region of Halton Standards and Guidelines and the servicing analysis within the report has shown that the proposed development can be serviced by the surrounding municipal infrastructure.

The servicing analysis provided within this report is summarized as follows:

Sanitary

- The proposed development is an increase of 8.07 L/s to the municipal sewer from pre-development conditions which results in an increase to the peak flows of the downstream municipal sewer of 5.4% of the available capacity.
- The proposed development will have its own separate service connection to the municipal sewer on Timber Lane. The proposed service connection is a 200 mm diameter service at 2% slope and is proposed to be directly connected to existing MH50A.

Water Servicing

- Fire protection for the proposed development will be achieved through the existing municipal hydrants that surround the site as well as internal sprinkler systems for the proposed residential building.
- A new service connection is proposed to be provided for the residential building with a standard backflow prevention system and internal water meter.

Storm

- The proposed development is part of the existing Appleby Mall development and is designed to decrease peak flows through roof top attenuation and reduce ‘dirty water’ runoff through increased roof top coverage and reduced at grade parking.
- Stormwater is treated prior to discharge to the municipal sewer system by an existing stormceptor system just upstream of the outlet to Timber Lane.
- Overland flow routes remain the same from pre development to post-development conditions.

Erosion and Sedimentation Control

- Sediment controls will be installed on the surrounding storm sewer systems (catchbasins adjacent to the site) as well as implemented during any pumping of the site during the construction of the underground parking facilities.
- Construction fencing will be required on site and will act as a sediment control barrier.

This Functional Servicing and Stormwater Management Report has been designed to be approved as part of the site plan approval application for the proposed residential

development within the 5111 New Street subject site in the City of Burlington, Region of Halton. The findings of this report indicate that the proposed development can be constructed to the City of Burlington and Region of Halton guidelines and standards and in general conformance with the Appleby Mall overall development plan.

Prepared by:

R. J. Burnside & Associates Limited



Ben Davies, P.Eng., LEED® AP
Project Manager
BD:cv

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Appendix A

Sanitary Design Information

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CALCULATION SHEET

Project:

APPLEBY MALL RESIDENTIAL

Sanitary Servicing Analysis

Prepared by:	B. Davies
Checked by:	B. Davies
Project No:	300 034551
Date:	January 2014

Pre Development flows from the subject property:

Site Area =	67300	sq.m
Equivalent Population =	90	persons/ha
	606	
Peaking Factor =	0.80 x (1+ 14/4+Pe$^{1/2}$)	
	3.144	
Commercial Loading =	24.75	m^3/ha/day
Commercial Flow =	523.68	m^3/day
Qcom =	6.06	L/sec (incl. peaking factor)

*As per Region of Halton's "Design Criteria, Contract Specifications and Standard Drawings"

Total Block Area: 67,300 m^2

Qinf= 0.286 L/s/ha

Qinf= 1.92 **L/s**

Total Flow from the subject site under Predevelopment conditions:

Q_{pre} = 7.99 **L/s**

Post Development flows from the subject property to the new service connection:

Commercial Site Area =	17200	sq.m
Equivalent Population =	90	persons/ha
	155	
Peaking Factor =	0.80 x (1+ 14/4+Pe$^{1/2}$)	
	3.349	
Commercial Loading =	24.75	m^3/ha/day
Commercial Flow =	42.57	m^3/day
Qcom =	1.65	L/sec

*As per Region of Halton's "Design Criteria, Contract Specifications and Standard Drawings"

Total Block Area: 17,200 m^2

Qinf= 0.286 L/s/ha

Qinf= 0.49 **L/s**

Residential Flow assuming 2 persons per unit:

Residnetial Flow =	0.275	m^3/person/day
Residential units =	324	
Population / unit =	2.0	
Residential Population =	648	
Peaking Factor =	1 + (14/4+P$^{1/2}$))	
	3.9136	
Residential Flow =	697.41	m^3/day
Qres =	8.07	L/s

Residential Flow 285 persons per hectare:

Residnetial Flow =	0.275	m^3/person/day
Population density =	285	persons/ha
site area =	1.3	ha
Residential Population =	362	
Peaking Factor =	1 + (14/4+P$^{1/2}$))	
	4.0424	
Residential Flow =	402.42	m^3/day
Qres =	4.66	L/s

Q_{post} = 10.21 **L/s**

The assumption of 2 persons per residential unit provides a more conservative estimate of the increase in total peak sanitary flows.
The proposed development contributes an addition **8.07 L/s** of design flows to the municipal sewers
The proposed flow to be directed to the new service connection at the north east corner of the site = **10.21 L./s**

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Appendix B

Fire Flow Information

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CALCULATION SHEET

Project:
Appleby Mall Residential
Fire Flow Calculations

Prepared by:	B. Davies
Checked by:	B. Davies
Project No:	300 034551
Date:	January 2014

Fire Flow Calculation
Based on Fire Underwriters Survey

As per Region of Halton standards
"Design Criteria for Watermains"
Design water demands shall be designed to meet the greater of:
(i) Max Day Demand plus Fire Flow
(ii) Max Hourly Demand

1 F= 220 C (sqrt (A))

Where F= Fire flow in Lpm
C= construction type coefficient
= 0.6 fire resistive construction
A = total floor area in sq.m. excluding basements, includes garage

Using the east building as the limiting building

Floor	Area (sq.m)	%
Ground	982	100%
2	982	50%

Largest Area= 1,473 sq.m
F = 5,066 L/min
Round to nearest 1000 l/min
F = 5,000 Ll/min

2 Occupancy Reduction
25% reduction for normal residential occupancy
Reduction = 1250 L/min
F = 3,750 L/min

3 Separation Charge

5%	North Side	30m to 45m
0%	East Side	More than 45m
0%	South Side	More than 45m
15%	West Side	10.1m to 20m
20%	Total Separation Charge,	**750** L/min

Note: Maximum Total Separation Charge is 75%

4 Sprinkler Reduction
25% Reduction for NFPA Sprinkler System
Reduction = **188** L/min

5 Domestic Flow Calculations

Population =	648	persons
Ave. Day Demand =	275	L/cap/day
	124	L/min
Max. Daily Demand Factor =	2.25	
Max. Hourly Peaking Factor =	4.0	(Residential)
Max. Domestic Flow Rate F_{dom} =	**495**	L/min
Max. Day + Fire Flow =	**841**	L/min

The limiting required flow is the Max. Day plus Fire Flow of 841 L/min

2231602863

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Water Services

10 Estate Drive, Toronto, Ontario M1H 2Z1
Phone: 416.282.1665 Fax: 416.282.7702 Toll Free: 1.888.349.2493
www.corix.com

SITE NAME: APPLEBY MALL DATE: 10/31/13

LOCATION: APPLEBY @ PINEDALE BURLINGTON

TEST DATA TIME OF TEST: 9:00 AM

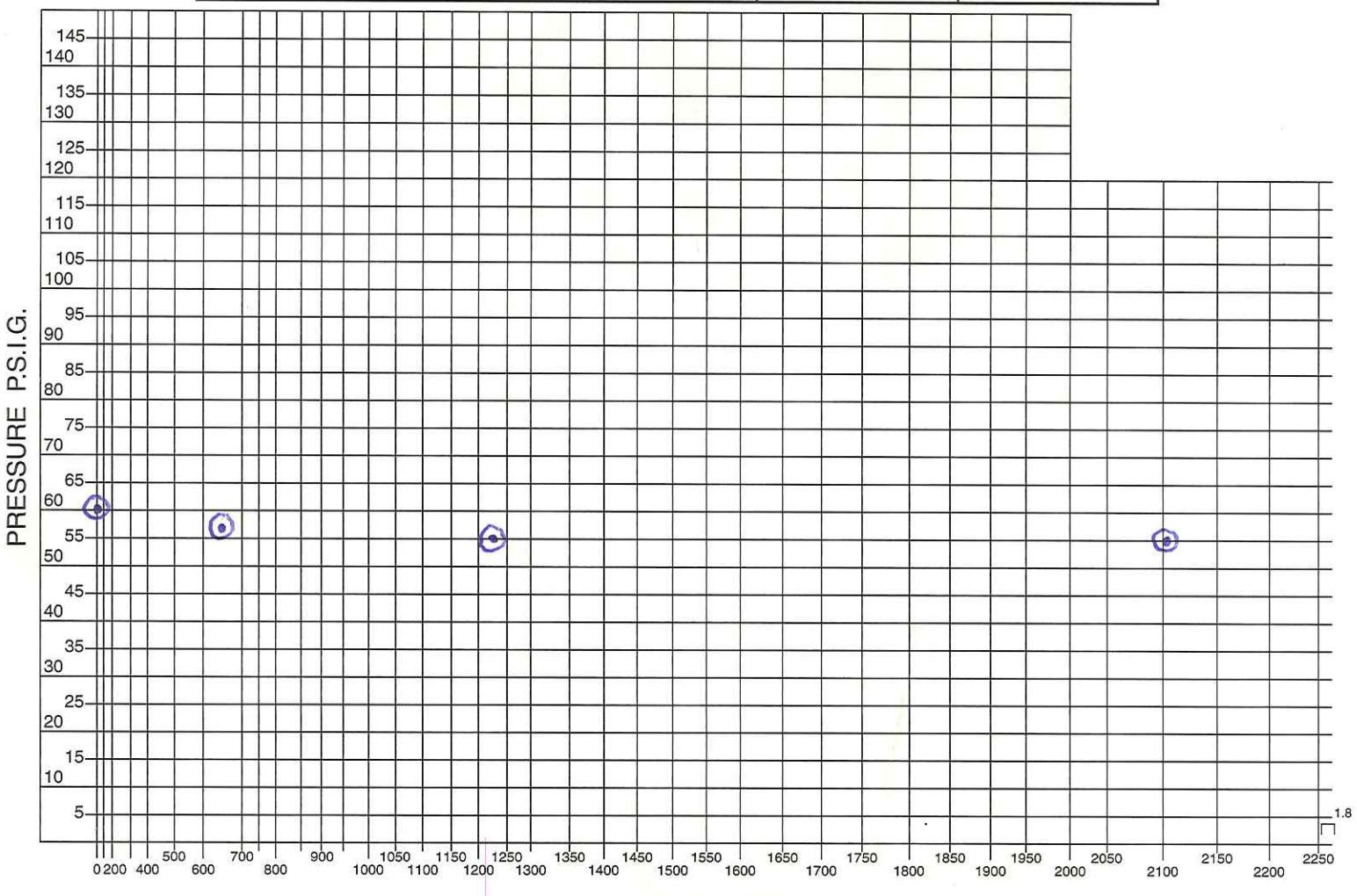
LOCATION OF TEST: (FLOW) N. SIDE TIMBERLINE @ PINEDALE

(RESIDUAL) 1ST HYDRANT EAST OF APPLEBY ON PINEDALE

MAIN SIZE: 300 mm

STATIC PRESSURE: 60 psi

	NUMBER OF OUTLETS & ORIFICE SIZE	PITOT PRESSURE	FLOW (U.S. G.P.M.)	RESIDUAL PRESSURE
# 1	1 x 1 3/4"	52	655	57
# 2	1 x 2 1/2"	44	1234	55
# 3	2 x 2 1/2"	32	2104	55
# 4				



COMMENTS: PERFORMED 1 COMPLETE NFPA FLOW TEST.

Authorized Signature _____ Corix Water Services Signature _____