FUNCTIONAL SERVICING REPORT
2055 BROCK ROAD
BROCK ROAD DUFFINS FOREST INC.
CITY OF PICKERING
REGIONAL MUNICIPALITY OF DURHAM

This document is intended for preliminary review in support of Official Plan Amendment, Zoning By-Law Amendment and Draft Plan of Subdivision Application for Brock Road Duffins Forest Inc. only and shall not be relied upon for construction or bidding purposes.

Prepared By:	Sabourin Kimble & Associates Ltd.
Prepared For:	Brock Road Duffins Forest Inc.
Project Number:	19:411
Date:	March 2020

FUNCTIONAL SERVICING AND SWM REPORT
2055 BROCK ROAD
CITY OF PICKERING

TABLE OF CONTENTS

FUNCTIONAL SERVICING AND SWM REPORT
2055 BROCK ROAD
CITY OF PICKERING

LIST OF FIGURES

LIST OF APPENICES

FUNCTIONAL SERVICING AND SWM REPORT
2055 BROCK ROAD
CITY OF PICKERING

LIST OF TABLES

1.0 INTRODUCTION

Sabourin Kimble & Associates (SKA) has been retained by Brock Road Duffins Forest Inc. to carry out a Functional Servicing and Stormwater Management Report (FSSR) for 2055 Brock Road, located within City of Pickering. 2055 Brock Road will be referred to in this report as the "subject site".

The purpose of this FSSR is to provide municipal servicing information to address stormwater management, storm drainage, sanitary drainage, water supply, and grading for development of the subject site in support of site plan approval. This report has been prepared in keeping with the criteria and constraints outlined by the following previously approved reports:

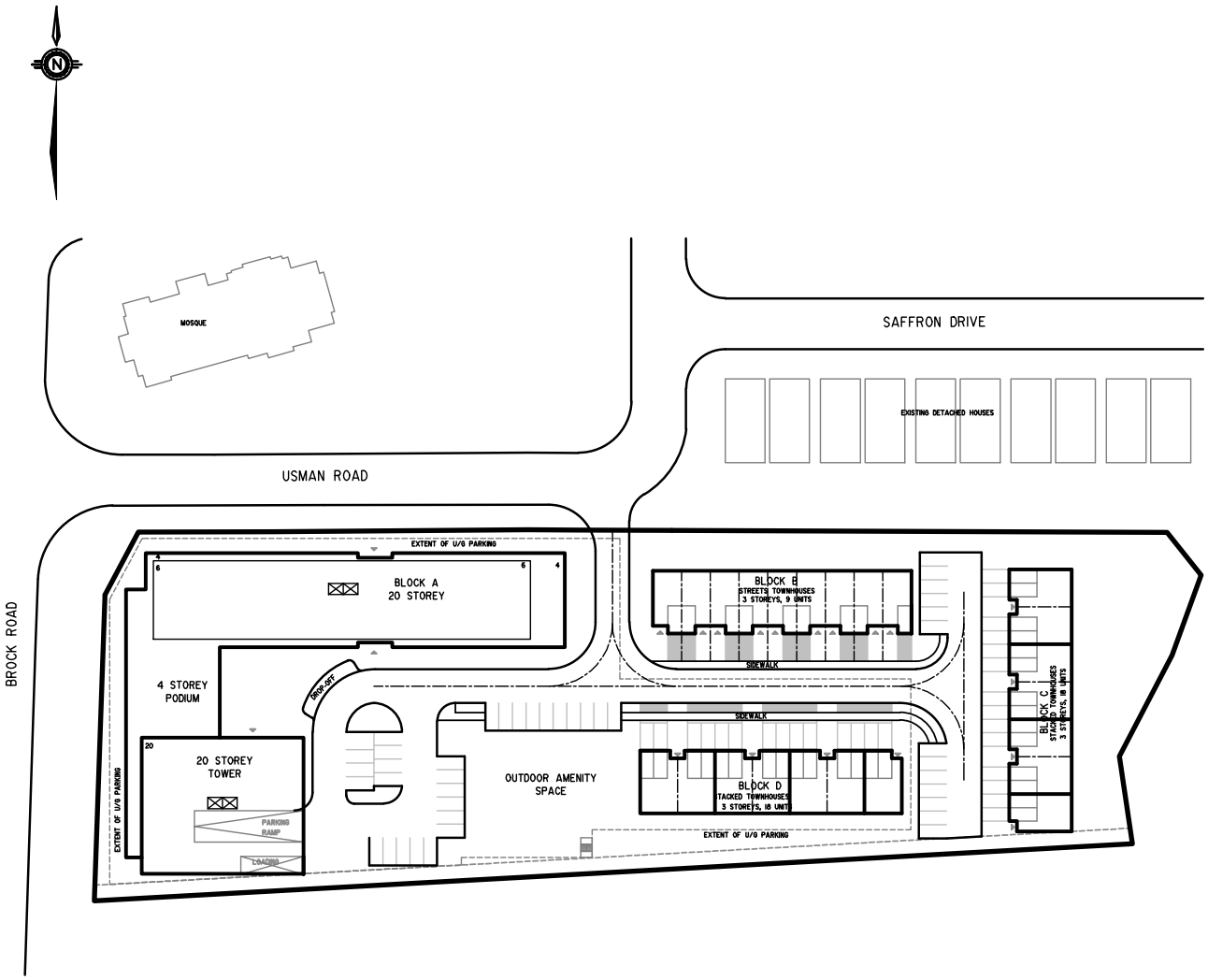
- Environmental Servicing Plan Update for the Duffins Precinct, Southern Lands, City of Pickering prepared by Sernas Associates (November 2012)
- Functional Servicing and Stormwater Report (FSSR) for the Kindwin Lands, City of Pickering, prepared by Sernas Associates (December 2012)
- Stormwater Management Report for the Kindwin Lands, City of Pickering, prepared by GHD Inc. (February 2015)

2.0 STUDY AREA

The subject site is located in the City of Pickering, Regional Municipality of Durham. The aforementioned previous servicing studies conducted by The Sernas Group for the development of the Duffins Precinct and the FSSR for the proposed Kindwin Lands determined the servicing potential of the subject site. Additionally, the SWM report for Kindwin Lands was consulted for all specific stormwater management requirements. The subject site is bounded by Usman Road to north, East Duffins Creek to the east, West Duffins Creek to the south and Brock Road to the west.

Figure 1 – Study Area, shows the location of the study area with reference to the surrounding land parcels including the road pattern, development areas, and limits of development.

Based on the proposed site plan for the subject site, this land will be developed as one high-rise complex and 45 townhouse units.



STUDY AREA

SABOURIN KIMBLE & ASSOCIATES LTD.
CONSULTING ENGINEERS

PROJECT NUMBER	FIGURE NO.
19.411	1

3.0 STORM DRAINAGE

3.1 Existing Site Drainage

The Subject Site is approximately 1.3 hectares in size and is located within the West Duffins Creek subwatershed. The majority of the site drains southeasterly, directly to the West Duffins Creek. A small portion of the site drains northerly towards the existing subdivision, which drains to the East Duffins Creek. Please refer to Figure 2 for an illustration of the existing drainage.

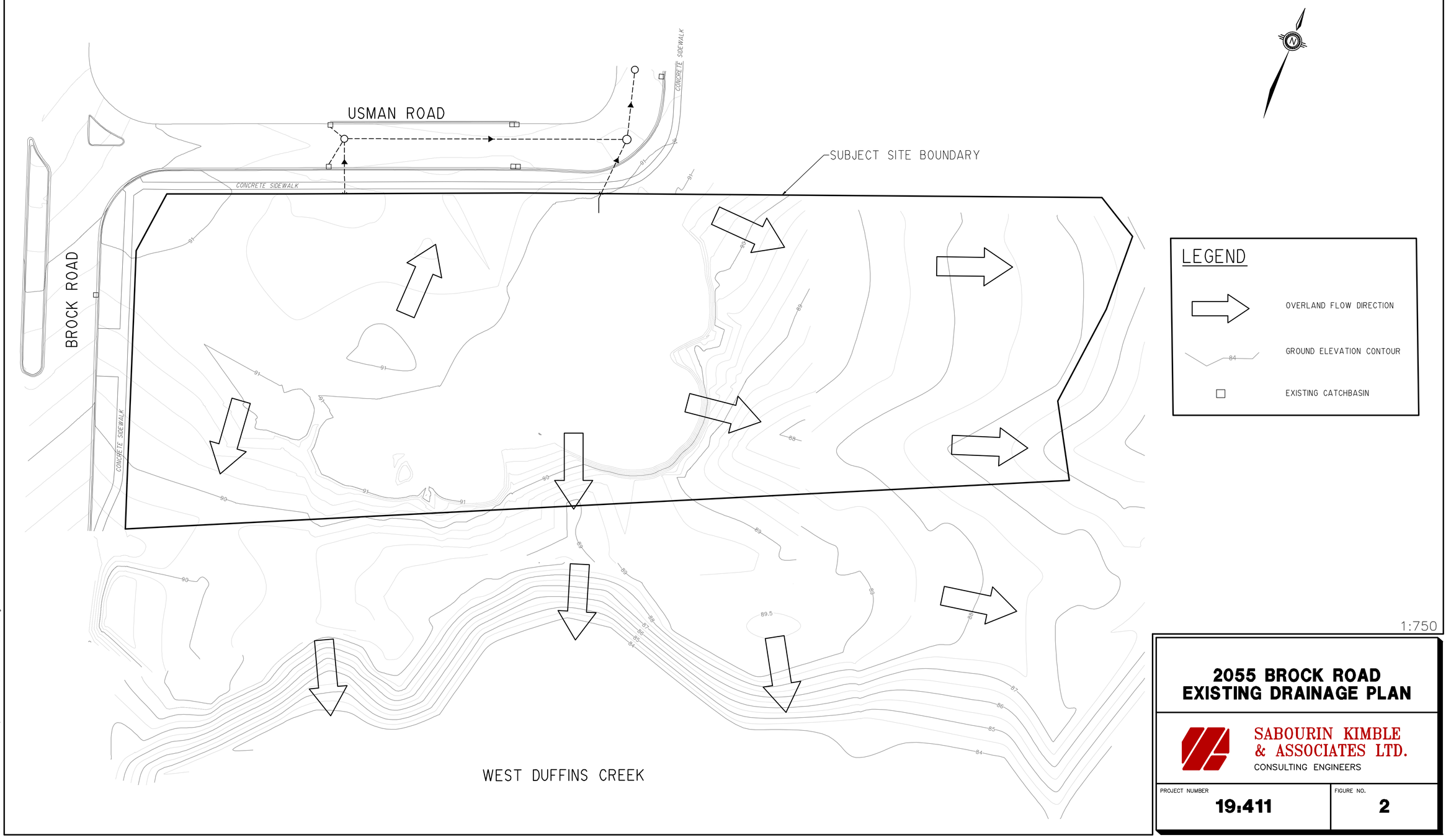
3.2 Post Development Conditions

It was established in the aforementioned ESPU that the subject site should direct all roof drainage towards the existing wetland located southeast of the property limit to meet the water balance requirements. It was also determined that the SWM pond designed for the Kindwin Lands would be sized to accept the minor system drainage from the subject site and that the major system drainage would be conveyed directly from the subject site to the West Duffins Creek. This was further confirmed by the Stormwater Management Report for the Kindwin Lands. See Appendix A for the Storm Design Sheet.

A roof drainage area of 0.48 hectares (0.27 hectares from the high-rise and 0.21 hectares from the townhomes) from the site will be directed via a clean water collector (CWC) system to the existing wetland at the southeastern limit of the development. To avoid point source contributions to the wetland, a flow spreader is proposed for the outfall of the CWC. The remainder of the minor system drainage will be conveyed to the existing Kindwin SWM pond per the assumption made by the ESPU for Kindwin lands. Also in keeping with the ESPU, all major system flows will be directed directly to the West Duffins Creek as overland flow as per Figure 3.

3.3 Service Connections

The foundation drains for the townhouse dwellings and high-rise complex will be connected to the CWC. All storm service connections will be constructed in accordance with municipal, regional and Ontario Building Code standards. As previously mentioned, all roof leaders will also be connected to the CWC.



2055 BROCK ROAD
EXISTING DRAINAGE PLAN

SABOURIN KIMBLE & ASSOCIATES LTD.
CONSULTING ENGINEERS

PROJECT NUMBER	FIGURE NO.
19:411	2

CAD FILE: P:\19\411\Drawing Files\Phase 1\411 base.dwg

USMAN ROAD

BROCK ROAD

SITE BOUNDARY

BLOCK A
HIGH RISE
4 STOREY PODIUM / 20 STOREY TOWER
307 UNITS
GFA: 22,532 sm (235,902 sf)

BLOCK B
STREETS TOWNHOUSES
3 STOREYS, 9 UNITS

BLOCK C
STACKED TOWNHOUSES
3 STOREYS, 32 UNITS

BLOCK D
STACKED TOWNHOUSES
3 STOREYS, 32 UNITS

EASEMENT

96
89
88
87
86
85
84
89.5

LEGEND

- MAJOR SYSTEM FLOW DIRECTION
- 84 GROUND ELEVATION CONTOUR
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN
- MINOR SYSTEM FLOW DIRECTION

1:750

2055 BROCK ROAD
PROPOSED DRAINAGE PLAN

SABOURIN KIMBLE & ASSOCIATES LTD.
CONSULTING ENGINEERS

PROJECT NUMBER	FIGURE NO.
19.411	3

CAD FILE: P:\19\411\Drawing Files\Phase 1\411 base.dwg

4.0 STORMWATER MANAGEMENT

4.1 General

The stormwater management criteria for the subject site was established by the previous FSSR and SWM Brief for the Kindwin Lands, as previously mentioned. The criteria outlined in these reports was in keeping with the City of Pickering and the Toronto and Region Conservation Authority (TRCA) criteria at the time of their approval.

Under proposed conditions, the subject site will ultimately drain to the West Duffins Creek. All minor system flow will be conveyed to the existing stormwater management pond servicing the Kindwin Lands, which then discharges to West Duffins Creek. Major system flows will be conveyed directly to the creek, as specified in the Stormwater Management Report for the Kindwin Lands. The drainage from all roofs and foundations will be collected into a clean water collector and discharge to the existing wetland.

The existing Kindwin stormwater management pond has been designed to provide sufficient permanent pool and extended detention volumes to meet the quality and erosion control requirements for the tributary drainage area, which is inclusive of the subject site. Since the West Duffins Creek has no quantity control requirements, all flows above the erosion flow will be discharged directly from the subject site to the creek. Excerpts from the Kindwin SWM report have been included in Appendix B.

4.2 Water Balance

As outlined in the detailed water balance assessment (section 3.4.6 of the ESPU), the infiltration volumes were calculated for the pre-development and post-development conditions at a regional scale which was inclusive of all the southern lands of Duffins Precinct. The total infiltration deficit (11,600 m^3/a) was then pro-rated for each property (i.e. the total target multiplied by the area of the property divided by total area of all 3 development blocks). The post-development infiltration target for 2077/2095 Brock Road and 2055 Brock Road (the subject site) were estimated to be 5,765 m^3/a and 1,240 m^3/a respectively. An excerpt from the ESPU has been included in Appendix B. However, the ESPU identified that 2077 Brock Road would be responsible for providing the required infiltration volume for 2055 Brock Road on-site in addition to providing their respective infiltration volume. This compensation was predicated on 2055 Brock Road directing all available roof runoff (0.42ha) to the wetland located southeast of the subject site.

5.0 SANITARY DRAINAGE

5.1 Existing Conditions

Existing sanitary sewers are located on Usman Road. Sanitary drainage from the Study Area will drain to the 300mm sanitary sewer on Usman Road which was sized to accommodate sanitary drainage from this site. The sanitary sewer along Usman Road drains sanitary sewage to an existing trunk sewer located beneath Brock Road which is immediately to the west of the Study area.

5.2 Proposed Sanitary Servicing

5.2.1 Design Flow

In accordance with Region of Durham design guidelines, residential sewage flows shall be calculated on the basis of the following for residential areas

- Residential Average Flow – 364 litres/person/day
- Commercial Flow – 180,000 litres/gross floor area ha/day
- Infiltration – 22,500 litres/gross hectare/day when foundation drains are not connected to the sanitary sewer. Calculated on the number of gross hectares of residential lands tributary to the sanitary sewer systems.

All sanitary sewers shall be sized to handle the theoretical daily peak flow, where the peaking factor for sanitary drainage is calculated as follows:

Peaking Factor, $K_H = 1 + \frac{14}{4 + P^{1/2}}$

Where, P is population in thousands

K_H is the Harmon peaking factor, maximum of 3.8 and minimum of 1.5

The number and type of housing units within this development is known, therefore the calculation of population for the proposed development shall be based on the following:

Table 1: Population Densities - Known Lot Configurations

Type of Housing	Persons Per Unit	Resultant Populations
Townhouses	3.0	3 * 9 = 27
Apartments		
1 Bedroom	1.5	1.5 * 186 = 279
2 Bedroom	2.5	2.5 * (32+97+28) = 393
3 Bedroom	3.5	3.5 * 24 = 84

Based on the design flow, the minimum sewer size and gradient are calculated using Manning's Formula on the basis of full flow pipes. The sewer infrastructure located internal to the site will be privately owned and maintained with a control manhole located close to the where the sewer connects to the municipal sewer on Usman Road.

Sanitary servicing will be provided by proposed private local sanitary sewers within the common element roadway. The proposed sewers will drain to the existing 300mm diameter sanitary sewer on Usman Road. See Appendix C for the Sanitary Design Sheet.

5.3 Service Connections

Residential sanitary service connections will be constructed in accordance with regional and Ontario Building Code standards. In particular, all sanitary sewer service connections where multiple units will be serviced by one connection will be 200mm in diameter, minimum 2.0% gradient and a minimum of 2.0m deep, townhouse dwellings that require individual service connections shall be 100mm in diameter, minimum 2.0% gradient and minimum 2.0m depth. Connections to the main sewer shall be made with an approved manufactured tee or approved saddle.

6.0 WATER SUPPLY

6.1 Existing Water Supply Infrastructure

Water servicing for the proposed development will be provided by the Ajax Water Supply Plant. Water servicing for the site will be supplied from an existing 200mm watermain along Usman Drive which is fed by the existing 400mm watermain under Brock Road. The external watermain on Usman Road has been sized to service this development site and separate existing water service and fire supply plugs have been provided to the sites property line.

6.2 Proposed Water System

Proposed watermain servicing is illustrated in Figure 3 – Preliminary Site Servicing Plans (located in back Pocket). The water distribution system shall be designed to meet Regional standards within the Subject Site for residual pressure under maximum hourly demand (40psi) as well as maximum daily demand plus fire flow (20psi). Proposed water mains shall be sized during detailed engineering design to meet water usage with adequate flow and adequate residual pressure. The water service and fire service will connect to the existing watermain plugs provided on Usman Road at the sites northern boundary. The water service provided will pass through a water meter complete with a backflow preventer before residential distribution.

6.3 Service Connections

Minimum sized service connections will be used in accordance with Region of Durham standards. All service connections to private properties for freehold residential dwellings shall be a nominal size of 19mm diameter type “K” copper water mains. Service connections for multiple family dwellings shall be sized to provide capacity equivalent to a 19mm diameter connection to each unit. Service connections for the residential blocks, and commercial areas shall be sized according to the intended use.

7.0 SITE GRADING

In accordance with road design grading criteria, the minimum desirable gradient on all roadways is 0.5%, and the maximum gradient on all roadways is 5.0%. Lot grading criteria requires a minimum swale grade of 2% and the maximum swale grade of 5.0%.

Road and parking structure grading has been designed to ensure all drainage is self contained and directed to appropriate storm sewer catchment devices. To contain site drainage the complex outdoor ground level is elevated above the external existing grades on the south and west sides of the site which require railings. See the preliminary site grading, Figure 3 located in the back pocket.

8.0 SEDIMENTATION CONTROL MEASURES

There is existing residential properties and open space adjacent to the subject site. These environmental features and residential properties must be adequately protected from damage due to sedimentation runoff during construction.

During construction of any portion of the subject site, adequate erosion and sedimentation controls must be implemented to safeguard them against potential damage. In support of the detailed design for any development proposal, a comprehensive construction erosion and sedimentation control plan should be prepared in accordance with Pickering design standards. Works such as diversion swales, controlled stripping/earthworks practices, undisturbed buffers, rock check dams and catchbasin/storm sewer sediment traps should be implemented. In support of the erosion and sedimentation control plan, a Construction Management Plan and maintenance protocol should also be established.

The construction implementation plan and maintenance protocol should be completed in accordance with the Erosion and Sedimentation Control Guideline for Urban Construction, December 2006, which was created in cooperation with the greater Golden Horseshoe Area Conservation Authorities.

Sedimentation control practices will be implemented for all construction activities within the subject site, including during tree removal, topsoil stripping, underground sewer construction, road construction and house construction. Sedimentation control measures are to be installed and operational prior to any construction activity, and are to remain in place until such time that the residential dwellings are constructed and the lot grading complete with established sod.

9.0 UTILITIES

Utilities will be provided to the site by extending services from Brock Road to the east or Usman Road to the south or by adding additional infrastructure if it is required. Locations of services will be determined by the respective utility companies for hydro, gas, Bell, cable, etc.

10.0 CONCLUSIONS

Based on the information we have reviewed concerning this site, we find that the grading and servicing of the proposed development can be completed while generally adhering to the applicable Municipal and Regional standards.

The Site can be serviced using existing storm and sanitary sewers which have been sized and constructed to receive runoff from the proposed development. Domestic and Fire water supply services can be provided by the existing watermains located on Brock Road and Usman Road.

The site can be graded to contain site drainage with a limited amount of encroachment on the property to the south and will not exceed the maximum or minimum permissible grades. Overall the site will be in a cut condition.

Storm water management will be provided by an existing SWM pond located downstream of the site. The existing SWM pond was sized to handle the minor and major system runoff from the site. The water balance and infiltration will be completed using LID design to match pre-development conditions.

Appendix A

Storm Design Sheet

PROJECT TITLE:	2055 Brock Road
PROJECT No.:	19:411
CLIENT:	Brock Road Duffins Forest Inc.
ISSUED FOR:	First Submission FSSR

STORM SEWER DESIGN SHEET
5 - YEAR STORM
PICKERING TOWNSHIP - REGION OF DURHAM
DATE: Dec 19, 2019

SABOURIN KIMBLE & ASSOCIATES LTD.
CONSULTING ENGINEERS

NOTES, STANDARDS AND DESIGN INPUT PARAMETERS

Captured Overland Flow = Q(100yr) - Q(5yr)
Inlet Time (mins): 10.00
Run-off Coefficients: Paved Areas 0.85

IDF Parameters:

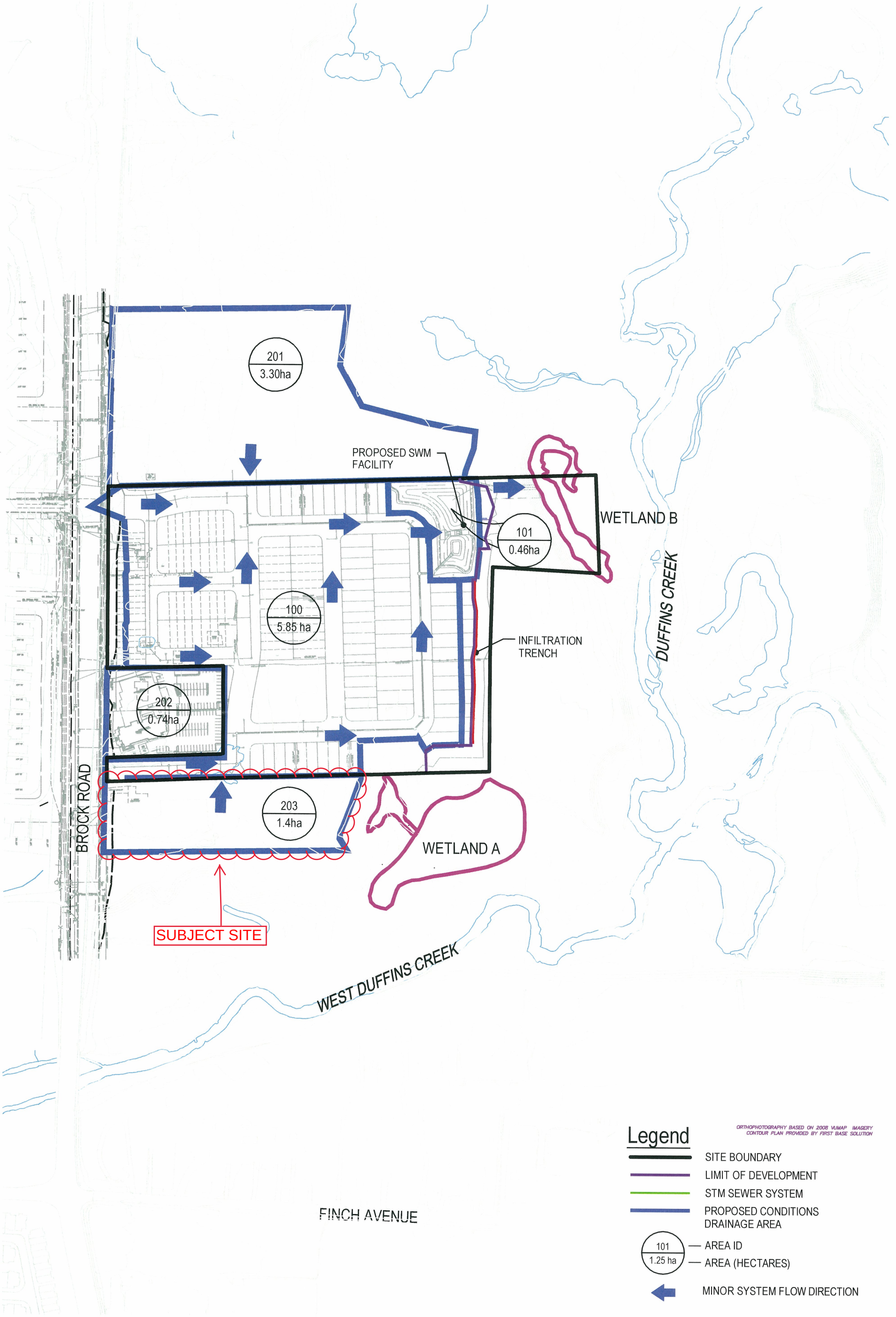
Storm:	A	B	C
5 - Year	1082.901	6.007	0.837
25 - Year	1581.718	6.007	0.848
100 - Year	2096.425	6.485	0.863

$$I_{YR} = \frac{A}{(t + B)^C}$$

PROPERTY	Upstream Manhole	Downstream Manhole	A Developent Capture (ha)	A x R This Section (ha)	Acc. AR (ha)	t (min)	I (5yr) (mm/hr)	Q (5yr) (l/s)	I (25yr) (mm/hr)	Q (25yr) (l/s)	I (100yr) (mm/hr)	Q (100yr) (l/s)	Q(design) (l/s)	Type	Pipe (mm)	Grade (%)	Capacity (l/s)	Length (m)	Velocity (m/s)	Time (min)	Total Time (min)	Capacity (%)
2055 Brock Road	1	ExMH	0.47	0.400	0.400	10.00	115.82	128.53	175.42	194.67	252.79	280.53	128.53	CONC	450	1.00	297.43	45.5	1.81	0.42	10.42	43%

Appendix B

Excerpts from Relevant Studies



N

GHD

KINDWIN

PROPOSED DRAINAGE CONDITIONS MINOR SYSTEM

Job Number 02112
Revision A
Date June 2014

Figure 3.1

110 Scotia Court, Unit 41, Whitby Ontario L1N 8Y7 **T** 1 905 686 6402 **F** 1 905 432 7787 **E** info@ghdcanada.com **W** www.ghd.com

Plot Date: 13 June 2014 - 11:36 AM Plotted by: Laura Wilson Cad File No: X:\GMS\Proj\2002\02112\Drawings\Water Resources\02112-FIGURE-2-3.1-4.dwg

Project Name:	Kindwin Development
Project No.:	02112
Description:	Permanent Pool Volume Calculation - Ultimate Conditions

Criteria: 80% T.S.S Removal

Area: 10.7 ha

Imperviousness: 75%

DESCRIPTION	AREA	C	AC
North Lands	3.30	0.75	2.475
Pickering Islamic centre	0.74	0.75	0.555
South lands (2055 Brock Rd.)*	1.12	0.8	0.90
Low/Medium Density *	5.11	0.70	3.58
Pond area	0.42	0.50	0.21
Total	10.7	0.72	7.71

SUBJECT SITE →

*Excluding Roof area to wetland

IMPERVIOUSNESS = 75%

Permanent Pool Volume[1] = (231m^3/ha - 40 m^3/ha) x Area

= 2039 m^3

[1] As per the Stormwater Management Planning and Design Manual, Ministry of the Environment, March 2003

Date: 21/06/2012

File Location: P:\Proj\2002\02112\Water Resources\Calculations\02112 pond sizing FSR 88.30[Quality]

Project Name:	Kindwin Development
Project No.:	02112
Description:	Permanent Pool Volume Calculation - Ultimate Conditions

Criteria: 80% T.S.S Removal
Area: 10.19 ha
Imperviousness: 73 %

DESCRIPTION	ID	AREA	Imperviousness	AI
Kindwin (Low/Medium Density) *	100	4.71	63	297
Pond area	101	0.46	50	23
North Lands	201	3.30	80	264
Pickering Islamic centre	202	0.74	95	70
SUBJECT SITE → South lands (2055 Brock Rd.)**	203	0.98	95	93
Total		10.19	73	747

*Based on total area of 5.85 ha excluding 1.14 ha of roof area
**Based on total area of 1.4 ha excluding 0.42 ha of roof area
Runoff from the roof area will be captured by CWP and directed to wetland.
Refer to Wetland Water Balance - Runoff Volume Calculations.

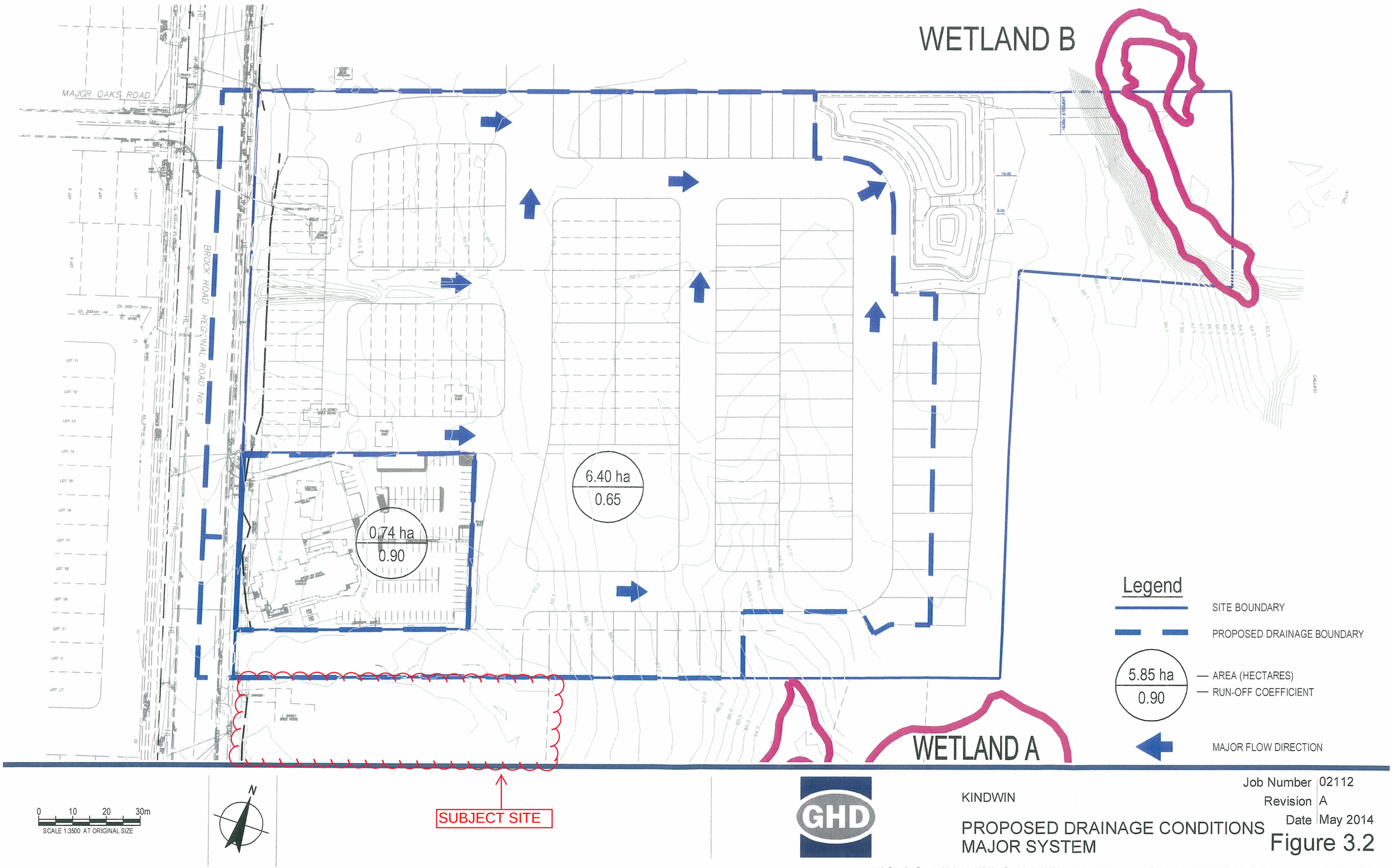
IMPERVIOUSNESS = 73 %

Permanent Pool Volume[1] = (228m^3/ha - 40 m^3/ha) x Area
= 1917 m^3

[1] As per the Stormwater Management Planning and Design Manual, Ministry of the Environment, March 2003

Detailed calculations of Area 100

Land use	AREA	Imperviousness	AI
Townhouses	1.41	80	113
Park	0.33	0	0
Single houses	3.19	60	191
Roads	0.92	70	64
TOTAL	**5.85**	**63**	**369**



KINDWIN

PROPOSED DRAINAGE CONDITIONS
MAJOR SYSTEM

Job Number 02112
Revision A
Date May 2014

Figure 3.2

110 Scotia Court, Unit 41, Whitby Ontario L1N 8Y7 **T** 1 905 686 6402 **F** 1 905 432 787 7 **E** info@ghdcanada.com **W** www.ghd.com

Plot Date: 18 June 2014 - 3:32 PM Plotted by: Laura Wilson Cad File No: X:\GMS\Proj\2002\02112\Drawings\Water Resources\02112-FIGURES-1&3.2.dwg

Project:	Kindwin Development
Project No.:	02112
Description:	Wetland Water Balance - Runoff Volume Calculations

Water Balance Runoff Volume Targets

Pervious Runoff Factor	145	mm/a	As per Hydrogeology Investiogation and Water balance report Table G-3 (Dillon, March 2013)
Impervious Runoff Factor	788	mm/a	As per Hydrogeology Investiogation and Water balance report Table G-3 (Dillon, March 2013)
Total Runoff Volume Required	**10070**	cu.m/a	As per Hydrogeology Investiogation and Water balance report Table 8 (Dillon, March 2013)
2055 Brock Road Development Area	1.4	ha	
Assumed Roof Area from 2055 Brock Road (30%)	4200	sq.m	
Total Runoff Volume from 2055 Brock Road	**3310**	cu.m/a	← SUBJECT SITE
Total Runoff Volume Required from Kindwin Lands (Total - 2077 and 2095 Brock Road)	6760	cu.m/a	
Drainage Area Required from Kindwin Lands	8579	sq.m	
Total Drainage Area Required (2055 Brock Road and Kindwin Lands)	**12779**	sq.m	

Drainage Area Provided from Kindwin Lands

Roof Area

Assuming an average roof area for towns	95	sq.m				
Assuming an average roof area for 11.6m singles:	185	sq.m				
Assuming an average roof area for 9.1m singles:	120	sq.m				
Townhouses	24	units	1805	sq.m		
Single 11.9m	22	units	4070	sq.m		
Single 9.1m	27	units	3240	sq.m		
Total Roof Area			9115	sq.m	**7183**	cu.m/a Total volume

*Rear Yard Area**

Assuming an average rear yard area for towns:	49	sq.m	7.0m Frontage Townhouse			
Assuming an average rear yard area for 9.1m singles:	64	sq.m	9.1m Frontage singles			
Townhouse	20	units	1274	sq.m		
Single 9.1m	10	units	987	sq.m		
Total Rear Yard Area			2261	sq.m	**328**	cu.m/a Total volume

Total Area for Runoff to Wetland from Kindwin Lands	11376	sq.m	7511	cu.m/a Total Runoff
Total Area for Runoff to Wetland	**15576**	sq.m	**10820**	cu.m/a Total Runoff

***NOTE: Rear yard area of 10 single units will drain overland to the wetland;**
Rear yard area of 28 townhous units will be captured by rear yard catchbasings and directed to CWP, in order to capture 100% of half of the roof area.

X:\GMS\Proj\2002\02112\Water Resources\Detailed design\Calculations\[02112 Wetland WB.xls]Wetland

Appendix C

Sanitary Design Sheet

PROJECT TITLE:	2055 Brock Road, Pickering
PROJECT No.:	19:411
CLIENT:	Brock Road Duffins Forest Inc.
ISSUED FOR:	First Submission FSSR

NOTES, STANDARDS AND DESIGN INPUT PARAMETERS

Densities (persons/unit):

Single Family, Semi-Detached Residential	3.5
Townhouse, Multi-Family Residential	3.0
Apartments - 1 Bedroom	1.5
- 2 Bedroom	2.5
- 3 Bedroom	3.5
- 4 Bedrooms or Larger	4.5

SANITARY SEWER DESIGN SHEET
PICKERING TOWNSHIP - DURHAM REGION
DATE: DECEMBER 2019

Harmon Peaking Factor:
Maximum: 3.8
Minimum: 1.5
Formula: $K_H = 1 + \frac{14}{(4 + P)^{1/2}}$
where; K_H = Harmon Peaking Factor
P = Population in Thousands

Design Flows:

Residential Flow	364 L/person/day
Infiltration Flow	22.5 m^3/gross ha/day
Commercial Flow	180 m^3/gross floor area ha/day
Floor Space Index	0.5 of gross lot area
Institutional Flow	112 m^3/gross ha/day
Industrial Flow	180 m^3/gross ha/day

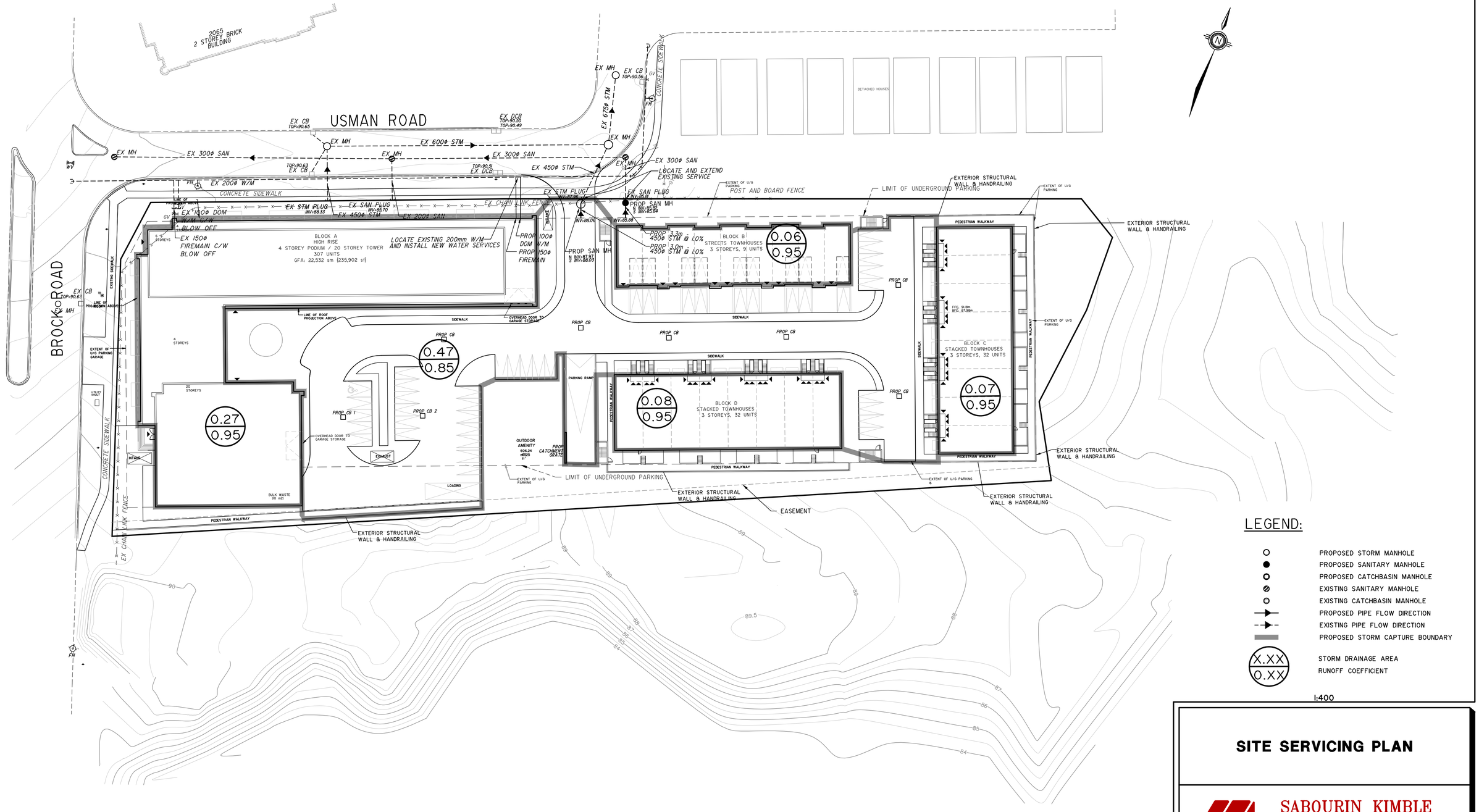
Note: PVC pipe is manufactured in metric dimensions, therefore, the pipe diameter stated is used to calculate capacity and velocity. However, since concrete pipe is manufactured in imperial dimensions, standard imperial equivalent sizes for the diameter stated have been used to calculate capacity and velocity.

ENGINEER'S SEAL

PREPARED BY:

SABOURIN KIMBLE & ASSOCIATES LTD. CONSULTING ENGINEERS

PROPERTY	STREET	Upstream Manhole	Downstream Manhole	RESIDENTIAL													COMMERCIAL				INSTITUTIONAL			INDUSTRIAL			EXTERNAL FLOWS		TOTAL AREA AND FLOWS			PIPE DESIGN								
				Section Area (ha)	Cummulative Area (ha)	Single Family Units	Townhouse Units	Apartment Units 1 Bed	Apartment Units 2 Bed	Apartment Units 3 Bed	Unplanned Land (ha)	Section Population	Cummulative Population (thousands)	Harmon Peaking Factor	Residential Flow (L/s)	Infiltration Flow (L/s)	Section Area (ha)	Gross Floor Area (ha)	Cummulative Gross Floor Area (ha)	Commercial Flow (L/s)	Section Area (ha)	Cummulative Area (ha)	Institutional Flow (L/s)	Section Area (ha)	Cummulative Area (ha)	Industrial Flow (L/s)	Total External Flow (L/s)	Cummulative External Flow (L/s)	Total Section Area (ha)	Total Cummulative Area (ha)	Total Design Flow (L/s)	Type	Pipe (mm)	Grade (%)	Capacity (l/s)	Length (m)	Velocity (m/s)	Down-stream Velocity (m/s)	Change in Velocity (m/s)	Capacity (%)
Kindwin		MH-18-0116	MH-18-0115			42	102.00					453	0.453	3.80	**7.25**	**0.00**		0.00	0.00	**0.00**	6.65	6.65	**8.62**		0.00	**0.00**		**0.00**	6.65	6.65	**15.87**	PVC	300	0.28	51.17	100.70	0.72	0.76	0.04	31%
Brock Rd Duffins Forest	2055 Brock Rd	PLUG3A	MH-18-0115	0.10	1.31		9	186	157	24		783	0.783	3.80	**12.54**	**0.34**		0.00	0.00	**0.00**	6.65	6.65	**8.62**		0.00	**0.00**		**0.00**	6.75	6.75	**21.50**	PVC	200	1.00	32.80	100.70	1.04	0.76	0.28	66%
Kindwin		MH-18-0115	MH-18-0114									0	1.236	3.74	**19.47**	**0.00**		0.00	0.00	**0.00**	6.65	19.95	**25.86**		0.00	**0.00**		**0.00**	6.65	20.05	**45.33**	PVC	300	0.31	53.84	100.70	0.76	N/A		84%



LEGEND:

- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED CATCHBASIN MANHOLE
- EXISTING SANITARY MANHOLE
- EXISTING CATCHBASIN MANHOLE
- PROPOSED PIPE FLOW DIRECTION
- EXISTING PIPE FLOW DIRECTION
- PROPOSED STORM CAPTURE BOUNDARY
- X.XX / 0.XX — STORM DRAINAGE AREA / RUNOFF COEFFICIENT

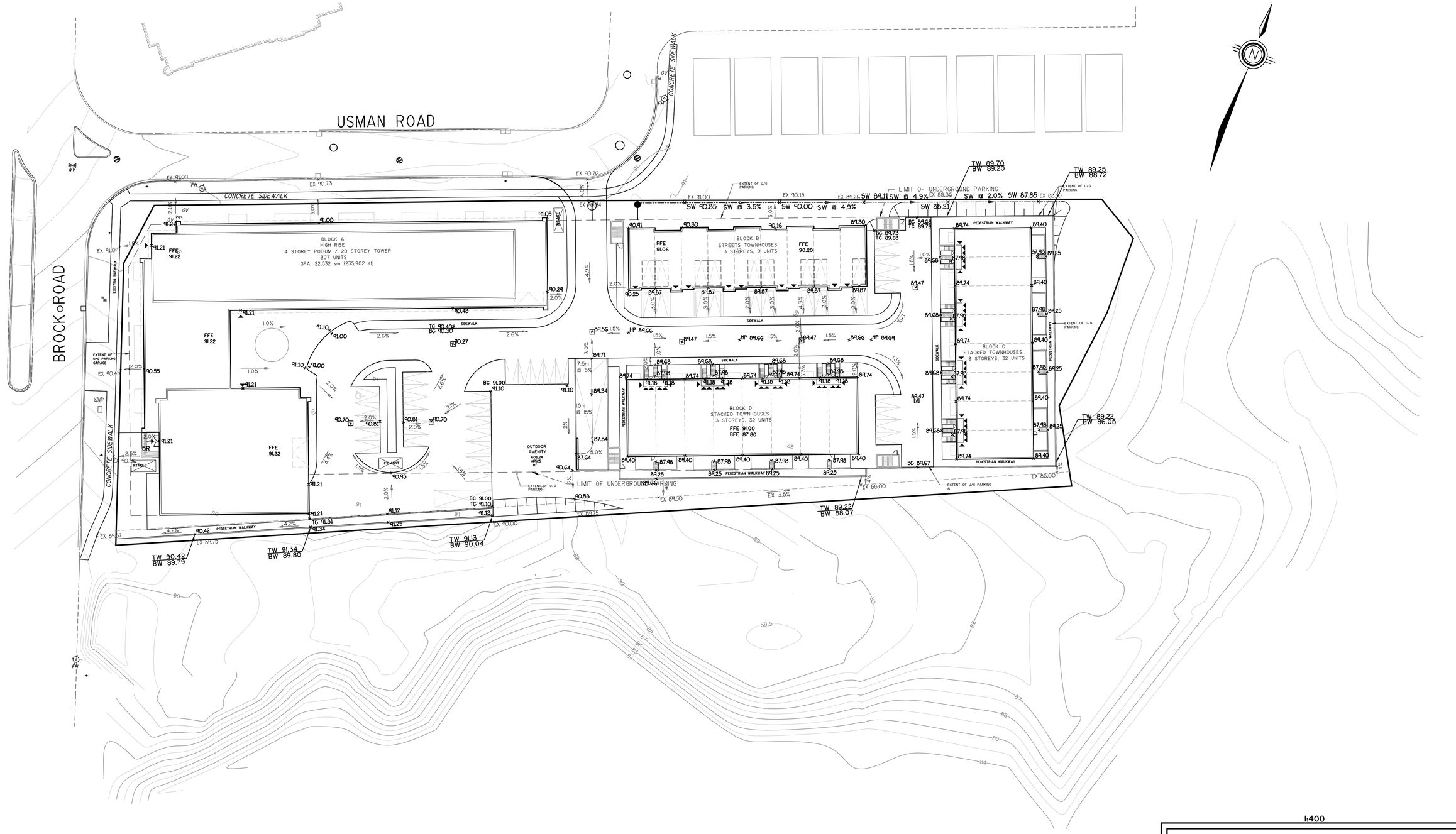
1:400

SITE SERVICING PLAN

SABOURIN KIMBLE & ASSOCIATES LTD.
CONSULTING ENGINEERS

PROJECT NUMBER	FIGURE NUMBER
19:411	SS1

PLOT DATE: 3/16/2020 3:32 PM CAD FILE: P:\19\411\drawing files\phase 1\v4\ base.dwg



1:400

LEGEND:

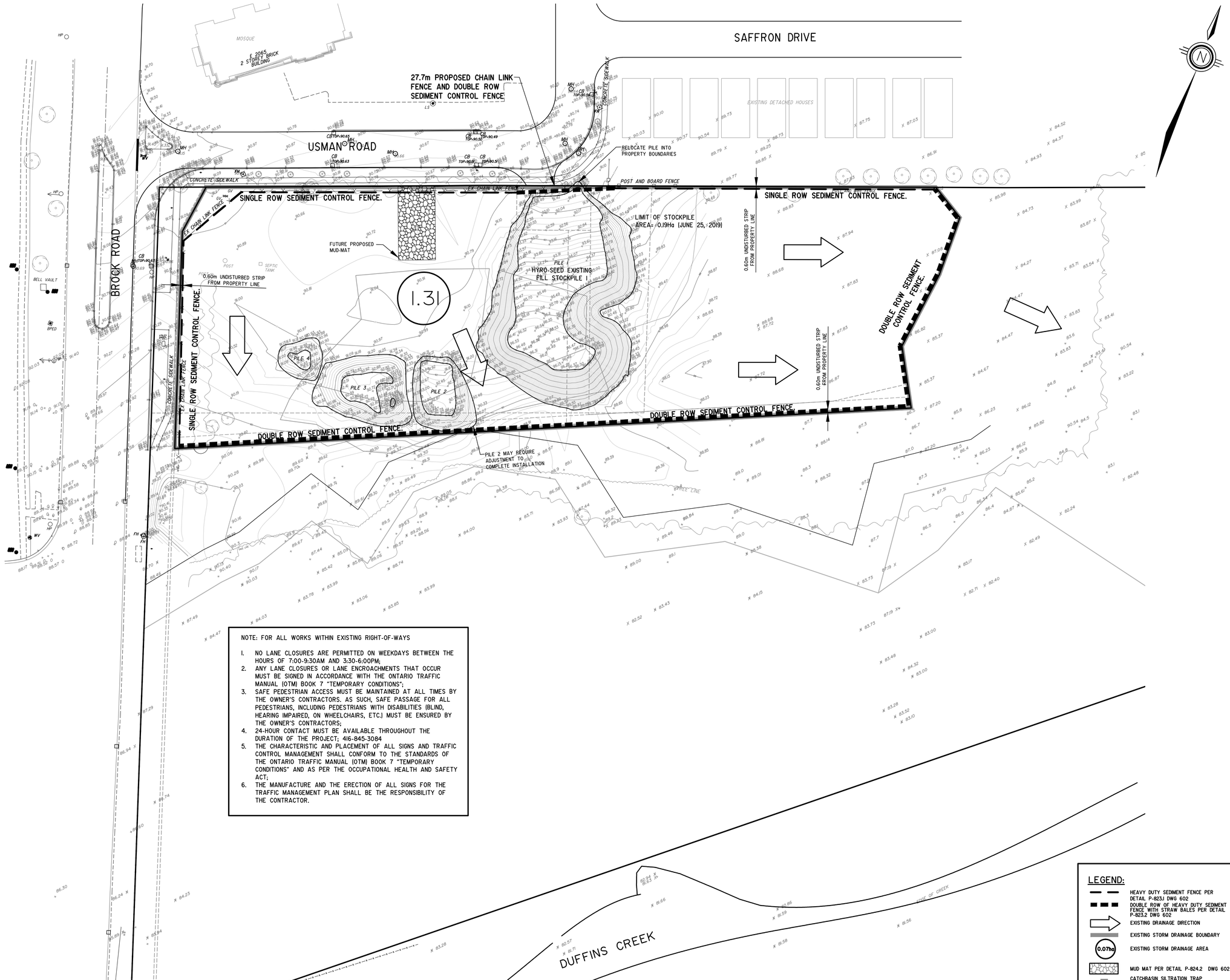
306.80	PROPOSED GRADING
EX 306.80	EXISTING GRADE
4.3%	PROPOSED SLOPE
○	PROPOSED STORM MANHOLE
●	PROPOSED SANITARY MANHOLE
◎	PROPOSED CATCHBASIN MANHOLE
⊘	EXISTING SANITARY MANHOLE
◎	EXISTING CATCHBASIN MANHOLE

SITE GRADING PLAN

SABOURIN KIMBLE & ASSOCIATES LTD.
CONSULTING ENGINEERS

PROJECT NUMBER	FIGURE NUMBER
19:411	SG1

PLOT DATE: 3/16/2020 8:32 PM CAD FILE: P:\SKA\Drawing Files\Phase 1\411 Site Grading.dwg

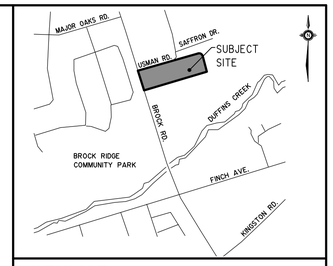


NOTE: FOR ALL WORKS WITHIN EXISTING RIGHT-OF-WAYS

1. NO LANE CLOSURES ARE PERMITTED ON WEEKDAYS BETWEEN THE HOURS OF 7:00-9:30AM AND 3:30-6:00PM;
2. ANY LANE CLOSURES OR LANE ENCROACHMENTS THAT OCCUR MUST BE SIGNED IN ACCORDANCE WITH THE ONTARIO TRAFFIC MANUAL (OTM) BOOK 7 "TEMPORARY CONDITIONS";
3. SAFE PEDESTRIAN ACCESS MUST BE MAINTAINED AT ALL TIMES BY THE OWNER'S CONTRACTORS. AS SUCH, SAFE PASSAGE FOR ALL PEDESTRIANS, INCLUDING PEDESTRIANS WITH DISABILITIES (BLIND, HEARING IMPAIRED, ON WHEELCHAIRS, ETC.) MUST BE ENSURED BY THE OWNER'S CONTRACTORS;
4. 24-HOUR CONTACT MUST BE AVAILABLE THROUGHOUT THE DURATION OF THE PROJECT; 416-845-3084
5. THE CHARACTERISTIC AND PLACEMENT OF ALL SIGNS AND TRAFFIC CONTROL MANAGEMENT SHALL CONFORM TO THE STANDARDS OF THE ONTARIO TRAFFIC MANUAL (OTM) BOOK 7 "TEMPORARY CONDITIONS" AND AS PER THE OCCUPATIONAL HEALTH AND SAFETY ACT;
6. THE MANUFACTURE AND THE ERECTION OF ALL SIGNS FOR THE TRAFFIC MANAGEMENT PLAN SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

LEGEND:

- HEAVY DUTY SEDIMENT FENCE PER DETAIL P-823.1 DWG 602
- DOUBLE ROW OF HEAVY DUTY SEDIMENT FENCE WITH STRAW BALES PER DETAIL P-823.2 DWG 602
- EXISTING DRAINAGE DIRECTION
- EXISTING STORM DRAINAGE BOUNDARY
- 0.07ha — EXISTING STORM DRAINAGE AREA
- MUD MAT PER DETAIL P-824.2 DWG 602
- CATCHBASIN SILTRATION TRAP PER DETAIL THIS DRAWING
- REMAINING EXISTING VEGETATION TO BE REMOVED (APPROXIMATE LOCATIONS)
- 97.10 — FUTURE FINISHED GRADE ELEVATIONS. SITE TO BE PRE-GRADED TO DEPTHS BELOW FINISHED GRADE AS PER THE NOTES ON THIS DRAWING.
- CHAIN LINK FENCE
- POST AND BOARD FENCE



KEYMAP N.T.S.

APPROVED BY

_____ P.ENG.

ENGINEERING SERVICES DEPARTMENT

APPROVAL TO WORKS REQUIRED BY THE CITY OF PICKERING AND AS DEFINED IN THE SUBDIVISION AGREEMENT. THE CITY IS RELYING ON THE TECHNICAL SKILLS AND ABILITY OF THE P.ENG. SEALING AND SIGNING THIS DRAWING.

DATE: _____

APPROVED

APPROVAL OF THE REGIONAL WORKS DEPT. FOR THE PURPOSES DESCRIBED IN THE APPLICABLE REGIONAL SUBDIVISION OR SERVICING AGREEMENT. THE REGION IS RELYING ON THE TECHNICAL SKILL AND ABILITY OF THE P. ENG. SEALING AND SIGNING THE DRAWINGS.

BY: _____

DATE: _____

BENCHMARK:

CITY OF PICKERING, BENCH MARK No. 2-035
ELEVATION 85.465m

NOTE: ALL DIMENSIONS AND ELEVATIONS IN METRES UNLESS NOTED OTHERWISE. ALL PIPE SIZES IN MILLIMETRES.

No.	REVISIONS TO DRAWING	BY	DATE	APPR.
1.	ISSUED FOR CONSTRUCTION	KLD	AUG/06/19	

ALL PREVIOUS ISSUES OF THIS DRAWING ARE SUPERSEDED

CLIENT
BROCK ROAD DUFFINS FOREST INC.

MUNICIPALITY
TOWN OF PICKERING
REGION OF DURHAM

PROJECT TITLE
2055 BROCK ROAD DEVELOPMENT

SHEET TITLE
SITE ALTERATION PLAN
EROSION & SEDIMENT CONTROL

SABOURIN KIMBLE & ASSOCIATES LTD. CONSULTING ENGINEERS

LICENSED PROFESSIONAL ENGINEER
W. J. LeMAISTRE
15/07/2019
PROVINCE OF ONTARIO

DESIGNED	DRAWN	CHECKED
KLD	SWS	WJL

SCALE	DATE
1:500	AUGUST 2019

PROJECT NUMBER	DWG. NUMBER
19:411	ESC1

CAD FILE: P:\07-ARCH\Drawing Files\Phase 1\4B SEP.dwg

City of PICKERING

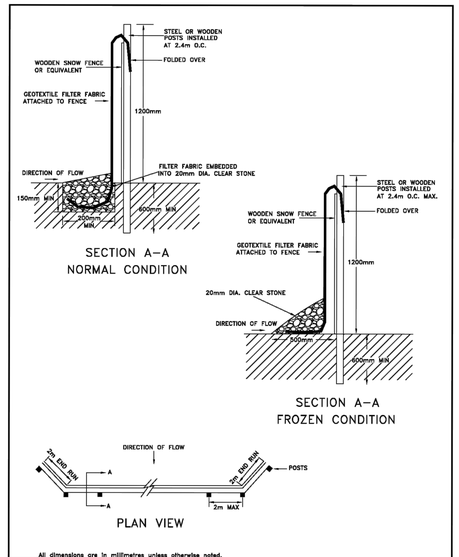
Erosion and Sediment Control General Notes

1. Prior to commencement of any on-site work/topsoil stripping, erosion and sediment control (ESC) measures, as per approved Erosion & Sediment Control Plan, must be installed to prevent surface runoff from leaving the site "untreated". All ESC measures are to be maintained until the site has been stabilized.
2. The contractor shall be responsible for the proper installation, maintenance and removal of all temporary erosion and sediment control measures during construction, as directed by the Engineer or the City of Pickering.
3. Sediment control fence to use geotextile with weave density of 270R terrafix or equivalent.
4. All exposed soils shall be immediately stabilized as directed by the Engineer or City of Pickering.
5. Check dams are to be used in any temporary drainage swales required during the construction period.
6. Additional erosion and sediment control measures may be required and shall be determined by the Engineer or the City of Pickering.
7. All swales are to be stabilized prior to use.
8. Inspection of the proposed erosion and sediment control measures will occur on a weekly basis, after rainfall events exceeding 10mm or after rapid snow melt events and daily during extended rain or snow melt periods. The silt control fence must be inspected for rips or tears, broken stakes, blow outs and accumulation of sediment. The silt control fence must be fixed and/or replaced immediately when damaged. Accumulated sediment must be removed from the silt control fence when accumulation reaches 50% of the height of the fence.
9. Rock check dams are to be cleaned of all accumulated sediment as soon as sediment has accumulated to a depth greater than 50% of all the upstream check dams.
10. Cleaning and repair of mud mats and any other temporary sediment control measures shall be done as necessary through regular inspection or as directed by the Engineer or City of Pickering. All damaged ESC measures shall be repaired and/or replaced within 48 hours of the inspection.
11. Materials to repair damaged ESC measures must be kept on-site at all times.
12. The ESC strategies on these plans are not static and may need to be upgraded/amended as site conditions change to prevent sediment releases. Failed ESC measures must be repaired immediately.

SCHEDULE C

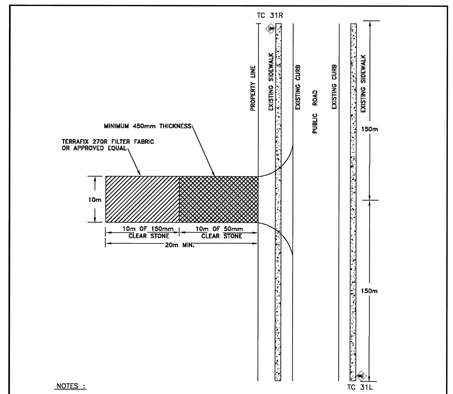
PERMIT CONDITIONS

1. All permit holders shall:
   - (a) Notify the Director or his/her designate a minimum of two business days prior to the commencement or recommencement of any land disturbing activity;
   - (b) Obtain permission in writing from the Director or his/her designate prior to modifying any element of the Erosion and Sediment Control Plan;
   - (c) Install all control measures as identified in the approved Erosion and Sediment Control Plan;
   - (d) Maintain all road drainage systems, stormwater drainage systems, control measures and other facilities identified in the Erosion and Sediment Control Plan;
   - (e) Promptly repair any siltation or erosion damage to adjoining surfaces and drainage ways resulting from land developing or disturbing activities;
   - (f) Inspect the sedimentation control measures at least once per week and after each rainfall of at least one centimetre and make needed repairs;
   - (g) Allow City officers or agents of the City to enter the site for the purpose of inspecting for compliance with the Erosion and Sediment Control Plan or for performing any work necessary to bring the site into compliance with the Erosion and Sediment Control Plan;
   - (h) Maintain a copy of the permit on the site;
   - (i) Notify all sub contractors and suppliers of approved access routes to the site and ensure compliance with these instructions;
   - (j) Maintain all roads in same or better condition than existed prior to the commencement of the work and keep all roads free from any materials or equipment arising from the work set out in the permit;
   - (k) Ensure that no construction machinery is operated in contravention of By-law Number 3821, as amended, (Noise By-law) or any successor thereto.



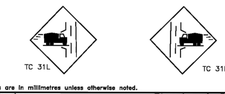
All dimensions are in millimetres unless otherwise noted.

City of Pickering	Planning & Development Department	
DRAWN J. McMULLEN	SILT FENCE	REVISION NO. 1
APPROVED R. STARR		DATE APRIL 2008
DATE FEBRUARY 2003		P–823.1



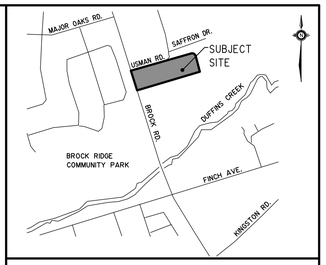
NOTES :

1. TEMPORARY "TRUCK ENTRANCE" SIGNS SHALL BE INSTALLED ON THE SHOULDER, 150 m IN ADVANCE OF THE ACCESS.(NOTE: SEE DETAILS ON THE USE OF THESE SIGNS IN THE ONTARIO TRAFFIC MANUAL BOOK 7). THE APPLICANT WILL BE RESPONSIBLE FOR THE COST OF OBTAINING, ERECTING AND MAINTAINING THESE SIGNS.
2. TEMPORARY CONSTRUCTION ACCESS SHALL BE REMOVED FROM THE ROAD ALLOWANCE AND ALL DISTURBED AREAS SHALL BE RESTORED TO ORIGINAL OR BETTER CONDITION.



All dimensions are in millimetres unless otherwise noted.

City of Pickering	Planning & Development Department	
DRAWN J. McMULLEN	MUD MAT FOR TEMPORARY CONSTRUCTION ACCESS (URBAN CROSS–SECTION)	REVISION NO.
APPROVED R. STARR		DATE
DATE OCTOBER 2007		P–824.2



KEYMAP N.T.S.

APPROVED BY

_____ P.ENG.

ENGINEERING SERVICES DEPARTMENT

APPROVAL TO WORKS REQUIRED BY THE CITY OF PICKERING AND AS DEFINED IN THE SUBDIVISION AGREEMENT. THE CITY IS RELYING ON THE TECHNICAL SKILLS AND ABILITY OF THE P.ENG. SEALING AND SIGNING THIS DRAWING.

DATE: _____

APPROVED

APPROVAL OF THE REGIONAL WORKS DEPT. FOR THE PURPOSES DESCRIBED IN THE APPLICABLE REGIONAL SUBDIVISION OR SERVICING AGREEMENT. THE REGION IS RELYING ON THE TECHNICAL SKILL AND ABILITY OF THE P. ENG. SEALING AND SIGNING THE DRAWINGS.

BY: _____

DATE: _____

BENCHMARK:

CITY OF PICKERING, BENCH MARK No. 2-035
ELEVATION 85.465m

NOTE: ALL DIMENSIONS AND ELEVATIONS IN METRES UNLESS NOTED OTHERWISE. ALL PIPE SIZES IN MILLIMETRES.

No.	REVISIONS TO DRAWING	BY	DATE	APPR.

ALL PREVIOUS ISSUES OF THIS DRAWING ARE SUPERSEDED

CLIENT
BROCK ROAD
DUFFINS FOREST INC.

MUNICIPALITY
TOWN OF PICKERING
REGION OF DURHAM

PROJECT TITLE
2055 BROCK ROAD DEVELOPMENT

SHEET TITLE
SITE ALTERATION PLAN
EROSION & SEDIMENT DETAILS

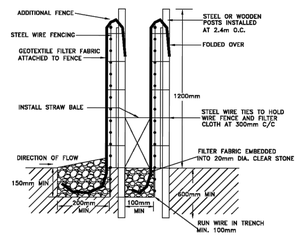
SABOURIN KIMBLE & ASSOCIATES LTD. CONSULTING ENGINEERS

LICENSED PROFESSIONAL ENGINEER
W. J. LeMAISTRE
15/07/2019
PROVINCE OF ONTARIO

DESIGNED KLD	DRAWN SWS	CHECKED WJL
SCALE 1:500	DATE JULY 2019	
PROJECT NUMBER 19:411	DWG. NUMBER ESC2	

2. The City:
   - a) Upon the failure by the permit holder to complete all or part of the works in the time stipulated in the Erosion and Sediment Control Plan, the City may draw the appropriate amount from the securities posted and use the funds to arrange for the completion of the said works, or any part thereof.
   - b) Upon failure by the permit holder to install, repair or maintain a specific part of the works as requested by the City, and in the time requested, the City may at any time authorize the use of all or part of the securities to pay the cost of any part of the works it may in its or their absolute discretion deem necessary.
   - c) In the case of emergency repairs or clean-up, the City may undertake the necessary works at the expense of the permit holder and reimburse itself out of securities posted by the applicant.

13. No construction activity or machinery shall intrude beyond the silt control fence or limit of development. All construction vehicles shall leave the site at designated locations as shown on the plans. All materials and equipment shall be stored on site in a designated area. No materials or equipment shall be stored on the Municipal right of way. No construction vehicles will park on Municipal roads.
14. Servicing of construction equipment on site is prohibited.
15. The contractor must clean adjacent roads on a regular basis. The road shall be, at a minimum scraped daily and flushed (if necessary) on Friday evenings or Saturday mornings.
16. Dust control to be reviewed daily. Water truck or calcium chloride is to be provided on-site and haul roads/working areas are to be treated as required to ensure that dust is controlled on-site.
17. At the end of construction period, accumulated sediment is to be removed off site prior to the removal of the silt fence.
18. All litter and debris shall be monitored and disposed of daily or as necessary through regular inspection.
19. All topsoil stockpiles shall be surrounded with sediment control fence and stabilized with seed mix as per this drawing.
20. Disturbed areas are to be minimized to the extent possible and stabilized as the work progresses. Any area exposed for more than 30 days will be stabilized.



NOTES :

1. INSTALL SILT FENCE IN HIGHLY SENSITIVE AREAS SUCH AS WATERCOURSES AND WETLAND AREAS. AN ADDITIONAL SILT FENCE MAY BE REQUIRED AS DIRECTED BY THE DIRECTOR, PLANNING & DEVELOPMENT.
2. EXACT LOCATION TO BE DETERMINED IN THE FIELD AND TO BE APPROVED BY THE ENGINEER OR DIRECTOR, PLANNING & DEVELOPMENT.
3. SILT FENCE AND SEDIMENT TRAP TO BE CLEANED AND STRAW BALES REPLACED PERIODICALLY AS REQUIRED BY THE ENGINEER OR DIRECTOR, PLANNING & DEVELOPMENT.
4. ALL SILT FENCE & SEDIMENT TRAPS ARE TO BE REMOVED WHEN CONSTRUCTION IS COMPLETED. THE REMAINING SEDIMENT IS TO BE GRADED, PREPARED AND SEEDED OR SODDED.
5. SILT FENCE INSTALLATION WORK MUST AVOID THE DESTRUCTION OF EXISTING WOODY VEGETATION(ie. SHRUBS AND TREES) OTHER THAN THOSE SPECIES WHICH HAVE BEEN APPROVED FOR REMOVAL BY THE DIRECTOR, PLANNING & DEVELOPMENT.

All dimensions are in millimetres unless otherwise noted.

City of Pickering	Planning & Development Department	
DRAWN J. McMULLEN	HEAVY DUTY SILT FENCE & STRAW BALE BARRIER	REVISION NO.
APPROVED R. STARR		DATE
DATE OCTOBER 2007		P–823.2

CAD FILE: P:\DWG\Drawing Files\Phase 1\AB SEP.dwg