

4129 Hixon Street
Beamsville, Ontario

FUNCTIONAL SERVICING REPORT

DRAFT REV. 1 - 2023 10 13

This report is prepared for submission and approval of the Re-zoning, the Draft Plan of Subdivision, and the Vacant Land Condominium.

This report is based upon Better Neighbourhoods' Master Concept Plan dated 2023 10 11. Existing conditions and design elevations are derived from Chambers & Associates topographic survey dated Nov 2, 2021, NPCA mapping contours outside of the parcel, municipal servicing drawings and the Master Servicing Plan Report for Hillside Estates, Plateau Estates, Church Property and Valencia Place.

A. SANITARY SEWERS

Existing Sanitary Sewers (See drawing 0292-PRE-SAN-DP-1)

- The predevelopment drainage areas are derived from the Stanley Master Servicing Plan for Hillside Estates Phase I.
- A 200mm diameter outlet @ 0.5% was provided at that time to the site from Ashby Drive with sufficient capacity and depth for Area A1.
- The Calvary Church presently drains to the Hixon Street sanitary sewer.

Proposed Sanitary Sewers (See drawing 0292-SANDP-1)

- Areas F to K will drain to the Ashby Drive sewer as intended by the Stanley Plan.
- We propose draining Areas A to E together with the Church (Area CH) to the sanitary sewer on Edward Street.
- Sewer flow calculations are provided in the attachments.
- Downstream capacity analysis to accommodate the proposed development has been undertaken by the Town's consultant engineer and will be available upon completion.

B. WATERMAINS & DOMESTIC SUPPLY (see Drawing 0292-WATER-1)

Existing Watermain

- The site locates at the boundary of the Town's two water pressure zones: 163m zone (Zone 1) and 193m zone (Zone 2)
- 150mm diameter watermains are available at Bush Crescent (Zone2), Edward Street and the street stub leading to Ashby Drive (Zone 1)
- Existing fire hydrants on the adjacent streets are shown on Drawing 0292-WATER-1.

- The Calvary Church is presently connected to the Hixon Street watermain.

Proposed Watermain & Services

- Block 4 and north portion of Block 1 will be serviced by the new 150mm water main looped Ashly Drive and Edward Street within Zone 1.
- The block 2, 3, 5, 6 and south portion of Block 1 will be serviced by the new 150mm loop connected to Bush Crescent within Zone 2.
- The watermains will be valved at street intersections to permit isolation of individual streets without affecting the others.
- The proposed fire hydrant locations are shown on 0292-WATER-1 together with their coverage areas.
- We request that the Town add these watermains and hydrants to the Town modelling to determine the affect upon the proposed and connecting mains.
- 25mm Municipex water services with main stops and curb stops will be used to service each low-density deed (detached, semi-detached or townhouse).
- One meter will be provided per deed (the Accessory Dwelling Units will not be metered separately).
- The existing service to the Calvary Church will be disconnected from the Hixon Street main at the Hixon Street property line and reconnected to the new Zone 1 watermain.
- The abandoned Church service on Hixon Street will be used for Unit 31 and a new service provided for Unit 32 from Hixon Street.
- Block 5 (the apartment building) will be supplied with a 150mm service valved at the property line for both fire and domestic water service. The domestic service will branch off the main service within the Block. Sizing of the domestic service and the meter will be provided by the building mechanical engineer.
- Initial Estimate of Required Fire Flow:

Formula: $F = 220 * C * \text{SQRT}(A)$

F = the required fire flow in litres per minute

C = coefficient related to the type of construction

= 1.5 for wood frame construction (structure essentially all combustible)

= 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior)

= 0.8 for non-combustible construction (unprotected metal structural components, masonry or metal walls)

= 0.6 for fire resistive construction (fully protected frame, floor, roof)

A = the total floor area in square metres (include all storeys but not basements at least 50% below grade)

* for fire resistive buildings, consider the two (2) largest adjoining floors plus 50% of each of any floors immediately above them up to eight (8), when the vertical openings are inadequately protected. If the vertical openings and exterior vertical communications are properly protected

(one hour rating), consider only the area of the largest floor plus 25% of each of the two (2) immediately adjoining floors.

In order to determine the total Design Water Demand, Fire Flow Demand has been estimated as per the Fire Underwriters Survey. It has been assumed that the low-rise buildings will be constructed with ordinary construction materials and no sprinkler system. The Required Fire Flow Demand has been estimated to be 117 L/s for the low-rise building. The high-rise building are assumed to use non-combustible materials with sprinkler system. The required fire flow is estimated to be 110 L/s for the high-rise building in Block 5.

Three new hydrants are proposed to provide fire flow coverage for the new development as shown in Drawing 0292-Water-1.

- Hydrants flow test has been completed at Ashly Drive and Bush Crescent. The hydrant flow test result shows a static pressure of 50 psi at Ashly Drive and 65 psi at Bush Crescent. A hydraulic model is built with these boundary conditions to size the pipe and estimate pressures using Bentley WaterCAD. Modeling results are included in attached "Water modeling results".

The demands under different scenarios are summarised in the table below.

		Demand				
		Population Projection	Average Demand	Max. Day	Peak Hour	FF(Required)
Nodes	Pressure Zone		(L/s)	(L/s)	(L/s)	(L/s)
J-A	Z1	64	0.22	0.34	0.89	117
J-B	Z1	35	0.12	0.19	0.49	117
J-C	Z2	210	0.73	1.13	2.92	110
J-D	Z2	48	0.17	0.26	0.67	117
J-E	Z2	48	0.17	0.26	0.67	117
J-F	Z2	69	0.24	0.37	0.96	117

The anticipate water pressure and available fire flow are summarized in the table below.

		Pressure			Fireflow
		ADD	MDD	PHD	FF(available)
Nodes	Pressure Zone	(kPa)	(kPa)	(kPa)	(L/s)
J-A	Z1	331.2	331.1	331.1	206.1
J-B	Z1	323.8	323.8	323.7	176.9
J-C	Z2	460.9	460.9	460.8	154.3
J-D	Z2	440.4	440.3	440.3	188.9
J-E	Z2	452.1	452.1	452.0	143.7
J-F	Z2	474.6	474.6	474.5	144.7

The modeling results show no pressure or fire flow deficiency for the new development.

C. STORM DRAINAGE

1. Existing Storm Drainage (see drawing 0292-PRE-STM-DP-1 dated 2022 08 03)

- The predevelopment drainage area is derived from the storm drainage area from Stanley Master Servicing Plan 1999.
- Area 1 presently drains across Area 2 to Nesbitt Street.
- However, the Stanley Plan and the subsequent Stantec servicing plans for Hillside Estates Phase 1 directed the 1:5-year storm from Area A1 at a runoff factor of 0.45 to the Ashby Drive storm sewer.
- A 600mm storm sewer @ 0.50% was constructed to Area A1 as part of that development.
- Area 2 (the Church Property) was to continue to drain northerly with a runoff factor of 0.45 to Nesbitt Street via a ditch inlet in the Church lands and a storm sewer between lots.
- Area 3 drains overland to the Hixon Street storm sewer via a small swale running alongside the Church driveway and leading to a catchbasin and lead to the Hixon Street storm sewer.
- Most of the Church parking lot drains to a swale along the north boundary to the ditch inlet behind Nesbitt Street

Proposed Storm Drainage (see drawing 0292-STMDP dated 2023 07 05)

2 The Minor System

- The urban density for this project will be higher than what was anticipated at the time that the Stanley Master Servicing Plan was finalized. The resulting increase in runoff factor would be about 0.2 to 0.3.
- The storm piping system has been designed using the Rational method with the proposed runoff factors.
- The resulting increased peak flows from Areas A will be detained using storage tanks or pipe storage (increase in pipe size) within the private laneways (A, C, & E) to restrict the peak 1:5-year flows to Ashby Drive to the original design peak flow.
- For Areas A4 & A5 storm detention storage in the form of tanks or piping (increase in the design size) will be constructed within Edward Street and Lane D Lanes to reduce the 1:5-year peak flows to the existing peak flow.
- The Storm Water Management Report by Greck and Associates Limited provides the modeling support for the required storage.
- The Servicing Plan incorporates the required storage facilities as in the Greck Report.
- The method of storage (tanks or pipes) will be reviewed at a later stage in the approval process.

3 The Major System

- According to the Stanley Plan, the 1:100-year storm from Area A1 was also to be directed overland to Ashby Drive according to a runoff factor of 0.45.

- Because of the increase in runoff factors the increase in the 1:100-year peak flow to Ashby Drive will be restricted to the Stanley design.
- Capacity in the storage pipes has been incorporated into the piping system within the private lanes for that purpose per the Greck report.
- Some overland flow has been permitted to continue northerly along the former watercourse from Areas A10-A, A10-B and A13. Per Table 7 of the Greck Report, this overland flow would be only about 20% of the 1:100-year peak flow under existing conditions.
- Capacity has been incorporated into the storage facilities on Edward Street and Lane D for the increase of peak flows from the 1:100-year storm towards Hixon Street.

4 Edward Street

During the preliminary consultation process we understand that consideration may be given to reconstructing Edward Street from the Church northerly to Cherrywood Crescent. If that becomes the case, there is some logic to directing the areas presently flowing to Hixon Street to Cherrywood Crescent along Edward Street. The necessary storage could be incorporated into the Edward Street storm sewer.

D. Quality Control

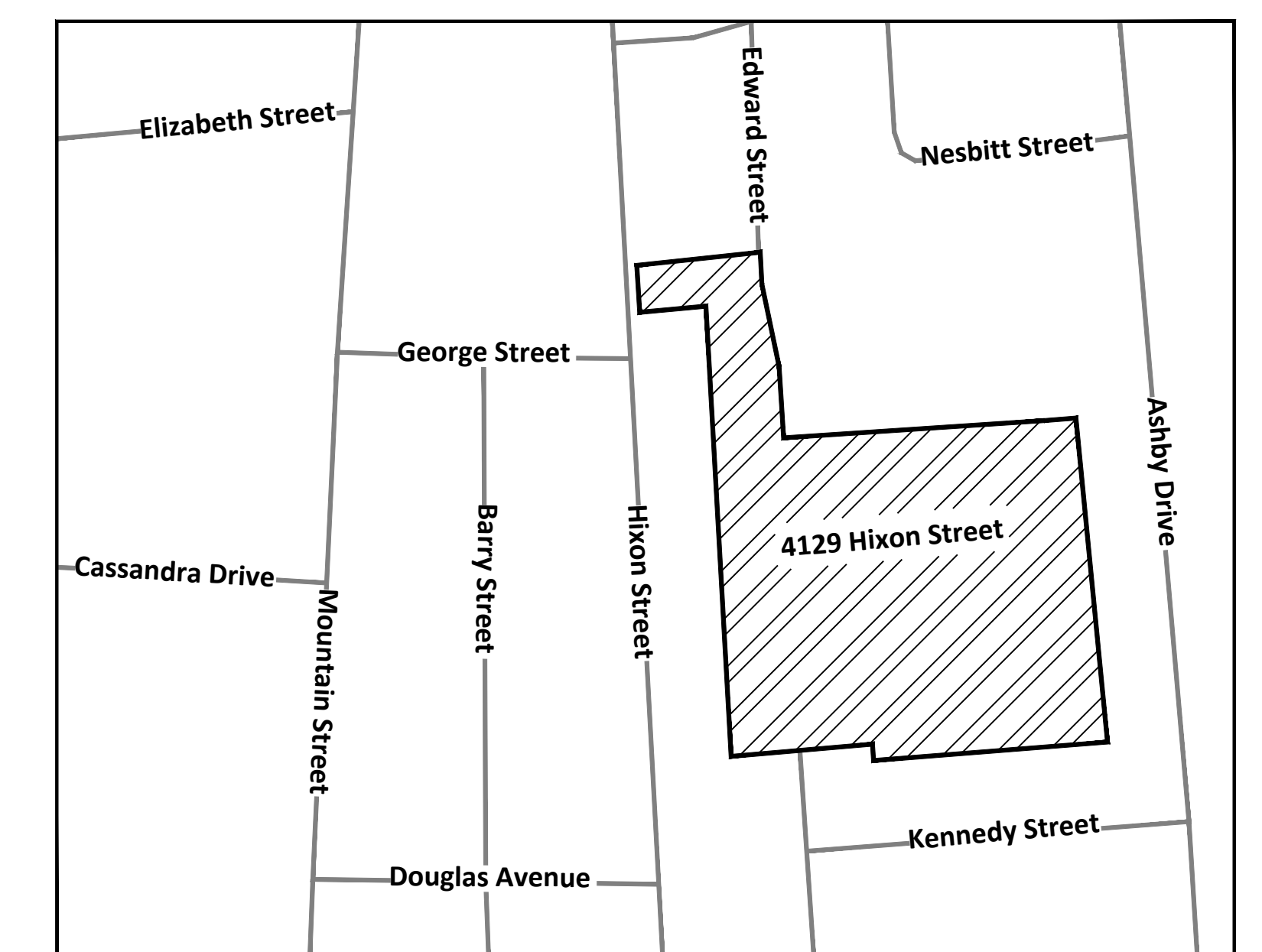
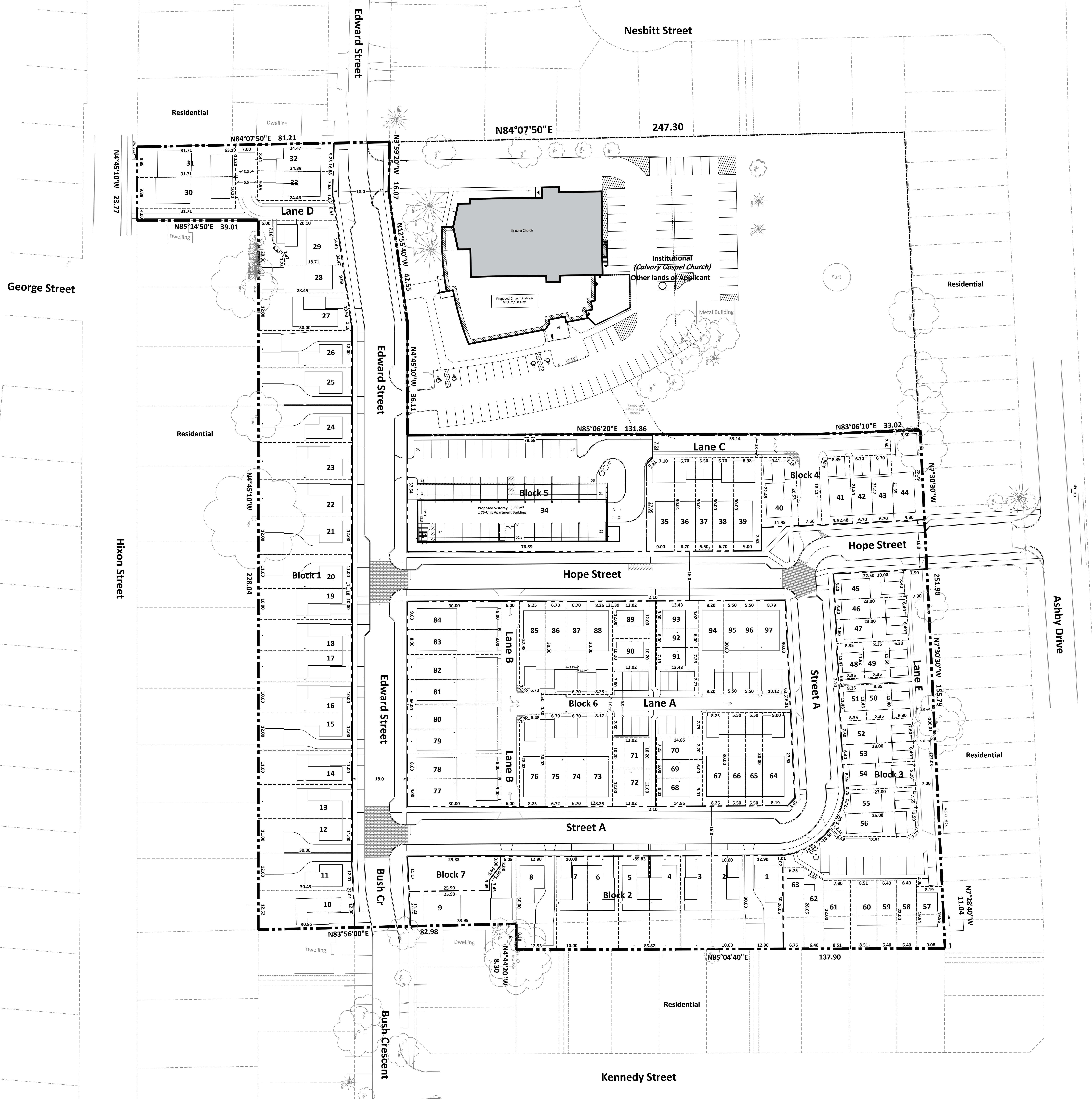
Quality control within the storm sewer system is proposed by using CB-Shields in all catchbasins within the streets, the lanes and the parking areas. The support and calculations for this is incorporated in the Greck Report.

Mike Xu EIT & G.E. Barr P.Eng. CNU-A

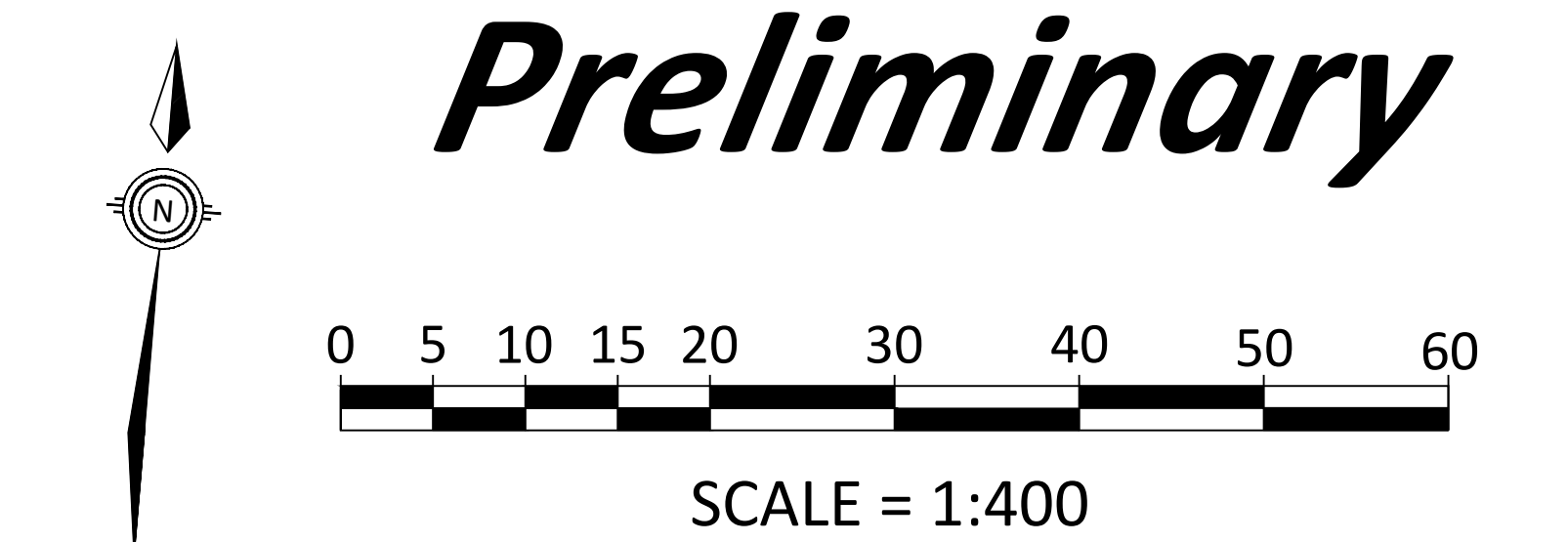


Attachments:

- A. Master Concept Plan 0292-MCP-1 dated 2023 10 11
- B. Topographic Survey by Chambers & Associates dated 2021 11 29
- C. Sanitary Drainage Area Plan Stantec Consulting Ltd. dated March 1999
- D. Pre-development Sanitary Drainage Plan 0292 PRE-SAN-DP-1 dated 2021 03 03
- E. Sanitary Drainage Plan 0292 SANDP-1 dated 2023 07 05
- F. Water Distribution Plan 0292-WATER-1 dated 2023 10 13
- G. Water Modeling Results
- H. Overall Storm Drainage Area Boundary Stantec Consulting Ltd. Dated March, 1999
- I. Predevelopment Storm Drainage Plan 0292-PRE-STM-DP-1 Dated 2022 08 03
- J. Storm Drainage Plan 0292-STMDP-1 dated 2023 07 05
- K. Storm Sewer Calculations dated 2023 07 05
- L. Master Servicing Plan 0292-MSER-1 dated 2023 10 13
- M. Master Grading Plan 0292-MGP-1 dated 2023 10 13
- N. *Separate file* - Stormwater Management Report (By Greck and Associates Limited) dated 2023 06 30



Key Map Not To Scale



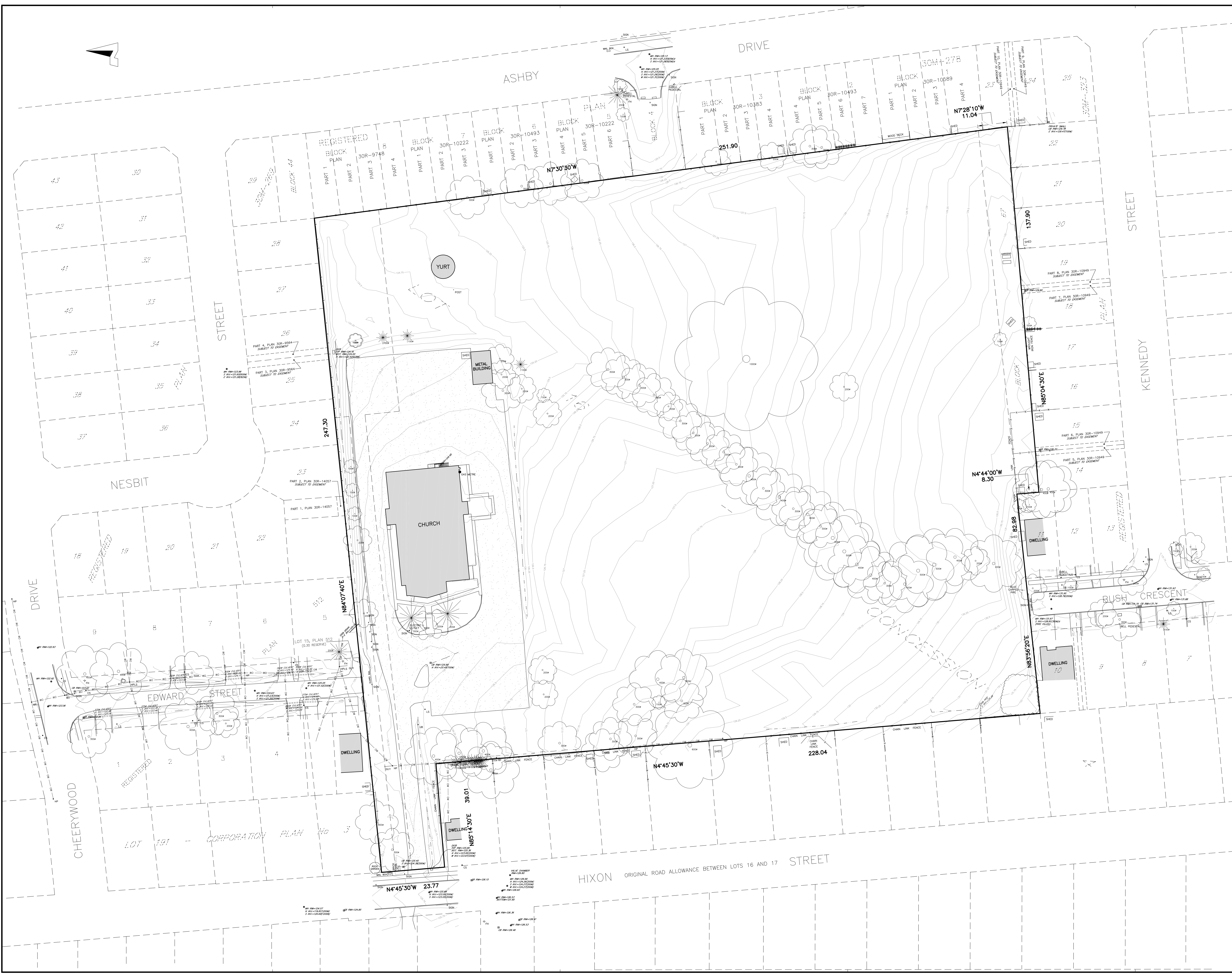
Legal Description

Part of Lot 16, Concession 4, and Block 67 on Plan 30M-323,
Geographic Township of Clinton, now Town of Lincoln.

Land Use Schedule			
Land Use	Unit	# Units	% of Units
Single Detached Residential	1, 8-11, 14, 21-27, 40, & 89-90	16	9 %
Semi-Detached Residential	2-7, 12-13, 15-20, 28-33, 48-51, 55-56, 71-72, & 77-84	36	21 %
Townhouse Residential	35-39, 41-47, 52-54 57-70, 73-76, 85-88, 91-97	44	26 %
Multi-unit Residential	34	75	44 %
Total	97	171	100%
Land Use	Notes	Area (ha)	Area (%)
Common Elements	Includes Lanes A - E	0.41	10.1 %
Public Roads	N/A to <i>Condo Plan</i>	1.06	26.2 %
Parkland	N/A to <i>Condo Plan</i>	0.03	0.8 %
Private / Residential		2.55	62.9 %
Total		4.05	100 %

[illegible]

	
190A Ontario Street, St Catharines, Ontario L2R 5K9 Studio: 905.684.8585 Betterneighbourhoods.ca	
PROJECT TITLE: 4129 Hixon Street <i>Lincoln, Ontario</i>	
DRAWING TITLE: Master Concept Plan	
DATE OF ISSUE: 2023-10-11	
DRAWING NO: 2092-MCP-1	REV. NO. 0



SKETCH

SHOWING TOPOGRAPHICAL INFORMATION

PART OF LOT 16, CONCESSION 4
GEOGRAPHIC TOWNSHIP OF CLINTON
ALL IN THE
TOWN OF LINCOLN
REGIONAL MUNICIPALITY OF NIAGARA
SCALE 1 : 500
DONALD G. CHAMBERS
ONTARIO LAND SURVEYOR

B

METRIC NOTE

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

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NOTE

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DO NOT SCALE FROM THIS DRAWING.

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CAUTION

THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED EXCEPT FOR THE PURPOSE INDICATED IN THE TITLE BLOCK

BENCHMARK

ELEVATIONS HEREON ARE GEODETIC AND WERE DERIVED FROM THE TOPNET RKT NETWORK, NAD83 CSRS, VERSION 3, EPOCH 2010.

LEGEND

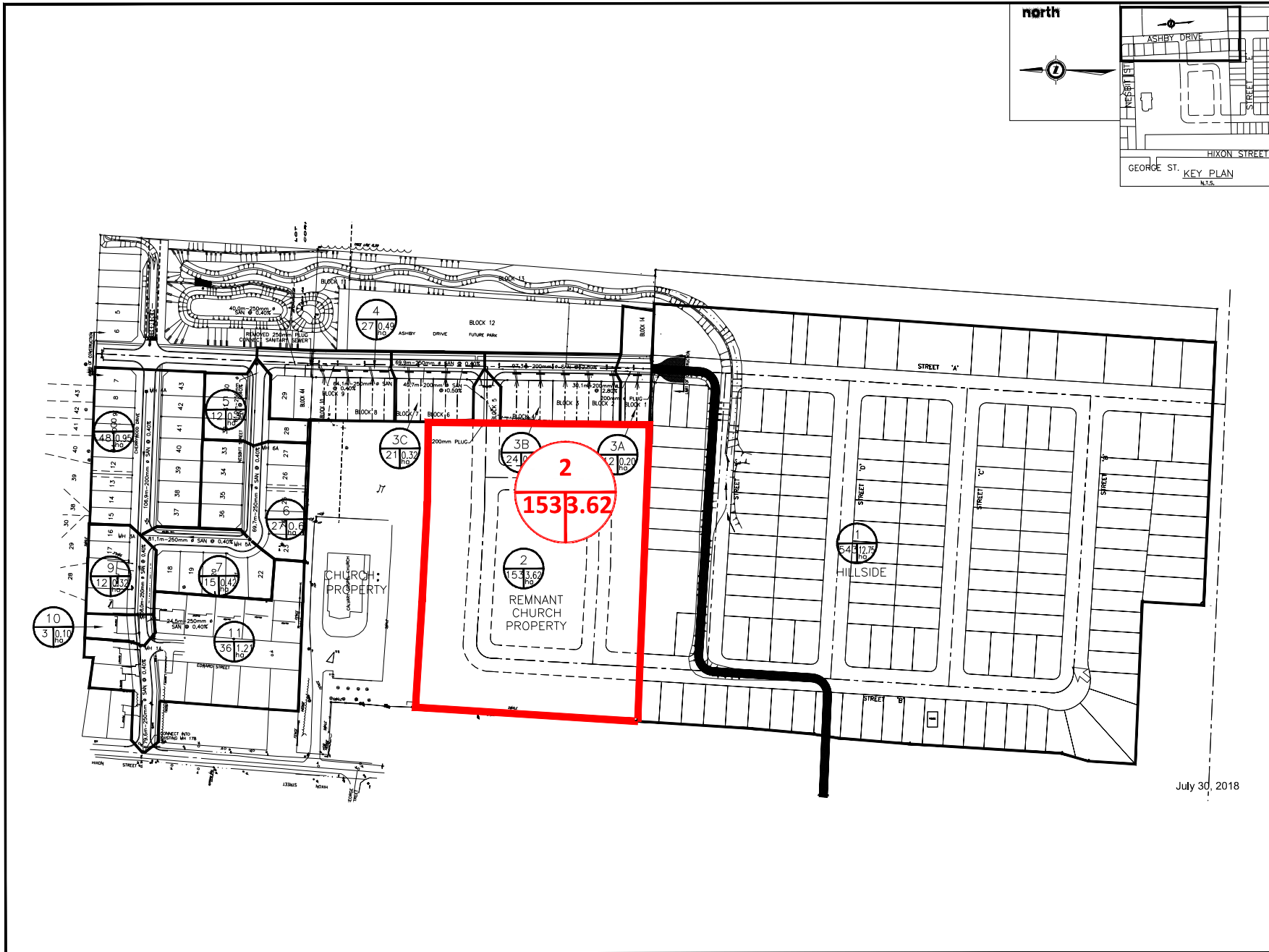
- | | |
|---|------------------------------------|
| • | EXISTING GROUND ELEVATION |
| • | EXISTING CONTOUR ELEVATION |
| • | CATCH BASIN |
| • | MANHOLE |
| • | WATER VALVE |
| • | CURB STOP |
| • | GAS VALVE |
| • | LIGHT STANDARD |
| • | HYDRO POLE |
| • | FIRE HYDRANT |
| • | OVERHEAD UTILITY LINE |
| • | SANITARY SEWER |
| • | STORM SEWER |
| • | BOARD FENCE UNLESS NOTED OTHERWISE |
| • | DECIDUOUS TREE |
| • | CONIFEROUS TREE |

FIELD WORK COMPLETION DATE: OCTOBER 20, 2021

REVISIONS		
Rev #	REVISION	Date
0	Submitted to client for review	2 Nov/21
1	Added Block 67 on Plan 30M-323 to Boundary	29 Nov/21

CHAMBERS AND ASSOCIATES
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www.cas-surveying.com

DRAWN BY: D. H. T. VESCAD: 21069_MS DWG: 21069_TOPO FILE NO: 21-69



THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND ABOVE GROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED, BEFORE STARTING WORK, THE CONTRACTOR SHALL CONFIRM THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

general notes

- FOR GENERAL NOTES AND DETAILS SEE SHEET 7.
- EXISTING SERVICE INFORMATION FROM MASTER SERVING PLAN BY STANLEY CONSULTING GROUP LTD., JAN. 1998.
- TOWN OF LINCOLN STANDARD DRAWINGS ARE REFERRED TO AS T OF L SPN-###.

legend

- SANITARY SEWER AND MANHOLE
- SANITARY LATERAL
- REACH
- AREA IN HECTARES
- POPULATION
- AREA IN HECTARES
- DRAINAGE AREA BOUNDARY

TOWN OF LINCOLN
REVIEWED
DATE: 19.....
DIRECTOR OF PUBLIC WORKS

4	AS RECORDED	J.L.	JAN. 05/05
3	SERVICE CONNECTIONS	B.T.	JUNE 30/99
2	SUBDIVISION AGREEMENT REQUIREMENTS	B.T.	JUNE 01/99
1	AS PER TOWN COMMENTS MAY 3/99 R.Z.	MAY 7/99	
NOL	REVISION	BY	DATE

1283269 ONTARIO INC.

Town of Lincoln
PUBLIC WORKS DEPARTMENT

Stanlec Consulting Ltd.
2002 - 1700 Longstaff Road
Concord ON Canada
L4W 3S3
Tel. (905) 761-6100
Fax. (905) 761-6101
www.stanlec.com

HILLSIDE ESTATES
PHASE 1
TOWN OF LINCOLN

SANITARY DRAINAGE
AREA PLAN

DATE: MARCH 1999	DATE: MARCH 1999	DATE: MARCH 1999
SCALE: 1:1,250	SCALE: 1:1,250	SCALE: 1:1,250
PROJECT NO. 7762.3	SHEET NO. 2	REV. NO. 4

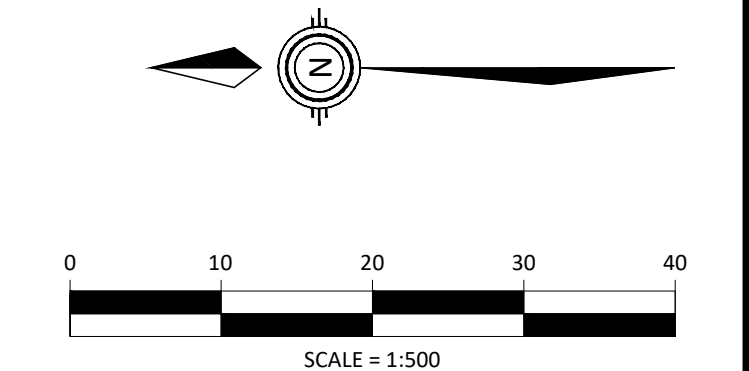
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July 30, 2018



D

PRELIMINARY



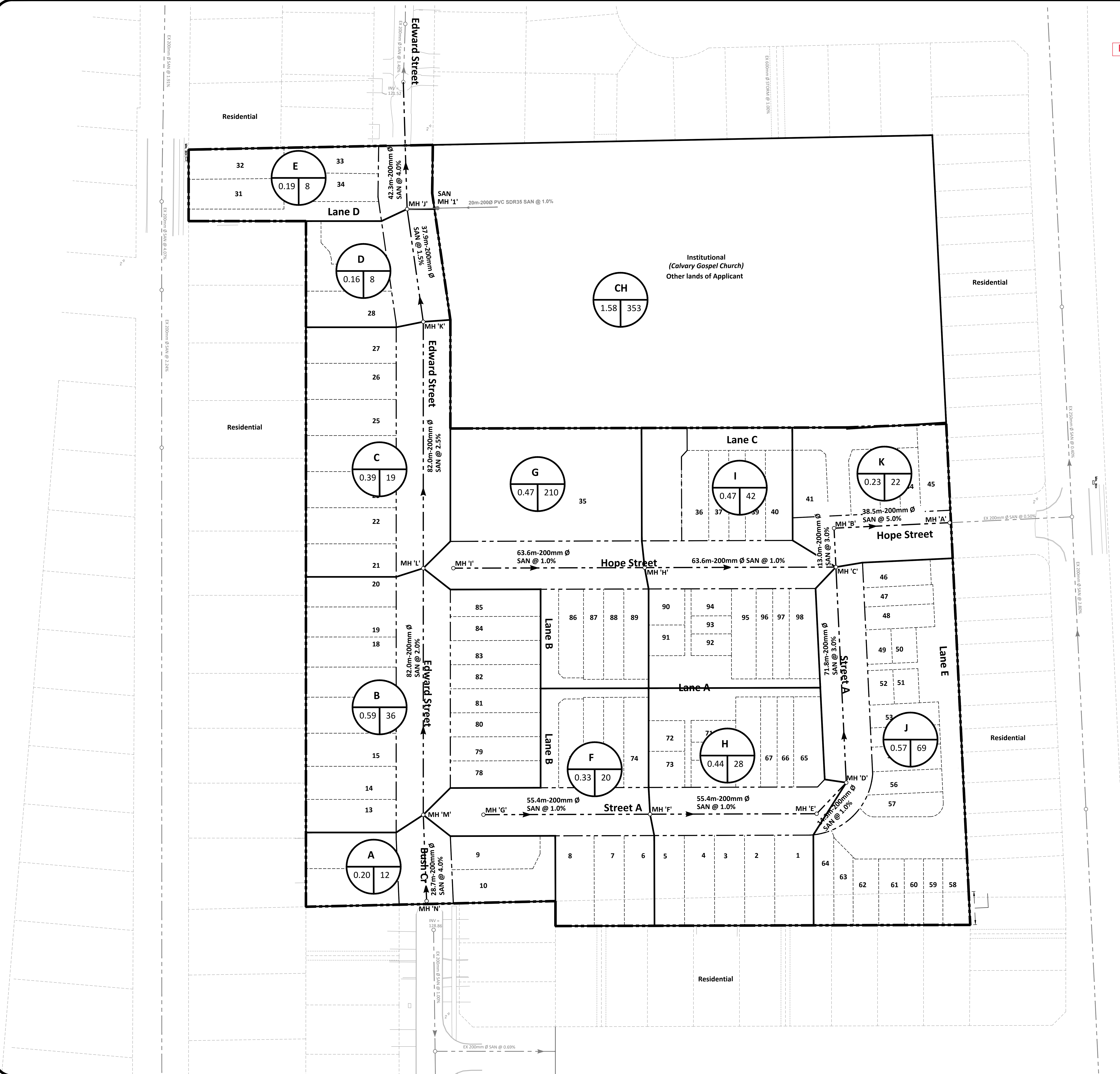
b better
neighbourhoods
DEVELOPMENT CONSULTANTS
190A Ontario Street, Ontario L2R 5K3
Office: 905.684.8585 betterneighbourhoods.ca

PROJECT TITLE:
**CALVARY GOSPEL
CHURCH PROPERTY**
Beamsville, Ontario

DRAWING TITLE:
**PRE-DEVELOPMENT
SANITARY DRAINAGE PLAN**

DATE OF ISSUE: 2021 03 03

DRAWING No: 0292 PRE-SAN-DP - 1	REV. NO: 1
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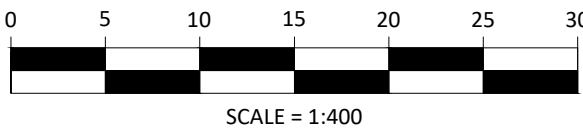
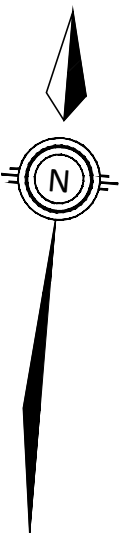
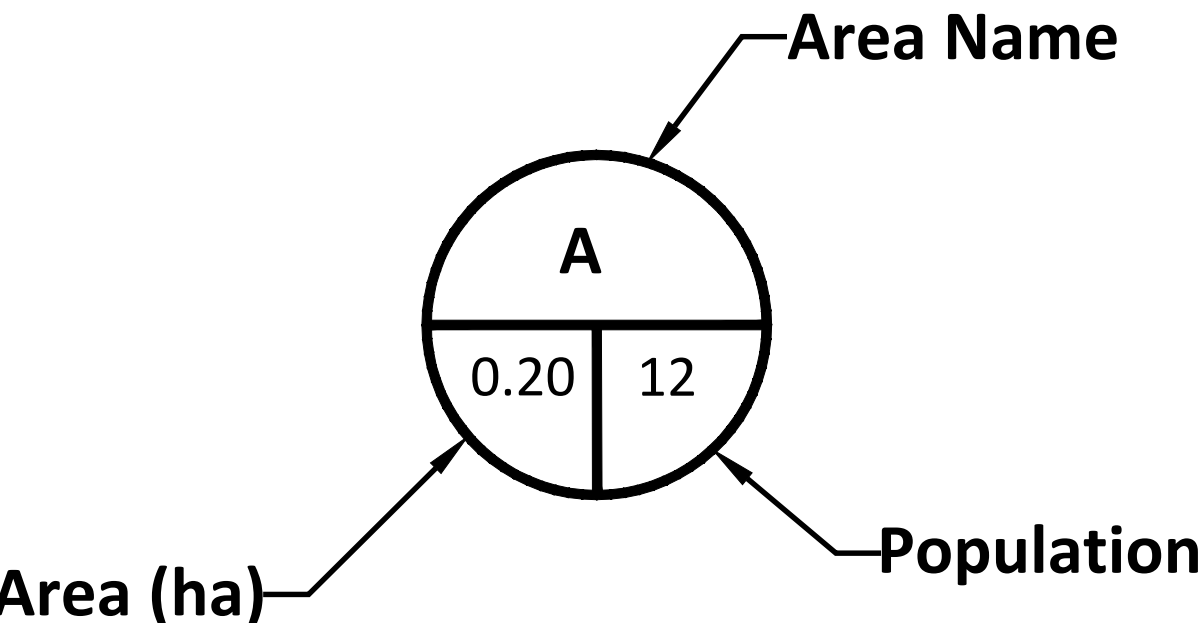


E



Key Map Not To Scale

Preliminary



#	Date	Revisions	Initial



190A Ontario Street, St Catharines, Ontario L2R 5K9 Studio: 905.684.8585 Betterneighbourhoods.ca

PROJECT TITLE:

4129 Hixon Street
St.Catharines, Ontario

DRAWING TITLE:

Sanitary Drainage Plan

DATE OF ISSUE:

2023 07 05

DRAWING No:

0292-SANDP-1

REV. NO.

0



4129 HIXON STREET

MASTER SANITARY SEWER CALCULATIONS

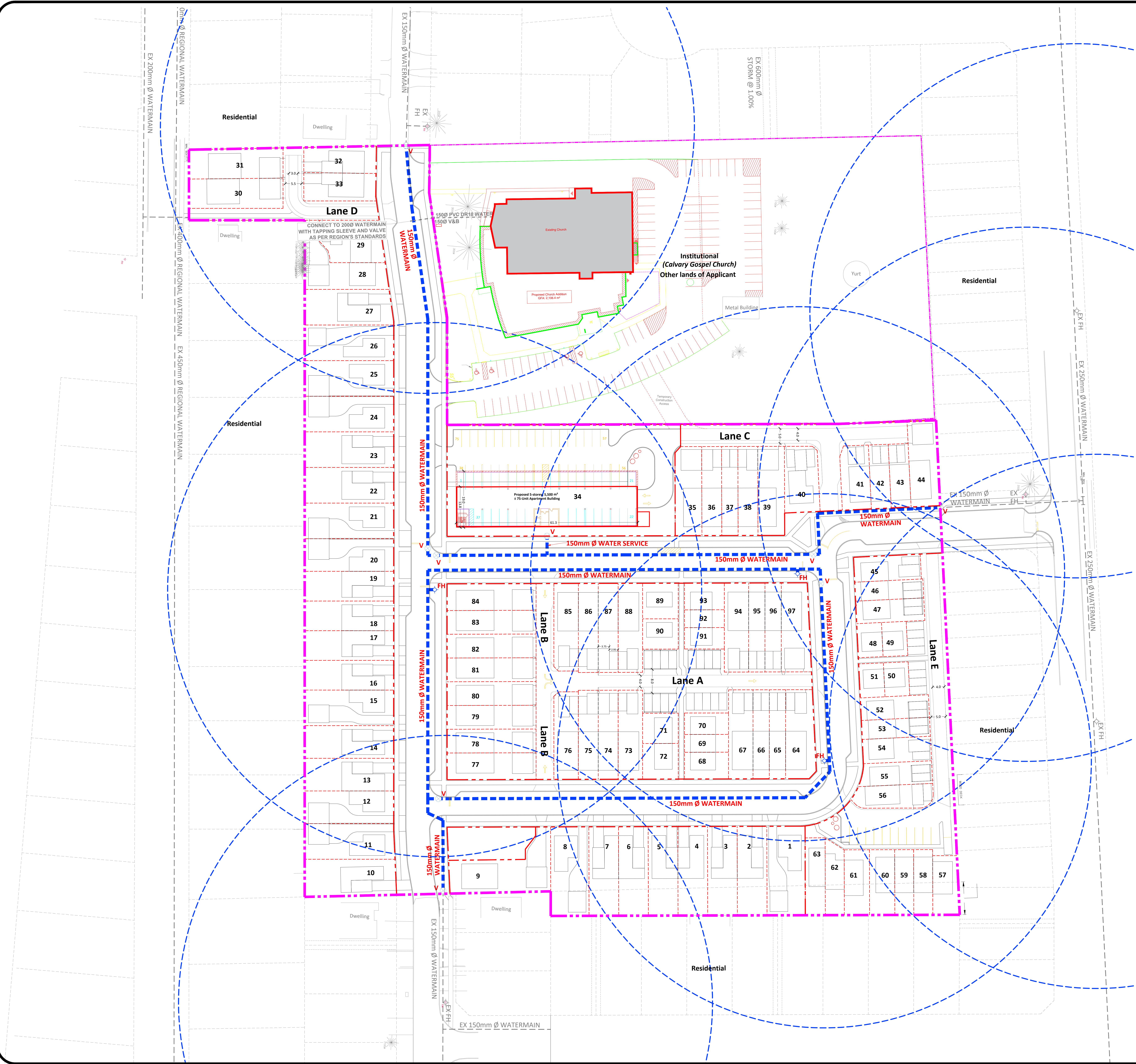
2023 07 05

G.E. BARR P.Eng.

Mike Xu E.I.T.

$Q(d) = (PqM/86.4) + IA$
 $Q(d)$ = Domestic Sewage Flow (L/s)
 P = Population (per 1000)
 q = 275L per day per person
 M = Peaking Factor $M = 1 + 14/(4 + P^{0.05})$
 A = Drainage Area in hectares
 I = infiltration per hectare in L/s = 0.28 L/s/ha

AREA #	LOCATION	FROM MH	TO MH	AREA (ha)	POP #	POP Cum	M	Q L/s	I L/s	Q Accum	PIPE SIZE mm	GRADE %	Q (full) L/s	v (full) m/s	Q/Q(full)	v/v(full)	v m/s	REMARKS
Proposed West																		
A	Block 1 South	N	M	0.20	12		4.4	0.2	0.06	0.2	200	4.00	68	2.110	0.003	0.180	0.380	
B	Block 1 & 6 West	M	L	0.59	36	48	4.3	0.7	0.17	0.9	200	2.00	48	1.492	0.018	0.350	0.522	
C	Block 1	L	K	0.39	19	67	4.3	0.9	0.11	1.2	200	2.50	54	1.668	0.023	0.400	0.667	
D	Block 1 North	K	J	0.16	8	75	4.3	1.0	0.04	1.4	200	1.50	42	1.292	0.033	0.450	0.581	
CH	Church	SAN 1	J	1.58	353	353	4.0	4.5	0.44	5.0	200	1.00	34	1.056	0.147	0.730	0.771	
E	Edward Street EX MH	J	Ex	0.19	8	436	4.0	5.6	0.05	6.4	200	4.00	68	2.110	0.095	0.600	1.266	Total to Edward
	Ex Edward Street San										200	1.40	41	1.248				Ex Sewer Capacity
Proposed East																		
F	Block 2 West & 6 South	G	F	0.33	20		4.4	0.3	0.09	0.4	200	1.00	34	1.056	0.011	0.200	0.211	
H	East of Area F	F	D	0.44	28	48	4.3	0.7	0.12	0.9	200	1.00	34	1.056	0.026	0.405	0.428	
J	Block 3 & 4	D	C	0.57	69	117	4.2	1.6	0.16	1.9	200	3.00	59	1.828	0.033	0.445	0.813	
G	Block 7 West & 6 North	I	H	0.47	210		4.1	2.8	0.13	2.9	200	1.00	34	1.056	0.085	0.330	0.348	
I	East of Area G	H	C	0.47	42	252	4.1	3.3	0.13	3.6	200	1.00	34	1.056	0.105	0.445	0.470	
	Transition from MH 'C' to 'B'	C	B			369	4.0	4.7		5.4	200	3.00	59	1.828	0.091	0.500	0.914	
K	Block 5 & 7 East	B	A	0.23	22	391	4.0	5.0	0.06	5.7	200	5.00	77	2.359	0.074	0.470	1.109	Total to Ashby
	Ex Ashby Stub										200	0.50	24	0.746				Ex Sewer Capacity



#	Date	Revisions	Initial



better
neighbourhoods

DEVELOPMENT CONSULTANTS

190A Ontario Street, St Catharines, Ontario L2R 5K9 Studio: 905.684.8585 Betterneighbourhoods.ca

PROJECT TITLE:

4129 Hixon Street
Lincoln, Ontario

DRAWING TITLE:

Water Distribution Plan

DATE OF ISSUE:

2023-10-13

DRAWING No:

0292-WATER-1

REV. NO.

1

Scenario: ADD



Scenario: MDD



Scenario: PHD



Scenario: MDD+FF





July 30, 2018

THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERES AND OTHER UNDERGROUND AND ABOVE GROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL CONFIRM THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.



general notes

HILLSIDE ESTATES
CONTOURS GENERATED FROM SURVEY BY WILLIAM A. MASCOE SURVEYING LTD. (1997)
CALVARY GOSPEL CHURCH AND BUTEAU ESTATES
CONTOURS GENERATED FROM SURVEY BY STANLEY CONSULTING (DECEMBER 1997)
VALENCIA PLACE
CONTOURS GENERATED FROM SURVEY BY KERRY T. HONE ENGINEERING LTD.
BENCHMARKS:
No. DESCRIPTION ELEVATION
47 (11471-77-0 NORTH BOLT, TOP FLANGE OF IRONMAN ON SOUTHWEST CORNER OF HIXON ST. AND GEORGE ST. (PROCTOR AND REDFERN) 127.314

1. FOR GENERAL NOTES AND DETAILS SEE SHEET 7.
2. EXISTING SERVICE INFORMATION FROM MASTER SERVING PLAN BY STANLEY CONSULTING GROUP LTD. JAN. 1998.
3. TOWN OF LINCOLN STANDARD DRAWINGS ARE REFERRED TO AS T.O.L. DPW-###.

legend

- PROPOSED STORM SEWER AND MANHOLE
- PROPOSED CATCH-BASIN
- PROPOSED DOUBLE CATCH-BASIN
- PROPOSED SWALE
- AREA IN HECTARES
- RUNOFF COEFFICIENT
- DRAINAGE AREA BOUNDARY
- MAJOR OVERLAND FLOW

TOWN OF LINCOLN
REVIEWED

NO.	REVISION	BY	DATE
4	AS RECORDED	J.J.	JAN. 05/05
3	SERVICE CONNECTIONS	R.T.	JUNE 30/99
2	SUBDIVISION AGREEMENT REQUIREMENTS	R.T.	JUNE 01/99
1	AS PER TOWN COMMENTS MAY 3/99	R.Z.	MAY 7/99

1283269 ONTARIO INC.

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PUBLIC WORKS DEPARTMENT

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HILLSIDE ESTATES
PHASE 1
TOWN OF LINCOLN
OVERALL
STORM DRAINAGE
AREA BOUNDARY

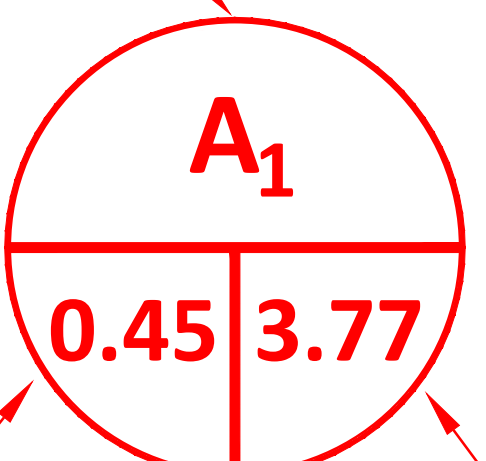
DRN. BY: R.Z.	CHD. BY: D.E.A.
DATE: MARCH 1999	DSN. BY: R.T.
SCALE: 1:750	
PROJECT NO. 7762.3	SHEET NO. 3
	REV. NO. 4

1762_0716100



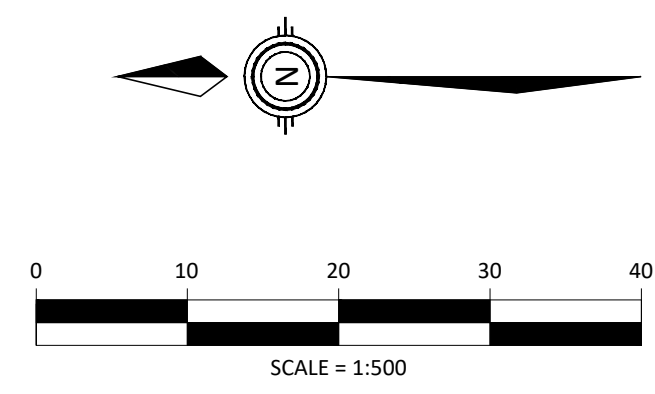
H

AREA NAME



RUNOFF FACTOR AREA (ha)

PRELIMINARY



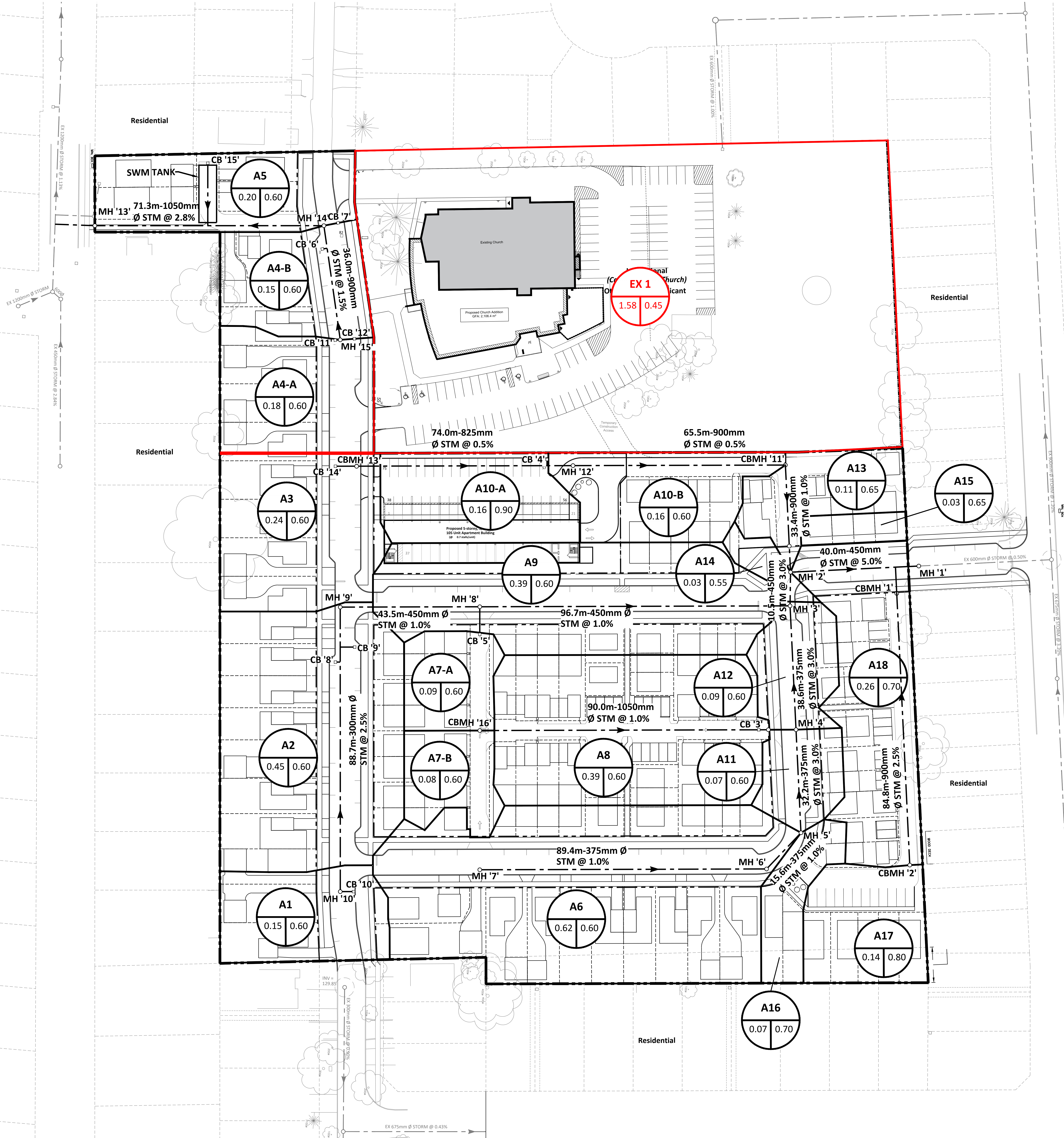
b better
neighbourhoods
DEVELOPMENT CONSULTANTS
190A Ontario Street, Ontario L2R 5K3
Office: 905.684.8585 betterneighbourhoods.ca

PROJECT TITLE:
**CALVARY GOSPEL
CHURCH PROPERTY
Beamsville, Ontario**

DRAWING TITLE:
**PRE-DEVELOPMENT
STORM DRAINAGE PLAN**

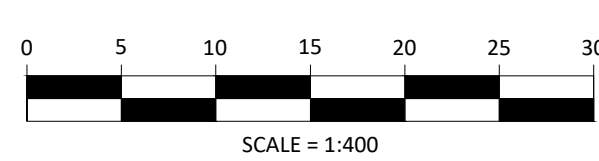
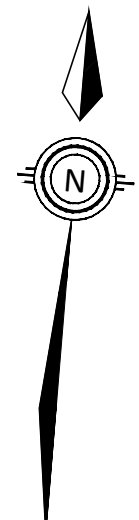
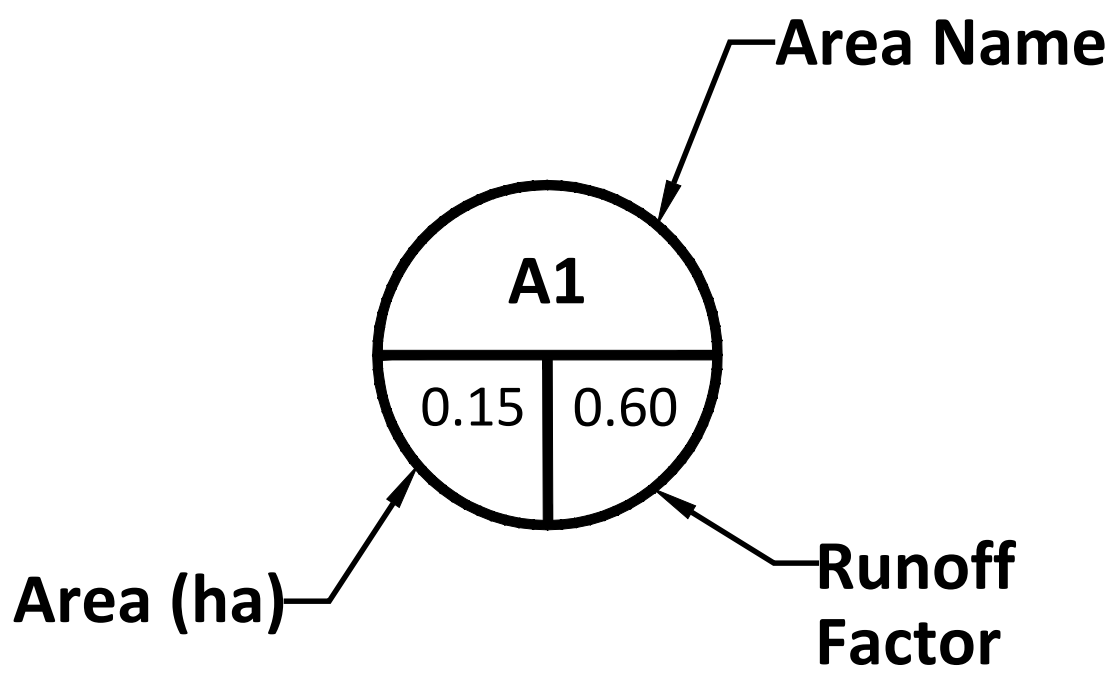
DATE OF ISSUE: 2022 08 03

DRAWING No: 0292 PRE-STM-DP -1	REV. NO: 1
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Key Map Not To Scale

Preliminary



#	Date	Revisions	Initial



190A Ontario Street, St Catharines, Ontario L2R 5K9 Studio: 905.684.8585 Betterneighbourhoods.ca

PROJECT TITLE:

4129 Hixon Street
St.Catharines, Ontario

DRAWING TITLE:

Storm Drainage Plan

DATE OF ISSUE:

2023 07 05

DRAWING No:

0292-STMDP-1

REV. NO.

0

4129 HIXON STREET, LINCOLN

STORM SEWER CALCULATIONS (OPTION B)

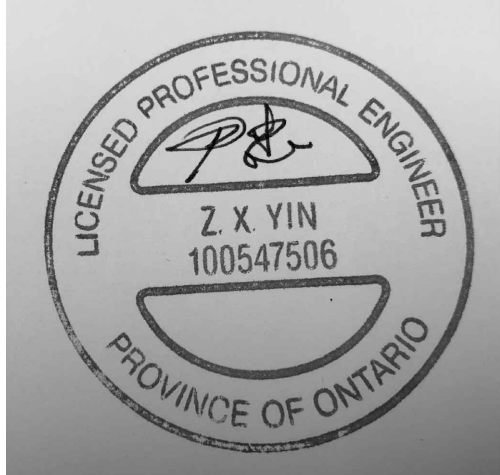
Date:	2023 07 05	Intensity Factors:	a	1039.2	Runoff Quantity:	$Q = A \times I \times R \times 0.00278$
Completed By:	Mike Xu		b	0.821		
Storm Data Location	Lincoln		c	7	Runoff Coefficient:	Varies
Return Period	5 year Storm					Impervious Area
Manning's Coefficient:	0.013					Pervious Area

AREA #	LOCATION	FROM MH	TO MH	AREA - A (Hectares) Ha	RUNOFF COEF. (C)	A X C	ACCUM A X C	TIME Min	INTENSITY (I) mm/hr	Q m3.sec	FALL m	LENGTH m	GRADE %	PIPE SIZE mm	Q (full) m3/sec	V (full) m/sec	TIME OF FLOW min	REMARKS
Proposed Drainage to Hixon Street																		
A4-A	Block 1 North	MH '15'	MH '14'	0.18	0.60	0.108												
A4-B	Block 1 North	MH '15'	MH '14'	0.15	0.60	0.090												
A4-A & A4-B							0.198	12.0	92.6	0.051		36	1.50	900	2.313	3.520	0.17	
A5	Block 1 North	MH '14'	Ex Sewer	0.20	0.60	0.120												
A5							0.318	12.2	92.0	0.081		71	2.80	1050	3.489	3.890	0.31	
Existing Drainage to Hixon Street																		
Ex A3	Hixon Street Storm Sewer			0.58	0.45	0.261												
							0.261	12.0	92.6	0.067			1.13	1200	4.268	3.650		Ex Sewer Capacity

AREA #	LOCATION	FROM MH	TO MH	AREA - A (Hectares) Ha	RUNOFF COEF. (C)	A X C	ACCUM A X C	TIME Min	INTENSITY (I) mm/hr	Q m3.sec	FALL m	LENGTH m	GRADE %	PIPE SIZE mm	Q (full) m3/sec	V (full) m/sec	TIME OF FLOW min	REMARKS
Proposed Drainage to Ashby Street																		
A1	Bush Cres & Edward St	MH '10'	MH '9'	0.15	0.60	0.090												
A2	Bush Cres & Edward St	MH '10'	MH '9'	0.45	0.60	0.270												
A1 & A2							0.360	12.0	92.6	0.093		89	2.50	300	0.160	2.186	0.68	
A6	Block 2	MH '7'	MH '5'	0.62	0.60	0.372												
A6							0.372	12.0	92.6	0.096		105	1.00	375	0.183	1.604	1.09	
A11	Street A & Block 3	MH '5'	MH '4'	0.07	0.60	0.042												
A16	Street A & Block 3	MH '5'	MH '4'	0.07	0.70	0.049												
A11 & A16							0.463	13.1	88.5	0.114		32	3.00	375	0.317	2.779	0.19	
A7-B	Block 6	CBMH '16'	MH '4'	0.08	0.60	0.048												
A8	Block 6	CBMH '16'	MH '4'	0.39	0.60	0.234												
							0.282	12.0	92.6	0.073		90	1.00	1050	2.849	3.180	0.47	
A12	Block 6 NE	MH '4'	MH '3'	0.09	0.60	0.054												
A8 & A12							0.799	13.3	87.8	0.195		39	3.00	375	0.317	2.779	0.23	
A9	Hope Street West	MH '9'	MH '3'	0.39	0.60	0.234												
A7-A	Block 6 West	MH '9'	MH '3'	0.09	0.60	0.054												
A7-A & A9							0.648	12.7	90.0	0.162		140	1.00	450	0.298	1.812	1.29	
A14	Hope Street Intersection	MH '3'	MH '2'	0.03	0.55	0.017												
A14							1.464	14.0	85.5	0.348		11	3.00	450	0.515	3.138	0.06	
A3	Block 1	CB '14'	CBMH '13'	0.24	0.60	0.144												
A3							0.144	12.0	92.6	0.037		7	1.00	300	0.101	1.383	0.08	
A10-A	Apartment	CBMH '13'	MH '12'	0.16	0.90	0.144												
A10-A							0.288	12.1	92.3	0.074		74	0.50	825	1.059	1.920	0.64	
A10-B	Lane C	MH '12'	CBMH '11'	0.16	0.60	0.096												
A10-B							0.384	12.1	92.3	0.099		66	0.50	900	1.334	2.030	0.54	
A13	Lane C East	CBMH '11'	MH '2'	0.11	0.65	0.072												
A13							0.456	12.6	90.2	0.114		33	1.00	900	1.889	2.880	0.19	
A17	Block 3 East	CBMH '2'	MH '2'	0.14	0.80	0.112												
A18	Block 4 East	CBMH '2'	MH '2'	0.26	0.70	0.182												
VIA CBMH '1'							0.294	12.0	92.6	0.076		85	2.50	900	2.986	4.550	0.31	
Total		MH '2'	MH '1'				2.213	12.8	89.5	0.551		40	5.00	450	0.665	4.051	0.16	Ashby Stub
Existing Drainage to Ashby Street																		
Ex A1	Ashby Street Ex Stub			3.77	0.45	1.697												
							1.697	12.0	92.6	0.437			0.50	600	0.453	1.550		Ex Sewer Capacity



- NOTES:**
- The proposed services for the Calvary Gospel Church Property are shown in gray.
 - Reinders + Law Ltd. produced the servicing plan for the Gospel Church Property.



#	Date	Revisions	Initial
1	2023-10-12	Issued for Resubmission	AY/FC



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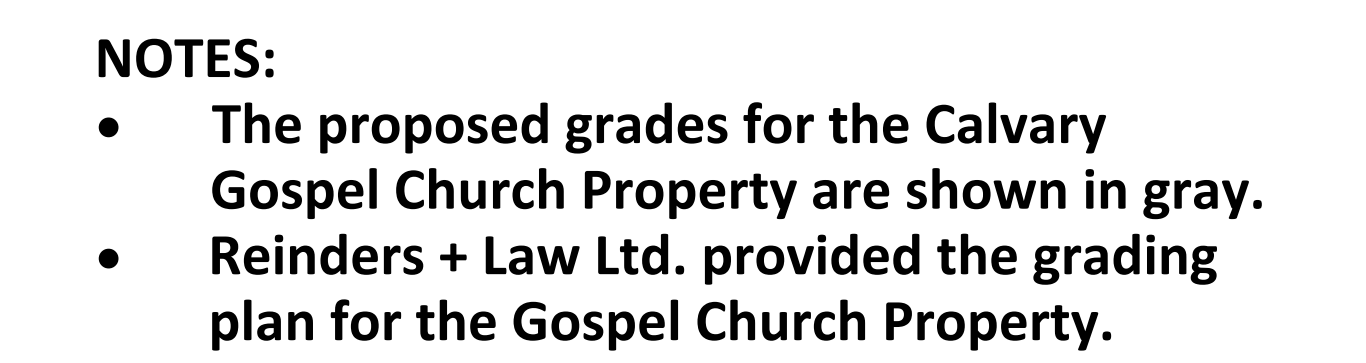
PROJECT TITLE:
**4129 Hixon Street
Lincoln, Ontario**

DRAWING TITLE:
Master Servicing Plan

DATE OF ISSUE:
2023-10-12

DRAWING No:
0292-MSER-1

REV. NO.
1

[illegible]

	
190A Ontario Street, St Catharines, Ontario L2R 5K9 Studio: 905.684.8585 Betterneighbourhoods.ca	
PROJECT TITLE: 4129 Hixon Street <i>Lincoln, Ontario</i>	
DRAWING TITLE: Master Grading Plan	
DATE OF ISSUE: 2023-10-13	
DRAWING NO: 2022-MGP-1	REV. NO. 1