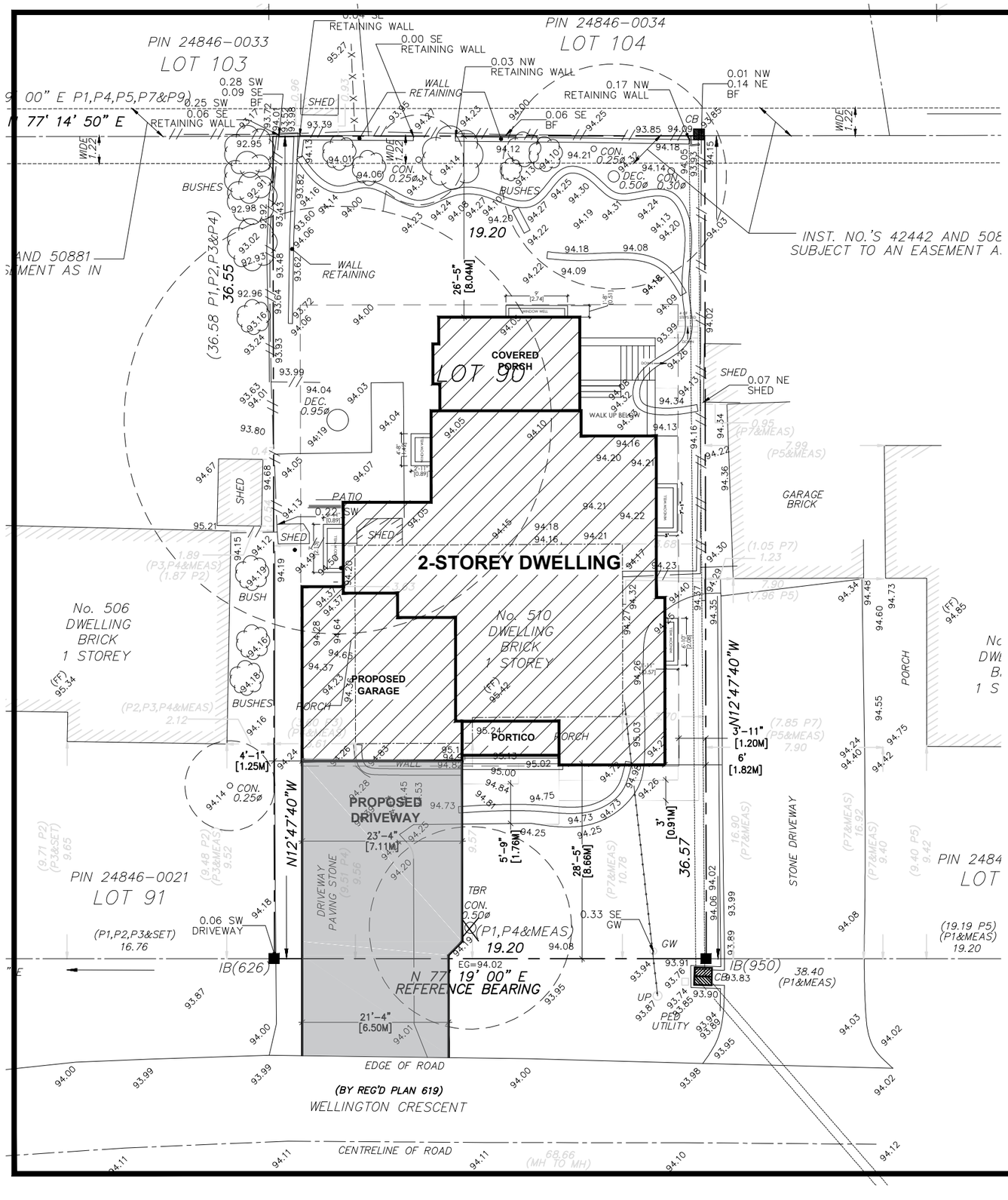


SITE STATISTICS: 510 WELLINGTON CRESCENT

	EXISTING	PROPOSED	TOTAL	ALLOWED
ZONING:	RL3-0			
LOT AREA:	702 M2			
LOT COVERAGE:	--- M2	240.1 M2	--- M2	245.7 M2
LOT COVERAGE:	--- %	34.2%	--- %	35 %
R.F.A. :	--- M2	310.4 M2	--- M2	287.8 M2
R.F.A. :	---%	44.2%		41%
BLDG. HEIGHT (PEAK)	--- M		--- M	9 M
GARAGE AREA		43.9 M2		45 M2

SITEPLAN

SCALE: 1:200

VARIANCE REQUIRED

KEEREN DESIGN
RESIDENTIAL ARCHITECTURE

11 BRONTE RD. SUITE 31
OAKVILLE, ON
L6L 0E1

PHONE: (905) 847-2350

WWW.KEEREN.CA

FIRM BCIN #: 31181

JORIS KEEREN
DESIGNER BCIN #: 25348

REVISION

DRAWING INFORMATION
INITIAL DESIGN : OCTOBER 2022
DESIGNER : JORIS KEEREN
DRAWN BY : J.PUGLIESE
PLOT DATE : Jan 17, 2024
PERMIT # : 23 -

PROJECT: 510 WELLINGTON

S1

KEEREN DESIGN
RESIDENTIAL ARCHITECTURE

11 BRONTE RD. SUITE 31
OAKVILLE, ON
L6L 0E1

PHONE: (905) 847-2350

WWW.KEEREN.CA

FIRM BCIN #: 31181

JORIS KEEREN
DESIGNER BCIN #: 25348

REVISION

DRAWING INFORMATION

INITIAL DESIGN : OCTOBER 2022
DESIGNER : JORIS KEEREN
DRAWN BY : J.PUGLIESE
PLOT DATE : Sept 11, 2023
PERMIT # : 23 -

PROJECT: 510 WELLINGTON

A3

REAR ELEVATION
SCALE: 1:75

KEEREN DESIGN
RESIDENTIAL ARCHITECTURE

11 BRONTE RD. SUITE 31
OAKVILLE, ON
L6L 0E1

PHONE: (905) 847-2350

WWW.KEEREN.CA

FIRM BCIN #: 31181

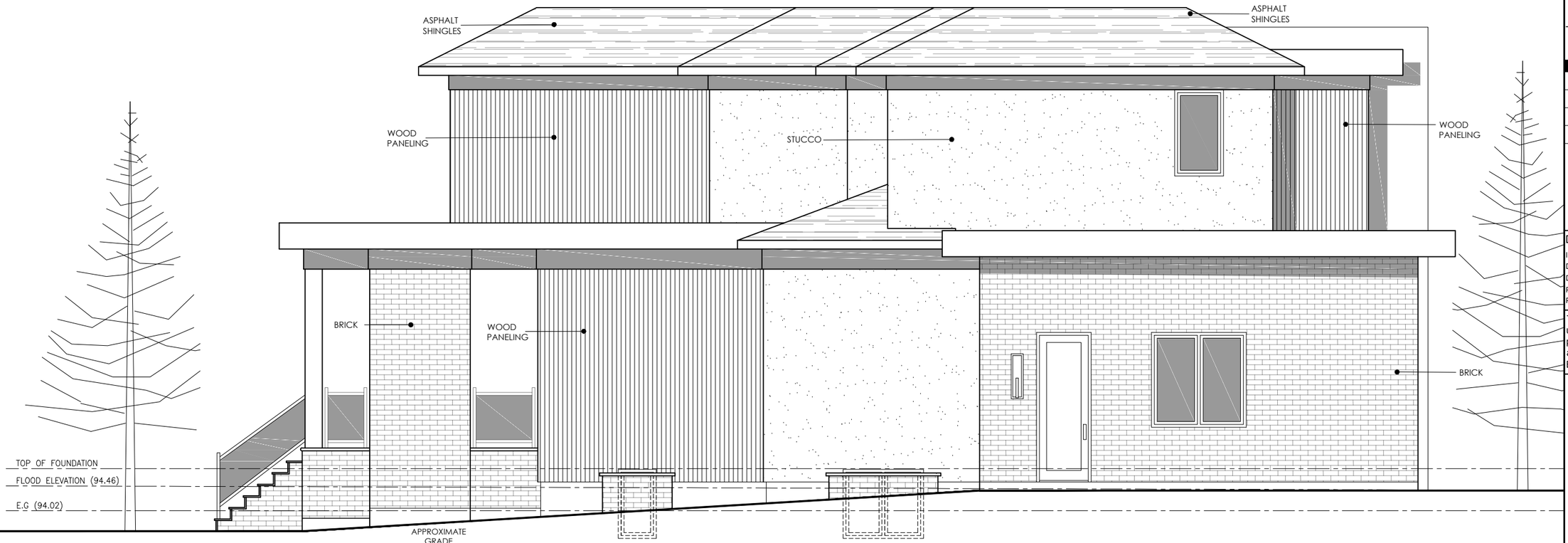
JORIS KEEREN
DESIGNER BCIN #: 25348

REVISION

DRAWING INFORMATION
INITIAL DESIGN : OCTOBER 2022
DESIGNER : JORIS KEEREN
DRAWN BY : J.PUGLIESE
PLOT DATE : Jan 17, 2024
PERMIT # : 23 -

PROJECT: 510 WELLINGTON

A7



SIDE ELEVATION
SCALE: 1:75

KEEREN DESIGN
RESIDENTIAL ARCHITECTURE

11 BRONTE RD. SUITE 31
OAKVILLE, ON
L6L 0E1

PHONE: (905) 847-2350

WWW.KEEREN.CA

FIRM BCIN #: 31181

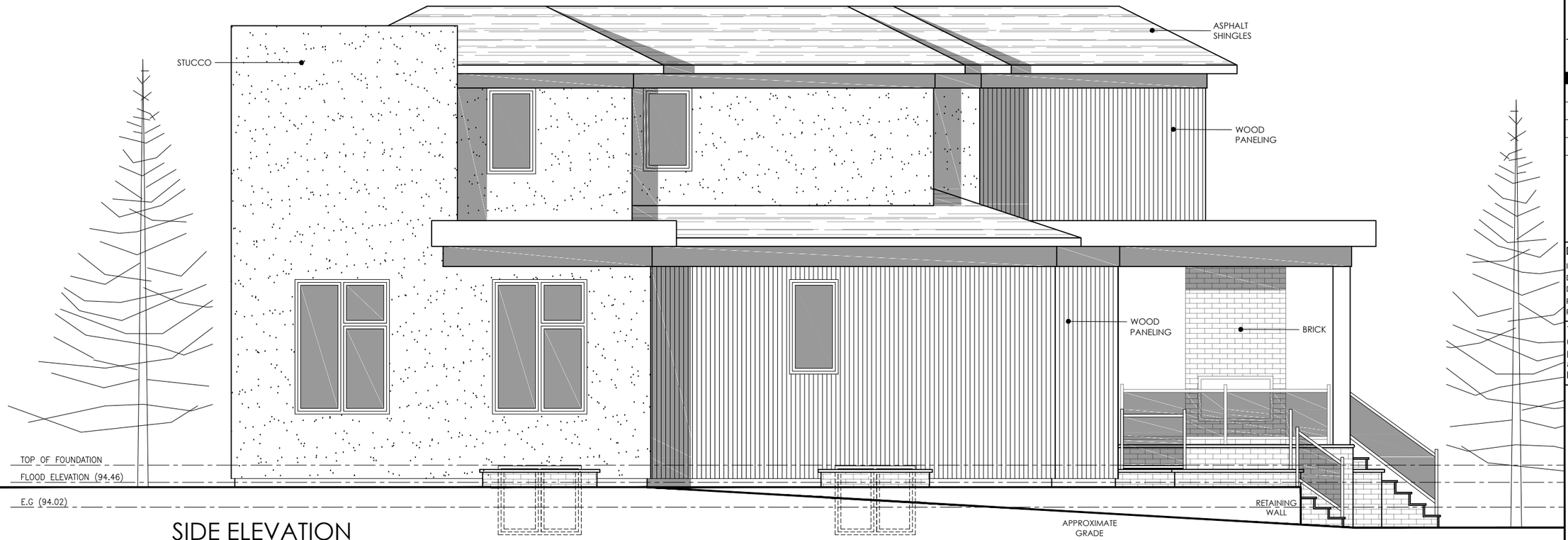
JORIS KEEREN
DESIGNER BCIN #: 25348

REVISION

DRAWING INFORMATION
INITIAL DESIGN : OCTOBER 2022
DESIGNER : JORIS KEEREN
DRAWN BY : J.PUGLIESE
PLOT DATE : Jan 17, 2024
PERMIT # : 23 -

PROJECT: 510 WELLINGTON

A6



SIDE ELEVATION
SCALE: 1:75

KEEREN DESIGN
RESIDENTIAL ARCHITECTURE

11 BRONTE RD. SUITE 31
OAKVILLE, ON
L6L 0E1

PHONE: (905) 847-2350

WWW.KEEREN.CA

FIRM BCIN #: 31181

JORIS KEEREN
DESIGNER BCIN #: 25348

REVISION

DRAWING INFORMATION
INITIAL DESIGN : OCTOBER 2022
DESIGNER : JORIS KEEREN
DRAWN BY : J.PUGLIESE
PLOT DATE : Jan 17, 2024
PERMIT # : 23 -

PROJECT: 510 WELLINGTON

A5

FRONT ELEVATION
SCALE: 1:75

KEEREN DESIGN
RESIDENTIAL ARCHITECTURE

11 BRONTE RD. SUITE 31
OAKVILLE, ON
L6L 0E1

PHONE: (905) 847-2350

WWW.KEEREN.CA

FIRM BCIN #: 31181

JORIS KEEREN
DESIGNER BCIN #: 25348

REVISION

DRAWING INFORMATION
INITIAL DESIGN : OCTOBER 2022
DESIGNER : JORIS KEEREN
DRAWN BY : J.PUGLIESE
PLOT DATE : Jan 17, 2024
PERMIT # : 23 -

PROJECT: 510 WELLINGTON

A4

510 Wellington Cres.

Planning & variance request justification.

Note: this application was deferred under CAV A/152/2023 to address staff concerns mainly associated with the fact that *"the subject property is on a remnant channel and may be subject to significant flooding conditions".*

The following four steps have been undertaken to address staff concerns as it relates to this application.

1. A Civil engineer has been engaged to prepare a detailed Storm Water Management (SWM) Report specific to this property as well as the one next door at 506 Wellington Ave. The report is attached to this submission for consideration and review by the committee. However, as per the normal permit process, these types of reports are typically reviewed by staff as part of the permit review, as was already done for the house next door at 506 Wellington Ave.

2. Similar concerns regarding the remnant channel and flooding were raised by staff through the building permit application process for 506 Wellington and a SWM report was also prepared for this property. Building department staff have completed their review of this application including the SWM report and is ready to issue the permit, with the only condition remaining being the issuance of a demolition permit. In other words, all flooding concerns were addressed for this property and the SWM report has been prepared by the same Civil engineer for both properties, 506 and 510.

3. A few minor modifications have been made to the design of the proposed dwelling, to address the recommendation set forth in the SWM report. This consists mainly of raising the retaining walls around the basement walkout stair and the basement windows, to be above the maximum flood level as spelled out in the SWM report, this will ensure adequate protection against any high-water storm events.

4. Variance #1 of the original application, pertaining to the window well encroachment into the rear yards, has been omitted, as this well now complies.

Therefore we have only one remaining variance, which is:

Request for increased RFA

The increase in RFA is required by the owner and his family to provide a 2nd floor laundry room, 1st floor pantry/server area and sitting/living room. These spaces account for the overage of about 22 sq. meters, which does not contribute significantly to massing.

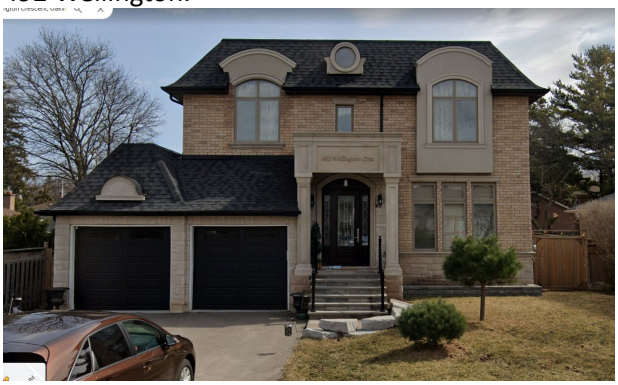
The exterior façade has been designed to include various corners and steps to break up the wall planes. Also, the 2nd floor walls have been set back from the 1st floor perimeter walls in most areas, to further break up massing.

Note, the property next door at 506 wellington is in for permit (permit # 23-111002) for a new dwelling of approximately 306 sq. Meters RFA, which will be fully compliant with zoning but very close in size to the 310 sq. Meters requested in this application. In other words, the house next door will be only 4 sq. meters smaller in RFA and therefore very similar in overall size. The building permit for 506 Wellington has completed its review process and is ready to be issued, the only condition is the issuance of the demolition permit for the existing house.

Also of note are the existing two storey dwellings which were recently constructed at 492 528 569 Wellington Cr. (see images on next page)

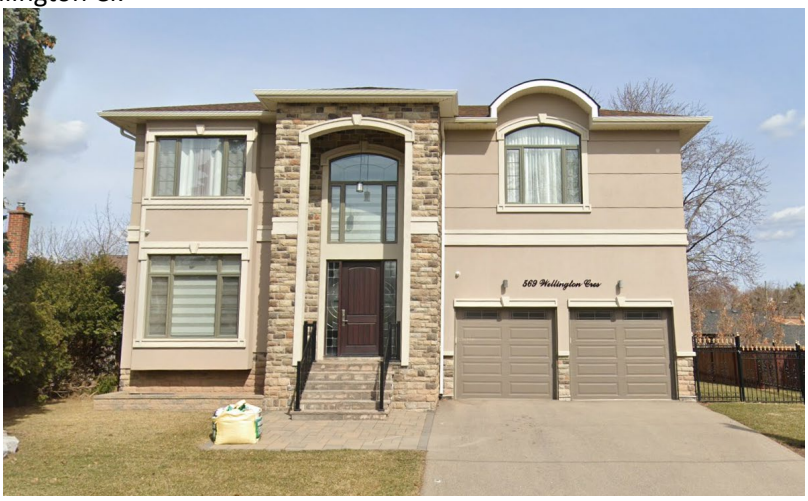
506 Wellington (new dwelling approved under permit 23-111002.

492 Wellington.



528 Wellington Cr.

569 Wellington Cr.



510 WELLINGTON CRES, OAKVILLE

Remnant Channel Floodplain Analysis

Revisions	Issue / Revision	Date
Rev 0	Issued for Submission	2023.12.14

Introduction

WestX has been retained to determine the floodplain extents of the existing remnant channel at 510 Wellington Crescent in the Town of Oakville. The site is 0.070 ha in area, located near the intersection of Wellington Crescent and Weir Ave, in an area zoned as RL3-0. The purpose of this report is to detail the process and results of determining the catchment areas, peak flows, and resulting floodplain elevation for the remnant channel. The report analyses the existing condition and will be updated in the future when the grading design has been completed.

Background

The following documents were referenced in preparation of this report:

Ref. 1: Development Engineering Procedures and Guidelines (Town of Oakville)

Ref. 2: Town of Oakville Stormwater Management Master Plan (Wood, November 2019)

Ref. 3: Topographic Survey: Project 22-232 (J. H. Gelbloom, January 4, 2023)

Analysis

To complete our analysis, the following steps were followed:

1. Determine the catchment area contributing to the remnant channel up to the site boundary.
2. Assign the catchment area a runoff coefficient.
3. Determine the 100-year storm peak flow.
4. Determine the capacity of the existing remnant channel culverts/sewers and the resulting overland flow.
5. Cut and model cross-sections (as needed).
6. Determine the flood elevation and extents.
7. Compare the floodplain limits to the Wood report.

The process and results of each of the steps completed are detailed below.

Catchment Area Determination

Two catchment areas, Catchment 1 and Catchment 2, were delineated to represent the areas contributing runoff to the remnant channel. The catchments contribute 100-year major flows to the channel at the point of the site. The catchment areas were determined using the 'Subcatchments' shapefile for the West area provided by the Town of Oakville from the PCMSWMM model created by Wood (Ref. 2). The catchment areas were verified per contour mapping from the Town of Oakville GIS open data and visual inspection of roadside ditches, culvert, and outlets, using Google Streetview. The catchment areas are shown in Figure A1 in Appendix A.

Catchment 1 includes an area of 17.11 Ha northwest of the site. Runoff from this area enters the channel upstream of the site and flows past the site through a 1050mm diameter CSP sewer. This pipe size was determined per a drawing supplied by the Town of Oakville, designed by Amec Foster Wheeler, City contract No. T-X-2016, Drawing S-3. The pipe material was determined using google maps street view where the CSP daylights at Taplow Crescent. Excess runoff that exceeds the capacity of the sewer flows overland through the subject lot.

Catchment 2 includes an area of 10.06 Ha north and north east of the site. Runoff from this area enters a 750mm diameter culvert at the northwest corner of the lot, per as built drawing R-132-76-3A, with excess runoff that isn't conveyed through the culvert flowing overland through the subject lot. The culvert connects into the 1050mm diameter sewer in the rear yard of the site.

Runoff Coefficient

The runoff coefficient was first determined using Table 6.1.1: *Impervious Coverages for Residential Zones and Municipal Rights-of-Way (%)* from the Wood report (Ref. 2), which provides an imperviousness for the right-of-way and lot area based on the residential zone the catchment is in. It was determined that the entire catchment area was zoned as RL3-0 using the Town of Oakville's zoning map (see Figure A2 in Appendix A). Based on the imperviousness provided, a runoff coefficient was calculated as 0.58. The runoff coefficient was then compared to Section 3.1.3.07 of the Town of Oakville Guidelines (Ref. 1), where 0.60 for single residential is required. Since the Town's standard of 0.60 is more conservative than the calculated value of 0.58, the Town's standard value of 0.60 was used in the modelling.

Peak Flow Calculation

The peak flows were calculated using the rational method and the Town of Oakville's Intensity-Duration-Frequency (IDF) parameters. The time of concentration for the rational method was calculated using the Bransby-William's Formula: $t_c = \frac{0.057 * L}{S_w^{0.2} * A^{0.1}}$; where L is the catchment length (m), S_w is the catchment slope (%), and A is the catchment area (ha). The length for each catchment was measured based on the length of the channel and overland flow from the farthest point in the catchment. Similarly, the catchment slopes were determined by dividing the difference in elevations between the upstream end and the downstream end, by the length. Using the time of concentration and IDF parameters, the peak flows were calculated and totaled to be 4.59 m^3/s (see Table 1 below and Appendix B for detailed calculations).

Table 1 – Peak Flow Calculations

Catchment ID	A (ha)	L (m)	Sw (%)	Tc (min)	Flow Type	Flow (m^3/s)
1	17.111	677	1.06	28.69	Major (100-yr)	2.9151
2	10.058	645	0.93	29.61	Major (100-yr)	1.6751
					Total	**4.5903**

Remnant Channel Culvert Capacity

A review of the Town of Oakville Stormwater Management Master Plan (Wood, November 2019) supporting documents, the Town of Oakville Mapbook (page 50), and drawings supplied by the Town of Oakville, designed by Amec Foster Wheeler, City contract No. T-X-2016, Drawings S-1, S-2, and S-3.), shows that the remnant channel is conveyed through an existing 1050mm diameter CSP sewer in the rear yard of the property. The two catchments enter this culvert through two access points. Catchment 1 enters the culvert upstream of the site at the bend in Taplow Street, while catchment 2 enters through a 750mm diameter culvert located at the northwest corner of 510 Wellington Street, off Wellington Street. The capacity of each sewer and expected overland flow is determined below.

Capacity of the Culvert – Catchment 1

Catchment 1 is conveyed through a 1050mm diameter CSP culvert. The flow enters the CSP sewer at approximately 93.50 (per the Town of Oakville topographic mapping) and exits at 91.30. The sewer is approximately 283m long, indicating a slope of 0.78%. A 1050mm diameter sewer at 0.78% has a capacity of 2,411.71 L/s at a velocity of 2.79 m/s. The pipe is assumed to have 50% capacity, giving a capacity for modelling of 1,206 L/s (1.206 m^3/s).

Capacity of the Culvert – Catchment 2

As detailed above, runoff from catchment 2 enters a 750mm diameter culvert at the northwest corner of the lot, per as built drawing R-132-76-3A. Excess runoff that isn't conveyed through the culvert will flow overland. The slope of the sewer is unknown so a 0.51% slope has been assumed. A 750mm diameter culvert at 0.51% slope has a capacity of 795 L/s at a velocity of 1.80 m/s. The culvert is assumed to be at 50% capacity, providing a modelling flow rate of 397.50 L/s (0.397 m^3/s).

Remnant Overland Flow

The table below outlines the overland flow expected from each catchment. The table determines the overland flow by subtracting the expected culvert capacity from the expected flow. As noted above, the inlet for each culvert is expected to be 50% of the pipes capacity.

Table 2 – Overland Flow

Catchment	100 yr Storm Peak Flow	Culvert Capacity	Overland Flow
Catchment 1	2.915	1.206	1.709
Catchment 2	1.675	0.397	1.278
Total	**4.59**	**1.603**	**2.987**

As detailed the table, 1.709 m^3/s of overland flow is expected from Catchment 1, and 1.278 m^3/s from Catchment 2.

Cross-Section and Floodplain Elevation

In order to model the floodplain passing through the site, three cross-sections were cut through the development lot. Cross section A models the remnant channel where the combined catchments 1 and 2 flows are conveyed through the property. Cross Section B models the channel formed where the overland flow from the north passes through the existing houses, draining towards the remnant channel. Cross Section C models the channel formed where the overland flow from the north passes through the proposed and existing houses, draining towards the remnant channel. Each of the cross sections are described below.

Cross Section A

Cross section A cuts through the rear yard using elevations from the topographic survey provided by J.H. Gelbloom (Ref. 3). The cross-section was limited to the available topographic information in the survey and supplemented with elevation information from the Town of Oakville topographic mapping. Manning's n values were assigned to sections of the cross-section, based on the area and ground cover. A value of 0.50 was assigned to the lot area as it is a mixture of grass, brush, and some trees. The channel cross-section, as seen in Figure 1, was modeled using HydraFlow Express to determine the floodplain elevation.

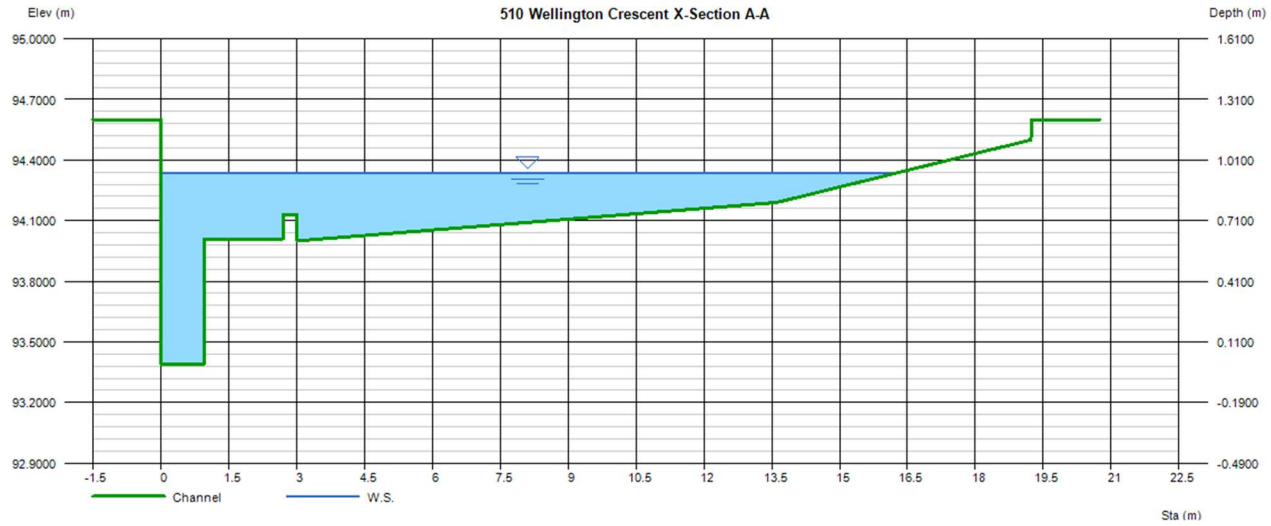


Figure 1 – Cross-Section A of Channel at Site

The HydraFlow Express model shows that the calculated overland peak flow rate of 2.987 m^3/s will produce a floodplain elevation of 94.46 m. A contour line delineating the floodplain elevation of 94.46 m is shown on Figure C1 in Appendix C. As shown in the figure, at an elevation of 94.46m the floodwater would spill between the houses towards Wellington Crescent.

Cross Section B

Cross section B models the cross section where the overland flow from Wellington and Weir Ave pass through the existing houses on Wellington Crescent. The modeled elevations were

taken from the topographic survey provided by J.H. Gelbloom (Ref. 3). The cross-section was limited to the available topographic information in the survey. In this cross section the elevation information from the Town of Oakville topographic mapping is not accurate enough to supplement the model. A manning's n value of 0.50 was assigned to the cross-section for the areas where the flows are blocked by a wood board fence. The channel cross-section, as seen in Figure 2, was modeled using HydraFlow Express to determine the capacity of the cross section. The area on either of the existing house was modelled and capacity below an elevation of 94.46m determined. The elevation of 94.46m was selected to match the flood level from the rear yard determined from Cross Section A-A. At this elevation we expect any additional overland flow to flow along Wellington Crescent towards Maplehurst Ave.

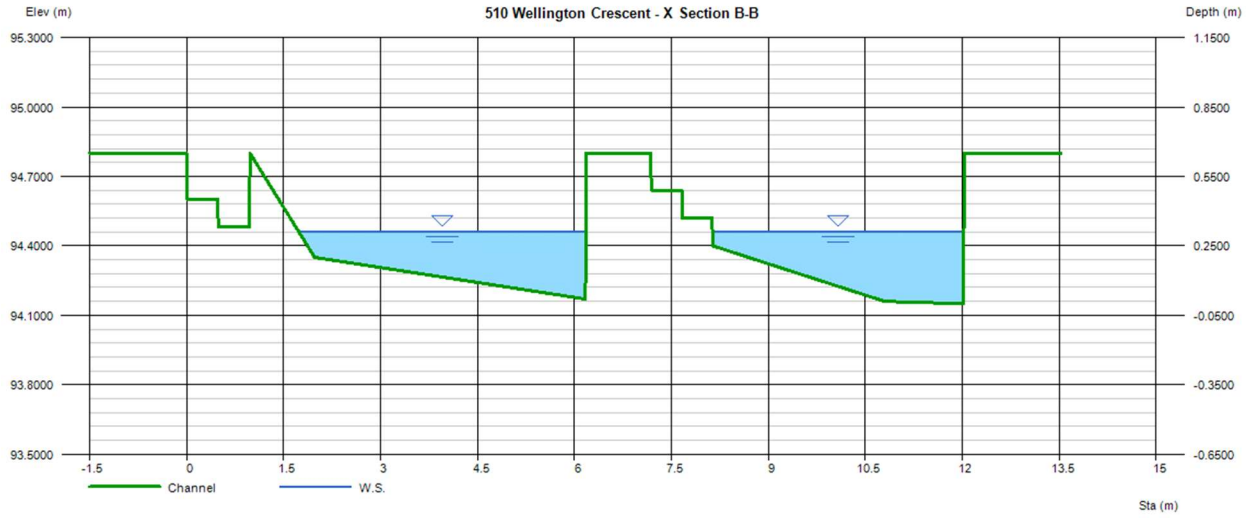


Figure 2 – Cross-Section B of Channel at Site

The HydraFlow Express model shows that the cross section has capacity to convey 0.081 m^3/s below the high water elevation of 94.46m. Given that the expected overland flow from Catchment 2 is 1.278 m^3/s, it is expected that the overland flow from this catchment primarily flows along Wellington Crescent towards Maplehurst Ave. A contour line delineating the floodplain elevation of 94.46 m is shown on Figure C1 in Appendix C. Based on the results of the existing conditions analysis, the proposed plan should be designed to convey at least 0.08m^3/s below an elevation of 94.46m.

Cross Section C

The grading design for the development has not yet been completed. Once completed an additional cross section will be cut to confirm that the grading provides the minimum conveyance required as described in the previous section.

Comparison to Appendix K of Wood Report (Ref. 2)

The results obtained from the calculations and modeling were compared to those shown in Figure RC-FL-3 of Appendix K (Ref. 2). We noted the following two conclusions:

1. That the remnant channel appears to have significantly less conveyance capacity through 510 Wellington than allotted in the model (Cross Section A)
2. That there is less capacity than expected to convey stormwater from catchment B towards the remnant channel between the existing houses (Cross Section B).

Conclusion 1 above indicates that the floodplain is expected to be higher than anticipated in the rear yard of 506 Wellington Crescent. Conclusion 2 indicates that the floodplain does not actually flow between the houses along Wellington Ave as suggested in the Wood Report. The overland flow will instead flow east along Wellington Crescent towards Maplehurst Ave. We expect to see such variations as we use more accurate topographic data for floodplain modelling. As shown in Figure 3 in Appendix D, in the Town of Oakville topographic data we see that the nearby Maplehurst Ave has a cross section elevation at approximately 94.00m (0.40m below the highwater level used in the modelling). Therefore the overland flow would instead flow primarily through Maplehurst Ave and not through the subject properties.

Design Recommendations

After completing an analysis of the existing conditions, we have the following recommendation for the grading design:

1. The rear yard of 510 Wellington should be graded to maintain the overland flow conveyance.
2. Where possible, the rear yard should be graded to increase the storage capacity of the lot, with the existing rear yard CB being the outlet.
3. The side yards of the proposed development should be designed to maintain the existing conveyance.

Cut Fill Analysis

A cut/fill analysis will be completed with the site grading plan. The report will be updated once the design information is available.

Conclusion and Next Steps

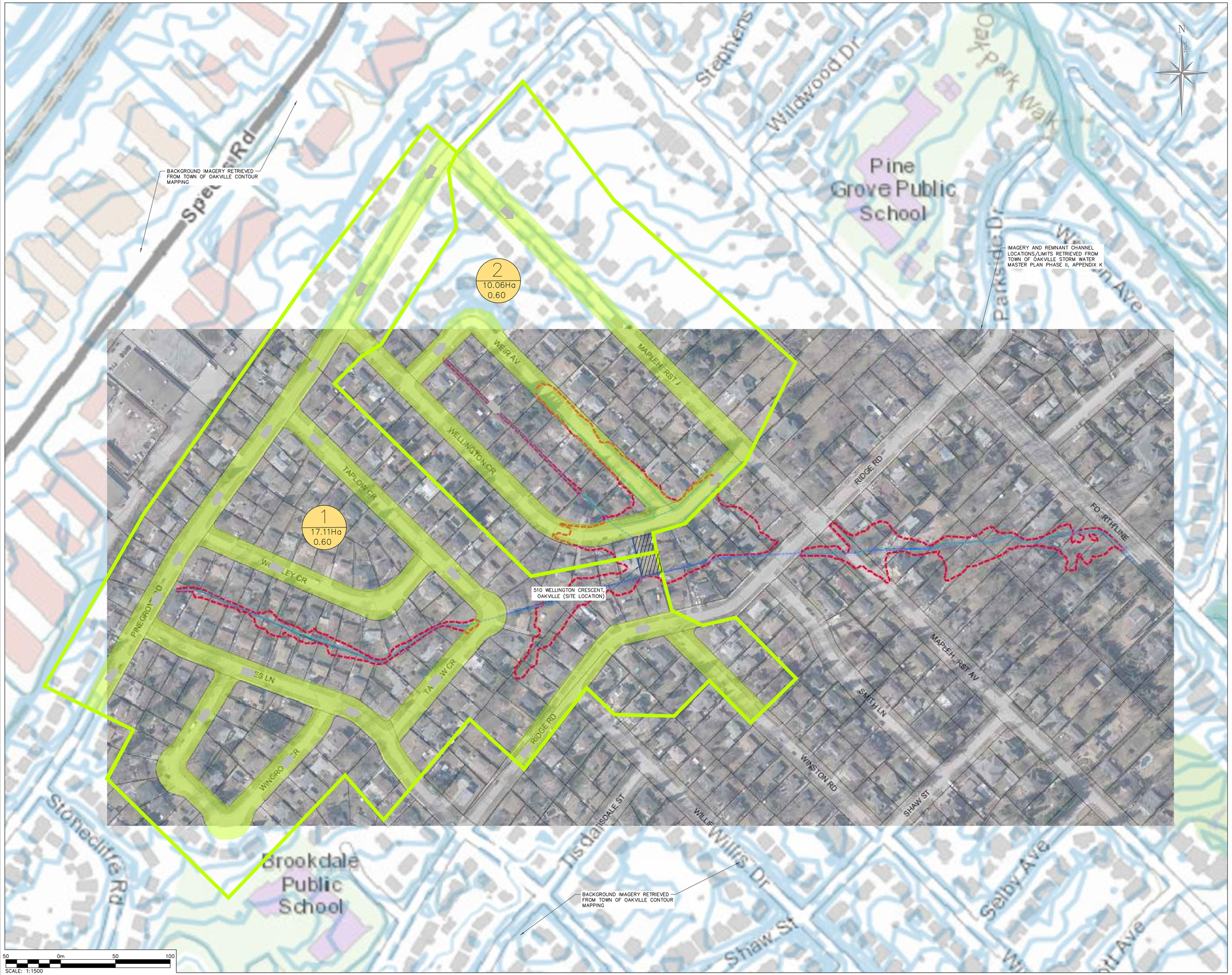
In conclusion, the catchment area, runoff coefficient, and peak flow calculation for the remnant channel adjacent to 510 Wellington Crescent were determined and modelled, resulting in a peak flow of 4.5903 m^3/s and flood elevation of 94.46m in the rear yard. The flood limits are delineated in Figure C1 in Appendix C and were found to be greater than the flood limit determined in the Wood model for the rear yard remnant channel. In the front yard of the property along Wellington Crescent the floodplain was found to flow east towards Maplehurst Crescent instead of flowing through the houses.

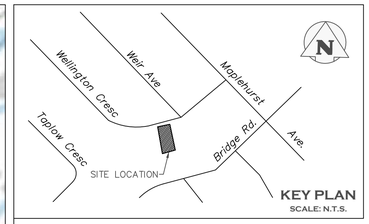
Thank you,

Wesley Taylor, P.Eng

WestX Inc.

Appendix A – Area Drainage Plan





LEGEND

- PROPERTY LINE
- CATCHMENT 1
- R.O.W.
- OVERLAND FLOW PATHWAY
- 100-YEAR STORM EVENT REMNANT CHANNEL FLOW LIMIT
- REMNANT CHANNEL
- UNDERGROUND CONVEYANCE

Project
510 WELLINGTON CRESCENT
OAKVILLE, ON

Drawing
FIGURE A1
AREA DRAINAGE PLAN

Project No.
23-0177

westX Civil Engineering
WESTX INC. CIVIL ENGINEERING
t. 905 526-3404
e. wesley@westx.engineering
w. www.westx.engineering

Appendix B – Peak Flow Calculations

westX
Civil Engineering

510 Wellington Crescent, Oakville
23-0177

Date: 2023.12
Design: WST

Rational Method Calculator

Catchment 1

Storm Event	a	b	c	Area (ha)	Runoff Coefficient "C"	Time of Conc. (min.)	Intensity (mm/hr)	Peak Flow (m^3/s)
2 Years	725.00	4.80	0.808	17.111	0.60	28.69	42.48	1.2114
5 Years	1170.00	5.80	0.843		0.60		59.14	1.6865
10 Years	1400.00	5.80	0.848		0.60		69.52	1.9827
25 Years	1680.00	5.60	0.851		0.60		82.95	2.3657
50 Years	1960.00	5.80	0.861		0.60		92.95	2.6509
100 Years	**2150.00**	**5.70**	**0.861**		**0.60**		102.22	2.9151

Burnsby-Williams

tc	28.69	
L	677	m
Sw	1.06	%
A	17.111	ha

(RL3-0)	**Area**	**% imp**	**C**
ROW	4.53	58.8	0.66
Lot	12.58	43.2	0.55
Total	**17.11**		**0.58**

Catchment 2

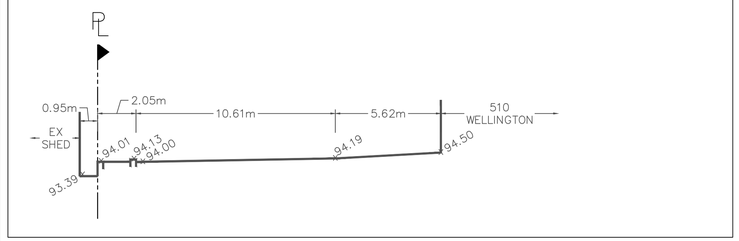
Storm Event	a	b	c	Area (ha)	Runoff Coefficient "C"	Time of Conc. (min.)	Intensity (mm/hr)	Peak Flow (m^3/s)
2 Years	725.00	4.80	0.808	10.058	0.60	29.61	41.56	0.6967
5 Years	1170.00	5.80	0.843		0.60		57.84	0.9697
10 Years	1400.00	5.80	0.848		0.60		67.99	1.1398
25 Years	1680.00	5.60	0.851		0.60		81.11	1.3597
50 Years	1960.00	5.80	0.861		0.60		90.87	1.5234
100 Years	**2150.00**	**5.70**	**0.861**		**0.60**		99.93	1.6751
						TOTAL PEAK FLOW		**4.5903**

Burnsby-Williams

tc	29.61	
L	645	m
Sw	0.93	%
A	10.058	ha

(RL3-0)	**Area**	**% imp**	**C**
ROW	2.33	58.8	0.66
Lot	7.72	43.2	0.55
Total	**10.06**		**0.58**

Appendix C – Floodplain Delineation and Cross Sections



A C1 REMNANT CHANNEL CROSS SECTION A

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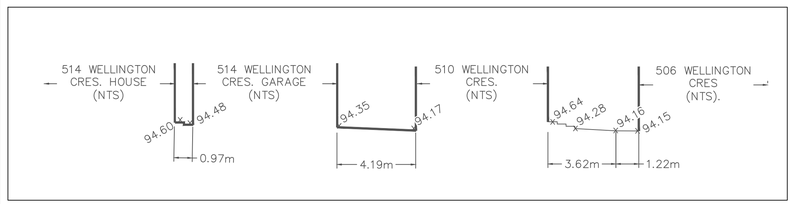
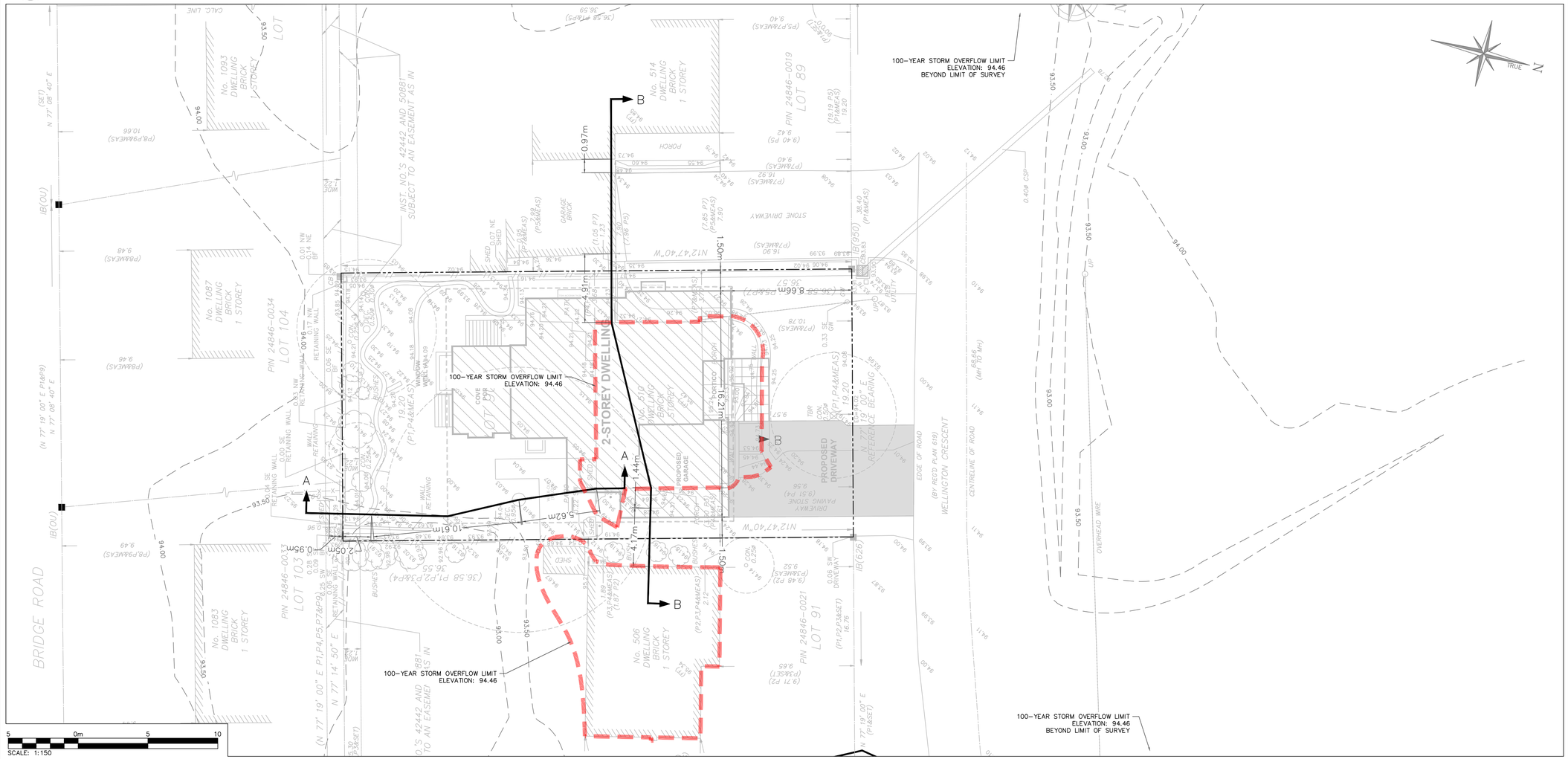


B C1 REMNANT CHANNEL CROSS SECTION B

SCALE: N.T.S.



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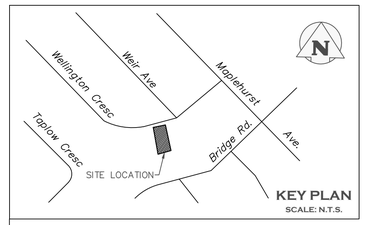

KEY PLAN
SCALE: N.T.S.

LEGEND

- PROPERTY LINE
- EXISTING FENCE
- EXISTING GRADE
- EXISTING HYDRO POLE
- 100-YEAR STORM OVERFLOW LIMIT

Project
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OAKVILLE, ON

Drawing
FIGURE C1
REMNANT CHANNEL CROSS SECTION AND FLOODPLAIN

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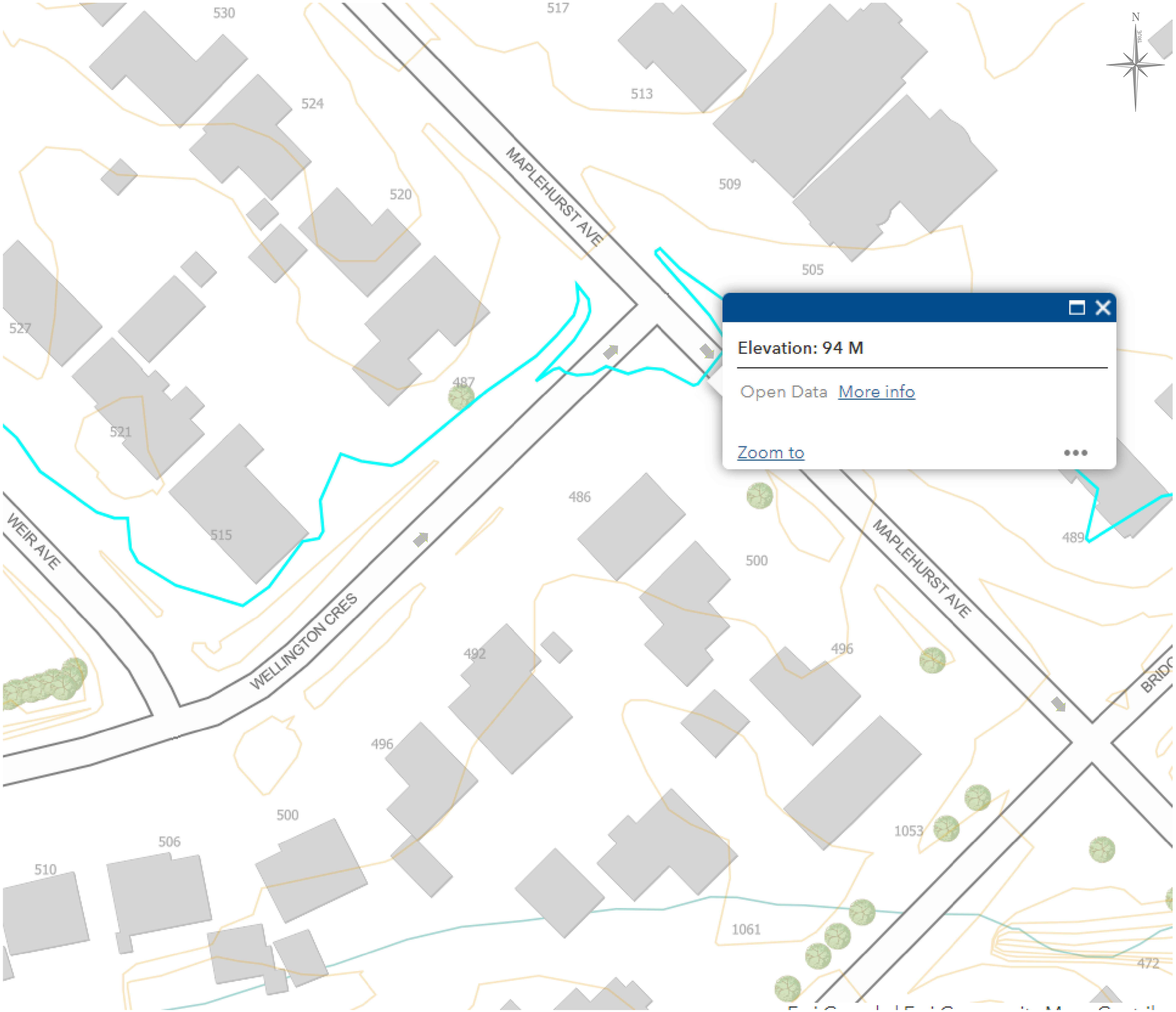
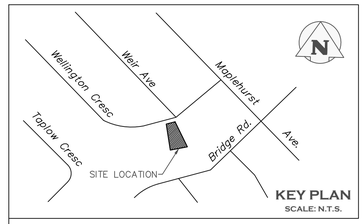
Appendix D – Overland Flow Route





LEGEND

- PROPERTY LINE
- CATCHMENT 1
- OVERLAND FLOW PATHWAY

BACKGROUND IMAGERY RETRIEVED FROM TOWN OF OAKVILLE TOPOGRAPHIC MAPPING

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Drawing
FIGURE 3
OVERLAND FLOW ROUTE

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