3171 Lakeshore Road West

Stormwater Management Report

October 2022

Submitted by:

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SUBMISSION HISTORY

Submission	Date	In Support Of	Distributed To
1st	January 2022	Site Plan Approval	Town of Oakville
2nd	October 2022	Site Plan Approval	Town of Oakville

1.0 INTRODUCTION

SCS Consulting Group Ltd. has been retained by Vogue Wycliffe (Oakville) Limited to prepare this Stormwater Management (SWM) report in support of the submission for Plan of Subdivision and Site Plan Approval from the Town of Oakville for the proposed re-development of the 3171 Lakeshore Road West property, located in the Town of Oakville.

1.1 Study Area

The proposed re-development is comprised of the following land uses (refer to the Site Plan in **Appendix A**):

A Plan of Subdivision consisting of:

- 3 Freehold Townhouses; and
- A Municipal Right-of-Way.

A Site Plan consisting of:

- 27 Condominium Townhouses;
- 8 Condominium Semi-Detached Lots; and
- A private condominium laneway.

The site is located predominantly within the Bronte Creek watershed in the Town of Oakville. As shown on **Figure 1**, the site is bound by Lakeshore Road West to the south, unopened municipal right-of-way to the east, and existing residential to the north and west.

The site is currently operating as a garden centre and is zoned as Residential Low (RL3-0).

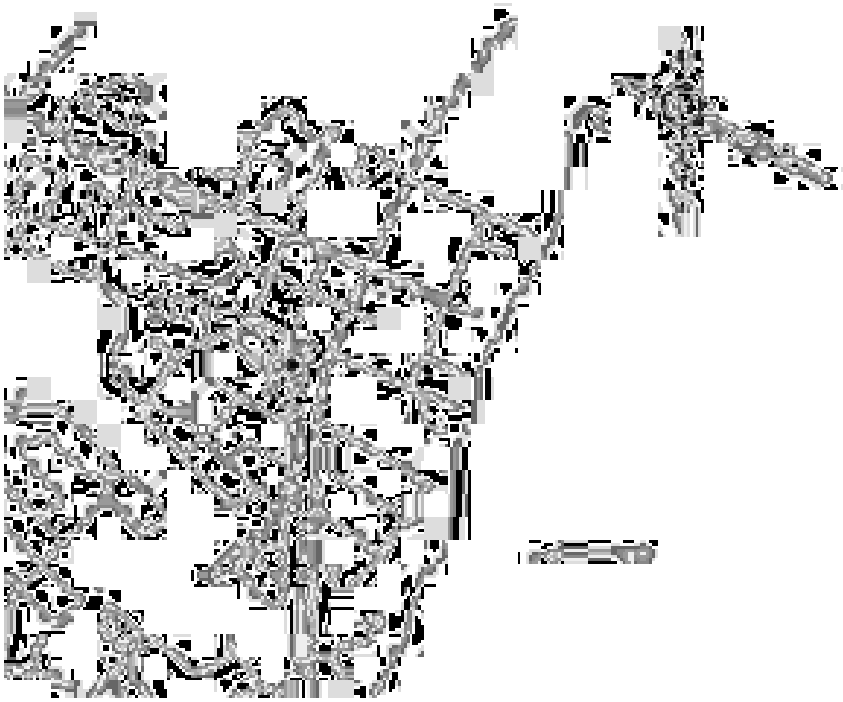

Figure 1: Site Location Plan

The proposed re-development is approximately 1.0 ha in size and consists of various types of condo townhouses and a proposed private road Access to the proposed re-development is off of Victoria Street (West of the proposed re-development) and Lakeshore Road West.

It should be noted that for the purposes of this report, south is defined as the direction of Lake Ontario per previous direction from the Town of Oakville. True north and the Site Plan north have been identified on all drawings and figures.

1.2 Purpose of the Report

This SWM report has been prepared in support of the Plan of Subdivision and Site Plan approval process. The detailed engineering design relating to site servicing and grading for the site will incorporate the concepts of the SWM measures outlined in this report.

The objectives of this report are to:

- Calculate the proposed stormwater runoff rate from the development; and,
- Determine suitable methods for attenuation and treatment of stormwater runoff.

1.3 Previous Documentation

The stormwater management strategy in this report was based on the following reports (relevant excerpts are included in **Appendix B**):

- Functional Servicing and Storm Water Management Report (FSSR), July 2019, prepared by SCS Consulting Group;
- Town of Oakville Stormwater Management Master Plan, dated November 2019.
- Town of Oakville Development Engineering Procedures and Guidelines Manual, dated January 2011; and
- MECP SWM Planning and Design Manual, dated March 2003.

2.0 STORM SERVICING

2.1 Existing Storm Sewer System

As shown on **Figure 2**, the sizes and locations of the existing storm sewers surrounding the site are:

- A 300 mm diameter storm sewer on Victoria St. (west of the proposed re-development) flowing west;
- A 600 mm diameter storm sewer and 100 mm diameter storm sewer on Victoria St. (east of the proposed re-development) flowing east; and
- Several lengths of storm sewer ranging in size from 300 - 450 mm diameter on Lakeshore Road West flowing east.

The Town of Oakville issued a Stormwater Management (SWM) Master Plan in November 2019 which provides a detailed major and minor system analysis of the Town of Oakville, including the drainage from the proposed re-development. It should be noted that no storm sewer upgrade recommendations were proposed for Victoria St. or Lakeshore Road West as part of the SWM Master Plan analysis. Relevant excerpts are provided in **Appendix B**.

2.2 Proposed Storm Sewer System

The storm sewer system (minor system) within the proposed re-development (**Drawing S-1**) is designed for the 5 year return storm as per the Town of Oakville standards. The storm sewer system was designed in accordance with the Municipality, Ontario Building Code and MECP guidelines, including the following:

- Pipes to be sized to accommodate runoff from a 5 year storm event;
- Minimum Pipe Size: 300 mm diameter
- Maximum Flow Velocity: 4.0 m/s;
- Minimum Flow Velocity: 0.75 m/s; and
- Minimum Pipe Depth: 1.2 m, 1.5 m where sump pumps are required.

The storm sewer system will typically be designed with a slope of 0.5%. The storm sewer will be constructed at a minimum depth of 1.5 m where sump pumps are required. The storm sewer depth is limited by the invert elevation of the existing downstream sewer on Victoria St. (west) and Lakeshore Road West. Sump pumps will be provided on all lots (where necessary) and will outlet to the proposed storm sewer.

Two oversized storm sewers (Superpipes) are proposed in the municipal right-of-way and condo laneway as shown on **Drawing S-1** to achieve stormwater management criteria for the site. The Superpipe sizing and associated infrastructure are discussed further in **Section 3.5.1**.

3.0 STORMWATER MANAGEMENT

3.1 Existing Drainage

As shown on **Figure 2**, based on the existing topography runoff from the proposed re-development is conveyed to Victoria St. (west of the proposed re-development), Victoria St. (east of the proposed re-development), and Lakeshore Road West. External drainage is generally conveyed away from the proposed re-development except for a small area at the southwest corner. The catchments shown on **Figure 2** correspond to the catchment boundaries provided in the Town of Oakville SWM Master Plan, the existing drainage boundaries based on the topographic survey were delineated in the FSR prepared by SCS Consulting dated July 2019, relevant excerpts (Figure 2.1) are provided in **Appendix B**.

Runoff conveyed to Victoria St. (west) is captured by an existing storm sewer or conveyed overland to Sheldon Creek. Runoff conveyed to Victoria St. (east)) and Lakeshore Road West is captured by an existing storm sewer or conveyed overland to Bronte Creek. The Victoria St. (east) major and minor system drainage combines with the Lakeshore Road West drainage just downstream of the proposed re-development at the intersection of Lakeshore Road West and Mississaga St.

There are no stormwater management controls on the existing site.

3.2 Allowable Release Rates

The catchments shown on **Figure 2** correspond to the catchment boundaries provided in the Town of Oakville SWM Master Plan. In the SWM Master Plan, Catchment 101 and 102 were modelled assuming the entire areas are conveyed to Victoria St. (west) and Lakeshore Road West respectively. The allowable release rates to the Victoria St. (west) and Lakeshore Road West major and minor systems are based on these drainage boundaries.

The allowable release rates for the proposed re-development are the SWM Master Plan peak runoff rates up to and including the 100 year storm event. For runoff conveyed directly to an existing storm sewer system, the allowable release rate is the respective SWM Master Plan 5 year peak runoff rate. The rational method was used to determine the target release rates from the site based on Intensity-Duration-Frequency (IDF) rainfall curves from the Town of Oakville SWM Master Plan. Supporting calculations are provided in **Appendix C**. **Table 3.1** summarizes the SWM Master Plan peak flows from the site to both the Victoria St. (west) and Lakeshore Road West outlets.

Table 3.1: Summary of Allowable Peak Flows

Return Period Storm	Victoria St. (West) (L/s)	Lakeshore Road West (L/s)
5 Year	26.8	140.6
100 Year	47.0	247.2

3.3 Stormwater Runoff Control Criteria

The following stormwater runoff control criteria have been established based on the Town of Oakville Stormwater Management Master Plan (2019) and the MECP Stormwater Management Planning and Design Manual (2003). The stormwater runoff criteria are summarized below in **Table 3.2**.

Table 3.2: Stormwater Runoff Control Criteria

Criteria	Control Measure
Quantity Control	Control proposed peak flows to SWM Master Plan peak flows for the 2 through 100 year storm events. Where runoff is conveyed to an existing storm sewer, limit the maximum peak flow to the SWM Master Plan 5 year storm event peak flow.
Quality Control	For site plan drainage, on-site quality control is required by an oil-grit separator before outletting to the municipal storm sewer.
Erosion Control	Detention of the 25 mm rainfall runoff for a minimum of 24 hours.
Water Budget	Measures to minimize development impacts on the water balance to be incorporated into the development design (i.e. infiltration measures).

3.4 Stormwater Best Management Practices Selection

In accordance with the Ministry of Environment Stormwater Management Planning and Design Manual (2003), a review of stormwater management best practices was completed in the FSSR using a treatment train approach, which evaluated lot level, conveyance system and end-of-pipe alternatives. The potential best management practices were evaluated based on the stormwater management objectives listed in **Table 3.2**.

Table 3.3 below summarizes the recommended stormwater management Best Management Practices (BMPs) for the proposed re-development as outlined in the FSSR.

Table 3.3: Summary of Recommended Stormwater Best Management Practices (BMPs)

Stormwater Management Control	Recommended BMP
At-Source Controls	Increased Topsoil Depth
	Roof Overflow to Grassed Areas
	Permeable Pavers
	Bioretention Facility
End-Of-Pipe Controls	Underground Stormwater Detention System
	Oil-Grit Separator

3.5 Proposed Storm Drainage

The proposed major and minor system flow patterns and drainage areas are shown on **Figure 3**.

Major and minor system overland flow from Catchment 201 (0.20 ha) will be captured via proposed catchbasins, and conveyed via internal storm sewers, outletting to the existing Victoria St. (west) storm sewer. A superpipe attenuation facility under the municipal road will provide quantity control for Catchment 201 before the flow is released to the existing storm sewer on Victoria St. (west). During the 100 year storm event, some flows will be released to the Victoria St. (west) major system (via overland flow).

Major and minor system overland flow from Catchment 202 (0.24 ha) will be conveyed uncontrolled overland to Lakeshore Road West, which generally matches the existing drainage condition.

Major and minor system runoff from Catchment 203 (0.67 ha) will be captured via proposed catchbasins and conveyed via internal storm sewers, outletting to the existing Lakeshore Road West storm sewer. A superpipe attenuation facility under the private condominium road will provide quantity control for Catchment 203 before the flow is conveyed through an oil-grit separator (OGS) and released to the existing storm sewer on Lakeshore Road West. Permeable paver parking spots are proposed throughout the re-development to meet water budget criteria.

Major and minor system overland flow from Catchment 204 (0.06 ha) will be conveyed uncontrolled overland to the unopened municipal right-of-way to the east of the proposed re-development which generally drains towards Victoria St. (east).

Runoff from the 100 year storm event will be captured in one location as shown on **Figure 3**. Runoff from the private condominium development (Catchment 203) will be captured in a low point in the entrance laneway at the southeastern corner of the proposed re-development. It should be noted that while the peak flow from 100 year storm event for Catchment 201 is not fully captured, the proposed catchbasins will have a sufficient inlet capacity to convey the peak flow. Inlet capacity is discussed further in **Section 3.5.4**.

3.5.1 Quantity Control

The proposed 100 year piped release rate from Catchment 201 will be controlled to the existing 5 year peak runoff rate to Victoria Street (west) via 43.0 m of 825 mm diameter concrete superpipe beneath the municipal road. The superpipe will release runoff from Catchment 201 to the existing Victoria St. (west) storm sewer, therefore the maximum release rate during the 100 year storm event from the superpipe will be limited to 24.8 L/s which is less than the allowable 5 year peak runoff rate entering the storm sewer from Catchment 101 (26.8 L/s). Some major system flow will be released uncontrolled to Victoria St. (west) during the 100 year storm event. Approximately 18.2 L/s will be released uncontrolled for a total proposed 100 year peak release rate of 43.0 L/s which is equal to the allowable 100 year peak runoff rate from Catchment 101 (47.0 L/s). Runoff entering the superpipe will be detained by an 85 mm diameter orifice plate on the downstream side of the control manhole (MH12) on Victoria St. (west). The location of the control manhole is shown on **Figure 3** and on **Drawing S-1**. Orifice plate, superpipe parameters, and peak flow calculations are provided in **Appendix C**. A dual

drainage hydrology (PCSWMM) model was prepared to determine potential impacts on the major and minor systems downstream of the proposed re-development. The results of the PCSWMM analysis are discussed in **Section 3.6**.

The proposed 100 year piped release rate from Catchment 203 will be controlled to the existing 5 year peak runoff rate to Lakeshore Road West via 95.0 m of 1200 mm diameter concrete superpipe beneath the private road. The superpipe will release runoff from Catchment 203 to the existing Lakeshore Road West storm sewer, therefore the maximum release rate during the 100 year storm event from the superpipe will be limited to 133.6 L/s which is less than the allowable 5 year peak runoff rate entering the storm sewer from Catchment 102 (140.6 L/s).

Runoff from Catchment 202 is released uncontrolled to Lakeshore Road West. It should be noted that Catchment 204 is conveyed uncontrolled to Victoria St. (east) but is eventually conveyed to the Lakeshore Road West major and minor system at the intersection of Lakeshore Road West and Mississauga St. Therefore, the proposed 100 year release rate to the Lakeshore Road West system includes Catchments 202, 203, and 204. Approximately 98.3 L/s will be released uncontrolled from Catchments 202 and 204 for a total proposed 100 year peak release rate of 231.9 L/s which is less than the allowable 100 year peak runoff rate from Catchment 102 (247.2 L/s). Runoff entering the superpipe will be detained by a 200 mm diameter orifice tube from the superpipe end cap at MHTEE1 to the proposed OGS unit. The location of the orifice is shown on **Figure 3** and on **Drawing S-1**. Orifice tube, superpipe parameters, and peak flow calculations are provided in **Appendix C**. The proposed release rates to Victoria St. (east) and Lakeshore Road West were examined as part of the PCSWMM analysis in **Section 3.6**.

Additional peak runoff release rate calculations were prepared for the 5 year storm event to confirm that the combined flows are less than or equal to the 5 year allowable runoff rates. The proposed peak release rate to the Victoria St. (west) and Lakeshore Road West storm systems are 14.4 L/s and 133.2 L/s respectively which is less than the 5 year allowable runoff rates of 26.8 L/s and 140.6 L/s respectively.

Refer to the proposed servicing on **Drawing S-1** and orifice plate details on **Drawing D-1**. Calculations are provided in **Appendix C**. A summary of the quantity control provided is listed in **Table 3.4** and **Table 3.5**.

Table 3.4: Summary of Release Rates

Storm Outlet	Storm Event	Allowable Release Rate to Storm Sewer (L/s)	Controlled Site Release Rate (L/s)	Uncontrolled Site Release Rate (L/s)	Total Allowable Site Release Rate (L/s)	Total Proposed Site Release Rate (L/s)
Victoria St. (west)	5 Year	26.8	14.4	0.0	26.8	14.4
	100 Year		24.8	18.2	47.0	43.0
Lakeshore Road West	5 Year	140.6	84.6	48.6	140.6	133.2
	100 Year		133.6	98.3	247.2	231.9

Table 3.5: Summary of Superpipe Storage Volumes

Storm Outlet	Storm Event	Total Required Storage (m^3)	Underground Storage System Provided (m^3)
Victoria St. (west)	5 Year	19.6	23.0
	100 Year	23.0	
Lakeshore Road West	5 Year	38.1	107.4
	100 Year	106.8	

*Note: the full storage volume will be utilized during the 100 year storm event as the pipe will fill completely before spilling uncontrolled to Victoria St. (west)

3.5.2 Quality Control

At-source quality control for all catchments will be provided by a treatment train of Best Management (BMP) techniques which will include additional topsoil depth on all grassed areas and directing roof leaders to grass. The quality control provided by the grassed areas and roof leaders to grass has not been quantified.

Runoff from Catchment 201 will not have quality control as it will be conveyed directly to the municipal storm sewer system where it will receive quality control from any existing devices operated by the Town of Oakville.

Runoff from Catchment 202 and 204 will be from roofs and yards which is generally considered to be "clean", therefore no quality control is proposed for these catchments.

Quality control for runoff from Catchment 203 will be provided by an EF06 (or approved equivalent) oil-grit separator (OGS). The OGS is sized to achieve 60% TSS Removal using the ETV particle size distribution. Sizing calculations, as well as operation and maintenance information are provided in **Appendix D**.

3.5.3 Erosion Control

The controlled areas of the proposed re-development (Catchment 201 and Catchment 203) are too small to practically detain the runoff volume from the 25 mm storm event over 24 hours, therefore it will not be possible to provide erosion control. It is typical that for relatively small sites of less than 2 ha, erosion control in the form of stormwater detention is not required.

3.5.4 Overland Flow Conveyance

Right-of-way capacity calculations were prepared for the proposed private laneway. The capacity provided by the private laneway will be sufficient to convey major system flows to the 100 year capture point at the laneway entrance to Lakeshore Road West. One 1.2 m x 0.6 m and one 0.6 m x 0.6 m catchbasins with Borden Grates are required at the 100 year capture point to convey the peak runoff rate into the proposed superpipe. The 100 year capture point was sized assuming 50% blockage. In an emergency event, runoff in excess of the capacity of the superpipe and/or 100 year capture point will be conveyed to Lakeshore Road West.

Calculations are provided in **Appendix C**. Refer to **Drawing GR-1** for grate elevation and ponding depth.

Right-of-way capacity calculations were not prepared for the municipal right-of-way as it is the most upstream end of Victoria St. (west). The two double catchbasins proposed at the low points of the cul-de-sac are sized to capture up to the 100 year peak flow assuming 50% blockage. Runoff in excess of the capacity of the Superpipe and/or 100 year capture point will be conveyed to Victoria St. (west). Calculations are provided in **Appendix C**. Refer to **Drawing GR-1** for grate elevation and ponding depth.

As shown in **Table 3.4** the 100 year peak release rates to Victoria St. (west) and Lakeshore Road West are less than the allowable runoff rates, therefore the major system flows on Victoria St. (west) and Lakeshore Road West will generally be maintained. A PCSWMM analysis was prepared to confirm overland flow conveyance in the major systems downstream of the proposed re-development and is discussed further in **Section 3.6**.

3.5.5 Water Budget

Where feasible, measures to minimize impacts on the water budget will be incorporated into the development design. GeoBase Solutions has prepared water budget calculations for the proposed re-development to show that the water budget for the site will be maintained in the proposed condition, the water balance report is provided in **Appendix B**.

The existing infiltration and runoff volumes for the study area are approximately 1,440 m^3 and 3,820 m^3 respectively. Without mitigation, the proposed re-development infiltration and runoff volumes are approximately 830 m^3 and 5,820 m^3 respectively.

As outlined in **Section 3.5**, infiltration measures, such as permeable pavers will be implemented, to maintain existing infiltration rates to the extent feasible. It is anticipated that a proposed infiltration volume of approximately 1,010 m^3 and a runoff volume of approximately 5,640 m^3 can be achieved through the proposed mitigation measures. It should be noted that additional infiltration measures, such as rear yard infiltration trenches, cannot be incorporated into the re-development design since there will be insufficient space to meet the minimum foundation setback of 5.0 m.

3.5.6 Proposed Mitigation Measures – Permeable Pavers

Permeable pavers will capture 25 mm of runoff, from the parking areas only as shown on **Figure 3**. Four parking areas within private property will be composed of Unilock permeable pavers (or approved equivalent) overtop of 0.65 m of various sizes of crushed stone. The layers of crushed stone will be wrapped in Terrafix 270R geotextile (or approved equivalent). Drainage will sheet flow over the parking area where it will infiltrate through the pavers and into the underlying stone bedding. A 100 mm diameter PVC underdrain will be provided a minimum distance of 0.1 m above the bottom of the crushed stone base to convey excess runoff to the closest catchbasin. Permeable paver sizing calculations are included in **Appendix C** and details are shown on Drawing L3 prepared by MHBC provided in **Appendix B**.

3.6 SWM Master Plan PCSWMM Model Update

The proposed re-development was incorporated into the dual drainage (PCSWMM) model prepared by the Town in support of the Town of Oakville SWM Master Plan (November 2019) to determine the impact of the proposed re-development on the existing major and minor systems as well as any backwater effects on the proposed superpipe facility described in **Section 3.5.1**. A download link for the Town and proposed re-development model files is provided in **Appendix E**.

As described in **Section 3.1**, under existing conditions a portion of the site is conveyed to Sheldon Creek and the remainder is conveyed to Bronte Creek. The site area is correspondingly distributed between PCSWMM catchments S8_36 (Catchment 101 to Sheldon Creek) and S9_9 (Catchment 102 to Bronte Creek). An excerpt of the PCSWMM model schematic showing the location of the site within the Town model is provided in **Appendix E** for reference. The site area and associated impervious area was removed from the PCSWMM catchments noted above to determine the impact that development of that area would have on downstream conveyance systems. A summary of the catchment area and impervious area for the original PCSWMM catchments, the site catchments, and the modified catchments is provided in **Table 3.6** below. It should be noted that the impervious area of Catchment 102 was underestimated in the original S9-9 parameters resulting in an unrealistic imperviousness for the remainder of the catchment (97%), therefore the catchment imperviousness was maintained as 51.4%.

Table 3.6: Summary of Existing PCSWMM Model Areas

Parameter	Original S8_36	SCS Catchment 101	Modified S8_36	Original S9_9	SCS Catchment 102	Modified S9_9
Area (ha)	1.594	0.204	1.391	1.380	0.969	0.411
Imperv. Area (ha)	0.942	0.052	0.891	0.709	0.309	0.211
Imperv. (%)	59.1	25.3	64.1	51.4	31.9	51.4

As described in **Section 3.5**, under proposed conditions runoff continues to be conveyed to Sheldon Creek (Catchment 201) and Bronte Creek (Catchments 202-204). Catchments 203 and 204 are proposed to be uncontrolled. To best replicate the existing modelling of the re-development area, catchment 203 has been combined with the associated PCSWMM catchment (S9_9). The percent routed has also been updated to account for the re-development catchment. A summary of the catchment S9_9 parameters is provided in **Table 3.7** below. Catchment 201, 203, and 204 have been added as separate PCSWMM catchments with Catchment 201 and 203 being routed through their respective proposed superpipe storage facilities before outletting to the existing minor system (Junction O_0160_6768 and Junction O_0160_400804 respectively) and Catchment 204 being conveyed to the existing major system node on Victoria St. (east) (Junction O_0160_6138-S). The laneway sections from the 100 year capture point in Catchment 203 to Lakeshore Road were also added to the model to allow for a spill condition and outlet to the Lakeshore Road West major system (Junction O_0160_400804-S). Similarly, a spill condition was provided for Catchment 201 using the right-of-way section attributed to Victoria St. (west) in the Town model. A summary of the

PCSWMM catchments created or modified as part of the PCSWMM analysis are provided in **Appendix E**.

Table 3.7: Summary of Combined PCSWMM Model Areas

Parameter	Modified S9_9	SCS Catchment 202	Combined S9_9
Area (ha)	0.411	0.245	0.656
Imperv. Area (ha)	0.211	0.108	0.319
Imperv. (%)	51.4	44	49
Routed (%)	40	71	50

The 5 year and 100 year storm events were modelled using the SWM Master Plan and the updated PCSWMM model. Printouts of the major and minor system profiles immediately downstream of the proposed re-development are provided in **Appendix E** which show the depth and peak flows in the conveyance systems.

In general, the peak flows and depths in the Victoria St. (east) and Victoria St. (west) major and minor systems will be maintained in both the 5 year and 100 year storm events. The peak flows and depths will generally be maintained in the Lakeshore Road West minor system in the 5 year and 100 year storm events and the major system in the 5 year storm event. The peak flows in the Lakeshore Road West major system will be significantly reduced in the 100 year storm event. Therefore, the proposed uncontrolled and controlled release rates will not negatively impact the major and minor systems on Victoria St. (east), Victoria St. (west), and Lakeshore road downstream of the proposed re-development.

It should be noted that the proposed laneway superpipe is shown to reach maximum capacity for a limited time during the design storm event with some flows spilling out of the laneway entrance to the Lakeshore Road west right-of-way. However, given the results presented above this is acceptable because the additional major system flow is still significantly less than in the existing condition. Similarly the cul-de-sac superpipe is shown to fill completely and spill to Victoria St. (west) as intended. Therefore, the superpipe and orifice sizing conducted using the modified rational spreadsheet as outlined in **Section 3.5.1** is acceptable.

4.0 EROSION AND SEDIMENT CONTROL DURIING CONSTRUCTION

To ensure stormwater runoff during the construction phase does not transport sediment to the existing municipal infrastructure, catchbasin sediment control devices have been proposed on Lakeshore Road West along the frontage of the site, in addition to sediment control fence around the perimeter of the site and a mud mat at the construction entrance. The existing west asphalt driveway will be utilized as a mud mat to limit disturbance to the Lakeshore Road right-of-way. Tree preservation fence will be provided in accordance with the landscape drawings prepared by MHBC.

These measures are designed and constructed per the "Erosion and Sediment Control Guide for Urban Construction" document (TRCA, 2019). These measures, as well as any additional information pertaining to ESC Controls, can be found on **Drawing ESC-1**, **ESC-2**, and **ESC-3** provided in **Appendix F**. All reasonable measures will be taken to ensure sediment loading to the adjacent storm sewer systems is minimized both during and following construction.

The following monitoring and record keeping will be ensured during construction:

- All temporary erosion and sediment controls will be routinely inspected (at minimum once a week) and maintained in proper working order;
- All temporary erosion and sediment controls will be inspected after each rainfall event;
- All necessary repair works will be executed within a 48 hour period;
- No removal of temporary erosion and sediment controls prior to the stabilization of the area; and
- Minimize sediment transport during and following construction.

A 'weekly' monitoring report will be completed after every visit outlined above. The primary contact for this will be Pete Stelmach of SCS Consulting Group Ltd. He can be reached at 647-999-5189.

5.0 SUMMARY

This report describes a stormwater management plan that services the proposed 3171 Lakeshore Road West, Oakville re-development in support of the submission for Plan of Subdivision and Site Plan Approval from the Town of Oakville.

Quantity Control:

- Runoff from the proposed re-development to the Victoria St. (west) and Lakeshore Road West storm systems will be limited to the allowable release rates based on the Town of Oakville Stormwater Management Master Plan;
- Stormwater quantity control will be achieved through two orifice controls with stormwater storage provided by underground superpipes in the municipal right-of-way and the private laneway.

Quality Control

- The water quality objective is satisfied by reducing the TSS loading at source as many of the site modifications are land uses that do not require water quality treatment by inherently contributing clean runoff (roofs, lawns, gardens, additional topsoil depth).
- Additional quality control will be provided for the private laneway drainage by an oil-grit separator sized for 60% TSS removal with the ETV particle size distribution.

Erosion Control

- The study area is too small to practically detail the runoff volume from the 25 mm storm event over a minimum of 24 hours.

Storm Servicing

- Storm runoff will be conveyed by storm sewers designed in accordance with Municipality and MECP criteria;
- Storm sewers will generally be designed for the 5 year storm event where superpipe is not proposed; and
- Adequate 100 year overland flow routes and capture locations will be provided.

Water Budget:

- The proposed re-development will result in a net decrease in infiltration volume of 424 m^3/yr (total infiltration volume of 1,012 m^3/yr) and a net increase in runoff volume of 1,822 m^3/yr (total runoff volume of 5,638 m^3/yr).
- Best efforts to match existing infiltration volumes have been provided through permeable paver parking spots.

PCSWMM Analysis:

- The Town of Oakville PCSWMM model was updated to incorporate the proposed re-development.
- The results of the model show that the proposed re-development will not have a negative impact on downstream major and minor systems.

Erosion and Sediment Control

- Erosion and Sediment control measures to facilitate construction of the site are proposed including sediment control fence, access roads, check dams, etc.

Respectfully Submitted:

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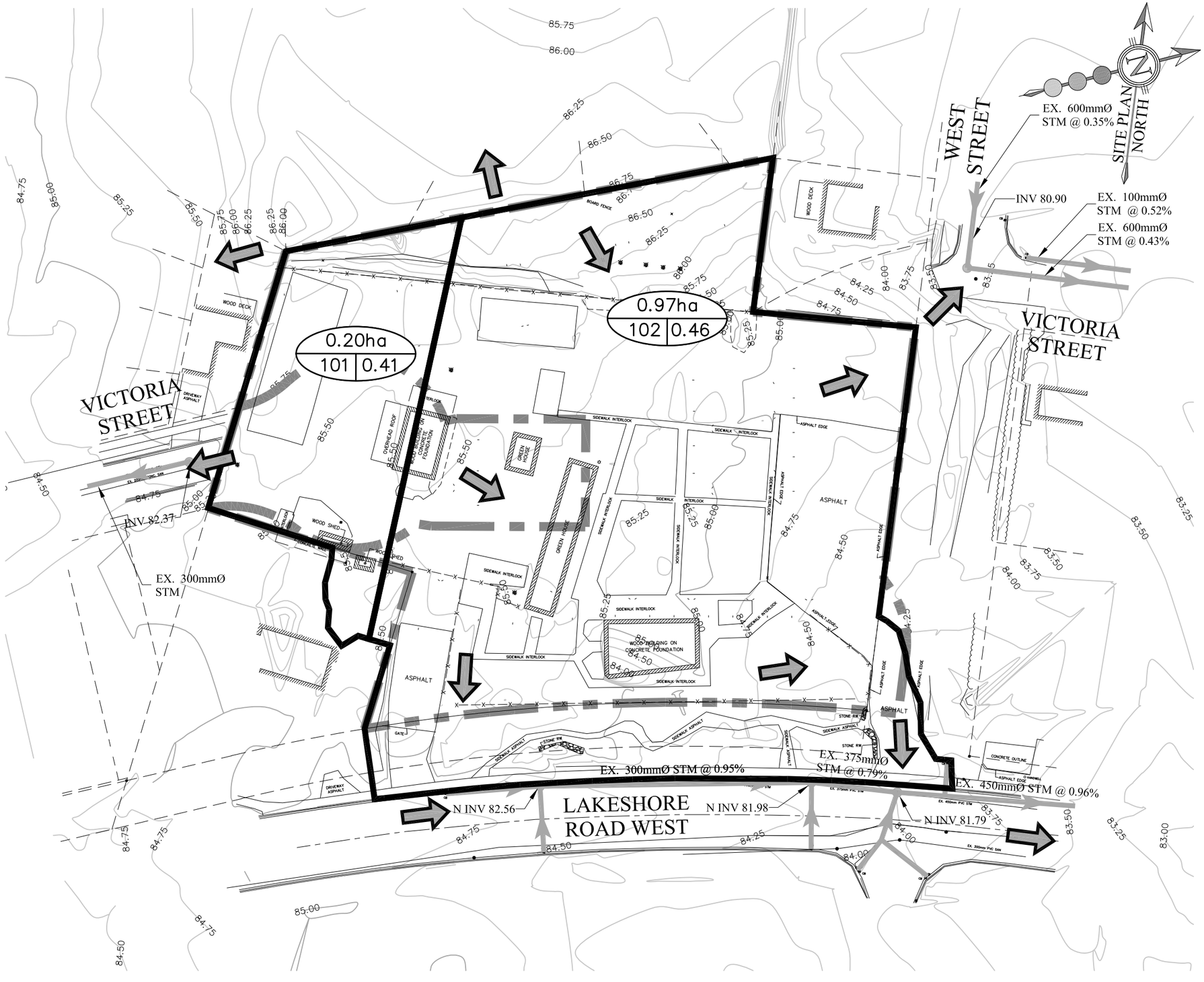

LEGEND:

- LIMIT OF DEVELOPMENT
- LIMIT OF SUBDIVISION
- MAJOR SYSTEM - OVERLAND FLOW
- STORM DRAINAGE BOUNDARY (PER TOWN OF OAKVILLE SWM MASTER PLAN, 2019)
- 0.20ha / 101 | 0.41 — DRAINAGE AREA (HECTARES); RUNOFF COEFFICIENT; CATCHMENT ID
- 255.50 — EXISTING CONTOURS
- EXISTING STORM SEWER AND MANHOLE

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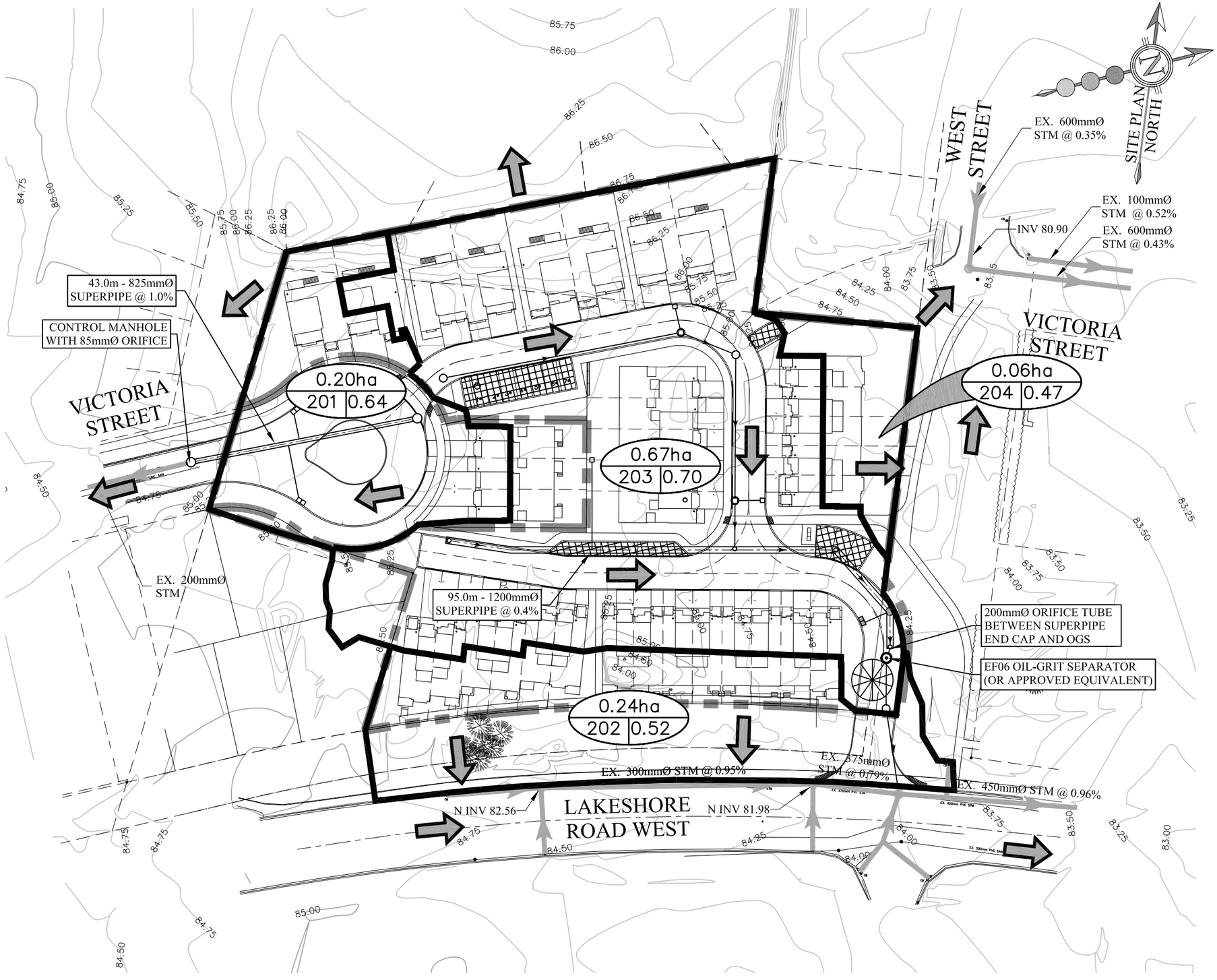
3171 LAKESHORE ROAD WEST, OAKVILLE

EXISTING STORM DRAINAGE PLAN

DESIGNED BY: N.D.M.	CHECKED BY: S.M.S.
SCALE: 1:750	DATE: OCTOBER 2022
PROJECT No: 1930	FIGURE No: 2



LEGEND:

- LIMIT OF DEVELOPMENT
- LIMIT OF SUBDIVISION
- MAJOR SYSTEM - OVERLAND FLOW
- PROPOSED STORM DRAINAGE BOUNDARY
- DRAINAGE AREA (HECTARES)
- RUNOFF COEFFICIENT
- CATCHMENT ID
- EXISTING CONTOURS
- EXISTING STORM SEWER AND MANHOLE
- PROPOSED STORM SEWER AND MANHOLE
- PROPOSED SUPERPIPE
- OIL-GRIT SEPARATOR MANHOLE
- 100 YEAR CAPTURE LOCATION
- PERMEABLE PAVERS

SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

3171 LAKESHORE ROAD WEST, OAKVILLE

PROPOSED STORM DRAINAGE PLAN

DESIGNED BY: N.D.M.	CHECKED BY: S.M.S.
SCALE: 1:750	DATE: OCTOBER 2022
PROJECT No: 1930	FIGURE No: 3

APPENDIX A

SITE PLAN

SITE STATISTICS SUMMARY (WITH OVERALL LOT AREA

DRAFT PLAN OF SUBDIVISION PART OF LOT 32, CONCESSION 4, SOUTH OF DUNDAS STREET (GEOGRAPHIC TOWNSHIP OF TRAFALGAR) AND BLOCK 79, REGISTERED PLAN M-257 TOWN OF OAKVILLE REGIONAL MUNICIPALITY OF HALTON

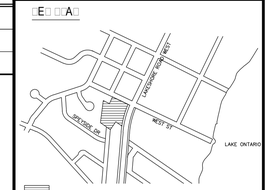
ZONING :	RM1-XX
OVERALL LOT AREA: *(LOT AREA OWNED BY DEVELOPER)*	9,925.86m2 2.45 ACRES 1.00 Ha
SITE AREA: *(SITE AREA, NOT INCLUDING CUL-DE-SAC/STREET TOWNS)*	8,193.89m2 2.03 ACRES 0.82 Ha
O.B.C. BUILDING CLASSIFICATION	PART 9, GROUP C 3 STOREY BUILDINGS/SEMIS
GROSS FLOOR AREA:	7,561.20m2 (92.28% OF SITE AREA)
TOTAL UNIT COVERAGE:	2,836.23m2 (34.62% OF SITE AREA)
DENSITY 32 UNITS TOTAL *(NOT INCLUDING 3 STREET TOWNS)*	39.02 PER Ha 15.76 PER ACRES
PARKING :	*27 TOWN HOMES RESIDENCE PARKING PROVIDED (1 INTERNAL & 1 EXTERNAL) 54 SPACES TOTAL*
	8 SEMI-DETACHED HOMES RESIDENCE PARKING PROVIDED (2 INTERNAL & 2 EXTERNAL) 32 SPACES TOTAL
	VISITOR PARKING: 35 x 0.25 = 8.75 (9 VISITOR PARKING REQUIRED) 14 VISITOR PARKING PROVIDED (INCLUDES 1 ACCESSIBLE SPACE)

UNIT COUNT

10.35m SEMI DETACHED (INCLUDES 2-11.60m SEMI DETACHED)	8
5.50m DUAL FRONTAGE TOWN HOME	27
TOTAL	35 UNITS

- PROPOSED VALVE
- HYDRANT
- WATER SERVICE
- CATCH BASIN
- CABLE TELEVISION PEDESTAL
- SUMP PUMP
- FF FINISHED FLOOR ELEVATION
- ML FINISHED MAIN LEVEL ELEVATION
- UF UNDERSIDE FOOTING ELEVATION
- BF FIN. BASEMENT FLOOR SLAB
- TFW TOP OF FOUNDATION WALL
- GF TOP OF GROUND FLOOR
- ML TOP OF MAIN LEVEL
- # No. OF RISERS
- LP LIGHT POLE
- TRANSFORMER
- DOUBLE STM./SAN. CONNECTION
- SINGLE STM./SAN. CONNECTION
- BELL PEDESTAL
- UFR UNDERSIDE FOOTING AT REAR
- UFF UNDERSIDE FOOTING AT FRONT
- UFS UNDERSIDE FOOTING AT SIDE
- W.O.D. WALK OUT DECK
- W.O.B. WALK OUT BASEMENT
- REV REVERSE PLAN
- STREET SIGN
- MAIL BOX
- RETAINING WALL
- CHAIN LINK FENCE (SEE LANDSCAPE PLAN)
- ACOUSTICAL FENCE (SEE LANDSCAPE PLAN)
- WOOD SCREEN FENCE (SEE LANDSCAPE PLAN)
- HYDRO SERVICE LATERAL
- HYDRO METER
- GAS METER
- SWALE DIRECTION
- EMBANKMENT
- PROVIDE 1/4" DIA. CLEAR STONE IN THIS AREA
- THIS LOT CONTAINS ENGINEERED FILL
- AC AIR CONDITIONER REQUIRED
- RAIN WATER DOWNSPOUT LOCATION (DISCHARGE ONTO SPLASHPAD)
- SIDE WINDOW LOCATION
- EXTERIOR DOOR LOCATION
- EXTERIOR DOOR LOCATION
- REDUCE SIDE YARD

north arrow



10.65m SEMI DETACHED

LOT No.	Model Type	G.F.A (sq.m.)	G.F.A. Per Lot (%)	Coverage (sq.m.)	Lot Area (sq.m.)	Coverage (%)	Driveway Area (m2)	Soft Landscape Area (m2)	Soft Landscape (%)	Lot Frontage (m)	Lot Depth (m)	Proposed Building Height (m)
1	SD-3A	264.40	76.32	106.20	346.44	30.65	31.79	208.45	60.17	18.72	24.28	10.44
2	SD-4A	270.00	94.28	106.20	286.37	37.08	40.56	139.61	48.75	12.94	23.29	10.41
3	SD-1B	251.00	103.40	100.35	242.74	41.34	29.89	112.50	46.35	10.46	22.94	10.31
4	SD-2B	249.20	105.30	100.35	236.65	42.40	29.23	107.07	45.24	10.35	22.94	10.36
5	SD-1A	245.80	103.86	100.35	236.654	42.40	29.54	106.76	45.11	10.35	22.94	10.29
6	SD-2A	248.80	105.13	100.35	236.65	42.40	29.21	107.09	45.25	10.35	22.94	10.44
7	SD-2B	249.20	104.67	100.35	238.09	42.15	29.25	108.49	45.57	10.37	22.94	10.32
8	SD-1B	251.00	58.78	100.35	427.04	23.50	40.51	286.18	67.01	14.69	22.94	10.44
TOTAL		2029.40	90.17	814.50	2250.63	36.19	259.98	1176.15	52.26			

5.80m STANDARD TOWN BUILDING 1A (FREE HOLD)

LOT No.	Model Type	Coverage (sq.m.)	Lot Area (sq.m.)	Coverage (%)	Driveway Area (m2)	Soft Landscape Area (m2)	Soft Landscape (%)	Lot Frontage (m)	Lot Depth (m)	Proposed Building Height (m)
1A	TH-2E (A)	87.20	183.40	47.55		42.93		7.20	25.57	
2A	TH-1 (A)	86.00	150.12	57.29	20.39	43.73	29.13	5.87	25.81	
3A	TH-2E (A)	87.20	204.98	42.54	25.01	92.77	45.26	7.82	28.62	
TOTAL		260.40	538.50	48.36	62.87	215.23	39.97			11.94

5.40m DUAL FRONTAGE TOWN BUILDING 1 (CONDO)

LOT No.	Model Type	Coverage (sq.m.)	Lot Area (sq.m.)	Coverage (%)	Driveway Area (m2)	Soft Landscape Area (m2)	Soft Landscape (%)	Lot Frontage (m)	Lot Depth (m)	Proposed Building Height (m)
9	DF-2E (A)	82.10	315.91	25.99	18.91	214.90	68.03	10.65	28.02	
10	DF-1 (A)	74.90	145.24	51.57	18.92	51.42	35.40	5.50	26.41	
11	DF-1 (B)	79.55	141.752	56.12	18.88	43.32	30.56	5.50	25.73	
12	DF-1 A)	74.90	137.80	54.35	18.81	44.09	32.00	5.50	25.06	
13	DF-2E (A UPG)	84.56	180.14	46.94	18.86	76.72	42.59	7.69	24.26	
TOTAL		396.01	920.84	43.01	94.38	430.45	46.75			11.71

5.40m DUAL FRONTAGE TOWN BUILDING 2 (CONDO)

LOT No.	Model Type	Coverage (sq.m.)	Lot Area (sq.m.)	Coverage (%)	Driveway Area (m2)	Soft Landscape Area (m2)	Soft Landscape (%)	Lot Frontage (m)	Lot Depth (m)	Proposed Building Height (m)
14	DF-2E (A UPG)	84.56	188.34	44.90	19.69	84.09	44.65	10.25	22.01	
15	DF-1 (A)	74.90	118.41	63.25	18.83	24.68	20.84	5.50	21.53	
16	DF-1 (B)	79.55	117.16	67.90	18.88	18.73	15.99	5.50	21.30	
17	DF-1 (AMOD)	75.09	116.35	64.54	18.88	22.38	19.24	5.50	21.15	
18	DF-1 (AMOD)	75.09	116.00	64.73	18.66	22.25	19.18	5.50	21.09	
19	DF-1 (B)	79.55	116.10	68.52	18.88	17.67	15.22	5.50	21.11	
20	DF-1 (A)	74.90	116.66	64.20	18.73	23.03	19.74	5.50	21.21	
21	DF-2E (A)	82.10	151.94	54.03	18.86	50.98	33.55	7.09	21.42	
TOTAL		468.74	772.36	60.69	151.41	152.21	19.71			11.99

5.40m DUAL FRONTAGE TOWN BUILDING 3 (CONDO)

LOT No.	Model Type	Coverage (sq.m.)	Lot Area (sq.m.)	Coverage (%)	Driveway Area (m2)	Soft Landscape Area (m2)	Soft Landscape (%)	Lot Frontage (m)	Lot Depth (m)	Proposed Building Height (m)
22	DF-2E (A)	82.10	172.57	47.57	18.93	71.54	41.46	7.41	21.88	
23	DF-1 (A)	74.90	126.63	59.15	19.07	32.66	25.79	5.51	23.03	
24	DF-1 (AMOD)	75.09	133.91	56.07	27.10	31.72	23.69	5.51	24.34	
25	DF-1 (AMOD)	75.09	141.67	53.00	27.63	38.95	27.49	5.51	25.75	
26	DF-1 (A)	74.90	149.91	49.96	36.75	38.26	25.52	5.51	27.25	
27	DF-2E (A)	82.10	240.54	34.13	39.87	118.57	49.29	6.68	29.74	
TOTAL		464.18	965.23	48.09	169.35	331.70	34.36			11.81

5.80m STANDARD TOWN BUILDING 4 (CONDO)

LOT No.	Model Type	Coverage (sq.m.)	Lot Area (sq.m.)	Coverage (%)	Driveway Area (m2)	Soft Landscape Area (m2)	Soft Landscape (%)	Lot Frontage (m)	Lot Depth (m)	Proposed Building Height (m)
28	TH-2E (A)	87.20	203.76	42.80	18.81	97.75	47.97	8.49	25.53	
29	TH-1 (A)	86.00	148.10	58.07	18.40	43.70	29.51	5.80	25.53	
30	TH-1 (B)	86.00	148.10	58.07	18.35	43.75	29.54	5.80	25.53	
31	TH-1 (A)	86.00	148.10	58.07	18.17	43.93	29.66	5.80	25.53	
32	TH-2E (A)	87.20	209.52	41.62	17.65	104.67	49.96	10.14	25.53	
TOTAL		432.40	857.58	50.42	91.38	333.80	38.92			11.87

no.	description	date	by
20		-	-
19		-	-
18		-	-
17		-	-
16		-	-
15		-	-
14	ISSUED FOR 2ND SPA	22-11-13	SS
13	ISSUED FOR SPA	22-01-19	RC
12	ADD LANDSCAPE INFO	22-01-19	RC
11	CHANGE MODEL FOR LOT 24/25 ADD GRADING	22-01-13	RC
10	ADDED ISLAND AT CUL-DE-SAC	21-11-09	SS
9	RE. STATS AS PER CLIENT REQUEST	22-02-10	SS
8	ADDED INDIVIDUAL STATS	21-01-20	SS
7	REVISED BUILDING SETBACK FOR BUILDING 3	20-12-10	SS
6	ADDED ACCESS EASEMENT	20-12-03	SS
5	REVISED TRAIL AT LAKESHORE ROAD WEST	20-11-11	SS
4	REMOVED EMERGENCY ACCESS	20-11-04	SS
3	REVISED OVERALL SITE PLAN	20-01-31	SS
2	REVISED AS PER CITY COMMENTS	19-08-09	SS
1	ISSUED FOR CLIENT REVIEW	19-05-01	SS

Builder to verify location of all hydrants, street lights, transformers and other services. If minimum dimensions are not maintained, builder is to relocate at his own expense.

Builder to verify service connection elevations prior to constructing foundations.

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t 416.630.4782
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The undersigned has reviewed and takes responsibility for this design and has the qualifications and meets the requirements set out in the Ontario Building Code to be a Designer.
qualification information: Richard Vink 24488
registration information: VA3 Design Inc. BCIN 42658

VOGUE WYCLIFFE (OAKVILLE) LTD.

project name: 3171 LAKESHORE ROAD WEST
municipality: OAKVILLE, ON
project no.: 17027
registered plan no.: —
lot/block no.: —

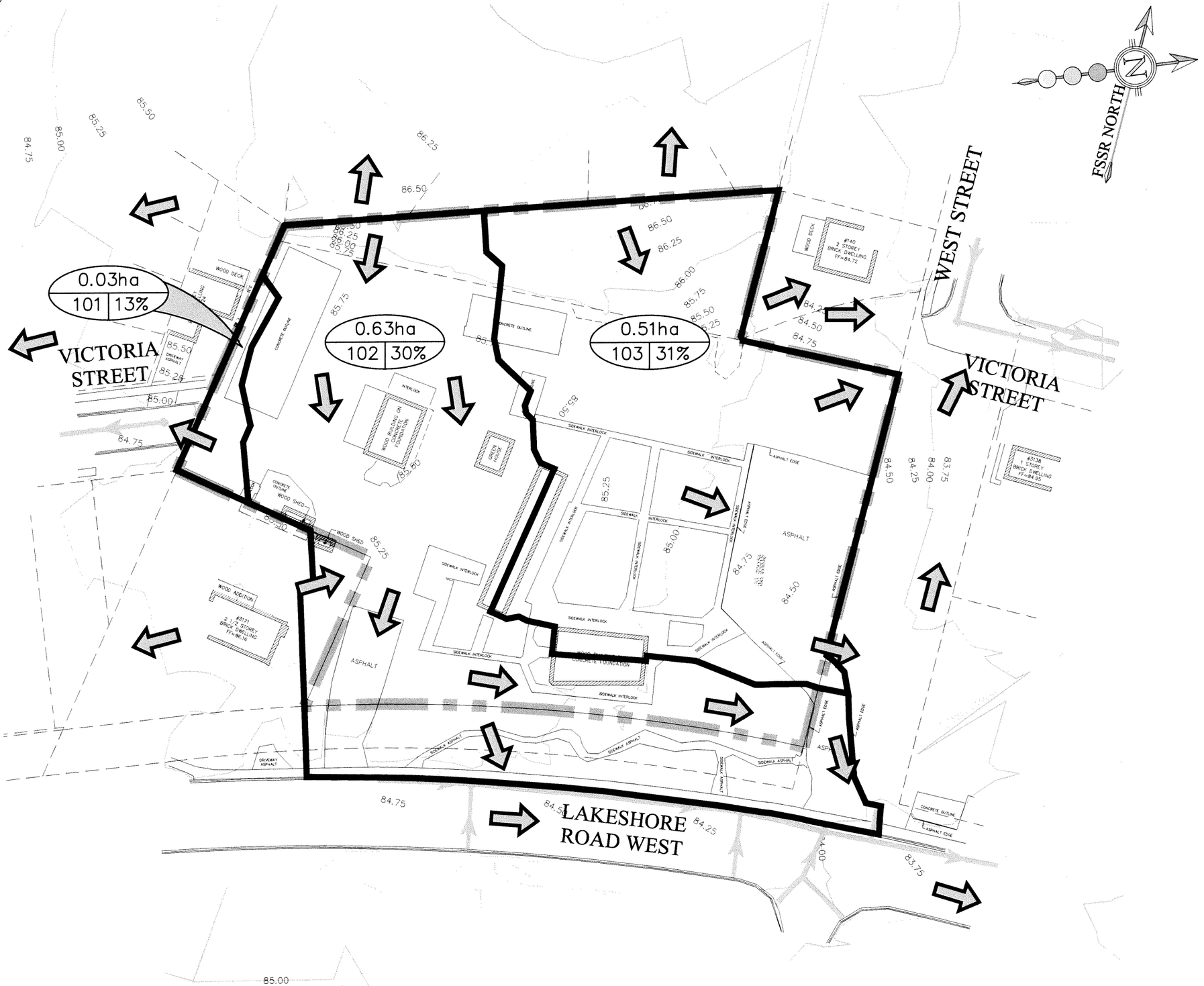
SITE PLAN

date: MAY 2016
scale: 1:250
drawn by: SS
file name: 17027-SP
checked by: —
drawing no.: S1

APPENDIX B

RELEVANT EXCERPTS

SCS consulting group ltd



LEGEND:

- LIMIT OF PROPERTY
- STORM DRAINAGE BOUNDARY
- EXISTING STORM SEWER/MANHOLE
- 83.25 — EXISTING CONTOUR
- MAJOR SYSTEM - OVERLAND FLOW
- 0.03ha / 101 | 13% — DRAINAGE AREA (HECTARES); PERCENT (%) IMPERVIOUS; CATCHMENT ID

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3171 LAKESHORE ROAD WEST, OAKVILLE

EXISTING STORM DRAINAGE PLAN

DESIGNED BY: N.D.M.	CHECKED BY: S.M.S.
SCALE: 1:750	DATE: JULY 2019
PROJECT No: 1930	FIGURE No: 2.1

File: P:\1930 3171 Lakeshore Road West, Oakville\Drawings\FSP\Fig\Report Figures\1930P-PRED-2.1.dwg – Revised by <FBISDA> : Wed, Jul 03 2019 – 10:54am