TATHAM ENGINEERING

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Barrie YMCA - 535 Bayview Drive

STORMWATER MANAGEMENT REPORT

YMCA of Simcoe/Muskoka

File 423449 | April 3, 2024

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Issue	Date	Description
1	January 19, 2024	Issued For Pre-Submission Review
2	April 3, 2024	Issued For SPA (1st Submission)

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1 Introduction

Tatham Engineering Limited (Tatham) has been retained by YMCA of Simcoe/Muskoka to prepare a Stormwater Management (SWM) report in support of a Site Plan Approval (SPA) application for the proposed YMCA facility located at 535 Bayview Drive (site) in the City of Barrie (City).

1.1 OBJECTIVES

This report was prepared to demonstrate the proposed development will not adversely affect local surface water conditions. This will be accomplished by evaluating the effect of the proposed development on local drainage conditions under existing and proposed site conditions and, where necessary, provide solutions to mitigate any adverse impacts.

1.2 GUIDELINES & BACKGROUND REPORTS

This report is prepared in consideration of the following municipal, provincial and agency guideline documents:

- The Ministry of the Environment, Conservation, and Parks (MECP, formerly known as Ministry of Environment), *Stormwater Management Practices Planning and Design Manual* (2003);
- The MECP, *Lake Simcoe Protection Plan (LSPP)* (2009);
- Lake Simcoe Region Conservation Authority (LSRCA), *Technical Guidelines for Stormwater Management Submissions* (2022);
- LSRCA, *Phosphorus Offsetting Policy* (2023);
- Hutchinson Environmental Sciences Ltd. et al., *Phosphorus Budget Tool in Support of Sustainable Development for Lake Simcoe Watershed* (2012);
- City of Barrie, *Stormwater Infrastructure Design Standard* (2023); and
- Research Branch, Canada Department of Agriculture of the Ontario Agricultural College, *Soil Survey of Simcoe County: Report No. 29 of the Ontario Soil Survey* (1962).

This report is also prepared in consideration of the following site-specific reports:

- Sabourin Kimble & Associates Ltd., *Stormwater Management Design Brief: Park Place Development – Phase 1 City of Barrie* (2007, rev. 2008);
- The Municipal Works Department, Corporation of the City of Barrie, *Stormwater Management Study: Barrie / Molson Centre Additional Parking Lot* (1995);

- The Municipal Works Department, Corporation of the City of Barrie, *Stormwater Management Study: Barrie / Molson Centre Additional Parking Lot* (1998);
- GEMTEC Consulting Engineers and Scientists Limited (GEMTEC), *Preliminary Geotechnical Investigation: Proposed YMCA* (2023); and
- Tatham Engineering Limited, *Hydrogeological Assessment* (2024).

2 Site Description

The site is an approximately 3 ha parcel, which consists of an existing parking lot which is mainly utilized for the Sadlon Arena building to the south. The site is bounded by existing commercial/industrial lands to the north, Bayview Drive to the west, the existing SWM Pond LV49 to the east, and the Sadlon Arena building and parking lots to the south. The proposed YMCA facility is to be located within the leased lands (currently parking lots) to the east/northeast boundary of the site adjacent to SWM Pond LV49, as shown in Figure 1: Site Location Plan.

A legal survey of the property was completed by Rudy Mak Surveying Ltd. in December 2023. The site is legally described as:

Part of Lots 8 and 9
Concession 12
Geographic Township of Innisfil
City of Barrie
County of Simcoe

The site re-development area is located within the Lake Simcoe Region Conservation Authority (LSRCA) watershed and is partially located within the LSRCA regulated area as a tributary of Lovers Creek bisects the north and south portions of the site. However, the limit of re-development on site is not located within the regulated area.

The site is designated as 'Community Hub' based on the City's current Official Plan, and 'Major Institutional' based on the City's Zoning By-law.

2.1 TOPOGRAPHY

Information relating to existing topography, ground cover, and drainage patterns was obtained through a review of relevant background studies, available plans, base mapping, and topographic surveys.

Detailed topographic surveys of the site were completed by Tatham on June 29, 2023 and November 27, 2023. The topographic survey base plan was also compiled by Tatham. This survey has been reviewed and compared to other available contour mapping and is sufficient for detailed design.

The site is gently sloping (1.8-2.5%) from west to east towards SWM Pond LV49 which receives all existing site drainage.

No waterbodies were noted on the site, and the nearest water bodies are tributaries of Lovers Creek which lie approximately 125 m to the south and 620 m north of the site.

2.2 GEOTECHNICAL SETTING

Based on the *Soil Survey of Simcoe County, Ontario: Report No. 29 of the Ontario Soil Survey*, the existing soils are comprised of Tioga sandy loam (Tisl) towards the north bounds of the site which is classified as Hydrologic Soil Group (HSG) A, and Tioga loamy sand and Vasey sand loam (Tis-Vasl) towards the south bounds of the site which is classified as HSG AB. The soil classifications are consistent with the findings of the *Preliminary Geotechnical Investigation* report.

Per the *Preliminary Geotechnical Investigation*, the subsurface conditions generally consist of a layer of fill (beneath the existing asphalt) with depths ranging from 1.4 to 2.4 mbgs underlain by sand and silty sand. Refer to the original report under separate cover for additional information with respect to suitability of native soils for building construction/foundation design, pavement structure recommendations and servicing construction.

2.3 HYDROGEOLOGICAL SETTING

The *Hydrogeological Assessment* completed by Tatham was prepared to characterize the hydrogeological conditions on-site and assesses the potential impacts the groundwater regime may have on the proposed development, as described in the *Preliminary Geotechnical Investigation*. Monitoring wells were installed in three boreholes to facilitate stabilized groundwater level measurements. Groundwater was not encountered in the three monitoring wells, indicating that groundwater levels are below the borehole depth of exploration of 6.0 m below existing grade. It is anticipated that groundwater levels will fluctuate with seasonal changes and may be higher during wet periods of the year such as the early spring or following periods of heavy precipitation.

2.4 SOURCE WATER PROTECTION

The site is located in the Lake Simcoe and Couchiching/Black River Source Protection Area. The site does not lie within a municipal Well Head Protection Area (WHPA) nor an Intake Protection Zone (IPZ). However, the site does lie within a WHPA-Q2, which refers to an area where a reduction in recharge may impact water supply quantities. Further, the site does not lie within a Significant Groundwater Recharge Area (SGRA) nor is it within an area identified as a Highly Vulnerable Aquifer (HVA).

2.5 PROPOSED DEVELOPMENT

The development consists of the proposed YMCA facility with a footprint of 4,225 m^2, including recreational and community spaces, and a parking lot. The re-development area is situated in the

least lands towards the east/northeast boundary of the site and will be accessed from Bayview Drive.

The overall site plan (prepared by Martin Simmons Sweers Architects, dated April 2, 2024) is provided in Appendix A.

3 Existing Drainage Conditions

The site is located within the Lovers Creek subwatershed.

The Modified Rational Method has been utilized to generate peak flow rates using current City IDF (Intensity-Duration-Frequency) rainfall data, and runoff coefficient and time of concentration values per Table 3.2 of the *Stormwater Infrastructure Design Standard*.

The site has been modelled as four drainage catchments (Catchments 101, 102, 103, and 104) and assessed at three drainage point of interest (POI) locations identified as POI#1, POI#2, and POI#3. Peak flows received at each POI are ultimately conveyed to the SWM Pond LV49, which is identified as Outlet #1.

A brief description of each POI location and drainage catchment is provided below while additional details are provided in Appendix B. A depiction of existing drainage conditions is provided in the Existing Conditions Drainage Plan (Drawing DP-1), provided in Appendix D for reference.

3.1 EXISTING CONDITIONS HYDROLOGY

Catchment 101 is approximately 1.48 ha and consists of the existing parking lot. A runoff coefficient (RC) of 0.95 has been applied. Runoff from this catchment is understood to drain overland to POI#1, which is defined as the existing ditch north of the site. Flows from this ditch are conveyed through an existing 750 mm dia. CSP culvert and discharged to Outlet #1.

Catchment 102 is approximately 0.55 ha and consists of the existing parking lot. An RC of 0.95 has been applied. Runoff from this catchment is understood to drain overland to POI#2, which is defined as the existing ditch east of the site. Flows from this ditch are discharged to Outlet #1.

Catchment 103 is approximately 1.06 ha and consists of the existing parking lot. An RC of 0.95 has been applied. Runoff from this catchment is understood to drain overland to POI#3, which is defined as the existing ditch south of the site. Flows from this ditch are conveyed through an existing 1,100 mm dia. CSP culvert and discharged to Outlet #1.

Catchment 104 is approximately 1.12 ha and consists of the existing parking lot in the southern portion of the site. An RC of 0.95 has been applied. Runoff from this catchment is conveyed through an existing 1,650 mm dia. storm trunk sewer running between the proposed building and the south ditch before routing east and is ultimately discharged to SWM Pond LV49. Due to the fact that this catchment has decreased under proposed conditions (0.05 ha decrease, as described in Section 5.1 of this report), it is understood that the re-development within this catchment will not increase peak flows and is therefore excluded from this assessment.

Overall, the existing site has a total imperviousness of 95%, which corresponds to the imperviousness of the parking lot as described in the *Stormwater Management Study: Barrie / Molson Centre Additional Parking Lot* (1995, 1998) reports.

3.2 SWM POND LV49

It is understood that SWM Pond LV49 provides the required water quality and quantity (peak flow) control for the existing site, as per *Stormwater Management Design Brief Park Place Development: Phase 1 City of Barrie* (2008) prepared by Sabourin Kimble & Associates Ltd. Refer to Appendix D for the Ultimate Post Development Storm Drainage Area from this report.

3.3 EXISTING CONDITIONS PEAK FLOWS

A summary of peak flows at POI#1, POI#2, and POI#3 for the 1:2-year through 1:100-year storm events is provided in Table 1 below. Detailed calculations are provided in Appendix B.

Table 1: Existing Conditions Peak Flow Summary

STORM EVENT	POI#1 (m^3/s)	POI#2 (m^3/s)	POI#3 (m^3/s)	OUTLET #1 (m^3/s)
1:2-year	0.29	0.12	0.24	0.65
1:5-year	0.38	0.16	0.32	0.86
1:10-year	0.44	0.18	0.37	0.99
1:25-year	0.54	0.23	0.46	1.23
1:50-year	0.60	0.25	0.51	1.36
1:100-year	0.66	0.28	0.56	1.49

4 Stormwater Management Plan

The SWM plan demonstrates the proposed drainage conditions do not adversely impact downstream or adjacent surface water conditions. The SWM plan is subject to the review and approval of the City and the LSRCA.

4.1 DESIGN CRITERIA

Applicable SWM design criteria for the proposed development are presented below.

4.1.1 Stormwater Quantity Control

Typically, the City and LSRCA require proposed conditions peak flows be controlled to existing conditions rates or less at any given outlet location to ensure no adverse impacts for downstream landowners. However, as the level of imperviousness on site is slightly decreased due to the proposed development, SWM Pond LV49 provides sufficient water quantity controls for the site. Therefore, water quantity controls are not proposed for the site.

4.1.2 Stormwater Quality Control

Due to the reduction in parking lot area and the implementation of green space, and rooftop area (which generally generates clean runoff), the quality of site-generated runoff will improve in comparison to existing conditions. Based on this, and considering the downstream pond provides water quality controls for the existing site, additional on-site water quality controls are not proposed for the site.

4.1.3 Water Balance / Volume Control

Due to the reduction in total impervious area in the post-development condition, on-site controls to achieve water balance and volume control requirements are not required and therefore not provided for the site. However, the implementation of green space throughout the site will encourage infiltration which is expected to improve stormwater recharge rates under proposed conditions.

4.1.4 Phosphorus Loading Assessment

The proposed development is expected to be subject to the Lake Simcoe *Phosphorus Offsetting Policy* which requires all major developments to control the phosphorus generated from the site to existing conditions or better. Any remaining phosphorus load not controlled/removed will require an offsetting fee.

As the proposed development involves an improvement in the overall land use of the development area with respect to phosphorus loading, phosphorus loading rates are not expected to increase under the proposed conditions.

4.1.5 Siltation & Erosion Control

A siltation and erosion control strategy must be provided for implementation during all construction activities.

5 Proposed Drainage Conditions

The proposed development will consist of mainly impervious surfaces (building, parking lot and walkways), but will also introduce some green space into the area. The total impervious area under the proposed conditions is reduced from 95% to 82%.

The site has been modelled as four drainage catchments (Catchments 201, 202, 203, and 204) and assessed at POI#1, POI#2, and POI#3. Flows from each POI location is ultimately conveyed to Outlet #1 (SWM Pond LV49).

A brief description of each drainage catchment is provided below while additional details are provided in Appendix B. A depiction of proposed drainage conditions is provided in the Proposed Conditions Drainage Plan (Drawing DP-2), provided in Appendix D for reference.

5.1 PROPOSED CONDITIONS HYDROLOGY

Catchment 201 is approximately 1.75 ha and includes the parking lot and the majority of the proposed re-development. Runoff from this catchment will drain overland to POI#1 (the existing ditch north of the site and downstream 750 mm dia. CSP culvert) and ultimately to Outlet #1.

Catchment 202 is approximately 0.08 ha and includes a portion of the proposed re-development. Runoff from this catchment will drain overland to POI#2 (existing ditch east of the site) and ultimately to Outlet #1.

Catchment 203 is approximately 1.31 ha and includes the parking lot and a portion of the proposed re-development. Runoff from this catchment will drain overland to POI#3 (existing ditch south of the site and downstream 1,100 mm dia. CSP culvert) and ultimately to Outlet #1.

Catchment 204 is approximately 1.07 ha and consists of the proposed parking lot improvements. Runoff from this catchment will behave similar to existing conditions and will be conveyed through the 1,650 mm dia. storm trunk sewer ultimately discharging to SWM Pond LV49. As the area of catchment has decreased under proposed conditions (0.05 ha decrease) and consists of the same level of impervious surface, it is understood that the re-development within this catchment will not increase peak flows and is therefore excluded from this assessment.

Overall, the proposed site has a total imperviousness of 82%, which is less than the existing imperviousness as described in Section 3.1 of this report. To assess site-generated peak flows, an RC of 0.95 has been assigned to each catchment which is conservative, recognizing that part of the proposed development will incorporate some green space which reduces the level of imperviousness under proposed conditions.

5.2 PROPOSED PEAK FLOW RATES

A summary of peak flow rates at POI#1, POI#2, and POI#3 for the 1:2-year through 1:100-year storm events is provided in Table 2 below. Detailed calculations are provided in Appendix B.

Table 2: Proposed Conditions Peak Flow Summary

STORM EVENT	POI#1 (m^3/s)	POI#2 (m^3/s)	POI#3 (m^3/s)	OUTLET #1 (m^3/s)
1:2-year	*0.34 *(0.29)*	0.02 *(0.12)*	*0.29 *(0.24)*	0.65 *(0.65)*
1:5-year	*0.45 *(0.38)*	0.02 *(0.16)*	*0.38 *(0.32)*	0.85 *(0.86)*
1:10-year	*0.52 *(0.44)*	0.03 *(0.18)*	*0.44 *(0.37)*	0.99 *(0.99)*
1:25-year	*0.65 *(0.54)*	0.03 *(0.23)*	*0.54 *(0.46)*	1.22 *(1.23)*
1:50-year	*0.72 *(0.60)*	0.04 *(0.25)*	*0.60 *(0.51)*	1.35 *(1.36)*
1:100-year	*0.79 *(0.66)*	0.04 *(0.28)*	*0.66 *(0.56)*	1.48 *(1.49)*

Note: values in *(italics)* denote existing conditions rates, and values with accompanying * denote increases in peak flows are further explained in Section 5.3 of this report.

As previously mentioned, an RC of 0.95 was applied to the proposed re-development catchments which results in the proposed conditions peak flows as shown in Table 2 being conservative.

5.3 MINOR & MAJOR FLOW CONVEYANCE

Minor site flows from a portion of Catchment 201 will be captured directly to Outlet #1 via a network of storm sewers and CBs and therefore bypasses the northern ditch for conveyance. The remainder of Catchment 201 will continue to drain overland to the ditch north of the site, per existing drainage conditions. A storm sewer design sheet and storm sewer catchment plan has been prepared to sufficiently size the proposed storm sewers for conveyance of the minor 1:5-year event in accordance with City standards. A storm sewer design sheet and Storm Sewer Catchment Plan (STM-1) has been prepared and provided in Appendix B and D, respectively.

At POI#1, although the 1:100-year peak flows are greater in proposed conditions than in existing conditions, the actual total peak flows entering the ditch itself are significantly reduced since the 1:5-year flows from the minor system within Catchment 201 are piped directly to Outlet #1 which bypasses the ditch. Therefore, the total 1:100-year peak flow entering the ditch is 0.49 m^3/s (0.79 m^3/s less 0.30 m^3/s) which is less than existing conditions.

At POI#2, the total peak flows entering the ditch are significantly reduced under proposed conditions, as shown in Table 2. Therefore, the ditch will continue to provide sufficient capacity for flow conveyance from the site.

At POI#3, the existing culvert downstream of the ditch in POI#3 was calculated to have a capacity of 1.92 m^3/s. Under existing conditions, Catchment 103 will drain 0.56 m^3/s of runoff to the culvert (29% flow capacity) and Catchment 203 will drain 0.66 m^3/s of runoff to the culvert (34% flow capacity). Therefore, under existing and proposed conditions, the culvert will have sufficient capacity to convey flows from the site.

It should be noted that a small external drainage area east of Catchments 103/203 is expected to drain to the ditch. Due to the fact that the culvert capacity is significantly greater than the proposed peak flows, the culvert is expected to sufficiently convey all site-generated and external flows to SWM Pond LV49.

Supporting calculations are provided in Appendix B.

5.4 WATER QUANTITY & QUALITY CONTROLS

As previously mentioned, it is understood that SWM Pond LV49 provides the required water quantity (peak flow controls) and quality control for the existing site, as per *Stormwater Management Design Brief Park Place Development: Phase 1 City of Barrie* (2008) prepared by Sabourin Kimble & Associates Ltd.

Per Table 2, since proposed peak flow rates are equal to or less than existing peak flow rates at Outlet #1, SWM Pond LV49 provides sufficient quality and quantity controls for the site.

6 Phosphorus Loading Assessment

To comply with LSPP requirements, a phosphorus budget for the site has been completed using the loading rates and removal efficiencies from the *Phosphorus Budget Tool in Support of Sustainable Development for Lake Simcoe Watershed* through a spreadsheet method.

6.1 EXISTING CONDITIONS

Under existing conditions, the site has been modelled as a single land use category (High Intensity Development – Commercial/Industrial) for the purpose of the phosphorus assessment.

Applying the relevant loading rate of 1.82 kg/ha/year, the existing phosphorus load is 7.66 kg/year.

6.2 PROPOSED CONDITIONS

Under proposed conditions, the site has also been modelled as a single land use category (High Intensity Development – Commercial/Industrial) with a loading rate of 1.82 kg/ha/year.

Since the land use remains the same between existing and proposed conditions, phosphorus loading rates do not change. Therefore, mitigation measures are not required. Furthermore, additional phosphorus removal is expected to occur due to the reduction in parking lot area and the implementation of green space, and rooftop area. Additional details are provided in Appendix C while a summary of the phosphorus loading rates for each scenario is provided in Table 3.

As shown, phosphorus loading is reduced under proposed conditions.

Table 3: Phosphorus Loading Summary

SCENARIO	AREA (ha)	PHOSPHORUS LOADING (kg/year)
Existing Conditions	4.21	7.66
Proposed Conditions	4.21	7.66

7 Siltation & Erosion Control

Erosion and sediment control measures will be implemented for all construction activities within the development site including removals, vegetation clearing, topsoil stripping, grading, servicing, road construction and site development. The basic principles considered to minimize erosion and sedimentation transport include:

- All erosion control measures will be designed in accordance with relevant City, LSRCA and OPSD standards;
- Silt fences to be constructed prior to commencement of any grading operations;
- Designated construction vehicle entrance(s) with stone mud mat;
- Temporary swales, silt ponds, and check dams will be constructed to control runoff during construction by reducing velocities and promoting settlement of particulates;
- Storm inlet structures will be provided with filter screens during construction;
- Long term siltation and erosion control will be enhanced with a re-vegetation strategy for disturbed areas; and
- Confine refueling and servicing of equipment sufficiently away from existing drainage systems.

Regular inspection of control measures will be completed through a monitoring and mitigation plan, with regular repairs made as necessary. Refer to the Erosion & Sediment Control Plan (Drawings ESC-1) in the Engineering Drawing Set provided with this submission.

8 Summary

The SWM plan demonstrates that the proposed development will not result in negative impacts with respect to stormwater and has been prepared in accordance with City, LSRCA, and MECP design guidelines.

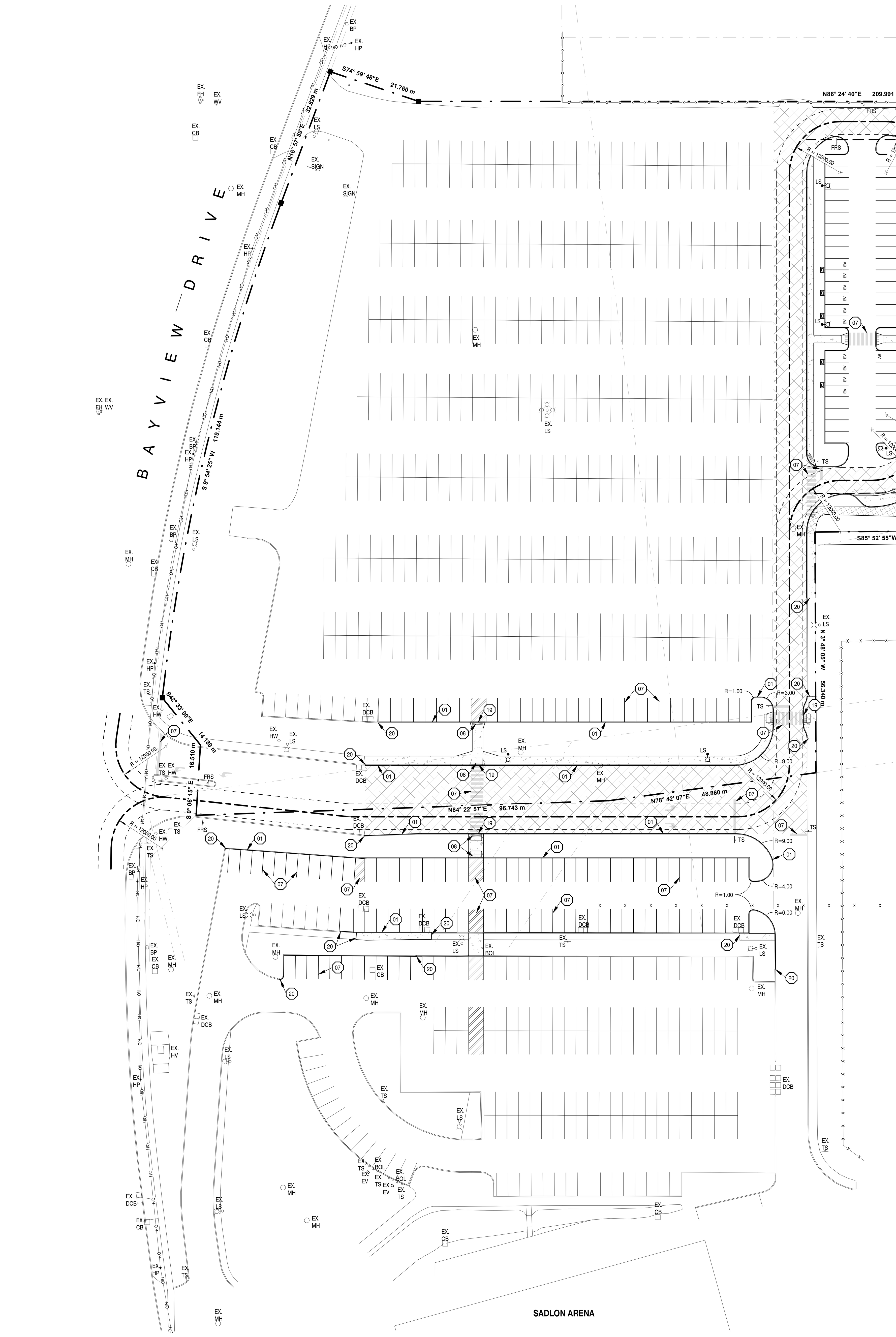
As the proposed development will reduce impervious area in comparison to existing conditions, on-site water quantity and quality controls are not required. In addition, water balance and volume control measures as well as phosphorus removal measures are not required as the proposed development will not negatively impact existing conditions infiltration rates or phosphorous loading.

Throughout construction, siltation and erosion control will be maintained and inspected to reduce erosion and the transportation of sediment from the site. These measures will mitigate environmental impacts downstream during construction.

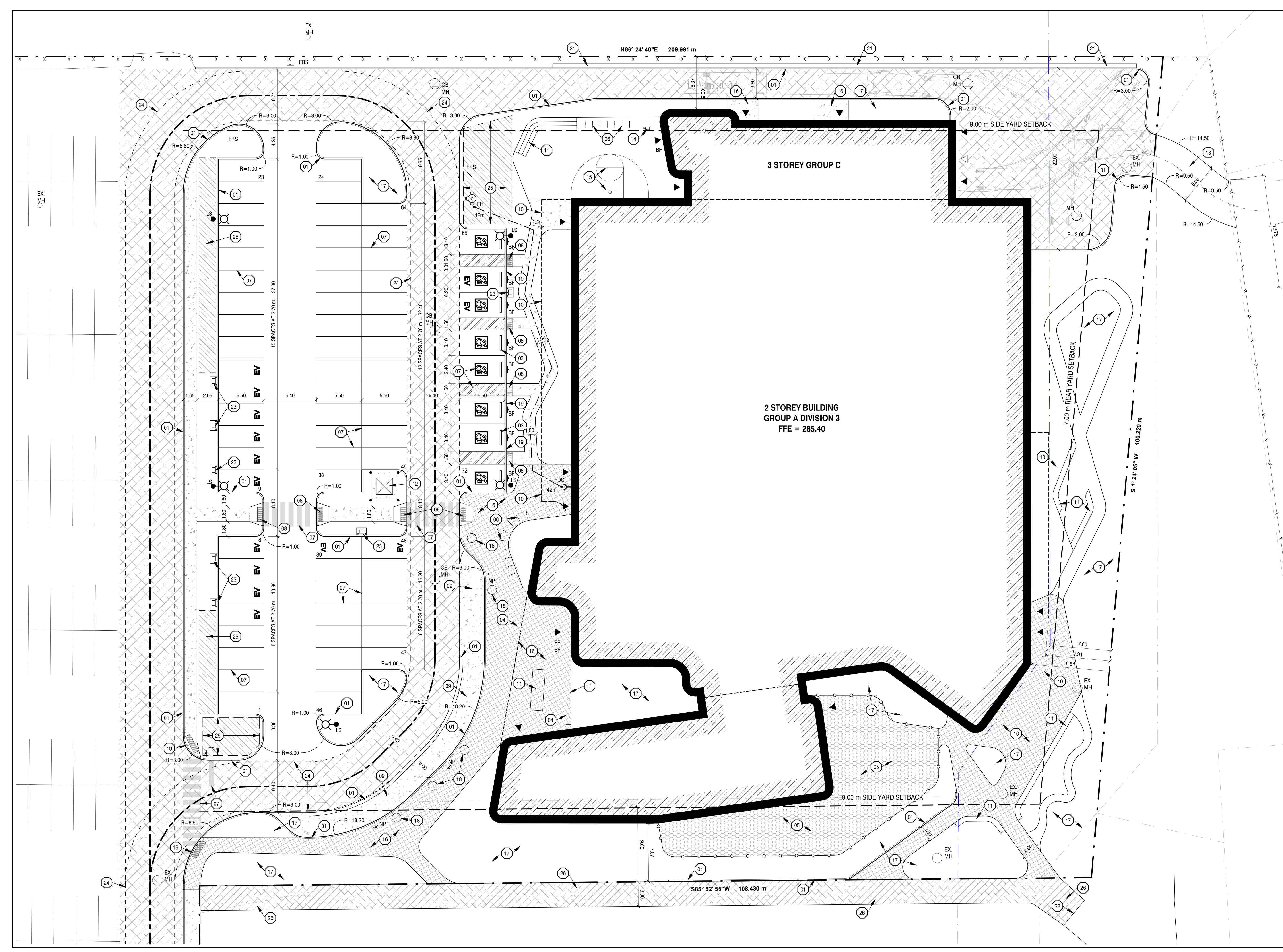
Source: City of Barrie Public Maps. Date accessed: 1/12/2024.

Figure 1: Site Location Plan

Appendix A:
Site Plan



1 OVERALL SITE PLAN
A102 1 : 500



2 ENLARGED SITE PLAN
A102 1 : 250

DRAWING NOTES:

- 01 CURB, REFER TO CIVIL DWGS.
- 02 HEAVY DUTY ASPHALT
- 03 CONCRETE BUMPER, REFER TO LANDSCAPE DRAWINGS
- 04 LINE OF ROOF ABOVE
- 05 OUTDOOR CHILCARE PLAY AREA
- 06 BICYCLE RACK, REFER TO LANDSCAPE DWGS.
- 07 PAINTED LINE MARKINGS AND GRAPHICS, REFER TO TRAFFIC PAVEMENT MARKING & SIGNAGE PLAN AS APPLICABLE
- 08 TACTILE WARNING SURFACE INDICATOR c/w ACCESSIBLE DROPPED CURB RAMP
- 09 DROP-OFF AREA
- 10 LINE OF BUILDING ABOVE
- 11 BENCH, REFER TO LANSCAPE DRAWINGS
- 12 TRANSFORMER, CONCRETE PAD AND BOLLARDS - REFER TO ELECTRICAL DWGS.
- 13 ACCESS TO STORM WATER POND
- 14 BICYCLE REPAIR STATION, REFER TO LANDSCAPE DRAWINGS
- 15 SPORTS COURT, REFER TO LANDSCAPE DRAWINGS
- 16 HARDSCAPED AREA/PATH (CONCRETE, UNIT PAVER, ETC.) REFER TO LANDSCAPE DWGS.
- 17 LANDSCAPE AREA (SOD, PLANTER, PLANTING BED, ETC.) REFER TO LANDSCAPE DWGS.
- 18 METAL TREE GUARD, REFER TO LANDSCAPE DRAWINGS
- 19 DROPPED CONCRETE CURB, REFER TO CIVIL DWGS.
- 20 TIE CONCRETE CURB / SIDEWALK INTO EXISTING, REFER TO CIVIL DRAWINGS
- 21 RETAINING WALL, REFER TO CIVIL DRAWINGS
- 22 TIE INTO EXISTING ASPHALT TRAIL
- 23 LEVEL II ELECTRICAL VEHICLE CHARGER C/W CONCRETE PAD AND BOLLARDS
- 24 6m WIDE FIRE ROUTE
- 25 SNOW STORAGE AREA
- 26 MEDIUM DUTY ASPHALT PEDESTRIAN PATH

SITE PLAN LEGEND:

SITE AND ACCESS

- PROPERTY LINE
- SETBACK
- PART 2 SUBJECT TO EASEMENT SC839163
- ROW RIGHT-OF-WAY / EASEMENT
- WOOD POST FENCE
- METAL POST FENCE
- TREE PROTECTIVE FENCING
- OVERHEAD HYDRO WIRE
- C/L CENTERLINE OF ROAD
- DENOTES FIRE ROUTE MIN. 6.0m WIDE WITH MIN. 12.0 CENTRELINE RADIUS
- BUILDING EXIT
  - BF - BARRIER FREE
  - FF - FIRE FIGHTER
  - PRINCIPAL ENTRANCE
- GRADE LEVEL OVERHEAD DOOR
- DRIVE AISLE DIRECTION
- TRAFFIC SIGN, REFER TO ABBREVIATIONS FOR SIGN TYPE
- FIRE DEPARTMENT CONNECTION
- LIGHT STANDARD
- FIRE HYDRANT
- BICYCLE RACK
- WATER VALVE
- MANHOLE
- HANDWELL
- BELL PEDESTAL
- CATCH BASIN
- ACCESSIBLE PARKING
- ELECTRICAL VEHICLE CHARGING STATION

LANDSCAPE AND SURFACING

- DENOTES EXISTING PAVING TO BE DEMOLISHED
- DENOTES NEW LANDSCAPE PLANTING AREA
- DENOTES NEW / REINSTATED SOD
- DENOTES NEW LANDSCAPE PAVERS
- DENOTES NEW CIP CONCRETE PAVING
- HEAVY DUTY ASPHALT PAVING
- MEDIUM DUTY ASPHALT PAVING

GENERAL NOTES:

1. SITE AREA AND SURVEY INFORMATION SHOWN HAS BEEN TAKEN FROM THE PLAN OF SURVEYS PREPARED BY RUDY MAK SURVEYING LTD. ONTARIO LAND SURVEYORS, DATED 4 DECEMBER 2023 (FILE REF: 16363)
2. THIS SITE PLAN IS PART OF THE CONTRACT DOCUMENTS AND MUST BE READ IN CONJUNCTION WITH ALL OTHER DOCUMENTS COMPRISING THE CONTRACT DOCUMENTS, INCLUDING BUT NOT LIMITED TO CIVIL, LANDSCAPE, AND SITE LIGHTING DOCUMENTS.
3. VERIFY ALL DIMENSIONS ON SITE AND PROMPTLY REPORT IN WRITING ANY DISCREPANCIES TO THE CONSULTANT (MARTIN SIMMONS SWEERS ARCHITECTS INC.)
4. ALL GEODETIC INFORMATION ON THIS SITE PLAN IS FOR REFERENCE ONLY. REFER TO SITE SURVEY, CIVIL, AND LANDSCAPE DOCUMENTS FOR EXISTING AND PROPOSED GRADING INFORMATION.
5. ALL LANDSCAPE INFORMATION ON THIS SITE PLAN IS FOR REFERENCE ONLY. REFER TO LANDSCAPE DOCUMENTS FOR EXISTING AND LANDSCAPE INFORMATION, INCLUDING TREE REMOVALS AND TREE PRESERVATION PLANS.
6. ALL BELOW-GRADE STORM, SANITARY, WATER, AND FIREMAIN SITE SERVICING INFORMATION ON THIS SITE PLAN IS FOR REFERENCE ONLY. REFER TO CIVIL DOCUMENTS FOR EXTENT OF BELOW-GRADE STORM, SANITARY, WATER, AND FIREMAIN SITE SERVICING TO REMAIN, ALONG WITH ASSOCIATED SITE SERVICES TO BE DEMOLISHED, AND PROPOSED STORM, SANITARY, WATER, AND FIREMAIN SITE SERVICES.
7. ANY EXISTING GRASS TO REMAIN WHICH IS DAMAGED DURING THE DURATION OF THE WORK IS TO BE REPLACED WITH NEW SOD.

YMCA of Simcoe/Muskoka

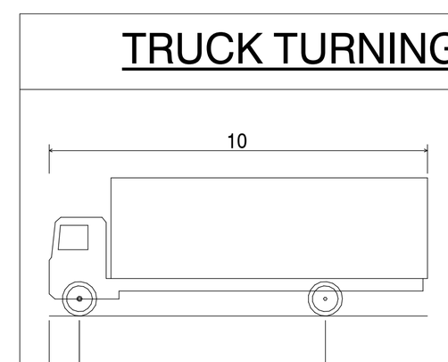
ABBREVIATIONS

PHASING

- (A) DENOTES ABANDONED
- (P) DENOTES PROPOSED (ALL WORK UNLESS NOTED)
- (EX) DENOTES EXISTING
- (BO) DENOTES WORK BY OTHERS

APS	DENOTES ACCESSIBLE PARKING SIGNAGE	HP	DENOTES HYDRO POLE
BLL	DENOTES BOLLARD WITH INTEGRATED LUMINAIRE	GV	DENOTES GAS VALVE
BF	DENOTES BARRIER-FREE PARKING SPACE	LS	DENOTES LIGHT STANDARD
CB	DENOTES CATCH BASIN	MAS	DENOTES MUNICIPAL ADDRESS SIGNAGE
CBMH	DENOTES CATCH BASIN MAINTENANCE HOLE COVER	MH	DENOTES MAINTENANCE HOLE COVER
DCB	DENOTES DOUBLE CATCH BASIN	OHW	DENOTES OVERHEAD WIRE
CO	DENOTES CLEANOUT	SP	DENOTES RAINWATER LEADER SPLASHPAD
DC	DENOTES DEPRESSED CURB	TD	DENOTES TRENCH DRAIN
DW	DENOTES DOMESTIC WATER CONNECTION	TS	TRAFFIC SIGN
EV	DENOTES CHARGE STATION	AD	DENOTES AREA DRAIN
FDC	DENOTES FIRE DEPARTMENT CONNECTION	WM	DENOTES WATERMAIN ENTRY
FH	DENOTES FIRE HYDRANT	WV	DENOTES WATER VALVE
FW	DENOTES FIRE SUPPRESSION WATER CONNECTION	OWT	DENOTES ONE WAY TRAFFIC
FR(X)	DENOTES FIRE ROUTE SIGNAGE. REFER TO FIRE ROUTE SIGN DIAGRAM FOR TYPE	DNE	DENOTES 'DO NOT ENTER'
HLP	DENOTES HYDRO LIGHT POLE	BP	BELL PEDESTAL
HGP	DENOTES HYDRO GUY POLE	NP	DENOTES NO PARKING, TEMPORARY DROP-OFF ONLY
		HV	DENOTES HYDRO VAULT
		RS	DENOTES ROUTE SIGN
		NP	NO PARKING

TRUCK TURNING LEGEND



MSU - MEDIUM SINGLE UNIT TRUCK

OVERALL LENGTH	10.000m
OVERALL WIDTH	2.600m
OVERALL BODY HEIGHT	3.650m
MIN BODY GROUND CLEARANCE	0.445m
TRACK WIDTH	2.600m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	11.100m

SITE PLAN DATA CHART

MUNICIPAL ADDRESS	535 BAYVIEW DRIVE, BARRIE, ONTARIO		
LEGAL DESCRIPTION	PART OF LOTS 8 AND 9 CONCESSION 12 GEOGRAPHIC TOWNSHIP OF INNISFIL CITY OF BARRIE COUNTY OF SIMCOE		
ZONING	I-M [MAJOR INSTITUTIONAL]		
DATA	REQUIRED	PROVIDED	
SITE AREA	5,000 m2	34,181.46 m2	
LOT FRONTAGE	45.00 m	119.14 m	
MIN. REAR YARD	7.0 m	7.91 m	
MIN. FRONT YARD	9.0 m	156.53 m	
MIN. SIDE YARD	9.0 m	NORTH	6.37 m
		SOUTH	7.07 m
MAX. LOT COVERAGE	35%	13%	
MIN. LANDSCAPE OPEN SPACE	35%	35%	
BUILDING HEIGHT	N/A	14.00 m	
OFF-STREET PARKING	N/A	72 SPACES [INCLUDING B.F. SPACES]	
BARRIER FREE PARK — TYPE 'A' SPACE	N/A	4 SPACES	
BARRIER FREE PARK — TYPE 'B' SPACE	N/A	4 SPACES	
OFF-STREET LOADING	N/A	1 SPACE	

Nº	DATE	ISSUE
1	19/01/24	ISSUED FOR SPA

MARTIN SIMMONS SWEERS

200 - 113 Breithaupt Street
Kitchener, ON N2H 5G9
t 519.745.4754 f 519.745.0061

PROJECT NORTH

PROJECT
BARRIE YMCA

535 BAYVIEW DRIVE, BARRIE, ONTARIO

DRAWING
SITE PLAN - PROPOSED

DRAWN BY: MB/ML
CHECKED BY: JM
DATE: MARCH 2024
SCALE: AS NOTED
PROJECT Nº: 23017
DRAWING Nº: A102

Appendix B: Existing and Proposed Conditions Hydrology

TATHAM ENGINEERING

PROJECT	Barrie YMCA, 535 Bayview Drive	FILE	423449
		DATE	1/19/2024
SUBJECT	Existing Conditions - Runoff Coefficients	NAME	LJC
		PAGE	1 OF 2

Catchment 101

Runoff Coefficient

Land Use Type	Runoff Coefficient	Area (ha)
Existing Parking Lot	0.95	1.48
	Total:	**1.48**

Composite Runoff Coefficient: **0.95**

Source: City of Barrie, Stormwater Infrastructure Design Standard (June 2023) - Table 3.2: Runoff Coefficients (Rational C) (5-yr to 10-yr) Based on Hydrologic Soil Group.

Time of Concentration

Per MTO Drainage Manual, 1997

Catchment Length (m):	268.62	m
Maximum Elevation (m):	289.00	m
Minimum Elevation (m):	283.00	m
Catchment Slope (%):	2.2	%
Runoff Coefficient:	0.95	
Airport:	6.1	min
Bransby Williams:	12.5	min
Time of Concentration Method:	Bransby Williams	
Time of Concentration (min):	12.5	min

Note: where calculated T_C is less than MTO standard of 10 minutes, 10 minutes has been used.

Catchment 102

Runoff Coefficient

Land Use Type	Runoff Coefficient	Area (ha)
Existing Parking Lot	0.95	0.55
	Total:	**0.55**

Composite Runoff Coefficient: **0.95**

Source: City of Barrie, Stormwater Infrastructure Design Standard (June 2023) - Table 3.2: Runoff Coefficients (Rational C) (5-yr to 10-yr) Based on Hydrologic Soil Group.

Time of Concentration

Per MTO Drainage Manual, 1997

Catchment Length (m):	178.88	m
Maximum Elevation (m):	287.00	m
Minimum Elevation (m):	283.76	m
Catchment Slope (%):	1.8	%
Runoff Coefficient:	0.95	
Airport:	5.4	min
Bransby Williams:	9.6	min
Time of Concentration Method:	Bransby Williams	
Time of Concentration (min):	10.0	min

Note: where calculated T_C is less than MTO standard of 10 minutes, 10 minutes has been used.

TATHAM ENGINEERING

PROJECT	Barrie YMCA, 535 Bayview Drive	FILE	423449
		DATE	1/19/2024
SUBJECT	Existing Conditions - Runoff Coefficients	NAME	LJC
		PAGE	2 OF 2

Catchment 103

Runoff Coefficient

Land Use Type	Runoff Coefficient	Area (ha)
Existing Parking Lot	0.95	1.06
	Total:	**1.06**

Composite Runoff Coefficient: **0.95**

Source: City of Barrie, Stormwater Infrastructure Design Standard (June 2023) - Table 3.2: Runoff Coefficients (Rational C) (5-yr to 10-yr) Based on Hydrologic Soil Group.

Time of Concentration

Per MTO Drainage Manual, 1997

Catchment Length (m):	148.97	m
Maximum Elevation (m):	289.37	m
Minimum Elevation (m):	285.64	m
Catchment Slope (%):	2.5	%
Runoff Coefficient:	0.95	
Airport:	4.4	min
Bransby Williams:	7.0	min

Time of Concentration Method: Bransby Williams

Time of Concentration (min): 10.0 min

Note: where calculated T_C is less than MTO standard of 10 minutes, 10 minutes has been used.

Catchment 104

Runoff Coefficient

Land Use Type	Runoff Coefficient	Area (ha)
Existing Parking Lot	0.95	1.12
	Total:	**1.12**

Composite Runoff Coefficient: **0.95**

Source: City of Barrie, Stormwater Infrastructure Design Standard (June 2023) - Table 3.2: Runoff Coefficients (Rational C) (5-yr to 10-yr) Based on Hydrologic Soil Group.

TATHAM ENGINEERING

PROJECT	Barrie YMCA, 535 Bayview Drive	FILE	423449
		DATE	1/19/2024
SUBJECT	Proposed Conditions - Runoff Coefficients	NAME	LJC
		PAGE	1 OF 2

Catchment 201

Runoff Coefficient

Land Use Type	Runoff Coefficient	Area (ha)
Prop. Development	0.95	1.75
	Total:	**1.75**

Composite Runoff Coefficient: **0.95**

Source: City of Barrie, Stormwater Infrastructure Design Standard (June 2023) - Table 3.2: Runoff Coefficients (Rational C) (5-yr to 10-yr) Based on Hydrologic Soil Group.

Time of Concentration

Per MTO Drainage Manual, 1997

Catchment Length (m):	268.62	m
Maximum Elevation (m):	289.00	m
Minimum Elevation (m):	283.00	m
Catchment Slope (%):	2.2	%
Runoff Coefficient:	0.95	
Airport:	6.1	min
Bransby Williams:	12.3	min
Time of Concentration Method:	Bransby Williams	
Time of Concentration (min):	12.3	min

Note: where calculated T_C is less than MTO standard of 10 minutes, 10 minutes has been used.

Catchment 202

Runoff Coefficient

Land Use Type	Runoff Coefficient	Area (ha)
Prop. Development	0.95	0.08
	Total:	**0.08**

Composite Runoff Coefficient: **0.95**

Source: City of Barrie, Stormwater Infrastructure Design Standard (June 2023) - Table 3.2: Runoff Coefficients (Rational C) (5-yr to 10-yr) Based on Hydrologic Soil Group.

Time of Concentration

Per MTO Drainage Manual, 1997

Catchment Length (m):	13.95	m
Maximum Elevation (m):	284.05	m
Minimum Elevation (m):	283.80	m
Catchment Slope (%):	1.8	%
Runoff Coefficient:	0.95	
Airport:	1.5	min
Bransby Williams:	0.9	min
Time of Concentration Method:	Bransby Williams	
Time of Concentration (min):	10.0	min

Note: where calculated T_C is less than MTO standard of 10 minutes, 10 minutes has been used.

TATHAM ENGINEERING

PROJECT	Barrie YMCA, 535 Bayview Drive	FILE	423449
		DATE	1/19/2024
SUBJECT	Proposed Conditions - Runoff Coefficients	NAME	LJC
		PAGE	2 OF 2

Catchment 203

Runoff Coefficient

Land Use Type	Runoff Coefficient	Area (ha)
Parking Lot Retrofit	0.95	1.31
	Total:	**1.31**

Composite Runoff Coefficient: **0.95**

Source: City of Barrie, Stormwater Infrastructure Design Standard (June 2023) - Table 3.2: Runoff Coefficients (Rational C) (5-yr to 10-yr) Based on Hydrologic Soil Group.

Time of Concentration

Per MTO Drainage Manual, 1997

Catchment Length (m):	148.97	m
Maximum Elevation (m):	289.37	m
Minimum Elevation (m):	285.64	m
Catchment Slope (%):	2.5	%
Runoff Coefficient:	0.95	
Airport:	4.4	min
Bransby Williams:	6.9	min
Time of Concentration Method:	Bransby Williams	
Time of Concentration (min):	10.0	min

Note: where calculated T_C is less than MTO standard of 10 minutes, 10 minutes has been used.

Catchment 204

Runoff Coefficient

Land Use Type	Runoff Coefficient	Area (ha)
Parking Lot Retrofit	0.95	1.07
	Total:	**1.07**

Composite Runoff Coefficient: **0.95**

Source: City of Barrie, Stormwater Infrastructure Design Standard (June 2023) - Table 3.2: Runoff Coefficients (Rational C) (5-yr to 10-yr) Based on Hydrologic Soil Group.

TATHAM ENGINEERING

Modified Rational Method Calculation

Project Details

Barrie YMCA, 535 Bayview Drive	423449

Prepared By

LJC	1/19/2024

Municipality

City of Barrie

Existing Conditions Analysis

Catchment ID:	101
Catchment Area (ha):	1.48
1:5-Year Runoff Coef:	0.95
Time of Conc. (min):	13

Proposed Conditions Analysis

Catchment ID:	201
Catchment Area (ha):	1.75
1:5-Year Runoff Coef.:	0.95
Time of Conc. (min):	12

Rational Method Calculations

Design Storm		2	5	10	25	50	100
IDF Curve	A	676	843	977	1133	1251	1384
	B	4.68	4.58	4.75	4.73	4.85	4.91
	C	0.78	0.76	0.76	0.76	0.75	0.75
101	i (mm/hr)	73	97	112	131	146	160
	C	0.95	0.95	0.95	1.00	1.00	1.00
	Q (m^3/s)	0.29	0.38	0.44	0.54	0.60	0.66

Design Storm		2	5	10	25	50	100
	i (mm/hr)	74	97	113	133	147	162
201	C	0.95	0.95	0.95	1.00	1.00	1.00
	Q (m^3/s)	0.34	0.45	0.52	0.65	0.71	0.79

Peak Flow Summary (m^3/s)

Storm	$Q_{EXISTING}$	$Q_{PROPOSED}$	$Q_{PROPOSED}$ - $Q_{EXISTING}$
2	0.287	0.342	0.055
5	0.378	0.450	0.072
10	0.438	0.522	0.084
25	0.541	0.645	0.104
50	0.600	0.715	0.115
100	0.660	0.786	0.126

TATHAM ENGINEERING

Modified Rational Method Calculation

Project Details

Barrie YMCA, 535 Bayview Drive	423449

Prepared By

LJC	1/19/2024

Municipality

City of Barrie

Existing Conditions Analysis

Catchment ID:	102
Catchment Area (ha):	0.55
1:5-Year Runoff Coef:	0.95
Time of Conc. (min):	10

Proposed Conditions Analysis

Catchment ID:	202
Catchment Area (ha):	0.08
1:5-Year Runoff Coef.:	0.95
Time of Conc. (min):	10

Rational Method Calculations

Design Storm		2	5	10	25	50	100
IDF Curve	A	676	843	977	1133	1251	1384
	B	4.68	4.58	4.75	4.73	4.85	4.91
	C	0.78	0.76	0.76	0.76	0.75	0.75
102	i (mm/hr)	83	109	126	148	164	180
	C	0.95	0.95	0.95	1.00	1.00	1.00
	Q (m^3/s)	0.12	0.16	0.18	0.23	0.25	0.28

Design Storm		2	5	10	25	50	100
	i (mm/hr)	83	109	126	148	164	180
202	C	0.95	0.95	0.95	1.00	1.00	1.00
	Q (m^3/s)	0.02	0.02	0.03	0.03	0.04	0.04

Peak Flow Summary (m^3/s)

Storm	$Q_{EXISTING}$	$Q_{PROPOSED}$	$Q_{PROPOSED}$ - $Q_{EXISTING}$
2	0.121	0.018	-0.103
5	0.159	0.024	-0.135
10	0.184	0.027	-0.156
25	0.227	0.034	-0.193
50	0.251	0.038	-0.214
100	0.276	0.041	-0.235

TATHAM ENGINEERING

Modified Rational Method Calculation

Project Details

Barrie YMCA, 535 Bayview Drive	423449

Prepared By

LJC	1/19/2024

Municipality

City of Barrie

Existing Conditions Analysis

Catchment ID:	103
Catchment Area (ha):	1.06
1:5-Year Runoff Coef:	0.95
Time of Conc. (min):	10

Proposed Conditions Analysis

Catchment ID:	203
Catchment Area (ha):	1.31
1:5-Year Runoff Coef.:	0.95
Time of Conc. (min):	10

Rational Method Calculations

Design Storm		2	5	10	25	50	100
IDF Curve	A	676	843	977	1133	1251	1384
	B	4.68	4.58	4.75	4.73	4.85	4.91
	C	0.78	0.76	0.76	0.76	0.75	0.75
103	i (mm/hr)	83	109	126	148	164	180
	C	0.95	0.95	0.95	1.00	1.00	1.00
	Q (m^3/s)	0.23	0.30	0.35	0.43	0.48	0.53

Design Storm		2	5	10	25	50	100
	i (mm/hr)	83	109	126	148	164	180
203	C	0.95	0.95	0.95	1.00	1.00	1.00
	Q (m^3/s)	0.29	0.38	0.44	0.54	0.60	0.66

Peak Flow Summary (m^3/s)

Storm	$Q_{EXISTING}$	$Q_{PROPOSED}$	$Q_{PROPOSED}$ - $Q_{EXISTING}$
2	0.243	0.287	0.044
5	0.320	0.377	0.058
10	0.370	0.437	0.067
25	0.457	0.540	0.083
50	0.506	0.598	0.092
100	0.556	0.657	0.101

TATHAM ENGINEERING

PROJECT	Barrie YMCA, 535 Bayview Drive	FILE	423449
		DATE	1/19/2024
SUBJECT	Culvert Capacity Check At POI#3	NAME	LJC
		PAGE	1 OF 1

Culvert Capacity Check At POI#3

Existing Conditions

Approx. Drainage Area Entering Culver	1.06	ha	(Catchment 103)
Peak Flow Entering Culvert:	0.56	m^3/s	(from Modified Rational Method calculations)
Manning's Roughness Coefficient:	0.024		(Material: CSP)
Sewer Length:	28.2	m	
Sewer Slope:	1.3%		
Diameter:	1,100	mm	
Full Flow Velocity:	2.02	m/s	
Full Flow Capacity:	1.92	m^3/s	
Total Travel Time:	0.23	min	
Percentage of Full Flow Capacity:	**29%**		

Proposed Conditions

Approx. Drainage Area Entering Culver	1.31	ha	(Catchment 203)
Peak Flow Entering Culvert:	0.66	m^3/s	(from Modified Rational Method calculations)
Manning's Roughness Coefficient:	0.024		(Material: CSP)
Sewer Length:	28.2	m	
Sewer Slope:	1.3%		
Diameter:	1,100	mm	
Full Flow Velocity:	2.02	m/s	
Full Flow Capacity:	1.92	m^3/s	
Total Travel Time:	0.23	min	
Percentage of Full Flow Capacity:	**34%**		

Therefore, the flows through the culvert will increase by 5%.

TATHAM ENGINEERING

PROJECT	Barrie YMCA, 535 Bayview Drive	FILE	423449
		DATE	1/19/2024
SUBJECT	Rip Rap Sizing - US Army Corp of Engineers Manual EM 1110-2-1601	DESIGNED	LJC
		CHECKED	JG

Required Rip Rap size, $D_{30} = S_f \times C_s \times C_v \times C_T \times d \times \{[y_w/(y_s - y_w)]^{1/2} \times [V/(Kgd)^{1/2}]\}^{2.5}$

(US Army Corp of Engineers, EM 1110-2-1601, Chapter 3: Rip Rap Protection, Eq. 3-3)

where:

D_{30} =	rip rap size of which 30% is finer by weight (m)
S_f =	factor of safety (unitless)
C_s =	stability coefficient for incipient failure (unitless)
C_v =	vertical velocity distribution coefficient (unitless)
C_T =	thickness coefficient (unitless)
d =	depth of flow (m)
y_w =	unit weight of water (kg/m^3)
y_s =	unit weight of rip rap (kg/m^3)
V =	depth -average velocity (m/s)
K_b =	bed correction factor (unitless)
g =	gravitational constant (m/s^2)

				Notes
where:	S_f =	1.10		
	C_s =	0.30		Angular Rock
	C_v =	1.00		Straight Channel
	C_T =	1.00		
	d =	0.53	m	
	y_w =	1000	kg/m^3	
	y_s =	2650	kg/m^3	
	V =	1.66	m/s	
	K_b =	1.00		
	g =	9.81	m/s^2	
therefore:	D_{30} =	42	mm	
	D_{50} =	53	mm	Required rip rap size on channel bed
	t =	79	mm	Minimum rip rap thickness on channel bed lesser of t or D_{100}

TATHAM ENGINEERING

Storm Sewer Design Sheet

Project Information

Barrie YMCA - 535 Bayview Drive	423449

Drawing Reference

STM-1: Storm Sewer Design Sheet	March 21-24

Prepared By

LJC/JLM	March 21-24

Reviewed By

NM	March 21-24

Municipality

City of Barrie

Runoff Coefficient Adjustment

Equation	1	
Year	**A**	**B**
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	675.59	4.68	0.78
5	843.02	4.58	0.76
10	976.90	4.75	0.76
25	1133.12	4.73	0.76
50	1251.47	4.85	0.75
100	1383.63	4.91	0.75

Manning's Coefficient

Material	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Notes

Version Date: March 21, 2024

Version Number: 1

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient (C)	Design Storm (Year)	Adjusted Runoff Coefficient (C)	Area x Runoff Coefficient	Cumulative Area (ha)	Cumulative Area x Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)	Total Time of Travel (min)
	301	STM PLUG	CBMH1	0.42	0.95	5	0.95	0.40	0.42	0.40	10.00	109.11	0.121	0.013	9.9	3.0%	375	2.75	0.304	2.43	0.07	265	39.8%	10.07
	302	CBMH1	CBMH2	0.18	0.95	5	0.95	0.17	0.60	0.57	10.07	108.72	0.172	0.013	30.3	1.2%	375	1.74	0.192	1.74	0.29	360	89.6%	10.36
	303	CBMH2	CBMH3	0.19	0.95	5	0.95	0.18	0.79	0.75	10.36	107.10	0.223	0.013	29.9	0.8%	450	1.60	0.255	1.60	0.31	428	87.6%	10.67
	304	CBMH3	STM MH1	0.26	0.95	5	0.95	0.25	1.05	1.00	10.67	105.43	0.292	0.013	64.8	0.6%	525	1.54	0.333	1.54	0.70	500	87.7%	11.37
	-	STM MH1	CBMH4	-	0.95	5	0.95	0.00	1.05	1.00	11.37	101.88	0.282	0.013	14.9	0.6%	525	1.54	0.333	1.54	0.16	493	84.7%	11.53
	305	CBMH4	HW1	0.06	0.95	5	0.95	0.06	1.11	1.05	11.53	101.10	0.296	0.013	31.7	0.7%	525	1.66	0.360	1.66	0.32	488	82.3%	11.85

Appendix C: Phosphorus Loading Assessment

TATHAM ENGINEERING

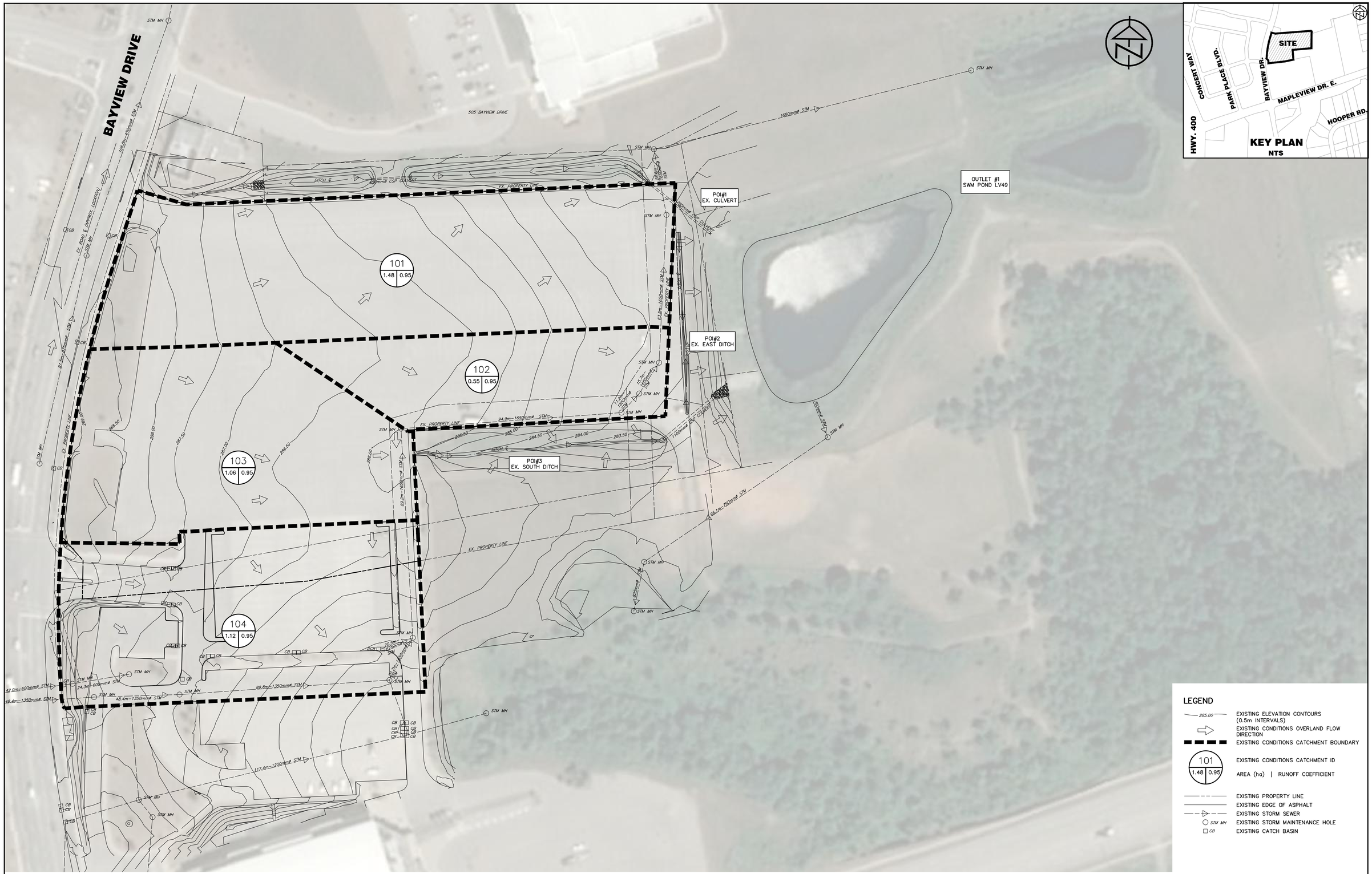
PROJECT	Barrie YMCA, 535 Bayview Drive	FILE	423449
		DATE	1/19/2024
SUBJECT	Phosphorus Loading Assessment	NAME	LJC
		PAGE	1 OF 1

Phosphorus Loading

			Existing		Proposed	
Land Use Category	Existing Phosphorous Loading Rate (kg/ha/year)	Future Phosphorous Loading Rate (kg/ha/year)	Area (ha)	Phosphorous Loading (kg/year)	Area (ha)	Phosphorous Loading (kg/year)
Cropland	0.19	0.19	0.00	0.00	0.00	0.00
Hay-Pasture	0.07	0.07	0.00	0.00	0.00	0.00
Turf-Sod	0.12	0.12	0.00	0.00	0.00	0.00
High Intensity Development - C/Ind.	1.82	1.82	4.21	7.66	4.21	7.66
High Intensity Development - Res.	1.32	1.32	0.00	0.00	0.00	0.00
Low Intensity Development	0.13	0.13	0.00	0.00	0.00	0.00
Quarry	0.08	0.08	0.00	0.00	0.00	0.00
Unpaved Road	0.83	0.83	0.00	0.00	0.00	0.00
Forest	0.05	0.05	0.00	0.00	0.00	0.00
Transition	0.06	0.06	0.00	0.00	0.00	0.00
Wetland	0.05	0.05	0.00	0.00	0.00	0.00
Open Water	0.26	0.26	0.00	0.00	0.00	0.00
Total			**4.21**	**7.66**	**4.21**	**7.66**

Since the phosphorus loading rates do not change between existing conditions and proposed conditions, phosphorus mitigation measures are not required as per the LSRCA *Phosphorus Offsetting Policy* (May 2023).

Appendix D: Drawings



LEGEND

- 285.00 — EXISTING ELEVATION CONTOURS (0.5m INTERVALS)
- EXISTING CONDITIONS OVERLAND FLOW DIRECTION
- EXISTING CONDITIONS CATCHMENT BOUNDARY
- 101 / 1.48 | 0.95 — EXISTING CONDITIONS CATCHMENT ID; AREA (ha) | RUNOFF COEFFICIENT
- EXISTING PROPERTY LINE
- EXISTING EDGE OF ASPHALT
- EXISTING STORM SEWER
- STM MH — EXISTING STORM MAINTENANCE HOLE
- CB — EXISTING CATCH BASIN

DISCLAIMER AND COPYRIGHT

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

BENCHMARKS

TBM#1 – ELEVATION 289.30m
NAIL SPIKE IN HYDRO POLE ON EAST SIDE OF BAYVIEW DRIVE, SOUTH OF PARKING LOT ENTRANCE.

ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE CGVD28 REFERENCING CANNET GNSS NETWORK.

CITY OF BARRIE CONTROL MONUMENTS:
1. VBM 031200300300 – ELEVATION 287.26m
2. HCM 03120040044 – ELEVATION 288.82m
3. VBM/HCM 003120080015 – ELEVATION 248.84m

NOTES

SITE PLAN COMPLETED BY MARTIN SIMMONS SWEERS ARCHITECTS, DATED APRIL 2, 2024.

TOPOGRAPHIC SURVEYS COMPLETED BY TATHAM ENGINEERING LIMITED, DATED JUNE 29, 2023 AND NOVEMBER 27, 2023.

LEGAL SURVEY COMPLETED BY RUDY MAK SURVEYING LIMITED, DATED DECEMBER 4, 2023.

EXISTING INFRASTRUCTURE AS PER CITY OF BARRIE'S OPEN GIS DATA PORTAL AND AS-BUILT DRAWINGS.

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR PRE-SUBMISSION REVIEW	JAN 19/24
2.	ISSUED FOR SPA (1ST SUBMISSION)	APR 03/24

ENGINEER STAMP

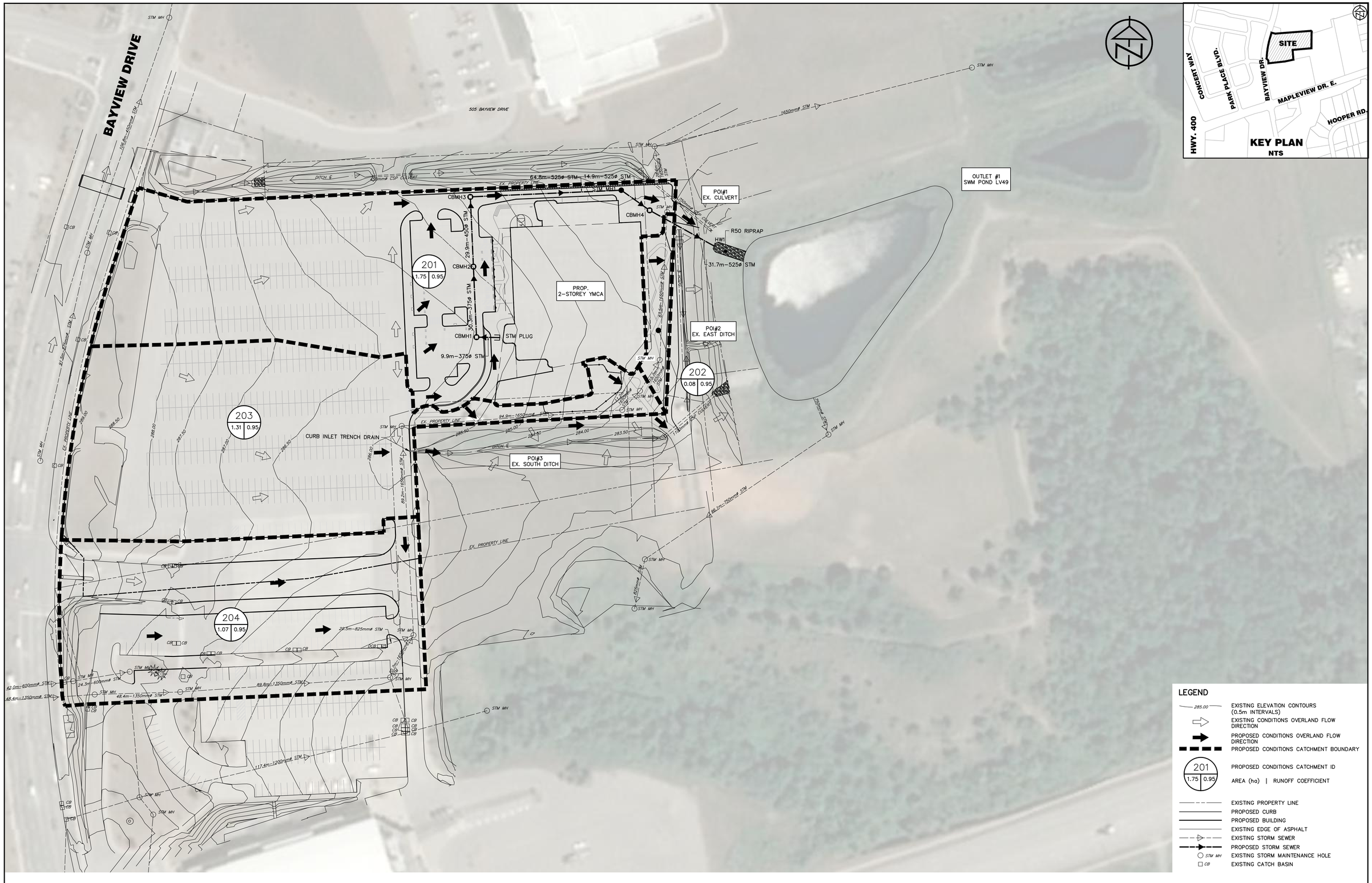
BARRIE YMCA
535 BAYVIEW DRIVE
CITY OF BARRIE

EXISTING CONDITIONS DRAINAGE PLAN

TATHAM ENGINEERING

DESIGN: NM/LMG	FILE: 423449	DWG: DP-1
DRAWN: LMG/JLM	DATE: JUL 2023	
CHECK: NM	SCALE: 1:750	

Drawing Name: 423449-DP01.dwg, Plotted: Apr 03, 2024



LEGEND

- 285.00 — EXISTING ELEVATION CONTOURS (0.5m INTERVALS)
- EXISTING CONDITIONS OVERLAND FLOW DIRECTION
- PROPOSED CONDITIONS OVERLAND FLOW DIRECTION
- PROPOSED CONDITIONS CATCHMENT BOUNDARY
- 201 / 1.75 | 0.95 — PROPOSED CONDITIONS CATCHMENT ID; AREA (ha) | RUNOFF COEFFICIENT
- EXISTING PROPERTY LINE
- PROPOSED CURB
- PROPOSED BUILDING
- EXISTING EDGE OF ASPHALT
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- STM MH — EXISTING STORM MAINTENANCE HOLE
- CB — EXISTING CATCH BASIN

DISCLAIMER AND COPYRIGHT

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

BENCHMARKS

TBM#1 – ELEVATION 289.30m
NAIL SPIKE IN HYDRO POLE ON EAST SIDE OF BAYVIEW DRIVE, SOUTH OF PARKING LOT ENTRANCE.

ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE CGVD28 REFERENCING CANNET GNSS NETWORK.

CITY OF BARRIE CONTROL MONUMENTS:
1. VBM 031200300300 – ELEVATION 287.26m
2. HCM 031200040044 – ELEVATION 288.82m
3. VBM/HCM 003120080015 – ELEVATION 248.84m

NOTES

SITE PLAN COMPLETED BY MARTIN SIMMONS SWEERS ARCHITECTS, DATED APRIL 2, 2024.

TOPOGRAPHIC SURVEYS COMPLETED BY TATHAM ENGINEERING LIMITED, DATED JUNE 29, 2023 AND NOVEMBER 27, 2023.

LEGAL SURVEY COMPLETED BY RUDY MAK SURVEYING LIMITED, DATED DECEMBER 4, 2023.

EXISTING INFRASTRUCTURE AS PER CITY OF BARRIE'S OPEN GIS DATA PORTAL AND AS-BUILT DRAWINGS.

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR PRE-SUBMISSION REVIEW	JAN 19/24
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ENGINEER STAMP

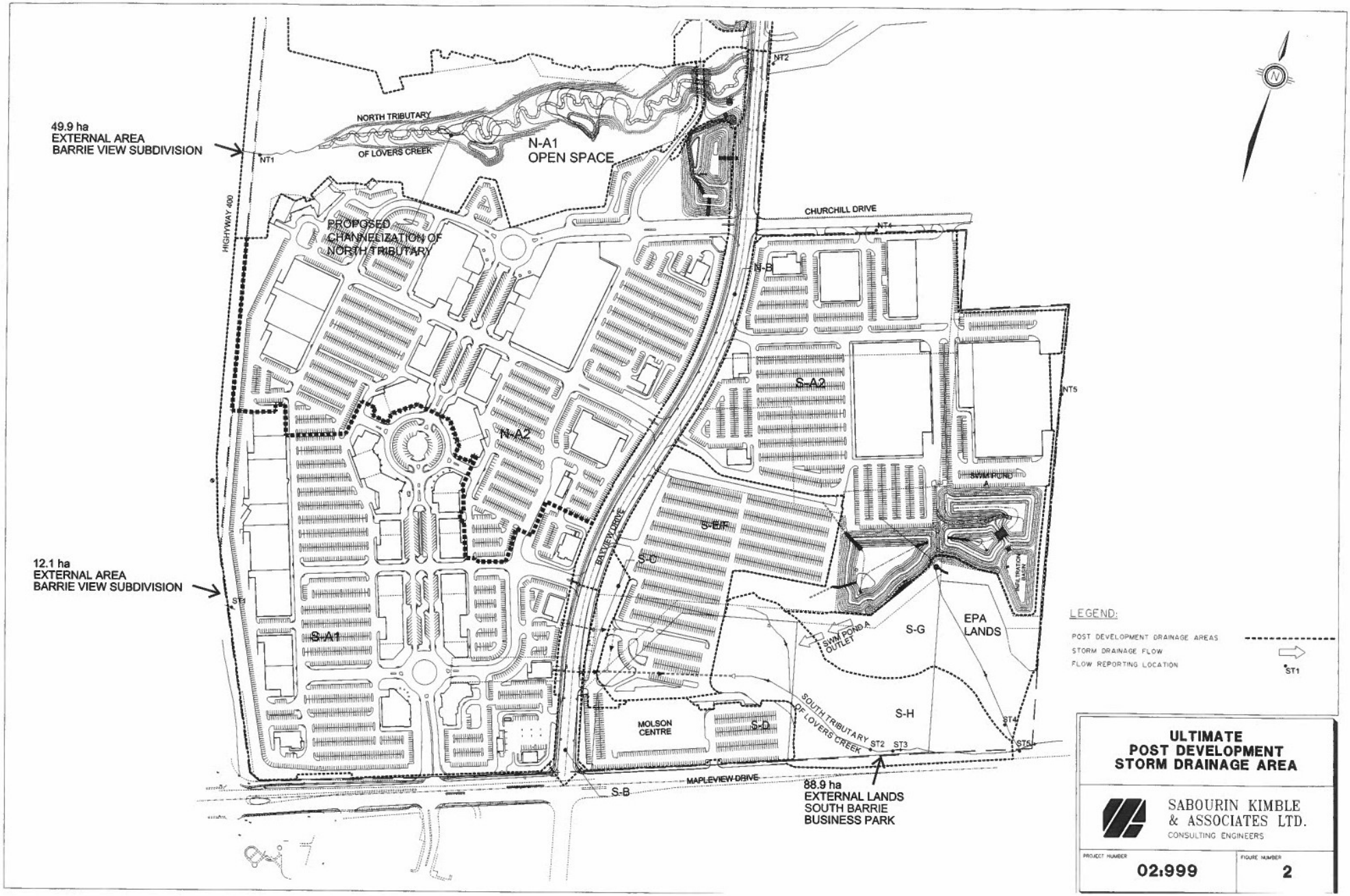
BARRIE YMCA
535 BAYVIEW DRIVE
CITY OF BARRIE

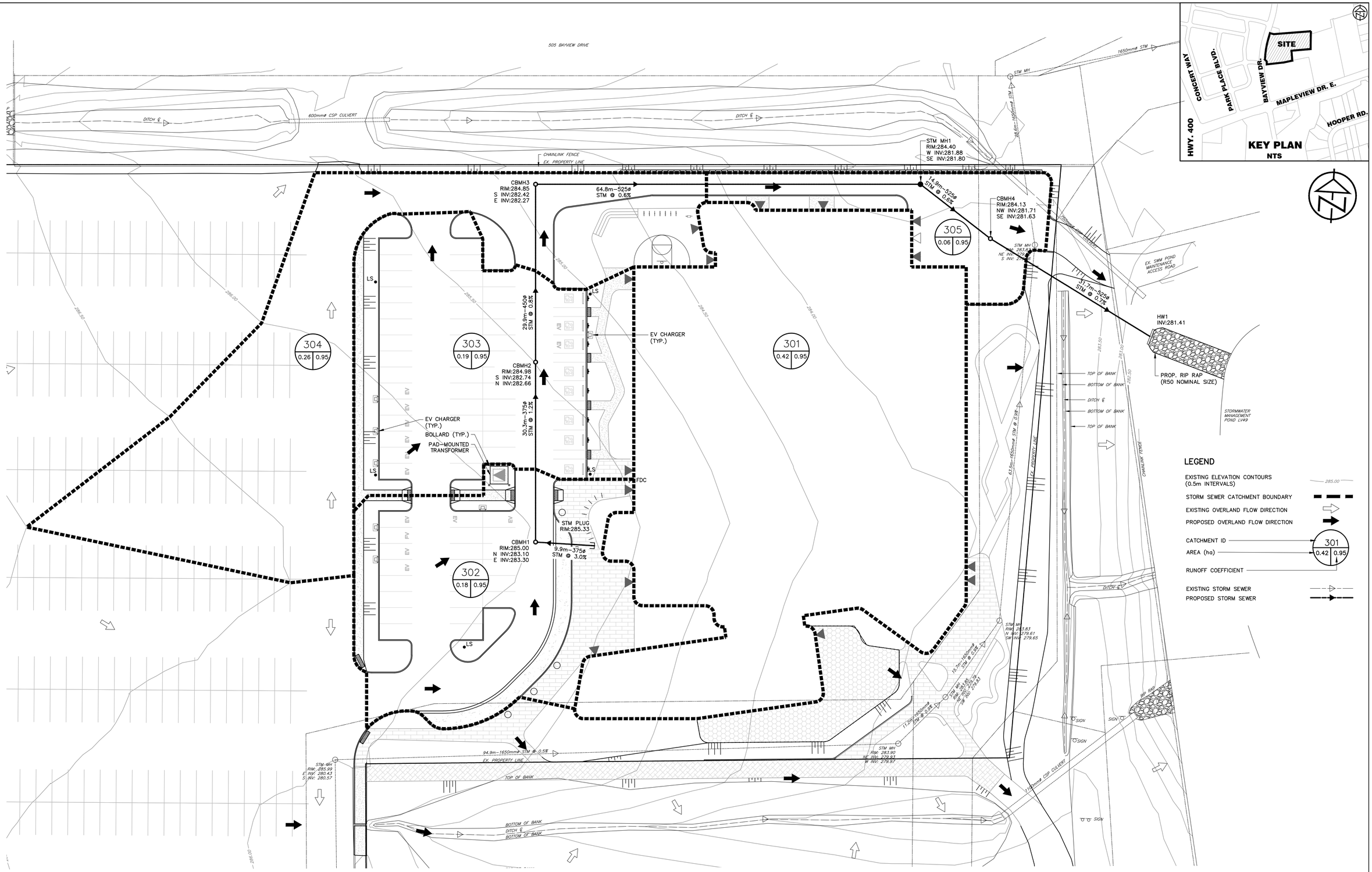
PROPOSED CONDITIONS DRAINAGE PLAN

TATHAM ENGINEERING

DESIGN: NM/LMG	FILE: 423449	DWG: DP-2
DRAWN: LMG/JLM	DATE: JUL 2023	
CHECK: NM	SCALE: 1:750	

Drawing Name: 423449-DP02.dwg, Plotted: Apr 03, 2024


49.9 ha
EXTERNAL AREA
BARRIE VIEW SUBDIVISION
12.1 ha
EXTERNAL AREA
BARRIE VIEW SUBDIVISION
NORTH TRIBUTARY
OF LOVERS CREEK
N-A1
OPEN SPACE
PROPOSED
CHANNELIZATION OF
NORTH TRIBUTARY
HIGHYWAY 400
CHURCHILL DRIVE
N-B
N-A2
S-A2
S-A1
S-E
S-F
S-C
BAYVIEW DRIVE
SWM POND A
INFILTRATION BASIN
SWM POND A OUTLET
S-G
EPA
LANDS
S-H
S-D
MOLSON
CENTRE
SOUTH TRIBUTARY
OF LOVERS CREEK
S-B
MAPLEVIEW DRIVE
88.9 ha
EXTERNAL LANDS
SOUTH BARRIE
BUSINESS PARK
NT1
NT2
NT4
NT5
ST1
ST2
ST3
ST4
ST5
LEGEND:
POST DEVELOPMENT DRAINAGE AREAS
STORM DRAINAGE FLOW
FLOW REPORTING LOCATION
ULTIMATE
POST DEVELOPMENT
STORM DRAINAGE AREA
SABOURIN KIMBLE
& ASSOCIATES LTD.
CONSULTING ENGINEERS
PROJECT NUMBER
02:999
FIGURE NUMBER
2



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BENCHMARKS

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NOTES

SITE PLAN COMPLETED BY MARTIN SIMMONS SWEERS ARCHITECTS, DATED APRIL 2, 2024.

TOPOGRAPHIC SURVEYS COMPLETED BY TATHAM ENGINEERING LIMITED, DATED JUNE 29, 2023 AND NOVEMBER 27, 2023.

LEGAL SURVEY COMPLETED BY RUDY MAK SURVEYING LIMITED, DATED DECEMBER 4, 2023.

EXISTING INFRASTRUCTURE AS PER CITY OF BARRIE'S OPEN GIS DATA PORTAL AND AS–BUILT DRAWINGS.

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR PRE–SUBMISSION REVIEW	JAN 19/24
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ENGINEER STAMP

BARRIE YMCA
535 BAYVIEW DRIVE
CITY OF BARRIE

STORM SEWER CATCHMENT PLAN

TATHAM ENGINEERING

DESIGN: NM/LMG	FILE: 423449	DWG: STM-1
DRAWN: LMG/JLM	DATE: JUL 2023	
CHECK: NM	SCALE: 1:300	