URBANTECH®

SECONDARY PLAN
SCOPED SERVICING STUDY

ALLOA CALEDON SECONDARY PLAN

TOWN OF CALEDON
REGION OF PEEL

PREPARED FOR
ALLOA LANDOWNERS GROUP INC.

Urbantech File No.: 20-665

1ST SUBMISSION – JULY 2024
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Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 · Markham · ON · L3R 3T7 | 905.946.9461
urbantech.com

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1 INTRODUCTION

1.1. PROJECT BACKGROUND

Urbantech Consulting was retained by the Alloa Landowners Group to prepare a Scoped Servicing Study in support of the Alloa Community Secondary Plan. This document is meant to provide a general overview of the servicing strategy for the Alloa Secondary Plan (water, sanitary, stormwater management) and a framework for further block-level analysis (Tertiary Plan EIR / FSR). Additional reports will be prepared to support future planning and development approvals.

This report should be read in conjunction with the Alloa Local Subwatershed Study and Secondary Plan information package. This report has been prepared to satisfy the following:

- Town of Caledon Development Standards Manual (2019)
- Peel Public Works Stormwater Design Criteria and Procedures Manual (June 2019)
- Consolidated Linear Infrastructure Environmental Compliance Approval (CLI ECA) Stormwater Management Criteria (September 2022)
- Region of Peel Public Works Watermain Design Criteria (June 2010)
- Region of Peel Public Works Linear Wastewater Standards (March 2023)
- Toronto and Region Conservation Authority (TRCA) and Credit Valley Conservation (CVC) Authority Guidelines

Drawings referenced in this report can be found in **Appendix A.**

Applicable site-specific background information, guidelines, policies, and design criteria have been considered in the development of this report, in addition to comments received from Agencies during the first submission circulation.

1.2. STUDY AREA

The Alloa Secondary Plan study area is approximately 724 hectares (ha). The study area is bounded by Mayfield Road to the south, Chinguacousy Road to the east, Heritage Road to the west and the preferred route of the future Highway 413 to the north. The area is bisected (north to south) by Creditview Road and Mississauga Road and east-west by the Alloa Municipal Drain. Refer to **Figure 1B** for additional details. Under existing conditions, the land is predominantly agricultural with a few small farm and residence structures.

The Alloa Secondary Plan is situated at a drainage divide between the Etobicoke Creek watershed, Fletcher's Creek watershed and Huttonville Creek watershed. As such, the lands fall within the jurisdiction of both Toronto and Region Conservation Authority (TRCA) and Credit Valley Conservation (CVC). The TRCA boundary includes the Etobicoke Creek watershed (northern portion of the site), and the CVC jurisdiction includes the Fletcher's Creek watershed and Huttonville Creek watershed (southern portion of the site). The adjacent watersheds are shown in **Figure 1A**. **Table 1-1** summarizes the total area of the Alloa Secondary Plan within each watershed.

Table 1-1: Watershed Drainage Divide (Alloa Secondary Plan)

Description	Area (ha)	Percent of Total
Etobicoke Creek	542	75.7%
Fletcher's Creek	141	19.7%
East Huttonville Creek	19	2.7%
West Huttonville Creek	14	1.9%

There is a small area in the northeast corner of the site designated as Greenbelt Outer Boundary. In addition, there are woodlands and wetland features across the landscape. The Secondary Plan concept maintains the Greenbelt boundary and the natural features and associated connectivity where required, although future work may address alignment and refinement to these features. Both the Alloa Municipal Drain and some connecting Etobicoke Creek headwater features also have existing associated floodplain which is to be regulated in the post development condition. **Drawing 2A** provides information on the Secondary Plan features and constraint limits.

1.3. BACKGROUND DOCUMENTATION

In preparation of the Scoped Servicing Study, the following reports and documents were referenced:

- Huttonville and Fletcher's Creeks Subwatershed Study (AMEC, 2011)
- Etobicoke Creek Hydrology Update Study (MMM Group, 2013)
- Etobicoke Creek Synthesis Study (CH2M HILL & TRCA, December 2014)
- Mount Pleasant Sub-Area 51-2 EIR/FSR (2016)
- Region of Peel SABE Scoped Subwatershed Study (2022)
- Region of Peel Development Charges Background Study – Consolidated Report (November 2020)
- Region of Peel Water and Wastewater Master Plan for the Lake-Based System (2020)

- Region of Peel Settlement Area Boundary Expansion Water and Wastewater Service Analysis (August 2021)
- Region of Peel Wastewater Development Charges 2025 (Mapping)
- Region of Peel Water Development Charges 2025 (Mapping)

1.4. POPULATION PROJECTIONS

Population forecasts have been prepared by GSAI based on the Secondary Plan preferred land use plan (see **Figure 1C**) and projected housing mix within each area. Population estimates are used for the purposes of calculating preliminary servicing quantities (i.e., water demand and wastewater generation rates). **Table 1-2** summarizes the Secondary Plan area and population projections.

Table 1-2: Alloa Secondary Plan – Projected Area and Population

Description	Area (ha)	Population
Phase 1: Neighbourhood Area + Major Commercial / Mixed Use	264.1	20,600
Phase 1: Major Commercial – Future Costco Site	13.0	650
Phase 2: Neighbourhood Area	166.5	15,825
Phase 2: Employment Lands	100.7	5,035
TOTAL	**544.3**	**42,110**

2 DEVELOPMENT CONSTRAINTS & PRELIMINARY SITE GRADING

2.1. SECONDARY PLAN PROPOSED GRADING

The future site grades required to service the Alloa Secondary Plan lands are influenced by:

- Existing and/or proposed grades along the boundary roads (Mayfield Road, Heritage Road, Mississauga Road, Creditview Road and Chinguacousy Road).
- Preliminary design information for future Hwy. 413.
- NHS boundaries and buffer limits. Refer to **Drawing 2A** for details.
- Downstream stormwater outlet invert elevations which determine the elevation of future SWM facilities' normal water levels and, ultimately, storm sewer depth and serviceable drainage areas.

Preliminary grading for the Secondary Plan is shown in **Drawing 2B**. Development of site grading has taken into consideration the following requirements and constraints:

- Conformance to the Town's grading criteria.
- Minimize cut and fill operations and work towards a balanced site.
- Match existing boundary grading condition, where feasible.
- Match existing grades at woodland and wetland features and their buffers, where possible. Some transition grading has been proposed within buffers in order to avoid the use of retaining walls.
- Maintain subwatershed drainage boundaries, where possible.
- Provide suitable cover on proposed servicing.
- Provide overland flow conveyance for major storm conditions.

The majority of the existing Alloa Secondary Plan lands slope from the north to the south, towards either the Alloa Municipal Drain or towards existing culverts across Mayfield Road and Chinguacousy Road as shown on **Drawing 3A**. There are some areas south of the Alloa Municipal Drain, within the Etobicoke Creek watershed, which drain from south to north, towards the Drain. The proposed development grading is generally consistent with the pre-development drainage pattern, and it is based on an overall SWM strategy that includes maximizing the lands that can drain by gravity to the proposed SWM facilities, while avoiding excessive sewer sizes and pipe conflicts.

Proposed road grades vary between the Town's minimum accepted slope of 0.50% and will not exceed 5%. Sawtooth grading may be introduced to maximize overland flow drainage to SWM Ponds and minimize 100-year flow capture in the storm sewer. Sawtooth road grading will conform to the Town's minimum 0.50% road grade; however, the net grade over an extended length of road is reduced by introducing sections of road reversed graded at 0.50%. The net slope will not be less than 0.25% in this scenario and will accommodate major system flow conveyance. Proposed Grading Plans for the Subject Lands including road grades and overland flow routes are illustrated on **Drawing 2B.**

2.1.1. Boundary Road Grades

Existing boundary roads are within the jurisdiction of either the Town of Caledon (i.e., Chinguacousy Road, Creditview Road) or the Region of Peel (Mayfield Road, Mississauga Road).

The Town and the Region have road widening projects either planned or on-going for all boundary roads associated with the Alloa Secondary Plan. Ultimately, internal development grades need to be compatible with the approved vertical alignment of the boundary road conditions after road urbanization projects are completed by the Region and the Town. For the purposes of this study, the following has been assumed:

- Mayfield Road – detailed design for Mayfield Road widening has been finalized by Peel Region. Region staff have provided detailed design drawings to the Secondary Plan study team. The grading plan shown in **Drawing 2B** captures the design of Mayfield Road, as provided by Peel.
- Chinguacousy Road – the Town of Caledon is in the process of awarding the contract for detailed design for road urbanization. The Town has provided the road design as contemplated through the Municipal Class Environmental Assessment (MCEA) Study for Chinguacousy Road. Grading shown in **Drawing 2B** reflects the most current EA design.
- Future widening projects are planned for both Creditview Road (Town of Caledon) and Mississauga Road (Region of Peel). MCEA studies have not been completed to-date. For the purposes of this study, preliminary road grades have been identified for both road corridors to ensure they are compatible with development and can be serviced by proposed storm infrastructure. Further coordination with the Town and Region will be required as work proceeds. Proposed preliminary plans for both Creditview Road and Mississauga Road can be found on **Drawings 2C** and **2D,** and **Drawings 2E** and **2F** respectively.

2.1.2. Highway 413

The Alloa Secondary Plan is bounded on the north side by the future planned Highway 413 (see **Figure 1C**). As development planning for Alloa proceeds, coordination of Alloa land use with MTO requirements (e.g., Stormwater Management Ponds, Transitway Stations, interchanges, etc.) is required.

As part of the initial site grading plan, Urbantech has reviewed the proposed preliminary Highway 413 grading, dated October 2024, and January 2025 TRCA drainage report by MTO with respect to grading and drainage implications as they relate to the Alloa Development Plan. The following assumptions per the preliminary MTO design have been considered for the Alloa grading assumptions:

- Existing boundary roads (Mayfield, Mississauga, Creditview and Chinguacousy Road) will be reconstructed as flyovers in conjunction with the Hwy 413 construction.
- Location of proposed Hwy 413 crossings (bridges and culverts) is reflected in the Alloa Grading plan in **Drawing 2B** for external drainage conveyance through Alloa.

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- Recognizing that MTO's design work remains on-going, the grading concept proposed is preliminary and will need to be reviewed as development proceeds. It is noted that MTO remains open to consider changes to the preliminary Hwy 413 SWM pond footprints through future Hwy design work based on the Alloa development input.

3 STORMWATER MANAGEMENT STRATEGY

3.1. BACKGROUND

The Alloa Secondary Plan Scoped Subwatershed Study (Scoped SWS, under separate cover) provides guidance for the management of stormwater under post development land use conditions. The guidelines established in the Scoped SWS form the foundation for the integrated stormwater management strategy proposed for the Secondary Plan area.

3.2. EXISTING CONDITIONS

Existing (pre-development) overland flow is split between the Fletcher's Creek, Huttonville Creek, and Etobicoke Creek watersheds (see **Figure 1A**). The north portion of the site drains to the Alloa Municipal Drain, which discharges to Etobicoke Creek east of Chingaucousy Road. Municipal drains, while naturalized, are man-made municipal infrastructure constructed to improve drainage and reduce flooding of agricultural lands. The Alloa Municipal Drain is owned and maintained by the municipality. The future requirements and ownership of the municipal drain will be discussed with the Town of Caledon as work proceeds.

The south portion of the site drains to Mayfied Road. Adjacent to the site, Mayfield Road consists of a rural road right-of-way, which drains via existing roadside ditches and culverts to a storm sewer system in the neighbourhood to the south. This sewer network outlets to the Fletcher's Creek and Huttonville Creek watersheds.

A large portion of the site currently has tile drains. For the most part, the tile drain system directs flow to the Alloa Municipal Drain.

Pre-development drainage catchments, overland flow direction and discharge locations are shown in **Drawing 3A**.

TRCA updated the 2013 Etobicoke Creek Hydrology model in 2022 and provided the calibrated Visual OTTHYMO model for the study area to the Alloa study team (Urbantech Consulting) in 2024. This model forms the basis of the Secondary Plan and Local Subwatershed Study hydrologic analysis, including flow estimation, continuous modelling, and water balance assessments. This model uses the 2-year to 100-year 12-hour AES storm distribution (AMC II conditions), as well as the final 12 hours of Hurricane Hazel for the Regional event (AMC III conditions). Minimal modifications were made to the original TRCA hydrology model for Etobicoke Creek, as part of the Secondary Plan and Local Subwatershed Study hydrologic analysis. The TRCA model was discretized appropriately for a Local Subwatershed Study scale and therefore, no significant changes were made beyond minor drainage area and time to peak adjustments.

Note that the Secondary Plan / Local Subwatershed Study ***continuous*** modelling has not been calibrated, but it was agreed by the agencies that the water resources recommendations for the LSS (erosion control, wetland water balance, site water balance) could move forwards on the basis of a sensitivity analysis in lieu of calibration. The sensitivity analysis tested various scenarios including a baseline, "high" runoff, and "low" runoff, each based on agreed-upon adjustments to key modelling parameters affecting runoff (SCS Curve Number, Initial Abstractions, and soil type/land use). Refer to the *Sensitivity Analysis Approach Prior to Model Calibration* memo (Urbantech, August 2025) in

Appendix C for additional details. The ***single event*** model used for establishing return period event flows and Regional flows for the purposes of hydraulic modelling and pond sizing does not require calibration, as it has been calibrated though the 2013 ECHUS and accepted by TRCA.

3.3. STORMWATER MANAGEMENT DESIGN CRITERIA

The stormwater management requirements for the Alloa Secondary Plan Area are based on the criteria as specified in the Etobicoke Creek Hydrology Update (April 2013), the Subwatershed Study for the Huttonville and Fletcher's Creeks (June 2011) and the Heritage Heights Subwatershed Study Phase 2 Report (March 2022). The Scoped Subwatershed Study for the Settlement Area Boundary Expansion in the Region of Peel (January 2022) was also referenced to confirm that SWM criteria proposed in this report align with the SABE study.

The following sections outline the specific SWM criteria for the various outlets from the subject area to Etobicoke Creek, Huttonville Creek and Fletchers Creek, as per the applicable studies.

3.3.1. Quality Control Requirements

Etobicoke Creek, Huttonville Creek and Fletcher's Creek require Enhanced (Level 1) Quality Control for the removal of 80% Total Suspended Solids (TSS), based on the MOE (2003) SWMF & Design Guidelines. This is required for the Subject Lands through the implementation of end-of-pipe SWM facilities and/or LID measures (also see **Section 3.6.2**).

3.3.2. Erosion Control Requirements

Settlement Area Boundary Expansion:

The SABE Scoped Subwatershed Study provided recommended ranges of unit volumes for Extended Detention erosion control for Huttonville Creek, Fletcher's Creek and Etobicoke Creek. The erosion control recommendations from the SABE study are summarized in **Table 3-1** below.

Table 3-1 : Erosion Criteria, Unit Volumes (SABE)

	Unit Volume (Ranges) (m^3 / impervious ha)		
	Huttonville Creek	**Fletcher's Creek**	**Etobicoke Creek**
Extended Detention	200 - 325	250	325

A summary of the erosion control recommendations from the SABE Scoped Subwatershed Study is provided in **Appendix B**. The SABE report targets have been further confirmed / refined based on the studies completed for the respective watersheds including the Mayfield West Comprehensive EIS, the Huttonville-Fletchers Subwatershed Study, the Block 51-1 / East Huttonville Creek EIR/FSR and the Block 51-2 / Fletchers Creek EIR/FSR studies.

Etobicoke Creek:

Erosion targets for Etobicoke Creek were established in the Mayfield West Comprehensive Environmental Impact Study and Management Plan (December 2014). As per the Mayfield West EIS, the erosion unitary target flow to be applied to the subject Alloa area within the Etobicoke Creek subwatershed is 0.00031 $m^3/s/ha$, and the target unitary storage for erosion control is 325 $m^3/$ impervious ha.

Huttonville & Fletchers Creek:

As per the Subwatershed Study for the Huttonville and Fletcher's Creeks (June 2011), the subject Alloa area outlets to Flow Node H3 of East Huttonville Creek and Flow Nodes F2 and F3 of Fletcher's Creek. As per the Heritage Heights Subwatershed Study Phase 2 Report (March 2022), part of the subject lands also drains to Flow Node HW (Huttonville West). **Table 3-2** below summarizes the unit target rates and unit target volumes for the required erosion control for the portion of the subject site draining to the West Huttonville Creek, East Huttonville Creek and Fletcher's Creek, as per the HFSWS and HHSWS.

It should be noted that the erosion threshold for East Huttonville Creek and Fletcher's Creek was subsequently updated and further refined, based on discussions with CVC as part of the Mount Pleasant Sub-Area 51-1 and 51-2 EIR/FSR (August 2016). The agreed-upon erosion target unit flow rate for East Huttonville and Fletcher's Creek was revised to 0.00041 $m^3/s/ha$. The updated unit flow rate for erosion control is to be applied to the portion of subject Alloa area discharging to East Huttonville Creek and Fletcher's Creek.

Table 3-2: Erosion Control Criteria (East Huttonville Creek & Fletcher's Creek)

Subwatershed	Unit Flow Rates (m^3 / s / ha)	Unit Volume (m^3 / impervious ha)
West Huttonville Creek	0.00061 (HHSWS)	425
East Huttonville Creek	0.00052 (HFWS – superseded) 0.00041 (EIR/FSS – approved)	200
Fletcher's Creek	0.00025 (HFWS – superseded) 0.00041 (EIR/FSS – approved)	250

The proposed SWM plan for the subject Alloa area will be designed according to the erosion control criteria outlined in the subwatershed studies for Etobicoke Creek, Huttonville Creek and Fletcher's Creek (as discussed above).

3.3.3. Quantity Control Requirements

Settlement Area Boundary Expansion:

The Settlement Area Boundary Expansion (SABE) Scoped Subwatershed Study provided recommended ranges of unit volumes for 100-year and Regional level quantity control for Huttonville Creek, Fletcher's Creek and Etobicoke Creek. The quantity control recommendations from the SABE study are summarized in **Table 3-3** below.

Table 3-3: Quantity Control Criteria, Unit Volumes (SABE)

Design Storm	Unit Flow Rates (Ranges) (m^3 / impervious ha)		
	Huttonville Creek	Fletcher's Creek	Etobicoke Creek
100-Year Storm	550 - 1150	600 - 1250	400 – 1250
Regional Storm	975 - 1200	0 - 1225	0 - 1200

The SABE report targets have been further confirmed / refined based on the studies completed for the respective watersheds including the Mayfield West Comprehensive EIS, the Huttonville-Fletchers Subwatershed Study, the Block 51-1 / East Huttonville Creek EIR/FSR and the Block 51-2 / Fletchers Creek EIR/FSR studies as described below.

Etobicoke Creek:

As per the Etobicoke Creek Hydrology Update (MMM Group, April 2013), the subject area falls within the Etobicoke Creek Headwater (Basin 1) and contributes drainage to flow nodes A, B and D, as per Figure J-1 of the hydrology study. The 12-hour AES storm distribution was used for the Etobicoke Creek hydrology model to assess the 2 to 100-year peak flows under existing and future conditions. The last 12 hours of the Regional storm (Hurricane Hazel) was also simulated with AMC III conditions. Based on this assessment, target unit flow rates were determined for each catchment within Basin 1 of the Etobicoke subwatershed. These unit target rates reflect controlling post-development flows to 60% of existing flows, which was the criteria identified for the Etobicoke Creek headwater basins to ensure mitigation of downstream flow increases.

As there are several catchments within Basin 1, each with specific unit target flow rates, catchment 89 was selected as the basis for the quantity control criteria for the 2 to 100-year storms for the portion of the subject Alloa area within the Etobicoke Creek subwatershed, as this catchment has the most conservative unit flow rates. Similarly, the unit flow rate for catchment 85 was selected for the Regional storm, as it was the most conservative. **Table 3-4** below summarizes the unit target rates for the required quantity control for the portion of the subject site draining to Etobicoke Creek Basin 1.

Table 3-4: Selected Quantity Control Criteria, Unit Flow Rates (Etobicoke Creek, Basin 1)

Design Storm	Unit Flow Rates (m^3 / s / ha)
2-Year Storm	0.00272
5-Year Storm	0.00483
10-Year Storm	0.00648
25-Year Storm	0.00877
50-Year Storm	0.01059
100-Year Storm	0.01255
Regional Storm	0.05155

In addition to the required storage to control the subject Alloa area within the Etobicoke Creek subwatershed to the unit flow rate for the Regional storm event, an additional unit storage of 214 m^3/ha is required for Regional controls to account for the first 36 hours of the Regional event preceding the peak during the last 12 hours.

A summary of the Basin 1 quantity control requirements and unit flow rates from the Etobicoke Creek Hydrology Update is provided in **Appendix B.**

Huttonville & Fletcher's Creeks:

As per the Subwatershed Study for the Huttonville and Fletcher's Creeks (June 2011), the subject area contributes drainage to flow nodes HW, F2 and F3, as per Figure 3G of the subwatershed study. As per the Heritage Heights Subwatershed Study Phase 2 Report (March 2022), part of the subject lands also drains to flow node HW (Huttonville West). **Table 3-5** and **Table 3-6** below summarizes the unit target rates for the required quantity control for the portion of the subject site draining to Huttonville Creek and Fletcher's Creek.

Table 3-5: Quantity Control Criteria, Unit Flow Rates (Huttonville Creek and Fletcher's Creek)

Design Storm	Unit Flow Rates [1] (m^3 / s / ha)		
	Flow Node HW	Flow Node F2	Flow Node F3
25-Year Storm	0.0096	0.0083	0.0083
100-Year Storm	0.0170	0.0250	0.0260
Regional Storm	0.0618	N/A	

[1] *While only the 25-year and 100-year targets were provided in the HFSWS, the other storms targets have historically been determined through interpolation and subsequently confirmed through model verification. No targets for the regional storm were provided in the HFSWS; only the model verification determined if the provided storage and flow control adequately mitigated the post-development flow increase.*

Table 3-6: Quantity Control Criteria, Unit Volumes (Huttonville Creek and Fletcher's Creek)

Design Storm	Unit Flow Rates [1] (m^3 / impervious ha)		
	Flow Node HW	Flow Node F2	Flow Node F3
25-Year Storm	675	500	700
100-Year Storm	1000	850	900
Regional Storm [2]	925	446	Not required

[1] *While only the 25-year and 100-year targets were provided in the HFSWS, the other storms targets have historically been determined through interpolation and subsequently confirmed through model verification.*

[2] *Regional storage to be provided above 100-year storage (stacked)*

A summary of the quantity control requirements from the Subwatershed Study for the Huttonville and Fletcher's Creeks is provided in **Appendix B.**

The proposed SWM plan for the subject Alloa area will be designed according to the quantity control criteria outlined for Etobicoke Creek and Huttonville / Fletcher's Creek (**Table 3-4, Table 3-5** and **Table 3-6**). The proposed SWM design, based on the subwatershed studies for Etobicoke Creek, Huttonville Creek and Fletcher's Creek will then be verified against the recommended ranges for quantity control volumes in the SABE Scoped Subwatershed Study.

3.3.4. Thermal Mitigation

Thermal mitigation practices are recommended in the Subwatershed Study for the Huttonville and Fletcher's Creeks and in the SABE Scoped Subwatershed Study. Thermal mitigation can be achieved by implementing effective stormwater management facility measures (shading, orientation, outlet design, floating islands, etc.), including LIDs. The target SWM facility discharge temperature for thermal mitigation is 24ºC (per CVC study "*Thermal Impacts of Urbanization including Preventative and Mitigation Techniques*" (draft, December 2010)). Thermal mitigation options will be further reviewed at the Tertiary Plan stage and refined through Draft Plans.

3.3.5. Sensitivity Analysis

As per the LSS Terms of Reference, the subwatershed study model should be calibrated to confirm criteria, particularly as it relates to erosion analysis / frequent flows for wetland and site water balance. However, as discussed at the April 23rd, 2025 workshop with agency staff and peer review staff, a sensitivity analysis could be completed in lieu of calibration (until such time as calibration data is available to refine the continuous hydrologic model). The existing conditions flows and ultimate conditions / proposed SWM criteria have therefore been tested under a baseline (i.e. current TRCA Visual OTTYMO model) and high / low flow scenarios. The *Sensitivity Analysis Approach Prior to Model Calibration* memo (Urbantech, August 2025) in **Appendix C** confirms that the currently proposed criteria are adequate as it relates to quality, quantity and erosion control, but that specific scenarios could be used for evaluation of wetland water balance (high flow scenario), site wide water balance (low flow scenario), and erosion analysis (low flow scenario) as a conservative measure until such time as the model is calibrated and conclusions are refined. It should be noted that the baseline scenario agreed most with observed / accepted values of runoff coefficient and unit flow rates based on frequency analysis.

3.3.6. Climate Change Considerations

The LSWS Terms of Reference requires consideration of climate change as it relates to SWM criteria / evaluation of future conditions and infrastructure. The approach to climate change consideration was discussed at the April 23rd, 2025 workshop with agency staff and peer review consultants.

It was identified that while accepted approaches exist to evaluate climate-related impacts to the IDF parameters (single event), these impacts do not affect the LSS / Secondary Plan scope of work or general block sizing. For example, IDF parameters may impact the sizing of storm sewers, number of catchbasins, and modelled return period flows for establishing the 2-year to 100-year flows and volumes in ponds, but the pond blocks, channel blocks, and other major infrastructure (road crossings) have been sized based on the conservative Regional storm criteria (control to 60% of existing Regional flows + 214 m^3/ha of additional storage). It was also confirmed in the attached climate change memo that the Regional storm governs in all cases as it relates to establishing flood flows in the channel for the subject lands, versus the 100-year or climate-adjusted 100-year storm. Refer to the *Future Climate Change Conditions Assessment* memo (Urbantech, July 2025) in **Appendix E** for details.

Climate change may impact continuous flows and the related wetlands, site wide water balance, and erosion impacts. However, it was agreed that there is no “climate adjusted” continuous data set (temperature and rainfall) that could be used for the continuous model assessment. The *Sensitivity Analysis Approach Prior to Model Calibration* memo (Urbantech, August 2025) in **Appendix C** provides a range of impacts that could be considered in lieu of a continuous, climate-adjusted data set. Furthermore, TRCA indicated that provision of adequate LID measures / infiltration could counteract the long-term effects of climate change, including more frequent / more intense rainfall events. If a climate-adjusted continuous data set becomes available, it could be used to further assess wetland water balance, site wide water balance, and erosion impacts for future climate scenarios. At this time, the following approach as presented at the April 23rd, 2025 workshop is proposed (**Table 3-7**):

Table 3-7: Alloa SWM Design – Climate Change Considerations

Component	Impact from Climate Change	Notes	How to evaluate	When	Asset Life Evaluation
Storm Sewer Sizing	✅ Yes — increased IDF curves → larger peak flows → larger sewers / additional CB capture capacity required	Design flows based on 2–100 year events	IDF_CC Tool / Canadian Climate Atlas for 2-year to 100-year storms, other CC recommendations from surrounding municipalities	**Evaluate** at FSR / detailed design	**Functional lifespan** is tied to the frequency of exceedance of design flow. Climate change can shorten this by increasing rainfall intensities. Climate change is unlikely to impact structural degradation.
Culvert Sizing	❌ No — sized for **Regional Storm**	The Regional storm is historical and not climate-adjusted	No adjustment to Regional storm required.	See *Future Climate Change Conditions Assessment* Memo (**Appendix E**)	Structure / sizing based on Regional storm conveyance – structure life unlikely to be impacted by climate change effects on hydrology.
Channel Block / Floodplain Hazard	❌ No — sized for **Regional Storm**	The Regional storm is historical and not climate-adjusted	No adjustment to Regional storm required.	See *Future Climate Change Conditions Assessment* Memo (**Appendix E**)	Channel corridor and flood hazards based on Regional storm conveyance – unlikely to be impacted by climate change. Natural channel design best practices and substantial meander belt width ensure channel can adapt in relation to changes in flows.
SWM Pond Blocks	❌ No — quantity control based on Regional	Smaller storms and frequency of ED may change; longer drawdown times if rainfall events are more frequent.	IDF_CC Tool for 2-year to 100-year storms ED - Run climate-adjusted continuous precipitation and	**Evaluate** at FSR/detailed design	Changes in rainfall frequency and duration may require adjustments to extended detention orifice controls, but no impact to service life or total sediment loading is

Component	Impact from Climate Change	Notes	How to evaluate	When	Asset Life Evaluation
			temperature data (provided by the Town)		expected, other than vegetation stress.
Wetland Water Balance	✅ Yes — changes in rainfall & temperatures / evaporation → more or less frequent inundation	Impacts water balance, hydroperiods. LSWS current examined extreme (wet and dry) years.	Run climate-adjusted continuous precipitation and temperature data (provided by the Town)	See *Sensitivity Analysis Approach Prior to Model Calibration* Memo **(Appendix C) Evaluate** at FSR/detailed design	Adaptive management measures may have to be implemented to ensure wetland hydroperiods are maintained; this may introduce additional infrastructure that requires maintenance / replacement over time.
LID Features / Site Water Balance	✅ Yes / ❌ No — changes to runoff, variable infiltration, but mitigation target based on existing conditions. LIDs not factored into pond calculations	**If less rainfall,** then potentially insufficient recharge. **If more rainfall,** then water balance will continue to be met.	Run climate-adjusted continuous precipitation and temperature data (provided by the Town)	See *Sensitivity Analysis Approach Prior to Model Calibration* Memo **(Appendix C) Evaluate** at FSR/detailed design	Functional service life of LID features such as vegetation may be impacted by climate change.

3.4. PROPOSED STORMWATER MANAGEMENT PLAN

The stormwater management plan proposed in support of the Alloa Secondary Plan is designed to satisfy the required SWM criteria, as outlined in **Section 3.3**. Stormwater management, including quantity, quality and erosion control will be provided for the Secondary Plan area by several SWM wet pond facilities, on-site controls and LID measures.

As per **Drawing 3D**, the preliminary storm servicing plan identifies ten (10) proposed SWM pond facilities to achieve the SWM requirements for the proposed neighbourhood/residential areas. Two (2) of the SWM pond facilities are located in the Fletcher's Creek subwatershed, which will be designed to meet the SWM criteria from the HFSWS. Eight (8) of the SWM pond facilities are located in the Etobicoke Creek subwatershed, which will be designed to meet the SWM criteria as per the Etobicoke Creek Hydrology Update and Mayfield West EIS. The proposed SWM pond locations have been selected based on the following criteria:

- To make use of existing / natural low points in terrain to minimize earthworks/cut and fill operations and maintain existing drainage patterns as much as possible.
- To maintain a permanent pool and drain into the receiving watercourse.
- To maintain flow input locations along the receiving watercourse.
- To minimize storm sewer infrastructure size.
- To efficiently use land and maximize serviceable area.

It is noted that several of the proposed SWM ponds are located in areas of high groundwater. Baseflow mitigation measures will be explored at the Tertiary Plan / FSR stage, subject to final placement and grading details of the proposed SWM facilities.

Drawing 3D also shows multiple employment blocks in the southwest corner of the subject area, which drain to flow node H3 in the East Huttonville Creek, and flow node F2 in Fletcher's Creek. These employment blocks are to be controlled by private on-site controls to achieve the required SWM criteria.

Similarly, there are blocks of medium and high-rise development planned along the southeast boundary (adjacent to Chinguacousy Road) that will be controlled by private on-site SWM facilities and / or LIDs, discharging to a new clean water pipe running south on Chinguacousy Road to Mayfield Road. There is an existing clean water storm sewer connection on Mayfield Road which runs east to an existing culvert. The approved drainage plans for both the Mayfield West Phase 2 and Mount Pleasant Block 51-2 lands included provision for drainage from this area of Alloa to the clean water pipe on Mayfield Road.

The minor and major drainage systems for the subject lands will be designed to convey storm runoff to the proposed SWM facilities described above, prior to the outlets at Huttonville Creek, Fletcher's Creek and Etobicoke Creek. The minor storm system will be designed to convey flows up to the 10-year design storm (via storm sewers) without surcharge, in accordance with the Town of Caledon's standards and IDF parameters. The major storm system will use the internal road network, designed with sufficient capacity to allow excess flows up to the 100-year design storm to be conveyed via overland flow within the proposed ROW limits.

Ultimate storm outlets across boundary roads will be coordinated with coincident road widening projects by the Region of Peel and Town of Caledon (e.g., Mayfield Road and Chinguacousy Road improvement projects).

3.5. SWM POND DESIGN

3.5.1. Imperviousness

The Subwatershed Studies provide recommendations for SWM end-of-pipe facility sizing based on a required storage per impervious hectare and a release rate per hectare. As such, to establish the preliminary pond design, the imperviousness of the contributing drainage areas to each proposed SWM facility was required. The imperviousness is utilized to calculate the permanent pool and target storage volumes for each SWM facility.

The catchment imperviousness values for each drainage area were determined based on the land use composition of each catchment. The proposed unit types and land use distribution within each catchment were determined from the Secondary Plan Land Use Schedule, as per **Figure 1C**. A total imperviousness was assumed for each land use type based on the ratio of impervious surface (roofs, pavement, etc.) to total catchment area. The land use imperviousness values are summarized in **Table 3-8.**

Table 3-8: Percent Imperviousness by Land Use

Land Use Type	Percent Imperviousness
Single Detached Homes	50
Townhomes	80
Medium-High Density Residential	80
Mixed-Use	95
Commercial	95
Elementary Schools	75
Neighbourhood Parks	10
Open Space	10
Natural Heritage System	0
SWM Ponds	100
Greenbelt Plan Area	0
Road ROW	90

The catchment areas to the proposed SWM ponds and overall weighted imperviousness values are summarized in **Table 3-9**. Also refer to **Drawing 3D** for all drainage areas and associated imperviousness values.

Table 3-9: Pond Catchment Areas and Imperviousness

Catchment	Subwatershed	Total Area (ha)	Impervious Area (ha)	Imperviousness (%)
SWM Pond 1	Fletcher's Creek (F2)	59.4	41.6	70
SWM Pond 2	Fletcher's Creek (F2)	37.6	28.6	76
SWM Pond 3	Etobicoke Creek	16.3	11.6	71
SWM Pond 4	Etobicoke Creek	30.1	22.0	73
SWM Pond 5	Etobicoke Creek	38.6	27.4	71
SWM Pond 6	Etobicoke Creek	50.4	36.8	73
SWM Pond 7	Etobicoke Creek	25.8	19.9	77
SWM Pond 8	Etobicoke Creek	46.6	33.1	71
SWM Pond 9	Etobicoke Creek	60.3	42.8	71
SWM Pond 10	Etobicoke Creek	57.3	41.3	72

3.5.2. SWM Pond Stage-Storage-Discharge Characteristics

Section 3.3 provides the storage volume and flow targets for the 2 to 100-year and Regional storm events, based on the SWM criteria from the Subwatershed Studies. The proposed Alloa SWM facilities were sized based on the conventional storage volume (not accounting for LID measure storages) and flow targets, as described in **Section 3.3.3**.

The permanent pools for the proposed wet pond SWM facilities were sized according to Table 3.2 in the MOE's Stormwater Planning and Design Manual (2003), as per the water quality requirements discussed in **Section 3.3.1**. The quality control sizing calculations for the proposed SWM facility are provided in **Appendix D**.

The preliminary storage-discharge curves based on the storage and release rate requirements, were developed for the proposed SWM facilities, as summarized in **Table 3-10** to **Table 3-19** below.

Table 3-10: SWM Pond 1 Storage-Discharge Relationship

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
Permanent Pool	10,734	N/A
Extended Detention	10,395	0.024
25-Year	20,790	0.493
100-Year	35,343	1.485
Regional	18,545	N/A
Total (100-Year + Regional)	53,888	N/A

Table 3-11: SWM Pond 2 Storage-Discharge Relationship

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
Permanent Pool	7,296	N/A
Extended Detention	7,144	0.015
25-Year	14,288	0.312
100-Year	24,290	0.940
Regional	12,745	N/A
Total (100-Year + Regional)	37,034	N/A

Table 3-12: SWM Pond 3 Storage-Discharge Relationship

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
Permanent Pool	2,982	N/A
Extended Detention	3,761	0.005
2-Year	5,006	0.044
5-Year	6,371	0.079
10-Year	7,281	0.106
25-Year	8,411	0.143
50-Year	9,248	0.173
100-Year	10,080	0.205
Regional	25,991	0.840

Table 3-13: SWM Pond 4 Discharge Relationship

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
Permanent Pool	5,640	N/A
Extended Detention	7,141	0.009
2-Year	9,262	0.082
5-Year	11,760	0.145
10-Year	13,432	0.195
25-Year	15,495	0.264

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
50-Year	17,035	0.319
100-Year	18,558	0.378
Regional	47,823	1.552

Table 3-14: SWM Pond 5 Storage-Discharge Relationship

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
Permanent Pool	7,061	N/A
Extended Detention	8,907	0.012
2-Year	11,845	0.105
5-Year	15,088	0.186
10-Year	17,254	0.250
25-Year	19,612	0.339
50-Year	21,702	0.409
100-Year	23,760	0.484
Regional	61,369	1.990

Table 3-15: SWM Pond 6 Storage-Discharge Relationship

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
Permanent Pool	9,444	N/A
Extended Detention	11,957	0.016
2-Year	15,507	0.137
5-Year	19,697	0.243
10-Year	22,502	0.327
25-Year	25,948	0.442
50-Year	28,535	0.534
100-Year	31,071	0.633
Regional	80,009	2.598

Table 3-16: SWM Pond 7 Storage-Discharge Relationship

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
Permanent Pool	5,064	N/A
Extended Detention	6,456	0.008
2-Year	8,206	0.070
5-Year	10,370	0.125
10-Year	11,827	0.167
25-Year	13,619	0.226
50-Year	14,955	0.273
100-Year	16,276	0.324
Regional	41,501	1.330

Table 3-17: SWM Pond 8 Storage-Discharge Relationship

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
Permanent Pool	8,525	N/A
Extended Detention	10,753	0.014
2-Year	14,173	0.127
5-Year	18,043	0.225
10-Year	20,637	0.302
25-Year	23,819	0.409
50-Year	26,210	0.493
100-Year	28,552	0.585
Regional	73,782	2.402

Table 3-18: SWM Pond 9 Storage-Discharge Relationship

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
Permanent Pool	11,031	N/A
Extended Detention	13,914	0.019
2-Year	18,363	0.164
5-Year	23,380	0.291
10-Year	26,743	0.391

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
25-Year	30,864	0.529
50-Year	33,955	0.639
100-Year	36,983	0.757
Regional	95,477	3.108

Table 3-19: SWM Pond 10 Storage-Discharge Relationship

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
Permanent Pool	10,609	N/A
Extended Detention	13,408	0.018
2-Year	17,578	0.156
5-Year	22,354	0.277
10-Year	25,562	0.371
25-Year	29,484	0.503
50-Year	32,428	0.607
100-Year	35,311	0.719
Regional	90,962	2.954

The pond storage-discharge data above is subject to change based on the detailed pond grading and outlet structure design for the proposed SWM pond facilities. However, the target storage volumes and discharge rates will be maintained, unless the proposed drainage areas are revised at future stages of design.

3.5.3. On-site Controls Stage-Storage-Discharge Characteristics

As shown on Drawing 3D, there are several areas which are to be controlled by private on-site SWM facilities. These areas include commercial / medium-high density blocks, as well as residential areas where these catchments could not be accommodated by the proposed SWM ponds due to grading constraints.

The catchment areas to the proposed private on-site storage and overall weighted imperviousness values are summarized in **Table 3-20**.

Table 3-20: On-Site Catchment Areas and Imperviousness

On-Site Storage ID	Subwatershed	Total Area (ha)	Impervious Area (ha)	Imperviousness (%)
OS1	Etobicoke Creek	7.30	6.94	95
OS2	Etobicoke Creek	22.30	21.19	95
OS3	Etobicoke Creek	9.90	9.41	95
OS4	Etobicoke Creek	8.70	8.27	95
OS5	Etobicoke Creek	2.40	1.68	70
OS6	Etobicoke Creek	6.40	4.48	70
OS7	Etobicoke Creek	4.00	2.80	70
OS8	Huttonville West	3.70	3.52	95
OS9	Huttonville West	12.30	11.69	95
OS10	Fletcher's Creek (F2)	13.00	12.35	95
OS11	Fletcher's Creek (F2)	8.00	7.60	95
OS12	Fletcher's Creek (F2)	9.40	8.93	95
OS13	Fletcher's Creek (F2)	9.50	9.03	95
OS14	Fletcher's Creek (F2)	2.10	2.00	95
OS15	Fletcher's Creek (F3)	5.00	4.75	95
OS16	Fletcher's Creek (F3)	4.90	3.43	70
OS17	Fletcher's Creek (F3)	2.10	1.47	70

The Town of Caledon Development Standards provides a comprehensive list of available stormwater management techniques. Specifically, for commercial blocks, available on-site controls include rooftop storage, parking lot storage, underground storage or a combination of the above. Quality control is to be provided by a combination of oil/grit separator (OGS) units, filtration and/or LID measures.

The CVC/TRCA LID Stormwater Management Planning and Design Guide will be referenced to provide further information on the design of these strategies at the detailed design stage.

The storage and release rate requirements for the private on-site SWM facilities were determined based on the SWM criteria for Etobicoke Creek, Fletcher's Creek and West Huttonville Creek subwatersheds, as summarized in **Table 3-21** to **Table 3-27** below.

Table 3-21: Private Storage OS1 Volume Requirements & Target Flows

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
2-Year	2,624	0.020
5-Year	3,261	0.035
10-Year	3,693	0.047
25-Year	4,215	0.064
50-Year	4,614	0.077
100-Year	4,998	0.092
Regional	12,350	0.376

Table 3-22: Private Storage OS2 Volume Requirements & Target Flows

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
2-Year	8,013	0.061
5-Year	9,958	0.108
10-Year	11,265	0.145
25-Year	12,873	0.196
50-Year	14,078	0.236
100-Year	15,263	0.280
Regional	37,549	1.150

Table 3-23: Private Storage OS3 Volume Requirements & Target Flows

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
2-Year	3,557	0.027
5-Year	4,418	0.048
10-Year	5,002	0.064
25-Year	5,713	0.087
50-Year	6,252	0.105
100-Year	6,776	0.124
Regional	16,719	0.510

Table 3-24: Private Storage OS4 Volume Requirements & Target Flows

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
2-Year	3,122	0.024
5-Year	3,882	0.042
10-Year	4,397	0.056
25-Year	5,023	0.076
50-Year	5,496	0.092
100-Year	5,955	0.109
Regional	14,716	0.448

Table 3-25: Private Storage OS5 Volume Requirements & Target Flows

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
2-Year	726	0.007
5-Year	926	0.012
10-Year	1,060	0.016
25-Year	1,230	0.021
50-Year	1,356	0.025
100-Year	1,479	0.030
Regional	3,850	0.124

Table 3-26: Private Storage OS6 Volume Requirements & Target Flows

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
2-Year	1,937	0.017
5-Year	2,464	0.031
10-Year	2,820	0.041
25-Year	3,260	0.056
50-Year	3,584	0.068
100-Year	3,910	0.080
Regional	10,205	0.330

Table 3-27: Private Storage OS7 Volume Requirements & Target Flows

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
2-Year	1,209	0.011
5-Year	1,543	0.019
10-Year	1,761	0.026
25-Year	2,037	0.035
50-Year	2,242	0.042
100-Year	2,446	0.050
Regional	6,388	0.206

Table 3-28: Private Storage OS8 Volume Requirements & Target Flows

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
25-Year	2,373	0.036
100-Year	3,515	0.063
Regional	3,251	0.229
Total (100-Year + Regional)	6,766	

Table 3-29: Private Storage OS9 Volume Requirements & Target Flows

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
25-Year	7,887	0.118
100-Year	11,685	0.209
Regional	10,809	0.760
Total (100-Year + Regional)	22,494	

Table 3-30: Private Storage OS10 Volume Requirements & Target Flows

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
25-Year	6,175	0.108
100-Year	10,498	0.325
Regional	5,508	N/A

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
Total (100-Year + Regional)	16,006	

Table 3-31: Private Storage OS11 Volume Requirements & Target Flows

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
25-Year	3,800	0.066
100-Year	6,460	0.200
Regional	3,390	N/A
Total (100-Year + Regional)	9,850	

Table 3-32: Private Storage OS12 Volume Requirements & Target Flows

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
25-Year	4,465	0.078
100-Year	7,591	0.235
Regional	3,983	N/A
Total (100-Year + Regional)	11,573	

Table 3-33: Private Storage OS13 Volume Requirements & Target Flows

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
25-Year	4,513	0.079
100-Year	7,671	0.238
Regional	4,025	N/A
Total (100-Year + Regional)	11,696	

Table 3-34: Private Storage OS14 Volume Requirements & Target Flows

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
25-Year	998	0.017
100-Year	1,696	0.053
Regional	890	N/A
Total (100-Year + Regional)	2,586	

Table 3-35: Private Storage OS15 Volume Requirements & Target Flows

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
25-Year	3,325	0.042
100-Year	4,275	0.130
Regional	N/A	

Table 3-36: Private Storage OS16 Volume Requirements & Target Flows

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
25-Year	2,401	0.041
100-Year	3,087	0.127
Regional	N/A	

Table 3-37: Private Storage OS17 Volume Requirements & Target Flows

Storm Event	Required Volume (m^3)	Target Release Rate (m^3/s)
25-Year	1,029	0.017
100-Year	1,323	0.055
Regional	N/A	

It is noted that CVC does not generally support private / on-site Regional SWM controls. However, the Secondary Plan's employment lands along Mayfield Road preclude large public facilities typically used to meet the Regional volume requirements. Each block must drain to discrete outlets provided on Mayfield Road in order to convey drainage to channels, wetlands and facilities downstream. There is no practical way to consolidate runoff into shared ponds or larger detention areas due to grading constraints, and traditional, public wet-pond blocks are not feasible or practical for these small parcels.

Therefore, the quantity control requirements for each individual private site plan block along Mayfield Road will follow a hierarchy of evaluation:

1. Verify that the existing Mayfield Road sewers / culvert crossings (with no upgrades assumed) can convey the controlled 100-year peak. If it can, the block simply adheres to unit rates for the 2-year to 100-year events, as per the Huttonville Fletcher's Subwatershed Study and the Heritage Heights Subwatershed Study. If not, the allowable release rate must be reduced to match the pipe capacity, and additional on-site storage solutions (e.g., underground tanks, pipe storage, rooftop storage, surface storage, etc.) will be applied to ensure the 100-year peak never exceeds downstream capacity.

2. If outlet capacity is not limited, and where a conventional detention facility remains impractical, it is possible that post-development Regional peak flow is only marginally higher than the pre-development Regional flow. In this case, a "no-impact" analysis should be completed to demonstrate that releasing the uncontrolled Regional flows do not impact downstream water levels / infrastructure beyond acceptable thresholds (to be determined with the CVC). This would involve evaluating the downstream storm sewers, culverts/channels (HEC-RAS analysis) and overall hydrology (Huttonville Fletcher's HSP-F model). This approach was previously accepted by CVC for small areas in which meeting the Regional storage criteria was impractical and absence of the Regional volume had no effect downstream.

3. HFLSS Unit Rate Targets (2 to 100-Year and Regional) – Design SWM controls to meet the prescribed release rates for the 2 to 100-Year and Regional storm events if existing infrastructure does not limit the allowable release rate, and the Town and CVC should accept private on-site Regional facilities. Note that the Huttonville Fletcher's Subwatershed Study does not specify a private Regional peak control target, where only an overall volume target (m3/imp ha) is applied.

The individual requirements for each development block along Mayfield Road will be determined at the Tertiary Plan / FSR stage and further refined through detailed design.

3.5.4. Downstream Hydrologic Assessment

A comparison of downstream flows was completed as part of the overall hydrologic assessment in order to confirm that the proposed SWM controls, including Regional control, will mitigate any increase in peak flows resulting from the subject development. The downstream analysis includes comparing pre- and post-development flows at Chinguacousy Road (VO Node 2107) and McLaughlin Road (VO Node 2076). The downstream analysis flows are summarized below in **Table 3-38** and **Table 3-39**.

Table 3-38: Downstream Hydrologic Assessment Results (Chinguacousy Rd, VO Node 2107)

Storm Event	Pre-Development Flow (m^3/s)	Post-Development Flow (m^3/s)	Post – Pre (%)
2-Year	3.530	3.471	-1.7%
5-Year	6.329	6.158	-2.7%

Storm Event	Pre-Development Flow (m^3/s)	Post-Development Flow (m^3/s)	Post – Pre (%)
10-Year	8.474	7.988	-5.7%
25-Year	11.314	10.446	-7.7%
50-Year	13.615	12.339	-9.4%
100-Year	16.024	14.493	-9.6%
Regional	71.155	60.838	-14.5%

Table 3-39: Downstream Hydrologic Assessment Results (McLaughlin Rd, VO Node 2076)

Storm Event	Pre-Development Flow (m^3/s)	Post-Development Flow (m^3/s)	Post – Pre (%)
2-Year	7.871	8.018	1.9%
5-Year	13.142	13.223	0.6%
10-Year	17.386	17.083	-1.7%
25-Year	23.703	22.780	-3.9%
50-Year	28.662	27.280	-4.8%
100-Year	34.163	32.371	-5.2%
Regional	158.438	149.615	-5.6%

As per the results summarized in **Table 3-38** and **Table 3-39**, there are no downstream impacts resulting from the proposed development. At Chinguacousy Road, it is noted that there are no flow increases at VO Node 2107 under post-development conditions. At McLaughlin Road, there are negligible increases in flow under post-development conditions for the 2 and 5-year storms (<2%) at VO Node 2076, however, this increase for the minor storm events will not have an impact on downstream capacity. For the major storm events at McLaughlin Road, there is a noted flow decrease for the 10 to 100-year and Regional storm events under post-development conditions.

3.5.5. Erosion Assessment

In addition to applying the erosion criteria to the proposed SWM facilities, an erosion assessment was undertaken by GEO Morphix in order to evaluate the downstream impacts of the subject development and effectiveness of the proposed SWM measures within Etobicoke Creek. This erosion assessment was completed using an erosion threshold exceedance model and continuous hydrology modelling, where the continuous model output from the Visual OTTHYMO hydrology model was used to compare the exceedance of the erosion threshold under both pre- and post-development conditions. As per the *Sensitivity Analysis Approach Prior to Model Calibration* memo (Urbantech, August 2025) provided in **Appendix C**, the “low runoff” and “high runoff” scenarios were evaluated as part of the erosion assessment in order to confirm that the most conservative runoff conditions were considered with regards to erosion.

The SWM measures considered as part of the continuous hydrology modelling for the erosion assessment include the proposed SWM ponds and on-site storage facilities, as well as Low Impact Development (LID) measures. The LIDs considered for the subject site are to accommodate 11 mm of retention over the impervious surfaces of the proposed development in order to reduce downstream erosion impacts for the most conservative "low runoff" scenario as part of the sensitivity analysis.

As per the Fluvial Geomorphology Assessment and Conceptual Natural Corridor Designs (prepared by GEO Morphix, dated August 2025), provided in **Appendix F**, the restoration concept for Wetland 7 along the Alloa Drain includes fourteen (14) wetlands, which will provide water balance mitigation via a combined surface water volumetric storage capacity of 20,791 m^3, to be infiltrated in the corridor. The storage capacity provided by the LIDs in the Wetland 7 corridor equates to 7 mm over the total impervious site area of 295 ha. Therefore, a remaining 4 mm of on-site retention is required in order to achieve the total 11 mm of retention for erosion mitigation.

The location and preliminary design of the proposed LIDs within the subject site is to be determined at the Tertiary Plan / FSR stage, and subject to groundwater conditions throughout the site. **Drawing 3E** shows depth to groundwater comparing the seasonally high groundwater elevations to the preliminary grading concept for the Secondary Plan.

As per the *Erosion Threshold and Exceedance Assessment* report prepared by GEO Morphix (August 2025) provided in **Appendix F**, it was determined that the proposed SWM plan is effective in mitigating downstream erosion impacts within the receiving watercourse.

As agreed, through consultation with CVC, previously approved erosion thresholds and target release rates will be used to inform the stormwater management strategy for the Fletchers Creek and Huttonville Creek subwatersheds. It is acknowledged that erosion mitigation analysis are ongoing as part of studies within the Heritage Heights lands. As information becomes available it will be integrated in the LSS, where appropriate. Notably, the drainage area within the Secondary Plan Area associated with West Huttonville Creek and Heritage Heights is relatively small and no SWM Pond is proposed to direct drainage to this subwatershed.

3.6. WATER BALANCE AND LOW IMPACT DEVELOPMENT

In addition to meeting the quantity, quality, and erosion control targets, the SWM strategy will address water balance requirements for the site and adjacent wetlands. The site water balance aims to mimic pre-development groundwater recharge rates to maintain groundwater as a source of flow. Feature-based water balance aims to mimic pre-development wetland hydroperiods to maintain their ecological function.

3.6.1. Site Water Balance

A site water balance has been conducted for the Alloa Secondary Plan in order to determine local pre-development infiltration volumes, impacts of proposed development and potential mitigation measures to preserve groundwater recharge.

Development of an area affects the natural water balance. The most significant difference is the addition of impervious surfaces as a type of surface cover (i.e., roads, parking lots, driveways, and rooftops). Impervious surfaces prevent infiltration of water into the soils, and the removal of the

vegetation removes the evapotranspiration component of the natural water balance. The evaporation component from impervious surfaces is relatively minor compared to the evapotranspiration component that occurs with a healthy vegetation cover. The net effect of the development of a property is expected to be an increase in the water surplus resulting in a decrease in infiltration and an increase in runoff.

It is important to note that the proposed development will be serviced by municipal water supply and wastewater services. Therefore, there will be no impact on the water balance and local groundwater or surface water quantity and quality conditions related to any on-site groundwater taking or from septic effluent.

The site water balance assessment was completed using a continuous hydrologic model, as per Town requirements. For the portion of the site within the Etobicoke Creek subwatershed, the TRCA's approved Visual OTTHYMO hydrologic model was used as a basis for the site water balance continuous model. The groundwater interaction for the subject lands is to be modelled and assessed as part of the Local Subwatershed Study.

The continuous model was simulated for the period of 1986 to 2007 using data from the Buttonville Airport weather station, as recommended by TRCA. This data set from Buttonville Airport was used for the sensitivity analysis until such time that sufficient monitoring data is available for model calibration. The selected data set captures a suitable range of wet and dry years, as well as extreme events, for the given period of 1986 to 2007.

The results from the site water balance continuous model for the portion of the site within the Etobicoke Creek subwatershed are summarized in **Table 3-40**. and the continuous site water balance hydrology model is provided in **Appendix C**.

The average annual GWI (groundwater infiltration) under post-development conditions was compared to the pre-development average annual GWI for each of the three sensitivity analysis scenarios in order to assess the impacts of the subject development on infiltration and groundwater recharge. As per the *Sensitivity Analysis Approach Prior to Model Calibration* memo (Urbantech, August 2025) provided in **Appendix C**, the "low runoff" scenario has the most conservative infiltration target with respect to the site-wide water balance. As described in **Section 3.5.5**, the proposed LID mitigation provides 11.0 mm of retention, which exceeds the water balance infiltration target.

Table 3-40: Summary of Continuous Modelling Results (Etobicoke Creek)

Annual Infiltration	Baseline Scenario	High Runoff Scenario	Low Runoff Scenario
Pre-Development GWI (mm/year)	199	109	319
Post-Development GWI (mm/year)	121	71	188
GWI Deficit (mm/year)	78	37	131
Precipitation (mm/year)	826		
Deficit / Precipitation (%)	9%	5%	16%
Target Retention (mm)	1.5	1.0	2.0
Mitigation Provided (mm)	11.0		

For the portion of the site within the Huttonville Creek and Fletcher's Creek subwatersheds, the unitary infiltration targets from the HFSWS were applied to the subject area, which are based on the modelling that was done for the water balance analysis for Huttonville Creek and Fletcher's creek. These target infiltration volumes for the portion of the subject lands within Fletcher's Creek are summarized in **Table 3-41**.

Table 3-41: Summary of Infiltration Targets (Fletcher's Creek)

Land Use Type	LID Infiltration Target (m^3/ha)	Total Area (ha)	Total Volume (m^3)
Low Density Residential	10.4	102	1,058
Medium Density Residential	9.6	0	0
Commercial	17.3	66	1,144
School	6.4	0	0
NHS / Open Space / Park / SWM Pond	0	0	0
Total	-	168	2,203

As per **Table 3-41**, the target retention volume to achieve the infiltration target for the portion of the subject lands within Fletcher's Creek is 2,203 m^3. The location and preliminary design of the proposed LIDs for the portion of the site within the Huttonville Creek and Fletcher's Creek subwatersheds is to be determined at the Tertiary Plan / FSR stage, and subject to groundwater conditions. **Drawing 3E** shows depth to groundwater comparing the seasonally high groundwater elevations to the preliminary grading concept for the Secondary Plan.

3.6.2. Low Impact Development Alternatives

While end of pipe facilities provide the minimum required SWM controls, the use of LID (Low Impact Design) stormwater management measures can be helpful to reduce the amount of runoff by increasing on site retention, infiltration, and evapotranspiration. The use of LIDs in a "treatment-train" approach has long been endorsed by the TRCA and CVC.

Drawing 3E shows the interpreted depth of groundwater throughout the Secondary Plan area. LID placement is typically best in areas where groundwater is at least 2+ m below proposed grade. From **Drawing 3E** there are several areas (denoted in blue) where LID placement is possible (i.e., groundwater levels are favourable). Further details will be provided as planning proceeds.

As per **Section 3.5.5**, a total retention volume of 11 mm is required in order to achieve the required erosion mitigation, 7 mm of which is to be provided by a combination of the proposed surface storage capacity within restored Wetland 7, and the remaining 4 mm is to be provided by on-site retention over the impervious area within the portion of site within the Etobicoke Creek Subwatershed.

Water balance mitigation for the portion of the site within the Fletcher's and Huttonville Creek Subwatersheds to be provided by a variety of potential infiltration measures. Techniques to maximize the water availability in pervious areas such as designing grades to direct roof runoff towards open

space areas throughout the development, where possible (e.g., yards, boulevards, landscaped areas, swales, green space in parking lots, etc.), can increase recharge in the developed area. Where possible, increasing topsoil depths in the pervious areas to retain more water in storage can also assist to reduce runoff volumes and increase the potential for infiltration. Other engineered LID measures such as infiltration and/or exfiltration trenches, HDFs, enhanced grass swales, and bioswales can be used to reduce runoff volumes and increase the potential for infiltration. Some examples of possible LIDs that are typical for this type of development include:

Downspout Disconnection:
Roof leader discharge to pervious surfaces such as lawns or to LID measures provides a source of clean water that can be infiltrated. This is a low / no maintenance, lot-level control that is typically implemented by default.

Infiltration Trench:
These are rectangular trenches lined with geotextile fabric, filled with clean granular stone or void-forming materials. They are suitable for sites with limited space for infiltration, such as narrow strips of land between buildings or properties, or along road rights-of-way. They primarily handle roof and walkway runoff.

Bioretention:
This infiltration practice utilizes the natural properties of soil and vegetation to treat runoff from paved areas and remove contaminants. Variations can include the inclusion or exclusion of an underdrain and impermeable liner. Bioretention can help achieve Stormwater Management (SWM) objectives related to water quality, water balance, and erosion control.

Rain Barrel:
Water collected in rain barrels can serve as a non-potable source for various purposes like toilet flushing, urinals, and irrigation. Rain barrels can contribute to meeting SWM objectives related to water quality, water balance, and erosion control.

Soil Cells:
A modular storage system designed to support the growth of large trees and provide effective stormwater management through processes like absorption, evapotranspiration, and interception.

Infiltration Chambers:
Infiltration chambers provide large volume of underground void space, all the while maintaining the necessary structural stability for sub-surface Best Management Practices (BMPs). They consist of a variety of proprietary modular structures that can be installed beneath paved parking lots or landscaped areas. Typically featuring open bottoms, perforated side walls, and optional stone-filled reservoirs below, these chambers are versatile in treating runoff from roofs, walkways, parking lots, and roads, given proper sedimentation pre-treatment measures. Due to their significant storage capacity, this technology is often utilized in areas where little to no space is available for other stormwater BMP solutions.

During the next phases of planning the SWM Best Management Practices (BMPs) mentioned above will be further evaluated. The evaluation will consider technical feasibility, cost, maintenance requirements, and operational feasibility. While some LID approaches may be technically feasible, they may ultimately be cost-prohibitive or pose challenges in terms of maintenance and operation, particularly on a scale of this magnitude. Additional information is required regarding land use,

phasing, built form, hydrogeology and geotechnical prior to further study. Additional geotechnical / hydrogeological studies may be required prior to finalizing and confirming the selection of LID techniques.

3.6.3. Feature Based Water Balance

As shown in **Drawing 3F**, there are seven (7) existing wetlands throughout the Secondary Plan area.

To understand the existing hydroperiod and potential hydrological impacts due to the proposed development, a feature-based water balance assessment has been completed for Wetlands #1 to #6 as part of this Scoped Servicing Study.

Wetland #7 is recreated within re-aligned watercourses in the Secondary Plan and is considered a 'flow through' feature. There is also a re-created wetland feature located adjacent to SWM Pond 1. As such, these wetlands are designed and assessed differently. Information regarding the design of Wetland #7 is available in the *Fluvial Geomorphology Assessment and Conceptual Natural Corridor Designs* report prepared by Geo Morphix (August 2025), available as **Appendix F** of this report.

The feature-based analysis establishes the current hydrologic function of each relevant feature and determines if mitigation measures are required to preserve the water balance under post-development conditions. This assessment was done using the calibrated Visual OTTHYMO model provided by TRCA (modified as described in the preceding section), run in continuous mode. As previously noted, the Buttonville Airport climate data was used for the continuous hydrology model and simulated for the period of 1986 to 2007 in accordance with TRCA recommendations.

For the purposes of the Secondary Plan Scoped Servicing Study, the average monthly runoff was assessed for each wetland over the given simulation period for pre- and post-development conditions. The three sensitivity analysis scenarios were also included as part of the feature-based water balance assessment. The wetland water balance hydrology model and summary of water balance results are provided in **Appendix C**. As per the feature-based water balance results provided, runoff volume to the existing wetlands is maintained under post-development conditions for all three of the sensitivity analysis scenarios. Wetland function in terms of water level/depth is to be further assessed with the implementation of wetland bathymetry details at the Tertiary Plan / FSR stage.

3.7. EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

Rigorous erosion and sediment control measures will be designed, implemented and maintained throughout the construction period. At detailed design, an Erosion and Sediment Control Plan will be prepared and designed in conformance with the Town and Conservation Authority guidelines (e.g., Guidelines for Erosion and Sediment Control for Urban Construction Sites (2006)). Erosion and sediment control will be implemented for all construction activities including topsoil stripping, earthworks, foundation excavation and stockpiling of materials and will remain in place and functional until bare surfaces are stabilized.

The following erosion and sediment control measures are typical for this type of development:

- Natural features will be staked, and temporary fencing provided to keep machinery out of sensitive areas.
- Sediment control fence and snow fence will be placed prior to earthworks.
- Logistics/construction plan will be implemented to limit the size of disturbed areas, minimizing the non-essential clearing and grading areas.
- Temporary sediment ponds.
- Rock check-dams and cut-off swales will be provided, where required, in order to control, slow down and direct runoff to sediment basins.
- Sediment traps will be provided.
- Gravel mud mats will be installed at construction vehicle access points to minimize off-site tracking of sediments.
- All temporary erosion and sediment control measures will be routinely inspected / monitored and repaired during construction. Temporary controls will not be removed until the areas they serve are restored and stable.
- The “multiple barrier approach” will be applied to all construction stages to ensure erosion is prevented rather than reduced. Recommended measures are to be installed prior to the initiation of the earthworks and grading.

4 NATURAL CHANNEL DESIGN

The existing floodplain limits shown in the Pre-Development Flood Mapping (**Drawing 3B** and **Drawing 3C**) are built upon work completed as part of the 12300 Mississauga Road flood mapping as well as mapping recently completed for the FP Mayfield lands in Mayfield West Phase II, east of Chinguacousy Road. The existing flood hazard mapping for the Alloa Secondary Plan area informs the extent of the existing NHS and dictates the extent of future management strategies related to the development of the Alloa lands.

Under proposed conditions (see **Drawing 3H** and **Drawing 3I**) floodplain limits and associated watercourses across the Secondary Plan area are intended to be regularized, realigned and improved. The NHS traversing the site under post-development conditions will include a corridor designed to contain erosion hazards, meander belt, flood hazard, crossings and other environmental features / considerations. The proposed NHS features are illustrated in **Drawing 4A**.

The sections that follow provide additional information on the development of both existing and proposed floodplain / channel conditions for the Alloa Secondary Plan. It is noted that hazards and regulatory allowances associated with natural features will be further reviewed and clarified as work proceeds.

4.1. EXISTING CONDITIONS

4.1.1. Existing Conditions Floodplain Mapping

Etobicoke Creek has undergone various flood mapping studies, including the Etobicoke Creek Synthesis Study (CH2MHILL & TRCA, December 2014), which was used as the basis for the Mayfield West Stage 1 and Stage 2 Functional Servicing Report, and accompanying CEISMP and EIR studies completed by Crozier in support of development in the Mayfield West Phase 2 area.

The Visual OTHYMO (2022 model by TRCA) introduced revisions to flow data, cross-section locations, naming conventions, and geometry based on presumably improved topographic mapping. As described in Section 2, this model was updated by Urbantech based on minor revisions to drainage areas. The updated “future” scenario was used for the existing conditions HEC-RAS analysis. Urbantech has further updated the TRCA flood mapping as described in the following sections.

West of Mississauga Road

The 2022 TRCA model did not extend west of Mississauga Road. As described in the May 11, 2023 report by Urbantech Consulting prepared for Area 10 / 12300 Mississauga Road, the existing regional floodplain in this area is best described as an extensive backwater system with a large, flat depression area. This type of system is difficult to analyze using standard / accepted modelling approaches. Through frequent consultation with TRCA and Town of Caledon staff and senior management in late 2022 to early 2023, the challenges with the hydraulic modelling and ultimate development of this area have been explored, and area-specific solutions have been developed and agreed to with the agencies to define a suitable approach to modelling the subject lands under existing and proposed conditions (specific to Area 10), including:

- The use of a 2D hydraulic model (with specific assumptions and parameters as prescribed by TRCA and noted herein); and,

- Acknowledgment that post-development flood storage does not have to match pre-development flood storage as agreed to with TRCA staff (although best efforts to do so should be explored).

The general approach to the proposed channel corridor sizing and model evaluation was also established in the May 11, 2023 report, and the supporting studies / model results are included therein. TRCA recommended the use of a quasi-steady state approach, in which hydrographs from the Visual OTTHYMO model were extended at the peak flow time until the end of the simulation. The ROUTE CHANNEL elements were removed from the Visual OTTHYMO model to avoid double-counting flow routing (i.e. in VO and in the 2D model). This approach was carried forward into the LSWS study and minor updates were made to the models in terms of Manning's roughness, flows, and ultimate channel design geometry.

Mississauga Road to Chinguacousy Road

The floodplain in this location is based on the September 2022 TRCA model, surface (2015 LiDAR) and flows, with minor refinements to incorporate the recent ground surveys for the surrounding lands (RPE, April 2024 / JD Barnes, April 2024) and which includes the low-flow channel survey of the Alloa Drain. The peak flows from the updated Visual OTTHYMO model were incorporated into the model. The Urbantech Regional floodplain is generally consistent with the TRCA Regional floodplain, with any difference attributed to refinements to the surface topography. This portion of the model was updated through the LSWS study and this study, based on refined topography and flows, and the ultimate channel geometry.

Chinguacousy Road to Downstream

The Urbantech HEC-RAS model completed through the Mayfield West Phase II FSR process was updated to incorporate the revised flow data and geometry west of Chinguacousy Road and downstream of the FP Mayfield lands to the nearest confluence downstream of the proposed channel works in Etobicoke Creek. The future configuration of the channel/floodplain near the FP Mayfield lands was assumed to be in place east of Chinguacousy Road, as the permitting process is currently underway. The proposed works and accompanying hydraulic modelling were described in a memo dated March 13, 2024. Therefore, the ultimate conditions for the FP Mayfield lands have been integrated into the existing (updated) TRCA model.

The floodplain limits shown on **Drawing 3H** is therefore a consolidation of:

- Existing May 11, 2023 2D Model west of Mississauga Road
- Updated September 2022 TRCA model between Mississauga Road to Chinguacousy Road
- Ultimate March 13, 2024 FP Mayfield Model east of Chinguacousy Road
- Existing September 2022 TRCA east of FP Mayfield.

In general, the floodplain through the Alloa study area is large and is governed by backwater conditions downstream of Chinguacousy Road. The channel slopes throughout the study area are relatively flat and the backwater impacts are significant, to the extent that the floodplain west of Mississauga Road spills west, over Heritage Road. This was demonstrated in the 2D model for existing conditions.

4.1.2. Existing Riparian / Flood Storage

The riparian storage represents the relationship between the volume of water in the floodplain and the discharge (flow rate) of the watercourse. This relationship is typically assessed without any human-made structures, such as culverts, to understand the natural behavior of the watercourse and its capacity to convey and store water during various flow conditions. However, culverts can influence the extent and depth of flooding in the surrounding floodplain area and can affect the volume of water that the floodplain can store during flood events, impacting the flood hazard downstream.

To evaluate the existing riparian storage and flood storage (with culverts in place), the study area was divided into two specific areas: west of Mississauga Road, which features a large depression or ponding area serving as a significant storage region during flood events and which has been characterized with a 2D HEC-RAS model, and the area between Mississauga Road and Chinguacousy Road, which is more characteristic of conveyance systems rather than a storage area. The 1D HEC-RAS model was employed for the hydraulic modeling east of Mississauga Road. As agreed with TRCA staff, an unsteady-state modelling approach was permitted to properly characterize the existing and proposed storage between Mississauga Road and Chinguacousy Road, and to evaluate the potential impacts of changes in riparian storage.

The results of the HEC-RAS model runs are presented in **Table 4-1** and **Table 4-2,** which show the existing floodplain storage with existing flows, assuming all crossings have been removed both west of Mississauga Road (2D model) and east of Mississauga Road to Chinguacousy Road (1D unsteady state model). Note that the 2D model results indicate a spill to the west, across Heritage Road. The flow lost to this spill was ignored, and the full flow generated by the catchments west of Mississauga Road were used in the hydraulic modelling east of Mississauga Road as a conservative measure for establishing the riparian storage targets and flood hazards.

Table 4-1: Existing Riparian Storage (2D Model, No Culverts, West of Mississauga Rd)

Location	Volume (m^3)						
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	Regional
West of Mississauga Road	25.47	73.08	113.876	171.327	213.804	254.74	482.452

Table 4-2: Existing Flood Storage (1D Unsteady-State Model, No Culverts, East of Mississauga Rd)

Location	Volume (x1000m^3)						
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	Regional
Eto Hdwtr S - South 6 to 10 (Main Channel)	20.76	38.50	54.1	73.87	88.28	102.69	369.01
Eto Hdwtr S - South K1	6.77	10.05	14.87	16.73	17.54	20.66	51.61
Eto Hdwtr S - South N1	3.43	5.25	6.72	9.00	10.85	12.83	61.47
Eto Hdwtr S - South O1	5.69	8.75	10.95	13.85	16.01	18.21	51.35
Eto Hdwtr S - South P1	3.00	4.84	6.23	9.52	11.04	12.53	36.62
TOTAL	**39.65**	**67.39**	**92.87**	**122.97**	**143.72**	**166.92**	**570.06**

The storage volumes computed for these areas are significant. As agreed with TRCA staff through meetings regarding the 12300 Mississauga Road lands, matching the storage volumes west of Mississauga Road is impractical (although best efforts should be investigated). Furthermore, the large floodplain west of Mississauga Road will be partially filled by the future Highway 413 extension, reducing the existing floodplain storage by at least 35%.

4.2. PROPOSED CONDITIONS

4.2.1. Proposed NHS and Channel Corridor

The proposed conditions hydrologic and hydraulic modelling builds upon the framework and data used in the existing conditions analysis, as well as the preliminary NHS corridor design, provided by GEO Morphix in consultation with Urbantech and Crozier.

The post-development channel defines the NHS limits for the watercourse corridors and fully contains the post-development floodplain, as shown in **Drawing 4A**. The design focusses on a pool and run channel typology mixed with wetland and wet meadow features. The proposed wetland features provide connection to the floodplain and help maintain moist habitats while functionally attenuating flows. The objective of these features is to provide retention and detention of flows over longer attenuated periods. The design also enhances aquatic and terrestrial habitat and increases corridor variability by creating a low flow channel with variable geometry. This variability provides benefits to the system by replicating conditions found in natural systems, adding diversity to the valley corridor and providing additional pockets of sediment sources.

Drawings 4B-4D and **Drawings 4E-4J** provide details on the proposed watercourse profiles realignment and lowering and cross-section at various locations throughout the Secondary Plan.

4.2.2. Proposed Hydrologic Model

The hydrologic model was further updated by Urbantech to reflect post-development conditions based on the Secondary Plan and proposed drainage area delineation (see **Drawing 3D**). Similar to the updates for existing conditions, model parameters for external catchments under proposed conditions remained consistent with the original version provided by TRCA, except where larger, lumped catchments were split into smaller catchments to refine drainage patterns in areas requiring more resolution. Developed areas were modelled using the STANDHYD command. All model parameters are included in **Appendix C**.

The following scenarios were simulated for post-development conditions:

- 25mm, 2-year to 100-year storms (12-hour AES, AMC II conditions), with SWM facilities in place.
- Regional storm – Hurricane Hazel (AMC III conditions), uncontrolled (no SWM facilities), for use in hydraulic modelling.
- Regional storm – Hurricane Hazel (AMC III conditions), with SWM facilities in place.
- Continuous model, with SWM facilities in place (for use in the feature-based water balance and erosion analysis).

The Regional storm scenario (AMC III conditions) assuming no SWM facilities in place was used for hydraulic modelling. **Table 4-3** compares the proposed model flows to the existing flows at various key nodes.

Table 4-3: Proposed vs. Existing Peak Flows at Key Nodes

Location	NHYD	Area (ha)	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	Regional (SWM)	Regional (no SWM)
Node 2167 (Mississauga Road)	Existing UT	301.2	1.525	2.732	3.550	4.522	5.317	6.154	24.736	24.736
	Proposed UT	308.28	2.709	3.916	4.789	5.983	6.884	7.807	25.629	31.021
	Difference	7.08	1.184	1.184	1.239	1.461	1.567	1.653	0.893	6.285
	%	2.35%	77.64%	43.34%	34.90%	32.31%	29.47%	26.86%	3.61%	25.41%
Node 1125 (Creditview Road)	Existing UT	856.50	3.387	6.186	8.315	11.138	13.369	15.758	66.885	66.885
	Proposed UT	881.65	5.085	7.954	9.922	12.502	14.779	17.138	63.997	83.224
	Difference	25.15	1.698	1.768	1.607	1.364	1.41	1.38	-2.888	16.339
	%	2.94%	50.13%	28.58%	19.33%	12.25%	10.55%	8.76%	-4.32%	24.43%
Node 1105 (Chinguacousy Road)	Existing UT	1465.32	5.624	10.066	13.506	18.083	21.81	25.814	112.762	112.762
	Proposed UT	1464.16	7.322	11.625	14.6	18.975	22.596	26.414	106.087	127.903
	Difference	-1.16	1.698	1.559	1.094	0.892	0.786	0.6	-6.675	15.141
	%	-0.08%	30.19%	15.49%	8.10%	4.93%	3.60%	2.32%	-5.92%	13.43%

Based on the uncontrolled Regional flow scenario ("no SWM" in preceding table), there is a ~13% to 25% increase in the peak flows approaching Chinguacousy Road. Regional storm control is recommended to mitigate this increase, and the target release rates in the Etobicoke Creek Hydrology Update Study have been demonstrated to reduce the Regional flows below the existing conditions values due to the requirement to control to 60% of existing conditions flows (refer to the Regional – SWM results in the preceding table).

4.2.3. Proposed Hydraulic Model

The primary objective of the post-development hydraulic modeling exercise is to compare the existing and proposed conditions to identify changes and potential impacts on the floodplain, storage, and flow conveyance. The following sections provide a detailed overview of the proposed conditions modelling, highlighting significant changes and their implications. The proposed corridor has been sized to handle the post-development, uncontrolled flows resulting from the proposed drainage plan (see **Drawing 4.2**) and land use.

Proposed Hydraulic Structure Inventory

The preliminary span of proposed culverts and crossings are sized based on hydraulic conveyance requirements but have also been confirmed to meet geomorphological function and small mammal passage (as required by the Terrestrial Ecologist). See **Drawing 4K** for a typical road crossing detail along the NHS corridor.

The HEC-RAS model was used to evaluate the proposed culvert infrastructure within the study area. All new crossings were designed to pass the Regional storm without overtopping. The proposed conditions incorporate new or modified structures that are anticipated due to development or infrastructure projects.

Table 4-4: Post-Development Channel Crossings / Culvert Sizing

Crossing Location & HEC-RAS Section	Crossing Type	Size of Opening [span x rise] or [diameter] (m)	Upstream Invert (m)	Downstream Invert (m)	Road Centerline Elevation (m)
Chinguacousy Eto Hdwtr S South 6 XS 696	Conc, Box	19.0 x 2.5	256.69	256.64	262.26
Chinguacousy Eto Hdwtr S South 6 XS 1575	Conc. Box	19.0 x 2.5	257.63	257.58	264.04
Creditview Road Eto Hdwtr S South 6 XS 236	Conc. Box	19.0 x 2.5	258.02	257.96	260.20

Crossing Location & HEC-RAS Section	Crossing Type	Size of Opening [span x rise] or [diameter] (m)	Upstream Invert (m)	Downstream Invert (m)	Road Centerline Elevation (m)
Creditview Road Eto Hdwtr S Trb N South N1 XS 125	Conc. Box	9 x 1.75	258.95	258.85	262.20
Creditview Road Eto Hdwtr S South 8 XS 580	Conc. Box	19.0 x 2.5	258.66	258.54	253.75
Creditview Road Eto Hdwtr S South 8 XS 906	Conc. Box	19.0 x 2.5	258.68	258.63	264.14
Chinguacousy Eto Hdwtr S Trb O South O1 XS 323	Conc. Box	8 x 1.8	261.02	260.8	265.64
Chinguacousy Eto Hdwtr S Trb O South O1 XS 880	Conc. Box	8 x 1.8	264.4	264	268.54
Chinguacousy Eto Hdwtr S Trb P South P1 XS 314	Conc. Box	8 x 1.5	260.93	260.72	264.78
Mississauga 2D Model	Conc. Box	17 x 2.5	259.97	259.83	264.25

Proposed Conditions Riparian / Flood Storage

The riparian storage under proposed conditions was assessed to understand the impact of planned developments and infrastructure modifications on floodplain storage capacity. The analysis considers scenarios both with and without culverts to capture the full range of potential impacts.

The results of the HEC-RAS model runs are presented in **Table 4-5** and **Table 4-6**, showcasing the differences in floodplain storage and discharge relationships for the 2D model area west of Mississauga Road, and the 1D unsteady state model east of Mississauga Road.

Table 4-5: Proposed vs. Existing Riparian Storage (2D Model, No Culverts, West of Mississauga Rd)

Location	Scenario	Volume (x1000m^3)						
		2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	Regional
West of Mississauga Road	Existing	25.47	73.08	113.876	171.327	213.804	254.74	482.452
	Proposed	7.395	26.304	38.136	52.34	66.08	78.90	209.246
	Difference	-18.08	-46.78	-75.74	-118.99	-147.72	-175.84	-273.21

Table 4-6: Proposed vs Existing Flood Storage (1D Unsteady-State Model, No Culverts, East of Mississauga Rd)

Location	Scenario	Volume (x1000m^3)						
		2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	Regional
Eto Hdwtr S - South 6 to 10 (Main Channel)	Existing	20.76	38.5	54.1	73.87	88.28	102.69	369.01
	Proposed	21.71	51.95	76.73	104.87	124.26	143.28	426.73
	Difference	0.95	13.45	22.63	31	35.98	40.59	57.72
Eto Hdwtr S - South K1	Existing	6.77	10.05	14.87	16.73	17.54	20.66	51.61
	Proposed	6	9.06	13.12	14.44	14.99	16.38	50.94
	Difference	-0.77	-0.99	-1.75	-2.29	-2.55	-4.28	-0.67
Eto Hdwtr S - South N1	Existing	3.43	5.25	6.72	9	10.85	12.83	61.47
	Proposed	3.57	5.85	7.85	10.8	13.13	15.7	61.57
	Difference	0.14	0.6	1.13	1.8	2.28	2.87	0.1
Eto Hdwtr S - South O1	Existing	5.69	8.75	10.95	13.85	16.01	18.21	51.35
	Proposed	6.81	10.73	13.1	15.91	17.88	19.87	47.1
	Difference	1.12	1.98	2.15	2.06	1.87	1.66	-4.25
Eto Hdwtr S - South P1	Existing	3	4.84	6.23	9.52	11.04	12.53	36.62
	Proposed	1.17	2.88	4.09	5.44	6.43	7.32	20.88
	Difference	-1.83	-1.96	-2.14	-4.08	-4.61	-5.21	-15.74
TOTAL (1D)	**Existing**	**39.65**	**67.39**	**92.87**	**122.97**	**143.72**	**166.92**	**570.06**
	Proposed	**39.26**	**80.47**	**114.89**	**151.46**	**176.69**	**202.55**	**607.22**
	Difference	**-0.39**	**13.08**	**22.02**	**28.49**	**32.97**	**35.63**	**37.16**
TOTAL (1D+2D)	**Existing**	**65.12**	**140.47**	**206.75**	**294.30**	**357.52**	**421.66**	**1052.51**

Location	Scenario	Volume (x1000m^3)						
		2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	Regional
	Proposed	46.66	106.77	153.03	203.80	242.77	281.45	816.47
	Difference	-18.47	-33.70	-53.72	-90.50	-114.75	-140.21	-236.05

The hydraulic modelling for proposed conditions indicates a difference in storage west of Mississauga Road. This difference was anticipated for the lands west of Mississauga Road due to the presence of a large depression or ponding area and loss of storage attributed to the future Highway 413 corridor. For the channel east of Mississauga Road, the riparian storage targets have been generally maintained.

5 SANITARY SERVICING

5.1. EXISTING SANITARY SERVICING AND REGIONAL SYSTEM CAPACITY

The subject lands are serviced by Peel Region's lake-based wastewater system, which collects wastewater from the City of Mississauga, the City of Brampton and part of the Town of Caledon (including the Alloa Secondary Plan). The lake-based system consists of two (2) wastewater treatment facilities and a network of pumping stations, forcemains and gravity sewers (both trunk and local). The system is divided into three main trunk systems – McVean, East and West.

The Alloa Secondary Plan is tributary to the Peel Region West Trunk sewershed. Wastewater generated from the Secondary Plan area will be conveyed south via two (2) main branches of the west collection system:

- **Fletcher's Creek Trunk**: Wastewater generated from the Alloa Phase 1 lands (generally between Chinguacousy Road and Creditview Road) will be directed to the Fletcher's Creek trunk sewer via an existing 750 mm sanitary connection at Brisdale Drive.
- **Credit Valley Trunk**: Wastewater generated from the Alloa Phase 2 lands (generally between Creditview Road and Heritage Road) will be directed to the Credit Valley trunk sewer, via a future planned 900 mm sewer connection at Mississauga Road and Mayfield Road.

Peel Infrastructure Planning Staff have confirmed through on-going TAC meetings that there is existing capacity in the Fletcher's Creek trunk sewer, via the Brisdale sanitary sewer, of 300 L/s. This is available immediately to the Alloa Phase 1 area.

The Phase 2 lands will, generally, rely on the construction of the 900 mm sanitary sewer on Mississauga Road between Mayfield Road and Sandalwood Parkway (planned 2027 construction).

5.2. PROPOSED SANITARY SERVICING

Drawing 5A shows the proposed Alloa Secondary Plan sanitary servicing strategy, including all existing and future Peel Region service connections. The Secondary Plan is intended to be serviced by a series of local sub-trunk sewers, generally draining from north to south and connecting into existing or planned Regional DC infrastructure.

As noted in **Section 5.1**, discussions with Peel Region have confirmed that local sanitary infrastructure is in place to support Alloa Phase 1 (both Stage 1 and Stage 2 areas – refer to **Drawing 8A** and **Section 8** for phasing and staging delineation). The sanitary outlet for the Phase 1 lands is the existing 750 mm trunk sewer on Brisdale Drive. The Brisdale sewer is sized to accommodate all development in Alloa Phase 1. The size and capacity of this sewer was originally approved through the Mount Pleasant Block 51-2 EIR/FSR and the associated Block 51-2 detailed subdivision designs. More recently (February 2025), Region Infrastructure Planning Staff have confirmed through hydraulic modelling that the existing 750 mm Brisdale sanitary sewer and downstream Fletcher's Creek Trunk sewer system can immediately accommodate 300 L/s from the Alloa lands. Per the current Alloa Secondary Plan land use schedule, estimated Phase 1 development area (including SWM facilities, but excluding NHS) totals approximately 264.1 ha with a population of 20,600. This

results in a total wastewater flow of approximately 250 L/s to the Brisdale pipe, well within the capacity limit of 300 L/s.

Alloa Phase 2 (see **Drawing 8A** - generally from Creditview Road to Heritage Road) will be serviced by a network of internal sub-trunks and future regional trunk sewers planned along the Tim Manley extension (west of Crediview Road) and on Mississauga Road. The wastewater outlet for the Phase 2 area is the future 900 mm sanitary trunk sewer at Mississauga Road and Mayfield Road.

Also note that:

- **Drawing 5A** includes the agreed upon connection from the future Costco Site Plan to Robert Parkinson Drive (this area is not included the calculated flow to the Brisdale sewer).
- **Drawing 5A** also includes provision for a local connection across Mayfield Road at Veterans Drive. This connection could be used as either a temporary or permanent outlet (subject to the Region's confirmation of capacity) in the event that prestige employment lands along Mayfield Road proceed ahead of adjacent properties, and in advance of regional infrastructure along Mayfield Road and Mississauga Road.
- There is an existing 450 mm diameter sewer connection at the intersection of Tim Manley Blvd and Chinguacousy Road that could be utilized by Alloa Phase 1 (eastern boundary) as a temporary and/or ultimate servicing outlet. Further discussion with Peel Region staff is required to confirm servicing capacity in this sewer.
- There is a small area in the northeast corner of Phase 2 that could be serviced by either Phase 1 or Phase 2 infrastructure. The landowners will work with Peel Region to determine the ultimate preferred servicing route. There is downstream Regional pipe capacity available in either scenario.

Planned Regional sanitary infrastructure projects that directly support the Alloa Secondary Plan are summarized in **Table 5-1.**

Table 5-1: Alloa Wastewater Servicing (Planned Regional Projects[1])

Project No.	Project Description	Project Timing [2]	Supporting
56982	600 mm Brisdale Sewer Extension (Mayfield Road north to mid-block)	2029	Alloa Phase 1
56986	675 mm Tim Manley Extension Sewer (east / west alignment) from Creditview to Mississauga Road.	2029	Phase 2
56988	675 mm Mississauga Road Trunk Sewer (from Tim Manley Extension to Mayfield Road)	2032	Phase 2
21055 / 21056	900 mm Mississauga Road Trunk Sewer (from Mayfield Road to Wanless Drive	2027	Phase 2

Project No.	Project Description	Project Timing [2]	Supporting
21057 / 21058	900 mm Mississauga Road Trunk Sewer (Wanless Drive to Sandalwood Parkway)	2027	Phase 2

[1] *Taken from Peel Region Wastewater Map 2025 (Map ID: 4157-WW-DC), 2025 Budget (October, 2024). Timing for the Mississauga Road Trunk Sewer (south of Mayfield Road) has been provided directly by Peel Region Staff and will be reflected in the next revision of DC mapping.*

[2] *If required to accommodate development timing, the Alloa Landowner's Group may enter into a front ending agreement with Peel for delivery of necessary regional infrastructure ahead of the capital program planning schedule*

5.3. SANITARY DESIGN CRITERIA AND WASTEWATER GENERATION RATES

Peel Region wastewater design criteria and design standards are taken from the Public Works Linear Wastewater Standards (March, 2023). Pipe size, slope and depth, as shown in **Drawing 5A** will follow the March 2023 Design Manual.

Preliminary wastewater generation rates for the Secondary Plan area (**Table 5-3**) are determined by development phase and for the full Secondary Plan area based on site statistics as noted in **Section 1.4** and design criteria shown in **Table 5-2**, taken from the March 2023 Design Manual and consistent with the 2020 Master Plan.

Table 5-2: Peel Region Wastewater Generation Design Criteria

Population Type	Average Dry Weather Flow (L/cap/day)	Peaking Factor	Inflow and Infiltration (L/s/ha)
Residential	290	Harmon Formula	0.260
Employment	270	Harmon Formula	0.260

In the next phase of study (Tertiary Plan FSR) design sheets will be prepared for the proposed internal sub-trunk network.

Table 5-3: Alloa Secondary Plan Preliminary Wastewater Generation Rates

	Average Dry Weather Flow (L/s)	Peaking Factor (Harmon Formula)	Peak Wet Weather Flow (L/s)
Alloa – Phase 1 Brisdale Drive Trunk Sewer	69.1	2.64	**251.2**
Alloa – Phase 1 Costco Site Plan (Robert Parkinson Sewer)	2.0	3.91	**11.3**
Alloa – Phase 2 Mississauga Road Trunk Sewer	68.9	2.63	**250.8**

The values in **Table 5-3** are preliminary and subject to refinement in future studies as more information becomes available. Ultimately, pipes internal to the Alloa Secondary Plan will be designed based on peak wet weather flow for their specific sewer catchment area, and in accordance with Peel Region's design standards (size, slope, depth, etc.).

6 WATER SERVICING

6.1. EXISTING WATER SERVICING AND REGIONAL SYSTEM CAPACITY

The subject lands are serviced by the Region of Peel's lake-based water system, which distributes water from Lake Ontario to the City of Mississauga, the City of Brampton and part of the Town of Caledon (including the Alloa Secondary Plan). The Region's lake-based system consists of two (2) treatment facilities, transmission systems, and distribution systems. There are three transmission systems (west, central and east), each containing a series of booster pump stations, water reservoirs and elevated tanks. The Alloa Secondary Plan is part of the west transmission system. Transmission systems provide direct supply to the local water distribution systems, which includes watermains extending down to each individual user.

There are a total of seven (7) water pressure zones in the Peel System, each separated by approximately 30 m intervals of elevation. The Alloa Secondary Plan is proposed to develop on the Pressure Zone 7 West (7W) system. Zone 7W has a top water level of 327.7 m, a hydraulic grade line of 335.3 m and services elevations between 243.4 m and 289.6 m. The Alloa Booster Pump Station and Alloa Reservoir, both located within the Secondary Plan area (west of Creditview Road, north of Mayfield Road) provide storage and pumping capacity for the Alloa Secondary Plan area as well as other growth areas within Zone 7W.

The Zone 7W system is intended to be expanded in the near-term to include new transmission mains from the Alloa Booster Pump Station to the new West Caledon Elevated Tank. A Schedule C Municipal Class Environmental Assessment study is currently underway to select the ultimate location for the Elevated Tank and the alignment of the future transmission mains. This study is anticipated to be completed by the end of 2025. Currently, the Alloa Reservoir provides all of the Zone 7W floating storage. The future addition of the West Caledon Elevated Tank will improve the storage capacity for the zone as well as system redundancy and security of supply.

Preliminary hydraulic analysis undertaken by Peel Region staff have confirmed that Phase 1, Stage 1 development (i.e., lands generally south of the Alloa Drain – refer to **Drawing 8A** and **Section 8** for full Phase and Stage delineation) is not reliant on the future West Caledon Elevated Tank (or associated distribution / transmission mains). Phase 1, Stage 1 development can proceed with only the trunk watermains within Phase 1, as identified on **Drawing 6A**. Additional modelling at Tertiary Plan and Detailed Design stages will be required to confirm timing and serviceability of the Phase 1, Stage 2 properties (i.e., lands generally north of the Alloa Drain), ahead of planned infrastructure improvements. Broader area projects, like the West Caledon Elevated Tank, will provide additional capacity and security for the remainder of the Secondary Plan area (Phase 2).

6.2. PROPOSED WATER SERVICING

Drawing 6A shows the proposed Alloa Secondary Plan water servicing strategy, including all existing and future Peel Region service connections. The Secondary Plan area is intended to be serviced by a series of local watermains, connected and looped with existing and / or planned Regional DC infrastructure.

There is an existing 600 mm diameter Zone 7W watermain that runs along Mayfield Road from Mississauga Road to east of Chinguacousy Road. There is also an existing 600 mm diameter Zone

7W watermain that runs north on Chinguacousy Road, terminating at Tim Manley Blvd. This watermain will be extended further north by the Region in the 2026 timeframe. The Alloa Phase 1 lands will use these existing watermains for water distribution and looping. Additional Regional DC watermains on Mayfield Road, Creditview Road, Mississauga Road, Heritage Road and mid-block within the Secondary Plan (Tim Manley Blvd. extension) will be required for development of the remainder of the Secondary Plan, along with the future West Caledon Elevated Tank and associated transmission mains.

Planned Regional water infrastructure projects that directly support the Alloa Secondary Plan are summarized in **Table 6-1**.

Table 6-1: Alloa Water Servicing (Planned Regional Projects[1])

Project No.	Project Description	Project Timing [2]	Supporting
53977	600 mm watermain on Chinguacousy Road from Tim Manley Blvd to Old School Road	2026	Phase 1
57094	400 mm watermain on new Alloa internal east-west road from Chinguacousy Road to Creditview Road	2029	Phase 1 / Phase 2
57096	400 mm watermain on Creditview Road from Mayfield Road north to new Alloa internal east-west road	2029	Phase 1 / Phase 2
57092	400 mm watermain on new Alloa internal east-west road from Creditview Road to Mississauga Road	2029	Phase 2
57090	600 mm watermain on Mississauga Road from Mayfield Road north to new Alloa internal east-west road	2029	Phase 2
20697	750 mm transmission main from Alloa Pump Station to new West Caledon Elevated Tank	2026	Phase 2
30703	New West Caledon Elevated Tank (Zone 7W Reservoir)	2026	Phase 2
53975	750 mm watermain on Old School Road from West Caledon Elevated Tank to Chinguacousy Road	2026	General looping and security of supply. Not required for development.

[1] *Taken from Peel Region Wastewater Map 2025 (Map ID: 4156-W-DC), 2025 Budget (October, 2024).*

[2] *If required to accommodate development timing, the Alloa Landowner's Group may enter into a front ending agreement with Peel for delivery of necessary regional infrastructure ahead of the capital program planning schedule*

6.3. WATER DESIGN CRITERIA AND SYSTEM DEMAND

Peel Region provides design criteria and water supply standards to ensure uniformity in their system. The Region of Peel Public Works Design, Specifications and Procedures Manual (June, 2010)

provides comprehensive instruction for the design and construction of municipal services. Watermain size, slope and depth, as shown in **Drawing 6A**, follow the June 2010 Design Manual.

Peel Region per capita water demand criteria were updated through the 2020 Water and Wastewater Master Plan. As such, the criteria in the June 2010 Design Manual are considered superseded by the 2020 Master Plan values. The Master Plan water demand criteria are shown in **Table 6-2.**

Table 6-2: Peel Region Water Demand Design Criteria

Population Type	Average Dry Water Demand (L/cap/day)	Max Day Peaking Factor	Peak Hour Peaking Factor
Residential	270	1.8	3.0
Employment	250	1.4	3.0

Preliminary water demand rates are tabulated in **Table 6-3**. The values are subject to refinement in future studies as more information becomes available.

Table 6-3: Alloa Secondary Plan Preliminary Water Demand (Domestic)

	Average Day Demand (L/s)	Max Day Demand (L/s)	Peak Hour Demand (L/s)
Alloa – Phase 1	66.3	118.5	198.8
Alloa – Phase 2	64.0	109.4	192.1

In addition to the domestic demand outlined above, the water distribution system will provide water capacity for fire protection, in accordance with the requirements of the Underwriters Laboratories of Canada. Fire flow will be further defined as more information becomes available regarding built form. Water distribution systems are commonly designed to provide either Max Day + Fire Flow or Peak Hour Flow (whichever is higher).

The Region requires delivery pressures between 40 psi and 100 psi (not including during fire events).

The water distribution system analysis, including local watermain sizing and layout, for the subject site will be completed/confirmed as engineering proceeds and more information is available regarding built form and neighbourhood concept plans. Interim water servicing and looping is also to be determined, based on the future development phasing, as applicable. The Alloa Secondary Plan watermains will be designed to supply demand under all operating scenarios, while maintaining adequate pressure to the system as required by Peel Region.

7 CLIMATE ADAPTATION

The Resilient Caledon Community Climate Change Action Plan identifies how the Town of Caledon intends to respond to potential climate-related challenges including changes in the frequency of extreme weather (droughts, floods, etc.).

In order to design a community that is resilient to climate change, the following items have been (and will continue to be) considered as the studies for this area advance.

- **Irrigation:** In parks and site plan blocks, the potential for storing stormwater and utilizing it for irrigation should be explored in future studies to decrease reliance on municipal water during drought conditions. Increased irrigation demand due to potential drought should be considered in the final water distribution analysis. This can be mitigated through public education, signage, and the incorporation of efficient fixtures and irrigation methods.

- **Roadways**: Proposed roadways within the development will be designed to avoid excessive flooding during large storms as well as ensuring adequate conveyance of flows. This can be accomplished by verifying the capacity in the roadways compared to the 100-year event, as well designing and implementing adequate catchbasins to capture the flows.

From a stormwater management perspective, the LSWS Terms of Reference requires consideration of climate change as it relates to SWM criteria / evaluation of future conditions and infrastructure. The approach to climate change considerations through the Secondary Plan was discussed at the April 23rd, 2025 workshop with agency staff and peer review consultants, and includes the following:

- It was agreed that, while accepted approaches exist to evaluate climate-related impacts to the IDF parameters (single event), these impacts do not affect the LSWS / Secondary Plan scope of work or general pond block sizing. All proposed stormwater management facilities within the Secondary Plan have been designed to control, and in the case of Etobicoke Creek facilities, over-control the regional event. Due to the use of this historical storm in the sizing, the pond blocks are not anticipated to increase as a result of climate change.

- It was also confirmed that the Regional storm governs in all cases as it relates to establishing flood flows in the channel for the subject lands, versus the 100-year or climate-adjusted 100-year storm. Refer to the *Future Climate Change Conditions Assessment* memo (Urbantech, July 2025) in **Appendix E** for details.

- While climate change may impact continuous flows and the related wetlands, site wide water balance, and erosion impact, it was agreed that there is no “climate adjusted” continuous data set (temperature and rainfall) that could be used for the continuous model assessment. TRCA indicated that provision of adequate LID measures / infiltration could counteract the long-term effects of climate change, including more frequent / more intense rainfall events. If a climate-adjusted continuous data set becomes available, it could be used to further assess wetland water balance, site wide water balance, and erosion impacts for future climate scenarios.

Also refer to **Section 3.3.6**, **Table 3-7** and the *Future Climate Change Conditions Assessment* memo (Urbantech, July 2025) in **Appendix E** for additional details related to stormwater management in the context of climate change.

8 DEVELOPMENT PHASING

The Alloa Secondary Plan is intended to develop in two phases as shown in **Drawing 8A**:

- **Phase 1**: Generally, from Chinguacousy Road to Creditview Road, with a small area west of Creditview Road south of the Alloa Municipal Drain. Phase 1 is further divided into two stages:
    - Stage 1: Phase 1, generally south of the Alloa Drain within CVC jurisdiction.
    - Stage 2: Phase 1, generally north of the Alloa Drain, within TRCA jurisdiction.
- **Phase 2**: Generally, from Creditview Road to Heritage Road.

The phasing plan provides a logical extension of growth in this area of Caledon (east to west) and is consistent with Town and Regional infrastructure planning (water, sanitary, roads).

Development is intended to be phased in accordance with the availability of servicing infrastructure provided by the Region of Peel. At present, existing water and sanitary services are sufficient to support the full build-out of the Phase 1 / Stage 1 lands, as well as either full or partial development of the Phase 1 / Stage 2 lands, subject to confirmation through additional water modeling by the Region. Phase 2 lands cannot proceed until the external trunk sanitary sewer along Mississauga Road, south of Mayfield Road, has been constructed as well as the West Caledon Elevated Tank and associated transmission mains. Detailed servicing strategies are illustrated in **Drawings 5A** and **Drawing 6A**.

From a drainage perspective, the Alloa Secondary Plan is situated within the existing Etobicoke Creek and Fletchers Creek subcatchments. The pre-development drainage boundaries are generally being maintained in the post-development condition. For the Fletchers Creek catchment, post-development outlets are readily available at Mayfield Road and Chinguacousy Road. In contrast, the build-out of the Etobicoke Creek catchment is contingent on the realignment and lowering of the existing Alloa Drain, as outlined in **Drawings 2B** and **3D**.

The realignment and lowering of the Alloa Drain is expected to occur in phases to support the varying development timelines of Phases 1 and 2. Where feasible, the existing Alloa Drain and its contributing tributaries will remain in place during the construction of the ultimate channel system. In locations where the ultimate channel alignments conflict with existing watercourses, temporary diversion channels will be implemented to maintain overland flow and conveyance throughout the creek works. The Alloa Earthworks Program will require substantial import of clean fill from off-site sources to achieve overall site grading balance. To facilitate this large-scale, multi-year operation, Town Council authorized staff in April 2025 to apply the expedited site alteration permit review and issuance process to all eligible lands within Phase 1 / Stage 1, south of the Alloa Drain. Earthworks in the remaining Alloa lands will proceed following draft plan approvals.

It is also important to note that:

- Opportunities for partial development under the interim Natural Heritage System (NHS) condition will be further explored at the draft plan and detailed design stage, as applicable to specific landowner applications.

- If required to accommodate development timing and phasing, the Alloa Landowner's Group may enter into a front-ending agreement with Peel Region to deliver necessary regional infrastructure ahead of the capital program planning schedule. This will be further discussed as planning proceeds.

- Phasing internal to each Block will be determined as work proceeds and draft plans come forward. Considerations for interim phasing of stormwater management, water, sanitary and floodplain channelization will be reviewed, as required, with the Planning Authorities at an appropriate time in the process.

9 CONCLUSION

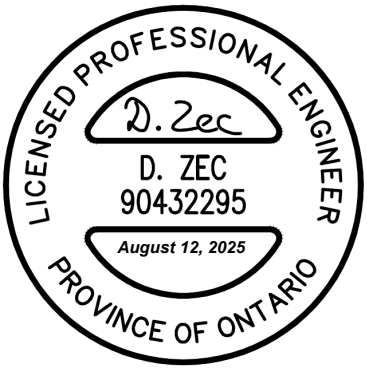
This Scoped Servicing Study has been prepared in support of the Alloa Secondary Plan and in conformance with the Alloa Local Subwatershed Study. This study is meant to provide a framework for future servicing work at the Tertiary Plan and Draft Plan stage.

Key conclusions are as follows:

- The Alloa Secondary Plan lands fall within the Fletcher's Creek, Huttonville Creek, and Etobicoke Creek watersheds. The north portion of the site drains to the Alloa Municipal Drain, which discharges to Etobicoke Creek east of Chingaucousy Road. The south portion of the site drains to existing roadside ditches and culverts across Mayfied Road. This sewer network outlets to the Fletcher's Creek and Huttonville Creek watersheds.
- The stormwater management requirements for the Alloa Secondary Plan Area are based on the criteria as specified in the Etobicoke Creek Hydrology Update (April 2013) and the Subwatershed Study for the Huttonville and Fletcher's Creeks (June 2011). The Scoped Subwatershed Study for the Settlement Area Boundary Expansion in the Region of Peel (January 2022) was also referenced to confirm that SWM criteria proposed in this report align with the SABE study.
- The storm servicing plan identifies ten (10) proposed SWM pond facilities to achieve the SWM requirements for the proposed neighbourhood/residential areas. Two (2) of the SWM pond facilities are located in the Fletcher's Creek subwatershed. Eight (8) of the SWM pond facilities are located in the Etobicoke Creek subwatershed.
- Employment blocks in the southwest corner of the subject area and mid/high rise blocks in the southeast portion of the site will be controlled by private on-site controls to achieve the required SWM criteria.
- The minor and major drainage systems for the subject lands will be designed to convey storm runoff to the proposed SWM facilities, prior to the outlets at Huttonville Creek, Fletcher's Creek and Etobicoke Creek. The minor storm system will be designed to convey flows up to the 10-year design storm (via storm sewers) without surcharge. The major storm system will allow excess flows up to the 100-year design storm to be conveyed via overland flow within the proposed ROW limits.
- The SWM strategy will address water balance requirements for the site and adjacent wetlands through the use of LID technology, where practical and appropriate.
- Under proposed conditions floodplain limits and associated watercourses across the Secondary Plan area are intended to be regularized, realigned and improved. The NHS traversing the site under post-development conditions will include a corridor designed to contain erosion hazards, meander belt, flood hazard, crossings and other environmental features / considerations.
- The proposed changes to the channel design between Mississauga Road and Chinguacousy Road, while reducing riparian storage, do not adversely impact downstream flows. The more efficient trapezoidal channel design improves flow conveyance, and the loss of storage primarily comprises dead storage that does not significantly contribute to flow dynamics.

- Sanitary flow from the Phase 1 area is intended to be conveyed via the existing 750 mm trunk sewer connection at Mayfield Road and Brisdale Drive, which is sized to provide service to the Alloa Phase 1 lands.
- Sanitary flow from the Phase 2 area will be serviced via future regional trunk sewers planned for Creditview Road, Mayfield Road and Mississauga Road. The ultimate wastewater outlet for the Phase 2 area is the future 900 mm sanitary trunk sewer at Mississauga Road and Mayfield Road.
- Pressure Zone 7W watermains are in place along Mayfield Road and Chinguacousy Road. Peel Region has confirmed that the existing Alloa Reservoir and Pump Station are sized to provide sufficient water capacity to support growth in Alloa Phase 1, Stage 1. Existing capacity to support Phase 1, Stage 2 lands will be confirmed through additional hydraulic modelling by the Region at detailed design. Development in Phase 2 will require the completion of the new West Caledon Elevated Tank and associated transmission / distribution mains.

Report prepared by:
Urbantech Consulting



Dragan Zec, P.Eng.
Partner

APPENDIX A

DRAWINGS AND FIGURES

APPENDIX B

SWM TARGETS

APPENDIX C

HYDROLOGY AND HYDRAULICS MODELLING FILES

Note: Modelling files are provided separately for Agency review

MEMO:

SENSITIVTY ANALYSIS APPROACH PRIOR TO MODEL CALIBRATION (URBANTECH, AUGUST 2025)

APPENDIX D

STORMWATER MANAGEMENT CALCULATIONS

APPENDIX E

MEMO:

FUTURE CLIMATE CHANGE CONDITIONS ASSESSMENT MEMO (URBANTECH, JULY 2025)

APPENDIX F

FLUVIAL GEOMORPHOLOGY REPORTS:

FLUVIAL GEOMORPHOLOGY ASSESSMENT AND CONCEPTUAL NATURAL CORRIDOR DESIGNS (GEO MORPHIX, AUGUST 2025)

EROSION THRESHOLD AND EXCEEDANCE ASSESSMENT (GEO MORPHIX, AUGUST 2025)