ENVISION
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# FUNCTIONAL SERVICING REPORT

Legacy II

Project #: 23-0462
Prepared for: Eco Lake Home Inc.
Date: July 28, 2026

Report Version: 01

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July 28, 2026

Eco Lake Home Inc.
57 Rosehill Drive
Stouffville, Ontario L4A 3X7

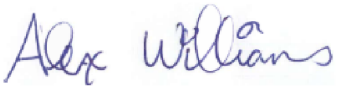
Attention: James Spratley

SUBJECT: FUNCTIONAL SERVICING REPORT, LEGACY II

EnVision Consultants Ltd. is pleased to present the enclosed Functional Servicing Report in support of the Zoning By-law Amendment submission for the above-noted property. This report provides the conceptual framework for water distribution, sanitary sewage, and stormwater management, including storm drainage and proposed quality and quantity controls on this Site.

We thank you for utilizing EnVision for this assignment. If there are any questions regarding the enclosed report, please do not hesitate to contact us.

Yours sincerely,



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## QUALITY MANAGEMENT

| ISSUE | FIRST ISSUE | REVISION 1 | REVISION 2 |
|---|---|---|---|
| PROJECT NUMBER | 23-0462 | | |
| PROJECT REFERENCE | Functional Servicing Report, Legacy II | | |
| VERSION NO. | 01 | | |
| REMARKS | | | |
| PREPARED BY | Raphael de Mesa, EIT | | |
| SIGNATURE |  | | |
| REVIEWED BY | Alex Williams, P.Eng. | | |
| SIGNATURE |  | | |
| DATE | July 28, 2026 | | |

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# 1. EXECUTIVE SUMMARY

EnVision Consultants Ltd. (EnVision) was retained by Eco Lake Homes Inc. the 'Client') to conduct a functional servicing assessment for the 18-lot Legacy II residential development within the Community of Musselman Lake, Town of Whitchurch-Stouffville (the 'Site') in support of an Official Plan Amendment and a Zoning By-law Amendment Application.

The proposed development (the Site) is located west of the intersection of Wylie Lane and Windsor Drive and is bounded to the northwest by Stapleton Drive with a small frontage on Lakeshore Road near the south of Musselman Lake. The current use of the land consists of agricultural land, with a single-family detached dwelling, and various sub-structures. The gross site area is 2.74 ha, with the developable area being 2.09 ha. The remaining area consists of a SWM block and vegetated areas that will not be disturbed.

The scope of this review includes site water servicing, sanitary servicing, stormwater management (SWM) and drainage, and site grading for the proposed development.

EnVision has reviewed the Legacy II Siting Plan prepared by Eco Lake Homes dated July 10, 2026, the Town of Whitchurch-Stouffville Design Guidelines and Standard Drawings, dated January, 2023, and other publicly available materials.

Based on the functional servicing review, EnVision presents the following findings:

- The Site will be accessed by a private road extending from Stapleton Drive.
- Water servicing will be provided by seven (7) wells.
- A 250,000 L reservoir will provide firefighting flows and was sized using OBC criteria.
- On-site septic servicing such as a combination of septic tanks and leaching beds will provide sanitary servicing for each of the residential lots.
- Stormwater management flows will be controlled to the pre-development condition up to and including the 100-year design storm. Flows will be outlet towards Lakeshore Road and ultimately drain to Musselman Lake. Quantity control will be achieved using underground storage and quality control will be provided by an Oil and Grit (OGS) unit.

# 2. INTRODUCTION

EnVision Consultants Ltd. (EnVision) was retained by Eco Lake Home Inc. (the 'Client') to prepare a Functional Servicing Report (FSR) for the Legacy II development (the 'Site') located at 2 Wylie Lane in the Community of Musselman's Lake. It is our understanding that this assessment has been requested in support of a Zoning Bylaw Amendment (ZBA) submission for the proposed cul-de-sac development. This report provides the conceptual framework for water distribution, sanitary sewage, and stormwater management controls, including storm drainage and quality and quantity controls for the Site and demonstrates the feasibility of the development of the site.

## 2.1. SITE DESCRIPTION

The Legacy II development is in a rural residential area in the Community of Musselman Lake, Whitchurch-Stouffville. The proposed development is located west of the intersection of Wylie Lane and Windsor Drive and is bounded to the northwest by Stapleton Drive with a small frontage on Lakeshore Road near the south of Musselman Lake. The current use of the land consists of vacant agricultural land and woodlot, with a single-family detached dwelling, two (2) sheds, an unused grain elevator, a small solar panel, and a single wind turbine. The proposed development includes 18 development blocks, a private access road, parking and landscape areas. The proposed development will extend from Stapleton Drive. The development will be situated on 2.09 ha, with the total site area being 2.74 ha.

Refer to Figure 1 for the Site Location Plan and Figure 2 for the Pre-Development Plan. Refer to Figure 3 for an illustration of the Proposed Development Plan.


CLIENT

ECO LAKE HOMES

TITLE

2 WYLIE LANE
WHITCHURCH - STOUFFVILLE, ONTARIO

# LOCATION PLAN

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| Date JULY 2026 | Proj. No. 23-0462 |
| Scale NTS | Figure No. 1 |

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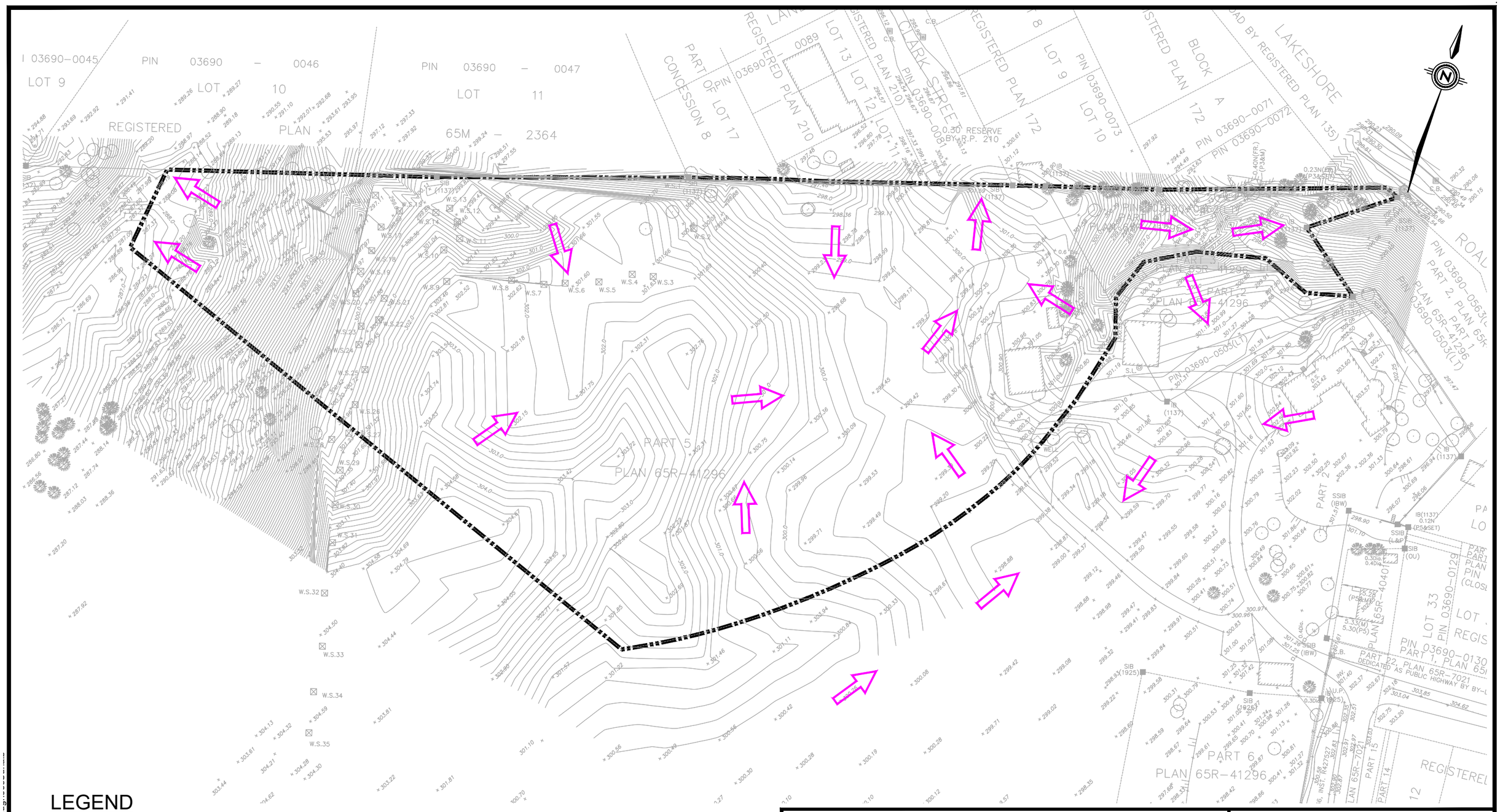


## LEGEND

LIMIT OF DEVELOPMENT

| | |
|---|---|
| CLIENT | ECO LAKE HOMES |
| TITLE | 2 WYLIE LANE<br>WHITCHURCH - STOUFFVILLE, ONTARIO<br>PRE- DEVELOPMENT PLAN |


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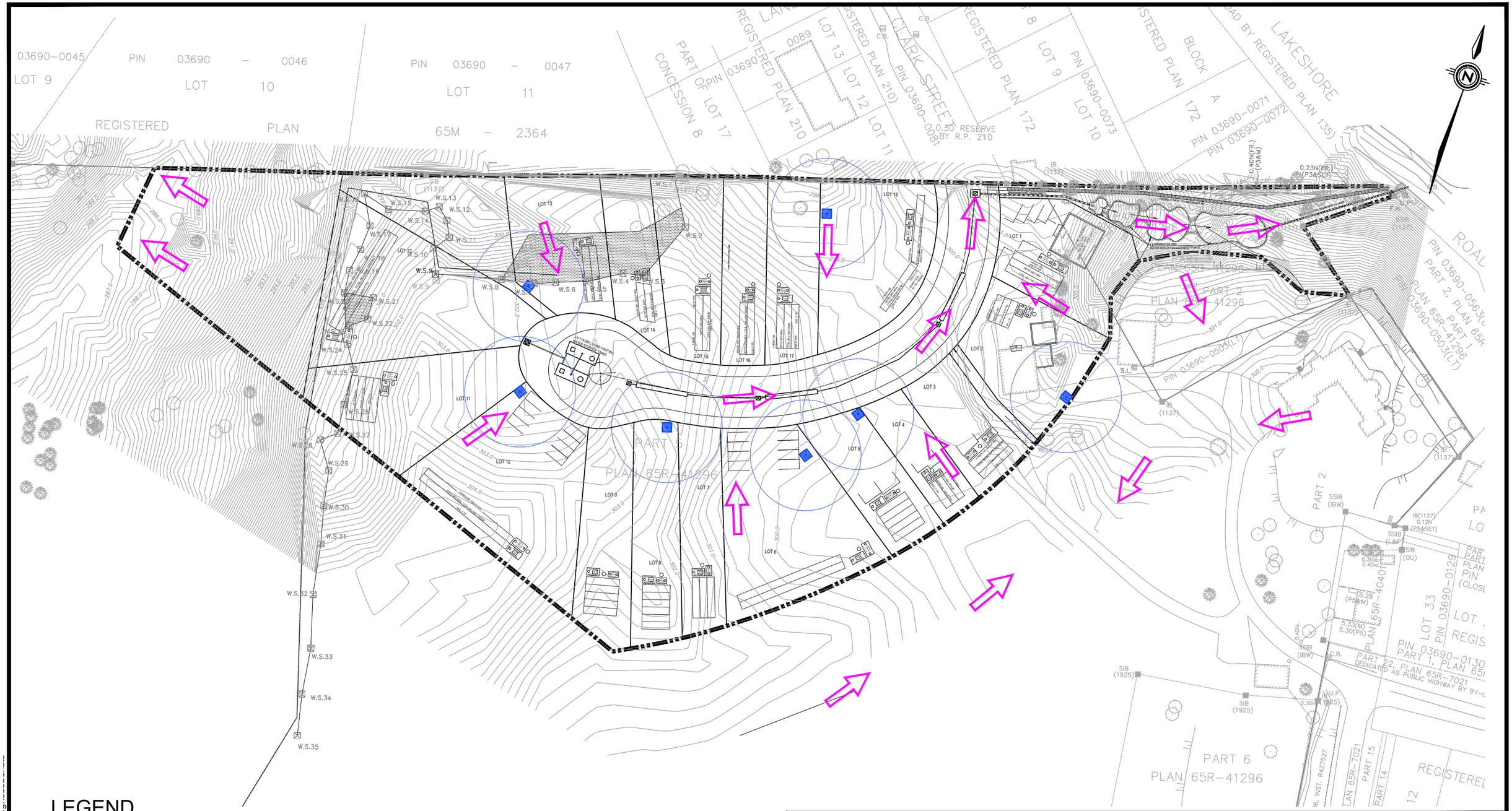


## LEGEND

LIMIT OF DEVELOPMENT

CLIENT
ECO LAKE HOMES

TITLE
2 WYLIE LANE
WHITCHURCH - STOUFFVILLE, ONTARIO
# PROPOSED DEVELOPMENT PLAN


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| Scale 1: 1000 | Figure No. 3 |

## 2.2. OBJECTIVES, SCOPE AND BACKGROUND MATERIALS

### *2.2.1. OBJECTIVES*

The objectives of the Functional Servicing Report are to:

- Determine the site-specific water, sanitary, and stormwater servicing requirements to ensure that the development proposal is in conformance with the Town of Whitchurch-Stouffville, York Region and MECP guidelines;
- Establish the proposed water and sanitary demands from the development;
- Develop a water, sanitary, and stormwater servicing strategy for the development; and
- Determine the grading approach for the development and identify grading constraints.

### *2.2.2. SCOPE*

The scope of this Functional Servicing Report includes the following components:

- Water Distribution
- Sanitary Drainage
- Stormwater management (SWM)
- Site Grading

### *2.2.3. BACKGROUND MATERIALS*

In preparing this report, EnVision used the following information to evaluate the servicing and grading for the Site:

- Legacy II Siting Plan prepared by Eco Lake Homes dated July 14, 2026 (see Appendix A for concept plan);
- Servicing & Stormwater Management Implementation Report - Coultice Drive prepared by C.F. Crozier & Associates Inc. dated January 2025;
- Preliminary sewage and hydrogeological servicing feasibility letter– 2 Wylie Lane prepared by Envision Consultants, dated July 20, 2026
- Town of Whitchurch-Stouffville Design Guidelines and Standard Drawings, dated January, 2023;
- Office of the Fire Marshal Fire Protection Water Supply Guidelines, dated October, 1999;
- Topographic Survey prepared by Mandarin Surveyors Limited, dated July 15, 2025;
- MECP Stormwater Management Planning and Design Manual, dated 2024.

# 3. WATER SERVICING

## 3.1. EXISTING CONDITIONS

Based on as-builts received from the Town of Whitchurch-Stouffville, there is an existing 150mm diameter watermain on Stapleton Drive and a 250mm diameter watermain on Lakeshore Road. The Site is located within the Oak Ridge Moraine hydrogeological system.

## 3.2. PLANNED MUNICIPAL WATER SERVICING UPGRADES

There are no planned municipal upgrades to the water distribution system within the Musselman Lake area. Should water distribution become available in the future, a design for a proposed municipal water system may be implemented.

## 3.3. WATER DEMANDS

### *3.3.1. DOMESTIC WATER DEMAND*

The peak domestic water demand for the Site was calculated using the population densities and average daily demand rates obtained from the Town of Whitchurch-Stouffville Design Guidelines and Standard Drawings, dated January 2023. Site statistics were obtained from the Legacy II Siting Plan prepared by Eco Lake Homes dated April 17, 2023. The results of the domestic water demand calculations are summarized in Table 3-1 on the following page. Refer to Appendix B for detailed domestic water demand calculations.

There are no plans to connect to the existing water infrastructure. Given that servicing will be provided by private wells, the following demand numbers will be subject to change based on future hydrogeological investigation and pumping tests, to be undertaking in support of detailed design and subsequent development approvals.

*Table 3-1: Estimated Domestic Water Demand*

| CRITERION | INFORMATION |
|---|---|
| LAND USE | Residential |
| SITE AREA | 31.0 ha |
| TOTAL RESIDENTIAL UNITS | 35 |
| POPULATION DENSITY | 3.2 people/unit |
| EQUIVALENT RESIDENTIAL POPULATION | 112 people |
| RESIDENTIAL AVERAGE CONSUMPTION RATE | 350 L/person/day |
| PEAKING FACTORS | Residential: Max. Day = 2.0, Peak Hour = 3.0 |
| AVERAGE RESIDENTIAL WATER DEMAND | 0.45 L/s |
| PEAK RESIDENTIAL WATER DEMAND | Max. Day = 0.86 L/s, Peak Hour = 1.36 L/s |
| TOTAL PEAK WATER DEMAND FROM SITE | Max. Day = 0.86 L/s, Peak Hour = 1.36 L/s |

### *3.3.2. FIRE FLOW DEMAND*

Town of Whitchurch-Stouffville Design Guidelines and Standard Drawings outline a minimum fire flow requirement of 7,000L/min (117L/s) for single family / semi-detached residential land use.

The firefighting needs of the Site must be accommodated through the usage of an on-site storage reservoir, as there are no current plans to connect to the existing water servicing infrastructure. For this purpose, the on-site reservoir must be designed using the Office of the Fire Marshal's 'Fire Protection Water Supply Guidelines'. This document provides instructions and examples of determining fire supply for Part 3 buildings as required by the Ontario Building Code. These calculations are based off building occupancy, size, and exposure distances.

As per the guidelines, new buildings shall be provided with a firefighting supply not less than the quantity from the following equation:

$$Q = KVS_{total}$$

where:

*Q = minimum supply of water (L)*
*K = water supply coefficient (L)*
*V = total building volume ($m^3$)*
$S_{total}$ *=sum of spatial coefficient from all sides of the building*

This equation was used to calculate the supply needed for every building in the Site, which results in a cumulative need for 241,000 L of water for firefighting purposes. For more information on the fire flow calculations, please refer to Appendix C.

## 3.4. PROPOSED WATER SERVICING

Municipal water servicing is unavailable to the site thus the site must be serviced by private on-site groundwater wells, as permitted by the governing regulations. The design of the wells will be deferred as permitted by future design and approval stages.

### *3.4.1. GROUNDWATER BACKGROUND AND SERVICING FEASIBILITY*

The Site is located within the Oak Ridges Moraine hydrogeological system, which supports several regionally significant aquifers which have been utilized for a wide range of applications including but not limited to private developments. Available regional geological information indicates that the principal hydrostratigraphic units beneath the Site include several water resources including the Thorncliffe Aquifer Complex. These units form part of a well-documented regional groundwater system that supports both municipal and private water supply development throughout the surrounding area.

The nearby communities of Ballantrae and Musselman lake are supplied within the Thorncliffe Aquifer Complex using municipal waters supply wells, whose long-term existence and operations demonstrate the feasibility of on-site private wells. Although site specific groundwater investigations have not yet been completed, the available information supports the development of deep groundwater bearing zones. Based on the available information, the design of on-site private well is both hydrogeologically feasible and is supported by an established precedent in the area.

### *3.4.2. DESIGN CONSIDERATIONS*

Private drilled wells servicing the development would be designed and constructed in accordance with Ontario Regulation 903, the Town of Whitchurch-Stouffville Official Plan, and the requirements of the Regional Municipality of York. Consistent with current municipal policy, future wells would be completed within the deeper groundwater systems and constructed to minimize hydraulic interaction with shallow groundwater resources.

The site will be serviced by 7 on site wells, which will be designed after the quantity and quality of groundwater resources has been confirmed in future hydrogeological and pumping investigations.

Fire flow will be provided separately, by an on-site reservoir. The firefighting calculations yielded a requirement of 241,000 L for the Site. Given this requirement, two water storage tanks of 125,000 L each will be designed for the needs of the site and placed within the cul-de-sac, for a total firefighting supply of 250,000 L. The design of these structures will be deferred as permitted by future design and approval stages

As per clause 6.3 (b) and Table 2 of the guidelines, if the required flow exceeds 190,000 L, at least 6300L/min must be provided for firefighting needs. As per clause 6.3(c) the minimum flow rate must be provided for 30 minutes. Given this information, the volume provided of 250,000 L yielded a flow rate of 8333L/min for 30 minutes, thus satisfying the requirements as set by the guidelines. This flow rate also satisfies the requirement for a minimum of 7000L/min as per Township standards.

# 4. SANITARY SERVICING

## 4.1. EXISTING CONDITIONS

Based on received as-builts from the Town of Whitchurch-Stouffville, no existing municipal sanitary infrastructure was observed near the proposed development. It is assumed that existing residences in the surrounding areas are serviced by private individual sanitary systems.

## 4.2. PLANNED SANITARY SERVICING UPGRADES

There are no planned municipal upgrades to the sanitary system within the Musselman Lake area. Should sanitary infrastructure become available in the future, a design for a proposed sanitary connection may be implemented.

## 4.3. SANITARY DEMANDS

The evaluation of the sanitary flow demand uses information obtained from the OBC Table 8.2.1.3.A for fixture unit counts and the flows are used to design preliminary layout and minimum disposal areas. For more information on the sanitary demands, refer to the Preliminary Servicing Feasibility Letter created by Envision Consultants, dated July 20,2026.

## 4.4. PROPOSED SANITARY SERVICING

The septic systems will need treatment systems for nitrate reduction as per the available information and soil conditions. The treatment system used for the design of the septic systems incorporates Shallow Buried Trench (SBT) leaching beds. These systems function as pressurized distribution systems which deliver small amount of effluent to small diameter laterals inside a chamber which filters the effluent using perforations on the top of the pipe and orifices at the bottom enable drainage. This approach represents a common solution for developments of such a nature and corresponds with the nitrate reduction assumption in the D-5-4 assessment.

The nitrate impact objective as laid out in MECP Procedure D-5-4, *Technical Guideline for Individual On-Site Sewage Systems: Water Quality Risk Assessment*, determines whether the effluent from the septic systems will cause unacceptable levels of damage to groundwater resources. The maximum allowable concentration for nitrate-nitrogen is 10 mg/L. To assess the nitrate contamination the lot size, system isolation and contaminant attenuation were considered, which yielded a nitrate concentration of 9.93 mg/L for this Site.

As per the OBC, where a SBT system is installed on soil having a percolation rate between 20 to 50 min/cm the minimum length of distribution pipe must not be less than one-fiftieth ($\frac{1}{50}$) of the total daily design sanitary sewage flow (L).

Given that the conceptual lengths are satisfactory and the nitrate concentrations area within limits, the on-site sanitary systems will be able to service the Site. As such the SBTs present a feasible solution for

the sanitary needs of the Site. For more information on the D-5-4 assessment, refer to the Preliminary Servicing Feasibility Letter created by Envision Consultants, dated July 20,2026.

The conceptual design of septic systems was completed to demonstrate that each lot could be serviced adequately, and this design is available on the concept plan in Appendix A. For more information on the conceptual layout and the sizes of the wastewater system, refer to the Legacy II Siting Plan prepared by Eco Lake Homes dated July 14, 2026

# 5. STORMWATER SERVICING

## 5.1. EXISTING CONDITIONS

The Site is located within East Holland River subwatershed and falls within the jurisdiction of the Lake Simcoe Region Conservation Authority (LSRCA). The Site encroaches into LSRCA regulated area towards Musselman's Lake on the north portion of the development, as well as to the south-east.

Under existing conditions, the Site consists of agricultural lands and a woodlot. A tributary of the East Holland River is located to the west of the Site, and two Provincially Significant Wetlands (PSWs) are present in the surrounding area; one situated west of the Site and another to the southeast. The Site lies on an elevated section of the surrounding areas and the site generally drains towards Musselman Lake, with some areas draining towards the woodlot towards the west. The catchment areas representing this drainage split are included in Figure 4.

## 5.2. PROPOSED DEVELOPMENT

The stormwater management and site drainage design are in compliance with the Town of Whitchurch-Stouffville, Lake Simcoe Region Conservation Authority (LSRCA), York Region (Region), and Ministry of the Environment (MOE), and Conservation and Parks (MECP) standards and guidelines.

A Stormwater Management (SWM) Report outlining the proposed stormwater quantity and quality controls has been prepared under separate cover by EnVision Consultants Ltd., dated July 2026. This report forms the basis of the discussion of the stormwater management requirements and strategy to address the requirements.

### *5.2.1. STORMWATER MANAGEMENT CRITERIA*

A stormwater management strategy and accompanying recommendations for the Subject Development are included below.

- Water Quantity Control
    - Control of the post-development peak flows to pre-development levels for all storms up to and including the 100-yr at the selected point of interest.
- Water Quality and Phosphorous Control
    - Implementation of Enhanced (Level 1) protection for the Site, requiring 80% TSS removal.
    - Control of phosphorous loading in post-development conditions to pre-development phosphorous loadings. If this cannot be achieved in post-development conditions, cash compensation is required per the Phosphorous Offsetting Policy.
- Erosion Control
    - Capture, retention and treatment of the first 25mm of rainfall from impervious surfaces (LSRCA).

### *5.2.2. PROPOSED STORMWATER MANAGEMENT (SWM) STRATEGY*

#### 5.2.2.1 Water Quantity Control

A HydroCAD model of the Site was developed to determine the maximum allowable discharge rate and the required storage volume using the Rational Method. For this method, an adjustment factor of 1.25 was used for the runoff coefficient of the catchment areas for the 100-year design storm. The post development catchment areas used in the model are shown in Figure 5.

The runoff from the site will be captured using catch basins and conveyed and stored using a superpipe system of concrete box culverts, each being 2400 mm in width and 1200 mm in height, which extends 156m in length and provides an effective storage volume of 449 m³. An orifice plate at the end of the system will attenuate the runoff flows to pre-development levels. The flows will outlet into Musselman Lake using an underground pipe. The storm servicing is shown in Figure 6. For more information on the hydrology calculations, please refer to the SWM report prepared by Envision Consultants, dated July 2026.

*Table 5-1: Proposed Peak Flow Rates*

| **RETURN PERIOD** | **PEAK FLOW RATE, Q ($m^3/s$)** | | |
|---|---|---|---|
| | SUBCATCHMENT 201 (2.1 ha) | SUBCATCHMENT 202 (0.1 ha) | MUSSELMAN LAKE OUTLET |
| 100-Year | 0.18 | 0.01 | 0.18 |

#### 5.2.2.2 Water Quality and Phosphorus Control

The water quality objectives require the removal of 80% Total Suspended Solids (TSS) to provide an Enhanced protection and 100% Total Phosphorus (TP) removal, controlling TP levels to the pre-development levels on an annual loading basis.

The removal of TSS will be achieved using an Oil and Grit Separator (OGS) before the outlet, allowing for the removal of sediment prior to discharge. This system will have to be inspected and maintained to ensure proper function and its design will be deferred as permitted by future design and approval stages.

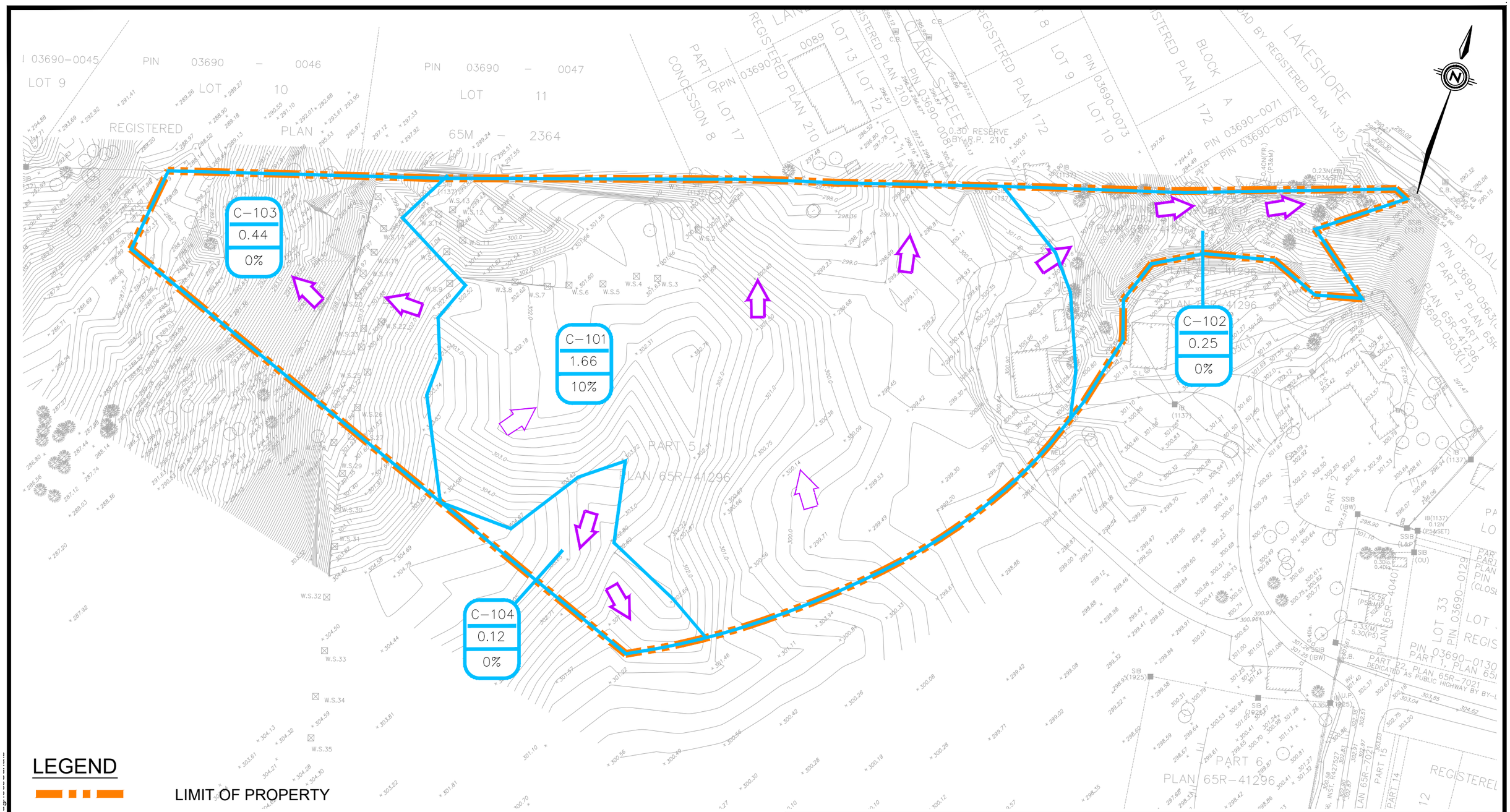
The 100% removal objective of TP cannot be achieved using on site SWM measures, thus a Phosphorus Offsetting Fee will be required. This fee is calculated using a rate of $35,770 per kg/year for every kg of phosphorus removal deficiency at a ratio of 2.5:1. An administration fee of 15% will be included to cover the LSRCA program.

The design of the phosphorus removal units and mitigation measures will be completed at the detailed design stage. For more information on the SWM strategy and design, please refer to the SWM report prepared by Envision Consultants, dated July 28, 2026.

## 5.3. EROSION AND SEDIMENTATION CONTROL DURING CONSTRUCTION

The following erosion and sediment controls are proposed for implementation during construction to minimize erosion potential and soil migration from the Site to receiving waters as per LRSCA guidelines, which state that the TRCA's 'Erosion and Sediment Control guide for Urban Construction(2019) may be followed :

1. Sediment and erosion control measures will be in place prior to the commencement of construction.
2. Construction will be scheduled to minimize the extent and period to which disturbed soils are exposed to weathering. As such, all disturbed areas will be stabilized within forty-five (45) days of commencing work at that location. Stabilization of disturbed areas may be accomplished by seeding, mulching, hydroseeding and planting. Temporary measures may employ the use of geotextile mats and nets.
3. Access to the site during construction will be limited to a maximum of two locations at any one time. The entrances of the access roads will be paved to promote the loosening and dislodging of soil attached to construction vehicles prior to them leaving the site.
4. Perimeter silt fencing will be placed and maintained around disturbed areas and around natural features which are to be preserved.
5. Silt traps or temporary sedimentation basins will be constructed for all overland flow routes. Basin sizing will be based on, with a total 250 $m^3$/ha of contributing area, of which 125 $m^3$/ha is permanent pool storage and 125 $m^3$/ha is active storage. Perforated riser pipes will be used in the temporary sedimentation basins to detain the stormwater flows for 24-48 hours before being discharged to drainage ways. Temporary sedimentation basins shall be designed in the site plan application stage.
6. Rock flow check dams will be placed at all sedimentation basin and temporary swale outlets. These flow check dams are intended as fail-safe controls to trap any sediment which circumvents the other sediment control measures. Erosion protection measures will also be provided at all outfall locations.
7. Construction mitigation measures must be installed prior to construction, and then removed after construction is completed when runoff from the site has been stabilized.




## LEGEND

- LIMIT OF PROPERTY
- CATCHMENT BOUNDARY
- OVERLAND FLOW ROUTE
- C-201 — CATCHMENT ID.
- 0.10 — DRAINAGE AREA (ha)
- 36% — IMPERVIOUSNESS (%)

CLIENT: ECO LAKE HOMES

TITLE:
2 WYLIE LANE
WHITCHURCH - STOUFFVILLE, ONTARIO

# PRE- DEVELOPMENT PLAN

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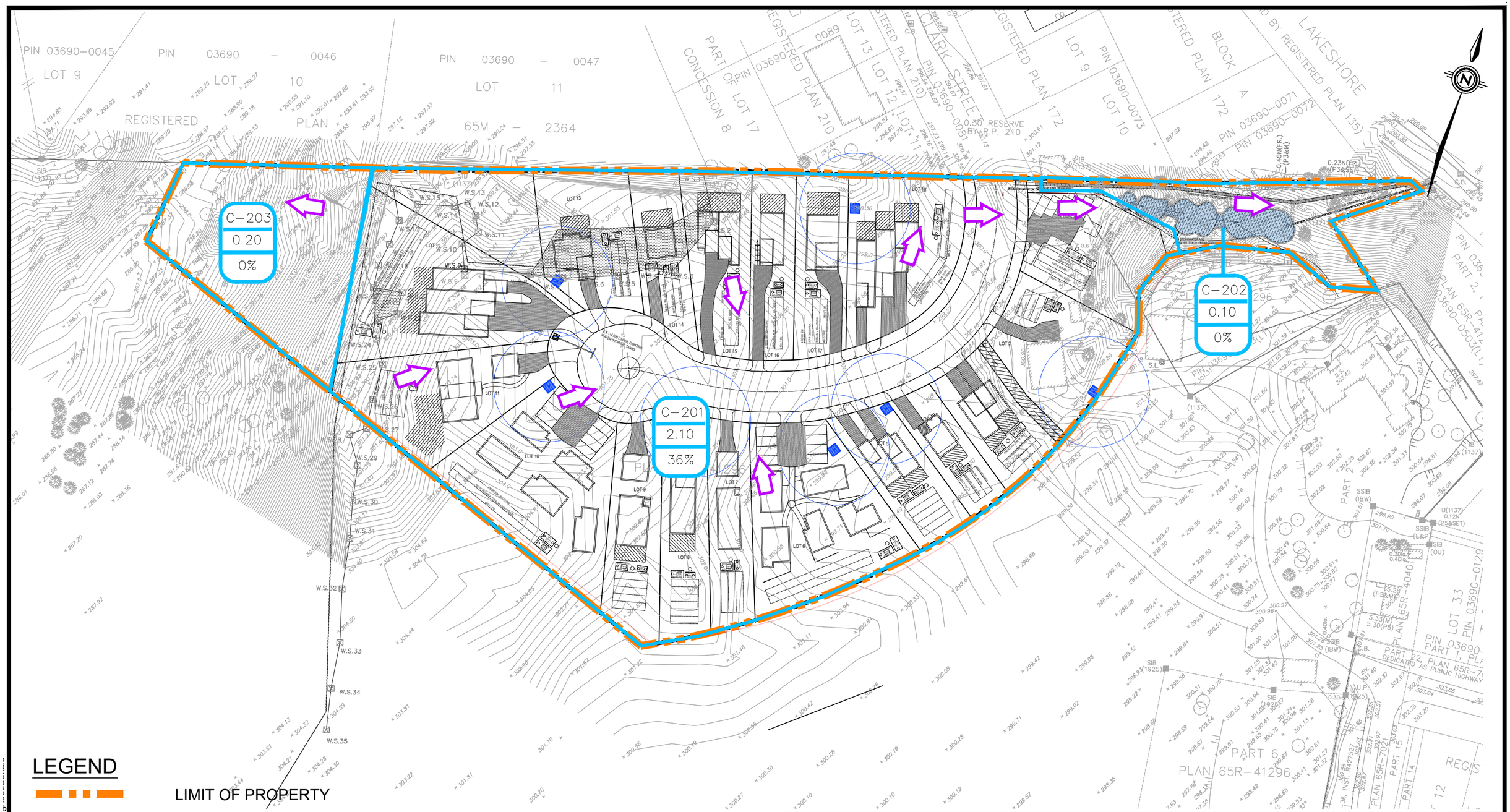


## LEGEND

- LIMIT OF PROPERTY
- CATCHMENT BOUNDARY
- OVERLAND FLOW ROUTE
- C-201 — CATCHMENT ID.
- 0.10 — DRAINAGE AREA (ha)
- 36% — IMPERVIOUSNESS (%)

CLIENT: ECO LAKE HOMES

TITLE:
2 WYLIE LANE
WHITCHURCH - STOUFFVILLE, ONTARIO

# POST DEVELOPMENT PLAN


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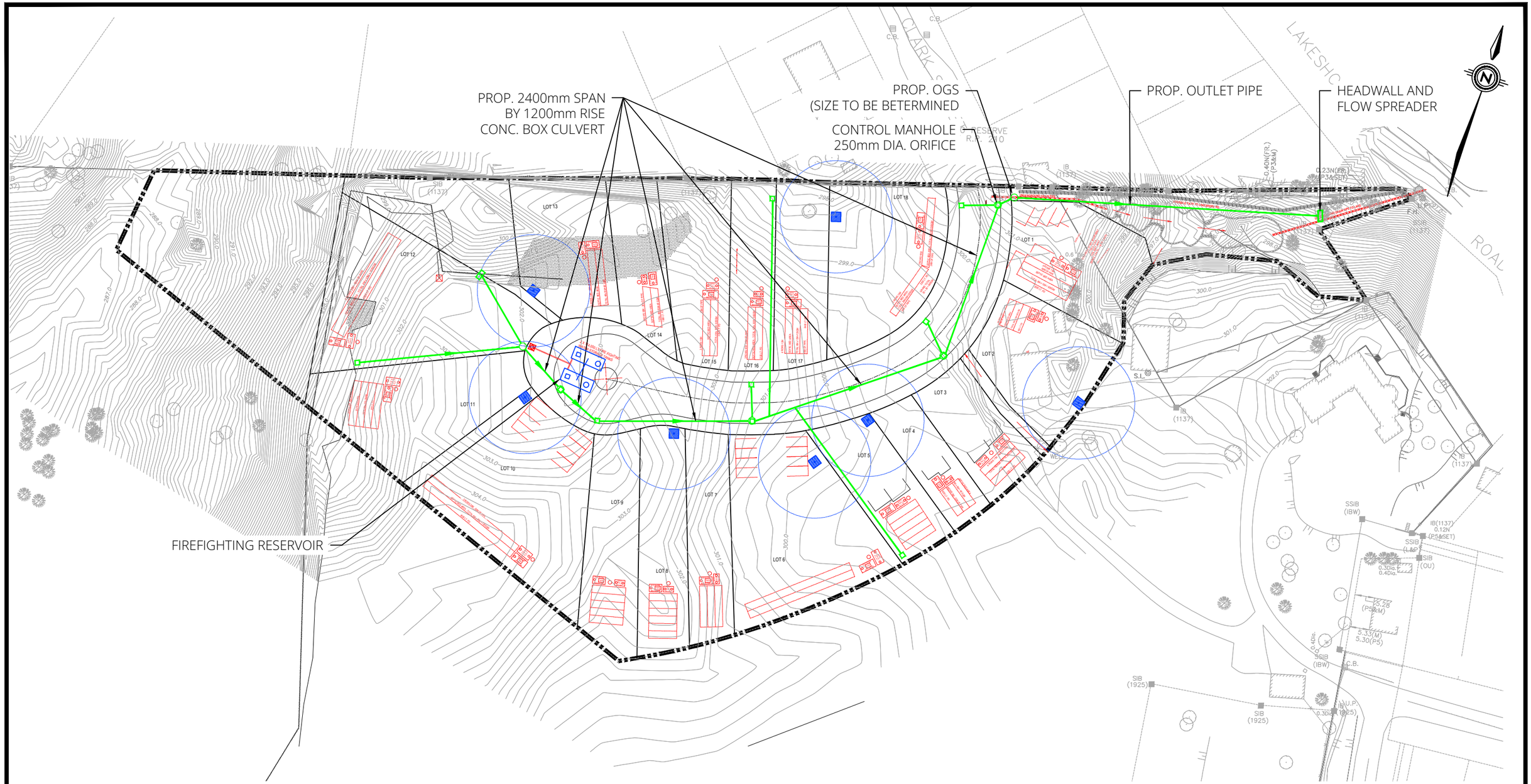


## LEGEND

- LIMIT OF DEVELOPMENT
- EX. STORM SEWER
- PROP. STORM SEWER
- PROP. STORM SINGLE/DOUBLE CATCH BASIN
- PROP. STORM MH
- PROP. CBMH
- PROP. SEPTIC
- PROP. WELLS

CLIENT: ECO LAKE HOMES

TITLE: 2 WYLIE LANE
WHITCHURCH - STOUFFVILLE, ONTARIO

# PRELIMINARY SITE SERVICING PLAN

ENVISION
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| Scale: 1: 1000 | Figure No.: 6 |

# 6. SITE GRADING

Under the existing conditions the site generally slopes towards Musselman Lake. The site lies at a high point in its environs and ranges from 305 masl to 300 masl along its southern boundary and from 290 masl to 301 masl along its northern boundary.

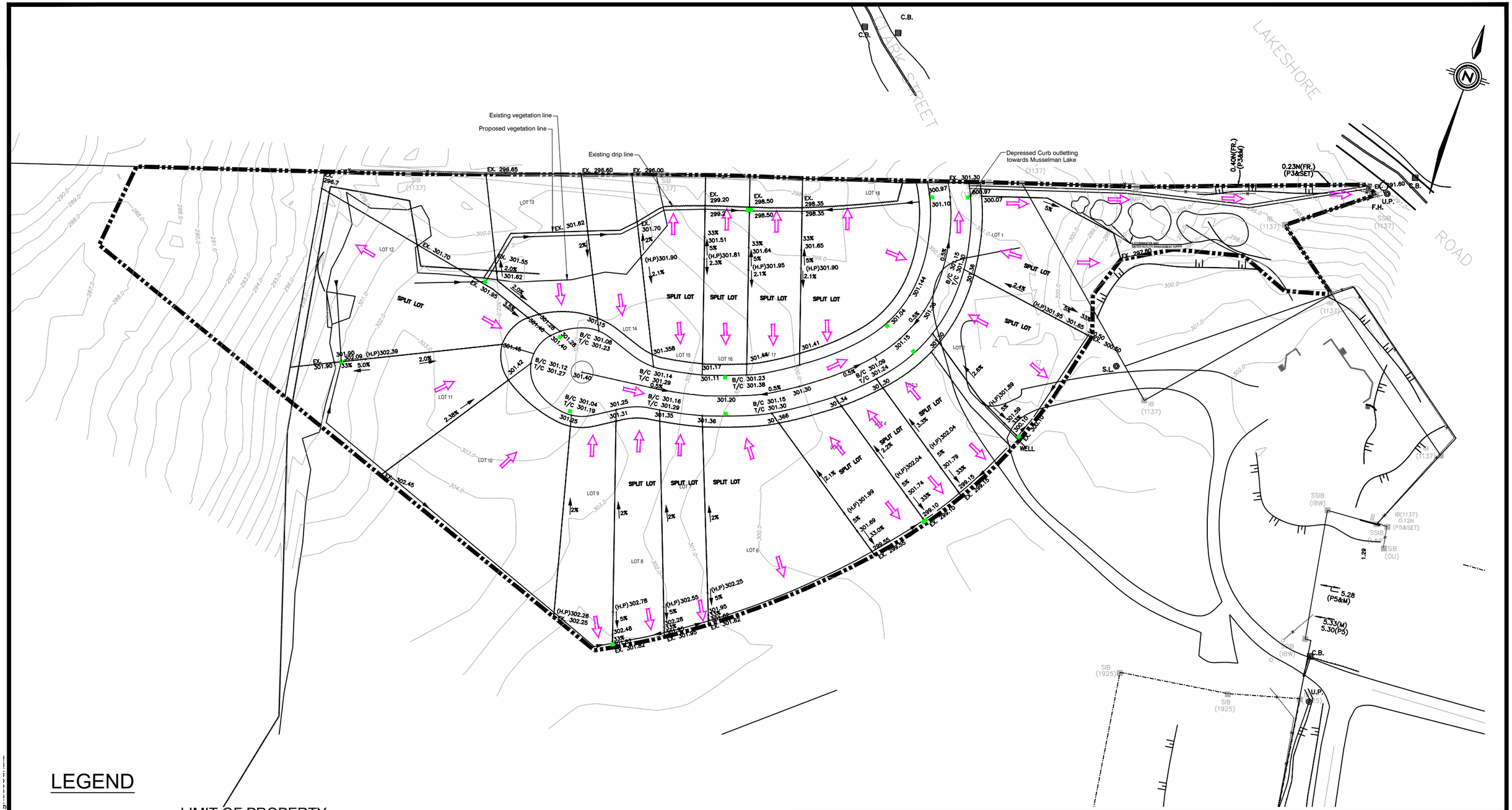
The grading design of the Site will direct runoff towards the on-site SWM collection infrastructure and will provide an overland flow route for runoff from the major storm event to be conveyed towards Musselman Lake. The grading design of the proposed development will direct storm runoff to the on-site collection points so that drainage is self-contained. The grading design will comply with the Township standards and will be designed to achieve the following:

- Maintain perimeter grades at Site boundaries;
- Promote drainage to the minor storm sewer system and accommodate stormwater management requirements;
- Provide adequate cover for underground services;
- Provide safe overland conveyance of flows exceeding the capacity of the storm sewer system; and
- Satisfy the County's requirement for maximum 0.3m of stormwater ponding;

The proposed grading for the Site will, where possible, generally maintain drainage patterns and match boundary grades.

Maximum 3:1 sloping is proposed within the Site where needed. The site grades generally lie between 2% to 5%, with the road grades being within 0.5% to 6% as per Township Standards. Where required, lots will be designed with split grading to accommodate grading requirements.

Refer to Figure 7 for the site grading plan.




## LEGEND

- LIMIT OF PROPERTY
- 212.0 — EXISTING CONTOUR
- 212.50 / EX.212.50 — EXISTING ELEVATION
- 212.86 — PROPOSED ELEVATION
- DIRECTION OF FLOW
- OVERLAND FLOW
- PROPOSED CATCHBASIN

CLIENT

ECO LAKE HOMES

TITLE

2 WYLIE LANE
WHITCHURCH - STOUFFVILLE, ONTARIO

# GRADING PLAN

ENVISION
6415 Northwest Dr. Mississauga, ON Canada L4V 1X1
Office (905) 677-0202
E-mail admin@envisionconsultants.ca

| | |
|---|---|
| Checked: R.D. | Drawn: M.R. |
| Date: 23-0462 | Proj. No.: JUNE 2026 |
| Scale: 1: 1000 | Figure No.: 7 |

# 7. CLOSING

## 7.1. CONCLUSIONS AND RECOMMENDATIONS

Based on the information obtained through functional servicing assessment, EnVision presents the following conclusions and recommendations.

### *7.1.1. WATER SERVICING*

The proposed development will be serviced by private groundwater wells, as municipal water servicing is not available to the Site. Based on the current concept plan, the development consists of 35 residential units on a 31.0 ha property, generating an estimated population of 112 persons. Using the Town of Whitchurch-Stouffville Design Guidelines and Standard Drawings, the total average domestic water demand is estimated at 0.45 L/s, with maximum day and peak hour demands of 0.91 L/s and 1.36 L/s, respectively. These values are subject to change pending future hydrogeological investigations.

Municipal groundwater systems servicing the nearby communities of Ballantrae and Musselman Lake demonstrate the viability of groundwater extraction from the local aquifer system. Although site-specific pumping and groundwater quality investigations have not yet been completed, available geological information suggests that sufficient groundwater resources are expected to be present beneath the Site to support private water servicing.

The development is proposed to be serviced by seven (7) private drilled wells, with final well design and capacity confirmation to be completed through future hydrogeological investigations and pumping tests. All wells will be designed in accordance with Ontario Regulation 903, Regional Municipality of York requirements, and applicable municipal policies.

Given the absence of municipal fire protection infrastructure, firefighting requirements will be provided through an on-site water storage reservoir system. Fire flow calculations completed in accordance with the Office of the Fire Marshal's Fire Protection Water Supply Guidelines determined a total fire storage requirement of approximately 270,000 L. To satisfy this requirement, two 135,000 L water storage tanks are proposed within the cul-de-sac area. The proposed storage volume provides a fire flow rate of approximately 9,000 L/min for 30 minutes, exceeding both the minimum 6,300 L/min requirement outlined in the Fire Protection Water Supply Guidelines and the Town requirement of 7,000 L/min. Detailed design of the wells and fire protection infrastructure will be completed during future design stages.

### *7.1.2. SANITARY SERVICING*

The proposed development will be serviced by individual on-site sewage treatment systems incorporating nitrate reduction technology and Shallow Buried Trench (SBT) leaching beds. Preliminary sanitary design flows were calculated in accordance with Ontario Building Code Table 8.2.1.3.A, based on the number of bedrooms, floor areas, and fixture unit counts proposed for each lot. Estimated sewage flows range from approximately 1,275 L/day to 4,450 L/day depending on lot configuration and dwelling type.

As the proposed lot sizes are less than 1 ha, a nitrate impact assessment was completed in accordance with MECP Procedure D-5-4: Technical Guideline for Individual On-Site Sewage Systems. The assessment evaluated the potential impact of septic system effluent on local groundwater resources through consideration of lot size, system isolation, and contaminant attenuation.

A dilution-based nitrate assessment was completed using site-specific recharge estimates and conservative design assumptions. The analysis assumed a treated effluent nitrate concentration of 17 mg/L, representing a significant reduction from untreated septic effluent concentrations. Based on the projected development density and available groundwater recharge, the predicted nitrate-nitrogen concentration at the downgradient property boundary was calculated to be 9.93 mg/L, which is below the Ontario Drinking Water Quality Standard objective of 10 mg/L. Therefore, unacceptable nitrate impacts to groundwater resources are not anticipated.

Conceptual septic systems utilizing SBT leaching beds were evaluated against Ontario Building Code minimum distribution pipe length requirements. The proposed conceptual systems provide sufficient leaching trench lengths to satisfy OBC requirements and accommodate the estimated sanitary sewage flows. Based on the preliminary assessment, the proposed septic systems are expected to provide adequate treatment and disposal capacity for the development while maintaining compliance with provincial groundwater quality objectives.

### *7.1.3. STORM SERVICING*

Stormwater management for the Site will include quantity and quality control measures designed to maintain pre-development drainage characteristics and satisfy Lake Simcoe Region Conservation Authority (LSRCA) requirements. A HydroCAD model was developed to assess runoff quantity controls using the Rational Method and a 100-year design storm event.

Runoff from the development will be collected through a catchbasin network and directed to an underground stormwater storage system consisting of concrete box culverts measuring 2.4 m wide by 1.2 m high with a total storage length of approximately 156 m. The proposed underground storage system provides an effective storage volume of approximately 449 m³. An orifice plate will restrict discharge rates to pre-development levels prior to discharge to Musselman Lake through an underground outlet pipe. Hydrologic modelling indicates that the system can safely manage post-development flows during the 100-year storm event while maintaining the allowable release rate.

Water quality treatment will be provided through the installation of an Oil and Grit Separator (OGS) upstream of the outlet. The proposed OGS will be designed to achieve Enhanced Protection requirements by removing at least 80% of total suspended solids (TSS) prior to discharge. Detailed design and maintenance requirements for the treatment system will be confirmed during subsequent design phases.

Phosphorus management requirements for the Site include achieving no net increase in phosphorus loading to Musselman Lake. As full phosphorus removal cannot be achieved through conventional on-site stormwater management measures alone, phosphorus offsetting will be required in accordance with LSRCA's Phosphorus Offsetting Policy. The final phosphorus removal strategy, associated offsetting

requirements, and detailed stormwater treatment infrastructure will be developed during future design stages.

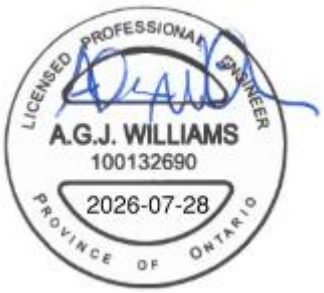
A site-wide water balance assessment has not yet been completed and will be undertaken during the detailed design phase once low impact development (LID) opportunities and additional hydrogeological information become available. Based on the preliminary stormwater analysis, the proposed underground storage, quantity controls, and water quality measures are expected to provide an effective stormwater servicing solution for the development.

## 7.2. CERTIFICATIONS AND SIGNATURES

Prepared by

Raphael de Mesa, EIT
Designer
rdemesa@envisionconsultants.ca

Reviewed by




Alex Williams, P.Eng.
Director – Land Development
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## 7.3. QUALIFIER

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The content and opinions contained in the report are based on the observations and/or information available to EnVision at the time of preparation, using investigation techniques and engineering analysis methods consistent with those ordinarily exercised by EnVision and other engineering/scientific practitioners working under similar conditions, and subject to the same time, financial and physical constraints applicable to this project.

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This limitations statement is considered an integral part of this report.

# APPENDIX A:

*Concept Plan of Subdivision*

# LEGACY II

## RE-IMAGINED

MIXED SIZE HOME SUBDIVISION PLAN
AFFORDABLE HOMES TO MODEST ESTATES

4 WYLIE LANE,
WHITCHURCH-STOUFFVILLE, ON L4A 7X3

57 ROSEHILL DR., STOUFFVILLE, ON, L4A 2Y3
E: JAMESTOTHENET@GMAIL.COM
P: (647) 987-7871

**eco lake homes**

| DATE: | SCALE: 3 : 1 | DRAWN BY: |
|---|---|---|
| FILE: | REV: | CHECKED BY: |

DRAWING TITLE: LEGACY II - SITE PLAN
DRAWING #: SP-1

## KEYS TO SUCCESSFUL 35-36 HOME PLAN

1. 17 METER ROAD ALLOWANCE (NOT 20) TOWN STILL ADOPTS ROAD
   JUSTIFICATION: NO TOWN WATER OR SEWERS REQUIRED, 20m NOT NEEDED
   RESULT: ADDS 2 LOTS AND 3 HOMES

2. FIRE FIGHTING TANKS UNDER TRAFFIC OVAL, AND STORM WATER INLINE WITH ROAD ALLOWANCE
   JUSTIFICATION: IT IS COMMON PRACTICE AND IS USED BY MANY TOWNS
   RESULT: SAVE 1 LARGE LOT (#1) 2 ADDITIONAL HOMES

3. CLUSTER HOMES
   2 ESTATE SIZE LOTS
   5 SMALL CONDO CLUSTER HOMES WITH COMMON PARKING

   JUSTIFICATION: OPPORTUNITY TO SAVE ON INFRASTRUCTURE AND BUILDING COST
   RESULTING IN 5-6 ADDITIONAL AFFORDABLE HOMES

* FINAL KEY, THIS PLAN ALLOWS LESS LOTS OF RECORD WHILE HELPING SEPTIC LOADING APPROVALS

4. USE NEW O.P.A ALLOWANCE FOR SHARED WELLS UP TO 5 HOMES PER WELL. PRIVATE ROAD PORTAL CONDO WILL MAINTAIN WELLS.

**LOT FABRIC - 2 WYLIE LANE - BLOCK 3 (LEGACY II - ECOLAKE HOME)**

| LOT # | FRONTAGE (m) | REAR YARD (m) | SIDE YARD(m) | SIDE YARD(m) | AREA (SQM) | AREA (SQFT) | LOT COVERAGE (%) |
|---|---|---|---|---|---|---|---|
| 1 | 21.50 | 12 | 13.46 | 2.4 | 963.80 | 10374.19 | 13.24 |
| 2 | 20.84 | 12 | 2.73 | 2 | 948.42 | 10208.73 | 19.90 |
| 3 | 16.39 | 12 | 3 | 2.4 | 590.52 | 6356.26 | 20.47 |
| 4 | 12.29 | 12 | 3 | 2.4 | 451.27 | 4857.41 | 15.16 |
| 5 | 17.55 | 12 | 3 | 2.4 | 681.00 | 7330.17 | 20.77 |
| 6 | 20.77 | 12 | 3 | 2.4 | 1634.26 | 17591.01 | 21.84 |
| 7 | 11.65 | 12 | 3 | 2.4 | 658.17 | 7084.51 | 21.81 |
| 8 | 12.02 | 12 | 3 | 2.4 | 781.53 | 8412.26 | 16.27 |
| 9 | 12.53 | 12 | 3 | 2.4 | 825.66 | 8887.27 | 20.06 |
| 10 | 21.33 | 12 | 3 | 2.4 | 1703.79 | 18339.46 | 19.70 |
| 11 | 10.11 | 12 | 3 | 2.4 | 1214.52 | 13072.95 | 13.46 |
| 12 | 10.28 | 12 | 3 | 2.4 | 1727.04 | 18589.68 | 19.69 |
| 13 | 16.05 | 12 | 3 | 2.4 | 930.53 | 10016.10 | 11.64 |
| 14 | 17.79 | 11 | 3 | 2.4 | 598.36 | 6440.63 | 10.50 |
| 15 | 13.84 | 11 | 3 | 2.4 | 841.27 | 9055.37 | 17.10 |
| 16 | 12 | 11 | 3 | 2.4 | 613.00 | 6598.30 | 15.42 |
| 17 | 14.6 | 11 | 3 | 2.4 | 704.08 | 7578.69 | 19.13 |
| 18 | 62.92 | 11 | 3 | 2.4 | 1202.23 | 12940.63 | 22.10 |
| | | | | TOTAL | 17069.43 | 183733.62 | |

# APPENDIX B:

*Domestic Water Demand Calculations*

EnVision Consultants Ltd. 2026-07-22

Legacy II Designed: M.S.

Project No.: 23-0462 Checked:

**Proposed Flows**

| Land Use | Block Area (ha) | Number of Residential Units | Population Density | Equivalent Population (persons) | Average Daily Consumption Rate | Average Daily Demand (L/s) | Max Day Peaking Factor | Max Day Demand (L/s) | Max Hour Peaking Factor | Max Hour Demand (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |
| | | | | | | | | | | |
| **PROPOSED DEVELOPMENT AREA** | | | | | | | | | | |
| Residential - Single Detached Dwelling | 31.00 | 35 | 3.2 persons/unit | 112 | 350 L/cap/day | 0.45 | 2.00 | 0.91 | 3.0 | 1.36 |
| | | | | | | | | | | |
| **Total** | *31.00* | *35* | | *112* | | *0.45* | | *0.91* | | *1.36* |

Notes:

1. Site statistics are based on the draft concept plan prepared by Eco Lake Homes, dated July 10, 2026
2. Population density, consumption rate pulled from the Town of Whitchurch-Stouffville Design Guidelines and Standard Drawings, dated January, 2023

# APPENDIX C:

*Fire flow Calculations*

EnVision Consultants Ltd.
2 Wylie Lane
Project No.: 23-0462

# Fire Flow Resevoir Design Sheet

Town of Whitchurch-Stouffville

2026-07-29
Designed: M.S.
Checked:

$$Q = KVS_{tot}$$

where Q = minimum required water supply (L)
K = water supply coeffcient
V = building volume ($m^3$)
$S_{tot}$ = total spatial coefficient

| Lot Number | Building Number | Building Dimensions | | | | | [4]Spatial Coefficient (S) | | | | | [5]K | Water Supply, Q (L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Length (m) | Width (m) | [3]Depth (m) | Volume ($m^3$) | Num. of Storeys | $S_1$ | $S_2$ | $S_3$ | $S_4$ | $S_{tot}$ | | |
| **1** | 1 | 11.6 | 11 | 2.25 | 861.3 | 3 | 0 | 0 | 0 | 0.5 | 0.5 | 18 | 7751.70 |
| | | | | | | | | | | | | | |
| **2** | 1 | 9.8 | 12.192 | 2.25 | 535.1215104 | 2 | 0 | 0.5 | 0.15 | 0.5 | 1.15 | 18 | 11077.02 |
| | | | | | | | | | | | | | |
| **3** | 1 | 5.0 | 9.5 | 2.25 | 213.75 | 2 | 0.15 | 0.5 | 0 | 0.5 | 1.15 | 18 | 4424.63 |
| | 2 | 5.0 | 12.5 | 2.25 | 281.25 | 2 | 0.15 | 0.5 | 0 | 0.5 | 1.15 | 18 | 5821.88 |
| | | | | | | | | | | | | | |
| **4** | 1 | 6.6 | 10 | 2.25 | 371.25 | 2.5 | 0.15 | 0.5 | 0 | 0.5 | 1.15 | 18 | 7684.88 |
| | | | | | | | | | | | | | |
| **5** | 1 | 5.7 | 13 | 2.25 | 333.45 | 2 | 0.15 | 0.5 | 0 | 0.5 | 1.15 | 18 | 6902.42 |
| | 2 | 5.7 | 13 | 2.25 | 333.45 | 2 | 0.15 | 0.5 | 0 | 0.5 | 1.15 | 18 | 6902.42 |
| | | | | | | | | | | | | | |
| **6** | 1 | 5.9 | 11.5 | 2.25 | 227.053125 | 1.5 | 0 | 0.5 | 0.5 | 0.5 | 1.5 | 18 | 6130.43 |
| | 2 | 7.6 | 10.9 | 2.25 | 186.39 | 1 | 0.5 | 0.5 | 0 | 0.5 | 1.5 | 18 | 5032.53 |
| | 3 | 6.2 | 10.9 | 2.25 | 228.0825 | 1.5 | 0.5 | 0.5 | 0 | 0.5 | 1.5 | 18 | 6158.23 |
| | 4 | 8.9 | 8.5 | 2.25 | 170.2125 | 1 | 0.5 | 0.5 | 0 | 0.5 | 1.5 | 18 | 4595.74 |
| | 5 | 12.0 | 6.7 | 2.25 | 361.8 | 2 | 0 | 0.5 | 0.5 | 0.5 | 1.5 | 18 | 9768.60 |
| | | | | | | | | | | | | | |
| **7** | 1 | 6.0 | 16.7 | 2.25 | 450.9 | 2 | 0 | 0.5 | 0 | 0.5 | 1 | 18 | 8116.20 |
| | | | | | | | | | | | | | |
| **8** | 1 | 18.9 | 7 | 2.25 | 595.35 | 2 | 0 | 0.5 | 0.5 | 0 | 1 | 18 | 10716.30 |
| | | | | | | | | | | | | | |
| **9** | 1 | 8.5 | 13.72 | 2.25 | 524.79 | 2 | 0 | 0.5 | 0 | 0.5 | 1 | 18 | 9446.22 |
| | | | | | | | | | | | | | |
| **10** | 1 | 11.0 | 5.5 | 2.25 | 136.125 | 1 | 0 | 0.5 | 0.5 | 0.5 | 1.5 | 18 | 3675.38 |
| | 2 | 6.7 | 11 | 2.25 | 331.65 | 2 | 0.5 | 0.5 | 0 | 0.5 | 1.5 | 18 | 8954.55 |
| | 3 | 6.7 | 11.5 | 2.25 | 173.3625 | 1 | 0.5 | 0.5 | 0 | 0.5 | 1.5 | 18 | 4680.79 |
| | 4 | 6.1 | 12 | 2.25 | 329.4 | 2 | 0.5 | 0.5 | 0.15 | 0.5 | 1.65 | 18 | 9783.18 |
| | 5 | 5.5 | 12.5 | 2.25 | 154.6875 | 1 | 0 | 0.5 | 0.5 | 0.35 | 1.35 | 18 | 3758.91 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| **11** | 2 | 16.7 | 9.75 | 2.25 | 732.7125 | 2 | 0 | 0.5 | 0 | 0.5 | 1 | 18 | 13188.83 |
| | | | | | | | | | | | | | |
| **12** | 1 | 18.9 | 6 | 2.25 | 510.3 | 2 | 0 | 0.35 | 0 | 0.5 | 0.85 | 18 | 7807.59 |
| | 2 | 18.9 | 6 | 2.25 | 510.3 | 2 | 0 | 0.5 | 0 | 0.5 | 1 | 18 | 9185.40 |
| | 3 | 20.4 | 6 | 2.25 | 550.8 | 2 | 0 | 0.5 | 0 | 0.5 | 1 | 18 | 9914.40 |
| | | | | | | | | | | | | | |
| **13** | 1 | 8.5 | 10 | 2.25 | 382.5 | 2 | 0.15 | 0 | 0 | 0.5 | 0.65 | 18 | 4475.25 |
| | | | | | | | | | | | | | |
| **14** | 1 | 7.9 | 7.92 | 2.25 | 282.2688 | 2 | 0 | 0.5 | 0.5 | 0 | 1 | 18 | 5080.84 |
| | | | | | | | | | | | | | |
| **15** | 1 | 5.8 | 11.5 | 2.25 | 300.15 | 2 | 0 | 0.5 | 0 | 0.5 | 1 | 18 | 5402.70 |
| | 2 | 5.8 | 14.6 | 2.25 | 381.06 | 2 | 0 | 0.5 | 0 | 0.5 | 1 | 18 | 6859.08 |
| | | | | | | | | | | | | | |
| **16** | 1 | 6.6 | 14.3 | 2.25 | 424.71 | 2 | 0 | 0.5 | 0 | 0.5 | 1 | 18 | 7644.78 |
| | | | | | | | | | | | | | |
| **17** | 1 | 8.9 | 15.25 | 2.25 | 607.33125 | 2 | 0 | 0.5 | 0 | 0.5 | 1 | 18 | 10931.96 |
| | | | | | | | | | | | | | |
| **18** | 1 | 5.2 | 18.29 | 2.25 | 427.986 | 2 | 0 | 0.5 | 0 | 0.5 | 1 | 18 | 7703.75 |
| | 2 | 5.2 | 18.29 | 2.25 | 427.986 | 2 | 0 | 0.5 | 0 | 0.5 | 1 | 18 | 7703.75 |
| | 3 | 6.3 | 13.72 | 2.25 | 385.875 | 2 | 0 | 0 | 0 | 0.5 | 0.5 | 18 | 3472.88 |
| | | | | | | | | | | | | ***Total*** | **240753.17** |

| [6]Minimum Water Supply Check | |
|---|---|
| Time (min) | 30 |
| Supply Provided, Q (L | 250000 |
| **L/min** | **8333.33** |

Notes:
1. Fire Flow Calculations per Office of the Fire Marshall (OFM) Fire Protection Water Supply Guidline (1999).
2. Site statistics are based on the site plan provided by Eco Lake Homes received July 10, 2026.
3. Assumed ceiling height of 8m.
4. S factor distances measured counterclockwise starting from roadside.
5. See Table 1 of OFM Fire Protection Water Supply Guidline.
6. See Table 2 of OFM Fire Protection Water Supply Guidline.