Northwest Yonge and Green Lane

Functional Servicing and Stormwater Management Report

February 2025

Submitted by:

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Submission History

Submission	Date	In Support Of	Distributed To
1st	February 2025	Community Design Plan Approval	Town of East Gwillimbury, York Region, Lake Simcoe and Region Conservation Authority, Northwest Yonge Green Lane Landowners Group Inc.

1.0 Introduction

SCS Consulting Group Ltd. has been retained by the Northwest Yonge Green Lane Landowners Group Inc. to prepare a Functional Servicing and Stormwater Management Report (FSSR) for a proposed development within the Green Lane Secondary Plan area (GLSP), located in the Town of East Gwillimbury, Ontario.

1.1 Purpose of the Functional Servicing and Stormwater Management Report

This FSSR has been prepared in support of a Community Design Plan (CDP) for the proposed development. The Community Design Plan is provided in **Appendix A**. The proposed development consists of the following land uses:

- low density residential,
- medium density residential,
- high density residential,
- commercial mixed-use,
- parks,
- open space,
- Sanitary pumping station,
- School blocks,
- SWM facility blocks,
- environmental protection blocks, and
- municipal roads.

The purpose of this report is to demonstrate that the development can be graded and serviced in accordance with the Town of East Gwillimbury, Lake Simcoe Region Conservation Authority (LSRCA), and the Ministry of Environment, Conservation and Parks (MECP) design criteria.

1.2 Study Area

The study area is approximately 118 ha in size and is bound by Green Lane West to the south, Yonge Street to the east, Green Belt boundaries to the west, and neighboring properties to the north (see **Figure 1.1**). The legal description of the lands is Part of Lots 101 and 102, Concession 1 W.Y.S.

The existing subject lands are comprised mostly of agricultural land and open space areas, the Northern Greens Golf Range, and Victory Baptist Church (Non-Participant) on Yonge Street. The proposed development is located within the East and West Holland River Watersheds in the Town of East Gwillimbury. Within the site there are several ephemeral water features draining into the Ansnorveldt Creek, tributary to the West Holland River. It is understood that these features originating inside of the development

are not required to be maintained. Ansnorveldt Creek begins as an ephemeral water feature originating from the neighboring lands north of the development and runs across the northwest corner of the site flowing southwestwardly. It is understood that this feature will need to be maintained, and an adequate watercourse crossing will be provided for the East-West Collector Road. It has been determined that the drainage area to the creek is less than 125 ha, and, therefore, there is no regulated floodplain. Several other ephemeral flow routes exist at the western portion of the site, draining into the creek. A provincially significant wetland (PSW) unit Wetland #27 exists on the northwest corner of the site and a shallow ravine CUW1 extends out of the greenbelt and into the site at the western boundary of the area (Beacon, 2016). See **Appendix B** for the Existing Natural, Cultural & Anthropogenic Features Figure (Beacon, 2016).

1.3 Background Information

In preparation of the servicing and stormwater management (SWM) strategies, the following design guidelines, standards, and approved drawings and reports were used:

- 2023 Water and Wastewater Master Plan Update (March 2024)
- Stream Permanency Assessment – Green Lane Property (January 2023)
- York Region Water and Wastewater Master Plan (August 2022)
- Lake Simcoe Conservation Authority (LSRCA) Technical Guidelines for Stormwater Management Submissions (April 2022)
- Green Lane Secondary Plan Master Environmental Servicing Plan (TMIG, 2018)
- Hydrogeological and Wellhead Protection Area Impact Assessment (Arcadis, February 2016)
- Report on Geotechnical Investigation (Toronto Inspection, June, 2015)
- Natural Heritage Inventory: Policy and Feature Boundary Review Green Lane Secondary Plan (GLSP), Town of East Gwillimbury (Beacon Environmental, January 2015)
- Town of East Gwillimbury Stormwater Management Master Plan Municipal Class Environmental Assessment (SWMMP) (November 2012)
- Town of East Gwillimbury Engineering Standards and Design Criteria (September 2012)
- Lake Simcoe Protection Plan (July 2009);
- Harvest Hill Subdivision (Minto) Engineering Drawings (Schaeffers & Associates Ltd.) (November 2005);
- Ministry of Environment (MOE) Stormwater Management Planning and Design Manual (March 2003);
- Green Lane West New Construction Engineering Drawings (York Region) (July 2002); and,
- Ministry of Transportation (MTO) Drainage Management Manual (1997).

Excerpts from the above listed documents are included in **Appendix B**.

2.0 Geotechnical and Hydrogeological Conditions

2.1 Soils

The soil classifications for the site were identified using the Ontario Soil Survey Complex from OMAFRA and land uses visible in recent aerial photography and site reconnaissance. The mapping identifies that the soils within the study limits are Schomberg Clay Loam for the eastern portion of the site and small parts along the western boundary of the site, and Bondhead Sandy Loam for generally the western portion of the site. According to the Design Flood Estimation Design Chart H2-6A, the Schomberg Clay Loam is considered as Hydrologic Soil Group C, and the Bondhead Sandy Loam as Hydrologic Soil Group AB. This is consistent with the Report on Geotechnical Investigation prepared by Toronto Inspection in June, 2015, which identifies Sandy Silt Till and Sandy Silt on the eastern portion of the site, and clayey silt on the south west portion of the site, which is a Hydrologic Soil Group AB/B and C respectively according to the MTO Drainage Management Manual (1997) Design Chart 1.08. The Soil Conservation Service Curve Numbers (CN) have been determined for the subject site. Refer to **Appendix B** for the soils mapping, excerpts from the Geotechnical Investigation (Toronto Inspection, June, 2015) and the calculations for the CN.

In the separate Hydrogeological and Wellhead Protection Area Impact Assessment by Arcadis in February 2016, have also completed in-situ rising head hydraulic conductivity testing in the monitoring wells, which found a range of infiltration rates from 0.002 m/day (0.083 mm/hr) at the south east corner of the study area, within the Soil Group C limit (BH-5) and 0.06 m/day (250 mm/hr) along the west side of the study area, within the Soil Group AB limit (BH-14 and BH-16). Refer to **Appendix B** for results of the infiltration testing.

2.2 Groundwater

Based on the groundwater levels collected by Arcadis in January 2015, the seasonal high groundwater levels are approximately 0.90 m to 2.38 m in depth below existing ground. Refer to **Appendix B** for excerpts from the Hydrogeological and Wellhead Protection Area Impact Assessment (Arcadis, 2016) including groundwater monitoring results. Further hydrogeological investigation is to be completed at the next stage of design in support of future Draft Plan of Subdivision applications.

3.0 Topography and Grading

3.1 Existing Conditions

3.1.1 Topography

Under existing conditions, the western part of the site falls westwards towards the Ansnorveldt Creek tributary to the West Holland River, while the eastern portion of the site falls eastwards towards the Yonge Street and Green Lane West rights-of-way (ROWs).

The existing topography has slopes in the range of 2% to 8%. The ground surface elevations through the study area range from approximately 266 m at the ephemeral water features at the west property line, to approximately 295m at a highpoint roughly in the center of the site. Refer to **Figure 3.1** for an illustration of the existing topography and drainage patterns for the site.

3.1.2 Floodplain

There is no regulated floodplain on the site as identified by the LSRCA.

3.2 Proposed Conditions

3.2.1 Site Grading

In general, the proposed development will be graded in a manner which will satisfy the following goals:

- Satisfy the Municipality lot and road grading criteria including:
  - Minimum Road Grade: 0.5%
  - Maximum Road Grade: 6.0%
  - Minimum Lot Grade: 2%
  - Maximum Lot Grade: 5%
- Provide continuous road grades for overland flow conveyance;
- Minimize the need for retaining walls;
- Minimize the volume of earth to be moved and minimize cut/fill differential;
- Minimize the need for rear lot catchbasins; and
- Achieve the stormwater management objectives required for the proposed development.

A preliminary grading plan is provided on **Figure 3.2**

Transition grading has been proposed where required, beyond the limit of development and into the Greenbelt areas clear of any key natural heritage features, to the extent possible, to avoid the use of retaining walls. The ephemeral features originating from the site flowing northward are not to be maintained.

Portions of the grading north of the East-West collector road corridor will extend into the neighboring properties to the north at the watercourse crossing and for approximately 550 m west of the Yonge Street intersection. In the event this would not be permitted, retaining wall options may be explored at the next stage of design.

At the detailed design stage, the preliminary grading shown on **Figure 3.2** will be subject to a more in-depth analysis in an attempt to balance the cut and fill volumes and minimize slopes and walls.

3.3 Erosion and Sediment Control During Construction

During the detailed design stage, erosion and sediment control measures will be designed with a focus on erosion control practices (such as stabilization, track walking, staged earthworks, etc.) as well as sediment controls (such as fencing, mud mats, catchbasin sediment control devices, rock check dams and temporary sediment control ponds). These measures will be designed and constructed as per the Technical Guideline for Stormwater Management Submissions (LSRCA, April 2022). A detailed erosion and sediment control plan will be prepared for review and approval by the Town of East Gwillimbury and LSRCA prior to any proposed grading being undertaken. This plan will address phasing, inspection and monitoring aspects of erosion and sediment control. All reasonable measures will be taken to ensure sediment loading to the adjacent watercourses and properties are minimized both during and following construction.

4.0 Storm Drainage and Servicing

4.1 Existing Conditions

4.1.1 Storm Drainage

The subject lands are located in the East and West Holland River subwatersheds within the Lake Simcoe watershed. As shown on **Figure 3.1**, the existing site exhibits split drainage, with the majority of runoff flowing East to West via sheet drainage towards Ansnorveldt Creek, tributary of West Holland River and ultimately into Cook's Bay and Lake Simcoe.

Runoff from 67.75 ha of land (Catchment 1101) currently drains west via sheet drainage into the provincially significant wetland at Ansnorveldt Creek cutting across the catchment. The land use of this area consists of cultivated cropland, a wetland area, portions of a golf range, meadow, and woodlot.

Runoff from 11.33 ha of land (Catchment 1201) currently drains southwest via sheet flow and agricultural swales, ultimately to West Holland River. The land use of this area consists of a mix of cropland and woodlot.

Runoff from 37.80 ha of land (Catchment 1301) currently drains southeast via sheet drainage into the existing roadside ditches along Yonge Street and Green Lane West, which ultimately drain into the Regional storm sewer on Green Lane West. The land use of this area consists of cropland, low intensity residential, woodlot, institutional, and portions of the golf range. Allowable Peak release rates have been set out by the Town of East Gwillimbury Stormwater Management Master Plan Municipal Class Environmental Assessment (SWMMP) (November 2012) for this catchment.

Runoff from 0.89 ha of land (Catchment 1401) currently drains north via sheet drainage into the neighboring property and into a tributary of the East Holland River. This area consists mainly of woodlot, with some existing cropland.

The site also receives external drainage from 32.23 ha of neighbouring lots (Catchment EXT-1) north of the subject lands, consisting of woodland and cultivated area.

4.1.2 Storm Servicing

There are two existing storm sewers along Green Lane West from the highpoint at the intersection of Green Lane West at Woodspring Avenue. The run of storm sewer draining westward outlets into an existing SWM pond southeast of the Bathurst Street and Green Lane West intersection. The run of storm sewers draining eastwards currently receives the runoff from the roadside ditches along Green Lane West and Yonge Street via ditch inlets and a 300 mm diameter catchbasin lead. Runoff from the

existing Catchment 1301 drains into the Green Lane West and Yonge Street road side ditches prior to entering the eastward existing storm sewer. No storm sewers currently exist along Yonge Street north of the Green Lane West intersection.

4.2 Proposed Storm Drainage

The proposed drainage areas and imperviousness are shown on **Figure 4.1**. The imperviousness of each catchment was determined based on anticipated zoning. Refer to **Appendix C** for calculations.

Conveyance and End-of-Pipe Drainage

All storm flows up to the 100 year storm event are to be controlled onsite to the extent possible, topography permitting. The storm flows from the west portion of the site will outlet ultimately to the West Holland River via overland flow (refer to Outlet 1 and Outlet 2 on **Figure 4.1**). Storm runoff from the eastern portion of the site will outlet ultimately to the East Holland River (refer to Outlet 3 and Outlet 4 on **Figure 4.1**) via the existing storm sewers along Green Lane West and proposed storm sewers along Yonge Street. See **Section 5.4** for allowable release rates.

The SWM facilities draining to Outlet 1 include the North Pond which controls flows from the proposed development lands (Catchment 2101) and a small external drainage area from Green Lane West (Catchment 2106), and the superpipe which controls flows from Catchment 2102. Uncontrolled overland flows from Catchment 2103, 2104, and 2105 have been identified due to grading constraints. Catchment 2107 includes lands designated for the western portion of the East-West Collector Road. The stormwater management controls for this catchment will be provided at the downstream (west) end of the collector road in future design stages by others.

The SWM facilities will attenuate flows to Outlet 1 such that the controlled and uncontrolled peak flows from the Catchments 2101 to 2107 are below the allowable release rate to Outlet 1; and that no adverse effects are observed in the downstream nodes.

The SWM facilities draining to Outlet 2 consists of the Southwest Pond which controls flows from the proposed development lands (Catchments 2201 and 2203) and a small external drainage area from Green Lane West (Catchment 2204). Uncontrolled overland flows from Catchment 2202 have been identified at the rear lots of some split draining lots. The SWM facility will attenuate flows to Outlet 2 such that the controlled and uncontrolled peak flows from the Catchments 2201, 2202, 2203 and 2204 are below the allowable release rate to Outlet 2; and that no adverse effects are observed in the downstream nodes.

The SWM facilities for Outlet 3 consist of both private and municipal SWM facilities. The Southeast Pond controls flows from the proposed development lands (Catchments 2301 and 2305) and a small external drainage area from Green Lane West (Catchment 2306). Catchments 2302, 2304 and 2307 represent mixed used and high density private development blocks which will provide private on-site stormwater management controls, outletting to Yonge Street. Due to grading constraints, minor and major system flows from Catchment 2303 will drain uncontrolled to the proposed storm sewer on Yonge Street. The SWM facilities will attenuate flows to Outlet 3 such that the controlled and uncontrolled peak flows from Catchments 2301 to 2307 are below the allowable peak release rates to Outlet 3.

Catchment 2401 will drain uncontrolled to Outlet 4. This catchment consists of the 3:1 slope along portions of the East-West Collector Road right-of-way at the northern boundary of the site. Given that the area north of the site is expected to be developed in the future, no stormwater management is proposed for this catchment.

Table 4.1: Outlet & Catchment Breakdown

Outlet	Controlled Catchment	Uncontrolled Catchment
Outlet 1	2101, 2102, 2106, 2107	2103, 2104, 2105
Outlet 2	2201, 2203, 2204	2202
Outlet 3	2301, 2302, 2304, 2305, 2306, 2307	2303
Outlet 4	None	2401

4.2.1 Minor System

The storm sewer system (minor system) will be designed for the 5 year return storm as per the Town of East Gwillimbury standards. Sewers downstream of the overland flow capture points identified throughout the site are to be sized appropriately for the additional flow greater than the 5 year return period that is required to be captured. The storm sewers are proposed to drain towards each of the five (5) proposed Stormwater Management (SWM) facilities, as outlined above and further below in **Section 5.4**.

The storm sewer system will typically be designed with grades between 0.5% and 2%. Throughout the proposed development, the Town's design criteria requires that storm sewer be constructed at a minimum depth of 2.7m from the centerline of the road; though a deeper depth of 3.3 m has been assumed to accommodate foundation drains.

While it is anticipated that storm sewers will be deep enough to service foundation drains by gravity, sump pumps have been identified to be required for ten (10) lots located within Catchment 2102 due to the hydraulic grade line associated with the proposed superpipe storage system.

The preliminary layout for the proposed storm sewer within the subject lands is provided on the Preliminary Servicing Plan, **Figure 4.2**.

The storm drainage system will be designed in accordance with the Town of East Gwillimbury and MECP guidelines, including the following:

- Pipes to be sized to accommodate runoff from a 5 year storm event,
- Minimum Pipe Size: 300 mm diameter,
- Maximum Flow Velocity: 6.0 m/s,
- Minimum Flow Velocity: 0.8 m/s,
- Minimum Pipe Depth: 2.7 m to obvert per Town's design criteria (Note: a minimum depth of 3.3 m has been used to accommodate gravity connection of foundation drains).

4.2.2 Major System

Major system flows (greater than the 5 year up to the 100 year storm event) will either be conveyed within the road rights-of-way to the SWM facilities and or captured at major system capture points identified on the Proposed Storm Drainage Plan and the Preliminary Servicing Plan, **Figures 4.1** and **4.2**. Standard municipal right-of-way cross-section geometries are proposed for the site.

While all efforts to contain flows within the proposed site were made, uncontrolled overland flows from small boundary areas of the site are required due to site topography. Therefore, the SWM facilities will provide over-control, where appropriate, to ensure the quantity control criteria is satisfied.

The right-of-way within Catchment 2101 at the North Pond inlet is unable to accommodate the entire 100 year major system flows. Therefore, additional major system capture points have been identified at upstream locations such that the major system flows can be conveyed within the proposed road right-of-way. Other major system capture points are proposed within the low points in Catchment 2101, Catchment 2102, and Catchment 2201 to facilitate conveying flows to their respective SWM facilities. See **Appendix D** for right-of-way capacity calculations.

5.0 Stormwater Management

5.1 Stormwater Management Criteria

The following stormwater management criteria have been established based on the greatest requirements of each of the design guidelines and standards listed in **Section 1.3**, discussions with LSRCA and previous reports. The stormwater management criteria are summarized below in **Table 5.1**.

Table 5.1: Stormwater Management Criteria

Criteria	Control Measure
Quality Control	Total Suspended Solids (TSS): Provide an "Enhanced" level of protection in accordance with Ministry of Environment (MOE) Stormwater Management Planning and Design Manual (2003) with a minimum 80% Total Suspended Solids (TSS) removal. Phosphorus: Per Lake Simcoe Protection Plan, a Phosphorus Loading Study is to be done to determine the existing and proposed phosphorus loading rates. Per the Lake Simcoe Phosphorus Offsetting Policy (2023), control post-development phosphorus loadings to pre-development levels with offsetting required for any exceedance of pre-development levels. (LSRCA)
Erosion Control	Detention of the 25 mm rainfall runoff for a minimum of 24 hours. (LSRCA)
Water Budget	As the north east portion of the site is within a Wellhead Protection Area (WHPA) D, and the majority of the site is situated on Highly Vulnerable Aquifers identified by the LSRCA, maintain the existing water budget through the use of best management practices such as Low Impact Development measures. (SGBLS SPP). An evaluation of anticipated water balance changes between existing and proposed condition must also be conducted, and a plan detailing how changes will be minimized must be provided. Detailed water budget will be provided upon availability of updated groundwater data at the next stage of design.

Criteria	Control Measure
Quantity Control	West Holland River Tributaries: Catchments tributary to West Holland River require proposed conditions peak flows be controlled to existing peak flows for the 2 through 100 year storm events, and such that no adverse effects are observed at the downstream nodes per the Visual Otthymo model obtained from the MESP (TMIG, 2018). East Holland River Tributaries: Catchments tributary to the East Holland River require proposed conditions peak flows be controlled to unitary rates established within the Town of East Gwillimbury Stormwater Management Master Plan (November 2012)
Volume Control	Proposed runoff volume from a 25 mm rainfall event over the total impervious area shall be captured and retained/treated on-site or in accordance with LSRCA's Flexible Treatment guidelines if full compliance with the 25mm guideline is not possible. (LSRCA)

5.2 Proposed Stormwater Management Plan

In accordance with the Ministry of Environment, Conservation and Parks Stormwater Management Planning and Design Manual (2003), a review of stormwater management best practices was completed using a treatment train approach, which evaluated lot-level, conveyance system and end-of-pipe alternatives.

The following study area characteristics and constraints are to be taken into consideration:

- The topography is split draining, with portions draining westwards to the West Holland River and portions draining eastwards towards the existing roadside ditch along Yonge Street and Green Lane West and ultimately towards the East Holland River.
- Based on the Geotechnical investigation, study area soils consisted of silty sand and clayey silt soils;
- A rising head hydraulic conductivity test was conducted and indicates that the native soils have an average hydraulic conductivity ranging from 0.002 to 0.06 mm/day; and,
- Within the installed site wells, groundwater was observed at depths ranging between 0.90 to 2.38 m below existing grade.

The proposed SWM Plan will include a treatment train of the following LID measures and SWM controls:

- Infiltration Trenches/Rear Yard Infiltration Trenches/Catchbasin Infiltration/Catchbasin Filtration;
- Superpipe;
- Bioswales/Rain Gardens;
- Manufactured Treatment Device - Oil/Grit Separator/Filtration Type OGS (i.e. Jellyfish, HydroDome, or approved equivalent);
- End-of-Pipe SWM Pond; and,
- End-of-Pipe Underground Storage.

Refer to **Sections 5.3** and **5.5** to **5.10** below for additional information on LID measures and end-of-pipe SWM facilities, respectively.

5.3 Low Impact Development Measures

Low Impact Development (LID) measures provide reduction of runoff and promote infiltration at the source. Each type of LID measure has the potential to provide phosphorous removal, volume control, and water budget benefits in order to aid in attaining the following design targets:

- Phosphorus Removal – Reduce post-development phosphorus loading to the extent possible;
- Volume Control – On-site retention of 25 mm runoff from new or fully constructed impervious areas, with flexible treatment alternatives for sites with restrictions; and
- Water Balance – measures to minimize impacts on the water balance will be incorporated into the development design where feasible.

Hydrogeological data collection is underway. Following the collection and processing of the data, including the seasonal high and spring freshet, LID types and locations will be evaluated for suitability according to the groundwater conditions. This evaluation will occur at the draft plan approval stage. Several options are listed below for LIDs to be considered at the next planning stage. The LID measures to be considered for the development at the draft plan approval stage include:

- Infiltration Trenches
- Rear yard Infiltration Trenches
- Catchbasin Filtration
- Bioswales/Rain Gardens

5.3.1 Manufactured Treatment Device (MTD)

The MTDs, specifically Imbrium Jellyfish stormwater filters have been sized for Catchment 2102 for a minimum of 80% TSS removal (refer to **Appendix E** for sizing reports) to achieve an "Enhanced" level of quality control. The Jellyfish stormwater filters are capable of capturing 89% of TSS load and 77% of TP from influent flows.

5.4 Allowable Release Rates

Control of post-development flows to pre-development levels is required for the 2 through 100 year storm events for catchments draining to the West Holland River. For catchments draining to the East Holland River, post-development flows are to be controlled to the allowable release rates determined using the unitary release rates established in the Town of East Gwillimbury Stormwater Management Master Plan Class Environmental Assessment (SWMMP) (Cole, November 2012). The subcatchments receiving the flows of the site from each of the outlets are summarized in **Table 5.2**.

Table 5.2: SWMMP (2012) Subcatchment and Outlet Breakdown

SWMMP Subcatchments	Outlets
418	Outlet 1
416	Outlet 2
224	Outlet 3
228	Outlet 4

For Outlet 1 and 2, draining to the West Holland River, additional stormwater management modelling based on the Visual Otthymo model included in the MESP report (TMIG, 2018), has been conducted in order to confirm that there will be no negative impacts to hydrologic nodes downstream of Outlet 1 and 2 when post-to-pre control is implemented.

For Outlet 3and 4, draining to the East Holland River, unitary release rates were utilized to overcontrol proposed flows. While unitary release rates were specified for Subcatchment 418, 416, and 228, no unitary release rates were specified for Subcatchment 224. Per the MESP, the release rate for Outlet 3 is to be controlled to the unitary release rate specified for the next downstream subcatchment – Subcatchment 226. The unitary release rates were applied in the same manner as in the MESP. Refer to **Appendix B** for excerpts from both the SWMMP and the MESP.

5.4.1 Allowable Release Rates – West Holland River

The allowable release rates for each of the catchments draining to the West Holland River are to be controlled to the existing condition runoff rates. This includes Outlet 1 and Outlet 2 identified on the Storm Drainage Plan (**Figure 4.1**). The existing peak flow rates for the 2 through 100 year storm events have been established utilizing the Visual Otthymo Version 6.2 software (VO6) based on the 4-hour Chicago, 12-hour SCS Type II, and 24-hour SCS Type II Distribution methods. IDF rainfall information was obtained from the Town of East Gwillimbury Engineering Standards and Design Criteria (September 2012).

The 4-hour Chicago, 12-hour SCS Type II, 24-hour SCS Type II design storms per LSRCA and Town of East Gwillimbury requirements were modelled for the proposed conditions hydrology model. The proposed peak release rates are to be controlled to the pre-development peak flow rates tabulated in **Tables 5.3** and **5.4**.

Table 5.3: Summary of Existing Flows – Outlet 1[1]

Return Period Storm	4-hour Chicago Storm (m^3/s)	12-hour SCS Type II Storm (m^3/s)	24-hour SCS Type II Storm (m^3/s)
2 Year	0.219	0.622	0.361
5 Year	0.411	1.090	0.610
10 Year	0.565	1.506	0.844
25 Year	0.737	1.978	1.112
50 Year	0.980	2.458	1.331
100 Year	1.130	2.728	1.446

[1] Subcatchment 418 from SWMMP

Table 5.4: Summary of Existing Flows – Outlet 2[1]

Return Period Storm	4-hour Chicago Storm (m^3/s)	12-hour SCS Type II Storm (m^3/s)	24-hour SCS Type II Storm (m^3/s)
2 Year	0.114	0.380	0.223
5 Year	0.231	0.672	0.377
10 Year	0.322	0.930	0.522
25 Year	0.426	1.222	0.686
50 Year	0.595	1.520	0.820
100 Year	0.699	1.688	0.890

[1] Subcatchment 416 from SWMMP

5.4.2 Allowable Release Rates – East Holland River

The allowable peak release rates for each of the catchments draining to the East Holland River are based on the unitary release rate for each of the outlets identified on Figure 4-5 within the SWMMP (refer to **Appendix B** for SWMMP excerpts). This includes Outlet 3 and Outlet 4 identified on the Storm Drainage Plan (**Figure 4.1**). The sum of uncontrolled overland flows and controlled SWM facility release rates to each outlet are to be controlled to the allowable peak flow rates for each of the outlets.

Outlet 3 is located within Catchment 224 within the SWMMP, however, the SWMMP did not provide unitary release rates for Catchment 224. Consistent with the approach taken in the MESP (TIMG, 2018), unitary release rates for Catchment 226, which was identified to have an area of 237.60 ha, were utilized for Outlet #3. This outlet discharges to the 900 mm diameter concrete storm sewer under Green Lane West, draining eastwards. The existing area from the site draining towards Outlet 3 consists of Catchment 1301 identified on the Existing Storm Drainage Plan (**Figure 3.1**), which has an area of 37.80 ha. Refer to **Table 5.5** for the unitary release rates breakdown.

Table 5.5: Summary of Existing Flows – Outlet 3[1]

Return Period Storm	SWMMP Qpost (post-to-pre) (m^3/s)	Unitary Peak Flow Rate ($m^3/s/ha$)	Allowable Peak Release Rate (m^3/s)
2 Year	1.097	0.005	0.175
5 Year	1.719	0.007	0.273
10 Year	2.200	0.009	0.350
25 Year	2.854	0.012	0.454
50 Year	3.434	0.014	0.546
100 Year	4.024	0.017	0.640

[1] Subcatchment 226 from SWMMP

Outlet 4 is located within the Catchment 228 within the SWMMP, which was identified to have an area of 310.54 ha. This outlet drains towards the neighboring properties north of the development site. The existing area from the site draining towards Outlet 4 consists of Catchment 1401 identified on the Existing Storm Drainage Plan (**Figure 3.1**), which has an area of 0.89 ha. Refer to **Table 5.6** for the unitary release rates breakdown.

Table 5.6: Summary of Existing Flows – Outlet 4[1]

Return Period Storm	SWMMP Qpost (post-to-pre) (m^3/s)	Unitary Peak Flow Rate ($m^3/s/ha$)	Allowable Peak Release Rate (m^3/s)
2 Year	0.727	0.002	0.002
5 Year	1.476	0.005	0.004
10 Year	1.906	0.006	0.005
25 Year	2.492	0.008	0.007
50 Year	3.011	0.010	0.009
100 Year	3.655	0.012	0.010

[1] Subcatchment 224 from SWMMP

A summary of modelling parameters and an existing VO6 schematic are provided in **Appendix C** along with digital modelling files included with the submission of this report.

5.5 North Pond Operating Characteristics

The proposed SWM Facility (SWMF) for Outlet 1 is a wet SWM pond (North Pond), and is located at the west side of Catchment 2101. The North Pond is located partially within the Green Belt boundary, as shown on **Figure 5.1**. The facility will outlet overland to Ansnorveldt Creek, a tributary to the West Holland River. The North Pond has been sized for a total drainage area of 61.41 ha assuming an imperviousness of 66%. Refer to **Appendix C** for impervious calculations.

5.5.1 Quality Control

The function of the permanent pool is to provide quality control by removing sediment from the storm runoff conveyed to the SWM facility. The North Pond is designed to provide permanent pool storage of 215.8 m^3/ha based on MECP's Enhanced Level Protection for a wet pond having a 66% impervious drainage area. The required permanent pool volume for the North Pond is 10,798 m^3 based on a total developed area draining to the pond of 61.41 ha, while the available permanent pool storage is 12,658 m^3. Refer to **Figure 5.1** and calculations in **Appendix E**.

5.5.2 Erosion Control

The attenuation of the extended detention volume in the pond will provide erosion protection for the downstream watercourse as well as promote sediment removal for water quality. The extended detention volume for the proposed stormwater management facilities is sized based on the detention of the 25 mm - 4 hour Chicago rainfall event. The volume calculated for the extended detention will be attenuated for a

minimum of 24 hours. The required extended detention volume for the North Pond is 7,173 m^3 (see **Appendix E**). This volume is greater than the 2003 MOE guidelines minimum extended detention volume of 40 m^3/ha or 2,456 m^3 based on the 61.41 ha drainage area.

The calculations for the extended detention component of the North Pond and orifice sizing calculations are provided in **Appendix E**, with hydrologic modelling provided in **Appendix C**. Details will be provided at the detailed design stage.

5.5.3 Quantity Control

The North Pond will control post-development peak flows from Catchment 2101 and 2106 such that the sum of peak flows draining to Outlet 1 (Catchments 2101 to 2106) will be controlled to existing peak flow rates for the 2 to 100 year storm events, provided in **Table 5.3**. Proposed hydrologic modelling was completed using the Visual Otthymo model (Version 6.2) to determine the required North Pond active volume. Refer to the file download link provided in **Appendix C** to download the VO hydrology model files.

The 4-hour Chicago, 12-hour SCS Type II, 24-hour SCS Type II design storms per LSRCA and Town of East Gwillimbury requirements were modelled for the proposed conditions hydrology model. A summary of the resulting storage requirements for the North Pond is provided in **Table 5.7.**

Table 5.7: SWM Facility Storage Requirements – North Pond

Storm Distribution	4-Hour Chicago		12-Hour SCS Type II		24-Hour SCS Type II	
Return Period Storm	Discharge (m^3/s)	Storage (m^3)	Discharge (m^3/s)	Storage (m^3)	Discharge (m^3/s)	Storage (m^3)
2 Year	0.156	9,286	0.174	11,158	**0.180**	**11,926**
5 Year	0.195	13,490	0.243	15,676	**0.271**	**16,368**
10 Year	0.269	16,341	0.425	18,461	**0.474**	**19,384**
25 Year	0.434	18,625	0.562	21,612	**0.611**	**23,086**
50 Year	0.569	21,808	0.667	24,967	**0.699**	**26,182**
100 Year	0.636	23,892	0.716	26,877	**0.739**	**27,812**

Note: Bold values indicate the more conservative (higher) proposed storage volumes

5.5.4 General SWM Facility Design Criteria

Preliminary grading for the North Pond is provided on **Figure 5.1**. The pond block size was established based on the following general criteria obtained from the Municipal Design Criteria from the Town of East Gwillimbury:

- A 3 m wide strip of maximum 4% crossfall will be provided around the property boundary of the SWM block for the purposes of grass cutting;
- A 3 m wide maintenance access road will be provided from a proposed municipal road with a maximum longitudinal slope of 10% and a crossfall of 2% (max). It will be used to facilitate machinery to access the forebay during scheduled maintenance as well as to access the outlet structure for maintenance purposes;
- A maximum slope of 4:1 from the pond bottom to 0.5 m below the normal water level will be provided;
- A maximum slope of 7:1 from 0.5 m below and above the normal water level will be provided; and,
- A maximum slope of 4:1 will be provided from 0.5 m above the normal water level to the pond grading limits.
- A maximum slope of 3:1 will be provided from the outside of the earth berm to the top of berm where required.

5.6 Southwest Pond Operating Characteristics

The proposed SWM Facility (SWMF) for Outlet 2 is a wet SWM pond (Southwest Pond), and will be located at the west side of Catchment 2201 within the Greenbelt boundary, as shown on **Figure 5.2**. The facility will outlet overland to the Ansnorveldt Creek tributary to the West Holland River. The SWM facility has been sized for a total drainage area of 15.67 ha assuming an imperviousness of 72%.

Refer to **Appendix C** for the impervious calculations.

5.6.1 Quality Control

The function of the permanent pool is to provide quality control by removing sediment from the storm runoff conveyed to the SWM facilities. The Southwest Pond will be designed to provide a permanent pool storage of 228.5 m^3/ha based on MECP's Enhanced Level Protection for a wet pond having a 72% impervious drainage area. The required permanent pool volume for the Southwest Pond is 2,955 m^3 based on a total developed area draining to the pond of 15.67 ha, while the available permanent pool storage is 3,160 m^3. (see **Figure 5.2** and calculations in **Appendix E**).

5.6.2 Erosion Control

The attenuation of the extended detention volume in the pond will provide erosion protection for the downstream watercourse as well as promote sediment removal for water quality. The extended detention volume for the proposed stormwater management facilities will be sized based on the detention of the 25 mm - 4 hour Chicago rainfall event. The volume calculated for the extended detention will be attenuated for a minimum of 24 hours. The required extended detention volume for the Southwest Pond is 2,083 m^3 (see **Appendix E**). This volume is greater than the 2003 MOE guidelines minimum extended detention volume of 40 m^3/ha or 627 m^3 based on the 15.67 ha drainage area.

The calculations for the extended detention component of the proposed stormwater management facility and orifice sizing calculations are provided in **Appendix E**, with hydrologic modelling provided in **Appendix C**. Details will be provided at the detailed design stage.

5.6.3 Quantity Control

The Southwest Pond will control post-development flows from Catchments 2201, 2203 and 2204 such that the sum of peak flows draining to Outlet 2 (Catchments 2201 to 2204) will be controlled to existing peak flow rates for the 2 to 100 year storm events, provided in **Table 5.4**. Proposed hydrologic modelling was completed using the Visual Otthymo model (Version 6.2) to determine the required active storage volume. Refer to the secure link provided in **Appendix C** to download the VO hydrology model files.

The 4-hour Chicago, 12-hour SCS Type II, 24-hour SCS Type II design storms per LSRCA and Town of East Gwillimbury requirements were modelled for the proposed conditions hydrology model. A summary of the resulting storage requirements for the Southwest Pond is provided in **Table 5.8**.

Table 5.8: SWM Facility Storage Requirements - Southwest Pond

Storm Distribution	4-Hour Chicago		12-Hour SCS Type II		24-Hour SCS Type II	
Return Period Storm	Discharge (m^3/s)	Storage (m^3)	Discharge (m^3/s)	Storage (m^3)	Discharge (m^3/s)	Storage (m^3)
2 Year	0.025	2,855	0.027	3,510	**0.028**	**3,744**
5 Year	0.029	4,068	0.038	4,882	**0.042**	**5,078**
10 Year	0.039	4,916	0.055	5,838	**0.059**	**6,135**
25 Year	0.054	5,741	0.067	6,927	**0.071**	**7,370**
50 Year	0.066	6,824	0.076	8,034	**0.079**	**8,378**
100 Year	0.072	7,473	0.081	8,650	**0.082**	**8,902**

Note: Bold values indicate the more conservative (higher) proposed storage volumes

5.6.4 General SWM Facility Design Criteria

Preliminary SWM facility grading is provided on **Figure 5.2**. The pond block size was established based on the following general criteria obtained from the Municipal Design Criteria from the Town of East Gwillimbury:

- A 3 m wide strip of maximum 4% crossfall will be provided around the property boundary of the SWM block for the purposes of grass cutting;
- A 3 m wide maintenance access road will be provided from a proposed municipal road with a maximum longitudinal slope of 10% and a crossfall of 2% (max). It will be used to facilitate machinery to access the forebay during scheduled maintenance as well as to access the outlet structure for maintenance purposes;
- A maximum slope of 4:1 from the pond bottom to 0.5 m below the normal water level will be provided;
- A maximum slope of 7:1 from 0.5 m below and above the normal water level will be provided;
- A maximum slope of 4:1 will be provided from 0.5 m above the normal water level to the pond grading limits; and,
- A maximum slope of 3:1 will be provided from the outside of the earth berm to the top of berm where required.

5.7 Superpipe Operating Characteristics

Catchment 2102 will be controlled for erosion and quantity control by a 3.0 x 2.4 m concrete box superpipe within the road right-of-way, with a total volume of 2,139 m^3

provided. Refer to **Figure 5.3** and the Preliminary Servicing Plan, **Figure 4.2** for the location and preliminary details of the superpipe storage system.

5.7.1 Quality Control

In order to achieve the 80% TSS removal target required for the Level 1 Enhanced protection level set out by the Ministry of Environment, an Imbrium Jellyfish filter JF8-9-2 capable of 80% TSS removal is to be provided downstream of the superpipe. The Jellyfish Filter is to be provided in a 3-Maintenance Hole off-line configuration in order to reduce maintenance and maximize life expectancy on the filters. See **Appendix E** for Jellyfish filter sizing calculations and specification.

5.7.2 Erosion Control

The attenuation of the extended detention volume in the superpipe will provide erosion protection for the downstream watercourse as well as promote sediment removal for water quality. The extended detention volume for the proposed stormwater management facilities will be sized based on the detention of the 25 mm - 4 hour Chicago rainfall event. The volume calculated for the extended detention will be attenuated for a minimum of 24 hours. The required extended detention volume for Catchment is 586 m^3 (see **Appendix E**). This volume is greater than the 2003 MOE guidelines minimum extended detention volume of 40 m^3/ha or 179 m^3 based on the 4.47 ha drainage area.

The calculations for the extended detention component of the proposed stormwater management facility and orifice sizing calculations are provided in **Appendix E**, with hydrologic modelling provided in **Appendix C**. Details will be provided at the detailed design stage.

5.7.3 Quantity Control

The proposed superpipe will control proposed 2 - 100 year flows from the site to the existing peak flow rates. Proposed hydrologic modelling was completed using the VO6 model to determine the required detention storage volume. Refer to the secure link provided in **Appendix C** to download the VO6 hydrology model files. A summary of the resulting storage requirements for the superpipe is provided in **Table 5.9.**

Table 5.9: Underground Storage System Storage Requirements - Superpipe

Storm Distribution	4-Hour Chicago		12-Hour SCS Type II		24-Hour SCS Type II	
Return Period Storm	Discharge (m^3/s)	Storage (m^3)	Discharge (m^3/s)	Storage (m^3)	Discharge (m^3/s)	Storage (m^3)
2 Year	0.014	770	0.014	907	**0.015**	**940**
5 Year	0.016	1,164	0.028	1,288	**0.030**	**1,301**
10 Year	0.038	1,340	0.078	1,420	**0.094**	**1,451**
25 Year	0.081	1,425	0.179	1,555	**0.213**	**1,590**
50 Year	0.180	1,556	0.278	1,674	**0.303**	**1,716**
100 Year	0.256	1,636	0.326	1,756	**0.345**	**1,791**

Note: Bold values indicate the more conservative (higher) proposed storage volumes

5.8 Downstream East-West Collector Road

Catchment 2107 (**Figure 4.1**) includes lands designated for the western portion of the East-West Collector Road. The stormwater management controls for this catchment will be provided at the downstream (west) end of the collector road in future design stages by others.

The Quality Control criterion of Enhanced (80%) TSS removal per the Ministry of Environment Stormwater Management Planning and Design Manual will be provided for the collector road either via a permanent pool in a future downstream SWM Facility or through Best Management Practices, such as Manufactured Treatment Devices (MTDs) or Low Impact Development measures (LIDs).

The attenuation of the extended detention volume for this catchment will provide erosion protection for the downstream watercourse as well as promote sediment removal for water quality. The extended detention volume for the future stormwater management facilities will be sized based on the detention of the 25 mm - 4 hour Chicago rainfall event. The volume calculated for the extended detention will be attenuated for a minimum of 24 hours. Refer to **Appendix C** for the impervious calculations and **Appendix E** for extended detention volume sizing.

The SWM controls for the collector road will control proposed 2 - 100 year flows from the site to the existing peak flow rates. Proposed hydrologic modelling was completed using the VO6 model to account for the control of this catchment to Outlet 1. Refer to the secure link provided in **Appendix C** to download the VO6 hydrology model files.

5.9 Southeast Pond Operating Characteristics

The proposed SWM Facility (SWMF) for Outlet 3 is a wet SWM pond (Southeast Pond), and will be located at the south side of Catchment 2301, north of Green Lane West, as shown on **Figure 5.4**. The Southeast Pond will outlet to the existing storm sewer onGreen Lane West and ultimately to a tributary of the East Holland River. The Southeast Pond has been sized for a total drainage area of 19.60 ha assuming an imperviousness of 81%.

Refer to **Appendix C** for the impervious calculations.

5.9.1 Quality Control

The function of the permanent pool is to provide quality control by removing sediment from the storm runoff conveyed to the SWM facilities. The Southeast Pond will be designed to provide permanent pool storage of 243.4 m^3/ha based on MECP's Enhanced Level Protection for a wet pond having a 81% impervious drainage area. The required permanent pool volume for the Southeast Pond is 3,988 m^3 based on a total developed area draining to the pond of 19.60 ha, while the available permanent pool storage is 5,159 m^3 (see **Figure 5.4** and calculations in **Appendix E**).

5.9.2 Erosion Control

The attenuation of the extended detention volume in the pond will provide erosion protection for the downstream watercourse as well as promote sediment removal for water quality. The extended detention volume for the proposed stormwater management facilities will be sized based on the detention of the 25 mm - 4 hour Chicago rainfall event. The volume calculated for the extended detention will be attenuated for a minimum of 24 hours. The required extended detention volume for the Southeast Pond is 3,622 m^3 (see **Appendix E**). This volume is greater than the 2003 MOE guidelines minimum extended detention volume of 40 m^3/ha or 784 m^3 based on the 19.60 ha drainage area.

The calculations for the extended detention component of the proposed stormwater management facility and orifice sizing calculations are provided in **Appendix E**, with hydrologic modelling provided in **Appendix C**. Details will be provided at the detailed design stage.

5.9.3 Quantity Control

The Southeast Pond will control post-development peak flows from Catchments 2301, 2305 and 2306 to the allowable peak release rates determined using unitary release rates of the pre-development Catchment 1301, pro-rated for the sum of the areas and

runoff coefficients of Catchments 2301, 2305 and 2306. This is done such that the post-development peak flows from all catchments draining towards Outlet 3 (Catchments 2301 to 2307) will be controlled to the allowable peak release rates provided in **Table 5.5**. Proposed hydrologic modelling was completed using the Visual Otthymo model (Version 6.2) to determine the required active storage volume. Refer to the secure link provided in **Appendix C** to download the VO hydrology model files.

The 4-hour Chicago, 12-hour SCS Type II, 24-hour SCS Type II design storms per LSRCA and Town of East Gwillimbury requirements were modelled for the proposed conditions hydrology model. A summary of the resulting storage requirements for the Southeast Pond is provided in **Table 5.10**.

Table 5.10: SWM Facility Storage Requirements – Southeast Pond

Storm Distribution	4-Hour Chicago		12-Hour SCS Type II		24-Hour SCS Type II	
Return Period Storm	Discharge (m^3/s)	Storage (m^3)	Discharge (m^3/s)	Storage (m^3)	Discharge (m^3/s)	Storage (m^3)
2 Year	0.047	4,894	0.076	5,553	**0.083**	**5,828**
5 Year	0.097	6,449	0.113	7,329	**0.119**	**7,674**
10 Year	0.118	7,622	0.135	8,814	**0.141**	**9,313**
25 Year	0.135	8,874	0.153	10,407	**0.161**	**11,096**
50 Year	0.155	10,501	0.169	11,964	**0.174**	**12,499**
100 Year	0.164	11,454	0.177	12,815	**0.180**	**13,218**

Note: Bold values indicate the more conservative (higher) proposed storage volumes

5.10 On-site Controls

Three private underground SWM facilities (tanks) are proposed for the high density lands draining to Outlet 3, referred to herein as the Beechway Tank, the Northmarket Tank, and the Rice Tank. The facilities will outlet to the proposed storm sewer along Yonge Street and ultimately to the East Holland River. Contributing drainage areas and associated imperviousness for each tank is summarized in **Table 5.11**. Refer to **Appendix C** for the impervious calculations.

The Quality Control criterion of Enhanced (80%) TSS removal per the Ministry of Environment Stormwater Management Planning and Design Manual will be provided on-site either via a permanent pool in a private SWM Facility or through Best Management Practices, such as Manufactured Treatment Devices (MTDs) or Low Impact Development measures (LIDs).

The attenuation of the extended detention volume in the tanks will provide erosion protection for the downstream watercourse as well as promote sediment removal for water quality. The extended detention volume for the proposed stormwater management facilities will be sized based on the detention of the 25 mm - 4 hour Chicago rainfall event. The volume calculated for the extended detention will be attenuated for a minimum of 24 hours. The required extended detention volumes for the tanks are summarize in **Table 5.11**. Refer to **Appendix E** for extended detention volume sizing.

Table 5.11: SWM Facility Storage Requirements – On-site Control

	Beechway SWM Tank	Northmarket SWM Tank	Rice SWM Tank
Drainage Area (ha)	3.00	3.80	2.02
Imperviousness (%)	85	80	85
Extended Detention Volume (m^3)	602	675	405

The private tanks will control post-development flows from Catchments 2302, 2304, and 2307 to the allowable peak release rates determined using unitary release rates of the pre-development Catchment 1301, pro-rated for the sum of the areas and runoff coefficients of Catchments 2302, 2304 and 2307. This is done such that the post-development peak flows from all catchments draining towards Outlet 3 (Catchments 2301 to 2307) will be controlled to the allowable peak release rates provided in **Table 5.5**. Proposed hydrologic modelling was completed using the Visual Otthymo model (Version 6.2) to determine the required active storage volume. Refer to the secure link provided in **Appendix C** to download the VO hydrology model files.

Details will be provided at the detailed design stage to support the future site plan applications.

5.11 Stormwater Management Plan Performance

5.11.1 Quality Control

5.11.1.1 Total Suspended Solids

An “Enhanced” protection level for quality control will be achieved through the implementation of end-of-pipe SWM facilities. The permanent pool within the wet ponds draining to Outlet 1, 2 and 3 have been sized for Enhanced (80%) TSS removal per the Ministry of Environment Stormwater Management Planning and Design Manual. An Imbrium Jellyfish Filter is proposed downstream of the superpipe located within the Catchment 2102 which has been sized to provide 80% TSS removal for the catchment.

5.11.1.2 Phosphorous

Under the Lake Simcoe Protection Plan, a stormwater management plan must demonstrate how phosphorus loadings are minimized between existing and proposed. Furthermore, the Lake Simcoe Phosphorus Offsetting Policy (May 2023) states that:

> "The phosphorus load from the development on the property will not exceed pre-development phosphorus loadings. In situations where the phosphorous load cannot be met or demonstrated in a post-development scenario to achieve the pre-development phosphorus loadings, the developer or proponent shall be required to provide phosphorus offsetting to the LSRCA."

The MECP database application Lake Simcoe Phosphorus Loading Development Tool (v2, 01-April-2012 update) was used to complete the phosphorus budget for the existing site and the proposed development. Due to the complex treatment train anticipated to be provided by the SWM measures at the draft plan approval stage, a spreadsheet based on the MECP database application was developed to determine the proposed conditions phosphorus budget.

The existing phosphorus loading is based on land uses delineated using aerial imagery. The existing land uses are identified on **Figure 5.5**. Based on the Phosphorus Loading Development Tool, the existing annual phosphorus loadings were calculated to be 39.48 kg/year. Refer to **Appendix F** for existing phosphorus loading calculations.

The proposed land uses for the proposed development are shown on **Figure 5.6**. The residential lots are considered high intensity development according to the MECP Phosphorus Tool. The proposed phosphorus loading with no best management practices (BMPs) was calculated to be 158.69 kg/yr.

The proposed phosphorus loading with BMPs including wet ponds, underground storage, and stormwater filters was calculated to be 61.09 kg/yr. **Table 5.12** provides a summary of the existing, unmitigated proposed, and mitigated proposed condition phosphorus loading rates. Refer to **Appendix F** for proposed phosphorus loading calculations.

Table 5.12: Phosphorus Budget Summary

Existing Phosphorus Loading (kg/yr)	Proposed Phosphorus Loading without BMPs (kg/yr)	Proposed Phosphorus Loading with BMPs (kg/yr)
39.54	158.67	61.09

Additional BMPs including bioswales and infiltration trenches are to be considered at the next stage of design, which would further mitigate the phosphorus loading of the proposed development. Once the LIDS are implemented and the proposed phosphorus loading with BMPs is recalculated, the phosphorus offsetting costs will be calculated, if applicable.

5.11.2 Erosion Control

The erosion control criterion is to provide a minimum of 24 hour extended detention of the runoff from a 25 mm rainfall event which will be achieved in the end-of-pipe wet ponds and underground storage/superpipe. The preliminary design requirements of the end-of-pipe SWM facilities are discussed above in **Sections 5.5** to **5.9**.

5.11.3 Runoff Volume Control

The proposed development targets a volume control criterion to capture and treat or retain the runoff volume from the 25 mm rainfall event from new and/or fully reconstructed impervious areas in accordance with LSRCA's Technical Guidelines for Stormwater Management Submissions (April 2022). Proposed LIDs and BMPs are to be sized to provide this storage volume where feasible as outlined in **Section 5.3**. **Table 5.13** below provides a summary of runoff volume control required through the implementation of LID measures.

Table 5.13: Volume Control Storage Summary - Targets

Rainfall Depth	Volume (m^3)
5 mm (Minimum)	2,809
12.5 mm	7,023
25 mm (Target)	14,046

In order to achieve the runoff volume control volume tabulated in **Table 5.13**, it is proposed that the following LIDs be implemented, where feasible pending groundwater levels:

- Infiltration Trenches
- Rear yard Infiltration Trenches
- Catchbasin Filtration
- Bioswales/Rain Gardens

Details of the volume control regime is to be provided at the next stage of design in support of the future draft plan process for each property.

5.11.4 Water Budget

The development is located within a WHPA D area identified by the LSRCA. LID measures will be implemented where feasible, to maintain or increase existing infiltration rates. Detailed LID designs as well as a water balance report will be provided at the next stage of design upon the availability of updated hydrogeological data.

5.11.5 Quantity Control

5.11.5.1 Peak Flow Comparison

The proposed SWM facilities will control proposed flows to the allowable release rates for the 2 through 100 year storm events. As discussed in **Section 5.4**, Outlet 1 and 2 allowable release rates are the existing peak flows. Outlet 3 and 4 allowable release rates are derived from the unitary release rates defined by the Town of East Gwillimbury Stormwater Management Master Plan Municipal Class Environmental Assessment (SWMMP, November 2012). **Tables 5.14** to **5.17** provide a comparison of existing and proposed flows at all outlet locations.

Table 5.14: Comparison of Allowable and Proposed Flows – Outlet 1

Storm Distribution	4-Hour – Chicago		12-Hour – SCS Type II		24-Hour – SCS Type II	
Return Period Storm	Allowable	Prop	Allowable	Prop	Allowable	Prop
2 Year	0.219	0.204	0.622	0.257	0.361	0.277
5 Year	0.411	0.290	1.090	0.357	0.610	0.383
10 Year	0.565	0.351	1.506	0.585	0.844	0.688
25 Year	0.737	0.564	1.978	0.920	1.112	1.036
50 Year	0.980	0.899	2.458	1.184	1.331	1.265
100 Year	1.130	1.090	2.728	1.314	1.446	1.379

Table 5.15: Comparison of Allowable and Proposed Flows – Outlet 2

Storm Distribution	4-Hour – Chicago		12-Hour – SCS Type II		24-Hour – SCS Type II	
Return Period Storm	Allowable	Prop	Allowable	Prop	Allowable	Prop
2 Year	0.114	0.049	0.380	0.049	0.223	0.053
5 Year	0.231	0.072	0.672	0.065	0.377	0.070
10 Year	0.322	0.099	0.930	0.078	0.522	0.086
25 Year	0.426	0.127	1.222	0.100	0.686	0.119
50 Year	0.595	0.168	1.520	0.130	0.820	0.148
100 Year	0.699	0.187	1.688	0.148	0.890	0.165

Table 5.16: Comparison of Allowable and Proposed Flows – Outlet 3

Storm Distribution	4-Hour – Chicago		12-Hour – SCS Type II		24-Hour – SCS Type II	
Return Period Storm	Allowable	Prop	Allowable	Prop	Allowable	Prop
2 Year	0.175	0.170	0.175	0.153	0.175	0.174
5 Year	0.273	0.244	0.273	0.227	0.273	0.255
10 Year	0.350	0.314	0.350	0.310	0.350	0.350
25 Year	0.454	0.386	0.454	0.389	0.454	0.434
50 Year	0.546	0.482	0.546	0.460	0.546	0.498
100 Year	0.640	0.533	0.640	0.498	0.640	0.535

Table 5.17: Comparison of Allowable and Proposed Flows – Outlet 4

Storm Distribution	Allowable Release Rate	4-Hour – Chicago		12-Hour – SCS Type II		24-Hour – SCS Type II	
Return Period Storm		Existing	Prop	Existing	Prop	Existing	Prop
2 Year	0.002	0.014	0.004	0.050	0.006	0.029	0.007
5 Year	0.004	0.029	0.008	0.086	0.011	0.049	0.012
10 Year	0.005	0.041	0.010	0.120	0.014	0.067	0.016
25 Year	0.007	0.054	0.014	0.156	0.018	0.088	0.020
50 Year	0.009	0.076	0.019	0.192	0.023	0.104	0.024
100 Year	0.010	0.089	0.022	0.214	0.025	0.113	0.026

As shown above, the proposed peak flows will be less than or equal to the allowable peak flows for the 2 through 100 year storm events at Outlet 1, 2, and 3. While drainage to Outlet 4 will not be controlled to the allowable release rate outlined, it should be noted that the drainage area consists only of the 3:1 slope vegetated strip between the East – West Collector right-of-way and the property limit, for which it would not be feasible to provide quantity control. The flow to Outlet 4, to the lands north of the development, will also be significantly reduced compared to existing conditions, and further stormwater management measures maybe be implemented as these lands become developed.

5.11.5.2 Downstream Conditions

As specified in **Section 5.4**, downstream conditions are to be maintained for Outlet 1 and Outlet 2. The existing and proposed condition VO6 model included in the MESP (TMIG, 2018) for the West Holland River Watershed was modified with the catchment areas draining to Outlet 1 and Outlet 2 from the proposed development. See **Appendix C** for the model schematic. Six nodes downstream of the development in the West Holland River were selected, and the comparison of the peak flows from proposed condition was compared to the existing condition. The results are tabulated in **Appendix C.**

The results of the analysis indicate that the proposed condition peak flow rates are lower at all nodes for storms from the 25 to 100 year return period. However, for node 8244 and downstream, the post-development peak flow rates exceed the existing condition flow rates by a maximum of 0.21% for storms from 2 to 10 year return periods, which is considered negligible. Therefore, it can be concluded that no adverse effects will occur downstream.

6.0 Watercourse Crossings

A watercourse crossing is required within the northwest portion of the site at the crossing of the East-West Collector Road and Ansnorveldt Creek. A 7.3 m wide by 1.8 m high Conspan Culvert is proposed for this crossing per the Green Lane Secondary Plan Master Environmental Servicing Plan (TMIG, 2018). The culvert is to provide capacity for 1.065 m^3/s of flow generated by 32.23 ha of external drainage north of the development under the 100 year 24-hour SCS Type II Storm. The culvert is capable of conveying such flow at a depth of 0.13 m accounting for the tailwater conditions within the natural wetland channel. Refer to **Appendix B** for excerpts from the MESP, and **Appendix D** for culvert and downstream flow calculations.

7.0 Sanitary Servicing

7.1 Existing Sanitary Sewer System

There currently exists no sanitary sewers on Yonge Street north of Green Lane West or Green Lane West west of Yonge Street along the east and south property lines of the development. An existing Regional 825 mm diameter concrete sanitary gravity sewer drains northward along Yonge Street south of Green Lane to the Yonge and Green Lane intersection, and extends eastwards along Green Lane East at the intersection. The existing sanitary sewer system is illustrated on **Figure 7.1.**

Per the East Gwillimbury Water and Wastewater Master Plan (March 2024), the existing wastewater collection system is part of a localized system that is serviced by the 825 mm diameter York Region Trunk Sewer on Green Lane East draining eastward along Green Lane East to 2nd Concession Road, then South towards Newmarket and ultimately to the Existing Regional Pump Station.

7.2 Proposed Sanitary Sewer System

The existing sanitary sewers located along Green Lane East and Yonge Street will be extended west and north, respectively, in order to service the proposed development, as outlined in the Green Lane Secondary Plan Master Environmental Servicing Plan (TMIG, 2018). The proposed development is divided into two sanitary drainage areas in accordance with existing site topography and proposed site grading. The majority of the east drainage area – Catchment 201G (see **Figure 7.1**) will drain by gravity to the proposed sanitary sewer along Green Lane West. The easterly portions of Catchment 201G comprised of high density residential along Yonge Street are to be serviced by the proposed sanitary sewer along Yonge Street. The west drainage area – Catchment 201F (see **Figure 7.1**) will drains by gravity towards the proposed sanitary pumping station at the southwest corner of the development, and will be pumped to the gravity system within the east drainage area Catchment 201G. The preliminary layout for the proposed sanitary sewer within the subject lands is provided on **Figure 4.2** and **7.1**. Site plan blocks fronting Yonge Street directly are expected to be serviced via the future sanitary sewer along Yonge Street north of Green Lane as identified in the Green Lane Secondary Plan Master Environmental Servicing Plan (TMIG, 2018).

The sanitary sewers within the proposed development will have slopes ranging between 0.5% and 2% (typically) and will be provided at 3.3 m to 8 m deep. Dual sanitary sewers and maintenance holes will be provided where a depth greater than 8 m is required due to site topography in accordance with the Town’s design criteria.

The sanitary sewer system will be designed in accordance with the Town of East Gwillimbury and MECP criteria, including but not limited to:

- Residential Sanitary Generation Rate: 350 L/c/d,
- Industrial Sanitary Generation Rate: 18,000 L/ha/d
- Commercial Sanitary Generation Rate: 35,000 L/ha/d,
- Single Detached Dwelling Population Density: 3.36 ppu,
- Townhouses Population Density: 2.78 ppu,
- Apartments Population Density: 1.76 ppu,
- Peaking Factor: Harmon (Min. 2.0, Max. 4.0),
- Infiltration Rate: 0.286 L/s/ha,
- Minimum Pipe Size: 200 mm diameter,
- Minimum Pipe Cover: 2.7 m,
- Minimum Actual Velocity: 0.60 m/s, and
- Maximum Velocity: 3.0 m/s.

The average daily sanitary demand generated for drainage area 201G is 111.5 L/s and for 201F is 51.4 L/s. See **Appendix G** for demand calculations

Per the Draft East Gwillimbury Water and Wastewater Master Plan (WSP, March 2024), the sanitary system and pumping station are to receive flows from the future external developments north of the proposed site. Refer to **Appendix G** for a map with the approximate external sanitary drainage area illustrated. Details of the sanitary servicing for the proposed development on these lands were not available at the time of this report. Based on the topography of the external lands to the north, pumping stations or alternative outlets for these external may be required. Alternatively, the sewers within the Northwest Yonge Green Lane CDP lands will need to be deepened in order to accept the external sanitary flows by gravity. Sizing of the proposed sanitary sewers and sanitary pumping station is to be provided at the draft plan of subdivision stage.

8.0 Water Supply and Distribution

8.1 Existing Water Distribution

The existing water system adjacent to the site includes a municipal 150 mm diameter to 400 mm diameter watermain along the southern boulevard of Green Lane West which provides water for the existing community south of Green Lane West. According to the York Region Water and Wastewater Master Plan (August 2022), the existing watermain system is part of the Newmarket West Pressure District, which is supplied by the Orchard Heights Pumping Station via Kirby Crescent Booster Pumping Station. The existing watermain system is illustrated on **Figure 8.1**.

8.2 Proposed Water System

A Preliminary Watermain Analysis has been provided by MES, with the proposed watermain design of the development. The site is proposed to be serviced by three connections to the existing municipal watermain from the community south of Green Lane West, and two connections to the future regional watermain along Yonge Street in order to maximize redundancy. The watermain system consists of 150 mm diameter to 300 mm diameter watermain within the public rights-of-way within the development area, and within private parking lots and driveways, as required. See **Appendix H** for the preliminary watermain report (MES, 2025).

The watermain system has been designed in accordance with the Town of East Gwillimbury Engineering Standards and Design Criteria (2012), 2023 Water and Wastewater Master Plan Update (WSP, 2023), and MECP Design Guidelines for Drinking-Water Systems (2008) including:

- Residential water usage rate: 350 l/c/d,
- Single Detached Dwelling Density: 3.36 people/unit,
- Townhouses Density: 2.78 people/unit,
- Apartments Density: 1.76 people/unit,
- Commercial: 28,000 L/ha/d,
- Institutional: 18,000 L/ha/d,
- Minimum Pipe Depth: 1.7 m,
- Maximum Hydrant Spacing: 120 m,
- Residential Fire Flow: 100 L/s, and
- Employment Fire Flow: 250 L/s.

9.0 Right-of-Way Cross Sections

Standard 18 m and 22 m right-of-way cross sections per the Town of East Gwillimbury Municipal Design Criteria are proposed for the development. It is proposed that LIDs be provided within the rights-of-way where possible within the boulevard, while still maintaining the general geometric layout of the pavement and street furniture per the Town's standard cross-section to the extent possible.

The proposed sidewalk location plan is provided on **Figure 9.1**. For the areas where sidewalk will be provided along one side of the street, sidewalks will typically be located on the boulevard side where the larger number of frontages can be serviced. Where lotting is equivalent, the north and east sides are be chosen.

10.0 Servicing Allocation

Servicing capacity is assigned by York Region to the Town of East Gwillimbury for allocation to individual developments. As part of the Draft Plan approval, servicing capacity allocation will provided by the Town of East Gwillimbury Council.

11.0 Cost Sharing

The cost of infrastructure which benefits multiple properties, such as trunk sanitary sewers, sanitary pumping stations, watermains, collector roads, schools, parks, and stormwater management facilities, is to be shared by the benefiting landowners. It is understood that negotiations are currently underway amongst landowners within the Northwest Yonge Green Lane Landowners Group Inc. to set out the principles by which these costs can be equitably shared.

12.0 Utility Considerations

The utility companies (hydro, natural gas, and telecommunications) have been contacted to circulate the proposed Community Design Plan to confirm whether there is sufficient servicing capacity. Correspondence received thus far is included in **Appendix H**.

12.1 Hydro

Per email correspondence from Hydro One in August 2024, there currently exists limited capacity to support residential lots. In order to support the full buildout of the Community Design Plan area, as well as other development lands in the Town outside of the Community Design Plan area, a new distribution substation will be required. At this time, the location of this substation has not been determined. Coordination will continue through the subsequent planning phases of the Community Design Plan and future Draft Plans to ensure capacity is made available when required.

12.2 Gas

Per email correspondence from Enbridge Gas on October 9, 2024, a reinforcement of the gas network, consisting of the replacement of approximately 2km of existing NPS 6 gas main on Yonge St. north of Green Lane, to NPS 8 gas main, as a Leave to Construct project. There may be availability to connect some of the development phases prior to the reinforcement.

12.3 Bell

Bell Canada has stated that there are no known issues at this point in servicing the proposed development.

12.4 Rogers

Rogers Communications has confirmed that there is sufficient existing capacity to service the proposed development.

13.0 Summary

This Functional Servicing and Stormwater Management Report has been prepared in support of the Community Design Plan application for the proposed Northwest Yonge and Green Lane development in the Municipality of East Gwillimbury. This report outlines the means by which the proposed development can be graded and serviced in accordance with the Town of East Gwillimbury, Lake Simcoe Region Conservation Authority, Lake Simcoe Protection Plan, and the Ministry of Environment, Conservation and Parks design criteria and policies.

General Information

- The existing land use consists mostly of farmland, but also includes a golf range, low intensity residential, woodland and wetland.
- The western portion of the proposed development is located in the West Holland River Watershed;
- The eastern portion of the proposed development is located in the East Holland River Watershed; and
- The proposed development consists of single family dwellings, townhouses, two school blocks, medium density residential, high density residential, mixed use and commercial building developments. Municipal rights-of-way and Stormwater management blocks to support the development are also proposed.

Stormwater Management and Storm Servicing

- Quality Control: MECP Enhanced (Level 1) water quality protection will be provided through the use of wet ponds, private SWM facilities, and a treatment train consisting of underground superpipe and stormwater filters/manufactured treatment devices.
- Erosion Control: The runoff volume from a 25 mm rainfall event will be detained over 24 hours by the wet SWM ponds, superpipe underground storage, and private SWM facilities;
- Quantity Control: Quantity control will be provided via the wet SWM ponds, superpipe underground storage, and private SWM facilities, in order to control proposed runoff rates in the 2 through 100 year storm events;
- Water Budget: It is proposed that the proposed annual infiltration rates will not be less than existing rates. Detailed water budget analysis is to be provided at the next stage of design;
- Phosphorus Budget: A phosphorus budget analysis was completed which shows that the proposed phosphorus export will be approximately 21.55 kg/yr greater than existing conditions. The phosphorus export will be mitigated through the use of LIDs, details to be provided at the next stage of design;
- Storm Servicing:

  - Storm runoff will be conveyed by storm sewers designed in accordance with the Town of East Gwillimbury and MECP criteria;
  - Storm sewers will generally be designed for the 5 year storm event, with additional capture points and up-sized sewers provided, where required; and
  - Adequate 100 year overland flow routes will be provided to the extent possible, with additional capture points provided, where required.
- Conveyance of existing external drainage will be accommodated through the proposed development via a 7.3 m wide by 1.8 m high Conspan culvert crossing at the East-West Collector Road.

Sanitary Servicing

- There is an existing 825 mm diameter sanitary sewer along Green Lane east of the Green Lane and Yonge Street intersection;
- The existing sanitary sewer is to be extended west along Green Lane by the owner, and northward along Yonge Street by the Region in order to service the development;
- The development will be split into two sanitary drainage areas per the grading design;
- The east sanitary drainage area will drain by gravity to the proposed sanitary sewer extension along Green Lane West;
- Lands directly adjacent to Yonge Street will connect directly to the proposed sanitary sewer along Yonge Street;
- The west sanitary drainage catchment will drain by gravity to the proposed sanitary pumping station located at the southwest corner of the development, which will then be pumped to the gravity sewer system within the east sanitary drainage area;
- The sanitary pumping station is to be sized for the sanitary flow generated by the west sanitary drainage area, as well as the external Yonge Corridor CDP lands located to the north of the development.

Water Supply and Distribution

- There exists a municipal watermain along Green Lane West,
- The lands fall within the Newmarket West Pressure District, which is supplied by the Orchard Heights Pumping Station via Kirby Crescent Booster Pumping Station;
- The development is proposed to be serviced with 3 connections to the existing watermain along Green Lane West and 3 connections to the future watermain along Yonge Street;
- MES has completed a preliminary watermain hydraulic analysis to show that there is sufficient domestic and fire flows to service the development; and

- Water supply allocation is required from the Town.

Grading

- The proposed site grading has been developed to match to the existing surrounding grades, to conform to the Town of East Gwillimbury Design Criteria, and provide conveyance of stormwater runoff, including external drainage; and
- The site grading will be subject to further grading design at the future detailed design stage.

Rights-of-Way and Sidewalks

- Standard right-of-way cross sections per the Town of East Gwillimbury Municipal Design Criteria are proposed for the development
- Low impact development measures are proposed in the boulevard where possible while maintaining the general geometric layout of the pavement and street furniture to the extent possible; and,
- Where sidewalks are provided along one side of the street, sidewalks will be provided on the side where the larger number of frontages can be serviced.

Cost-Sharing

- It is understood that the landowners within the development area have entered into a cost sharing agreement to set out the principles by which the costs of infrastructure can be equitably shared.

Erosion and Sediment Control during Construction

- An erosion and sediment control plan will be prepared at the detailed engineering stage, in accordance with the “Technical Guideline for Stormwater Management Submissions” (LSRCA, April 2022).

Utility Considerations

- The utility companies have been contacted to confirm whether there is sufficient servicing capacity.
- It is understood that an additional power substation is required to service the development, further coordination is in progress.

Respectfully Submitted:

SCS Consulting Group Ltd.

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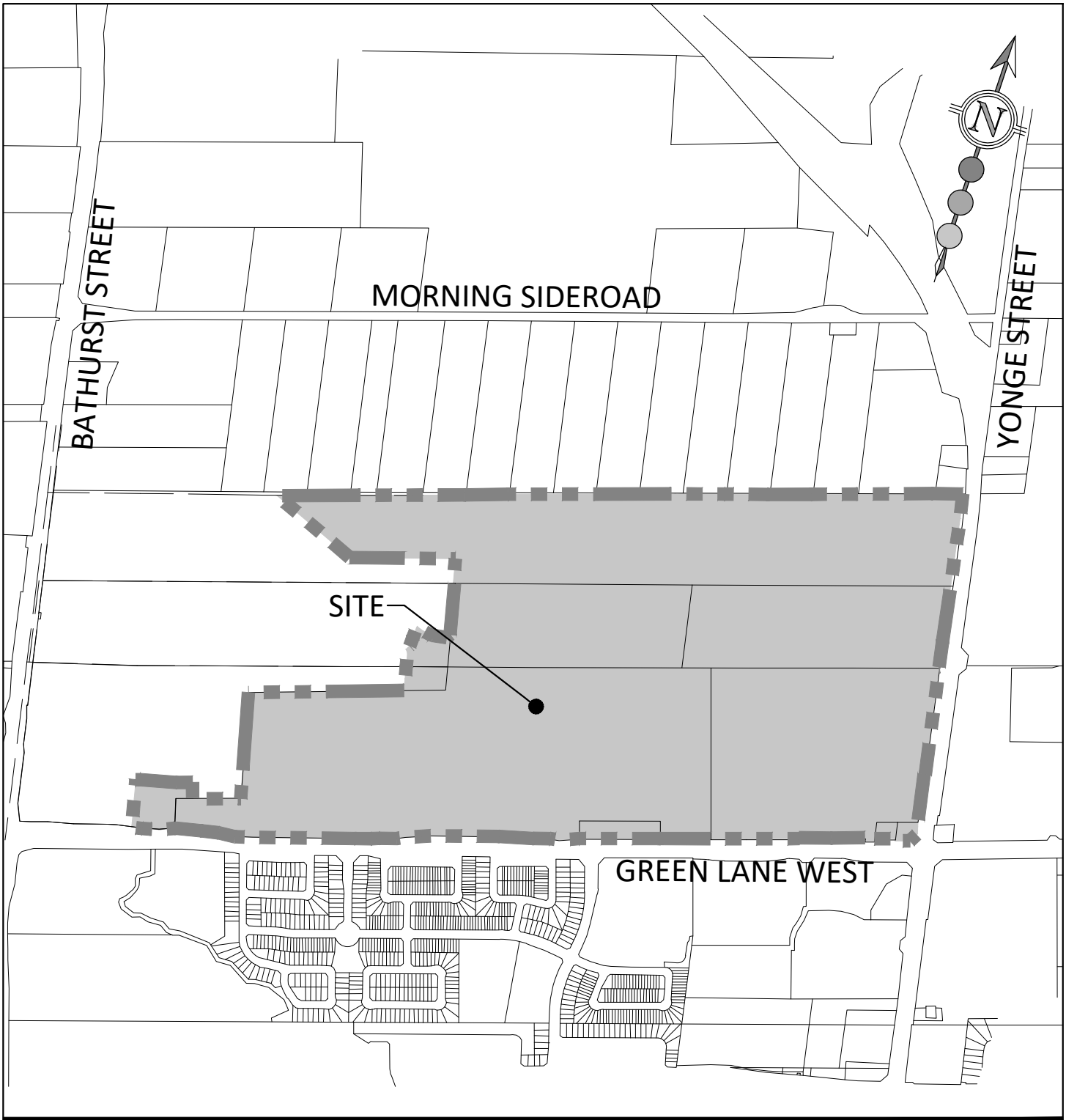
Figures

SCS consulting group ltd



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NORTHWEST YONGE AND GREEN LANE

FSSR

SITE LOCATION PLAN

DESIGNED BY: H.Y./E.A.S.	CHECKED BY: E.T.C.K.	PROJECT No: 2300	FIGURE No: 1.1
SCALE: 1:13000	DATE: FEBRUARY 2025		

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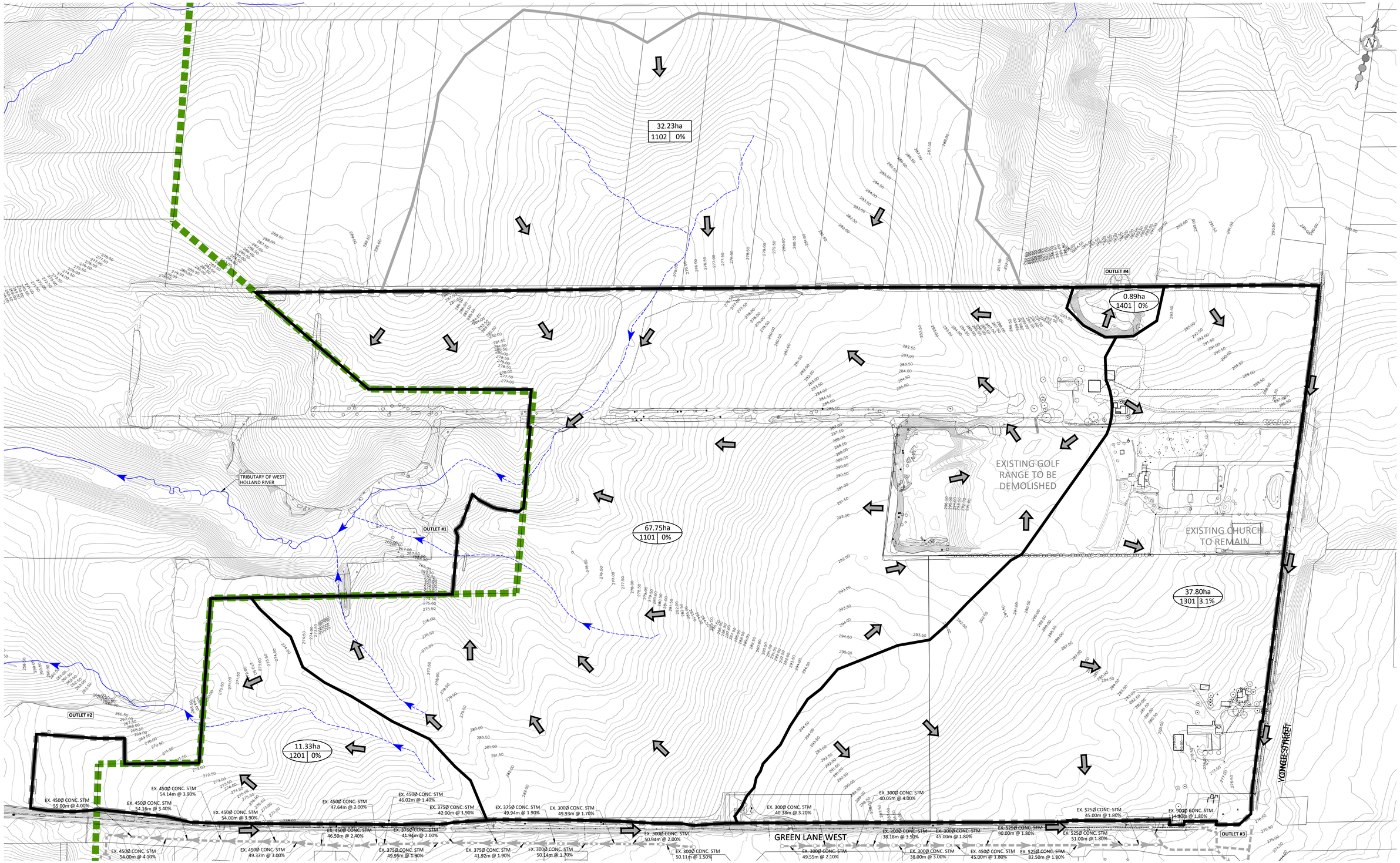

FSSR

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LEGEND:

- LIMIT OF DEVELOPMENT
- 220.00 — EXISTING CONTOUR AND ELEVATION
- GREENBELT BOUNDARY
- MAJOR SYSTEM - OVERLAND FLOW
- EXISTING STORM SEWER AND MAINTENANCE HOLE
- STORM DRAINAGE BOUNDARY
- 0.35ha / 1101 / 1% — DRAINAGE AREA (HECTARES); IMPERVIOUS PERCENTAGE; CATCHMENT ID
- 32.23ha / 1102 / 0% — EXTERNAL DRAINAGE AREA (HECTARES); IMPERVIOUS PERCENTAGE; CATCHMENT ID
- EXISTING INTERMITTENT AND PERMANENT STREAM
- EXISTING EPHEMERAL FEATURE

NORTHWEST YONGE AND GREEN LANE		EXISTING STORM DRAINAGE PLAN	
DESIGNED BY: H.Y./E.A.S.	CHECKED BY: E.T.C.K.	PROJECT No: 2300	FIGURE No: 3.1
SCALE: 1:2500	DATE: FEBRUARY 2025		

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*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

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LEGEND:

- LIMIT OF DEVELOPMENT
- 220.00 EXISTING CONTOUR AND ELEVATION
- GREENBELT BOUNDARY
- PROPOSED RETAINING WALL
- ×273.70 PROPOSED ELEVATION
- 2.0% PROPOSED GRADE
- ×271.56EX EXISTING ELEVATION
- 290.17 ROAD CENTERLINE LOCAL LOW POINT
- 291.69 ROAD CENTERLINE LOCAL HIGH POINT
- 100 YEAR CAPTURE POINT
- PROPOSED 3:1 SLOPE
- 290.05 EXISTING CONTOUR & ELEVATIONS
- HT=6.00 PROPOSED RETAINING WALL HEIGHT
- TW=280.25 PROPOSED TOP OF WALL ELEVATION
- BW=274.25 PROPOSED BOTTOM OF WALL ELEVATION
- EXISTING INTERMITTENT AND PERMANENT STREAM
- EXISTING EPHEMERAL FEATURE

NORTHWEST YONGE AND GREEN LANE

PRELIMINARY GRADING PLAN

DESIGNED BY:	H.Y./E.A.S.	CHECKED BY:	E.T.C.K.	PROJECT No:	FIGURE No:
SCALE:	1:2500	DATE:	FEBRUARY 2025	2300	3.2

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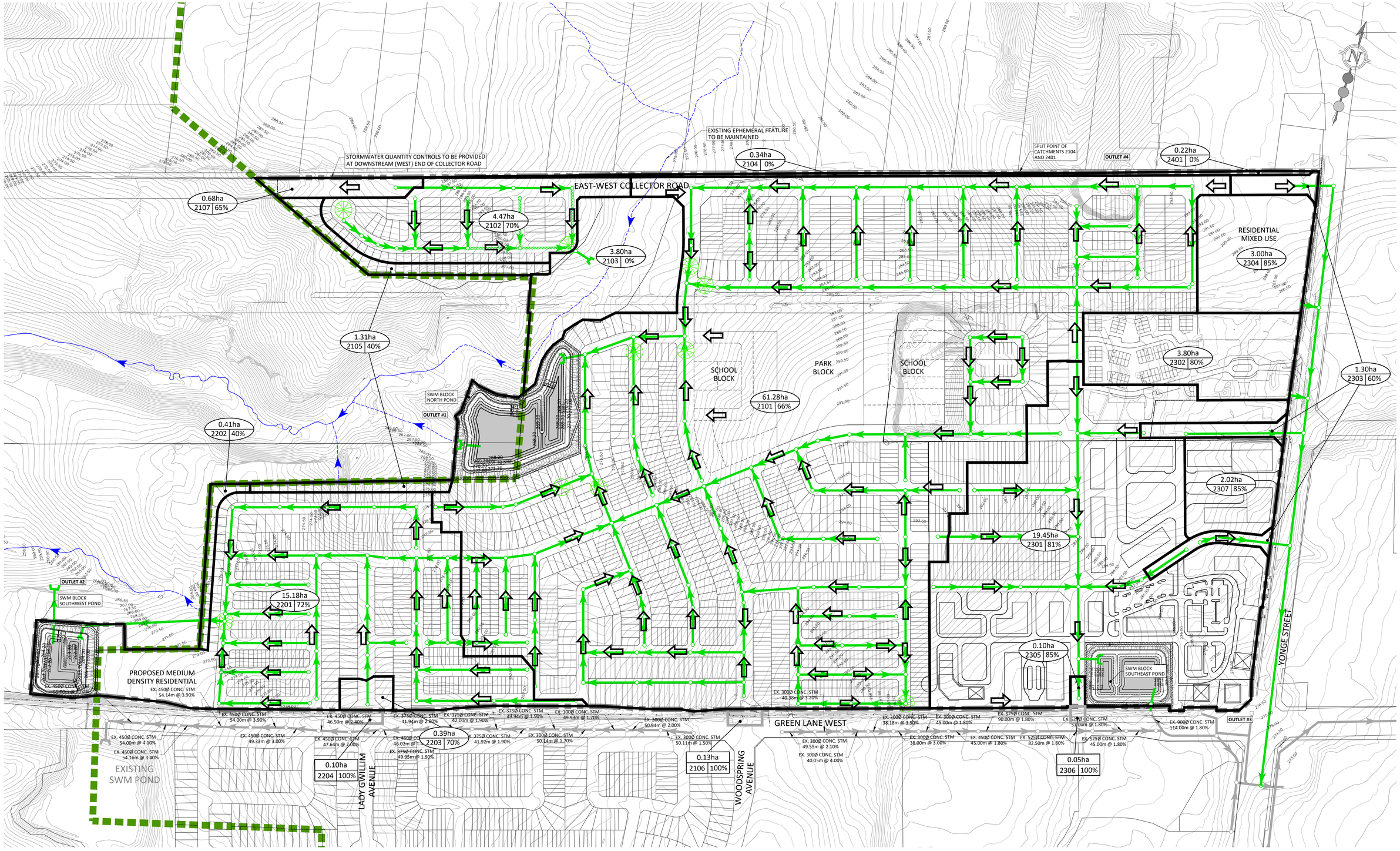

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

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LEGEND:

- LIMIT OF DEVELOPMENT
- GREENBELT BOUNDARY
- STORM DRAINAGE BOUNDARY
- MAJOR SYSTEM - OVERLAND FLOW
- 0.35ha 1101 0% — DRAINAGE AREA (HECTARES); IMPERVIOUS PERCENTAGE; CATCHMENT ID
- STORM SEWER AND MAINTENANCE HOLE
- EXISTING STORM SEWER AND MAINTENANCE HOLE
- OVERLAND FLOW CAPTURE POINTS
- 3.0x2.4 BOX SUPERPIPE
- EXISTING INTERMITTENT AND PERMANENT STREAM
- EXISTING EPHEMERAL FEATURE
- 220.00 — EXISTING CONTOUR AND ELEVATION

NORTHWEST YONGE AND GREEN LANE

PROPOSED STORM DRAINAGE PLAN

DESIGNED BY:	H.Y./E.A.S.	CHECKED BY:	E.T.C.K.
SCALE:	1:2500	DATE:	FEBRUARY 2025

PROJECT No:	FIGURE No:
2300	4.1

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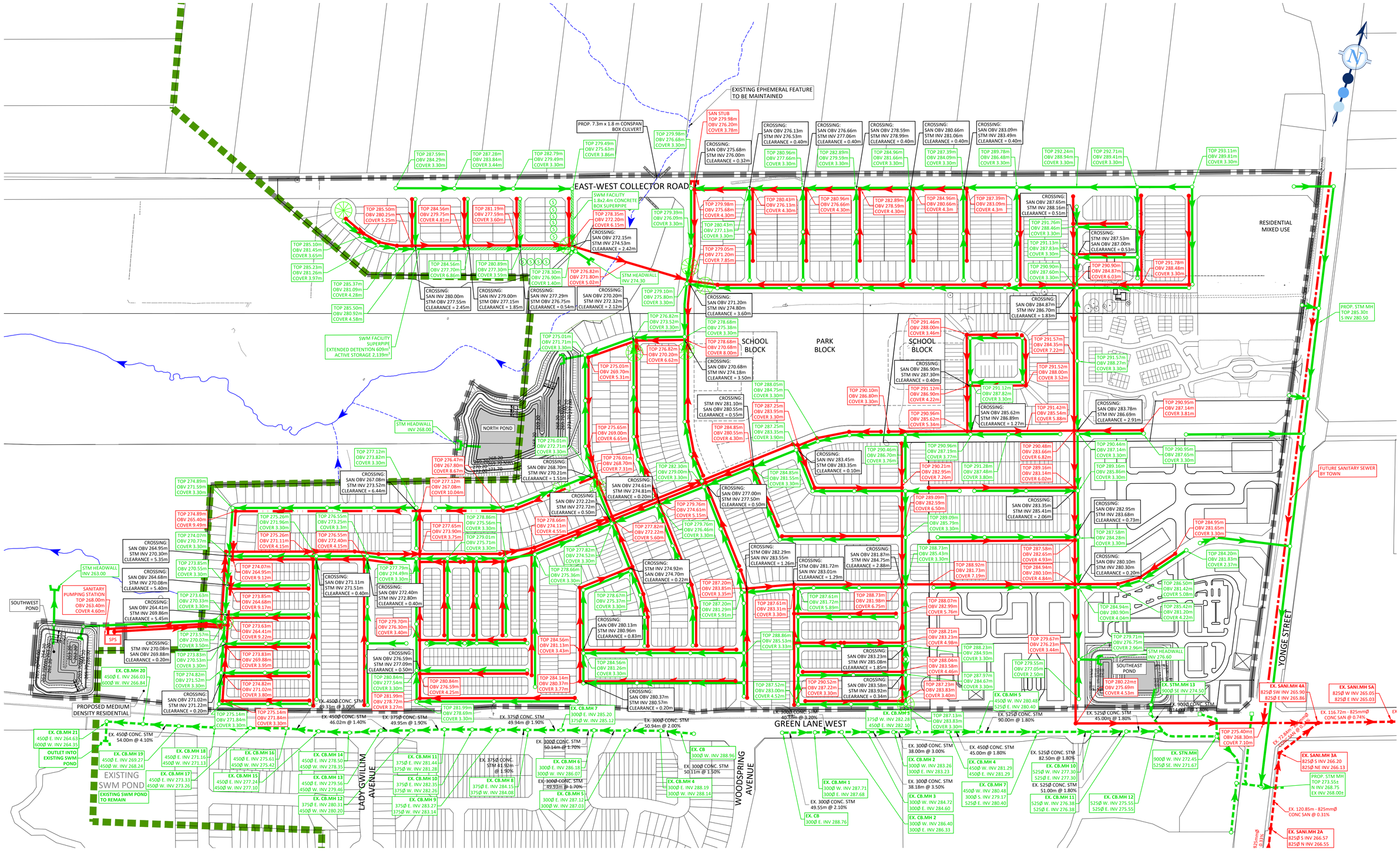
EAST-WEST COLLECTOR ROAD
GREEN LANE WEST
YONGE STREET
LADY GWILLIM AVENUE
WOODSPRING AVENUE
RESIDENTIAL MIXED USE
SCHOOL BLOCK
PARK BLOCK
SCHOOL BLOCK
NORTH POND
SOUTHWEST POND
SOUTHEAST POND
EXISTING SWM POND
EXISTING SWM POND TO REMAIN
PROPOSED MEDIUM DENSITY RESIDENTIAL
SWM FACILITY 1.8x2.4m CONCRETE BOX SUPERPIPE
SWM FACILITY SUPERPIPE EXTENDED DETENTION 609m³ ACTIVE STORAGE 2,139m³
PROP. 7.3m x 1.8 m CONSPAN BOX CULVERT
EXISTING EPHEMERAL FEATURE TO BE MAINTAINED
SANITARY PUMPING STATION TOP 268.00m OBV 263.40m COVER 4.60m
SPS
OUTLET INTO EXISTING SWM POND
PROP. STM MH TOP 285.30± S INV 280.50
FUTURE SANITARY SEWER BY TOWN
EX. STM.MH 13 900ø SE INV 274.50
EX. SANI.MH 4A 825ø SW INV 265.90 825ø E INV 265.86
EX. SANI.MH 5A 825ø W INV 265.05 825ø E INV 265.03
EX. SANI.MH 3A 825ø S INV 266.20 825ø NE INV 266.13
EX. SANI.MH 2A 825ø S INV 266.57 825ø N INV 266.55
PROP. STM MH TOP 273.55± N INV 268.75 EX INV 268.00±
EX. 116.72m - 825mmØ CONC SAN @ 0.74%
EX. 120.85m - 825mmØ CONC SAN @ 0.31%
EX. 72.84m - 825mmØ CONC SAN @ 0.74%
EX. 450Ø CONC. STM 49.33m @ 3.00%
EX. 450Ø CONC. STM 46.02m @ 1.40%
EX. 375Ø CONC. STM 49.95m @ 1.90%
EX. 375Ø CONC. STM 49.94m @ 1.90%
EX. 300Ø CONC. STM 50.94m @ 2.00%
EX. 300Ø CONC. STM 40.33m @ 3.20%
EX. 300Ø CONC. STM 50.14m @ 1.70%
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EX. 525Ø CONC. STM 90.00m @ 1.80%
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EX. 525Ø CONC. STM 82.50m @ 1.80%
EX. 525Ø CONC. STM 51.00m @ 1.80%
EX. 300Ø CONC. STM 38.00m @ 3.00%
EX. 300Ø CONC. STM 38.18m @ 3.50%
EX. 300Ø CONC. STM 49.55m @ 2.10%
EX. CB 3000Ø W. INV 288.96
EX. CB 3000Ø E. INV 288.76
EX. CB.MH 1 300Ø W. INV 287.71 300Ø E. INV 287.68
EX. CB.MH 2 300Ø W. INV 283.26 300Ø E. INV 283.23
EX. CB.MH 3 300Ø W. INV 284.72 300Ø E. INV 284.60
EX. CB.MH 4 300Ø E. INV 288.19 300Ø W. INV 288.14
EX. CB.MH 5 300Ø E. INV 287.12 300Ø W. INV 287.03
EX. CB.MH 6 300Ø E. INV 286.18 300Ø W. INV 286.07
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EX. CB.MH 18 450Ø E. INV 271.16 450Ø W. INV 271.13
EX. CB.MH 19 450Ø E. INV 269.27 450Ø W. INV 268.24
EX. CB.MH 20 450Ø E. INV 266.03 600Ø W. INV 266.84
EX. CB.MH 21 450Ø E. INV 264.63 600Ø W. INV 264.35
EX. CB.MH 3 375Ø W. INV 282.28 450Ø E. INV 282.10
EX. CB.MH 4 450Ø W. INV 281.29 450Ø E. INV 281.29
EX. CB.MH 5 450Ø W. INV 280.48 525Ø E. INV 280.40
EX. CB.MH 7 450Ø W. INV 280.48 300Ø S. INV 279.17 525Ø E. INV 280.40
EX. CB.MH 10 525Ø W. INV 277.30 525Ø E. INV 277.30
EX. CB.MH 11 525Ø W. INV 276.38 525Ø E. INV 276.38
EX. CB.MH 12 525Ø W. INV 275.55 525Ø E. INV 275.55
EX. STN.MH 900Ø W. INV 272.45 525Ø SE. INV 271.67
SOUTHEAST POND TOP 280.22±m OBV 275.69m COVER 4.53m
STM HEADWALL INV 276.60
STM HEADWALL INV 268.00
STM HEADWALL INV 263.00
STM HEADWALL INV 274.30
CROSSING: SAN OBV 280.00m STM OBV 277.55m CLEARANCE = 2.45m
CROSSING: SAN INV 279.00m STM OBV 277.15m CLEARANCE = 1.85m
CROSSING: SAN INV 277.29m STM OBV 276.75m CLEARANCE = 0.54m
CROSSING: SAN OBV 270.20m STM INV 272.32m CLEARANCE = 2.12m
CROSSING: SAN OBV 272.15m STM INV 274.53m CLEARANCE = 2.42m
CROSSING: SAN OBV 275.68m STM INV 276.00m CLEARANCE = 0.32m
CROSSING: SAN OBV 276.13m STM INV 276.53m CLEARANCE = 0.40m
CROSSING: SAN OBV 276.66m STM INV 277.06m CLEARANCE = 0.40m
CROSSING: SAN OBV 278.59m STM INV 278.99m CLEARANCE = 0.40m
CROSSING: SAN OBV 280.66m STM INV 281.06m CLEARANCE = 0.40m
CROSSING: SAN OBV 283.09m STM INV 283.49m CLEARANCE = 0.40m
CROSSING: SAN OBV 287.65m STM INV 288.16m CLEARANCE = 0.51m
CROSSING: STM INV 287.53m SAN OBV 287.00m CLEARANCE = 0.53m
CROSSING: SAN OBV 284.87m STM INV 286.70m CLEARANCE = 1.83m
CROSSING: SAN OBV 271.20m STM INV 274.80m CLEARANCE = 3.60m
CROSSING: SAN OBV 270.68m STM INV 274.18m CLEARANCE = 3.50m
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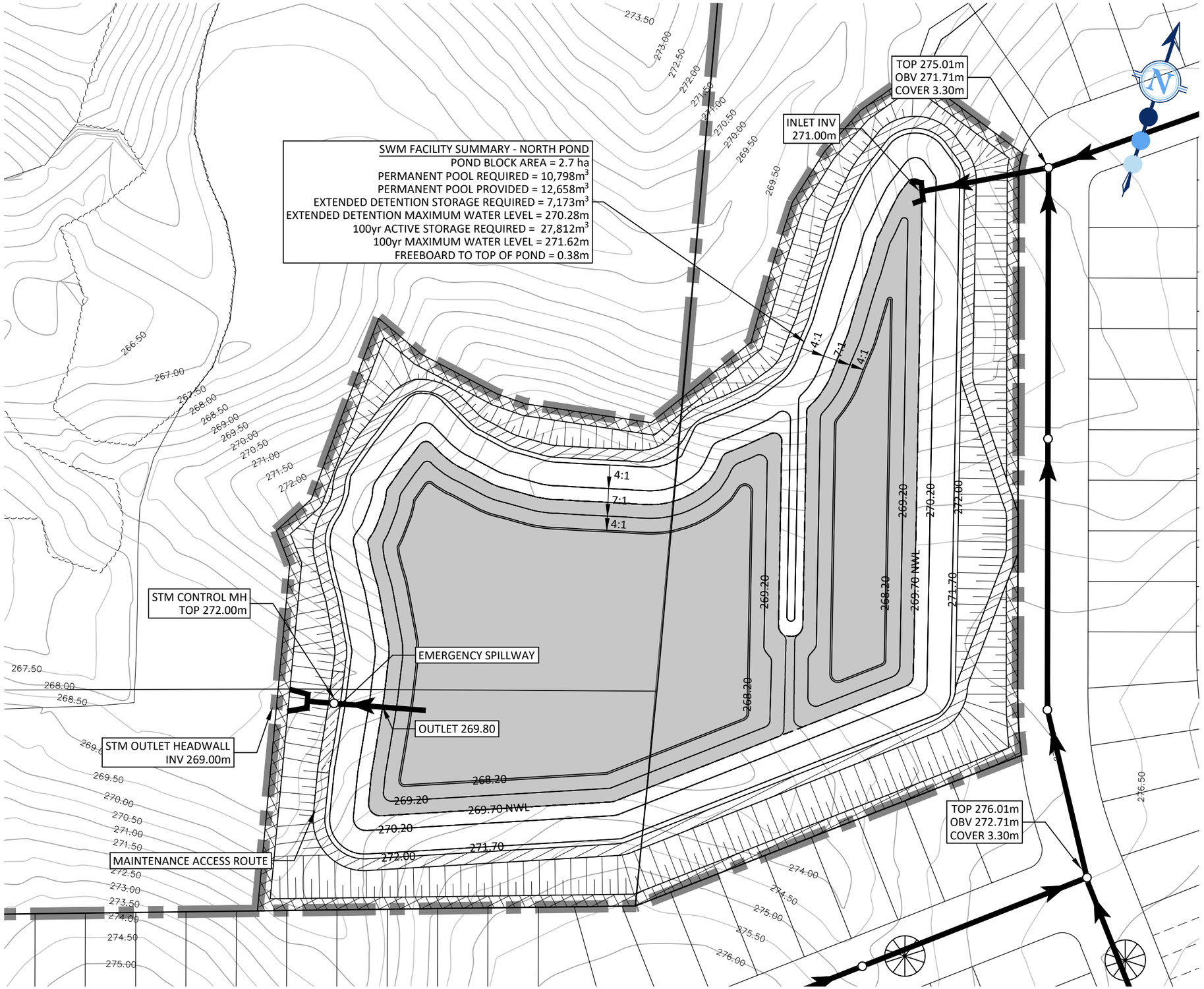
CROSSING: SAN OBV 286.90m STM INV 287.30m CLEARANCE = 0.40m
CROSSING: SAN OBV 285.62m STM INV 286.89m CLEARANCE = 1.27m
CROSSING: SAN OBV 283.78m STM INV 286.69m CLEARANCE = 2.91m
CROSSING: SAN INV 283.45m STM OBV 283.35m CLEARANCE = 0.10m
CROSSING: SAN OBV 277.00m STM INV 277.50m CLEARANCE = 0.50m
CROSSING: SAN OBV 283.35m STM INV 285.41m CLEARANCE = 2.06m
CROSSING: SAN OBV 282.95m STM INV 283.68m CLEARANCE = 0.73m
CROSSING: SAN OBV 280.10m STM INV 280.30m CLEARANCE = 0.20m
CROSSING: SAN OBV 282.29m SAN INV 283.55m CLEARANCE = 1.26m
CROSSING: STM OBV 281.72m SAN INV 283.01m CLEARANCE = 1.29m
CROSSING: SAN OBV 281.87m STM INV 284.75m CLEARANCE = 2.88m
CROSSING: STM OBV 274.92m SAN OBV 274.70m CLEARANCE = 0.22m
CROSSING: SAN OBV 280.13m STM INV 280.96m CLEARANCE = 0.83m
CROSSING: SAN OBV 280.37m STM INV 280.57m CLEARANCE = 0.20m
CROSSING: SAN OBV 283.23m STM INV 285.08m CLEARANCE = 1.85m
CROSSING: SAN OBV 283.58m STM INV 283.92m CLEARANCE = 0.34m
CROSSING: SAN OBV 264.95m STM INV 270.30m CLEARANCE = 5.35m
CROSSING: SAN OBV 264.68m STM INV 270.08m CLEARANCE = 5.40m
CROSSING: SAN OBV 264.41m STM INV 269.86m CLEARANCE = 5.45m
CROSSING: STM INV 270.08m SAN OBV 269.88m CLEARANCE = 0.20m
CROSSING: SAN OBV 271.02m STM INV 271.22m CLEARANCE = 0.20m
CROSSING: SAN OBV 267.08m STM INV 273.52m CLEARANCE = 6.44m
CROSSING: SAN OBV 268.70m STM INV 270.21m CLEARANCE = 1.51m
CROSSING: SAN OBV 274.61m STM INV 274.81m CLEARANCE = 0.20m
CROSSING: SAN OBV 272.22m STM INV 272.72m CLEARANCE = 0.50m
CROSSING: SAN OBV 271.11m STM INV 271.51m CLEARANCE = 0.40m
CROSSING: SAN OBV 272.40m STM INV 272.80m CLEARANCE = 0.40m
CROSSING: SAN OBV 276.59m STM INV 277.09m CLEARANCE = 0.50m
CROSSING: SAN OBV 283.23m STM INV 285.23m CLEARANCE = 2.00m
CROSSING: SAN OBV 283.83m STM INV 285.83m CLEARANCE = 2.00m
CROSSING: SAN OBV 283.78m STM INV 285.78m CLEARANCE = 2.00m
CROSSING: SAN OBV 283.73m STM INV 285.73m CLEARANCE = 2.00m
CROSSING: SAN OBV 283.68m STM INV 285.68m CLEARANCE = 2.00m
CROSSING: SAN OBV



LEGEND:

- LIMIT OF DEVELOPMENT
- LIMIT OF SWM BLOCK
- PROPOSED STORM SEWER AND MAINTENANCE HOLE
- EXISTING CONTOUR AND ELEVATION (220.00)
- POND NORMAL WATER LEVEL (269.70 NWL)
- PROPOSED CONTOUR AND ELEVATION (270.20)
- MAINTENANCE ACCESS ROAD
- EMERGENCY SPILLWAY
- 3.0m WIDE MOW STRIP
- MAX 3:1 SLOPING
- 100 YEAR CAPTURE LOCATION

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

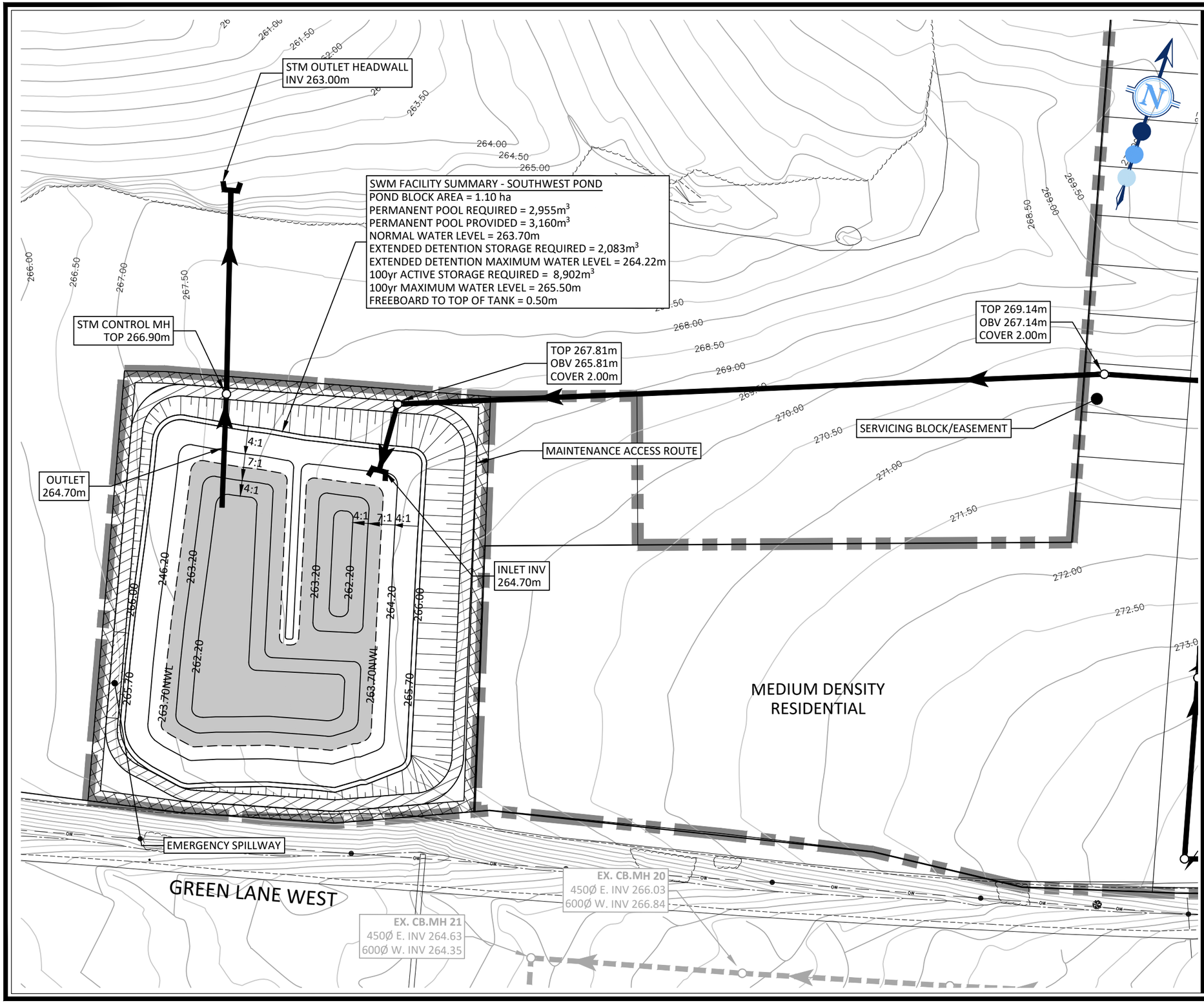
SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

FSSR

NORTHWEST YONGE AND GREEN LANE

PROPOSED SWM FACILITY - NORTH POND

DESIGNED BY:	H.Y./E.A.S.	CHECKED BY:	S.K.
SCALE:	1:1000	DATE:	FEBRUARY 2025
PROJECT No:	2300	FIGURE No:	5.1



LEGEND:

- LIMIT OF DEVELOPMENT
- LIMIT OF SWM BLOCK
- PROPOSED STORM SEWER AND MAINTENANCE HOLE
- EXISTING STORM SEWER AND MAINTENANCE HOLE
- 220.00 — EXISTING CONTOUR AND ELEVATION
- 264.70 NWL — POND NORMAL WATER LEVEL
- 265.20 — PROPOSED CONTOUR AND ELEVATION
- MAINTENANCE ACCESS ROAD
- EMERGENCY SPILLWAY
- 3.0m WIDE MOW STRIP
- MAX 3:1 SLOPING

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

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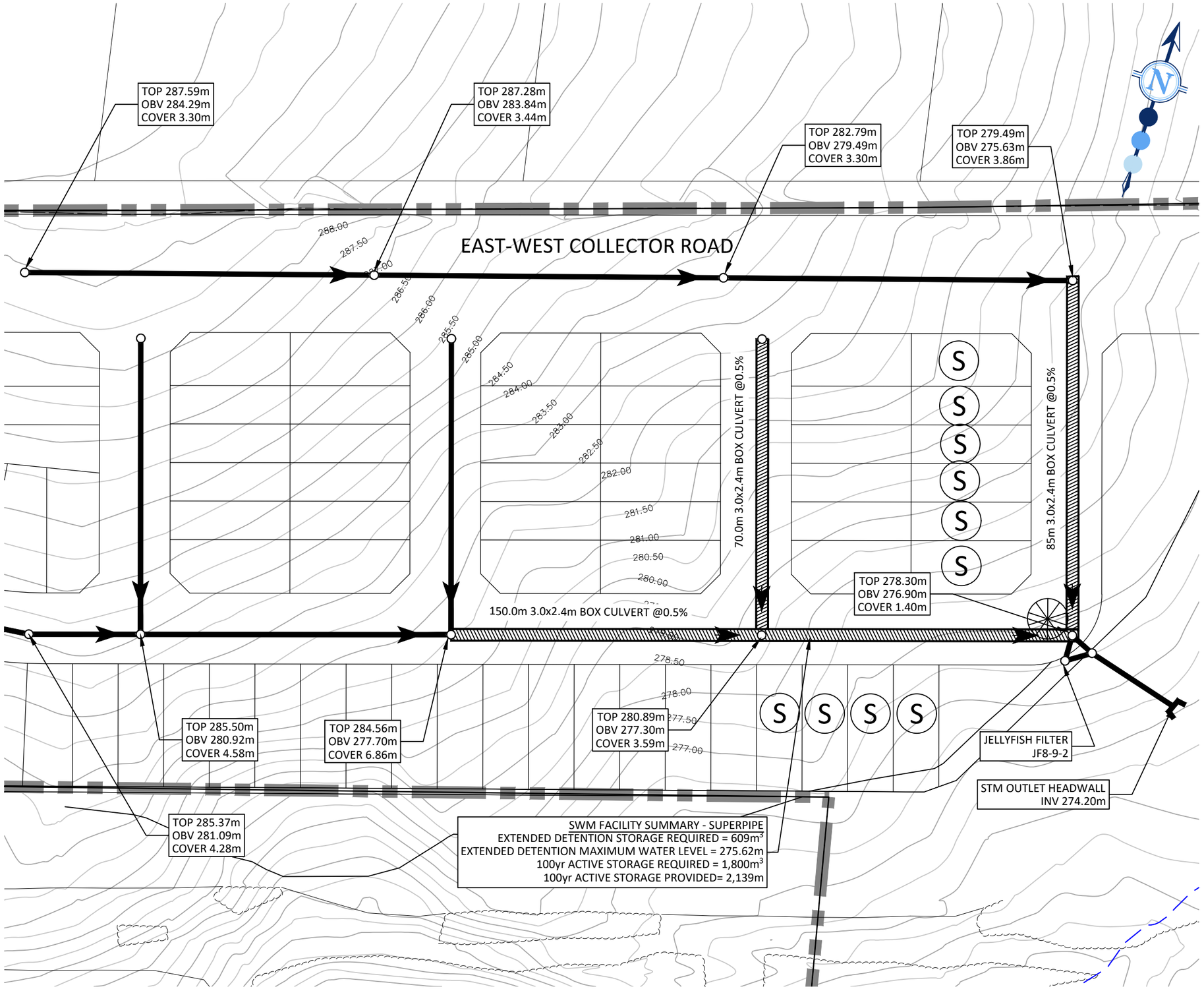
NORTHWEST YONGE AND GREEN LANE

PROPOSED SWM FACILITY - SOUTHWEST POND

DESIGNED BY:	H.Y./E.A.S.	CHECKED BY:	S.K.
SCALE:	1:1000	DATE:	FEBRUARY 2025
PROJECT No:	2300	FIGURE No:	5.2

File: P:\2300 NW Yonge and Green Lane\Drawings\FSP\Fig\Report Figures\2300P-SWMF-5.1-5.4.dwg - Revised by <SOZDEMIR> : Tue, Feb 04 2025 - 5:18pm



LEGEND:

- LIMIT OF DEVELOPMENT
- PROPOSED STORM SEWER AND MAINTENANCE HOLE
- STORM SUPERPIPE
- 220.00 — EXISTING CONTOUR AND ELEVATION
- 100 YEAR CAPTURE LOCATION
- S — SUMP PUMP

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

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FAX: (905) 475-8335

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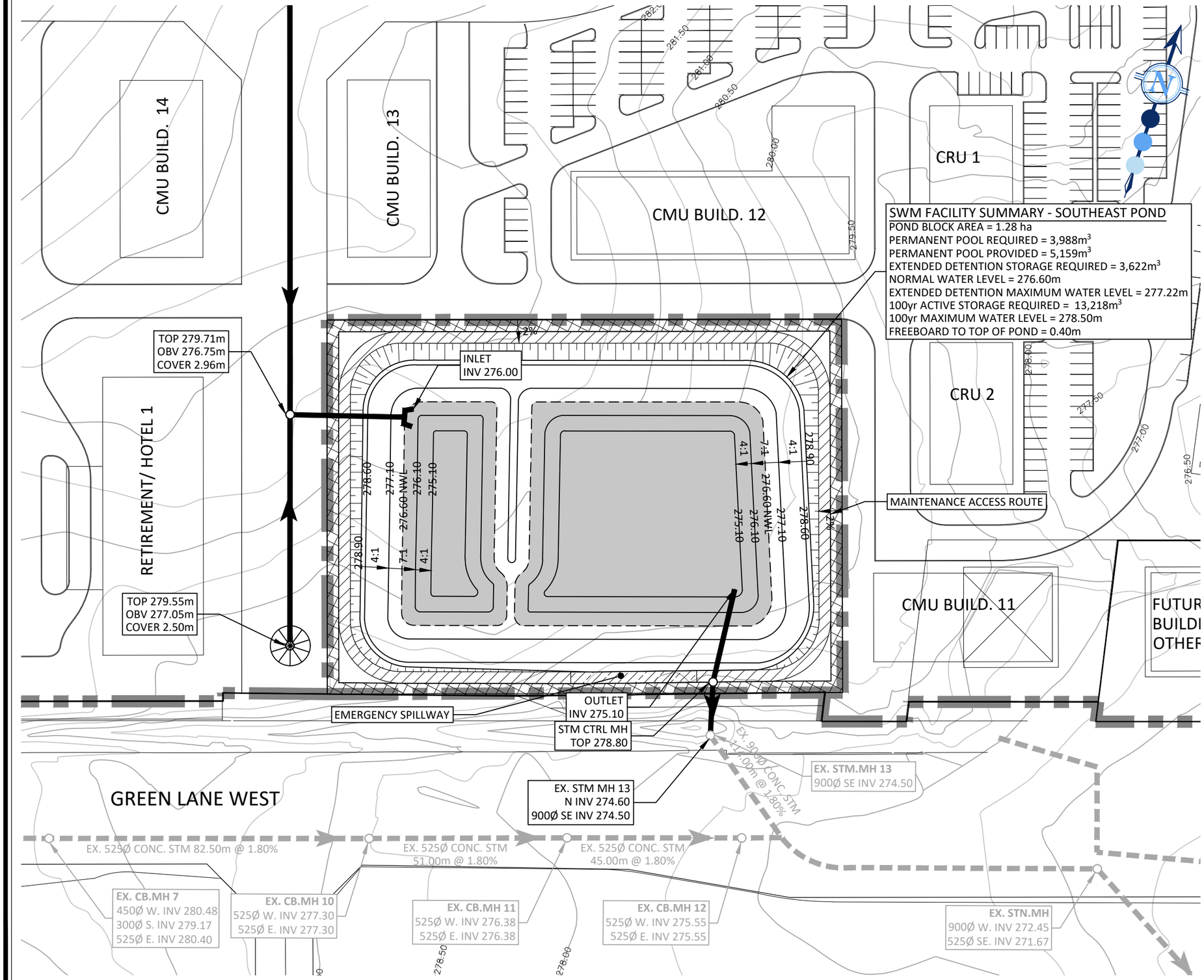
NORTHWEST YONGE AND GREEN LANE

PROPOSED SUPERPIPE

DESIGNED BY:	H.Y./E.A.S.	CHECKED BY:	S.K.
SCALE:	1:1000	DATE:	FEBRUARY 2025
PROJECT No:	2300	FIGURE No:	5.3



LEGEND:

- LIMIT OF DEVELOPMENT
- LIMIT OF SWM BLOCK
- PROPOSED STORM SEWER AND MAINTENANCE HOLE
- EXISTING STORM SEWER AND MAINTENANCE HOLE
- 220.00 — EXISTING CONTOUR AND ELEVATION
- 269.70 NWL — POND NORMAL WATER LEVEL
- 270.20 — PROPOSED CONTOUR AND ELEVATION
- MAINTENANCE ACCESS ROAD
- EMERGENCY SPILLWAY
- 3.0m WIDE MOW STRIP
- MAX 3:1 SLOPING
- 100 YEAR CAPTURE LOCATION

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

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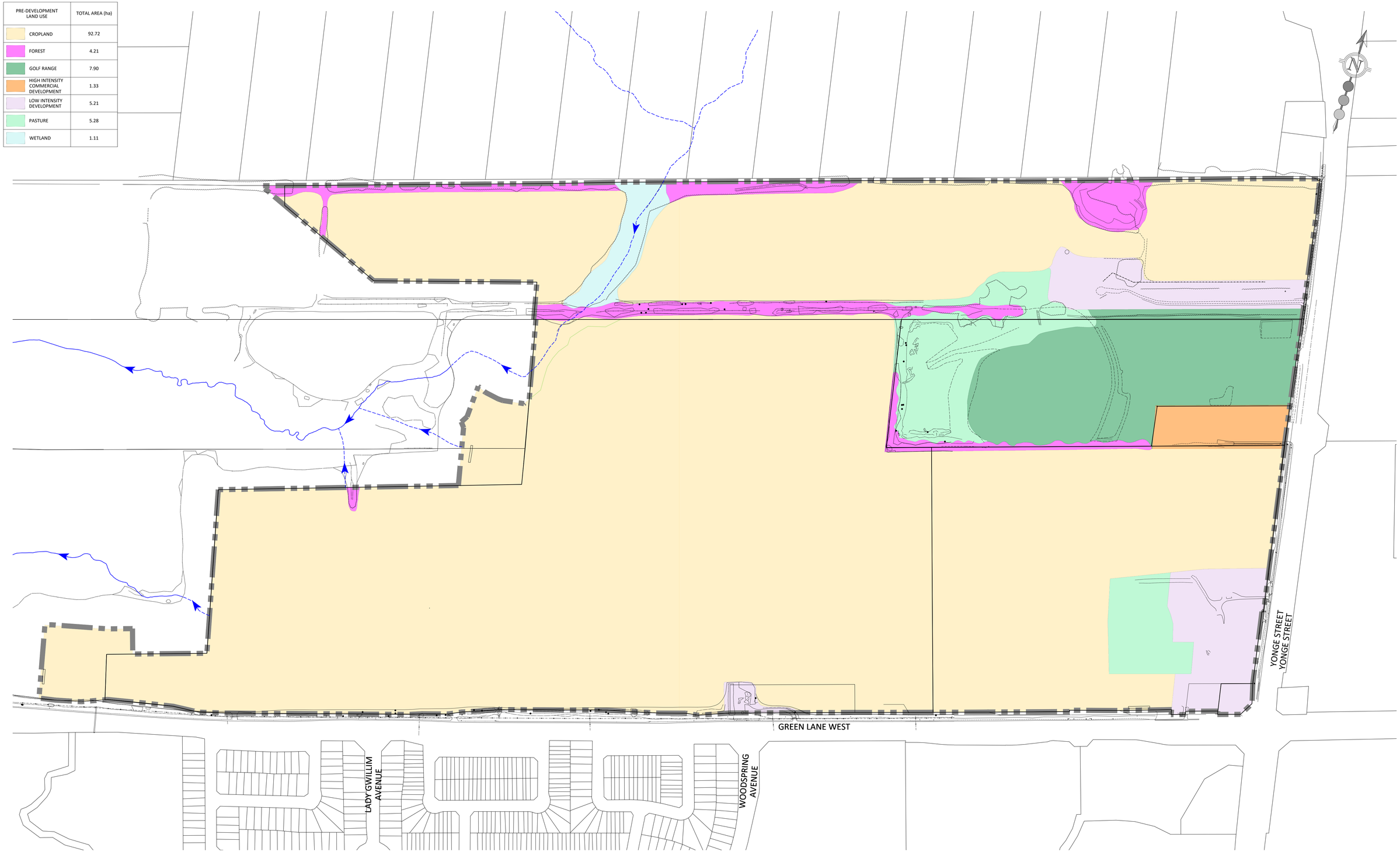
NORTHWEST YONGE AND GREEN LANE

PROPOSED SOUTHEAST POND

DESIGNED BY:	H.Y./E.A.S.	CHECKED BY:	S.K.
SCALE:	1:1000	DATE:	FEBRUARY 2025
PROJECT No:	2300	FIGURE No:	5.4

PRE-DEVELOPMENT LAND USE	TOTAL AREA (ha)
CROPLAND	92.72
FOREST	4.21
GOLF RANGE	7.90
HIGH INTENSITY COMMERCIAL DEVELOPMENT	1.33
LOW INTENSITY DEVELOPMENT	5.21
PASTURE	5.28
WETLAND	1.11



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

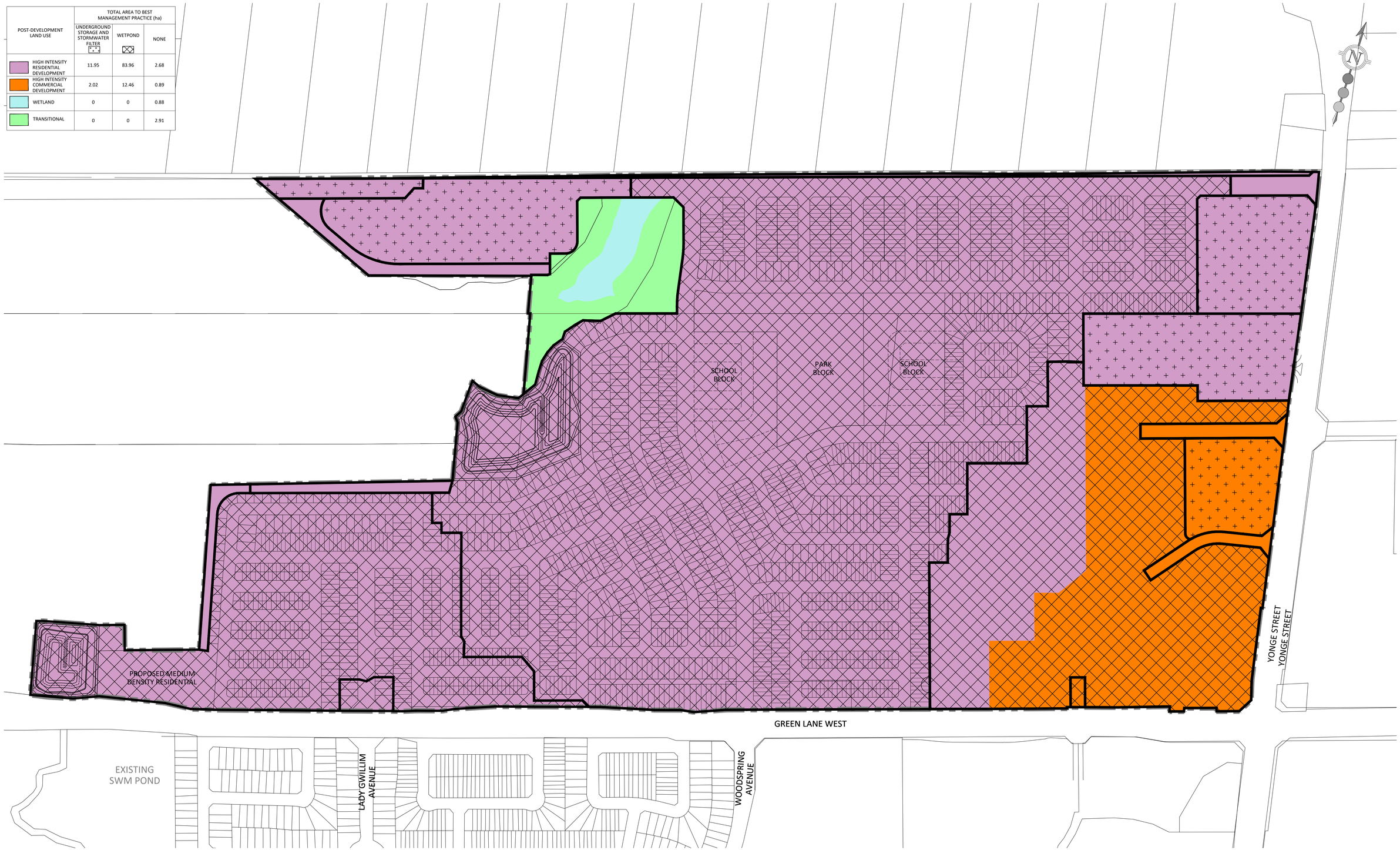
LEGEND:

LIMIT OF DEVELOPMENT

NORTHWEST YONGE AND GREEN LANE		EXISTING PHOSPHORUS BUDGET	
DESIGNED BY: H.Y./E.A.S.	CHECKED BY: E.T.C.K.	PROJECT No: 2300	FIGURE No: 5.5
SCALE: 1:2500	DATE: FEBRUARY 2025		

File: P:\2300 NW Yonge and Green Lane\Drawings\FSP\Fig\Report Figures\2300P-PHSB-EXST-5.5.dwg - Revised by <SOZDEMIR> : Tue, Feb 04 2025 - 4:13pm

POST-DEVELOPMENT LAND USE	TOTAL AREA TO BEST MANAGEMENT PRACTICE (ha)		
	UNDERGROUND STORAGE AND STORMWATER FILTER	WETPOND	NONE
HIGH INTENSITY RESIDENTIAL DEVELOPMENT	11.95	83.96	2.68
HIGH INTENSITY COMMERCIAL DEVELOPMENT	2.02	12.46	0.89
WETLAND	0	0	0.88
TRANSITIONAL	0	0	2.91



*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

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TEL: (905) 475-1900
FAX: (905) 475-8335

LEGEND:

LIMIT OF DEVELOPMENT

STORM DRAINAGE BOUNDARY

NORTHWEST YONGE AND GREEN LANE

PROPOSED PHOSPHORUS BUDGET

DESIGNED BY:	H.Y./E.A.S.	CHECKED BY:	E.T.C.K.	PROJECT No:	FIGURE No:
SCALE:	1:2500	DATE:	FEBRUARY 2025	2300	5.6

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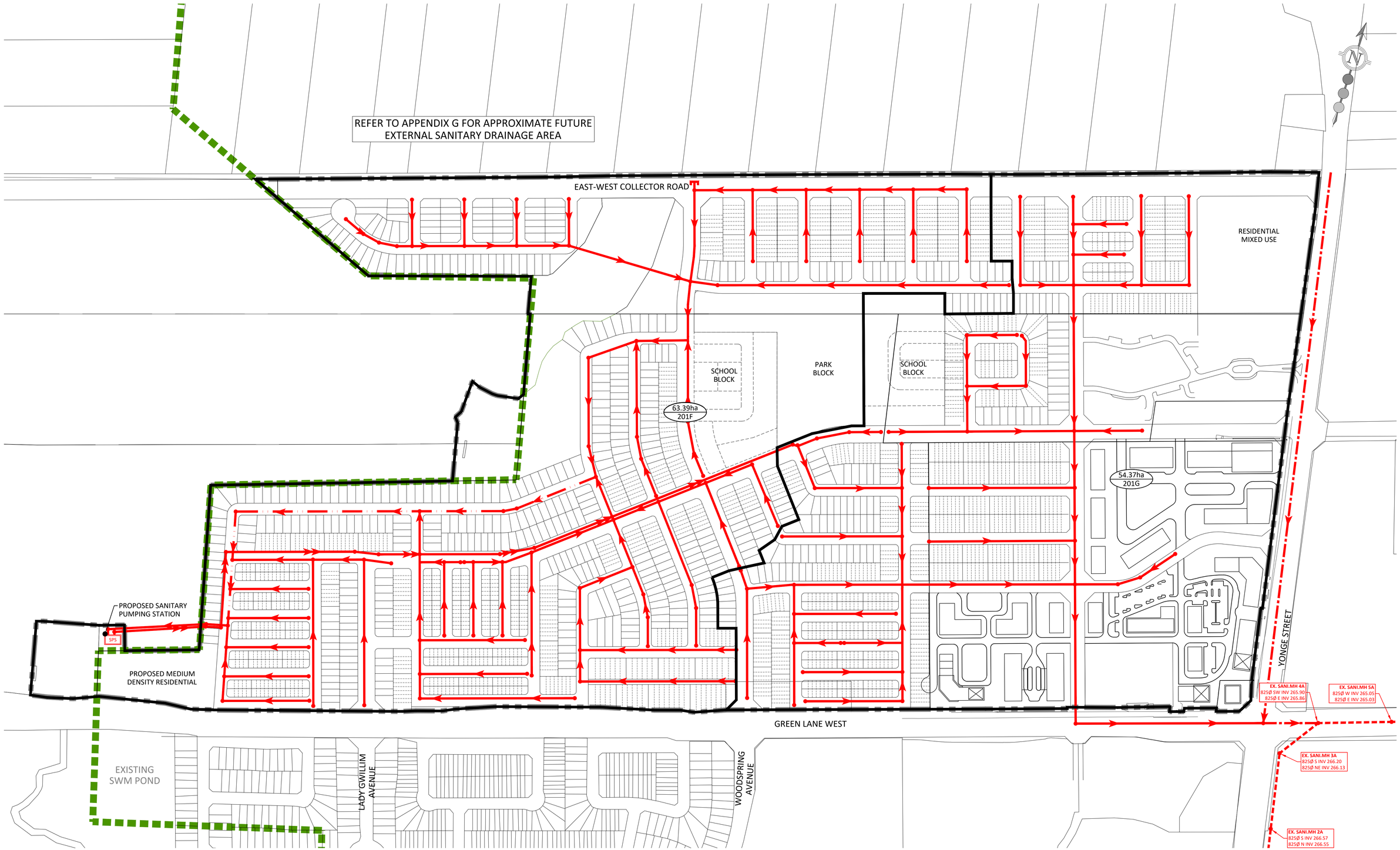

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

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MARKHAM, ONTARIO L3R 8B8
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FAX: (905) 475-8335

LEGEND:

- LIMIT OF DEVELOPMENT
- GREENBELT BOUNDARY
- SANITARY DRAINAGE BOUNDARY
- SANITARY SEWER AND MAINTENANCE HOLE
- EXISTING SANITARY SEWER AND MAINTENANCE HOLE
- FUTURE SANITARY SEWER BY REGION
- 54.47ha / 201G — DRAINAGE AREA (HECTARES) / CATCHMENT ID
- PROPOSED DUAL SANITARY SEWER AND MAINTENANCE HOLE

NORTHWEST YONGE AND GREEN LANE

PROPOSED SANITARY DRAINAGE PLAN

DESIGNED BY:	H.Y./E.A.S.	CHECKED BY:	E.T.C.K.
SCALE:	1:2500	DATE:	FEBRUARY 2025

PROJECT No:	FIGURE No:
2300	7.1

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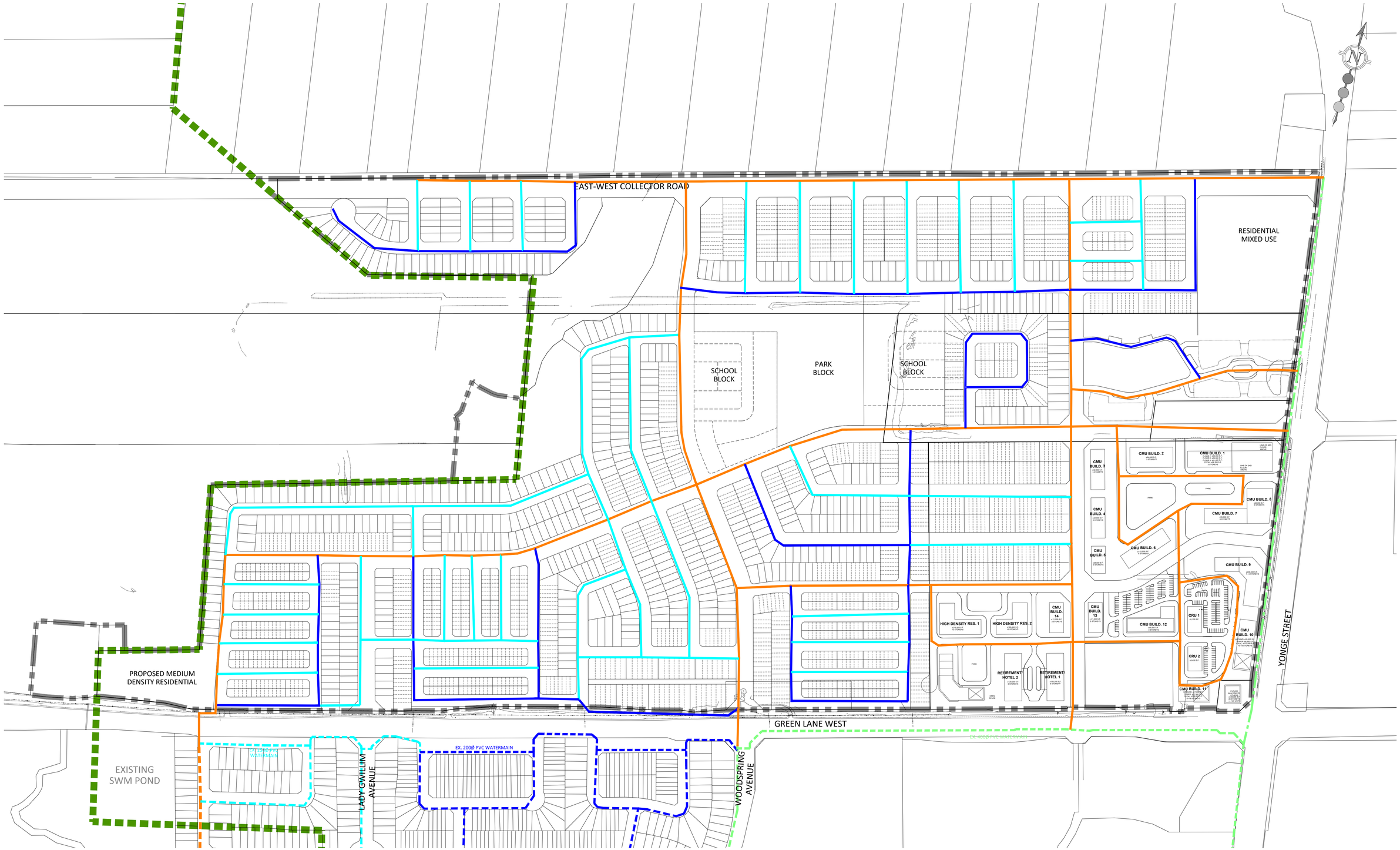

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

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TEL: (905) 475-1900
FAX: (905) 475-8335

LEGEND:

- LIMIT OF DEVELOPMENT
- GREENBELT BOUNDARY
- EXISTING 150Ø WATERMAIN
- EXISTING 200Ø WATERMAIN
- EXISTING 300Ø WATERMAIN
- EXISTING 400Ø WATERMAIN
- PROPOSED 150Ø WATERMAIN
- PROPOSED 200Ø WATERMAIN
- PROPOSED 300Ø WATERMAIN
- FUTURE 400Ø WATERMAIN

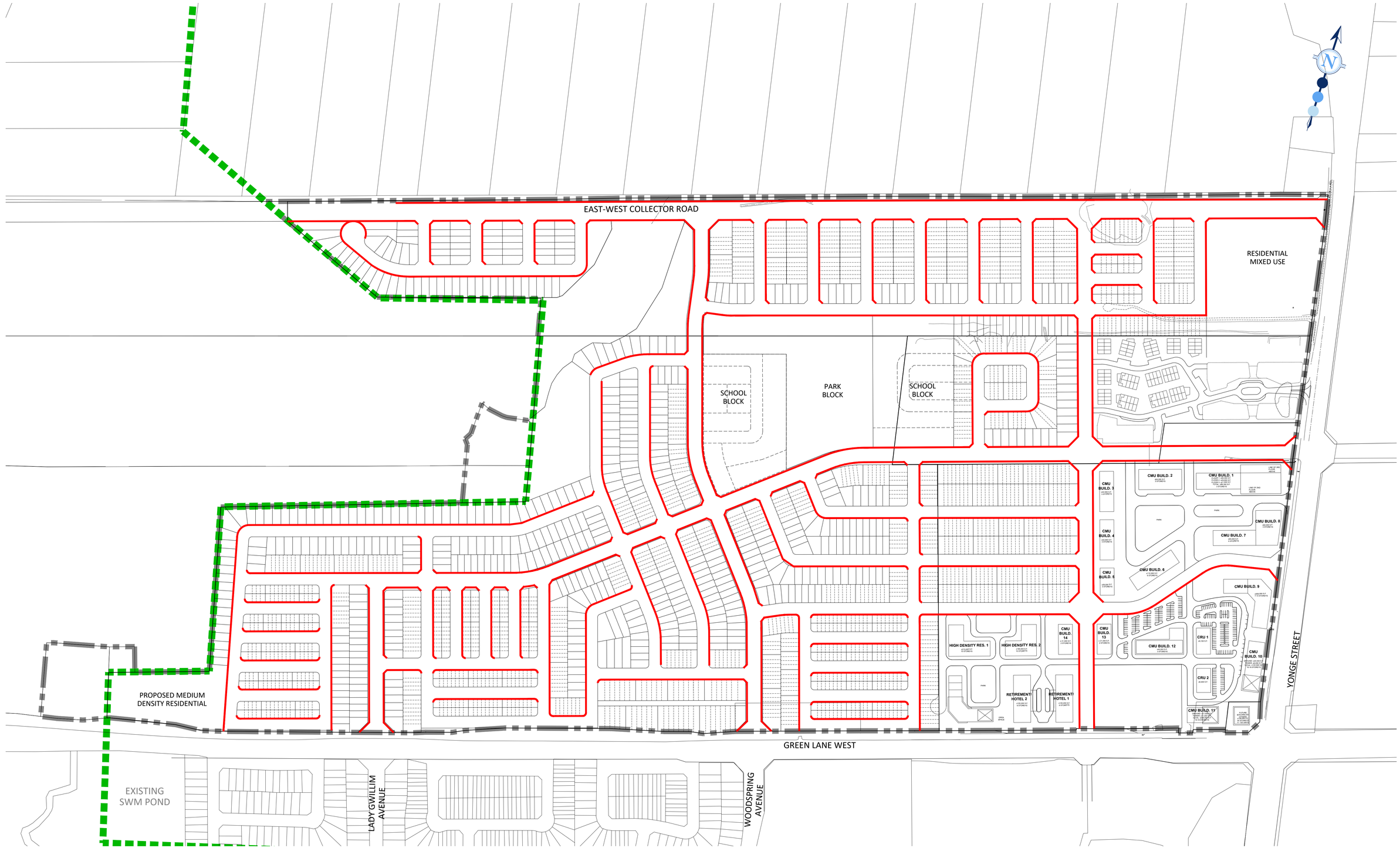
NORTHWEST YONGE AND GREEN LANE

PROPOSED WATER SERVICING PLAN

DESIGNED BY:	H.Y./E.A.S.	CHECKED BY:	E.T.C.K.
SCALE:	1:2500	DATE:	FEBRUARY 2025

PROJECT No:	FIGURE No:
2300	8.1

File: P:\2300 NW Yonge and Green Lane\Drawings\FSP\Fig\Report Figures\2300P-WTRM-8.1.dwg - Revised by <SOZDEMIR> : Tue, Feb 04 2025 - 5:21pm



*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

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FAX: (905) 475-8335

LEGEND:

- LIMIT OF DEVELOPMENT
- GREENBELT BOUNDARY
- PROPOSED SIDEWALK

NORTHWEST YONGE AND GREEN LANE

SIDEWALK LOCATION PLAN

DESIGNED BY: H.Y./E.A.S.	CHECKED BY: E.T.C.K.	PROJECT No: 2300	FIGURE No: 9.1
SCALE: 1:2500	DATE: FEBRUARY 2025		

File: P:\2300 NW Yonge and Green Lane\Drawings\FSP\Fig\Report Figures\2300P-SDWK-9.1.dwg – Revised by <SOZDEMIR> : Tue, Feb 04 2025 – 4:16pm

Appendix A Community Design Plan

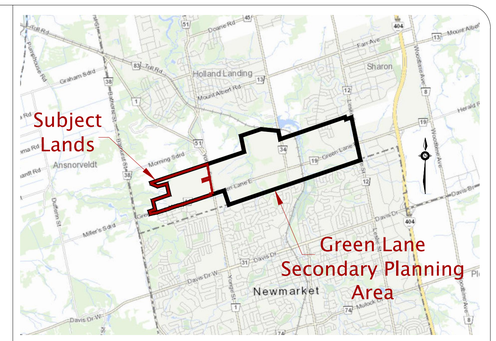
SCS consulting group ltd

COMBINED PHASES	Beechway Developments Inc.	Northmarket Holdings Inc.	Sundial	Rice Group	Totals
Single Detached	135	22	413	0	570
Street Townhomes	264	75	434	186	959
Street Back to Back Towns	32	110	562	0	704
Block Townhomes	0	0	113	0	113
High Density	0	0	0	1033	1033
Mixed Use Residential	1290	661	0	0	1951
Mixed Use Commercial	0	130	0	1526	1656
TOTAL	*1721*	*998*	*1522*	*2745*	*6986*

Units By Owner	
Beechway Developments Inc.	1721
Northmarket Holdings Inc.	998
Sundial	1522
Rice Group	2745
TOTAL	*6986*

Northwest Green Lane Community Design Plan Town of East Gwillimbury (Land Use Plan)

Compiled Plan of
Part of Lots 100, 101 and 102
Concession 1
West of Yonge Street
Part of Lots 101 102
Concession 1
East of Yonge Street
Geographic Township of East Gwillimbury
Town of East Gwillimbury
Regional Municipality of York
2025



Key Plan Scale 1:75,000

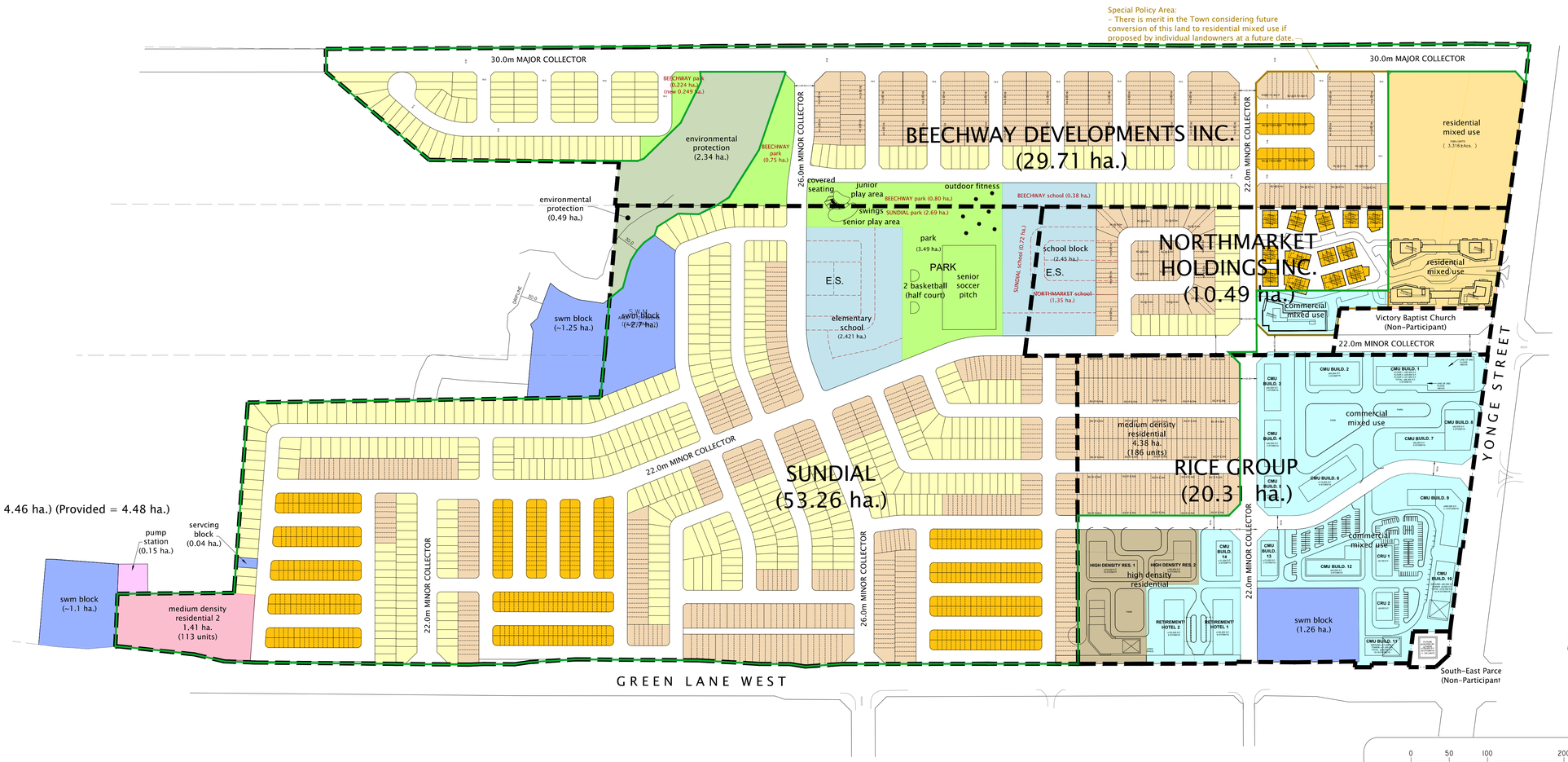
Statistics

Total Area = 117.57 ha.
115.22 ha. – Settlement Area
2.35 ha. – Greenbelt SWM Pond Area

Net Developable Total Area = 100.87 ha.
27.42 ha. – Beechway
11.03 ha. – Northmarket
53.25 ha. – Sundial
20.53 ha. – Rice
0.68 ha. – Church (Non-Participant)
0.22 ha. – South-East Parcel (Non-Participant)

Legend

- Single Detached
- Street Townhomes
- Street Back to Back Townhomes
- Block Townhomes
- High Density
- Mixed Use – Residential
- Mixed Use – Commercial
- Park (4.48 ha.)
- Institutional – School (4.87 ha.)
- Stormwater Management Blocks (6.35 ha.)
- Pump Station (0.15 ha.)
- Environmental Protection (2.83 ha.)
- Parkland Calculation – (Required 89.15 ha. x 5% = 4.46 ha.) (Provided = 4.48 ha.)



0 50 100 200 300M
SCALE 1 : 3000 (A1)

TOWN OF EAST GWILLIMBURY
LAND USE PLAN

Raymond J. Duhaime
REGISTERED PROFESSIONAL PLANNER
R.P.P.

Date Issued:	NOV. 28, 2024
Checked By:	RD
Project No.:	GRE-19060
Drawn By:	m.c.r.
Drawing Name:	GRE-19060-CDP-36-LU.dwg

SCHEDULE OF REVISIONS		
DATE	DESCRIPTION	DRAWN
25.01.28	NEW SUNDIAL PLAN/UPDATE CDP AND STATS	m.c.r.
25.02.05	MINOR CHANGE TO STATISTICS TABLE	m.c.r.

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Drive East, Unit 1, Barrie, Ontario, L4N 0W5
Phone: 705-734-2538 Fax: 705-734-1056
www.jonesconsulting.com

NORTHWEST YONGE GREEN LANE LANDOWNERS GROUP INC.
TOWN OF EAST GWILLIMBURY

G:\Planning Drawings\GRE-19060\Submitted\Jan 2025\GRE-19060-CDP-36-LU.dwg Layout:CDP-LU Plotted Feb 05, 2025 @ 8:33am by mrichards The Jones Consulting Group Ltd.

Appendix B Background Information

SCS consulting group ltd

Stream Permanency Assessment (Azimuth, 2023)

SCS consulting group ltd

AZIMUTH ENVIRONMENTAL CONSULTING, INC.
Environmental Assessments & Approvals

January 3, 2023 AEC 15-105b

Matson Planning and Development Inc.
20 Shore Breeze Dr., Suite 1609,
Toronto, ON
M8V 0C7

Re: **Stream Permanency Assessment – Green Lane Property (Properties 1 and 2), Town of East Gwillimbury, Regional Municipality of York**

Dear Mr. Matson:

Azimuth Environmental Consulting, Inc. (Azimuth) is pleased to provide the following stream permanency assessment for the property described above. It is our understanding that this assessment is required to characterize the drainage features on the property as either ephemeral or intermittent/permanent to assist with the Lake Simcoe Region Conservation Authority (LSRCA) review process for site development. The property location can be seen on Figure 1 attached.

1.0 POLICY CONTEXT

The Lake Simcoe Protection Plan (LSPP) (2009) outlines potential impacts and development constraints regarding shorelines and natural heritage. The purpose of these constraints is to minimize the alterations to permanent and intermittent streams, as alterations to these features can result in fragmentation of natural areas, degradation of water quality and negative impacts to fish and wildlife habitat (LSPP, 2009).

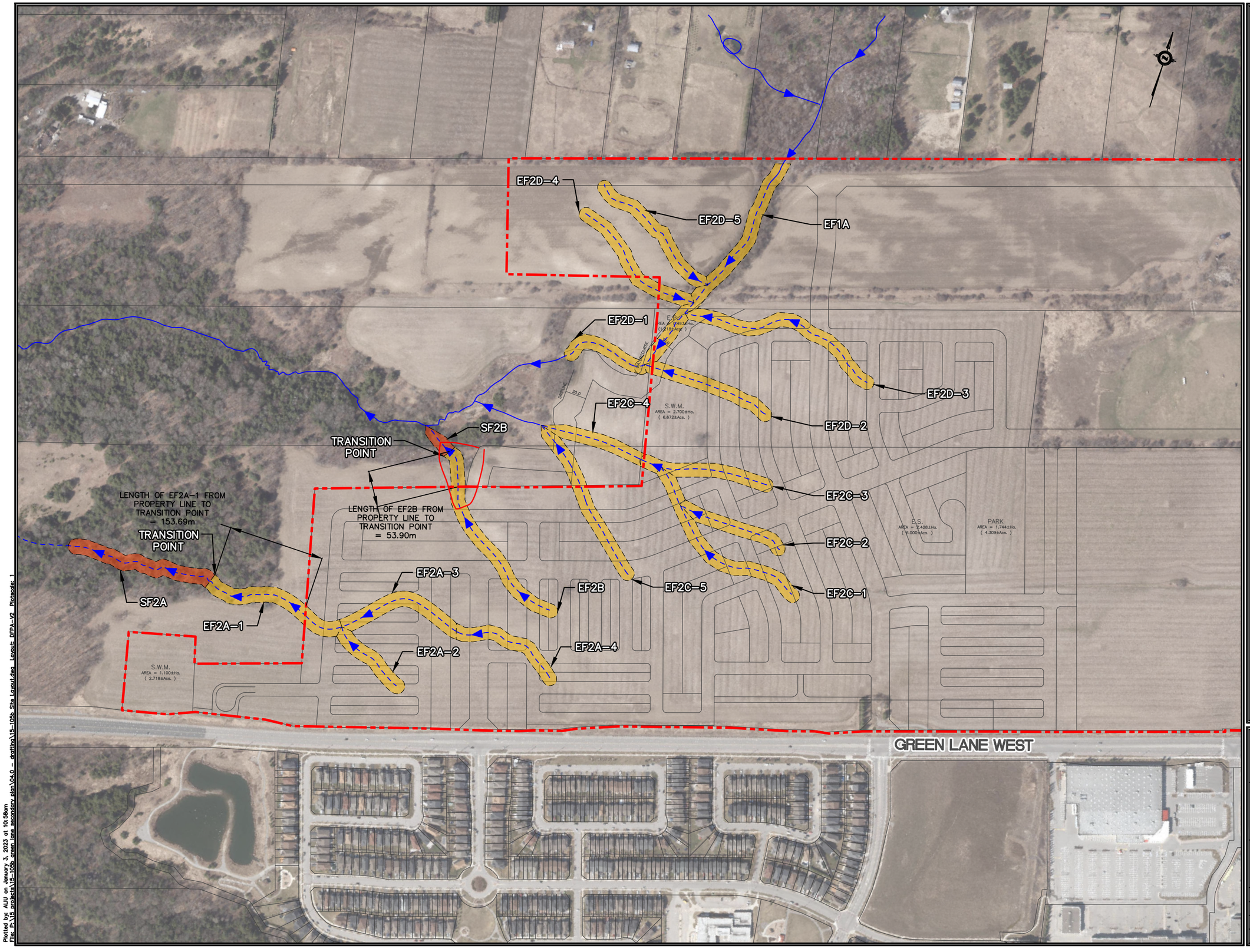
Within the LSPP, there are specific protections applied to streams and drainage features that are characterized as either permanent or intermittent. The LSPP identifies permanent and intermittent streams as key hydrological features as per Section 6.22-DP, and development or site alterations are not permitted within a key natural heritage features except under certain circumstances. However, no such protections or restrictions are outlined in the LSPP for ephemeral features. Therefore, the proper characterization of drainage features and streams as either permanent, intermittent, or ephemeral is important in the land use planning and development process.

642 Welham Road, Barrie, Ontario L4N 9A1
telephone: (705) 721-8451 • fax: (705) 721-8926 • info@azimuthenvironmental.com • www.azimuthenvironmental.com

Table 1. Summary of Stream Permanency Assessment – Green Lane Property (Properties 1 and 2), Town of East Gwillimbury.

Feature ID (s)	Surface Flow	Feature Characteristics	Feature Permanency
EF1A	Dry	No defined feature through thick hedgerow. No defined banks or channel bottom, no substrate sorting observed. Soils were dry with no aquatic vegetation. Feature appears to convey diffuse surface flow through hedgerow duff layer.	Ephemeral
EF2D-1, ED2D-2, ED2D-3 EF2D-4, EF2D-5, EF2C-1, EF2C-2, EF2C-3, EF2C-4, EF2C-5, EF2A-2 EF2A-3, EF2A-4	Dry	Dry agricultural swales through actively cropped farm field. No defined banks or channel bottom, no substrate sorting observed. Soils were dry with no aquatic vegetation.	Ephemeral
EF2B	Dry	At the edge of the properly line, tile drainage from the upslope farm field outlets into a vegetated drainage swale to the south of the forested lands. In the farm field upslope, the drainage feature has no defined banks or channel bottom, and no substrate sorting was observed. Within the vegetated drainage swale, terrestrial vegetation was dense throughout the feature. Poorly defined banks/channel bottom were observed, along with partial scouring/slumping of the feature, but this was attributed to the steep slope within the vegetated swale and not consistent/regular flows. Downstream of the Study Area, the feature continues to flow north where it transitions into feature SF2B.	Ephemeral
SF2B	Minimal/trickle flow	Poorly defined channel banks were noted along sections of the feature in this area, along with substrate sorting along the channel bottom (cobble observed). The banks were not continuous or prominent along the entire feature, but	Intermittent

		scouring and defined segments were noted. Standing water was noted in at the upstream segment of this feature, and a trickle flow of water was observed in the feature approximately 30m into the forested lands.	
EF2A-1	Dry	Dry agricultural swale through actively cropped farm field. No defined banks or channel bottom, no substrate sorting observed. Soils were dry with no aquatic vegetation. At the edge of the farm field, EF2A-1 drains into a grass swale with no define channel banks/bottom or substrate sorting observed. The grassed swale continues west until it begins to turn northwest into the forested area where it transitions into feature SF2A.	Ephemeral
SF2A	Dry	Poorly defined channel banks were noted along sections of the feature in this area, along with substrate sorting along the channel bottom (cobble observed). The banks were not continuous or prominent along the entire feature, but scouring and defined segments were noted. The entire feature segment was dry during the field investigation.	Intermittent



LEGEND:

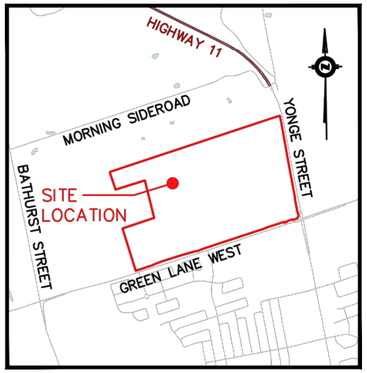
APPROX. PROPERTY BOUNDARY

DRAINAGE FEATURE FLOW PERMANENCY:

UNEVALUATED

INTERMITTENT

EPHEMERAL



LOCATION PLAN

DRAFT

0 125.00 250.0

HORIZONTAL SCALE 1:5000

AZIMUTH ENVIRONMENTAL CONSULTING, INC.
ENVIRONMENTAL ASSESSMENTS & APPROVALS

DRAINAGE FEATURE PERMANENCY ASSESSMENT AND PROPOSED SITE PLAN

GREEN LANE PROPERTY
EAST GWILLIMBURY, ON

DATE ISSUED:	NOVEMBER 2022	Figure No.
CREATED BY:	A.L.	2
PROJECT NO.:	15-105B	
REFERENCE:	SIMCOE COUNTY	

Plotted by: ALIU on January 3, 2023 at 10:58am
File: P:\15 projects\15-105b green lane secondary plan\04.0 - drafting\15-105b Site Layout.dwg Layout: DFPA-V2 Plotscale: 1

Geotechnical Investigation (Toronto Inspection, 2015)

SCS consulting group ltd

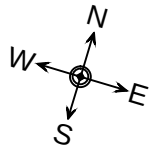
TIL TorontoInspection LTD.
GEO-ENVIRONMENTAL CONSULTANTS

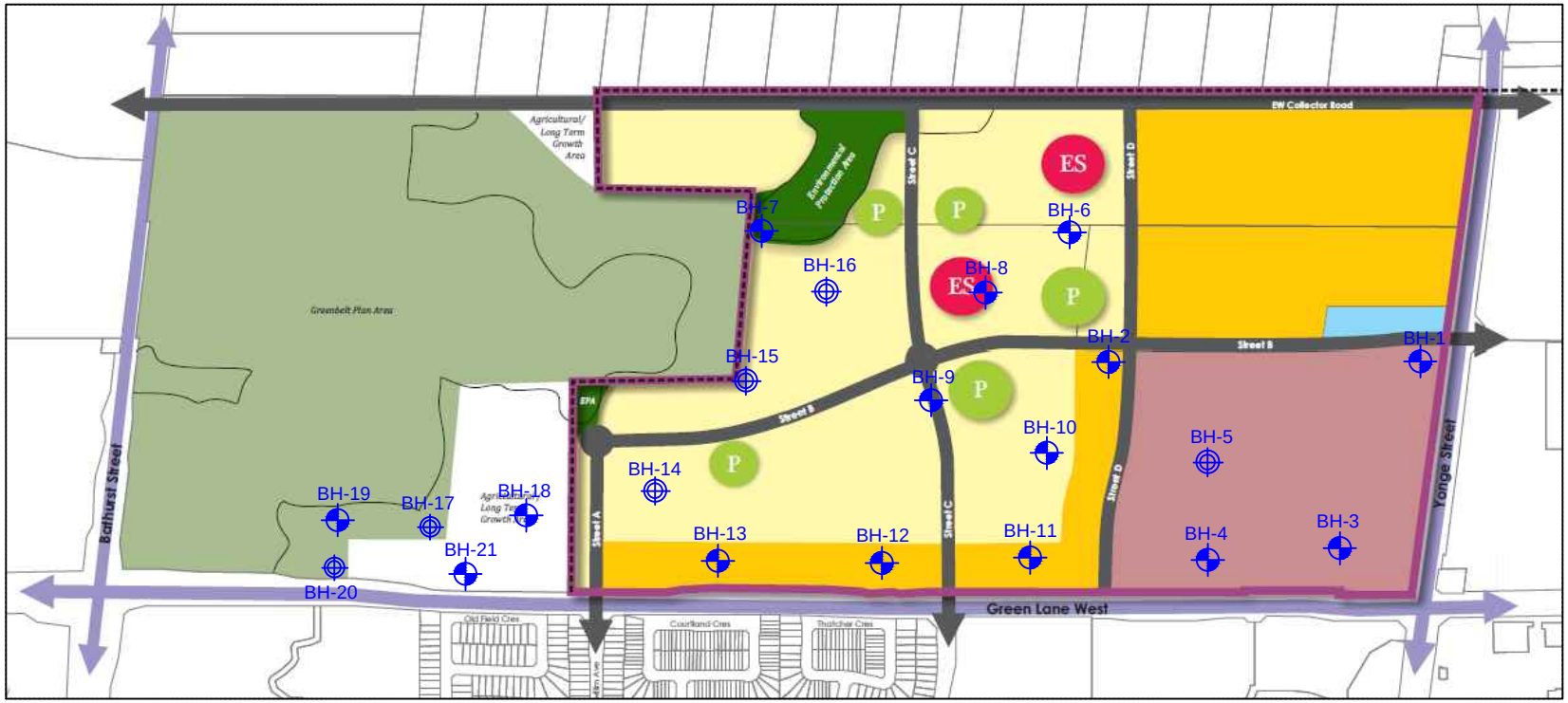
REPORT ON
GEOTECHNICAL INVESTIGATION
NW YONGE AND GREEN LANE SECONDARY PLAN
EAST GWILLIMBURY, ONTARIO

REPORT NO.: 4007-14-G-YON-A
REPORT DATE: JUNE 8, 2015

PREPARED FOR
YONGE GREEN LANE GP INC.
15 GORMLEY INDUSTRIAL, UNIT 3
P.O. BOX 215, GORMLEY, ONTARIO
L0H 1G0

110 KONRAD CRESCENT, UNIT 16, MARKHAM, ONTARIO L3R 9X2
TEL.: 905-940-8509 FAX: 905-940-8192





LEGEND :

/ Borehole/Monitoring Well Location

TorontoInspection LTD.
GEO-ENVIRONMENTAL CONSULTANTS

110 Konrad Crescent,
Unit 16
Markham, Ontario
L3R 9X2

Tel: 905-940 8509 Fax: 905-940 8192 Email : TIL1@rogers.com

TITLE:	Borehole/ Monitoring Well Location Plan
LOCATION:	NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

PROJECT NO.	DATE :	DRAWING NO :
4007-14-G-YON-A	December 2014	1

Boreholes BH-13, BH-15 were terminated in the clayey silt till deposit at depths of 6.6m from grade and the lower limit of this deposit was not established. The clayey silt till deposit, at BH-4, BH-7 and BH-17 locations, extended to depths of 2.1m to 5.8m from the existing ground level. The in-situ moisture content of the soil samples retrieved from the clayey silt till deposits ranged from 8% to 22%, indicating moist to very moist conditions, with wet spots near the ground surface.

4.7 Silty Sand/Sand

Underlying deposits of sandy silt till or clayey silt or clayey silt till, at BH-7, BH-8, BH-12, BH-14, BH-16, BH-18 and BH-19 locations, at depths of 2.1m to 5.8m from garde, silty and or sand deposits were contacted. The deposits, generally fine to medium grained, consisted of some silt or gravel, with occasional trace of clayey silt. Based on the Standard Penetration N-values of 36 to more than 100 blows per 0.3m penetration, the relative density of the deposits was dense to very dense.

Boreholes BH-7, BH-8, BH-12, BH-14, BH-16 and BH-18 were terminated in the silty sand/sand deposits at depths of 6.2m to 6.6m from grade and the lower limit of these deposits was not established. The silty sand deposit, at BH-19 locations, extended to a depth of 5.8m from grade.

The in-situ moisture content of the soil samples retrieved from this deposit ranged from 8% to 17%, indicating moist to wet conditions.

4.8 Ground Water

Free water or wet cave-in was recorded in the open boreholes at BH-1, BH-2, BH-4, BH-7 to BH-16 and BH-18 to BH-20, at depths between 2.7m and 6.0m from the existing ground level, upon the completion of borehole drilling. No free water was contacted in the remaining boreholes throughout the investigation.

On January 5, 6, March 24 and April 14, 2015, the water levels were documented in the observation wells at BH-5, BH-14 to BH-17 and BH-20:

Well Location	Jan 5 & 6, 2015		Mar 26, 2015		Apr 14, 2015	
	Depth (m)	Elevation (m)	Depth (m)	Elevation (m)	Depth * (m)	Elevation (m)
BH-5	1.10	287.37	1.62	286.85	1.87	286.60
BH-14	0.50	276.78	1.37	275.91	1.02	276.26
BH-15	0.53	275.88	1.07	275.34	0.70	275.71
BH-16	1.05	277.00	1.92	276.13	1.33	276.72
BH-17	0.90	267.26	1.71	266.45	1.62	266.54
BH-20	1.50	263.17	2.96	261.71	2.65	262.02

*: Water levels in the wells were measured after bailing out and recharge on and after March 26, 2015.

Based on the field records and the moisture content profiles of soil samples, as shown on the appended borehole logs, it is our opinion that the depths of free water or cave-in represent perched water in discontinuous sand layers or lenses. It is our opinion that there is no continuous groundwater table at the Site, within the depths of investigation.

5.0 RECOMMENDATIONS

We understand that the Site will be used for commercial, residential, parks and schools. However, the details of the development and the final gradients of the Site will be determined at detailed design.

Since the existing site gradient is undulating, with a grade difference of more than 27m across the Site, we recommend that additional boreholes should be required to obtain site specific subsoil and groundwater data and confirm our recommendations. For the purpose of this preliminary report, we have assumed that the final grade will be close to the existing ground surface.

Based on the subsoil data obtained at the borehole locations, our recommendations are as follows:

Project No. 4007-14-G-YON-A

Log of Borehole BH-1

Dwg No. 2

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/9/14

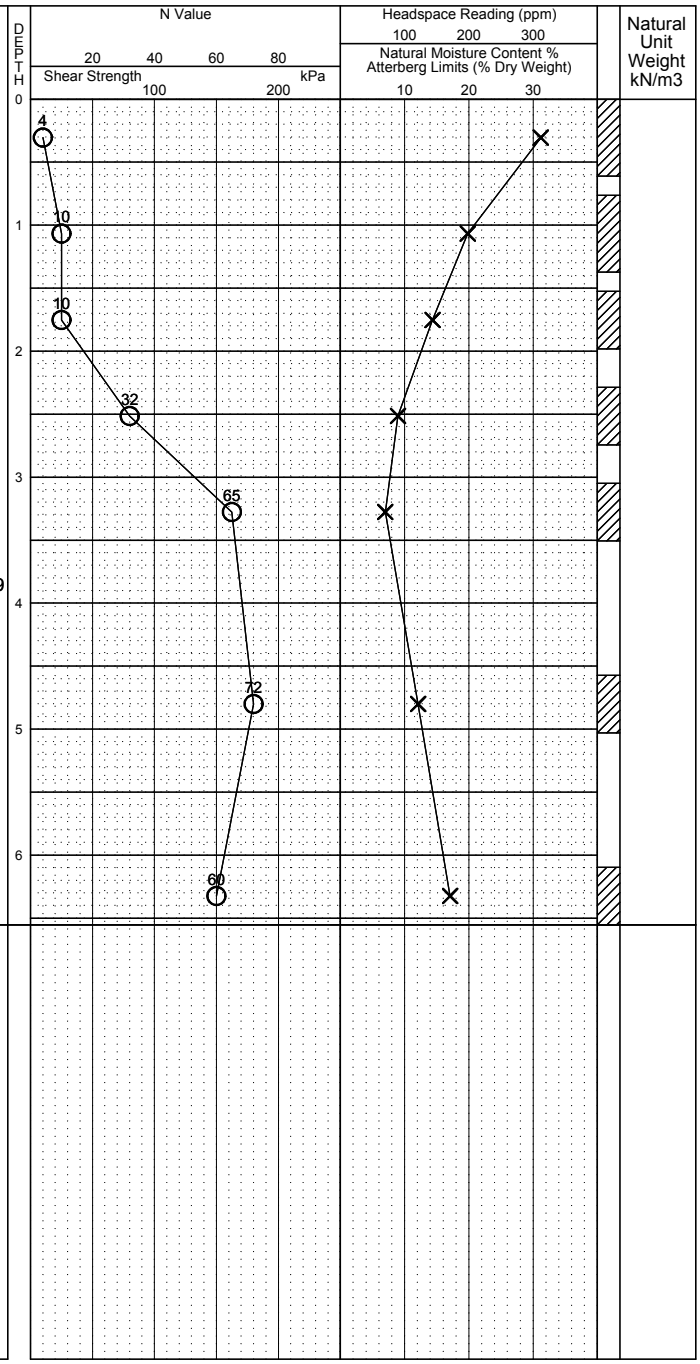
Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	282.29
		TOPSOIL	281.74
		SANDY SILT - compact, brown - some silty sand - trace of gravel - trace of clayey silt - damp to wet	280.92
		SANDY SILT TILL - compact, dense to very dense below 2.4m - brown - some silty sand - some gravel - trace of clayey silt at 1.5m - damp to moist	278.39
			277.42
		CLAYEY SILT - hard, grey - trace of gravel - moist	275.74
		END OF BOREHOLE **NOTE:** Upon completion of drilling: - water level at 3.9m	



LGBE3 4007-14-G-YON-A.GPJ 2/3/16

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

Project No. 4007-14-G-YON-A

Log of Borehole BH-2

Dwg No. 3

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/12/14

Drill Type: Track Mounted Drill Rig

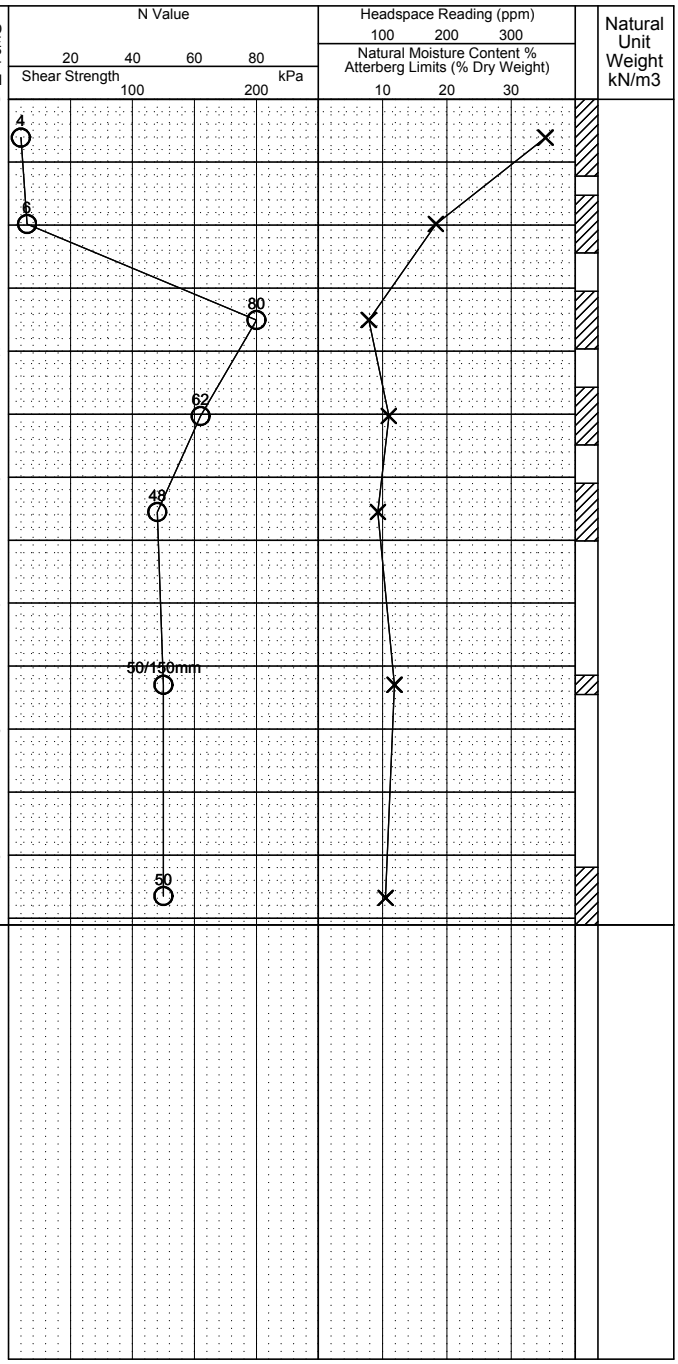
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	291.99
		TOPSOIL	291.71
		REWORK FILL - brown sandy silt to clayey silt - some rootlets - damp	290.93
▼		**SANDY SILT TILL** - very dense to dense - brown - some gravel - trace of clayey silt - seams of fine sand - moist	287.29
		END OF BOREHOLE	285.44

NOTES:
Upon completion of drilling:
- water level at 4.7m



Natural Unit Weight kN/m3

LGBE3 4007-14-G-YON-A.GPJ 2/3/16

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

Project No. 4007-14-G-YON-A

Log of Borehole BH-3

Dwg No. 4

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/9/14

Drill Type: Track Mounted Drill Rig

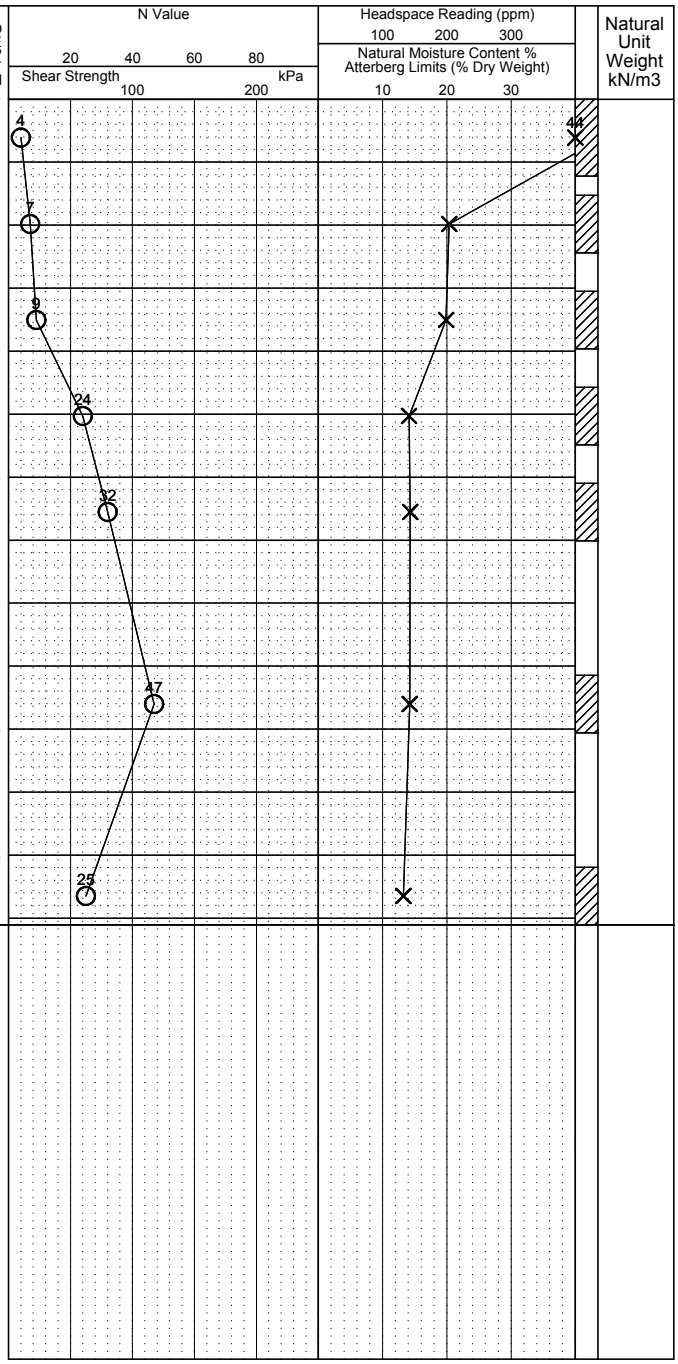
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	280.20
		TOPSOIL	279.64
		CLAYEY SILT - firm, brown - trace of sandy silt - trace of gravel - moist to damp	278.07
		SANDY SILT TILL - compact, dense to very dense below 3.0m - some clayey silt - some gravel - seams of fine sand - moist	275.32
		CLAYEY SILT - very stiff, grey - low plasticity - trace of sandy silt - trace of gravel - moist	273.65
		END OF BOREHOLE	

NOTES:
Upon completion of drilling:
- no free water



Natural Unit Weight kN/m3

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

Project No. 4007-14-G-YON-A

Log of Borehole BH-4

Dwg No. 5

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/9/14

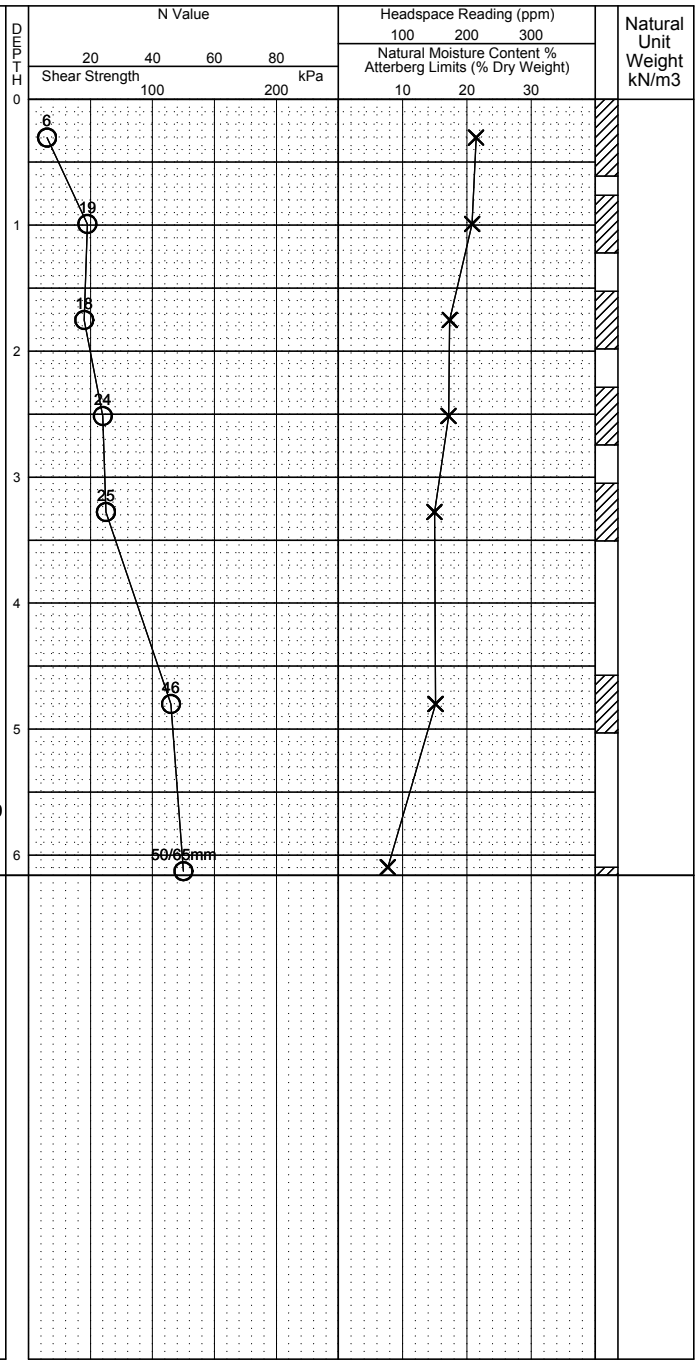
Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	283.29
		TOPSOIL	282.98
		REWORK FILL - brown sandy silt to clayey silt - trace of rootlets - moist	282.68
		SANDY SILT - compact, brown - trace of clayey silt - trace of gravel - seams of sand at 3.6m - moist	279.02
		CLAYEY SILT TILL - hard, grey - some gravel - trace of sandy silt - moist	277.59 277.50
		SANDY SILT - very dense, grey - some silty sand - trace of gravel - moist	277.13
		END OF BOREHOLE **NOTES:** Upon completion of drilling: - water level at 5.7m	



NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

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Time	Water Level (m)	Depth to Cave (m)

LGBE3 4007-14-G-YON-A.GPJ 2/3/16

Project No. 4007-14-G-YON-A

Log of Borehole BH-5

Dwg No. 6

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/15/14

Drill Type: Track Mounted Drill Rig

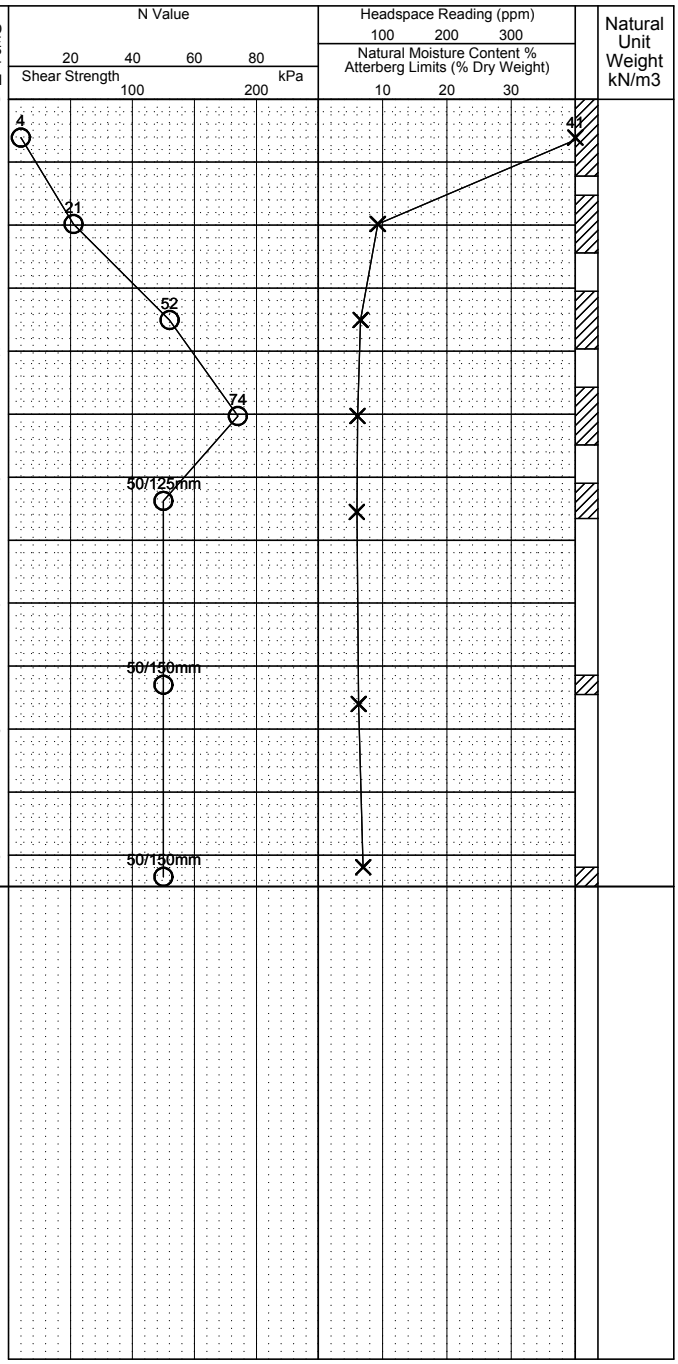
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

Soil Description	ELEV. m
Ground Surface	288.47
TOPSOIL	287.91
SANDY SILT TILL - compact, very dense below 1.5m - brown - layers of silty sand - some gravel - moist	286.59
	282.22
END OF BOREHOLE	

NOTES:
Upon completion of drilling:
- no free water



NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

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Time	Water Level (m)	Depth to Cave (m)
January 5, 2015	1.10m	
March 26, 2015	1.62m	
April 14, 2015	1.89m	

LGBE3 4007-14-G-YON-A.GPJ 2/3/16

Project No. 4007-14-G-YON-A

Log of Borehole BH-6

Dwg No. 7

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/12/14

Drill Type: Track Mounted Drill Rig

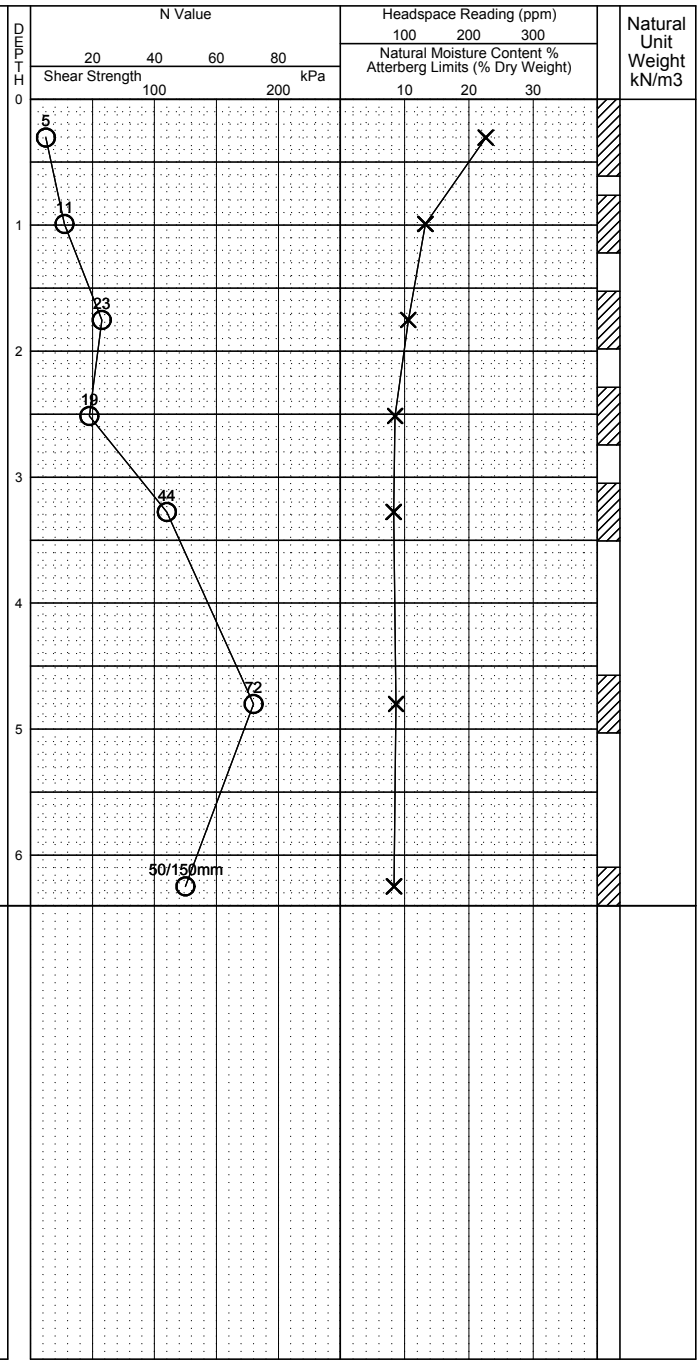
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	288.89
		TOPSOIL	288.28
		SANDY SILT TILL - compact, dense to very dense below 3.0m - brown, grey below 6.0m - trace of clayey silt - trace to some gravel - seams of fine sand - moist	282.49
		END OF BOREHOLE	

NOTES:
Upon completion of drilling:
- no free water



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Time	Water Level (m)	Depth to Cave (m)

LGBE3 4007-14-G-YON-A.GPJ 2/3/16

Project No. 4007-14-G-YON-A

Log of Borehole BH-7

Dwg No. 8

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/12/14

Drill Type: Track Mounted Drill Rig

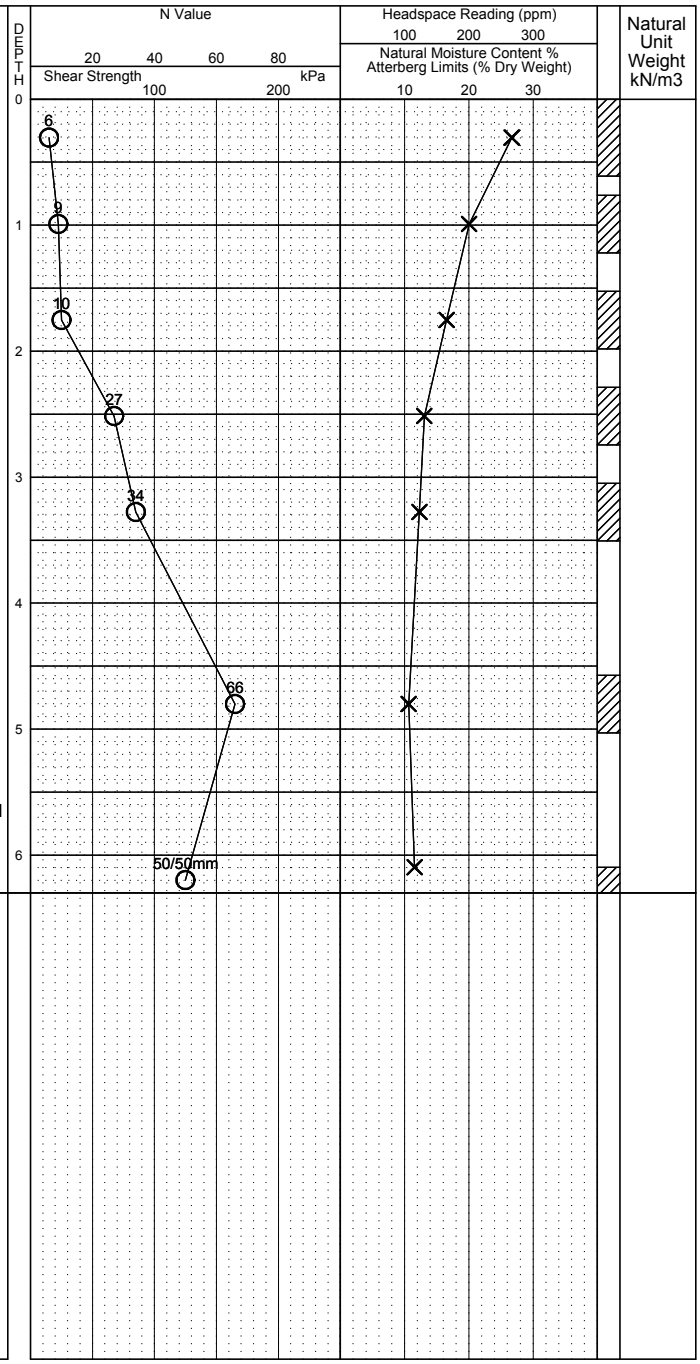
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	273.11
		TOPSOIL	272.50
		CLAYEY SILT TILL - stiff, brown - some sandy silt - trace of gravel - very moist to moist	270.98
		SANDY SILT TILL - compact to very dense - brown, grey below 4.5m - some gravel - seams of sand - trace of clayey silt - moist	267.41 267.32
▼		**SILTY SAND** - very dense, grey - fine to medium grained - some gravel - wet	266.81
		END OF BOREHOLE	

NOTES:
Upon completion of drilling:
- water level at 5.7m



NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

LGBE3 4007-14-G-YON-A.GPJ 2/3/16

Project No. 4007-14-G-YON-A

Log of Borehole BH-8

Dwg No. 9

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/12/14

Drill Type: Track Mounted Drill Rig

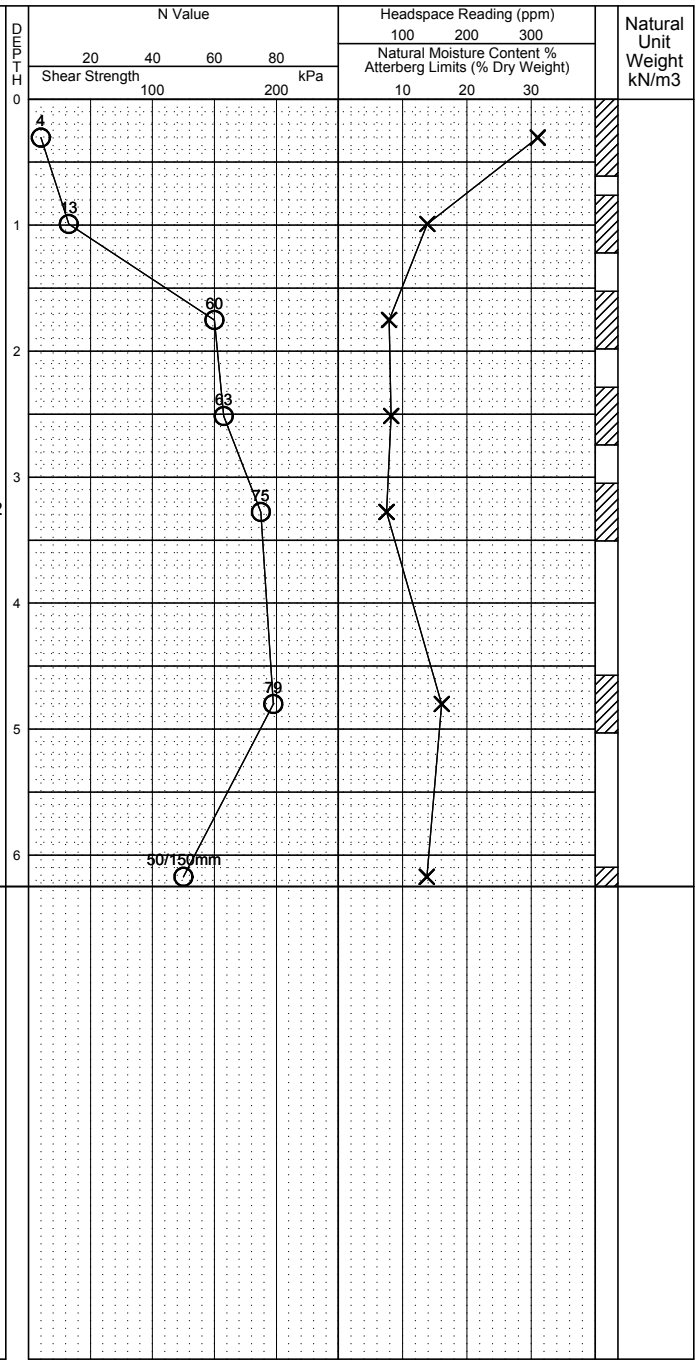
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	290.52
		TOPSOIL	290.11
		REWORK FILL - brown sandy silt - trace of rootlets - very moist	289.76
		SANDY SILT TILL - compact, very dense below 1.5m - brown - some gravel - some silty sand - moist	287.22
		SAND - very dense, brown - fine to medium grained - silty at 4.5m - some gravel - damp to wet	286.25
		END OF BOREHOLE	284.27

NOTES:
Upon completion of drilling:
- water level at 3.3m
- cave-in at 5.1m



NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

LGBE3 4007-14-G-YON-A.GPJ 2/3/16

Project No. 4007-14-G-YON-A

Log of Borehole BH-9

Dwg No. 10

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/15/14

Drill Type: Track Mounted Drill Rig

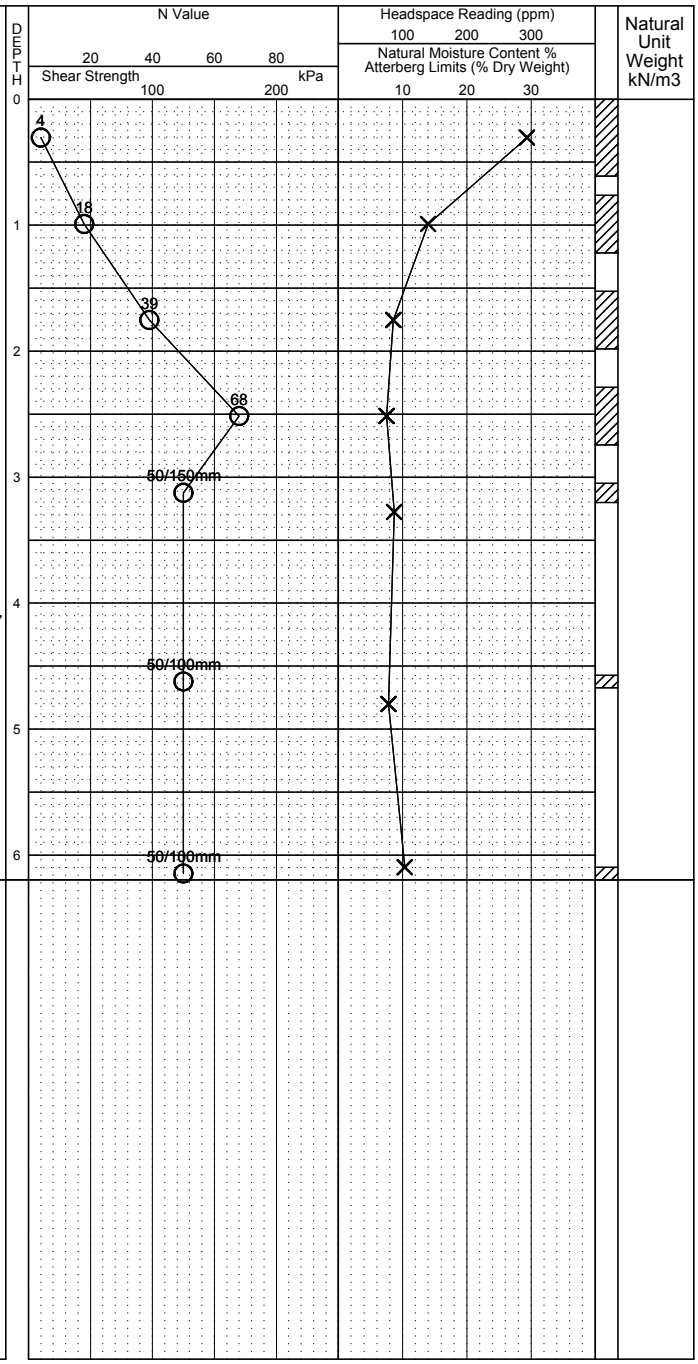
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	289.27
		TOPSOIL	288.81
		REWORK FILL - dark brown to brown sandy silt - moist	288.51
		SANDY SILT TILL - compact, dense to very dense below 1.5m - brown - layers of silty sand - some gravel - moist, wet below 4.5m	
▼			285.07
			283.07
		END OF BOREHOLE	

NOTES:
Upon completion of drilling:
- water level at 4.2m



NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

LGBE3 4007-14-G-YON-A.GPJ 2/3/16

Project No. 4007-14-G-YON-A

Log of Borehole BH-10

Dwg No. 11

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/15/14

Drill Type: Track Mounted Drill Rig

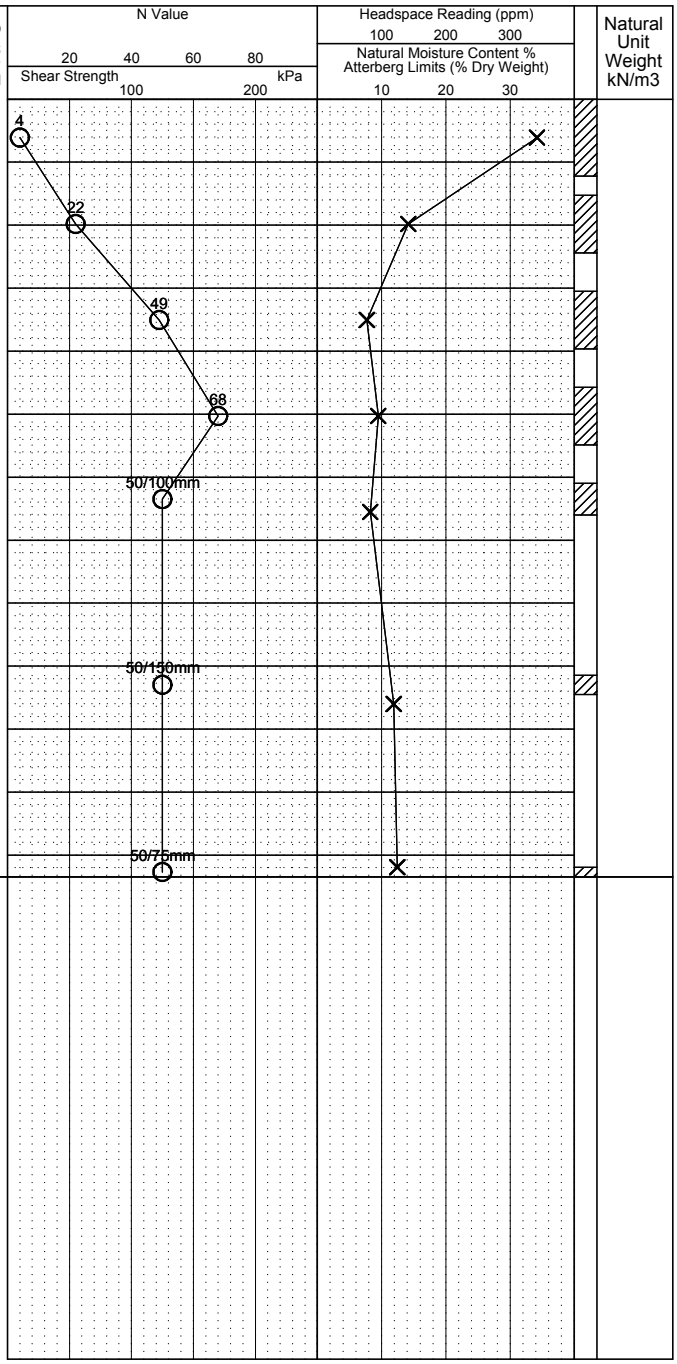
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	295.25
		TOPSOIL	294.92
		REWORK FILL - dark brown to brown sandy silt - trace of rootlets - moist	294.49
		SANDY SILT TILL - compact, dense to very dense below 1.5m - brown - layers of silty sand - some gravel - trace of clayey silt at 6.0m - moist, damp at 6.0m	
▼			289.55
		END OF BOREHOLE	289.08

NOTES:
Upon completion of drilling:
- water level at 5.7m



NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

LGBE3 4007-14-G-YON-A.GPJ 2/3/16

Project No. 4007-14-G-YON-A

Log of Borehole BH-11

Dwg No. 12

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/9/14

Drill Type: Track Mounted Drill Rig

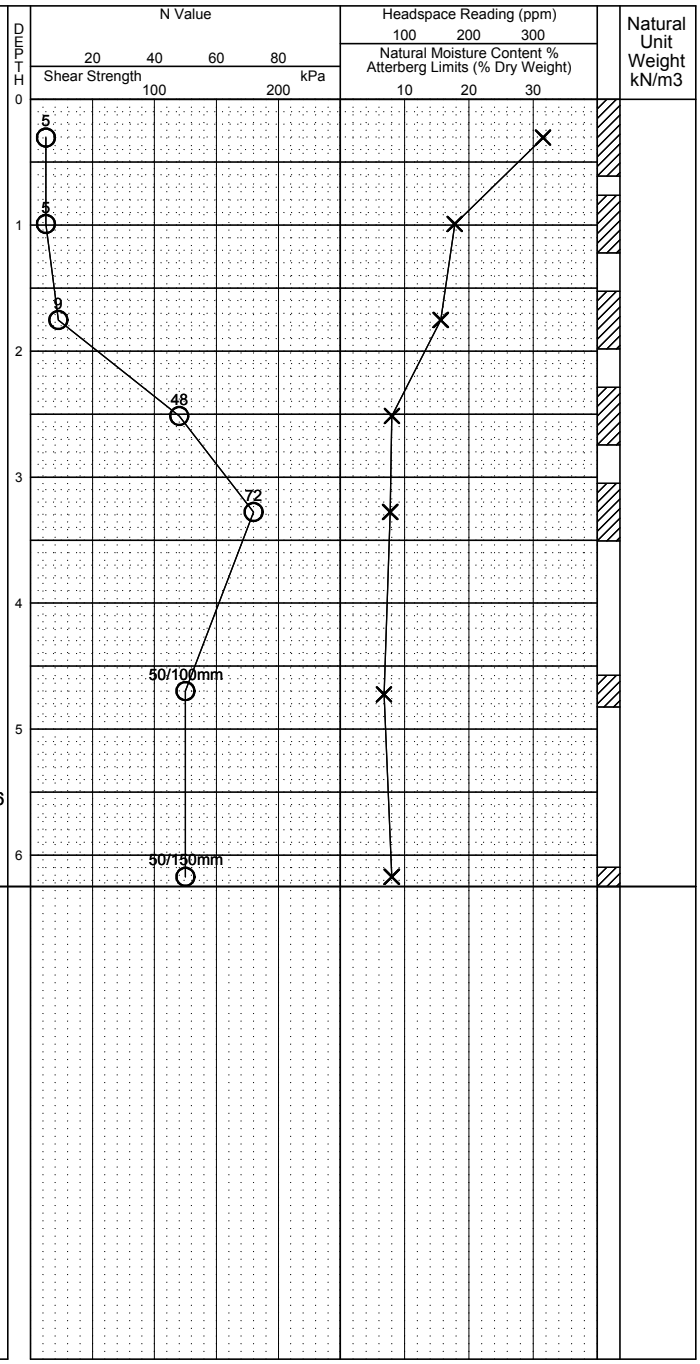
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	290.06
		TOPSOIL	289.76
		SANDY SILT - loose, brown - some clayey silt at 1.5m - some gravel at 1.5m - wet to very moist	287.93
▼		**SANDY SILT TILL** - dense to very dense - brown, grey below 6.0m - some gravel - seams of fine sand - moist	284.46 283.81
		END OF BOREHOLE	

NOTES:
Upon completion of drilling:
- water level at 5.6m



NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

LGBE3 4007-14-G-YON-A.GPJ 2/3/16

Project No. 4007-14-G-YON-A

Log of Borehole BH-12

Dwg No. 13

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/9/14

Drill Type: Track Mounted Drill Rig

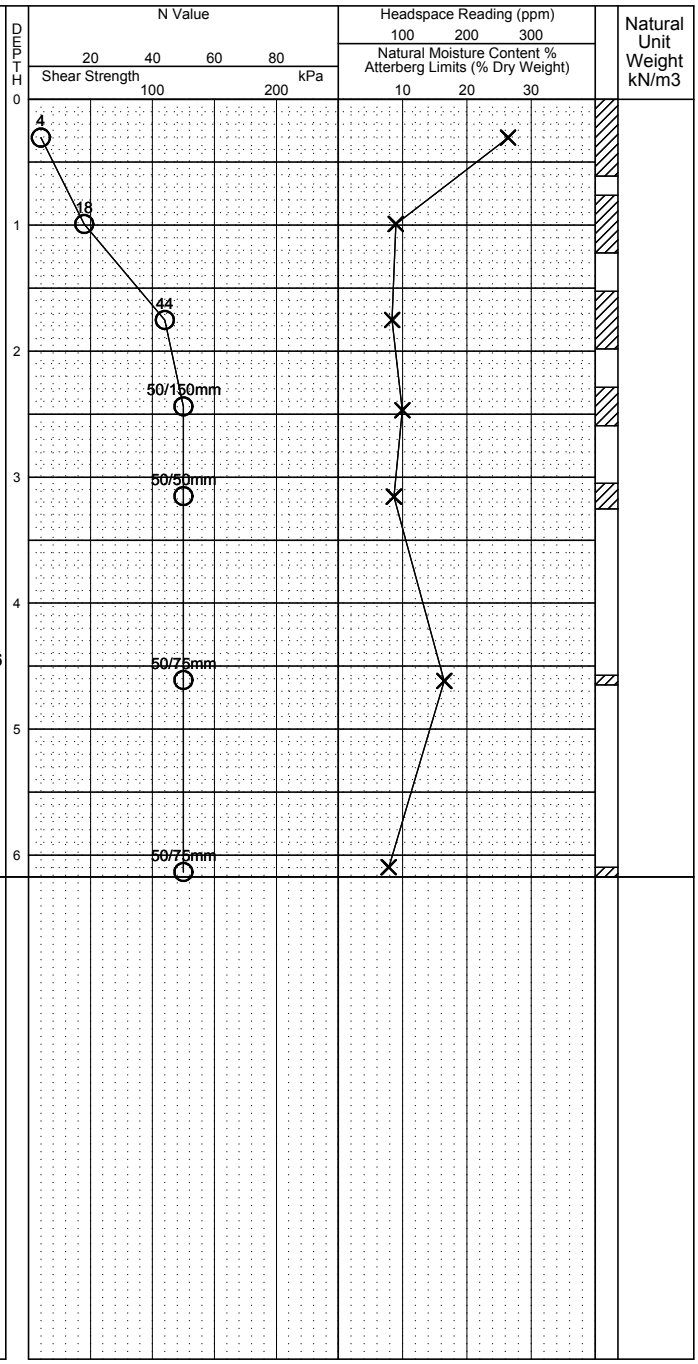
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	291.96
		TOPSOIL	291.35
		SANDY SILT TILL - compact to dense, brown - some silty sand - trace of gravel - moist	289.83
▼		**SILTY SAND** - very dense - brown, grey below 6.0m - trace of gravel - layer of sandy silt at 4.5m - moist, wet at 4.5m	287.46
		END OF BOREHOLE	285.79

NOTES:
Upon completion of drilling:
- water level at 4.5m



Natural Unit Weight kN/m3

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

LGBE3 4007-14-G-YON-A.GPJ 2/3/16

Project No. 4007-14-G-YON-A

Log of Borehole BH-13

Dwg No. 14

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/10/14

Drill Type: Track Mounted Drill Rig

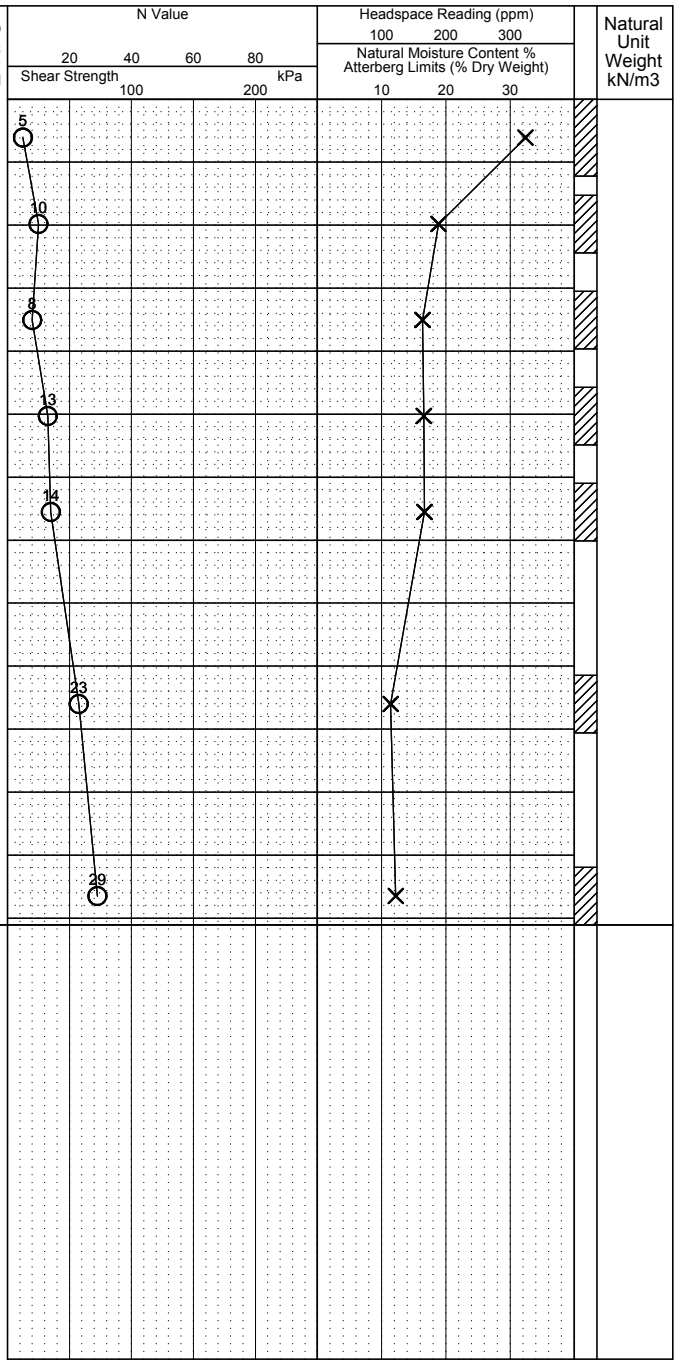
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	283.04
		TOPSOIL	282.43
		SANDY SILT - compact, brown - some silty sand - wet	281.67
▼		**CLAYEY SILT TILL** - firm to very stiff, hard below 6.0m - brown, grey below 4.8m - trace of some gravel - trace of sandy silt - layers of sandy silt at 4.5m - moist to damp	280.34
		END OF BOREHOLE	276.48

NOTES:
Upon completion of drilling:
- water level at 2.7m



Natural Unit Weight kN/m3

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

LGBE3 4007-14-G-YON-A.GPJ 2/3/16

Project No. 4007-14-G-YON-A

Log of Borehole BH-14

Dwg No. 15

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/11/14

Drill Type: Track Mounted Drill Rig

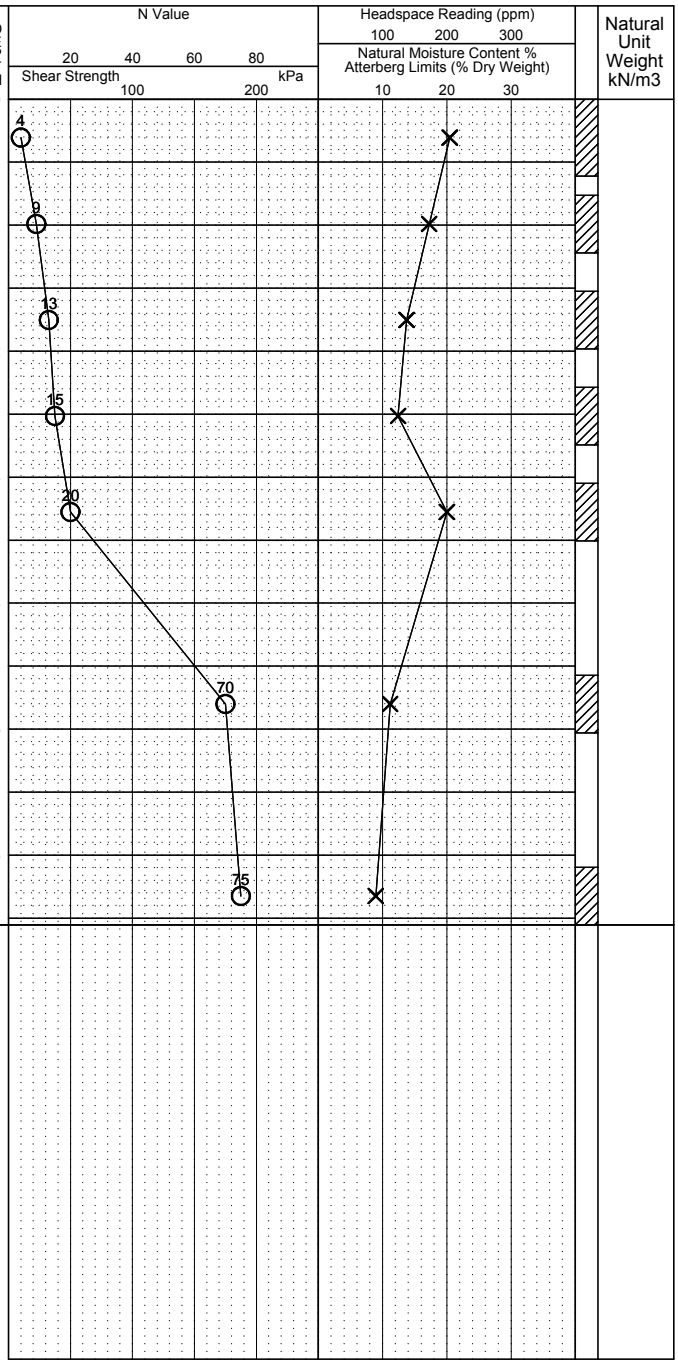
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

Soil Description	ELEV. m
Ground Surface	277.28
TOPSOIL	276.98
REWORK FILL - brown sandy silt - trace of rootlets - damp	276.67 276.26
SANDY SILT TILL - loose to compact, brown - some clayey silt - trace of gravel - layer of sandy silt at 3.0m - moist	273.02
SILTY SAND - very dense - brown, grey below 6.0m - fine grained - trace of gravel - some sandy silt at 6.0m - wet to damp	270.73
END OF BOREHOLE	

NOTES:
Upon completion of drilling:
- water level 4.5m



Natural Unit Weight kN/m3

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)
January 6, 2015	0.50m	
March 26, 2015	1.37m	
April 14, 2015	1.02m	

LGBE3 4007-14-G-YON-A.GPJ 2/3/16

Project No. 4007-14-G-YON-A

Log of Borehole BH-15

Dwg No. 16

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/15/14

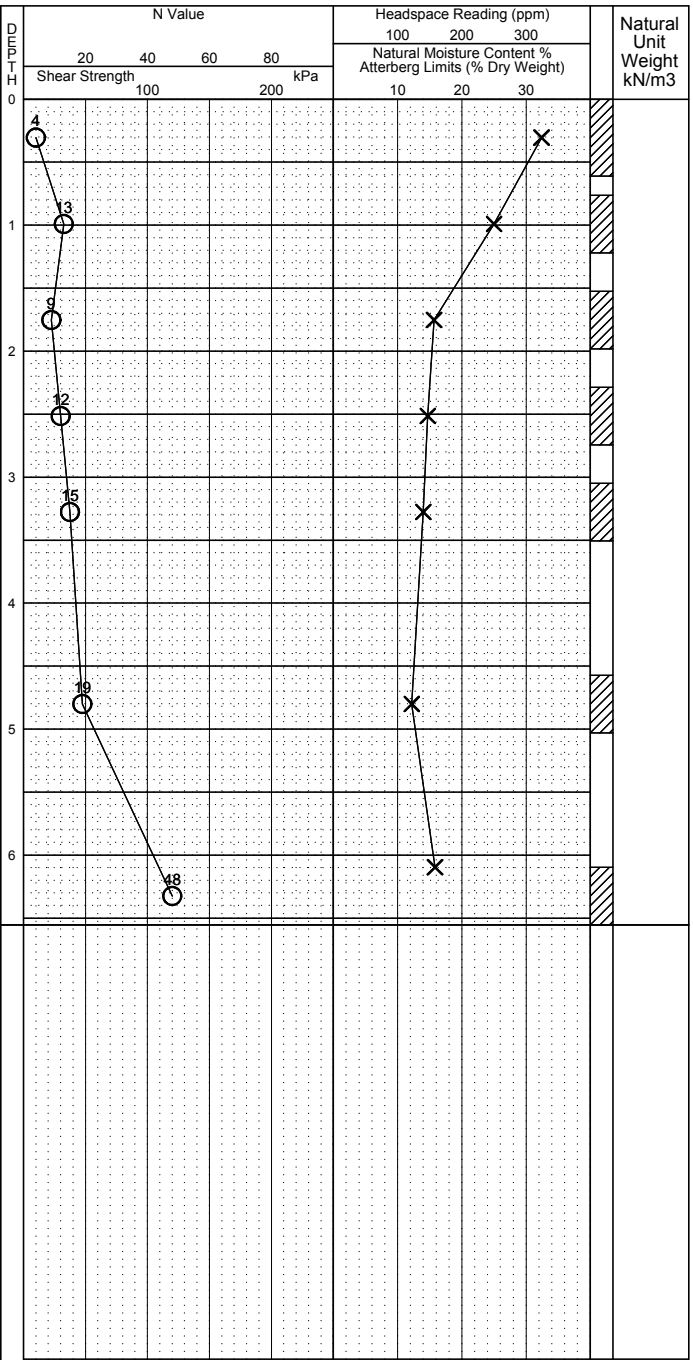
Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

Soil Description	ELEV. m
Ground Surface	276.41
TOPSOIL	276.15
REWORK FILL	
- dark brown to brown clayey silt	275.80
- damp	275.71
CLAYEY SILT	
- stiff, brown	
- trace of sandy silt	275.04
- very moist	
CLAYEY SILT TILL	
- stiff to very stiff, hard below 6.0m	
- brown, grey below 4.5m	
- some sandy silt	
- trace of gravel	
- layer of sandy silt at 6.0m	
- moist, wet at 6.0m	
	269.85



END OF BOREHOLE

NOTES:
Upon completion of drilling:
- water level at 5.7m

LGBE3 4007-14-G-YON-A.GPJ 2/3/16

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)
January 6, 2015	0.53m	
March 26, 2015	1.07m	
April 14, 2015	0.70m	

Project No. 4007-14-G-YON-A

Log of Borehole BH-16

Dwg No. 17

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/12/14

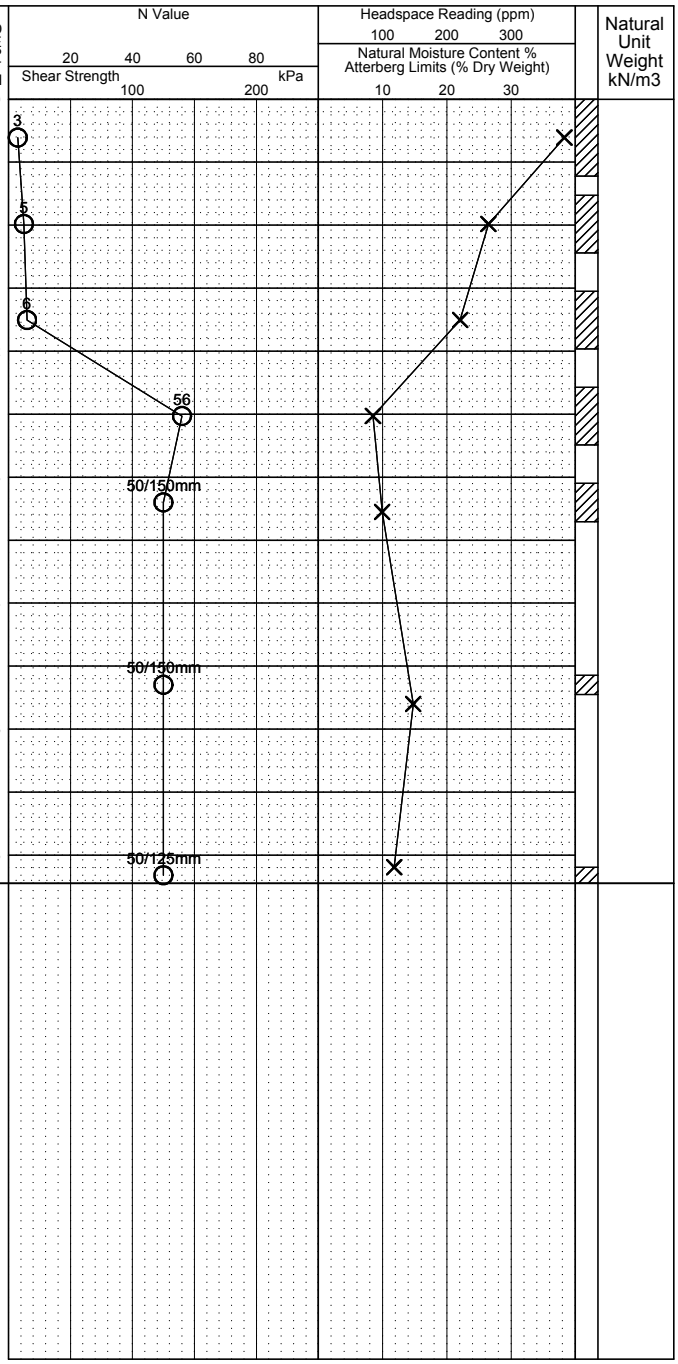
Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

Soil Description	ELEV. m
Ground Surface	278.05
TOPSOIL	277.44
REWORK FILL - dark brown to brown clayey silt to sandy silt - trace of rootlets - wet	276.83 276.72
CLAYEY SILT - firm, brown - some sandy silt - very moist	275.92
SILTY SAND - very dense, brown - layers of sandy silt at 2.2m - trace of sandy silt - layer of clayey silt at 4.5m - trace of some gravel - moist to damp, wet below 4.5m	271.83



END OF BOREHOLE

NOTES:
Upon completion of drilling:
- water level at 3.2m

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)
January 6, 2015	1.05m	
March 26, 2015	1.92m	
April 14, 2015	1.33m	

LGBE3 4007-14-G-YON-A.GPJ 2/3/16

Project No. 4007-14-G-YON-A

Log of Borehole BH-17

Dwg No. 18

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/11/14

Drill Type: Track Mounted Drill Rig

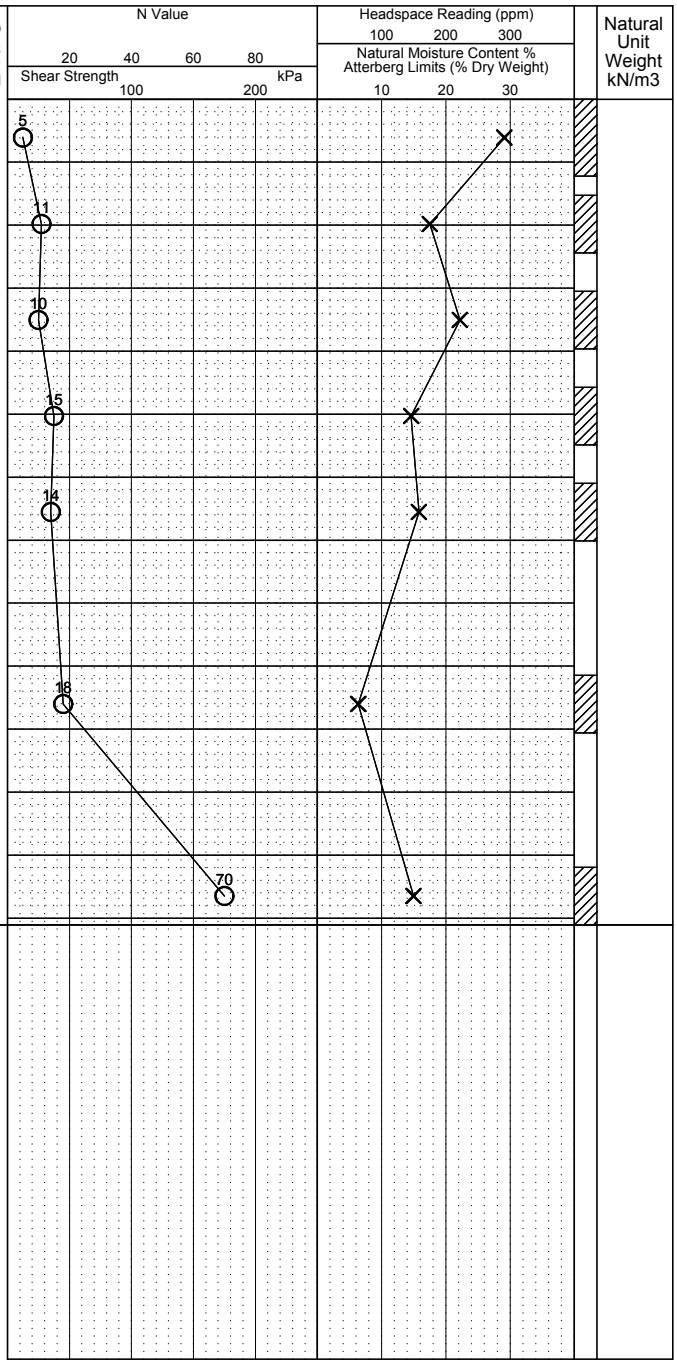
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

Soil Description	ELEV. m
Ground Surface	268.16
TOPSOIL	267.55
REWORK FILL - dark brown to brown clayey silt - trace of sandy silt - very moist	267.25
CLAYEY SILT TILL - stiff to very stiff - brown, grey below 4.5m - some sandy silt - trace of gravel - very moist to damp	266.54
SANDY SILT TILL - very dense, grey - some silty sand - some gravel - moist	262.37 261.61
END OF BOREHOLE	

NOTES:
Upon completion of drilling:
- no free water



NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)
January 6, 2015	0.90m	
March 26, 2015	1.71m	
April 14, 2015	1.62m	

LGBE3 4007-14-G-YON-A.GPJ 2/3/16

Project No. 4007-14-G-YON-A

Log of Borehole BH-18

Dwg No. 19

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/15/14

Drill Type: Track Mounted Drill Rig

Datum: Geodetic

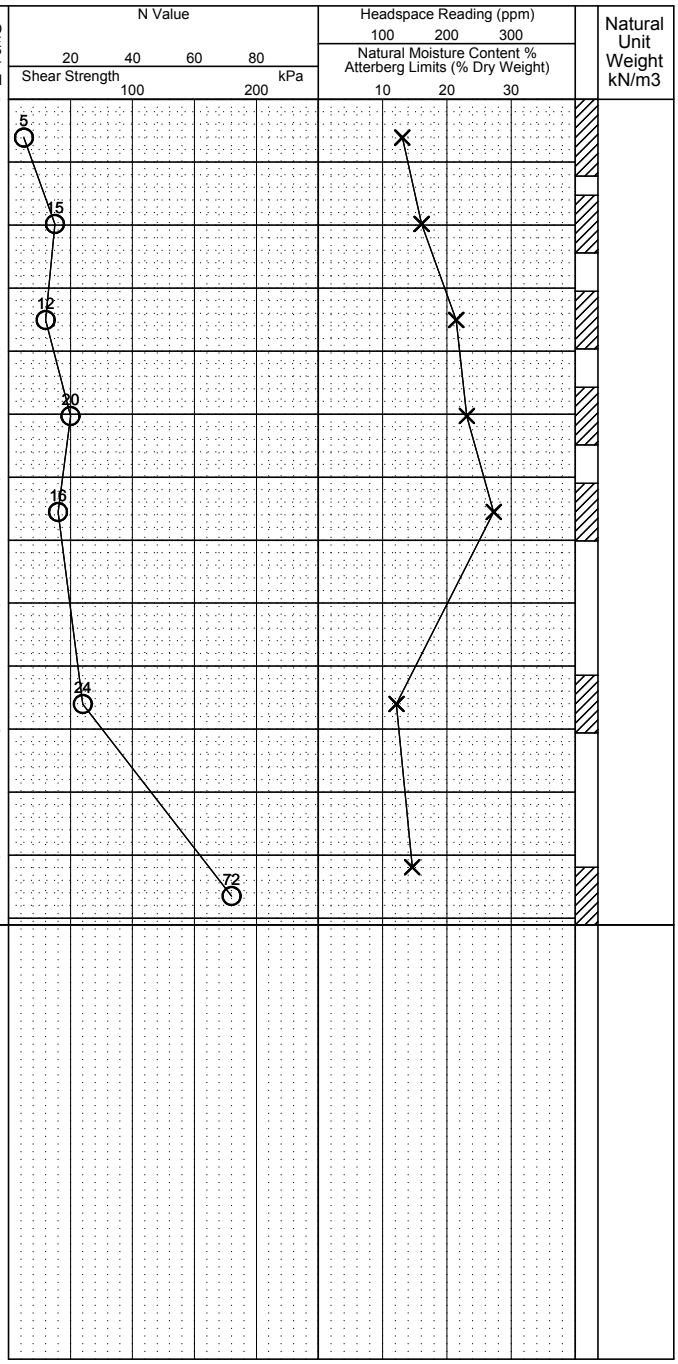
Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	275.52
		TOPSOIL	275.06
		REWORK FILL - dark brown to brown clayey silt to sandy silt - trace of rootlets - moist	274.91
		CLAYEY SILT TILL - stiff to very stiff - brown - some sandy silt - trace of gravel - seams of fine sand - moist	269.73
▼		**SILTY SAND** - very dense, grey - some gravel - trace of clayey silt - damp	269.52 268.96

END OF BOREHOLE

NOTES:
Upon completion of drilling:
- water level at 6.0m



Natural Unit Weight kN/m3

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

LGBE3 4007-14-G-YON-A.GPJ 2/3/16

Project No. 4007-14-G-YON-A

Log of Borehole BH-19

Dwg No. 20

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/11/14

Drill Type: Track Mounted Drill Rig

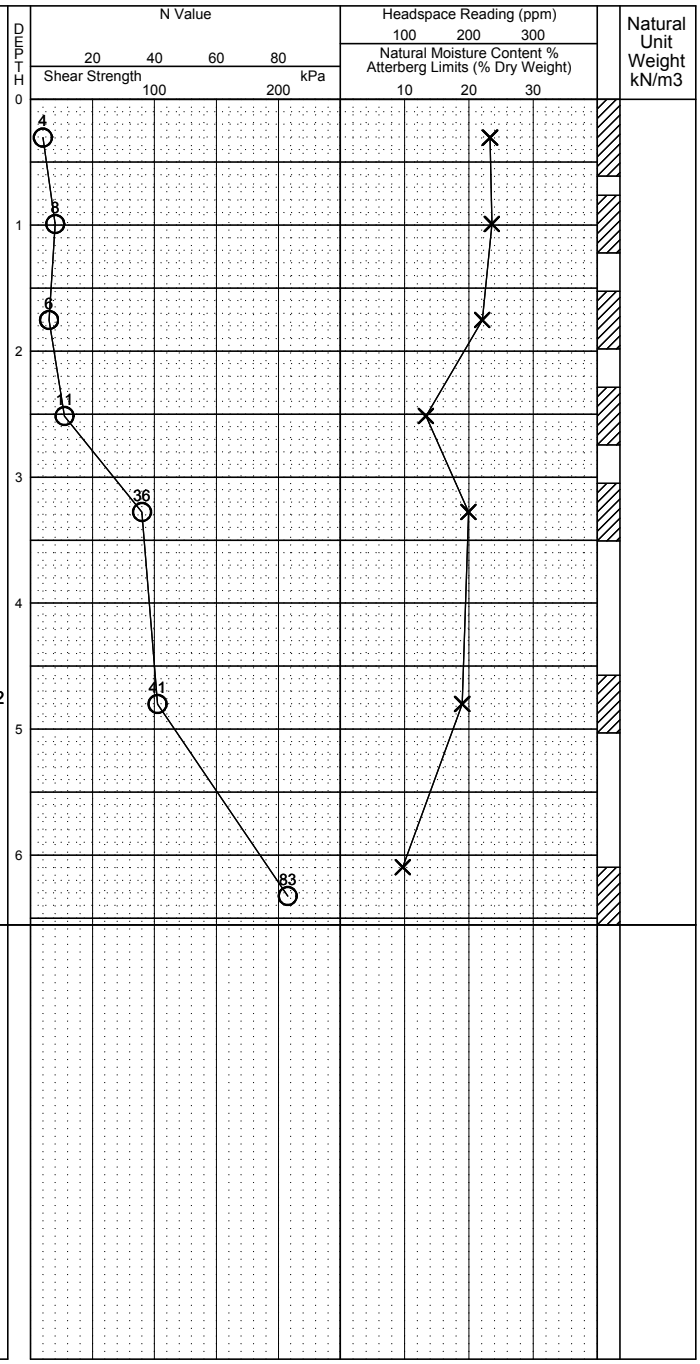
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	266.12
		TOPSOIL	265.67
		REWORK FILL - brown clayey silt - some sandy silt - trace of topsoil - very moist to damp	265.21
		CLAYEY SILT - firm to stiff, brown - some sandy silt - damp	263.08
		SILTY SAND - dense, brown - fine to medium grained - trace of sandy silt - damp to wet	261.32
		SANDY SILT TILL - very dense, brown - trace of gravel - moist	260.33 259.57
		END OF BOREHOLE	

NOTES:
Upon completion of drilling:
- water level at 4.8m
- cave-in at 5.4m



NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

Project No. 4007-14-G-YON-A

Log of Borehole BH-20

Dwg No. 21

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/11/14

Drill Type: Track Mounted Drill Rig

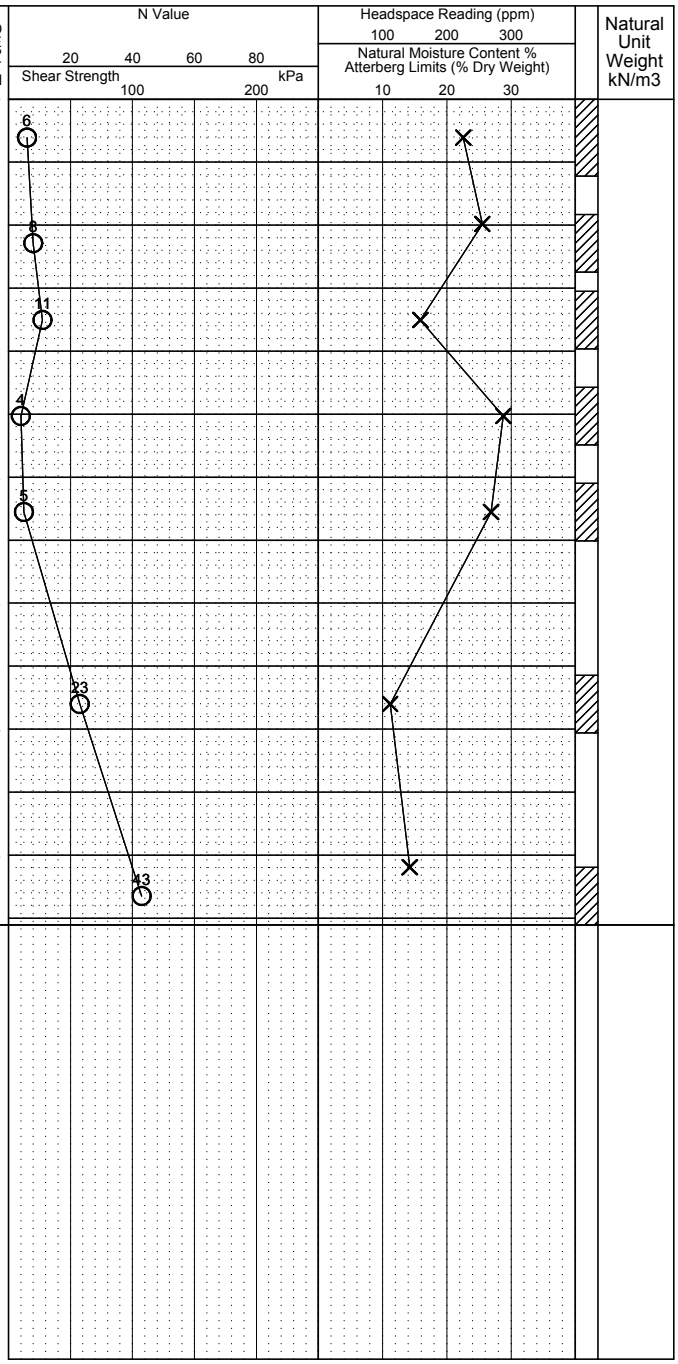
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

Soil Description	ELEV. m
Ground Surface	264.67
TOPSOIL	263.76
REWORK FILL - dark brown clayey silt - some sandy silt - very moist	263.30
CLAYEY SILT - stiff to firm, brown - trace of sandy silt - layers of sandy silt at 3.0m - very moist to damp	262.02
SANDY SILT TILL - compact to very dense - brown - some clayey silt - trace of gravel - very moist	260.41
END OF BOREHOLE	258.12

NOTE:
Upon completion of drilling:
- water level at 4.5m



Natural Unit Weight kN/m3

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)
January 6, 2015	1.50m	
March 26, 2015	2.96m	
April 14, 2015	2.65m	

LGBE3 4007-14-G-YON-A.GPJ 2/3/16

Project No. 4007-14-G-YON-A

Log of Borehole BH-21

Dwg No. 22

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: NW Yonge and Green Lane Secondary Plan, East Gwillimbury, Ontario

Date Drilled: 12/11/14

Drill Type: Track Mounted Drill Rig

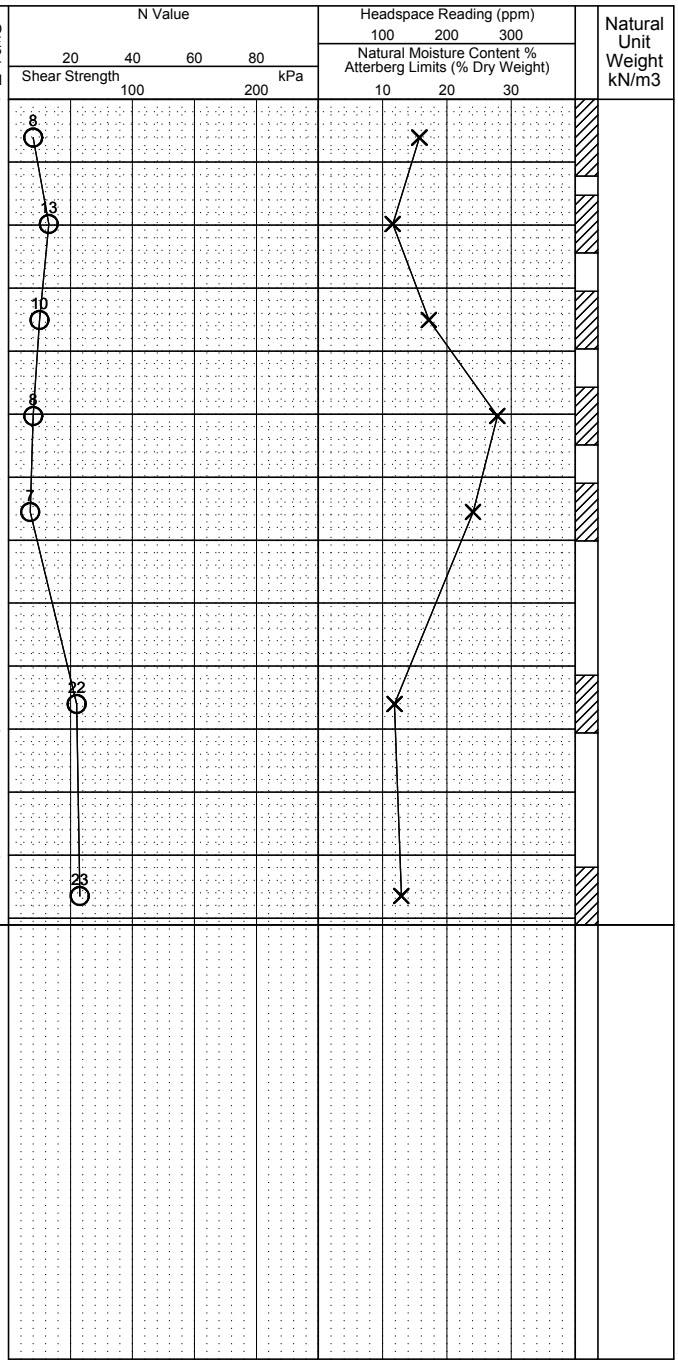
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	272.86
		TOPSOIL	272.48
		REWORK FILL - dark brown to brown sandy silt - some clayey silt - trace of rootlets and topsoil - very moist	271.19
		CLAYEY SILT - stiff to firm, brown - some sandy silt - moist to very moist	268.60
		SANDY SILT TILL - compact, brown - some clayey silt - trace of gravel - seams of sand - moist to very moist	266.31
		END OF BOREHOLE	

NOTES:
Upon completion of drilling:
- no free water



Natural Unit Weight kN/m3

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

LGBE3 4007-14-G-YON-A.GPJ 2/3/16

Hydrogeological Assessment (Arcadis, 2016)

SCS consulting group ltd

Yonge Green Lane GP Inc.

HYDROGEOLOGICAL AND WELLHEAD PROTECTION AREA IMPACT ASSESSMENT

NW Yonge and Green Lane Secondary Plan Area - East Gwillimbury, Ontario

February 26, 2016

4 GROUNDWATER CONDITIONS

4.1 Regional Groundwater Recharge

Groundwater recharge is the process by which groundwater is replenished and involves the vertical infiltration of water through the subsoil deposits and geologic materials to the saturated zone. The major sources of recharge in the study area are a result of precipitation and spring freshet. The amount of groundwater recharge in a particular area depends on the surficial geology, topography, and the extent of land development (i.e. impervious surfaces) in that area. Generally, regional groundwater recharge is irregularly distributed temporally and spatially, as interpreted from specific climatic conditions, local geology, and land development status.

The Site is located primarily in an agricultural area with limited impermeable surfaces. Groundwater recharge on the Site is expected to occur primarily in the open, unpaved spaces. In general, the Secondary Plan Area lands are expected to have a relatively low groundwater recharge rate due to the dense sandy silt till and/or clayey silt till below the surficial topsoil. Recharge may be slightly enhanced in the areas that are mapped as having coarser grained surficial soil deposits, such as the northeast corner of the parcel (Figure 5). In the denser till areas, recharge may be expected to range from 8 to 20 cm/year. Coarser grained near-surface soil areas can have a recharge range of 16 to 36 cm/year. Note that the presence of fine grained fill materials at surface can reduce the effective recharge, even in areas that are underlain by coarser native soils.

4.2 Groundwater Levels

The groundwater level data collected from the monitoring wells are provided in Table 3, below. The screen elevations of these monitoring wells are shown in Table 1 in Section 2.2 and on the borehole logs provided in Appendix A.

Groundwater levels were monitored in BH-5, BH-14 to BH-17 and BH-20 upon completion by TIL (TIL, 2015) and on January 20, 2015 by Arcadis.

As shown below in Table 3, the groundwater levels in the monitoring wells were measured at depths ranging from 0.9 to 2.4 m below the existing ground surface (corresponding to elevations of 275.5 to 262.3 m).

Regional groundwater flow in the Lake Simcoe watershed typically reflects the local topography and drainage of the area sub-watersheds. As such, the lateral flow of local shallow groundwater in the area generally occurs from topographic highs to topographic lows. The dominant regional groundwater flow direction is northerly, toward Lake Simcoe. The presence of the nearby creek influences the direction of shallower groundwater flow at local scales. Based on the recorded groundwater elevations in the monitoring wells and the topography across the subject lands, the groundwater flow direction on the areas of the Secondary Plan Area that were investigated is inferred to primarily reflect the local topography, and eventually discharge to the local Holland River tributaries that traverse the Secondary Plan Area.

It should be noted that groundwater conditions vary depending on factors such as temperature, season, precipitation, construction activity and other situations, which may be different from those encountered at the time of the monitoring. The potential range of temporal groundwater level fluctuations should be considered when conceptualizing and ultimately, designing future development plans on the Secondary Plan Area.

Table 3: Summary of Groundwater Level Observations

Borehole No.	Ground Surface Elevation (m)	Groundwater Level Observations			
		Depth (mbgs) / Elevation (m)			
		Upon Completion (TIL, Dec. 2014)		20-Jan-2015	
		Depth	Elevation	Depth	Elevation
BH-5	288.47	-	-	1.49	286.98
BH-14	277.28	4.5	272.78	0.93	276.35
BH-15	276.41	5.7	270.71	0.90	275.51
BH-16	278.05	3.2	274.85	1.58	276.48
BH-17	268.16	-	-	1.22	266.94
BH-20	264.67	4.5	260.17	2.38	262.29

Notes:

Elevations in metres relative to geodetic datum
mbgs = metres below ground surface

4.3 Inferred Shallow Hydrostratigraphy

The subsurface investigations revealed that beneath the surficial topsoil and fill materials, the subsurface conditions encountered in the boreholes consisted primarily of sandy silt till, underlain at some locations by dense silty sand. Clayey silt/clayey silt till was encountered in the western part of the Secondary Plan Area that was investigated during 2014, below the top soil and/or fill and overlying the silty sand/silty sand till.

A very dense, silty sand was encountered at some locations below the sandy silt till. It is anticipated that there may be groundwater that occurs in the fill, on top of the less permeable, dense, sandy silt till, which would be considered perched groundwater. No monitoring well was installed in this layer.

The groundwater levels measured in the five on-site monitoring wells were all within the upper native soil strata, be it the clayey silt or sandy silt till, and were very close to the inferred original ground surface (i.e. ground surface prior to fill emplacement). These water levels are within the unconfined water table "aquifer". The silty sand that underlies the surficial tills in a number of the boreholes is confined or semi-confined, based on the water level and screen interval observed in BH-16 (Appendix A).

4.4 Rising Head Hydraulic Conductivity Test Results

Table 4 below summarizes the results of the rising head hydraulic conductivity testing in the monitoring wells and the hydrostratigraphic units in which these monitoring wells were screened. The hydraulic conductivity slug tests and analysis data sheets are presented in Appendix B.

Table 4: Summary of Rising Head Hydraulic Conductivity Test Results

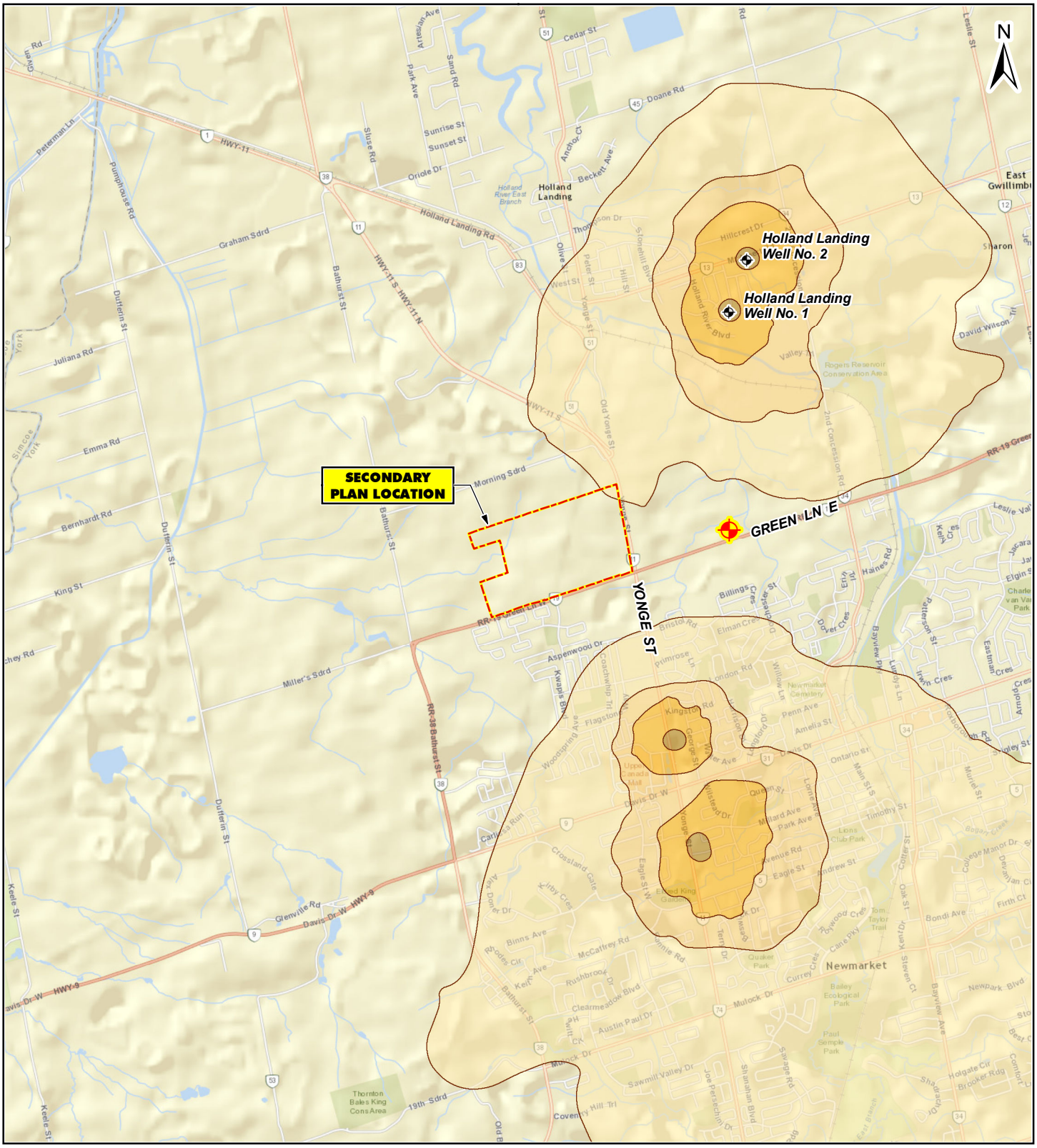
Monitoring Well	Hydraulic Conductivity 1st Trial (cm/sec)	Hydraulic Conductivity 2nd Trial (cm/sec)	Average Hydraulic Conductivity K (m/day)	Stratigraphic Unit
BH-5	2.8×10^{-6}	-	0.002	Sandy Silt Till
BH-14	8.5×10^{-5}	5.8×10^{-5}	0.06	Sandy Silt Till underlain by Silty Sand
BH-16	6.7×10^{-5}	8.2×10^{-5}	0.06	Silty Sand

The hydraulic conductivity for the silty sand layer was consistent in both boreholes with the average value of approximately 7.3×10^{-5} cm/s. BH-5 was screened in the near-surface sandy silt till and the estimated hydraulic conductivity was lower than in the other two boreholes, as might be expected.

4.5 Groundwater Use in the Study Area

As part of this hydrogeological study, Arcadis undertook a request to search the MOECC Water Well Information System (WWIS) database to identify active wells in the vicinity of the Secondary Plan Area. The database search was requested for the area located within 500 m from the boundary of the Site. The database search identified records for 105 wells.

Figure 6 presents the recorded locations of the identified 105 wells as well as the associated water use categories within 500 m around the Site. A detailed table showing water well record (WWR) information for these wells is provided in Appendix C. Twenty-two (22) of these wells were classified as monitoring wells or test holes. Sixty-five (65) wells were identified as water supply wells and they are used for domestic, livestock, public and commercial purposes. Fifteen (15) wells are classified as abandoned or not used.



Legend

- Secondary Plan Boundary
- Municipal Well Type 1
- Likely Proposed Supply Well

WELLHEAD PROTECTION AREAS

- 100 meter Zone/WHPA-A
- 0-2 Year Zone/WHPA-B
- 2-5 Year Zone/WHPA-C/C1
- 5-25 Year Zone/WHPA-D

1:50,000

500 250 0 500 1,000 1,500

Metres

Basemap:
- ESRI ArcGIS Online
- Region of York

Title: **WELLHEAD PROTECTION AREAS**

Project: **HYDROGEOLOGICAL AND WHPA IMPACT ASSESSMENT NORTHWEST YONGE AND GREEN LANE SECONDARY PLAN AREA, EAST GWILLIMBURY, ON**

Client: **YONGE GREEN LANE GP INC.**

ARCADIS

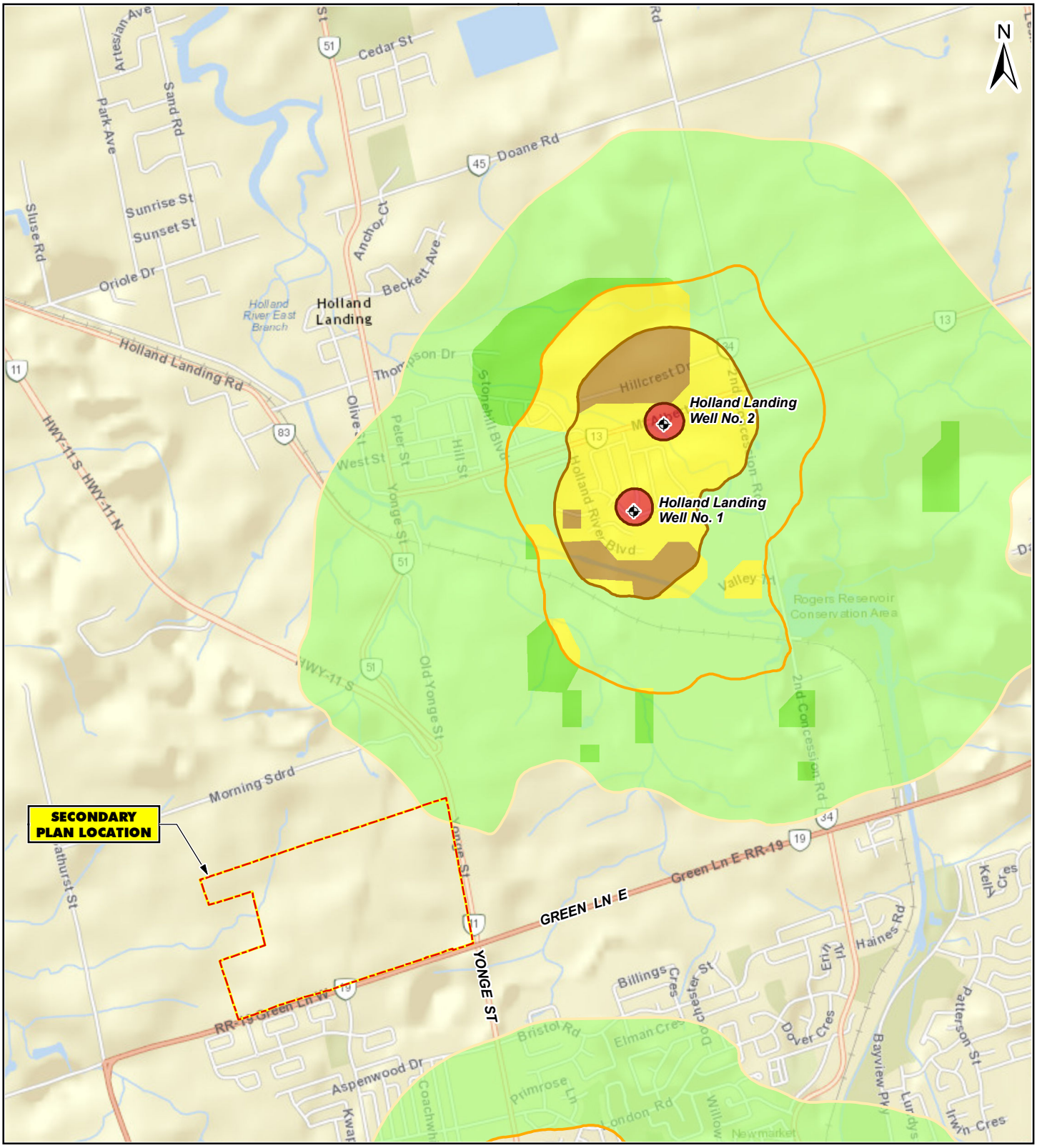
Date: **Jan. 2016**

Updated: **Feb 11, 2016**

FIGURE 7

Layout: 8.5" x 11", Last saved by:mzarei

{Craig Kelly\Mehrdad Zarei} V:\ESRI\101653_(3085)_EastGwillimbury_18328YongeSt\001_HydroG_assessment\Site_WellHeadAreas.mxd



Legend

- Secondary Plan Boundary
- Municipal Well Type 1

WELLHEAD PROTECTION AREAS

- WHPA-A
- WHPA-B
- WHPA-C
- WHPA-D

VULNERABILITY SCORING

- 2 (Low)
- 4
- 6
- 8
- 10 (High)

1:30,000

200 100 0 200 400 600 800 1,000

Metres

Basemap:
- ESRI ArcGIS Online
- Region of York

Title: **VULNERABILITY SCORE - HOLLAND LANDING WHPA**

Project: **HYDROGEOLOGICAL AND WHPA IMPACT ASSESSMENT NORTHWEST YONGE AND GREEN LANE SECONDARY PLAN AREA, EAST GWILLIMBURY, ON**

Client: **YONGE GREEN LANE GP INC.**

ARCADIS

Date: **Jan. 2016**

Updated: **Feb 11, 2016**

FIGURE 8

Layout: 8.5" x 11", Last saved by:mzarei

{Craig Kelly\Mehrdad Zarei} V:\ESRI\101653_(3085)_EastGwillimbury_18328YongeSt\001_HydroG_assessment\Site_VulnerabilityScore.mxd

Master Environmental Servicing Plan (TMIG, 2018)

SCS consulting group ltd

GREEN LANE SECONDARY PLAN

MASTER ENVIRONMENTAL SERVICING PLAN

FINAL REPORT ▪ SEPTEMBER 2018

REPORT PREPARED FOR

TOWN OF EAST GWILLIMBURY
19000 LESLIE STREET
SHARON, ONTARIO L0G 1V0

REPORT PREPARED BY

THE MUNICIPAL INFRASTRUCTURE GROUP LTD.
8800 DUFFERIN STREET, SUITE 200
VAUGHAN, ON L4K 0C5
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TMIG PROJECT NUMBER 16150

REPORT PREPARED IN ASSOCIATION WITH

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GOLDER ASSOCIATES LTD.
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DAVID KRIGER CONSULTANTS INC.
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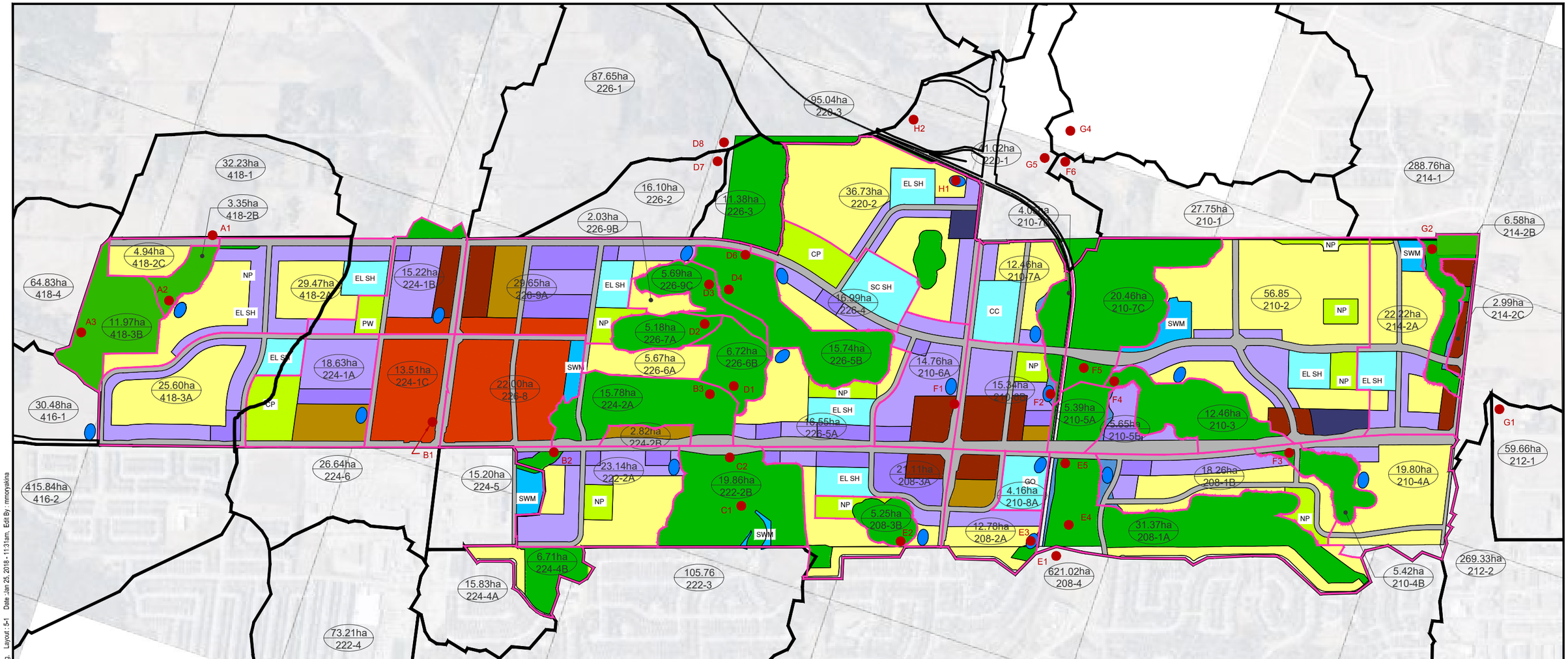

LEGEND:

- POST-DEVELOPMENTAL DRAINAGE AREAS
- EXTERNAL DRAINAGE AREAS
- 29.12ha / 226-5 — DRAINAGE AREA / SUBCATCHMENT ID
- C1 — HYDROLOGIC REFERENCE NODE
- SWM POND

- LOW DENSITY
- MEDIUM DENSITY 1
- MEDIUM DENSITY 2
- INSTITUTIONAL
- HIGH DENSITY
- COMMERCIAL MIXED USE
- RESIDENTIAL MIXED USE
- NEIGHBORHOOD COMMERCIAL
- EXISTING STORMWATER POND
- FLOODPLAIN
- PARK
- RESTORATION AREA
- NHS

EL SH	ELEMENTARY SCHOOL
SC SH	SECONDARY SCHOOL
CC	COMMUNITY CENTER
PW	PLACE OF WORSHIP
SWP	EXISTING STORMWATER POND
NP	NEIGHBORHOOD PARK
CP	COMMUNITY PARK
SWM	STORM WATER POND

TMIG
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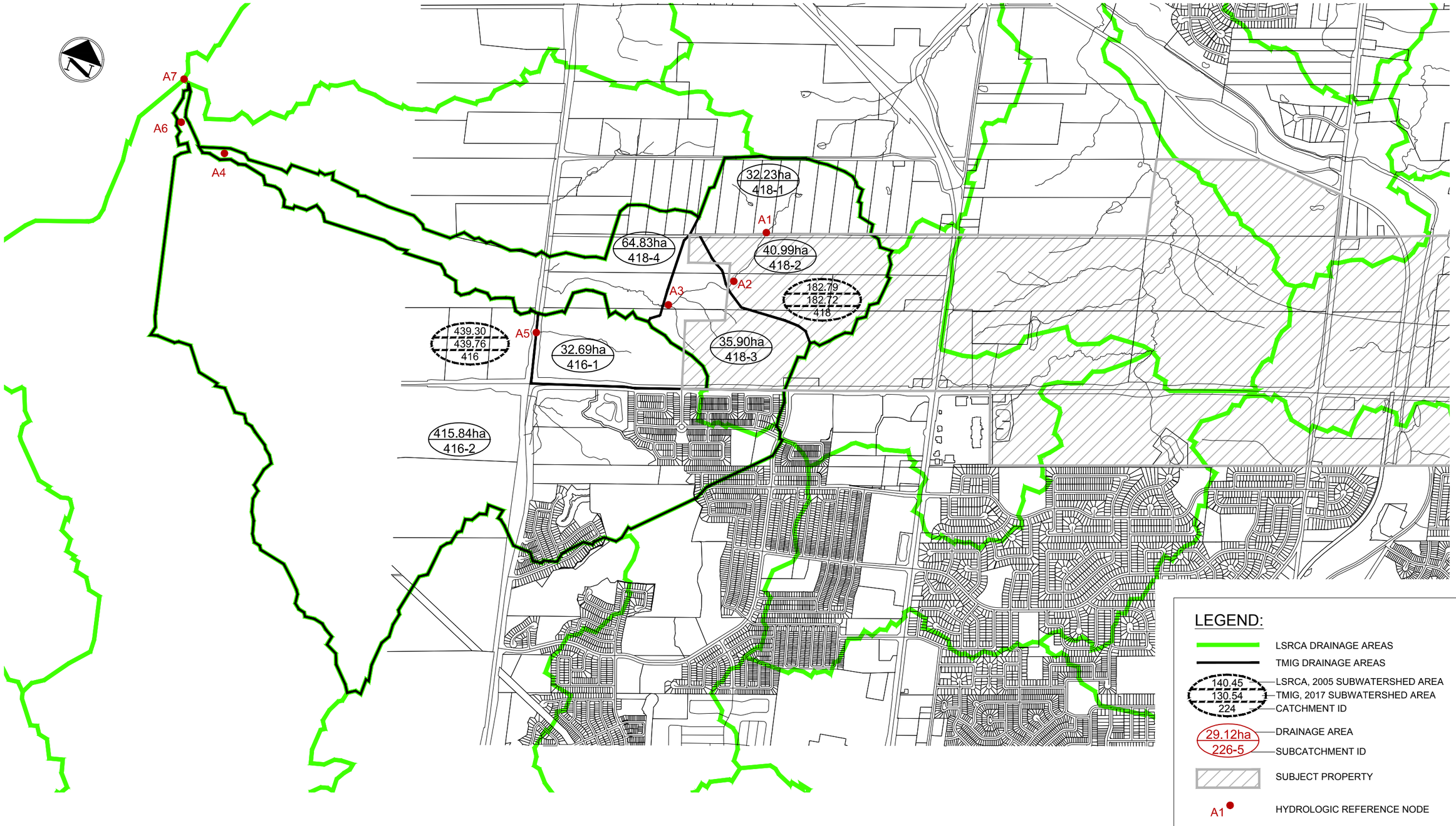
GREEN LANE SECONDARY PLAN
POST-DEVELOPMENTAL CONDITIONS

SCALE: 1:15500		PROJECT No. 16150
DATE: JANUARY 2018		
DESIGNED BY: -	DRAWN BY: D.T & J.P	FIGURE No. 5-2
CHECKED BY: -	CHECKED BY:	

File : G:\Projects\2016\16150 - Green Lane MESP\Drawings\Drainage\2018-01-09 - 16150 - Post-Developmental Conditions.dwg, Layout: 5-1 Date: Jan 25, 2018 - 11:31am, Edit By: nmoryakina



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GREEN LANE SECONDARY PLAN

WEST HOLLAND RIVER - EXISTING DRAINAGE AREAS

SCALE: 1:20,000		PROJECT No. 16150
DATE: APRIL 2017		
DESIGNED BY: D.T.	DRAWN BYCAD	FIGURE No. 3-8
CHECKED BY: S.H.	CHECKED BY:	

File : G:\Projects\2016\16150 - Green Lane MESP\Drawings\Report Figures\20170411 Drainage Areas.dwg, Layout : WHS Date : Jan 25, 2018 - 8:46am, Edit By : mmonyakina

Existing Conditions VO Input Parameters

PROJECT: Green Lane MESP
PROJECT #: 16150
DATE: Mar-17
MUNICIPALITY: Town of East Gwillimbury

	Subwatershed	Drainage Area (ha)	Area (m)	LGI for STANDHYD (m)	Flow Path (m)	High Point (m)	Outlet (m)	% Imp.	TIMP	XIMP	CN[2] FROM SWMMP	Ia (mm)[2]	Method (1=std, 2=85/10)	Slope (%)	Slope (m/m)	Time to Peak (hr) - See Note 1: (a) HYMO - 2 parameter	(b) HYMO - 3 parameter	(c) Kirpich	(d) Williams & Hann	(e) Bransby-Williams	Method Selected	Time to Peak (hr)[3]	Tp Adjustment Factor	Time to Peak (hr)[3]
208[1a]	East Holland River	692.30	URBAN						0.527	0.302	70	5										N/A		N/A
208-1		46.70	RURAL		1420	263	229	12.7%	0.127	0.082	70	5	1	2.39%	0.0239	0.000	0.294	0.245	0.315	0.517	average	0.342	0.840	0.296
208-2		7.77	RURAL		420	251	228	21.2%	0.212	0.127	70	5	1	5.48%	0.0548	0.129	0.087	0.070	0.104	0.155	average	0.109	0.747	0.081
208-3		21.03	RURAL		500	252	240	9.9%	0.099	0.059	70	5	1	2.40%	0.0240	0.266	0.177	0.110	0.231	0.197	average	0.196	0.871	0.171
208-4		621.03	URBAN	2034.75	N/A	N/A	N/A	68.0%	0.680	0.466	70	5										N/A		N/A
208[1b]		696.53																						
210[1a]	East Holland River	218.27	RURAL		2705.9				0.140	0.061	80	5			0.0033	1.484	1.363	0.866	1.556	1.256	average	1.305	0.826	1.078
210-1		27.74	URBAN	430.04	1380	269	227	41.6%	0.416	0.238	80	5	1	3.04%	0.0304							N/A		N/A
210-2		69.81	RURAL		1460	267	228	0.0%	0.000	0.000	80	5	1	2.67%	0.0267	0.365	0.317	0.240	0.349	0.499	average	0.354	1.000	0.354
210-3		20.87	RURAL		1280	267	231	10.7%	0.107	0.086	80	5	1	2.81%	0.0281	0.245	0.211	0.213	0.213	0.489	average	0.274	0.862	0.236
210-4		27.85	RURAL		860	270	247	22.3%	0.223	0.151	80	5	1	2.67%	0.0267	0.274	0.211	0.160	0.244	0.322	average	0.242	0.735	0.178
210-5		15.59	RURAL		720	255	228	23.0%	0.230	0.184	80	5	1	3.75%	0.0375	0.194	0.146	0.122	0.164	0.267	average	0.179	0.727	0.130
210-6		15.70	RURAL		520	259	244	11.1%	0.111	0.089	80	5	1	2.88%	0.0288	0.221	0.151	0.105	0.188	0.203	average	0.174	0.858	0.149
210-7		24.11	RURAL		660	254	230	4.0%	0.040	0.032	80	5	1	3.64%	0.0364	0.225	0.164	0.116	0.198	0.236	average	0.188	0.948	0.178
210-8		9.15	URBAN	246.98	420	247	233	50.1%	0.502	0.479	80	5	1	3.33%	0.0333							N/A		N/A
210-9		3.23	RURAL		340	254	246	28.3%	0.283	0.227	80	5	1	2.35%	0.0235	0.150	0.094	0.082	0.112	0.162	average	0.120	0.669	0.080
210[1b]		214.05																						
212[1a]	East Holland River	328.40	URBAN						0.399	0.323	69	5										N/A		N/A
212-1		59.66	URBAN	630.66	N/A	N/A	N/A	80.0%	0.800	0.800	69	5										N/A		N/A
212-2		269.33	URBAN	1339.98	N/A	N/A	N/A	80.0%	0.800	0.800	69	5										N/A		N/A
212[1b]		328.99																						
214[1a]	East Holland River	316.95	URBAN		1453.6				0.246	0.087	62	5										N/A		N/A
214-1		289.08	URBAN	1388.24	N/A	N/A	N/A	70.0%	0.700	0.400	62	5										N/A		N/A
214-2		29.62	RURAL		820	269	259	5.9%	0.059	0.041	62	5	1	1.22%	0.0122	0.414	0.304	0.208	0.370	0.357	average	0.331	0.923	0.305
214[1b]		318.70																						
220[1a]	East Holland River	169.10	RURAL		3134.6				0.146	0.065	73	5			0.0015	2.055	1.910	1.324	2.110	1.755	average	1.831	0.819	1.500
220-1		44.75	RURAL		1160	254	223	14.7%	0.147	0.100	73	5	1	2.67%	0.0267	0.318	0.262	0.201	0.294	0.415	average	0.298	0.818	0.244
220-2		28.17	RURAL		980	260	228	1.4%	0.014	0.011	73	5	1	3.27%	0.0327	0.249	0.200	0.163	0.222	0.353	average	0.237	0.982	0.233
220-3		96.23	RURAL		2340	246	222	15.6%	0.156	0.089	73	5	1	1.03%	0.0103	0.651	0.612	0.499	0.639	0.939	average	0.668	0.808	0.540
220[1b]		169.15																						
222[1a]	East Holland River	219.50	URBAN						0.501	0.262	75M-79EA	5										N/A		N/A
222-1		6.50	RURAL		660	265	240	26.3%	0.263	0.210	75	5	1	3.79%	0.0379	0.147	0.110	0.114	0.116	0.267	average	0.151	0.691	0.104
222-2		34.16	RURAL		740	274	248	4.3%	0.043	0.035	75	5	1	3.51%	0.0351	0.255	0.190	0.128	0.230	0.257	average	0.212	0.944	0.200
222-3		105.76	URBAN	839.68	2020	272	247	65.3%	0.653	0.386	75	5	1	1.24%	0.0124							N/A		N/A
222-4		73.20	URBAN	698.57	N/A	N/A	N/A	71.1%	0.711	0.555	75	5										N/A		N/A
222[1b]		219.62																						
224[1a]	East Holland River	140.45	URBAN		967.6				0.340	0.259	79	5										N/A		N/A
224-1		42.91	RURAL		780	293	276	12.6%	0.126	0.111	79	5	1	2.18%	0.0218	0.348	0.256	0.160	0.320	0.292	average	0.275	0.841	0.231
224-2		12.39	RURAL		920	276	240	1.9%	0.019	0.015	79	5	1	3.91%	0.0391	0.176	0.143	0.145	0.147	0.347	average	0.192	0.975	0.187
224-3		16.95	RURAL		800	272	264	31.6%	0.316	0.274	79	5	1	1.00%	0.0100	0.385	0.282	0.220	0.329	0.384	average	0.320	0.634	0.203
224-4		15.82	URBAN	324.76	700	274	272	72.5%	0.725	0.499	79	5	1	0.29%	0.0029							N/A		N/A
224-5		15.83	URBAN	324.86	580	274	263	66.3%	0.663	0.650	79	5	1	1.90%	0.0190							N/A		N/A
224-6		26.64	URBAN	421.43	820	294	274	60.5%	0.605	0.557	79	5	1	2.44%	0.0244							N/A		N/A
224[1b]		130.54																						
226[1a]	East Holland River	237.58	RURAL		3991.4				0.023	0.011	75	5			0.0079	0.983	1.035	0.834	1.038	1.542	average	1.086	0.970	1.054
226-1		87.23	RURAL		2740	291	221	0.0%	0.000	0.000	75	5	1	2.55%	0.0255	0.400	0.408	0.396	0.390	0.925	average	0.504	1.000	0.504
226-2		15.96	RURAL		1000	289	231	0.0%	0.000	0.000	75	5	1	5.80%	0.0580	0.157	0.131	0.133	0.133	0.339	average	0.179	1.000	0.179
226-3		8.49	RURAL		540	255	231	0.0%	0.000	0.000	75	5	1	4.44%	0.0444	0.147	0.105	0.092	0.119	0.206	average	0.134	1.000	0.134
226-4		22.60	RURAL		840	259	232	0.0%	0.000	0.000	75	5	1	3.21%	0.0321	0.235	0.181	0.146	0.205	0.310	average	0.215	1.000	0.215
226-5		29.12	RURAL		1200	257	232	0.0%	0.000	0.000	75	5	1	2.08%	0.0208	0.315	0.262	0.227	0.281	0.471	average	0.311	1.000	0.311
226-6		18.40	RURAL		940	257	237	6.4%	0.064	0.051	75	5	1	2.13%	0.0213	0.271	0.213	0.187	0.233	0.384	average	0.257	0.917	0.236
226-7		8.01	RURAL		640	268	237	0.0%	0.000	0.000	75	5	1	4.84%	0.0484	0.139	0.103	0.101	0.111	0.241	average	0.139	1.000	0.139
226-8		21.35	URBAN	377.27	780	273	266	73.4%	0.734	0.720	75	5	1	0.90%	0.0090							N/A		N/A
226-9		28.31	RURAL		1200	291	237	1.6%	0.016	0.013	75	5	1	4.50%	0.0450	0.213	0.182	0.169	0.189	0.405	average	0.232	0.979	0.227
226-10		8.30	RURAL		560	289	252	0.0%	0.000	0.000	75	5	1	6.61%	0.0661	0.120	0.087	0.081	0.097	0.198	average	0.117	1.000	0.117
226[1b]		247.77																						
416[1a]	West Holland River	439.30	RURAL		4656.1				0.033	0.015	64	5			0.0070	1.257	1.355	0.979	1.394	1.730	average	1.343	0.957	1.286
416-1		32.69	RURAL		980	N/A	N/A	7.5%	0.075	0.060	64	5	assumed	0.50%	0.0050	0.667	0.495	0.337	0.601	0.506	average	0.521	0.903	0.470
416-2		415.84	RURAL		4220	N/A	N/A	1.5%	0.015	0.009	64	5	assumed	0.50%	0.0050	1.467	1.521	1.036	1.619	1.688	average	1.466	0.981	1.438
416[1b]		448.53																						
418[1a]	West Holland River	182.79	RURAL		4681.8				0.095	0.038	64	5			0.0067	0.984	1.079	1.004	1.017	1.919	average	1.201	0.877	1.052
418-1		32.23	RURAL		680	289	275	0.0%	0.000	0.000	64	5	1	2.06%	0.0206	0.327	0.233	0.147	0.294	0.265	average	0.253	1.000	0.253
418-2		40.99	RURAL		1160	294	275	0.0%	0.000	0.000	64	5	1	1.64%	0.0164	0.395	0.320	0.243	0.362	0.461	average	0.356	1.000	0.356
418-3		35.90	RURAL		760	288	262	2.2%	0.022	0.018	64	5	1	3.42%	0.0342	0.262	0.196	0.132	0.238	0.264	average	0.219	0.971	0.212
418-4		64.83	RURAL		2960	290	262	0.0%	0.000	0.000	64	5	1	0.95%	0.0095	0.600	0.603	0.617	0.570	1.255	average	0.729	1.000	0.729
418[1b]		173.95																						

Note 1: Selection of the Most Appropriate Time to Peak Formula
Watt and Chow - Generalized expression based on data from Canada and US
HYMO 3 Parameter - Intended for rural basins with slopes < 2%
HYMO 2 Parameter - Intended for rural basins with slopes > 2%
Bransby-Williams - Intended for urban basins, C > 0.4 (also consider the STANDHYD command)
Airport Method - Intended for rural basins, C < 0.4
Note that the Bransby-Williams and Airport Method formulae have been multiplied by 0.6 to convert Time of Concentration to Time to Peak

[1a] Catchment Areas as reported in the Stormwater Management Master Plan - Municipal Class Environmental Assessment (SWMMP), dated Nov. 2012
[1b] Catchment Areas as delineated during TMIG's pre-development analysis
[2] Curve Number (CN) and Initial Abstraction (Ia) values are extracted from the SWMMP, dated Nov 2012, as well as the original Visual Otthymo v. 2.3 model
[3] TP (hr) for original catchment areas are extracted from Table 4-9 of the SWMMP, dated Nov 2012

Proposed Conditions VO Rural Catchment Input Parameters

PROJECT: Green Lane MESP
PROJECT #: 16150
DATE: Jan-18
MUNICIPALITY: Town of East Gwillimbury

													Time to Peak (hr)										
Catchment ID	**NHS Area (ha)**	**Road Area (ha)**	**External Residential Area (ha)**	**Total Drainage Area (ha)**	**Runoff Coefficient**	**Curve Number (CN)**	**Ia (mm)**	**Flow Path Length (m)**	**High Point Elevation (m)**	**Outlet Elevation (m)**	**Slope (%)**	**Slope (m/m)**	**(a) HYMO - 2 parameter**	**(b) HYMO - 3 parameter**	**(c) Kirpich**	**(d) Williams & Hann**	**(e) Bransby-Williams**	**Method Selected**	**% Imp**	**TIMP**	**Time to Peak (hr)(3)**	**Tp Adjustment Factor**	**Time to Peak (hr)(3)**
East Holland River Watershed																							
208-1A	23.35	3.13	4.89	31.37	0.32	**74.4**	**8.4**	1380	263	228	2.54%	0.0254	0.292	0.254	0.234	0.262	0.517	average	18.4%	0.184	0.312	0.778	**0.243**
208-3B	5.25	-	-	5.25	0.20	**70.0**	**10.0**	220	248	240	3.64%	0.0364	0.140	0.079	0.050	0.109	0.092	average	0.0%	0.000	0.094	1.000	**0.094**
210-3	10.98	1.48	-	12.46	0.28	**73.3**	**9.0**	800	251	231	2.50%	0.0250	0.221	0.169	0.155	0.184	0.329	average	8.9%	0.089	0.212	0.884	**0.187**
210-4B	4.82	0.60	-	5.42	0.28	**73.1**	**9.1**	380	258	247	2.89%	0.0289	0.159	0.102	0.083	0.124	0.165	average	8.3%	0.083	0.126	0.892	**0.113**
210-5A	4.29	1.10	-	5.39	0.34	**75.7**	**8.4**	120	231	227	3.33%	0.0333	0.148	0.070	0.032	0.115	0.051	average	15.3%	0.153	0.083	0.812	**0.068**
210-7B	3.80	0.25	-	4.05	0.24	**71.7**	**9.5**	120	231	230	0.83%	0.0083	0.270	0.122	0.055	0.206	0.069	average	4.6%	0.046	0.145	0.940	**0.136**
210-7C	19.45	1.01	-	20.46	0.23	**71.4**	**9.6**	360	246	229	4.72%	0.0472	0.188	0.118	0.066	0.163	0.124	average	3.7%	0.037	0.132	0.952	**0.125**
214-2B	4.85	0.40	1.33	6.58	0.30	**73.7**	**8.5**	220	264	260	1.82%	0.0182	0.213	0.116	0.065	0.169	0.103	average	18.7%	0.187	0.133	0.774	**0.103**
222-2B	18.91	0.95	-	19.86	0.23	**71.3**	**9.6**	420	267	243	5.71%	0.0571	0.169	0.111	0.069	0.146	0.140	average	3.6%	0.036	0.127	0.953	**0.121**
224-2A	13.98	1.80	-	15.78	0.28	**73.2**	**9.1**	840	265	240	2.98%	0.0298	0.218	0.169	0.150	0.185	0.326	average	8.6%	0.086	0.210	0.889	**0.187**
226-5B	15.74	-	-	15.74	0.20	**70.0**	**10.0**	780	256	235	2.69%	0.0269	0.229	0.174	0.148	0.195	0.309	average	0.0%	0.000	0.211	1.000	**0.211**
226-6B	6.72	-	-	6.72	0.20	**70.0**	**10.0**	380	245	236	2.37%	0.0237	0.188	0.119	0.089	0.149	0.168	average	0.0%	0.000	0.143	1.000	**0.143**
226-7A	5.18	-	-	5.18	0.20	**70.0**	**10.0**	440	264	237	6.14%	0.0614	0.108	0.074	0.069	0.084	0.165	average	0.0%	0.000	0.100	1.000	**0.100**
226-9C	5.69	-	-	5.69	0.20	**70.0**	**10.0**	440	258	236	5.00%	0.0500	0.123	0.084	0.075	0.096	0.171	average	0.0%	0.000	0.110	1.000	**0.110**
226-3	11.38	-	-	11.38	0.20	**70.0**	**10.0**	400	255	231	6.00%	0.0600	0.139	0.092	0.065	0.115	0.140	average	0.0%	0.000	0.110	1.000	**0.110**
226-1	87.65	-	-	87.65	0.20	**75.0**	**5.0**	2740	291	221	2.55%	0.0255	0.401	0.408	0.396	0.390	0.924	average	0.0%	0.000	0.504	1.000	**0.504**
226-2	16.10	-	-	16.10	0.20	**75.0**	**5.0**	1000	289	231	5.80%	0.0580	0.157	0.131	0.133	0.134	0.339	average	0.0%	0.000	0.179	1.000	**0.179**
220-3	73.58	-	21.46	95.04	0.27	**73.0**	**5.0**	2340	246	222	1.03%	0.0103	0.648	0.610	0.499	0.636	0.940	average	15.8%	0.158	0.667	0.806	**0.537**
220-1	33.13	3.90	3.99	41.02	0.30	**73.0**	**5.0**	1160	254	223	2.67%	0.0267	0.310	0.256	0.201	0.284	0.418	average	13.9%	0.139	0.294	0.827	**0.243**
West Holland River Watershed																							
418-2B	3.35	-	-	3.35	0.20	**70.0**	**10.0**	320	274	270	1.25%	0.0125	0.208	0.125	0.100	0.156	0.173	average	0.0%	0.000	0.152	1.000	**0.152**
418-3B	11.97	-	-	11.97	0.20	**70.0**	**10.0**	400	270	262	2.00%	0.0200	0.244	0.154	0.099	0.203	0.173	average	0.0%	0.000	0.175	1.000	**0.175**
416-1	27.49	2.99	-	30.48	0.27	**64.0**	**5.0**	980	N/A	N/A	0.50%	0.0050	0.653	0.485	0.337	0.584	0.509	average	7.4%	0.074	0.514	0.904	**0.464**

Runoff Coefficients	
NHS Area	0.20
Roads	0.90
Existing Residential	0.50

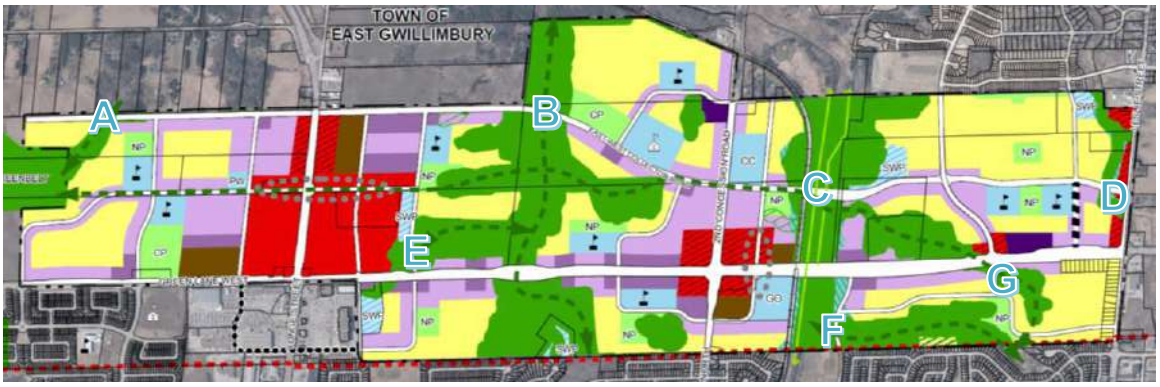
Curve Numbers (Based on 'Type C' Silty Clay Soils)	
NHS Area (Forested)	70
Roads	98
Existing Residential	80

Initial Abstraction (Based on 'Type C' Silty Clay Soils)	
NHS Area (Forested)	10
Roads	2
Existing Residential	5

Table 5-1 Proposed Bridge and Culvert Properties

Crossing ID	Location	Crossing Length (m) (in direction of flow)	Available Depth (m) (from top of road to channel invert)
A	E-W Collector at Ansnorveldt Creek	41	2
B	E-W Collector at the Tributary of the East Holland River	90	11
C	E-W Collector at the East Holland River	23	14
D	E-W Collector at Sharon Creek	30	5
E	North-south collector at the tributary east of Yonge Street	22	3
F	Bayview Parkway extension at the tributary south of Green Lane	23	3
G	Murrell Boulevard extension at the tributary south of Green Lane	38 (skewed)	3

Figure 5-1 Proposed Bridge and Culvert Crossings



5.2.1 Hydraulic Analyses and Recommended Structures

HEC-RAS models were available to evaluate crossings of the East Holland River tributaries for the East-West Collector (Crossing B) and the north-south collector road east of Yonge Street (Crossing E). Hydraulic analyses were not completed for the smaller tributary crossings (A, F, G) as the contributing drainage areas are relatively small and the structure opening is unlikely to be governed by hydraulics.

The recommended crossing structures at each location are presented in **Table 5-2**, and are based on hydraulics as well as wildlife passage. The Openness Ratio has been used to assess wildlife passage, and is calculated by dividing the structure opening area by the structure length. A ratio of 0.4 to 0.6 is generally considered adequate for the passage of medium sized mammals such as fox and skunk, whereas an openness ratio of up to 1.0 is recommended for large mammals such as deer.

With the exception of the East-West corridor crossing of the Tributary of Ansnorveldt Creek (Crossing A), all of the crossings have an Openness Ratio of at least 0.4. The shallow height available from the creek invert to the top of the road limits the Openness Ratio at Crossing A, based on the road profile presented in the East-West Road Corridor Environmental Assessment (AECOM, May 2015). This crossing should be assessed in more detail during the design of the East-West Collector to determine if and how wildlife passage through the

culvert can be accommodated (targeting small to medium sized mammals and amphibians), including but not limited to revisions to the preliminary road profile.

Crossing B has been identified by LSRCA as a large mammal corridor, and therefore the combined opening of the recommended twin culverts achieves an openness index of more than 1.0.

Note that the recommended structures may be revised during detailed design, when the road profile, grading and culvert lengths are refined. This is particularly relevant for Crossing B, which has been very conservatively estimated as 90 m long. As noted in Section 5.2, it is expected that retaining walls and/or reinforced slopes will be used to significantly reduce the culvert length and fill volumes associated with Crossing B. If the length of the culvert is significantly reduced, the recommended culvert size can also be reduced while still achieving an openness index of at least 1.0 and avoiding increases in upstream flood levels. If the length of Crossing B cannot be significantly reduced, consideration should also be given to a bridge in lieu of multiple culverts at this crossing.

Table 5-2 Recommended Crossing Structures

Crossing ID	Upstream Drainage Area (ha)	Recommended Structure	Openness Index
A	32	7.3 m wide x 1.8 m high Conspan or equivalent	0.27
B	475	Twin - 14.6 m wide x 4.0 m high Conspan or equivalent	1.05
C	n/a [1]	190 m long, 5 span bridge	n/a [1]
D	n/a [2]	3 – 14.6 m x 3.0 m Conspan culverts	n/a [2]
E	115	11.0 m wide x 2.4 m high Conspan or equivalent	0.86
F	30	11.0 m wide x 1.8 m high Conspan or equivalent	0.71
G	25	7.3 m wide x 2.4 m high Conspan or equivalent	0.40

[1] Structure was determined through the East-West Corridor EA (AECOM, 2015)
[2] Structure was determined through the South-Sharon – Green Lane MESP (Stantec, 2016).

Hydraulic analyses were prepared for the proposed culverts at crossings B and E, where HEC-RAS hydraulic modelling was available and the upstream drainage area warrants analyses. The results are summarized in **Table 5-3**, and the HEC-RAS hydraulic modelling is included in **Appendix H**. The hydraulic analyses confirm that the recommended crossings will not have any impact on upstream flood levels.

Note that, while the drainage area to the proposed Bayview Parkway extension is relatively small and does not warrant hydraulic analysis, the proposed roadway lies partially within the Regional storm flood plain associated with the East Holland River to the west. The Bayview Parkway extension is proposed to be aligned with the utility corridor that was recently disturbed for construction of the new forcemain connections to the Newmarket Sanitary Pumping Station. However, as evident from **Figure 3-9**, this alignment lies within the East Holland River Regional flood plain. The Bayview Parkway extension should be designed to minimize the amount of fill in the flood plain while providing safe passage during a Regional flood event, and must not have any impact on flood levels associated with the East Holland River.

At all other significant crossings, all fill placed in the Regional storm flood plain for roadway construction should be offset by a compensating cult.

APPENDIX G3

SWM Pond Rating Curves

SWM Pond Rating Curves

PROJECT:	Green Lane MESP
PROJECT #:	16150
DATE:	Jan-18
MUNICIPALITY:	Town of East Gwillimbury

Post Catchment 208-1B, 208-2A, 208-3A

Parent Model Catchment (Comparison Point)	210 (9210)	From Town of EG Stormwater Management Master Plan (Cole, 2012)
Pre-development drainage area (ha)	218.27	
Proposed development area 208-1B (ha)	18.26	
Proposed development area 208-2A (ha)	12.78	
Proposed development area 208-3A (ha)	21.11	

Storm Event	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q over-control from SWM Master Plan (m^3/s)	1.066	1.778	2.313	3.322	3.875	4.443
Calculated Unit Rate ($m^3/s/ha$)	0.005	0.008	0.011	0.015	0.018	0.020
Target Release Rate for 208-1B (m^3/s)	0.089	0.149	0.194	0.278	0.324	0.372
Target Release Rate for 208-2A (m^3/s)	0.062	0.104	0.135	0.195	0.227	0.260
Target Release Rate for 208-3A (m^3/s)	0.103	0.172	0.224	0.321	0.375	0.430

NOTE: Unit flow rates for subcatchment 208 from SWM Master Plan skewed by extent of existing development in catchment area. Catchment areas from subcatchment 210 are more appropriate for planned development areas north of Green Lane, West of Yonge Street

Post Catchment 210-4A, 210-5B, 210-6A, 210-6B, 210-7A

Parent Model Catchment (Comparison Point)	210 (9210)	From Town of EG Stormwater Management Master Plan (Cole, 2012)
Pre-development drainage area (ha)	218.27	
Proposed development area 210-4A (ha)	19.80	
Proposed development area 210-5B (ha)	5.65	
Proposed development area 210-6A (ha)	14.76	
Proposed development area 210-6B (ha)	15.34	
Proposed development area 210-7A (ha)	12.46	

Storm Event	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q over-control from SWM Master Plan (m^3/s)	1.066	1.778	2.313	3.322	3.875	4.443
Calculated Unit Rate ($m^3/s/ha$)	0.005	0.008	0.011	0.015	0.018	0.020
Target Release Rate for 210-4A (m^3/s)	0.097	0.161	0.210	0.301	0.352	0.403
Target Release Rate for 210-5B (m^3/s)	0.028	0.046	0.060	0.086	0.100	0.115
Target Release Rate for 210-6A (m^3/s)	0.072	0.120	0.156	0.225	0.262	0.300
Target Release Rate for 210-6B (m^3/s)	0.075	0.125	0.163	0.233	0.272	0.312
Target Release Rate for 210-7A (m^3/s)	0.061	0.101	0.132	0.190	0.221	0.254

Post Catchment 220-2

Parent Model Catchment (Comparison Point)	220 (9220)	From Town of EG Stormwater Management Master Plan (Cole, 2012)
Pre-development drainage area (ha)	161.1	
Proposed development area 220-2 (ha)	36.73	

Storm Event	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q over-control from SWM Master Plan (m^3/s)	0.547	0.943	1.23	1.613	1.917	2.218
Calculated Unit Rate ($m^3/s/ha$)	0.003	0.006	0.008	0.010	0.012	0.014
Target Release Rate for 220-2 (m^3/s)	0.125	0.215	0.280	0.368	0.437	0.506

Post Catchments 222-2A & 224-2B

Parent Model Catchment (Comparison Point)	226 (9226)	From Town of EG Stormwater Management Master Plan (Cole, 2012)
Pre-development drainage area (ha)	237.6	
Proposed development area 222-2A (ha)	23.14	
Proposed development area 224-2B (ha)	2.82	

Storm Event	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q over-control from SWM Master Plan (m^3/s)	1.097	1.719	2.2	2.854	3.434	4.024
Calculated Unit Rate ($m^3/s/ha$)	0.005	0.007	0.009	0.012	0.014	0.017
Target Release Rate for 222-2A (m^3/s)	0.107	0.167	0.214	0.278	0.334	0.392
Target Release Rate for 224-2B (m^3/s)	0.013	0.020	0.026	0.034	0.041	0.048

NOTE: Unit flow rates for subcatchment 222 from SWM Master Plan skewed by extent of existing development in catchment area. Catchment areas from subcatchment 226 are more appropriate for planned development areas north of Green Lane, West of Yonge Street

Post Catchment 224-1A, 224-1B and 224-1C

Parent Model Catchment (Comparison Point)	226 (9226)	From Town of EG Stormwater Management Master Plan (Cole, 2012)
Pre-development drainage area (ha)	237.6	
Proposed development area 224-1A (ha)	18.63	
Proposed development area 224-1B (ha)	15.22	
Proposed development area 224-1C (ha)	13.51	

Storm Event	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q over-control from SWM Master Plan (m^3/s)	1.097	1.719	2.2	2.854	3.434	4.024
Calculated Unit Rate ($m^3/s/ha$)	0.005	0.007	0.009	0.012	0.014	0.017
Target Release Rate for 224-1A (m^3/s)	0.086	0.135	0.173	0.224	0.269	0.316
Target Release Rate for 224-1B (m^3/s)	0.070	0.110	0.141	0.183	0.220	0.258
Target Release Rate for 224-1C (m^3/s)	0.062	0.098	0.125	0.162	0.195	0.229

NOTE: Unit flow rates for subcatchment 224 from SWM Master Plan skewed by extent of existing development in catchment area. Catchment areas from subcatchment 226 are more appropriate for planned development areas north of Green Lane, West of Yonge Street

Post Catchment 226-4, 226-5A, 226-6A, 226-9A & 226-9B

Parent Model Catchment (Comparison Point)	226 (9226)	From Town of EG Stormwater Management Master Plan (Cole, 2012)
Pre-development drainage area (ha)	237.6	
Proposed development area 226-4 (ha)	16.99	
Proposed development area 226-5A (ha)	16.55	
Proposed development area 226-6A (ha)	5.67	
Proposed development area 226-9A (ha)	29.65	
Proposed development area 226-9B (ha)	2.03	

Storm Event	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q over-control from SWM Master Plan (m3/s)	1.097	1.719	2.200	2.854	3.434	4.024
Calculated Unit Rate (m3/s/ha)	0.005	0.007	0.009	0.012	0.014	0.017
Target Release Rate for 226-4 (m3/s)	0.078	0.123	0.157	0.204	0.246	0.288
Target Release Rate for 226-5A (m3/s)	0.076	0.120	0.153	0.199	0.239	0.280
Target Release Rate for 226-6A (m3/s)	0.026	0.041	0.053	0.068	0.082	0.096
Target Release Rate for 226-9A (m3/s)	0.137	0.215	0.275	0.356	0.429	0.502
Target Release Rate for 226-9B (m3/s)	0.009	0.015	0.019	0.024	0.029	0.034

Post Catchment 418-2 and 418-3

Parent Model Catchment (Comparison Point)	418 (9423)	From Town of EG Stormwater Management Master Plan (Cole, 2012)
Pre-development drainage area (ha)	182.79	
Proposed development area 418-2A (ha)	29.47	
Proposed development area 418-2C (ha)	4.94	
Proposed development area 418-3A (ha)	25.6	

Storm Event	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q over-control from SWM Master Plan (m3/s)	0.574	0.970	1.277	1.702	2.042	2.401
Calculated Unit Rate (m3/s/ha)	0.003	0.005	0.007	0.009	0.011	0.013
Target Release Rate for 418-2A (m3/s)	0.093	0.156	0.206	0.274	0.329	0.387
Target Release Rate for 418-2C (m3/s)	0.016	0.026	0.035	0.046	0.055	0.065
Target Release Rate for 418-3A (m3/s)	0.080	0.136	0.179	0.238	0.286	0.336

Natural Heritage Evaluation (Azimuth, 2016)

SCS consulting group ltd

NATURAL HERITAGE EVALUATION

NW Yonge and Green Lane Secondary Plan Area

Part of Lot 101 and 102,
Concession 1 W.Y.S.
(Geographic Township of East Gwillimbury)
Town of East Gwillimbury
The Regional Municipality of York

March 2016

Cunningham Environmental Associates

In association with

Azimuth Environmental Consulting Inc.

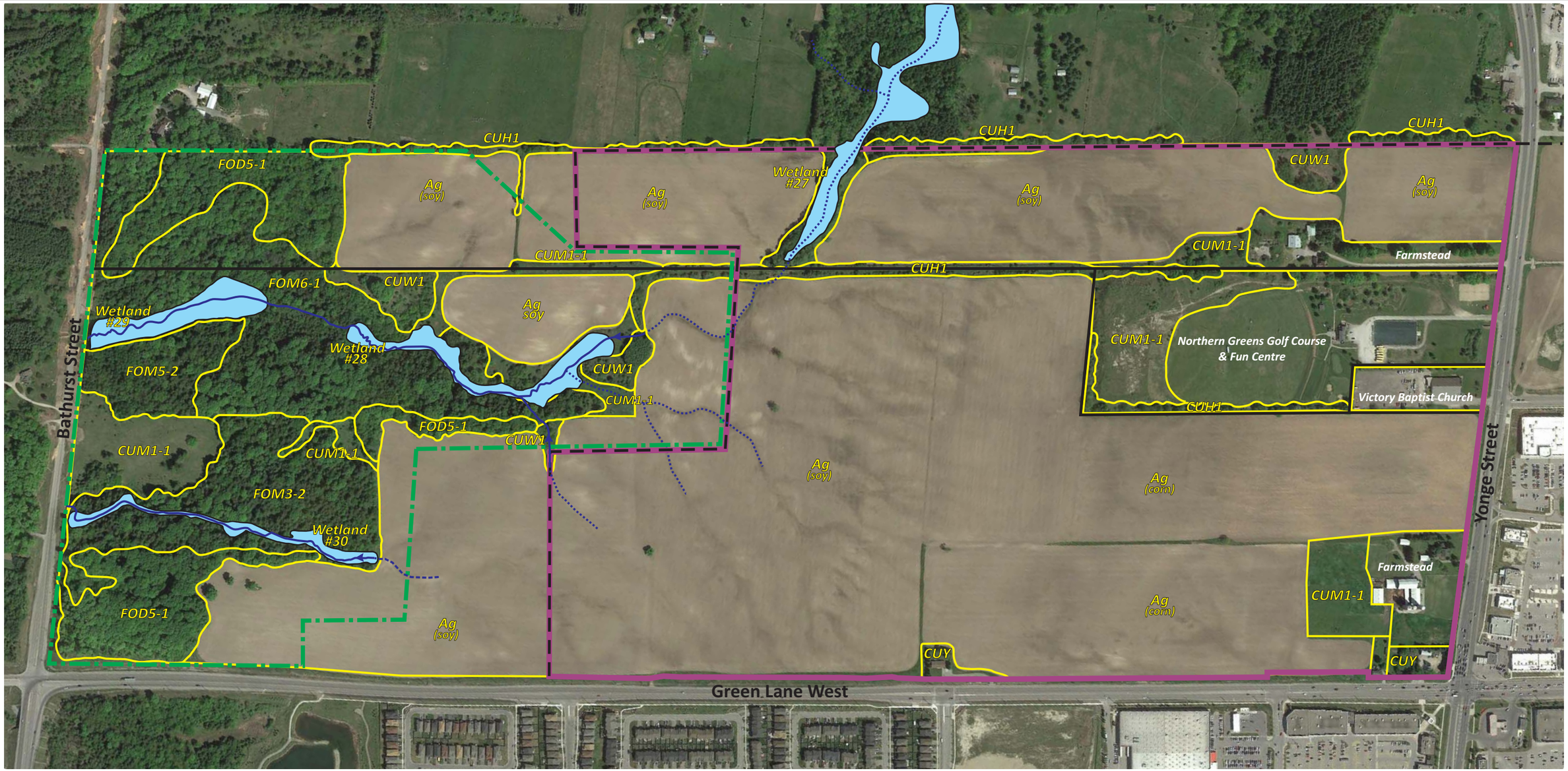


Figure 3. Existing Natural, Cultural & Anthropogenic Features

1: 6000

NW Yonge and Green Lane Secondary Plan Area

Part of Lots 101 and 102
Concession 1 W.Y.S
(Geographic Township of East Gwillimbury)
Town of East Gwillimbury
Regional Municipality of York

Cunningham Environmental Associates

- NW Yonge and Green Lane Secondary Plan Area
- Current Urban Boundary
- Greenbelt Boundary
- Land Ownership Boundary
- vegetation community boundary
- intermittent or permanent stream (tributary) (direction of flow)
- ephemeral feature (Beacon Environmental 2015)

Ecological Land Classification (ELC)

FOD5-1	*Dry-Fresh Sugar Maple Deciduous Forest*
FOM3-2	*Dry-Fresh Sugar Maple-Hemlock Mixed Forest*
FOM5-2	*Dry-Fresh Poplar Mixed Forest*
FOM6-1	*Fresh-Moist Sugar Maple-Hemlock Mixed Forest*
Wetland #27	*Deciduous Swamp & Meadow Marsh*
Wetland #28	*Deciduous Swamp, Coniferous Swamp & Meadow Marsh*
Wetland #29	*Meadow Marsh, Deciduous Swamp & Coniferous Swamp*
Wetland #30	*Meadow Marsh*
CUW1	*Cultural Woodland*
CUH1	*Cultural Deciduous Hedgerow*
CUM1-1	*Dry-Fresh Old Field Meadow*
CUY	*Cultural Yard*
Ag (soy)	*Agricultural Cropland (soybean)*
Ag (corn)	*Agricultural Cropland (corn)*

Stormwater Management Master Plan (Cole, 2012)

SCS consulting group ltd

The Town of East Gwillimbury

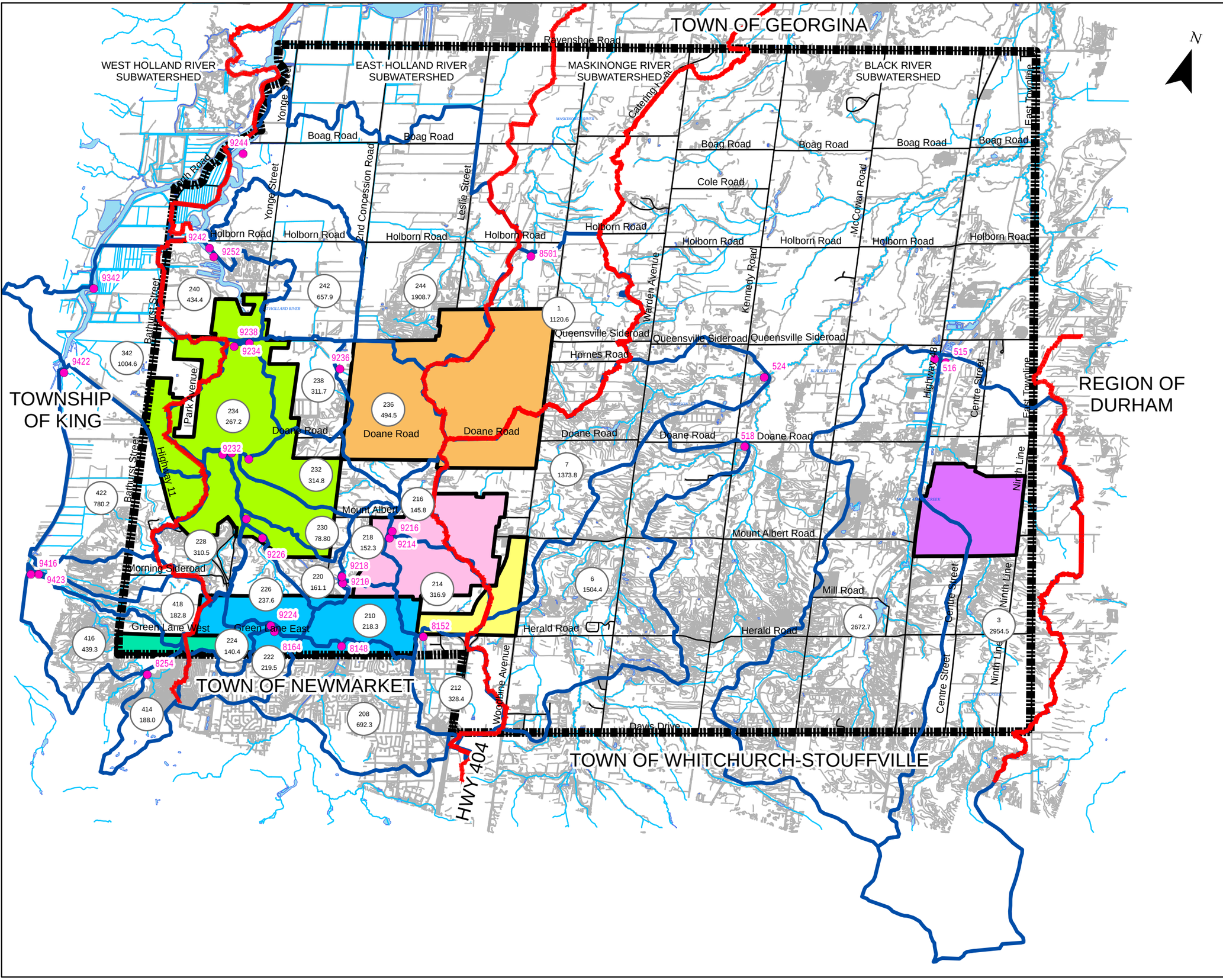
Stormwater Management Master Plan Municipal Class Environmental Assessment

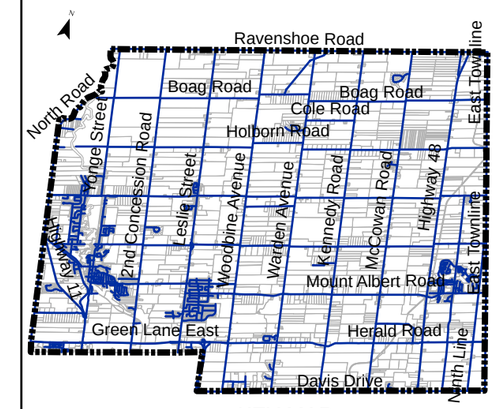
W10-487

November 2012

COLE ENGINEERING

Experience Enhancing Excellence





KEY MAP
SCALE: 1:250,000

LEGEND

- COMPARISON POINTS
- WATERSHED BOUNDARY
- TOWN BOUNDARY
- SUBCATCHMENT AREAS

COMMUNITY AREA

- GREEN LANE CORRIDOR COMMUNITY PLAN
- GREEN LANE WEST COMMUNITY PLAN
- HOLLAND LANDING - RIVER DRIVE PARK COMMUNITY PLAN
- MOUNT ALBERT COMMUNITY PLAN AREA
- QUEENSVILLE COMMUNITY PLAN
- SHARON COMMUNITY PLAN AREA
- HWY 404 EMPLOYMENT AREA

1 — SUBCATCHMENT ID
1120.6 — SUBCATCHMENT AREA (ha)

NOTES:

COLE ENGINEERING
Experience Enhancing Excellence

Town of East Gwillimbury
Our town, Our future

SCALE: 1:73,588

0 550 1,100 2,200 3,300 4,400 Meters

STORMWATER MANAGEMENT MASTER PLAN
EXISTING DRAINAGE AREAS AND SUBWATERSHED BOUNDARIES

FIGURE 4-5 **DATE: JAN 2012**

1	2	3	4	5	6	7 [1]	8 = 4–7	9 = (4–7)/4
Subwatershed	Storm Event	Rainfall	Qpre	Qpost (no mitigation)	Qpost (post-to-pre approach)	Qpost (over-control)	Diff.	% Diff.
	year	mm	m^3/s	m^3/s	m^3/s	m^3/s	m^3/s	
	25	73	1.221	1.205	1.216	1.197	-0.024	-2.0%
	50	81	1.476	1.456	1.467	1.446	-0.030	-2.0%
	100	89	1.747	1.724	1.734	1.713	-0.034	-1.9%

[1] Over-control approach utilized. Refer to **Table 4-42** for required unit-flow rate.

Table 4-20 – Post-Development Peak Flow for Subcatchment Area 228 (Comparison Point 9228)

1	2	3	4	5	6	7 [1]	8 = 4–7	9 = (4–7)/4
Subwatershed	Storm Event	Rainfall	Qpre	Qpost (no mitigation)	Qpost (post-to-pre approach)	Qpost (over-control)	Diff.	% Diff.
	year	mm	m^3/s	m^3/s	m^3/s	m^3/s	m^3/s	
East Holland River (Area: 310.54ha)	2	42	0.879	2.179	0.580	0.727	-0.152	-20.9%
	5	54	1.493	3.478	1.034	1.476	-0.017	-1.2%
	10	63	1.970	4.607	1.425	1.906	-0.064	-3.4%
	25	73	2.635	6.205	2.921	2.492	-0.143	-5.7%
	50	81	3.173	8.593	4.216	3.011	-0.162	-5.4%
	100	89	3.743	10.169	5.130	3.655	-0.088	-2.4%

[1] Over-control approach utilized. Refer to **Table 4-42** for required unit-flow rate.

Table 4-21– Post-Development Peak Flow for Subcatchment Area 226 (Comparison Point 9226)

1	2	3	4	5	6	7 [1]	8 = 4–7	9 = (4–7)/4
Subwatershed	Storm Event	Rainfall	Qpre	Qpost (no mitigation)	Qpost (post-to-pre approach)	Qpost (over-control)	Diff.	% Diff.
	year	mm	m^3/s	m^3/s	m^3/s	m^3/s	m^3/s	
East Holland River (Area: 237.6ha)	2	42	1.169	10.086	1.917	1.097	-0.072	-6.6%
	5	54	1.920	14.314	4.153	1.719	-0.201	-11.7%
	10	63	2.484	17.117	6.279	2.200	-0.284	-12.9%
	25	73	3.250	20.742	9.111	2.854	-0.396	-13.9%
	50	81	3.852	23.495	10.908	3.434	-0.418	-12.2%
	100	89	4.479	26.297	14.385	4.024	-0.455	-11.3%

[1] Over-control approach utilized. Refer to **Table 4-42** for required unit-flow rate.

Table 4-27 – Post-Development Peak Flow for Subcatchment Area 214 (Comparison Point 9214)

1	2	3	4	5	6	7 = 4–6	8 = (4–6)/4
Subwatershed	Storm Event	Rainfall	Qpre	Qpost (no mitigation)	Qpost (post-to-pre approach)	Diff.	% Diff.
	year	mm	m^3/s	m^3/s	m^3/s	m^3/s	
West Holland River (Area: 316.95ha)	2	42	3.693	11.137	1.473	-2.220	-60.1%
	5	54	6.812	15.749	4.012	-2.800	-41.1%
	10	63	9.005	20.665	8.476	-0.529	-5.9%
	25	73	12.628	25.985	12.150	-0.478	-3.8%
	50	81	17.592	30.405	13.920	-3.672	-20.9%
	100	89	20.817	34.675	15.918	-4.889	-23.5%

Table 4-28 – Post-Development Peak Flow for Subcatchment Area 224 (Comparison Point 9224)

1	2	3	4	5	6	7 = 4–6	8 = (4–6)/4
Subwatershed	Storm Event	Rainfall	Qpre	Qpost (no mitigation)	Qpost (post-to-pre approach)	Diff.	% Diff.
	year	mm	m^3/s	m^3/s	m^3/s	m^3/s	
East Holland River (Area: 140.45ha)	2	42	4.872	8.951	2.122	-2.750	-56.4%
	5	54	6.985	13.076	4.116	-2.869	-41.1%
	10	63	9.955	15.776	6.595	-3.360	-33.8%
	25	73	12.468	19.191	8.011	-4.457	-35.7%
	50	81	14.420	21.793	9.852	-4.568	-31.7%
	100	89	16.438	24.448	12.139	-4.299	-26.2%

Table 4-29 – Post-Development Peak Flow for Subcatchment Area 222 (Comparison Point 8164)

1	2	3	4	5	6	7 = 4–6	8 = (4–6)/4
Subwatershed	Storm Event	Rainfall	Qpre	Qpost (no mitigation)	Qpost (post-to-pre approach)	Diff.	% Diff.
	year	mm	m^3/s	m^3/s	m^3/s	m^3/s	
East Holland River (Area: 219.50ha)	2	42	5.052	11.876	4.972	-0.080	-1.6%
	5	54	7.127	17.696	6.960	-0.167	-2.3%
	10	63	8.611	21.382	8.341	-0.270	-3.1%
	25	73	10.506	26.191	10.118	-0.388	-3.7%
	50	81	11.943	29.866	11.458	-0.485	-4.1%

Table 4-32 – Post-Development Peak Flow for Subcatchment Area 342 (Comparison Point 9342)

1	2	3	4	5	6	7 [1]	8 = 4–7	9 = (4–7)/4
Subwatershed	Storm Event	Rainfall	Qpre	Qpost (no mitigation)	Qpost (post-to-pre approach)	Qpost (over-control)	Diff.	% Diff.
	year	mm	m^3/s	m^3/s	m^3/s	m^3/s	m^3/s	
West Holland River (Area: 1004.58ha)	2	42	1.208	9.517	1.748	1.136	-0.072	-6.0%
	5	54	2.057	13.498	4.136	1.986	-0.071	-3.5%
	10	63	2.724	16.363	5.408	2.649	-0.075	-2.8%
	25	73	3.660	22.261	7.536	3.570	-0.090	-2.5%
	50	81	4.420	25.680	9.111	4.304	-0.116	-2.6%
	100	89	5.230	29.235	10.777	5.080	-0.150	-2.9%

[1] Over-control approach utilized. Refer to **Table 4-42** for required unit-flow rate.

Table 4-33 – Post-Development Peak Flow for Subcatchment Area 422 (Comparison Point 9422)

1	2	3	4	5	6	7 [1]	8 = 4–7	9 = (4–7)/4
Subwatershed	Storm Event	Rainfall	Qpre	Qpost (no mitigation)	Qpost (post-to-pre approach)	Qpost (over-control)	Diff.	% Diff.
	year	mm	m^3/s	m^3/s	m^3/s	m^3/s	m^3/s	
West Holland River (Area: 780.20ha)	2	42	1.144	1.746	1.23	1.070	-0.074	-6.5%
	5	54	1.954	2.717	2.093	1.829	-0.125	-6.4%
	10	63	2.591	3.408	2.791	2.438	-0.153	-5.9%
	25	73	3.488	4.492	3.763	3.292	-0.196	-5.6%
	50	81	4.215	5.652	4.836	3.986	-0.229	-5.4%
	100	89	4.992	6.698	6.032	4.726	-0.266	-5.3%

[1] Over-control approach utilized. Refer to **Table 4-42** for required unit-flow rate.

Table 4-34 – Post-Development Peak Flow for Subcatchment Area 416 (Comparison Point 9416)

1	2	3	4	5	6	7 [1]	8 = 4–7	9 = (4–7)/4
Subwatershed	Storm Event	Rainfall	Qpre	Qpost (no mitigation)	Qpost (post-to-pre approach)	Qpost (over-control)	Diff.	% Diff.
	year	mm	m^3/s	m^3/s	m^3/s	m^3/s	m^3/s	
West Holland River (Area:	2	42	1.251	1.600	0.913	1.005	-0.246	-24.5%
	5	54	2.108	2.674	2.243	1.882	-0.226	-12.0%
	10	63	2.770	3.500	2.980	2.523	-0.247	-9.8%

1	2	3	4	5	6	7 [1]	8 = 4–7	9 = (4–7)/4
Subwatershed	Storm Event	Rainfall	Qpre	Qpost (no mitigation)	Qpost (post-to-pre approach)	Qpost (over-control)	Diff.	% Diff.
	year	mm	m^3/s	m^3/s	m^3/s	m^3/s	m^3/s	
	25	73	3.686	4.634	4.048	3.388	-0.298	-8.8%
	50	81	4.419	5.537	4.816	4.090	-0.329	-8.0%
	100	89	5.193	6.486	5.810	4.758	-0.435	-9.1%

[1] Over-control approach utilized. Refer to **Table 4-42** for required unit-flow rate.

Table 4-35 – Post-Development Peak Flow for Subcatchment Area 418 (Comparison Point 9423)

1	2	3	4	5	6	7 [1]	8 = 4–7	9 = (4–7)/4
Subwatershed	Storm Event	Rainfall	Qpre	Qpost (no mitigation)	Qpost (post-to-pre approach)	Qpost (over-control)	Diff.	% Diff.
	year	mm	m^3/s	m^3/s	m^3/s	m^3/s	m^3/s	
West Holland River (Area: 182.79ha)	2	42	0.600	0.643	0.618	0.574	-0.026	-4.3%
	5	54	1.014	1.082	1.114	0.970	-0.044	-4.3%
	10	63	1.335	1.421	1.467	1.277	-0.058	-4.3%
	25	73	1.780	1.904	1.954	1.702	-0.078	-4.4%
	50	81	2.136	2.291	2.348	2.042	-0.094	-4.4%
	100	89	2.512	2.702	2.757	2.401	-0.111	-4.4%

[1] Over-control approach utilized. Refer to **Table 4-42** for required unit-flow rate.

Table 4-36 – Post-Development Peak Flow for Subcatchment Area 414 (Comparison Point 8254)

1	2	3	4	5	6	7 = 4–6	8 = (4–6)/4
Subwatershed	Storm Event	Rainfall	Qpre	Qpost (no mitigation)	Qpost (post-to-pre approach)	Diff.	% Diff.
	year	mm	m^3/s	m^3/s	m^3/s	m^3/s	
West Holland River (Area: 188.00ha)	2	42	2.277	5.638	1.301	-0.976	-42.9%
	5	54	3.718	9.550	3.037	-0.681	-18.3%
	10	63	5.494	11.831	3.960	-1.534	-27.9%
	25	73	7.551	14.891	5.059	-2.492	-33.0%
	50	81	10.313	17.405	5.696	-4.617	-44.8%
	100	89	11.915	19.912	6.329	-5.586	-46.9%

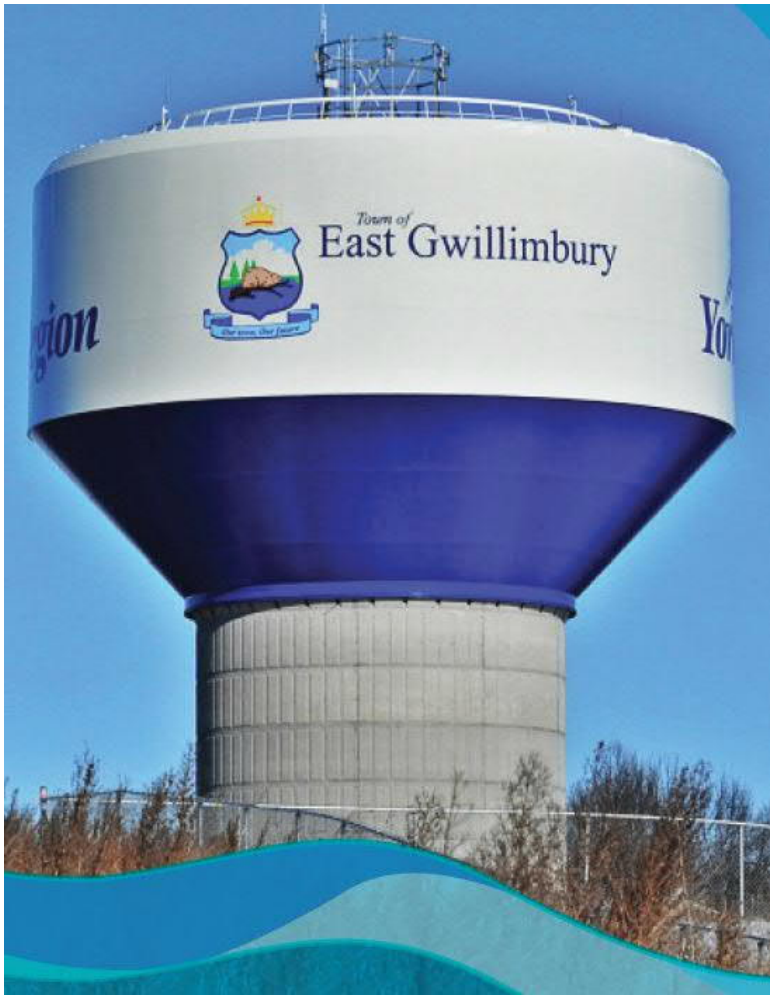
Town of East Gwillimbury Water and Wastewater Master Plan Update (WSP, 2024)

SCS consulting group ltd

TOWN OF EAST GWILLIMBURY

2023 WATER AND WASTEWATER MASTER PLAN UPDATE

March 6th 2024



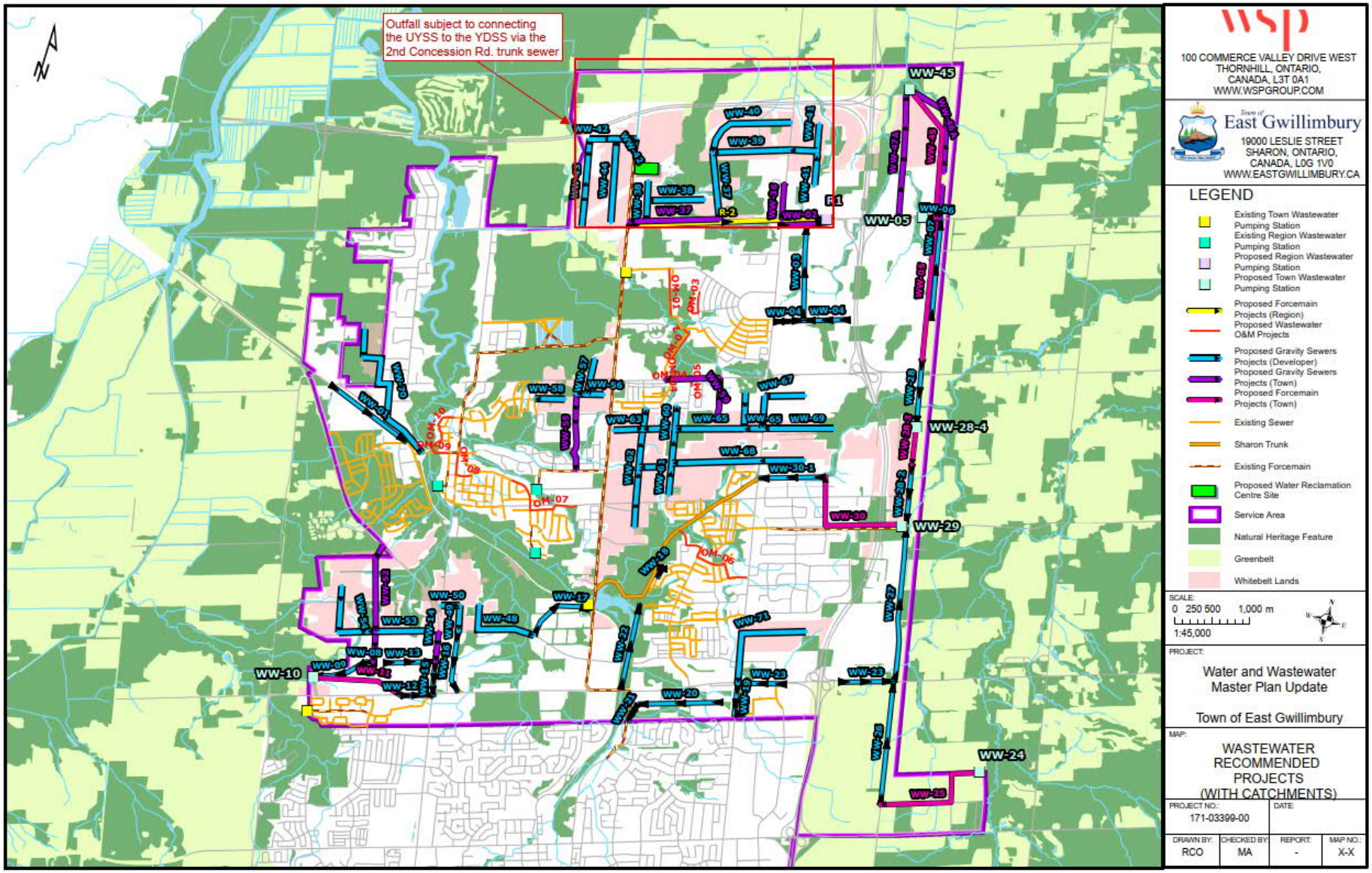


Figure 5-23 Wastewater Capital Projects in the CGA

York Water and Wastewater Master Plan (York Region, 2022)

SCS consulting group ltd

2022 YORK REGION

WATER AND WASTEWATER MASTER PLAN

Appendix A
Infrastructure

York Region

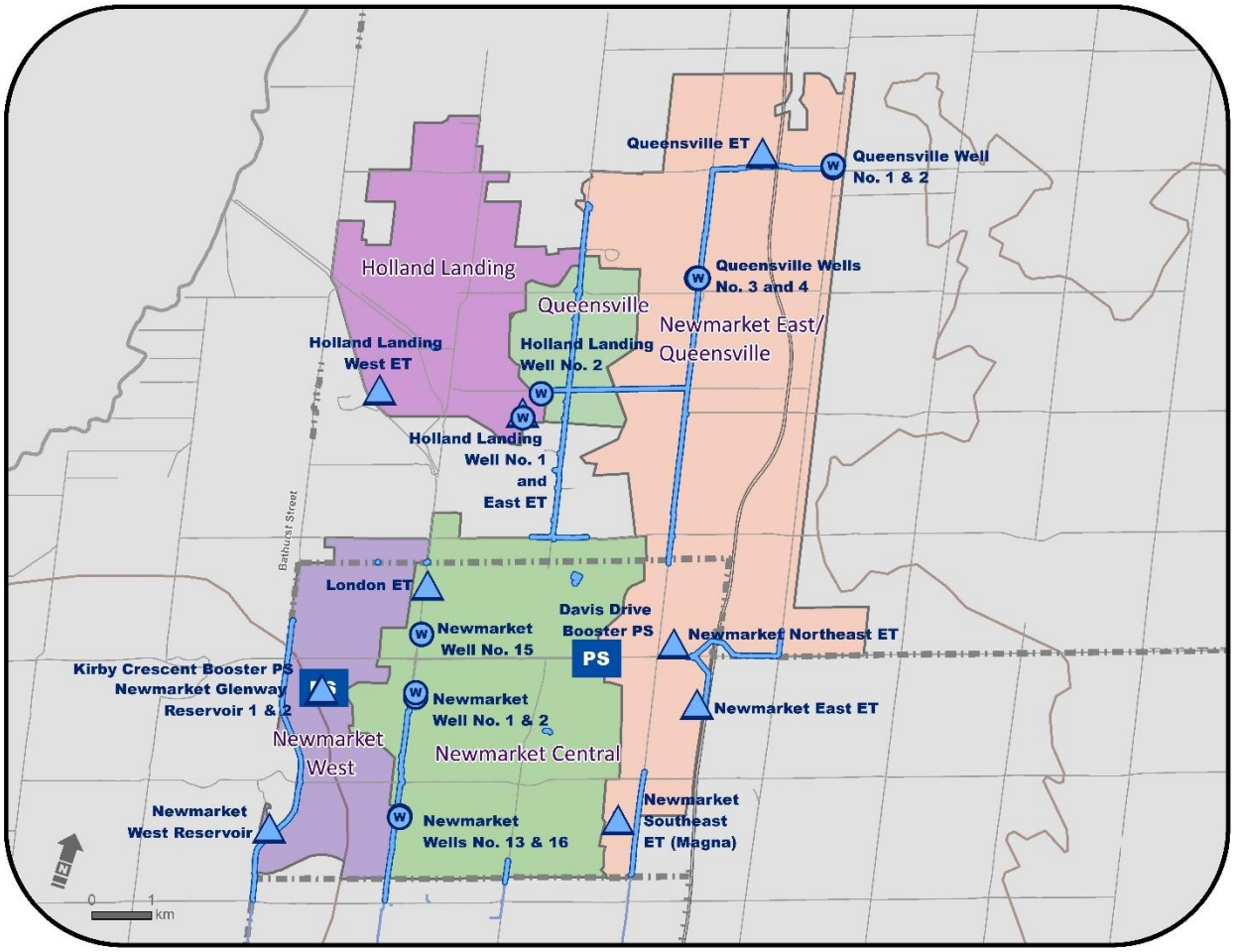
Newmarket West Pressure District (NWPD) services the area generally bounded by Green Lane West to the north, Aurora/Newmarket municipal boundary to the south, Bathurst Street to the west, and Yonge Street to the east. NWPD is supplied by the Orchard Heights Pumping Station via Kirby Crescent Booster Pumping Station. Newmarket West Reservoir provides storage capacity.

Holland Landing Pressure District (HLPD) services the Holland Landing community in Town of East Gwillimbury. HLPD is supplied by two Yonge Street Aquifer wells and an interconnection with NEQPD on Mount Albert Road. Holland Landing East and Holland Landing West elevated tanks provide storage capacity. In 2014, the Second Concession watermain was introduced to HLPD and is partially in service until the proposed Green Lane watermain is constructed to bring additional supply to this community.

Since 2016, a groundwater treatment strategy has been developed to remove iron and manganese from the well supply system. Introduction of a new Green Lane Well is also in progress through the asset management program to recover lost capacity in the Yonge Street Aquifer system.

Newmarket and East Gwillimbury Pressure Districts are shown in **Figure 12.**

Figure 12 - Newmarket and East Gwillimbury Pressure Districts



GEORGINA WATER SYSTEM

The Georgina Water System currently services Keswick, Sutton and Willow Beach communities in the Town of Georgina. The system receives supply from Lake Simcoe in the Lake Huron watershed via the

Appendix C Hydrologic Modeling

The following secure link is being provided by SCS Consulting Group to share Northwest Yonge and Green Lane FSSR related digital data:
https://filesafecloud.scsconsultinggroup.com/url/emwg5vtpymaqdtpb

Please click on the link and download all files from this location.

- Digital copy of the FSSR;
- Visual Otthymo modeling files

Site Hydrology Modelling

SCS consulting group ltd

Existing Condition VO6 Schematic

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

Existing Conditions
VO6 Parameter Summary

NASHYD

Number	1101	1201	1301	1401	1102 (External)
Description					
DT(min)	2	2	2	2	2
Area (ha)	67.75	11.33	37.80	0.89	32.23
CN*	72.0	73.0	84.0	77.0	53.0
IA(mm)	7.9	8.0	6.4	8.8	3.5
TP Method	Airport	Airport	Airport	Airport	Airport
TP (hr)	2.35	0.43	0.98	0.09	0.73

[1]Note that where there is NO directly connected area (ie: roof runoff to grassed areas), the hydrology program does not accept XIMP=0%, therefore, XIMP = 1% has been used
[2]Note that where there is NO pervious area, the hydrology program does not accept TIMP and XIMP=100%, therefore, TIMP and XIMP = 99% has been used

Total Site Area = 117.8 ha
Total Area with External = 150.0 ha

Existing Conditions
CN Calculations

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

Site Soils: (per Ontario Soil Survey Complex)

Soil Type	Hydrologic Soil Group
Bondhead Silt Loam	AB
Schomberg Silt Clay Loam	C

TABLE OF CURVE NUMBERS (CN's)**

Land Use		Hydrologic Soil Type A	AB	B	BC	C	CD	D	Manning's 'n'	Source
Meadow	"Good"	30	44	58	64.5	71	74.5	78	0.40	MTO
Woodlot	"Fair"	36	48	60	66.5	73	76	79	0.40	MTO
Gravel		76	80.5	85	87	89	90	91	0.30	USDA
Lawns	"Good"	39	50	61	67.5	74	77	80	0.25	USDA
Pasture/Range		58	61.5	65	70.5	76	78.5	81	0.17	MTO
Crop		66	70	74	78	82	84	86	0.13	MTO
Fallow (Bare)		77	82	86	89	91	93	94	0.05	MTO
Low Density Residences		57	64.5	72	76.5	81	83.5	86	0.25	USDA
Streets, paved		98	98	98	98	98	98	98	0.01	USDA

1. MTO Drainage Manual (1997), Design Chart 1.09-Soil/Land Use Curve Numbers
2. USDA (1986), Urban Hydrology for Small Watersheds, Table 2.2-Runoff Curve Numbers for Urban Areas

HYDROLOGIC SOIL TYPE (%) - Existing Conditions

Catchment	Hydrologic Soil Type A	AB	B	BC	C	CD	D	TOTAL
1101	0.0	73.1	0.0	0.0	26.9	0.0	0.0	100
1201	0.0	74.1	0.0	0.0	25.9	0.0	0.0	100
1301	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100
1401	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100
102 (External	0.0	99.8	0.0	0.0	0.2	0.0	0.0	100

LAND USE (%) - Existing Conditions

Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
1101	0.0	6.4	0.0	3.3	5.5	83.5	0.0	1.3	0.0	100.0
1201	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0
1301	0.0	0.6	0.0	15.5	0.0	65.3	0.0	15.6	3.0	100.0
1401	0.0	85.2	0.0	0.0	0.0	0.0	0.0	14.8	0.0	100.0
1102 (External)	0.0	19.3	0.0	0.0	0.0	0.0	0.0	80.7	0.0	100.0

Note: Where STANDHYD command used (shaded), impervious fraction is not considered in CN determination, since %Imp directly input in STANDHYD command

CURVE NUMBER (CN) - Existing Conditions

Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Weighted CN
1101	0.0	3.5	0.0	1.9	3.6	61.1	0.0	0.9	0.0	71
1201	0.0	0.0	0.0	0.0	0.0	73.1	0.0	0.0	0.0	73
1301	0.0	0.4	0.0	11.5	0.0	53.6	0.0	12.6	2.9	81
1401	0.0	62.2	0.0	0.0	0.0	0.0	0.0	12.0	0.0	74
1102 (External)	0.0	9.3	0.0	0.0	0.0	0.0	0.0	52.1	0.0	61

** AMC II assumed

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

Existing Conditions
CN Calculations

Input Values

Step	Subcatchment:	1101		1201	1301	1401	1102 (External)
1	**CN (AMC II):**	**71**		**73**	**81**	**74**	**61**
2	CN (AMC III) =	86		87	92	88	78
3	100 Year Precipitation, P =	108.98	mm	108.98	108.98	108.98	108.98

$$Q = \frac{(P - Ia)^2}{(P - Ia) + S} \qquad S = \frac{(P - Ia)^2}{Q} - (P - Ia)$$

Q = rainfall excess or runoff, mm
S = potential maximum retention or available storage, mm

$$CN = \frac{25400}{S + 254} \qquad S = \frac{25400}{CN} - 254$$

CN* = modified SCS curve # that better reflects Ia conditions in Ontario

Output Values

	Subcatchment:	1101		1201	1301	1401	1102 (External)
	S_{III} =	41.35	mm	37.95	22.09	34.64	71.64
	SCS Assumption of 0.2 S = Ia =	8.27	mm	7.59	4.42	6.93	14.33
4	Q_{III} =	71.40	mm	73.77	86.33	76.19	53.87
	Preferred Initial Abstraction, Ia =	7.9	mm	8.0	6.4	8.8	3.5
5	S^*_{III} =	41.93	mm	37.24	19.27	31.51	100.92
6	CN^*_{III} =	85.83	mm	87.21	92.95	88.96	71.57
	CN^*_{III}=	**86**	Rounded	**87**	**93**	**89**	**72**
7	**CN^*_{II}=**	**72**	convert	**73**	**84**	**77**	**53**

Explanation of Procedure

1 Determine CN based on typical AMC II conditions (attached)
2 Convert CN from AMC II to AMC III conditions (standard SCS tables)
3 Get precipitation depth P for 100 year storm
4 Using CN_{III} with Ia = 0.2S, compute Q_{III} for 100 year precipitation
5 For the same Q_{III}, compute S^*_{III} using Ia=1.5mm (or otherwise determined)
6 Compute CN^*_{III} using S^*_{III}
7 Calculate CN^*_{II} using SCS conversion table

Existing Conditions
IA Calculations

LAND USE (%) - Existing Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
1101		6.4		3.3	5.5	83.5		1.3		100.0
1201						100.0				100.0
1301		0.6		15.5		65.3		15.6	3.0	100.0
1401		85.2						14.8		100.0
1102 (External)		19.3						80.7		100.0

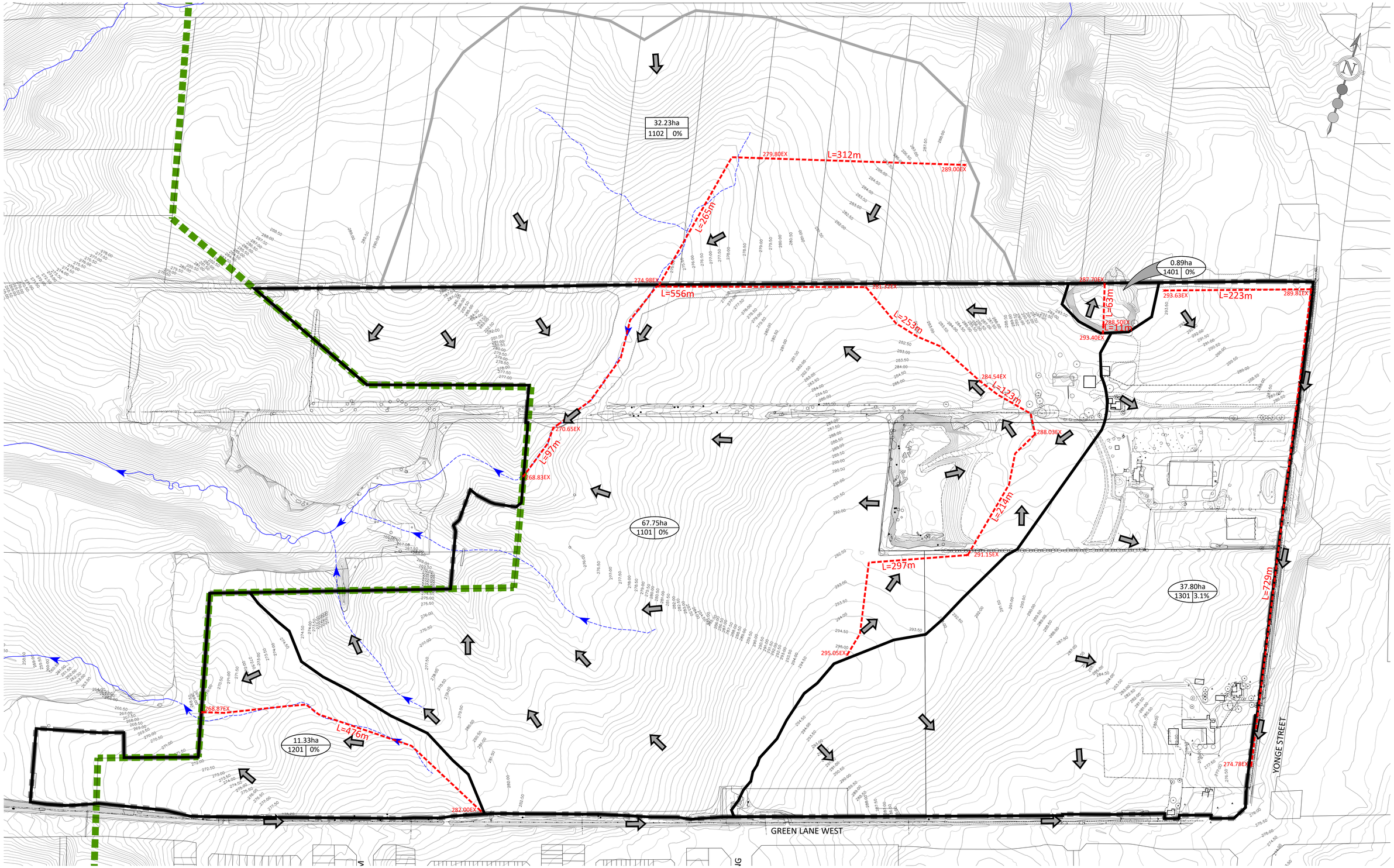
IA VALUES (mm) - Existing Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
IA (mm)	8	10	2	5	8	8	3	2	2	
1101		0.6		0.2	0.4	6.7		0.0		7.9
1201						8.0				8.0
1301		0.1		0.8		5.2		0.3	0.1	6.4
1401		8.5						0.3		8.8
1102 (External)		1.9						1.6		3.5

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

Existing Conditions
Time to Peak Calculations

Airport Method: (used for all catchments with a runoff coefficient of less than 0.4)

Catchment ID	High Elevation	Low Elevation	Length (m)	Slope (%)	Runoff Coefficient	Time of Concentration (minutes)	Time of Concentration (hr)	Time to Peak (hr)
1101a	295.05	291.15	297	1.31	0.35	38.47	0.64	0.43
1101b	291.15	288.03	214	1.46	0.08	43.15	0.72	0.48
1101c	288.03	284.54	123	2.85	0.28	20.96	0.35	0.23
1101d	284.54	281.32	253	1.27	0.35	35.95	0.60	0.40
1101e	281.32	270.65	556	1.92	0.25	52.70	0.88	0.59
1101f	270.65	268.83	97	1.87	0.35	19.63	0.33	0.22
1101								**2.35**
1201a	282.00	268.87	476	2.76	0.35	38.18	0.64	0.43
1201								**0.43**
1301a	293.63	289.81	223	1.71	0.35	30.57	0.51	0.34
1301b	289.81	274.78	729	2.06	0.28	56.85	0.95	0.63
1301								**0.98**
1401a	293.43	288.50	11	46.07	0.35	2.26	0.04	0.03
1401b	288.50	287.70	63	1.26	0.25	20.46	0.34	0.23
1401								**0.25**
1102 (External)a	289.00	279.80	312	2.95	0.28	33.07	0.55	0.37
1102 (External)b	279.80	274.65	265	1.94	0.35	31.99	0.53	0.36
1102 (External)								**0.73**



FSSR

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

- LIMIT OF DEVELOPMENT
- EXISTING CONTOUR AND ELEVATION (220.00)
- GREENBELT BOUNDARY
- STORM DRAINAGE BOUNDARY
- TIME TO PEAK FLOW PATH (L=XXXm)
- EXISTING ELEVATION (×271.56EX)
- MAJOR SYSTEM - OVERLAND FLOW
- 0.35ha / 1101 / 10% — DRAINAGE AREA (HECTARES); IMPERVIOUS PERCENTAGE; CATCHMENT ID
- 32.23ha / 1102 / 0% — DRAINAGE AREA (HECTARES); IMPERVIOUS PERCENTAGE; CATCHMENT ID
- EXISTING INTERMITTENT AND PERMANENT STREAM
- EXISTING EPHEMERAL FEATURE

NORTHWEST YONGE AND GREEN LANE

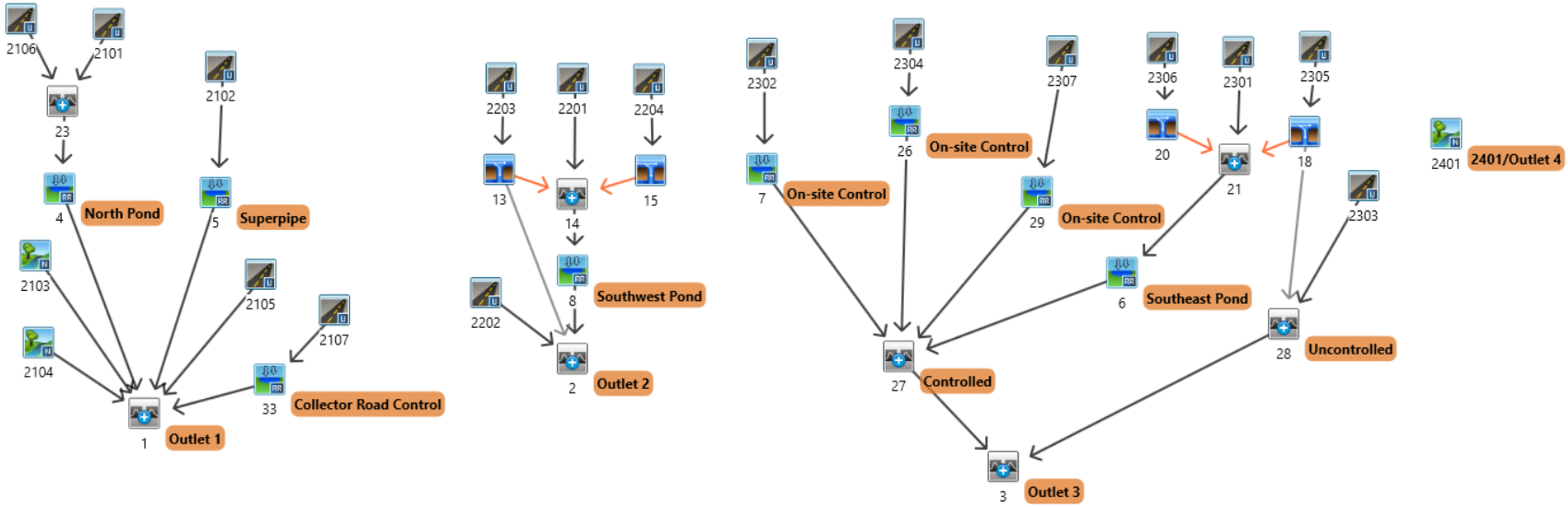
EXISTING TIME TO PEAK PLAN

DESIGNED BY:	H.Y./E.A.S.	CHECKED BY:	E.T.C.K.
SCALE:	1:2500	DATE:	FEBRUARY 2025

PROJECT No:	FIGURE No:
2300	C.1

File: P:\2300 NW Yonge and Green Lane\Drawings\FSR\Fig\Report Figures\2300P-EXST-PEAK-C.1.dwg – Revised by <SOZDEMIR> : Tue, Feb 04 2025 – 3:39pm

SCS consulting group ltd	**Proposed Condition VO6 Schematic**	Northwest Yonge and Green Lane Project Number: 2300 Date: February 2025



Proposed Conditions
VO6 Parameter Summary

NASHYD

Number	2103	2104	2401
Description			
DT(min)	2	2	2
Area (ha)	3.80	0.34	0.22
CN*	75.0	38.0	73.0
IA(mm)	9.7	5.0	5.0
TP Method	Airport	Airport	Airport
TP (hr)	0.46	0.55	0.25

STANDHYD

Number	2101	2102	2201	2301	2302	2105	2202	2303	2106	2203	2204	2304	2305	2306	2307	2107
Description																
DT(min)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Area (ha)	61.28	4.47	15.18	19.45	3.80	1.31	0.41	1.30	0.13	0.39	0.10	3.00	0.10	0.05	2.02	0.68
TIMP[2]	0.66	0.70	0.72	0.81	0.80	0.40	0.40	0.60	0.99	0.70	0.99	0.85	0.85	0.99	0.85	0.65
XIMP[1,2]	0.43	0.35	0.51	0.75	0.70	0.40	0.40	0.48	0.99	0.35	0.99	0.85	0.85	0.99	0.85	0.54
CN*	53.0	73.0	53.0	73.0	73.0	38.0	67.0	73.0	73.0	38.0	38.0	73.0	73.0	73.0	73.0	38.0
IA(mm)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
SLPP(%)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
LGP(m)	40	40	40	40	30	40	40	40	40	40	40	40	40	40	40	40
MNP	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
DPSI (mm)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
SLPI(%)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
LGI(m)	639.17	172.63	318.12	360.09	159.16	93.45	52.28	93.09	29.44	50.99	25.82	141.42	25.82	18.26	116.05	67.33
MNI	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013

[1]Note that where there is NO directly connected area (ie: roof runoff to grassed areas), the hydrology program does not accept XIMP=0%, therefore, XIMP = 1% has been used

[2]Note that where there is NO pervious area, the hydrology program does not accept TIMP and XIMP=100%, therefore, TIMP and XIMP = 99% has been used

Total Area = 118.0 ha

Proposed Conditions
CN Calculations

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

Site Soils: (per Ontario Soil Survey Complex)

Soil Type	Hydrologic Soil Group
Bondhead Silt Loam	AB
Schomberg Silt Clay Loam	C

TABLE OF CURVE NUMBERS (CN's)**

Land Use		Hydrologic Soil Type							Manning's 'n'	Source
		A	AB	B	BC	C	CD	D		
Meadow	"Good"	30	44	58	64.5	71	74.5	78	0.40	MTO
Woodlot	"Fair"	36	48	60	66.5	73	76	79	0.40	MTO
Gravel		76	80.5	85	87	89	90	91	0.30	USDA
Lawns	"Good"	39	50	61	67.5	74	77	80	0.25	USDA
Pasture/Range		58	61.5	65	70.5	76	78.5	81	0.17	MTO
Crop		66	70	74	78	82	84	86	0.13	MTO
Fallow (Bare)		77	82	86	89	91	93	94	0.05	MTO
Low Density Residences		57	64.5	72	76.5	81	83.5	86	0.25	USDA
Streets, paved		98	98	98	98	98	98	98	0.01	USDA

1. MTO Drainage Manual (1997), Design Chart 1.09-Soil/Land Use Curve Numbers
2. USDA (1986), Urban Hydrology for Small Watersheds, Table 2.2-Runoff Curve Numbers for Urban Areas

HYDROLOGIC SOIL TYPE (%) - Proposed Conditions

	Hydrologic Soil Type							
Catchment	**A**	**AB**	**B**	**BC**	**C**	**CD**	**D**	**TOTAL**
2103					100			100
2104		97.0			3.0			100
2401					100			100
2101		56.5			43.5			100
2102					100			100
2201		57.0			43.0			100
2301					100			100
2302					100			100
2105		94.9			5.1			100
2202		18.7			81.3			100
2303					100			100
2106					100			100
2203		100						100
2204		100						100
2304					100			100
2305					100			100
2306					100			100
2307					100			100
2107		100						100

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

Proposed Conditions
CN Calculations

LAND USE (%) - Proposed Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
2103		93.4		6.6						100.0
2104				100.0						100.0
2401				100.0						100.0
2101				100.0						100.0
2102				100.0						100.0
2201				100.0						100.0
2301				100.0						100.0
2302				100.0						100.0
2105				100.0						100.0
2202				100.0						100.0
2303				100.0						100.0
2106				100.0						100.0
2203				100.0						100.0
2204				100.0						100.0
2304				100.0						100.0
2305				100.0						100.0
2306				100.0						100.0
2307				100.0						100.0
2107				100.0						100.0

Note: Where STANDHYD command used (shaded), impervious fraction is not considered in CN determination, since %Imp directly input in STANDHYD command

CURVE NUMBER (CN) - Existing Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
2103	0.0	68.2	0.0	4.9	0.0	0.0	0.0	0.0	0.0	73
2104	0.0	0.0	0.0	50.7	0.0	0.0	0.0	0.0	0.0	51
2401	0.0	0.0	0.0	74.0	0.0	0.0	0.0	0.0	0.0	74
2101	0.0	0.0	0.0	60.4	0.0	0.0	0.0	0.0	0.0	60
2102	0.0	0.0	0.0	74.0	0.0	0.0	0.0	0.0	0.0	74
2201	0.0	0.0	0.0	60.3	0.0	0.0	0.0	0.0	0.0	60
2301	0.0	0.0	0.0	74.0	0.0	0.0	0.0	0.0	0.0	74
2302	0.0	0.0	0.0	74.0	0.0	0.0	0.0	0.0	0.0	74
2105	0.0	0.0	0.0	51.2	0.0	0.0	0.0	0.0	0.0	51
2202	0.0	0.0	0.0	69.5	0.0	0.0	0.0	0.0	0.0	70
2303	0.0	0.0	0.0	74.0	0.0	0.0	0.0	0.0	0.0	74
2106	0.0	0.0	0.0	74.0	0.0	0.0	0.0	0.0	0.0	74
2203	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	50
2204	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	50
2304	0.0	0.0	0.0	74.0	0.0	0.0	0.0	0.0	0.0	74
2305	0.0	0.0	0.0	74.0	0.0	0.0	0.0	0.0	0.0	74
2306	0.0	0.0	0.0	74.0	0.0	0.0	0.0	0.0	0.0	74
2307	0.0	0.0	0.0	74.0	0.0	0.0	0.0	0.0	0.0	74
2107	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	50

** AMC II assumed

Proposed Conditions
CN Calculations

Input Values

Step	Subcatchment:	2103		2104	2401	2101	2102	2201	2301	2302	2105	2202	2303	2106	2203	2204	2304	2305	2306	2307	2107
1	**CN (AMC II):**	**73**		**51**	**74**	**60**	**74**	**60**	**74**	**74**	**51**	**70**	**74**	**74**	**50**	**50**	**74**	**74**	**74**	**74**	**50**
2	CN (AMC III) =	87.00		70	88	78	88	78	88	88	70	85	88	88	70	70	88	88	88	88	70
3	100 Year Precipitation, P =	108.98	mm	108.98	108.98	108.98	108.98	108.98	108.98	108.98	108.98	108.98	108.98	108.98	108.98	108.98	108.98	108.98	108.98	108.98	108.98

$$Q = \frac{(P - Ia)^2}{(P - Ia) + S} \qquad S = \frac{(P - Ia)^2}{Q} - (P - Ia)$$

Q = rainfall excess or runoff, mm
S = potential maximum retention or available storage, mm

$$CN = \frac{25400}{S + 254} \qquad S = \frac{25400}{CN} - 254$$

CN* = modified SCS curve # that better reflects Ia conditions in Ontario

Output Values

	Subcatchment:	2103		2104	2401	2101	2102	2201	2301	2302	2105	2202	2303	2106	2203	2204	2304	2305	2306	2307	2107
	S_{III} =	37.95	mm	108.86	34.64	71.64	34.64	71.64	34.64	34.64	108.86	44.82	34.64	34.64	108.86	108.86	34.64	34.64	34.64	34.64	108.86
	SCS Assumption of 0.2 S = Ia =	7.59	mm	21.77	6.93	14.33	6.93	14.33	6.93	6.93	21.77	8.96	6.93	6.93	21.77	21.77	6.93	6.93	6.93	6.93	21.77
4	Q_{III} =	73.77	mm	38.79	76.19	53.87	76.19	53.87	76.19	76.19	38.79	69.06	76.19	76.19	38.79	38.79	76.19	76.19	76.19	76.19	38.79
	Preferred Initial Abstraction, Ia =	9.7	mm	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
5	S^*_{III} =	34.37	mm	174.75	37.92	96.71	37.92	96.71	37.92	37.92	174.75	52.57	37.92	37.92	174.75	174.75	37.92	37.92	37.92	37.92	174.75
6	CN^*_{III} =	88.08	mm	59.24	87.01	72.43	87.01	72.43	87.01	87.01	59.24	82.85	87.01	87.01	59.24	59.24	87.01	87.01	87.01	87.01	59.24
	CN^*_{III}=	**88**	Rounded	**59**	**87**	**72**	**87**	**72**	**87**	**87**	**59**	**83**	**87**	**87**	**59**	**59**	**87**	**87**	**87**	**87**	**59**
7	**CN^*_{II}=**	**75**	convert	**38**	**73**	**53**	**73**	**53**	**73**	**73**	**38**	**67**	**73**	**73**	**38**	**38**	**73**	**73**	**73**	**73**	**38**

Explanation of Procedure

1 Determine CN based on typical AMC II conditions (attached)
2 Convert CN from AMC II to AMC III conditions (standard SCS tables)
3 Get precipitation depth P for 100 year storm
4 Using CN_{III} with Ia = 0.2S, compute Q_{III} for 100 year precipitation
5 For the same Q_{III}, compute S^*_{III} using Ia=1.5mm (or otherwise determined)
6 Compute CN^*_{III} using S^*_{III}
7 Calculate CN^*_{II} using SCS conversion table

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

Proposed Conditions
IA Calculations

LAND USE (%) - Proposed Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
2103		93.4		6.6						100.0
2104				100.0						100.0
2401				100.0						100.0
2101				100.0						100.0
2102				100.0						100.0
2201				100.0						100.0
2301				100.0						100.0
2302				100.0						100.0
2105				100.0						100.0
2202				100.0						100.0
2303				100.0						100.0
2106				100.0						100.0
2203				100.0						100.0
2204				100.0						100.0
2304				100.0						100.0
2305				100.0						100.0
2306				100.0						100.0
2307				100.0						100.0
2107				100.0						100.0

IA VALUES (mm) - Proposed Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
IA (mm)	8	10	2	5	8	8	3	2	2	
2103		9.3		0.3						9.7
2104				5.0						5.0
2401				5.0						5.0
2101				5.0						5.0
2102				5.0						5.0
2201				5.0						5.0
2301				5.0						5.0
2302				5.0						5.0
2105				5.0						5.0
2202				5.0						5.0
2303				5.0						5.0
2106				5.0						5.0
2203				5.0						5.0
2204				5.0						5.0
2304				5.0						5.0
2305				5.0						5.0
2306				5.0						5.0
2307				5.0						5.0
2107				5.0						5.0

* IA values based on LSRCA guidelines

Proposed Conditions
CN Calculations

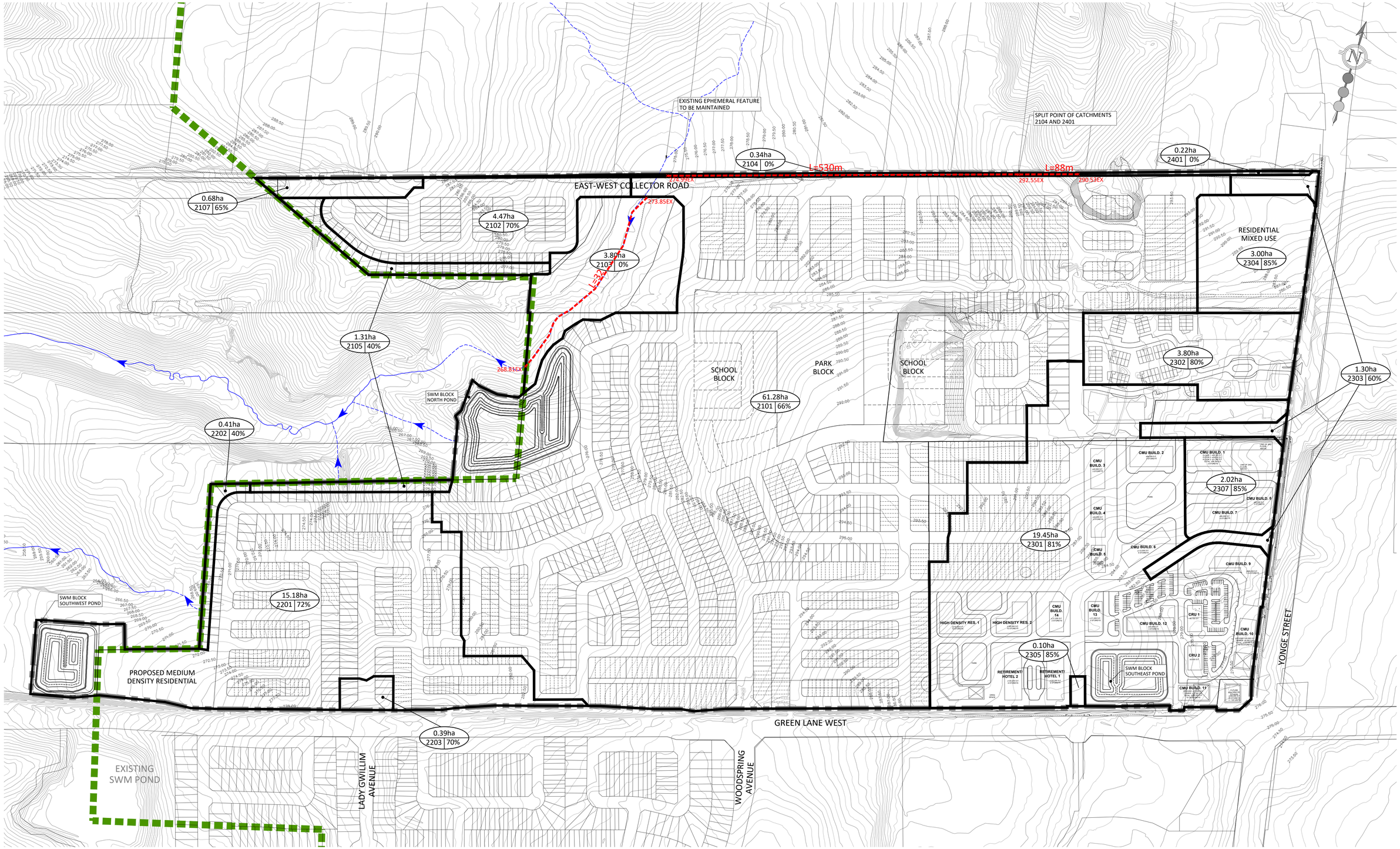
Airport Method: (used for all catchments with a runoff coefficient of less than 0.4)
Refer to Figure C.2.

Catchment ID	High Elevation	Low Elevation	Length (m)	Slope (%)	Runoff Coefficient	Time of Concentration (minutes)	Time of Concentration (hr)	Time to Peak (hr)
2103a	273.85	268.81	321	1.57	0.28	41.26	0.69	0.46
2103								**0.46**
2104a	292.55	274.99	530	3.31	0.12	49.53	0.83	0.55
2104								**0.55**
2401a	292.55	290.53	88	2.30	0.12	22.78	0.38	0.25
2401								**0.25**

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

Proposed Conditions
Percent Impervious Calculations

			StandHyd IDs																
			2101	2102	2201	2301	2302	2105	2202	2303	2106	2203	2204	2304	2305	2306	2307	2107	
Catchment Area (ha)			61.28	4.47	15.18	19.45	3.80	1.31	0.41	1.30	0.13	0.39	0.10	3.00	0.10	0.05	2.02	0.68	
Land Use Areas	Timp	Ximp	Land Use Areas																Total
Parks	0%	0.00	4.07																4.07
Green Lane West	100%	100%									0.13		0.10			0.05			0.28
Uncontrolled - RWO	40%	40%						1.31	0.41										1.72
Uncontrolled - 18m ROW	56%	47%								0.39									0.39
Uncontrolled - 22m ROW	58%	45%								0.50									0.50
Uncontrolled - 30m ROW	65%	54%								0.41								0.68	1.09
School Block	55%	55%	5.57																5.57
SWM Pond	50%	50%	2.70		1.24	0.80													4.74
Employment	85%	85%				0.68													0.68
Mixed Use	85%	85%			1.51	13.48	1.94							3.00	0.10		2.02		22.05
Single Houses	70%	35%	17.10	4.47	4.39	0.65						0.39							26.99
Back to back	75%	55%	6.29		5.49		1.86												13.65
Townhouses	75%	50%	25.55		2.54	3.84													31.94
Open Space		0%																	0.00
		Total Land Use =	61.28	4.47	15.18	19.45	3.80	1.31	0.41	1.30	0.13	0.39	0.10	3.00	0.10	0.05	2.02	0.68	113.67
		Timp =	66%	70%	72%	81%	80%	40%	40%	60%	100%	70%	100%	85%	85%	100%	85%	65%	70%
		Ximp =	43%	35%	51%	75%	70%	40%	40%	48%	100%	35%	100%	85%	85%	100%	85%	54%	52%



*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

FSSR

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30 CENTURIAN DRIVE, SUITE 100
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TEL: (905) 475-1900
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LEGEND:

- LIMIT OF DEVELOPMENT
- 220.00 — EXISTING CONTOUR AND ELEVATION
- GREENBELT BOUNDARY
- STORM DRAINAGE BOUNDARY
- L=XXXm — TIME TO PEAK FLOW PATH
- ×271.56EX — EXISTING ELEVATION
- 0.35ha / 1101 | 10% — DRAINAGE AREA (HECTARES); IMPERVIOUS PERCENTAGE; CATCHMENT ID
- EXISTING INTERMITTENT AND PERMANENT STREAM
- EXISTING EPHEMERAL FEATURE

NORTHWEST YONGE AND GREEN LANE

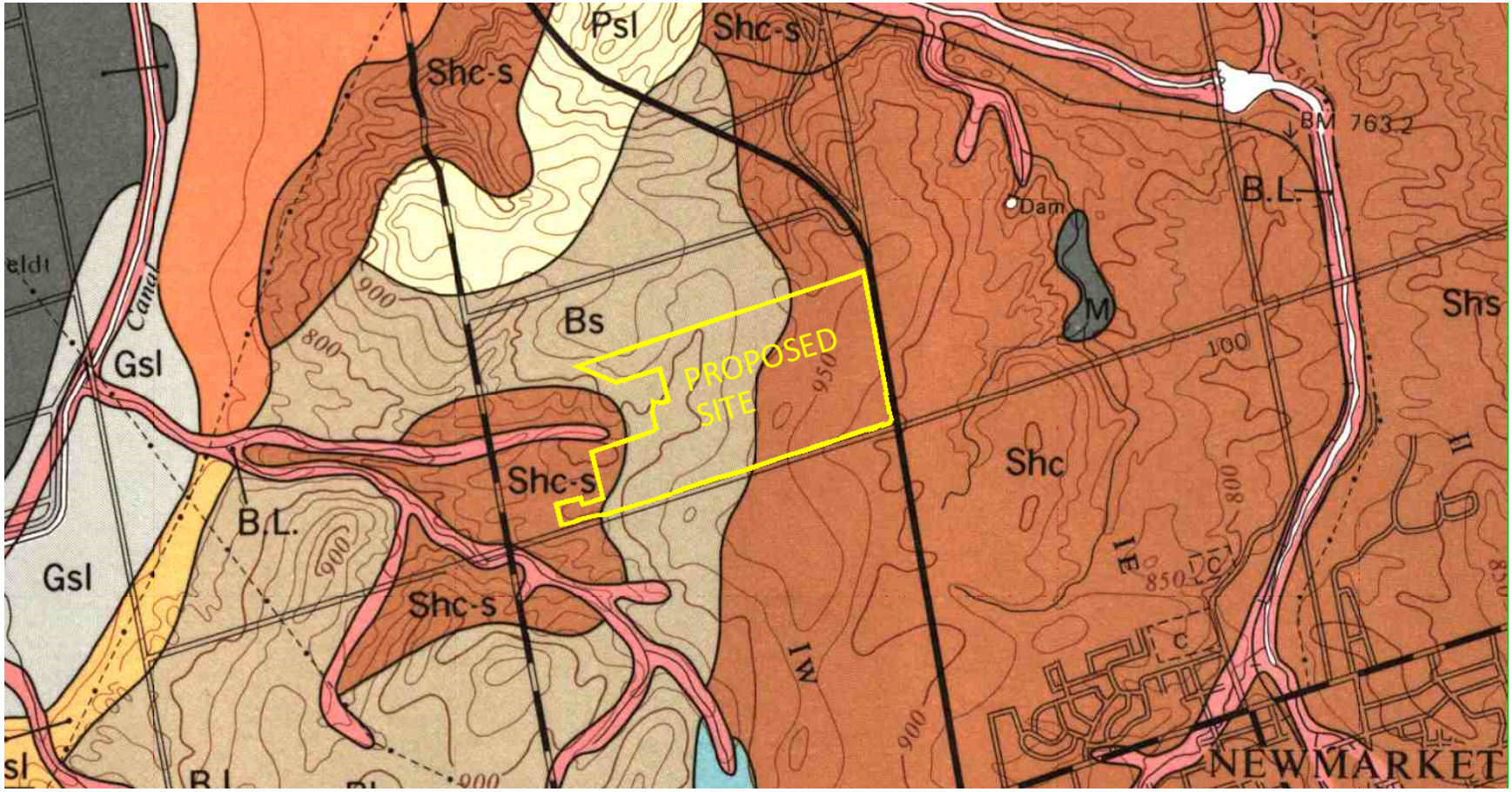
PROPOSED TIME TO PEAK PLAN

DESIGNED BY:	H.Y./E.A.S.	CHECKED BY:	E.T.C.K.
SCALE:	1:2500	DATE:	FEBRUARY 2025

PROJECT No:	FIGURE No:
2300	C.2

File: P:\2300 NW Yonge and Green Lane\Drawings\FSR\Fig\Report Figures\2300P-PROP-PEAK-C.2.dwg - Revised by <SOZDEMIR> : Tue, Feb 04 2025 - 4:17pm

SCS consulting group ltd	**Soil Map**	Northwest Yonge and Green Lane Project Number: 2300 Date: February 2025



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Soil Map

Bl	BONDHEAD	loam	Grey-Brown Podzolic	Good	Smooth moderately sloping. Few stones	Slightly alkaline to medium alkaline	Medium textured grey stony, strongly calcareous till
Bs	BONDHEAD	sandy loam					
Shc	SCHOMBERG	clay loam	Grey-Brown Podzolic	Good	Smooth moderately sloping to irregular steeply sloping. Stonefree	Slightly alkaline	Lacustrine,grey, calcareous,clay or silty clay
Shc-s	SCHOMBERG	clay loam steep phase					
Shs	SCHOMBERG	silt loam					

CHART H2-6A - HYDROLOGIC SOIL GROUPS FOR PRINCIPAL SOIL TEXTURES IDENTIFIED ON AGRICULTURAL SOILS MAPS (6)

Soils Series	Soil Texture	Hyd. Soil Grp.	Soils Series	Soil Texture	Hyd. Soil Grp.	Soils Series	Soil Texture	Hyd. Soil Grp.
Alberton	si l	BC	Bolingbr.	s	A	"	c	C
Allendale	s l	B	Bondhead	s l	AB	"	l	BC
Alliston	s l	AB	"	l	B	Camilla	s l	AB
Almonte	si c l	C	Bookton	s l	AB	"	si l	BC
Ameliasbg	c l	C	Boomer	l	B	Campbell	si c	C
"	l	B	Brady	s l	AB	Cane	si l	BC
Ancaster	si l &s	B	"	s	A	"	si c l	C
"	si l	BC	Brant	s &si l	B	Carp	c &c l	C
Anstruther	s	A	Brantford	si l	BC	Casey	si l	BC
Appleton	si l & s	B	"	si c l	C	Cashel	c	D
Atherley	c	C	"	l	BC	Castor	s l	AB
"	si c l	C	"	c l	D	"	si l	BC
Athol	s l	A	Brentha	s l	A	"	c	C
Atwood	c	C	"	l	B	Chesley	si l	BC
Ayr	s l	B	Brethour	si l	BC	"	si c l	C
Bainsville	s	B	Breypen	limest.	B	"	c l	C
"	si l	B	Bridgman	s	A	Chinguac'y	l	BC
Balderson	s l	B	Brighton	s	A	"	si l	BC
[illegible]nford	s	AB	"	s l	AB	"	c l	C
[illegible]croft	s	A	Brisbane	s g	AB	"	c	D
"	s l	B		l	B	Christy	s l	B
Bass	c	D	Brockport	c	D	Clyde	l	BC
Bastard	s	A	Brooke	l	B	"	si l	BC
Battersea	si l	BC	Brookston	s l	B	"	c l	C
"	s l	AB	"	l	C	"	c	C
Bearbrook	s l	B	"	si l	C	Colborne	s	A
"	si c l	C	"	si c l	C	Colwood	s l	B
"	c	C	"	c l	C	"	si l	B
Belmeade	m & c	B	"	c	C	"	l	BC
Bennington	s l	B	Bucke	s	AB	Codrington	si l	BC
"	s	A	"	s l	AB	Conestogo	l	BC
"	si l	A	Burford	s l	A	Conover	c l	C
Berrien	s	AB	"	l	AB	"	l	BC
"	s l	AB	Burnbrae	l	B	Cooksville	c	D
Berriedale	s & si	AB	Burnstown	l	B	Coutts	s l	AB
Beverly	l	BC	Burpee	s	A	"	l	BC
"	si l	C	Burris	c l	C	Craigleith	c	C
"	si c l	C	Buzwah	si c l	C	Cramahe	s g	A
Binbrook	si l	C	Buzwah	c 1	D	Crombie	s l	B
Blackwell	c	C	Caledon	s l	A	"	si l	BC
Blanche	si l	BC	"	l	B	Dack	c	D
Blue	c l	C	Caistor	c l	C	Dalton	s	AB

Notes: 1. See footnotes to Chart H2-2.

2. Key to abbreviations: c - clay; f - fine; g - gravel; l - loam; ma - marl; m - muck; p - peat; r - rock; s - sand; si - silt.

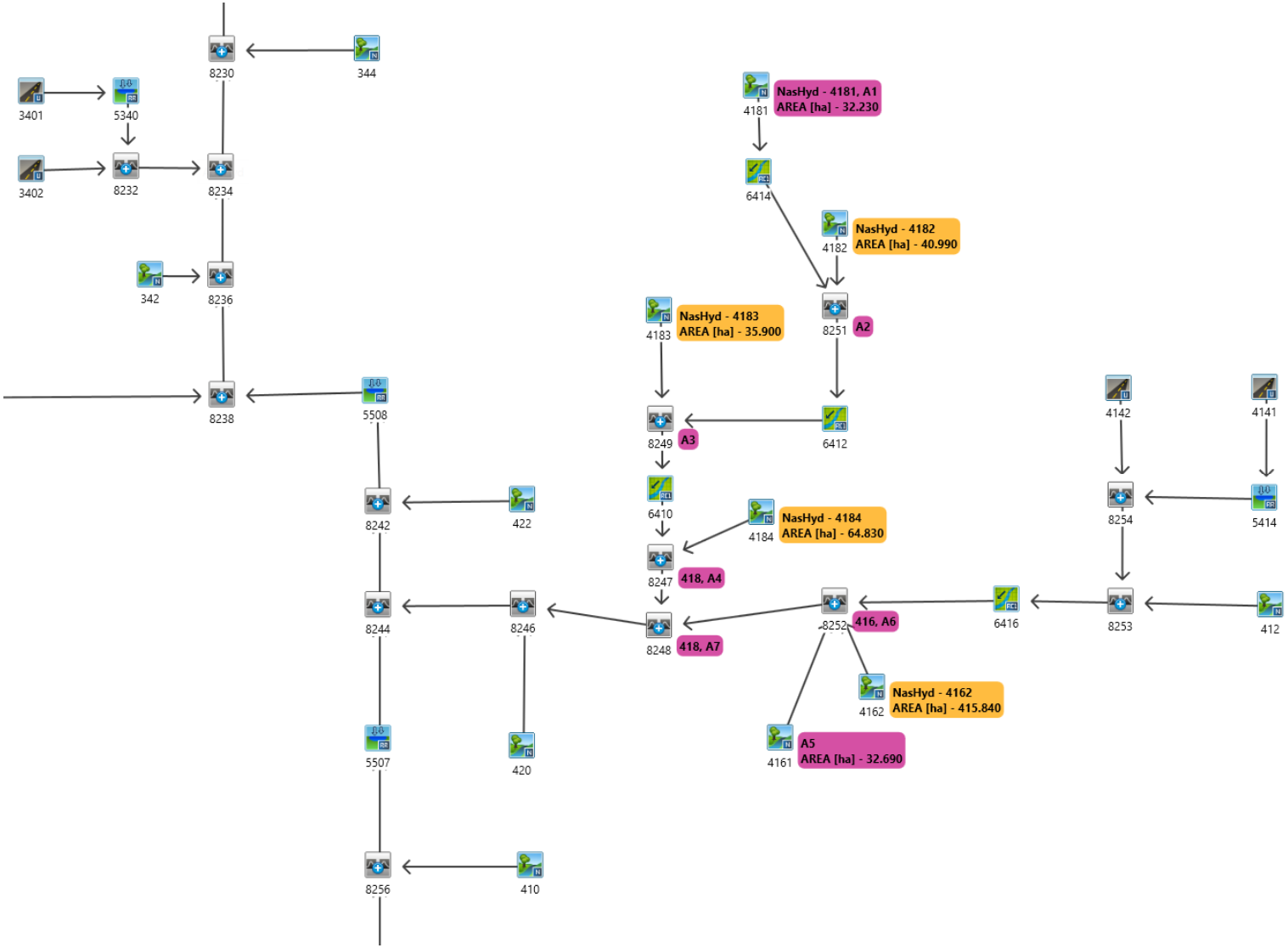
CHART H2-6A - continued

Soils Series	Soil Texture	Hyd. Soil Grp.	Soils Series	Soil Texture	Hyd. Soil Grp.	Soils Series	Soil Texture	Hyd. Soil Grp.
Lockport	c	D	Mountain	s l	AB	"	l	C
London	l	BC	Muck	m	B	"	si l	C
"	si l	BC	Murray	si l /f		"	si c l	CD
Lovering	si c l	C		s	B	"	c l	CD
"	c	D	Napanee	c /si l	C	"	c	CD
"	c l	CD	Neebing	s /si	B	Petherwick	si l	BC
Lyons	l	B	Nepean	s	AB	Phipps	si c l	C
Macton	l	B	Newburgh	s l	A	"	c l	C
Magnetawan	si l	BC	"	si l	BC	Piccadilly	s l	B
Mallard	s	AB	Newcastle	l	BC	"	l	BC
"	s l	AB	"	c l	C	"	si l	BC
Malton	c	C	"	si l	BC	Pike	c	D
Mannheim	l	B	Newton	s l	B	Pike Lake	l	B
Manotick	s	AB	Nelson	c	D	Plainfield	s	A
Maplewood	si l	BC	New lisk.	si c	C	Pontypool	s	A
Marionville	s	B	"	c	C	"	s l	AB
"	s l	B	Niagara	c	D	Powassan	si l	BC
Martin	s /g	AB	Nipissing	s /si	B	Preston	s l	B
Maryhill	l	BC	Norham	si l	BC	Raglan	s /g	A
Matilda	l	BC	North Gow.	c l	C	Rainy Riv.	p	B
Matson	si l	BC	"	c	C	Renfrew	c l	C
Medonte	si l	BC	O'Connor	c	D	"	l	BC
"	si c l	C	Oliver	l /si l	B-BC	Rideau	c l	D
cCool	c	C	Oneida	l	BC	"	c	D
McInnis Cr	c l/l		"	si l	BC	Rosslyn	s /g	A
	&P	BC	"	si c l	C	Rubicon	s	AB
McIntyre	s	AB	"	c l	D	"	s l	AB
Miami	l	BC	Ontario	l	BC	Sandford	c	D
"	si l	BC	Osgoode	l	BC	Sargent	s /g	A
"	c l	D	"	si l	BC	"	s l	AB
"	g l	AB	"	si c l	C	Saugeen	si l	BC
Milberta	c /si		Oshtemo	s	A	"	si c l	C
	c l	C	Osnabruck	c l	C	"	c l	D
Mill	s	B	Osprey	s l	A	Schomberg	si l	BC
	s l	B	"	l	B	"	si c l	C
Milliken	s l	AB	Otonabee	s l	A	"	c l	C
"	l	BC	"	l	B	Scoble	si c	C
Minesing	ma si		Otterskin	s l	B	Seely's Bay	si c l	C
	c l	BC	Oxdrift	c	D	Shashawan	l	B
"	ma c	C	Paipoonge	c	C	Shenston	c l &p	BC
Mississauga	c	C	Parkhill	l	BC	Sidney	c	C
Monaghan	l	BC	"	si l	BC	Sifton	si c /c	
"	si l	BC	Peat	p	B		l	C
"	c l	C	Peel	c	D	Simcoe	si l	BC
Monteagle	s l	A	Pelham	s l	A	"	si c l	C
"	sl + r	B	Pense	si l	BC	"	c l	C
Moose	s l	B	Pense	si c l	C	Slate River	s /l	B
"	l	BC	Perch	c	C	Smithfield	si l	C
Morley	c si		Percy	s	A	"	si l	C
	c l	C	"	f s l	B	"	c l	CD
Morrisburg	c	C	"	s l	B	Smithville	l	BC
Moscow	si c	C	Perth	s l	AB	"	si c l	C

Downstream Hydrology Modelling

SCS consulting group ltd

SCS consulting group ltd	**Existing Condition TIMG VO6 Schematic**	Northwest Yonge and Green Lane Project Number: 2300 Date: February 2025



NASHYD

Number	4161*
Description	416-1
DT(min)	15
Area (ha)	32.69
CN*	64.0
IA(mm)	5.0
TP (hr)	0.210

* Drainage Area and Hydrology Parameters as reported in the Green Lane Secondary Plan Master Environmental Servicing Plan (TIMG 2018). The Tp value has been adjusted per the York Region surface contour.

Existing Conditions
Time to Peak Calculations
Overall VO6 Model

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: J.S.

HYMO TWO-PARAMETER METHOD

Catchment ID	High Elevation	Low Elevation	Length (m)	Witdh (m)	Slope (m/m)	Area (ha)	Time to Peak (hr)
4161	281.99	253.00	1016	331	0.03	32.69	0.279

HYMO THREE-PARAMETER METHOD

Catchment ID	High Elevation	Low Elevation	Length (m)	Witdh (m)	Slope (m/m)	Area (ha)	Time to Peak (hr)
4161	281.99	253.00	1016	331	0.03	32.69	0.223

KIRPICH METHOD

Catchment ID	High Elevation	Low Elevation	Length (m)	Witdh (m)	Slope (m/m)	Area (ha)	Time to Peak (hr)
4161	281.99	253.00	1016	331	0.03	32.69	0.177

WILLIAMS and HANN METHOD

Catchment ID	High Elevation	Low Elevation	Length (m)	Witdh (m)	Slope (m/m)	Area (ha)	Time to Peak (hr)
4161	281.99	253.00	1016	331	0.03	32.69	0.251

BRANSBY-WILLIAMS METHOD

Catchment ID	High Elevation	Low Elevation	Length (m)	Witdh (m)	Slope (m/m)	Area (ha)	Time to Peak (hr)
4161	281.99	253.00	1016	331	0.03	32.69	4.624

Bransby-Williams method is considered as an outliner and is excluded in the adjusted Tp calculation

TP ADJUSTED

Catchment ID	Average Tp	%Imp	Adjustment Factor*	Adjusted Tp
4161	0.233	7.50	0.90	0.210

* Per Time to Peak Tp Adjustment Factor (SCS, 1972)

HYMO two-parameter: $t_p = 0.016 * A^{0.31} * S^{-0.5}$

HYMO three-parameter: $t_p = 0.0086 * A^{0.422} * S^{-0.46} * (L/W)^{0.133}$

Kirpich Method: $t_p = 0.67 * 0.0195 * L^{0.77} * S^{-0.385} / 60$

Williams and Hann Method: $t_p = 6.54 * A^{0.39} * (S*100)^{-0.50} / 60$

Bransby-Williams Method: $t_p = 0.67 * 0.057 * L / (S^{-0.50} * A^{0.10})$

Where: t_p is the time to peak (hour).
A is the drainage area (ha).
S is the slope (m/m).
L is the watershed length (m).
W is the watershed width (m).

Table 3. Time to Peak Tp Adjustment Factor (SCS, 1972)

Imperviousness	Time to Peak Tp Adjustment Factor
0%	1.00
10%	0.87
20%	0.76
30%	0.65
40%	0.55
50%	0.48

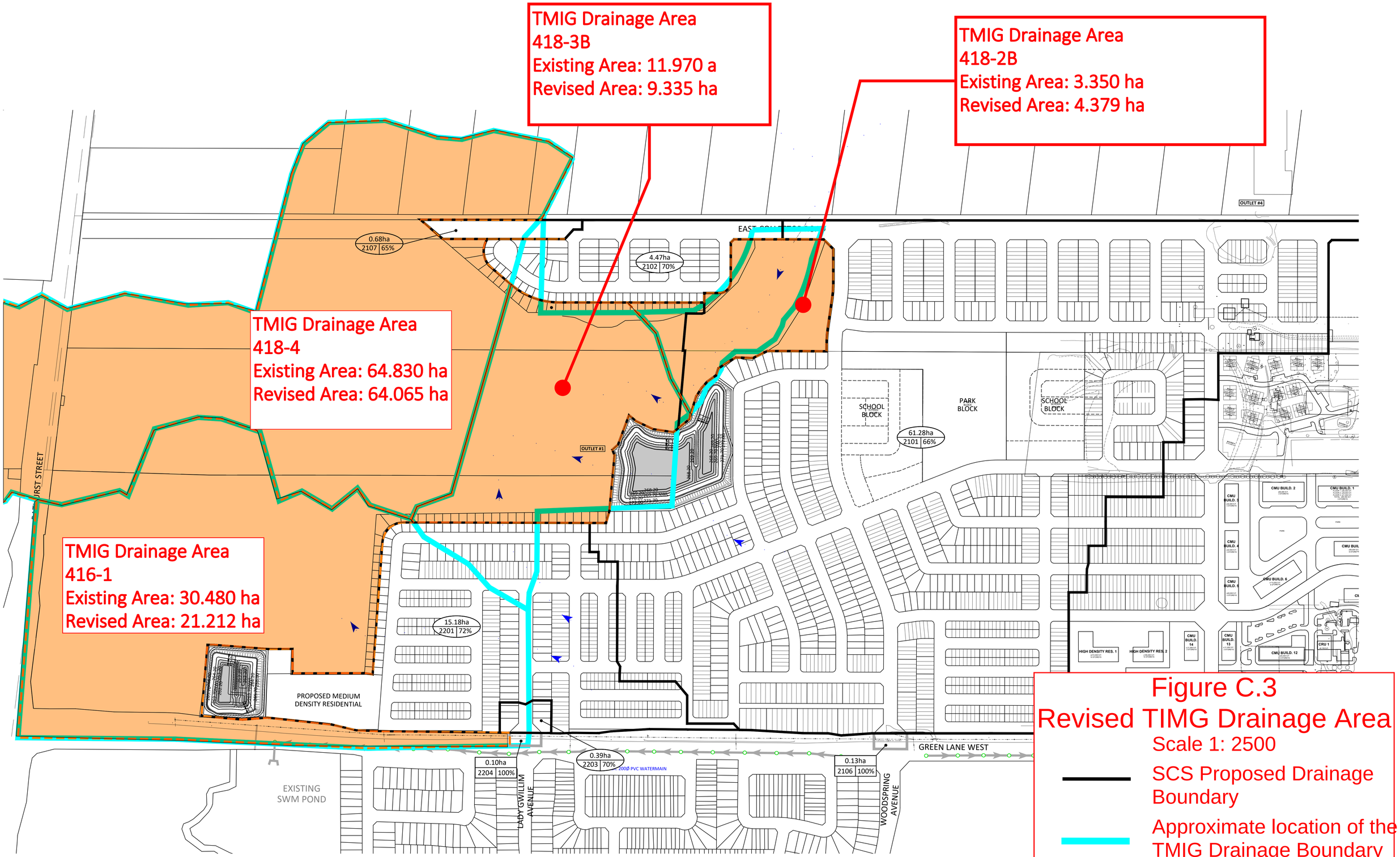


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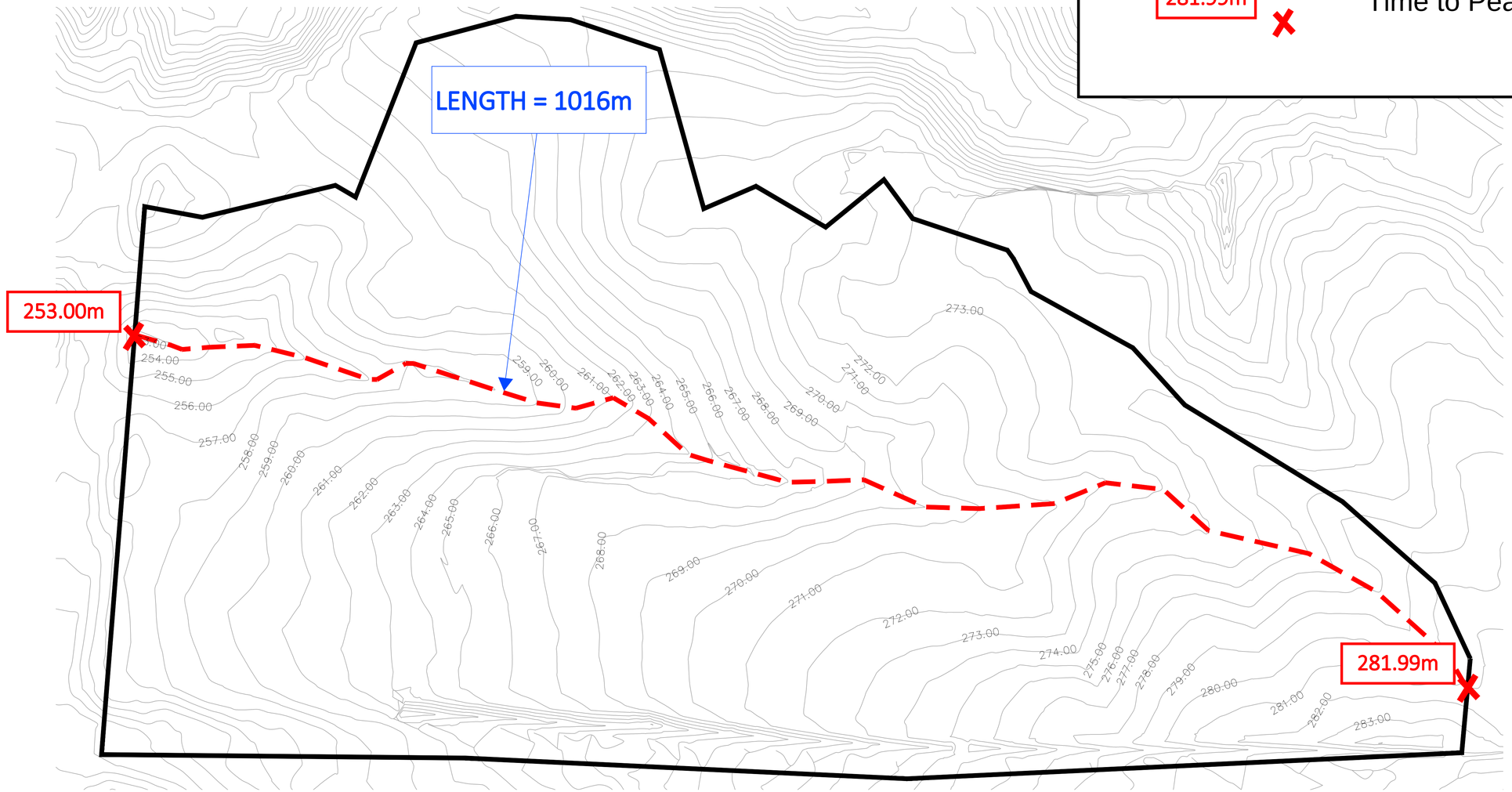
Figure C.4
Existing Catchment 4161 Time to Peak
Scale 1: 1000

TMIG Drainage Boundary

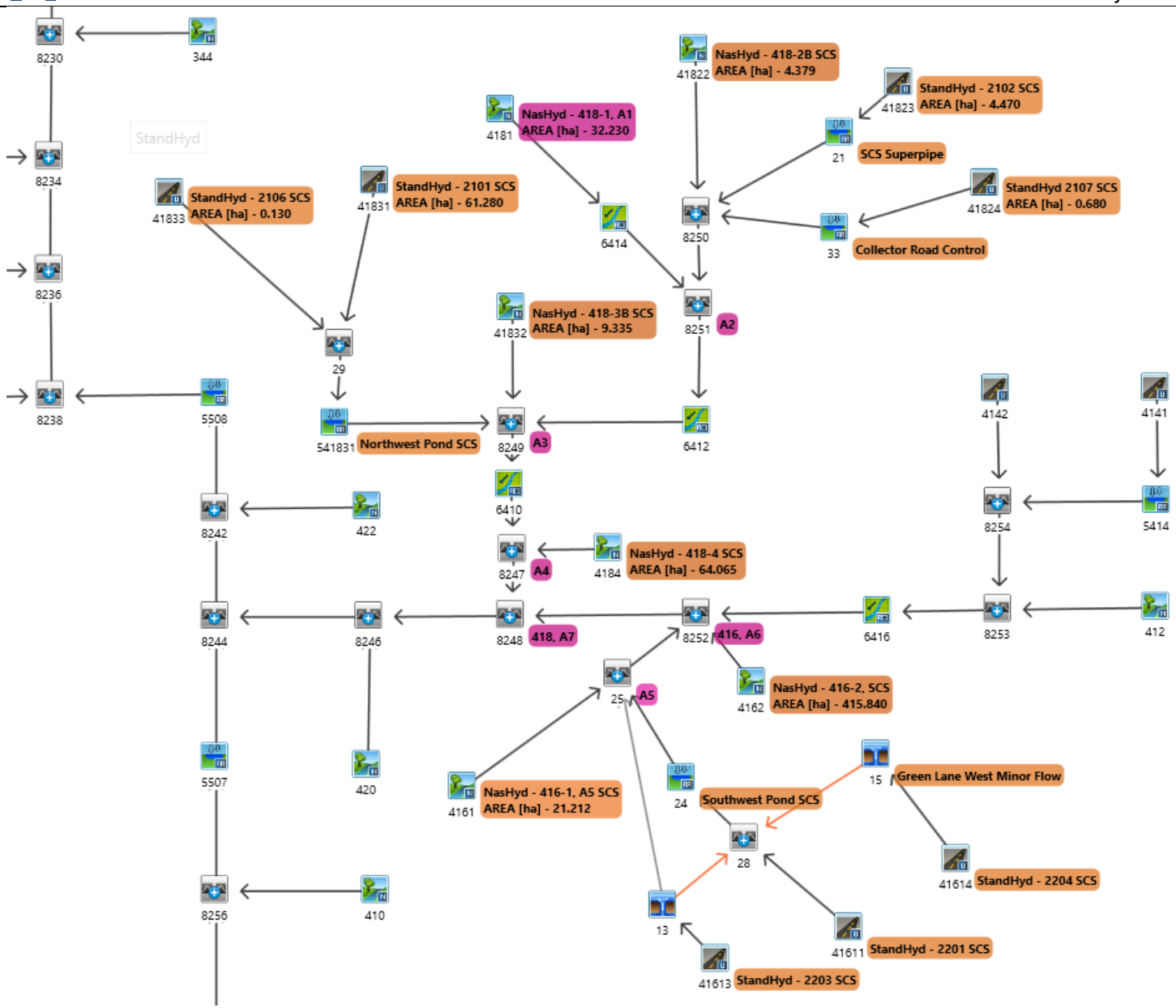
Time to Peak Length

281.99m Time to Peak Elevation



SCS Modified TIMG Proposed Condition VO6 Schematic

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025



Proposed Conditions
Parameter Summary
Overall VO6 Model

NASHYD

Number	4161**	41822*	41832*	4184*	4162***
Description	416-1	418-2B	418-3B	418-4	416-2
DT(min)	15	15	15	15	15
Area (ha)	21.212	4.379	9.335	64.065	415.84
CN*	64.0	70.0	70.0	64.0	64.0
IA(mm)	5.0	10.0	10.0	5.0	5.0
TP (hr)	0.169	0.152	0.175	0.729	1.438

*TIMG Drainage area has been revised per Figure C.3. Hydrology Parameters as reported in the Green Lane Secondary Plan Master Environmental Servicing Plan (TIMG 2018).

** TMIG Drainage area has been revised per Figure C.3. Hydrology Parameters as reported in the Green Lane Secondary Plan Master Environmental Servicing Plan (TIMG 2018). Tp value has been revised as there is a significant change in catchment area per Figure C.5.

*** Drainage Area and Hydrology Parameters as reported in the Green Lane Secondary Plan Master Environmental Servicing Plan (TIMG 2018). The proposed Tp value is 1.286 which is inconsistent with exsiting Tp value of 1.438. This creates an addtional 0.4 m3/s of peakflow at 100 year. Therefore, the Tp value has been revised to be consistent with the exsiting scenario.

Proposed Conditions
Time to Peak Calculations
Overall VO6 Model

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: J.S.

AVERAGE WIDTH

Measurement #	1	2	3	4	**Average**
Width (m)	383	345	251	259	**310**

HYMO TWO-PARAMETER METHOD

Catchment ID	High Elevation	Low Elevation	Length (m)	Witdh (m)	Slope (m/m)	Area (ha)	Time to Peak (hr)
4161	269.03	253.00	570	310	0.03	21.21	0.246

HYMO THREE-PARAMETER METHOD

Catchment ID	High Elevation	Low Elevation	Length (m)	Witdh (m)	Slope (m/m)	Area (ha)	Time to Peak (hr)
4161	269.03	253.00	570	310	0.03	21.21	0.175

KIRPICH METHOD

Catchment ID	High Elevation	Low Elevation	Length (m)	Witdh (m)	Slope (m/m)	Area (ha)	Time to Peak (hr)
4161	269.03	253.00	570	310	0.03	21.21	0.114

WILLIAMS and HANN METHOD

Catchment ID	High Elevation	Low Elevation	Length (m)	Witdh (m)	Slope (m/m)	Area (ha)	Time to Peak (hr)
4161	269.03	253.00	570	310	0.03	21.21	0.214

BRANSBY-WILLIAMS METHOD

Catchment ID	High Elevation	Low Elevation	Length (m)	Witdh (m)	Slope (m/m)	Area (ha)	Time to Peak (hr)
4161	269.03	253.00	570	310	0.03	21.21	2.689

Bransby-Williams method is considered as an outliner and is excluded in the adjusted Tp calculation

TP ADJUSTED

Catchment ID	Average Tp	%Imp	Adjustment Factor*	Adjusted Tp
4161	0.187	7.50	0.90	0.169

* Per Time to Peak Tp Adjustment Factor (SCS, 1972)

HYMO two-parameter: $t_p = 0.016 * A^{0.31} * S^{-0.5}$

HYMO three-parameter: $t_p = 0.0086 * A^{0.422} * S^{-0.46} * (L/W)^{0.133}$

Kirpich Method: $t_p = 0.67 * 0.0195 * L^{0.77} * S^{-0.385} / 60$

Williams and Hann Method: $t_p = 6.54 * A^{0.39} * (S*100)^{-0.50} / 60$

Bransby-Williams Method: $t_p = 0.67 * 0.057 * L / (S^{-0.50} * A^{0.10})$

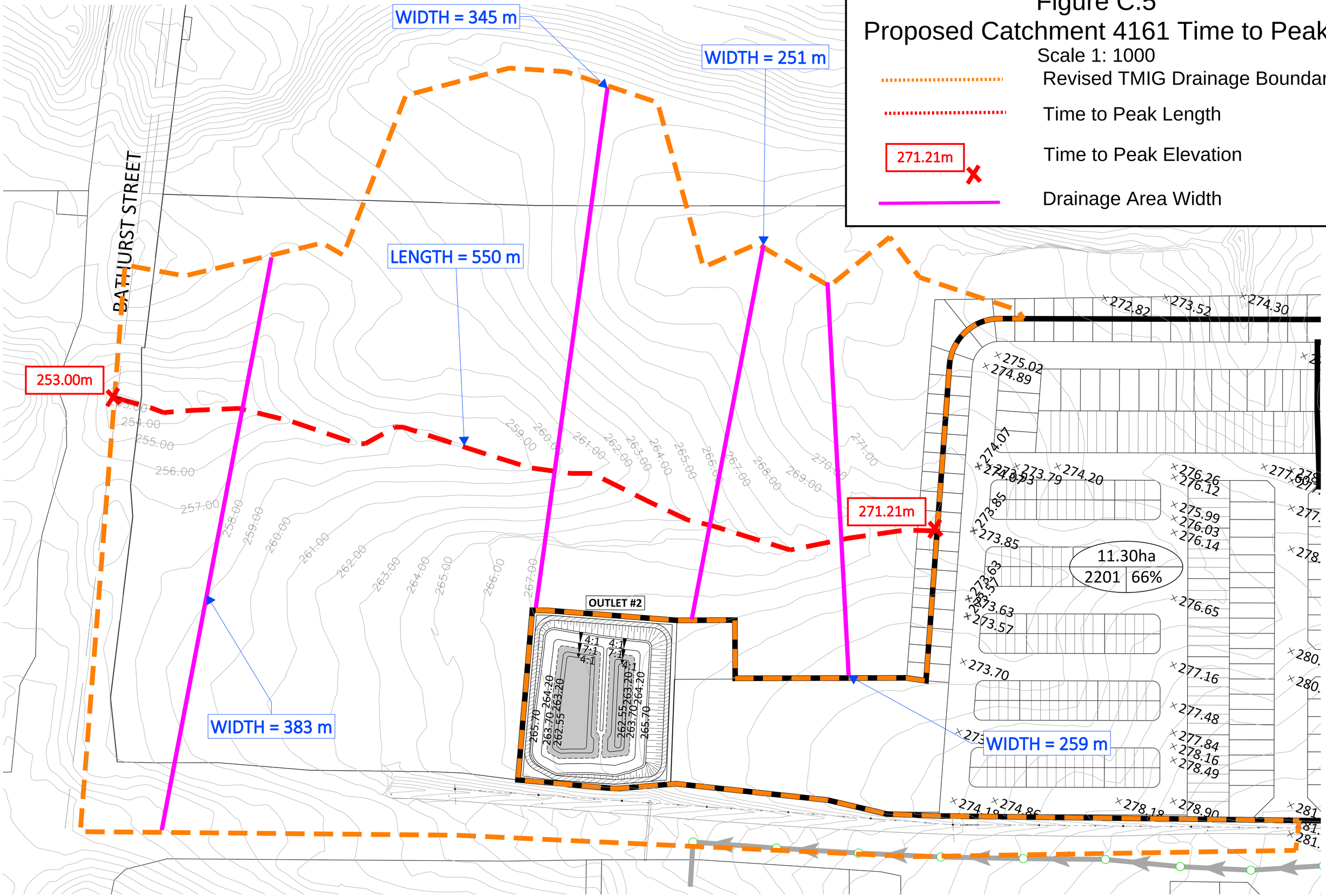
Where: t_p is the time to peak (hour).
A is the drainage area (ha).
S is the slope (m/m).
L is the watershed length (m).
W is the watershed width (m).

Table 3. Time to Peak Tp Adjustment Factor (SCS, 1972)

Imperviousness	Time to Peak Tp Adjustment Factor
0%	1.00
10%	0.87
20%	0.76
30%	0.65
40%	0.55
50%	0.48

Figure C.5
Proposed Catchment 4161 Time to Peak

Scale 1: 1000



Peak Release Rate Comparsion

Rainfall Event	SCS EX. Node 8251 / A2	SCS Prop. Node 8251 / A2	Percent Change	Release Rate Difference
2yr	0.486	0.244	-49.79%	-0.242
5yr	0.833	0.424	-49.10%	-0.409
10yr	1.096	0.566	-48.36%	-0.53
25yr	1.452	0.806	-44.49%	-0.646
50yr	1.768	1.066	-39.71%	-0.702
100yr	2.098	1.375	-34.46%	-0.723

Rainfall Event	SCS EX. Node 8249 / A3	SCS Prop. Node 8249 / A3	Percent Change	Release Rate Difference
2yr	0.569	0.346	-39.19%	-0.223
5yr	1.04	0.549	-47.21%	-0.491
10yr	1.401	0.738	-47.32%	-0.663
25yr	1.581	1.196	-24.35%	-0.385
50yr	1.889	1.452	-23.13%	-0.437
100yr	2.269	1.793	-20.98%	-0.476

Rainfall Event	SCS EX. Node 8247 / A4	SCS Prop. Node 8247 / A4	Percent Change	Release Rate Difference
2yr	0.423	0.37	-12.53%	-0.053
5yr	0.746	0.613	-17.83%	-0.133
10yr	0.981	0.814	-17.02%	-0.167
25yr	1.375	1.144	-16.80%	-0.231
50yr	1.647	1.415	-14.09%	-0.232
100yr	2.042	1.707	-16.41%	-0.335

Rainfall Event	SCS EX. Node 4161 / A5	SCS Prop. Node 4161 / A5	Percent Change	Release Rate Difference
2yr	0.344	0.261	-24.13%	-0.083
5yr	0.589	0.446	-24.28%	-0.143
10yr	0.78	0.59	-24.36%	-0.19
25yr	1.045	0.789	-24.50%	-0.256
50yr	1.259	0.95	-24.54%	-0.309
100yr	1.485	1.12	-24.58%	-0.365

Rainfall Event	SCS EX. Node 8252 / A6	SCS Prop. Node 8252 / A6	Percent Change	Release Rate Difference
2yr	2.821	2.811	-0.35%	-0.010
5yr	4.715	4.678	-0.78%	-0.037
10yr	6.225	6.161	-1.03%	-0.064
25yr	8.303	8.224	-0.95%	-0.079
50yr	9.996	9.855	-1.41%	-0.141
100yr	11.707	11.541	-1.42%	-0.166

Peak Release Rate Comparsion

Rainfall Event	SCS EX. Node 8248 / A7	SCS Prop. Node 8248 / A7	Percent Change	Release Rate Difference
2yr	3.242	3.182	-1.85%	-0.06
5yr	5.454	5.288	-3.04%	-0.166
10yr	7.205	6.975	-3.19%	-0.23
25yr	9.679	9.368	-3.21%	-0.311
50yr	11.629	11.254	-3.22%	-0.375
100yr	13.689	13.247	-3.23%	-0.442

Rainfall Event	SCS EX. Node 8244	SCS Prop. Node 8244	Percent Change	Release Rate Difference
2yr	13.841	13.87	0.21%	0.029
5yr	23.252	23.252	0.00%	0.000
10yr	30.462	30.48	0.06%	0.018
25yr	40.456	40.522	0.16%	0.066
50yr	47.867	47.914	0.10%	0.047
100yr	52.543	52.589	0.09%	0.046

Rainfall Event	EX. Node 8238	SCS Prop. Node 8238	Percent Change	Release Rate Difference
2yr	49.69	49.728	0.08%	0.038
5yr	80.809	80.818	0.01%	0.009
10yr	103.215	103.252	0.04%	0.037
25yr	129.929	130.011	0.06%	0.082
50yr	149.055	149.146	0.06%	0.091
100yr	163.456	163.598	0.09%	0.142

Rainfall Event	EX. Node 8190	SCS Prop. Node 8190	Percent Change	Release Rate Difference
2yr	54.502	54.531	0.05%	0.029
5yr	89.096	89.092	0.00%	-0.004
10yr	113.966	113.968	0.00%	0.002
25yr	144.39	144.429	0.03%	0.039
50yr	166.641	166.697	0.03%	0.056
100yr	184.619	184.685	0.04%	0.066

Appendix D Conveyance Calculations

SCS consulting group ltd

Watercourse Crossing Calculations

SCS consulting group ltd

Culvert Calculator Report
East West Corridor Culvert - 7.3m x1.8m Conspan

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	1.80	m	Headwater Depth/Height	0.12	
Computed Headwater Eleva	274.38	m	Discharge	1.0650	m³/s
Inlet Control HW Elev.	274.37	m	Tailwater Elevation	274.06	m
Outlet Control HW Elev.	274.38	m	Control Type	Entrance Control	

Grades					
Upstream Invert	274.15	m	Downstream Invert	273.83	m
Length	29.00	m	Constructed Slope	0.011034	m/m

Hydraulic Profile					
Profile	CompositeS1S2		Depth, Downstream	0.23	m
Slope Type	Steep		Normal Depth	0.09	m
Flow Regime	N/A		Critical Depth	0.13	m
Velocity Downstream	0.63	m/s	Critical Slope	0.003433	m/m

Section				
Section Shape	Box	Mannings Coefficient	0.013	
Section Material	Concrete	Span	7.31	m
Section Size	Conspan 7.3mx1.8m	Rise	1.83	m
Number Sections	1			

Outlet Control Properties					
Outlet Control HW Elev.	274.38	m	Upstream Velocity Head	0.06	m
Ke	0.50		Entrance Loss	0.03	m

Inlet Control Properties					
Inlet Control HW Elev.	274.37	m	Flow Control	Unsubmerged	
Inlet Type	3/4 bevel chamfers; 45° skewed headwall		Area Full	13.4	m²
K	0.54500		HDS 5 Chart	11	
M	0.66700		HDS 5 Scale	1	
C	0.04505		Equation Form	2	
Y	0.68000				

Rating Table Report
East West Corridor Culvert - 7.3m x1.8m Conspan

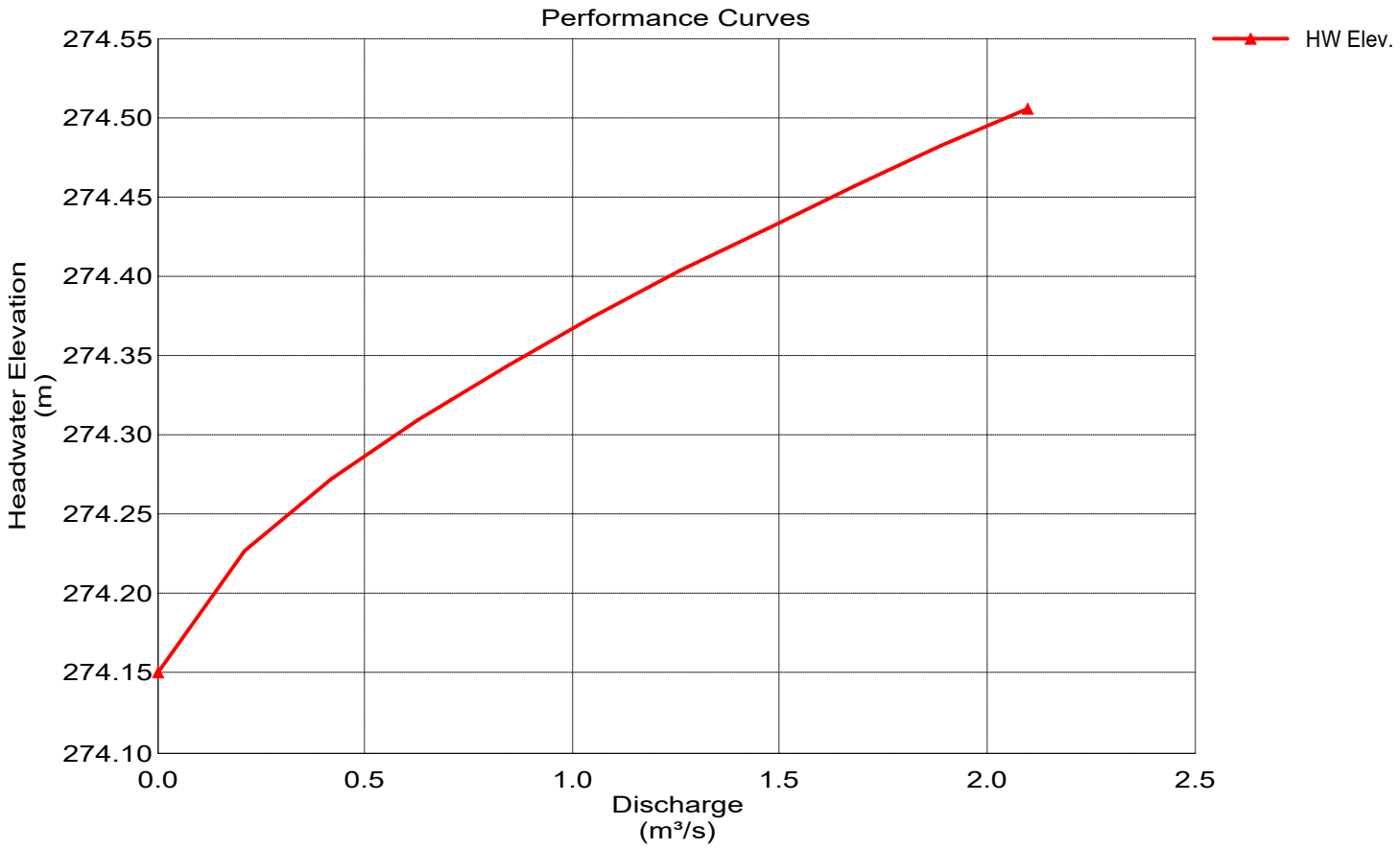
Range Data:

	Minimum	Maximum	Increment	
Discharge	0.0000	2.1000	0.2100	m³/s

Discharge (m³/s)	HW Elev. (m)
0.0000	274.15
0.2100	274.23
0.4200	274.27
0.6300	274.31
0.8400	274.34
1.0500	274.37
1.2600	274.40
1.4700	274.43
1.6800	274.46
1.8900	274.48
2.1000	274.51

Performance Curves Report
East West Corridor Culvert - 7.3m x1.8m Conspan

Range Data:				
	Minimum	Maximum	Increment	
Discharge	0.0000	2.1000	0.2100	m³/s



Flow Depth D/S of Culvert

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 m/m
Discharge	1.07 L/s

Section Definitions

Station (m)	Elevation (m)
0+00	276.31
0+01	276.23
0+11	275.46
0+16	275.15
0+30	274.53
0+39	274.35
0+45	274.30
0+70	273.83
0+73	273.94
0+80	274.11
0+94	274.33
0+97	274.42
1+01	274.52
1+09	274.65

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 276.31)	(1+09, 274.65)	0.035

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	17.6 mm
Roughness Coefficient	0.035
Elevation	273.85 m
Elevation Range	273.8 to 276.3 m
Flow Area	0.0 m²
Wetted Perimeter	1.4 m
Hydraulic Radius	8.8 mm

Flow Depth D/S of Culvert

Results	
Top Width	1.42 m
Normal Depth	17.6 mm
Critical Depth	10.7 mm
Critical Slope	0.069 m/m
Velocity	0.09 m/s
Velocity Head	0.00 m
Specific Energy	0.02 m
Froude Number	0.290
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 mm
Length	0.0 m
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 mm
Profile Description	N/A
Profile Headloss	0.00 m
Downstream Velocity	0.00 m/s
Upstream Velocity	0.00 m/s
Normal Depth	17.6 mm
Critical Depth	10.7 mm
Channel Slope	0.005 m/m
Critical Slope	0.069 m/m

Right-of-Way Conveyance Calculations

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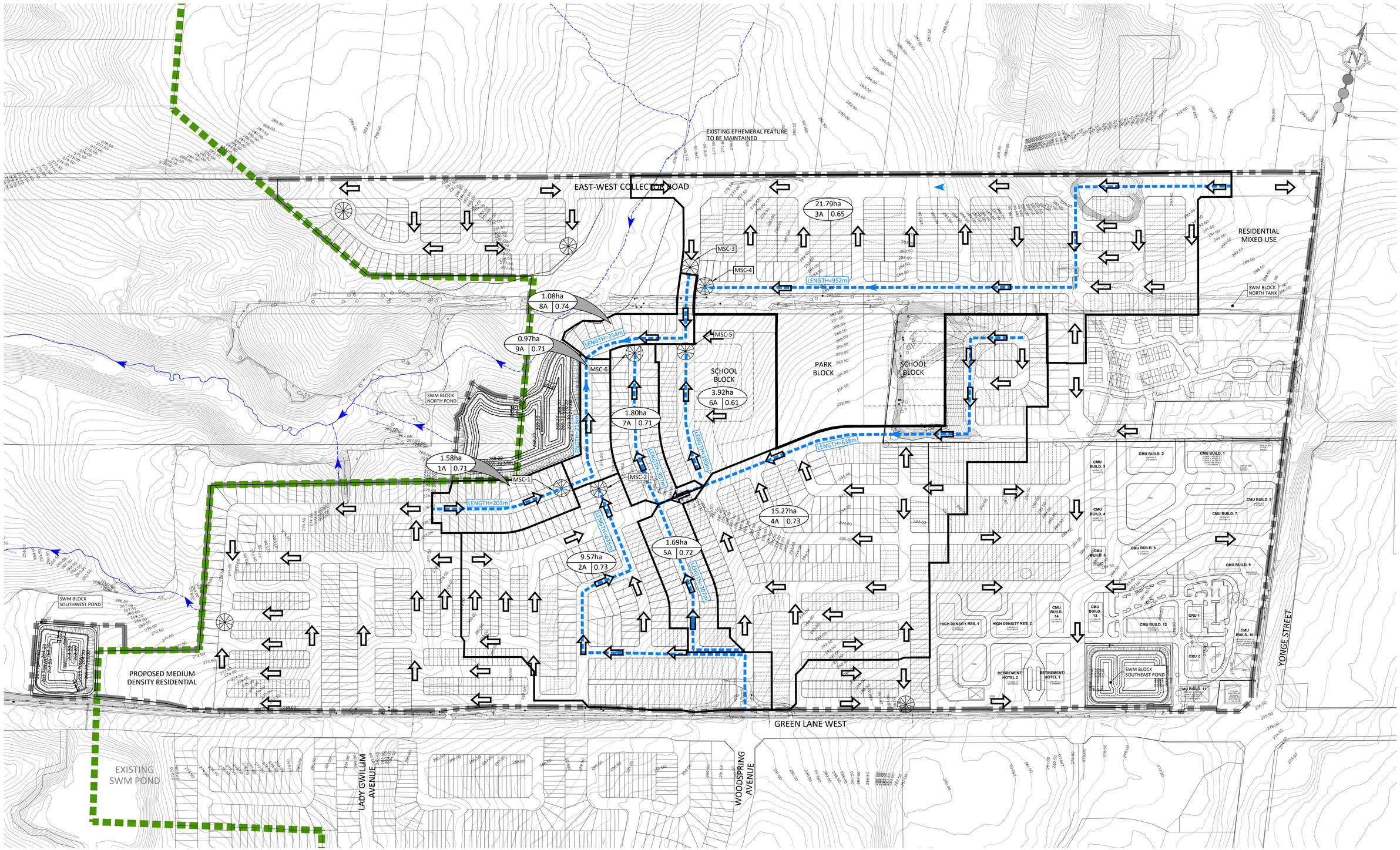


*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

FSSR

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

LEGEND:

- LIMIT OF DEVELOPMENT
- 220.00 — EXISTING CONTOUR AND ELEVATION
- GREENBELT BOUNDARY
- STORM DRAINAGE BOUNDARY
- MAJOR SYSTEM - OVERLAND FLOW
- 0.35ha — DRAINAGE AREA (HECTARES)
- 99 — RUNOFF COEFFICIENT
- 0.20 — CATCHMENT ID
- MAJOR SYSTEM CAPTURE POINT
- OVERLAND FLOW PATH
- EXISTING INTERMITTENT AND PERMANENT STREAM
- EXISTING EPHEMERAL FEATURE

NORTHWEST YONGE AND GREEN LANE

DESIGNED BY:	H.Y./E.A.S.	CHECKED BY:	E.T.C.K.
SCALE:	1:2500	DATE:	FEBRUARY 2025

PROPOSED RIGHT-OF-WAY CONVEYANCE PLAN

PROJECT No:	FIGURE No:
2300	D.1

File: P:\2300 NW Yonge and Green Lane\Drawings\FSP\Fig\Report Figures\2300P-PROP-STRM-OLFR-D.1.dwg - Revised by <SOZDEMIR> : Tue, Feb 04 2025 - 4:18pm

OVERLAND FLOW CALCULATIONS
CATCHMENT 1A

Catchment 1A			100 Year Return Period Factor =	1.25
	Runoff Coefficient	Area (ha)	Weighted Runoff Coefficient (5 Year)	Weighted Runoff Coefficient (100 Year)
Single Houses	0.71	1.58	0.71	0.88
TOTAL		1.58	0.71	0.88

Catchment 1A	Return Period
	5 Year
Area (ha)=	1.58
Runoff Coeff. =	0.71
T_c (min)=	8.69
a =	**930**
b =	**4.00**
c =	**0.798**
Intensity (mm/hr) =	122.43
Runoff (m^3/s) =	**0.379**

(7min. plus 203m @ 2 m/s)

Catchment 1A	Return Period
	100 Year
Area (ha)=	1.58
Runoff Coeff. =	0.88
T_c (min)=	8.69
a =	**1770**
b =	**4.0**
c =	**0.820**
Intensity (mm/hr) =	220.34
Runoff (m^3/s) =	**0.852**

*Area and Runoff coefficient per **Figure D.1**
*IDF parameters per Town of East Gwillimbury

5 Year Flow (Catchment 1A)

Q_{5yr} (m^3/s) = 0.379

100 Year Flow (Catchment 1A)

Q_{100yr} (m^3/s) = 0.852

Required 100 Year Conveyance Capacity

$Q_{100-5yr}$ (m^3/s) = 0.473

OVERLAND FLOW CALCULATIONS
CATCHMENT 2A

Catchment 2A			100 Year Return Period Factor =	1.25
	Runoff Coefficient	Area (ha)	Weighted Runoff Coefficient (5 Year)	Weighted Runoff Coefficient (100 Year)
Single Houses	0.71	3.41	0.25	0.31
Townhouses	0.74	4.52	0.35	0.44
B2B Townhouses	0.74	1.64	0.13	0.16
TOTAL		9.57	0.73	0.91

Catchment 2A	Return Period
	5 Year
Area (ha)=	9.57
Runoff Coeff. =	0.73
T_c (min)=	12.29 (7min. plus 635m @ 2 m/s)
a =	**930**
b =	**4.00**
c =	**0.798**
Intensity (mm/hr) =	100.31
Runoff (m^3/s) =	**1.937**

Catchment 2A	Return Period
	100 Year
Area (ha)=	9.57
Runoff Coeff. =	0.91
T_c (min)=	12.29
a =	**1770**
b =	**4.0**
c =	**0.820**
Intensity (mm/hr) =	179.54
Runoff (m^3/s) =	**4.333**

*Area and Runoff coefficient per **Figure D.1**
*IDF parameters per Town of East Gwillimbury

5 Year Flow (Catchment 2A)

Q_{5yr} (m^3/s) = 1.937

100 Year Flow (Catchment 2A)

Q_{100yr} (m^3/s) = 4.333

Required 100 Year Conveyance Capacity

$Q_{100-5yr}$ (m^3/s) = 2.396

OVERLAND FLOW CALCULATIONS
CATCHMENT 3A

Catchment 3A			100 Year Return Period Factor =	1.25
	Runoff Coefficient	Area (ha)	Weighted Runoff Coefficient (5 Year)	Weighted Runoff Coefficient (100 Year)
Single Houses	0.71	3.52	0.11	0.14
Townhouses	0.74	10.10	0.34	0.43
B2B Townhouses	0.74	1.64	0.06	0.07
Parks	0.25	3.38	0.04	0.05
School Block	0.61	2.56	0.07	0.09
Right-of-way	0.90	0.59	0.02	0.03
TOTAL		21.79	0.65	0.80

Catchment 3A	Return Period
	5 Year
Area (ha)=	21.79
Runoff Coeff. =	0.65
T_c (min)=	14.93
a =	**930**
b =	**4.00**
c =	**0.798**
Intensity (mm/hr) =	88.97
Runoff (m^3/s) =	**3.479**

(7min. plus 952m @ 2 m/s)

Catchment 3A	Return Period
	100 Year
Area (ha)=	21.79
Runoff Coeff. =	0.80
T_c (min)=	14.93
a =	**1770**
b =	**4.0**
c =	**0.820**
Intensity (mm/hr) =	158.73
Runoff (m^3/s) =	**7.726**

*Area and Runoff coefficient per **Figure D.1**
*IDF parameters per Town of East Gwillimbury

5 Year Flow (Catchment 3A)

Q_{5yr} (m^3/s) = 3.479

100 Year Flow (Catchment 3A)

Q_{100yr} (m^3/s) = 7.726

Required 100 Year Conveyance Capacity

$Q_{100-5yr}$ (m^3/s) = 4.247

OVERLAND FLOW CALCULATIONS
CATCHMENT 4A

Catchment 4A			100 Year Return Period Factor =	1.25
	Runoff Coefficient	Area (ha)	Weighted Runoff Coefficient (5 Year)	Weighted Runoff Coefficient (100 Year)
Single Houses	0.71	4.26	0.20	0.25
Townhouses	0.74	8.70	0.42	0.53
B2B Townhouses	0.74	1.83	0.09	0.11
Right-of-way	0.90	0.48	0.03	0.03
TOTAL		15.27	0.73	0.91

Catchment 4A	Return Period
	5 Year
Area (ha)=	15.27
Runoff Coeff. =	0.73
T_c (min)=	12.32
a =	**930**
b =	**4.00**
c =	**0.798**
Intensity (mm/hr) =	100.19
Runoff (m^3/s) =	**3.119**

(7min. plus 638m @ 2 m/s)

Catchment 4A	Return Period
	100 Year
Area (ha)=	15.27
Runoff Coeff. =	0.91
T_c (min)=	12.32
a =	**1770**
b =	**4.0**
c =	**0.820**
Intensity (mm/hr) =	179.31
Runoff (m^3/s) =	**6.947**

*Area and Runoff coefficient per **Figure D.1**
*IDF parameters per Town of East Gwillimbury

5 Year Flow (Catchment 4A)

Q_{5yr} (m^3/s) = 3.119

100 Year Flow (Catchment 4A)

Q_{100yr} (m^3/s) = 6.947

Required 100 Year Conveyance Capacity

$Q_{100-5yr}$ (m^3/s) = 3.829

OVERLAND FLOW CALCULATIONS
CATCHMENT 5A

Catchment 5A			100 Year Return Period Factor =	1.25
	Runoff Coefficient	Area (ha)	Weighted Runoff Coefficient (5 Year)	Weighted Runoff Coefficient (100 Year)
Single Houses	0.71	1.00	0.42	0.52
Townhouses	0.74	0.69	0.30	0.38
TOTAL		1.69	0.72	0.90

Catchment 5A	Return Period
	5 Year
Area (ha)=	1.69
Runoff Coeff. =	0.72
T_c (min)=	9.56
a =	**930**
b =	**4.00**
c =	**0.798**
Intensity (mm/hr) =	116.14
Runoff (m^3/s) =	**0.392**

(7min. plus 307m @ 2 m/s)

Catchment 5A	Return Period
	100 Year
Area (ha)=	1.69
Runoff Coeff. =	0.90
T_c (min)=	9.56
a =	**1770**
b =	**4.0**
c =	**0.820**
Intensity (mm/hr) =	208.72
Runoff (m^3/s) =	**0.880**

*Area and Runoff coefficient per **Figure D.1**
*IDF parameters per Town of East Gwillimbury

5 Year Flow (Catchment 5A)

Q_{5yr} (m^3/s) = 0.392

100 Year Flow (Catchment 5A)

Q_{100yr} (m^3/s) = 0.880

Required 100 Year Conveyance Capacity

$Q_{100-5yr}$ (m^3/s) = 0.488

OVERLAND FLOW CALCULATIONS
CATCHMENT 6A

Catchment 6A			100 Year Return Period Factor =	1.25
	Runoff Coefficient	Area (ha)	Weighted Runoff Coefficient (5 Year)	Weighted Runoff Coefficient (100 Year)
Single Houses	0.71	0.12	0.02	0.03
Townhouses	0.74	0.78	0.15	0.18
Parks	0.25	0.34	0.02	0.03
School Block	0.61	2.67	0.41	0.52
TOTAL		3.92	0.61	0.76

Catchment 6A	Return Period
	5 Year
Area (ha)=	3.92
Runoff Coeff. =	0.61
T_c (min)=	8.58
a =	**930**
b =	**4.00**
c =	**0.798**
Intensity (mm/hr) =	123.27
Runoff (m^3/s) =	**0.813**

(7min. plus 190m @ 2 m/s)

Catchment 6A	Return Period
	100 Year
Area (ha)=	3.92
Runoff Coeff. =	0.76
T_c (min)=	8.58
a =	**1770**
b =	**4.0**
c =	**0.820**
Intensity (mm/hr) =	221.89
Runoff (m^3/s) =	**1.830**

*Area and Runoff coefficient per **Figure D.1**
*IDF parameters per Town of East Gwillimbury

5 Year Flow (Catchment 6A)

Q_{5yr} (m^3/s) = 0.813

100 Year Flow (Catchment 6A)

Q_{100yr} (m^3/s) = 1.830

Required 100 Year Conveyance Capacity

$Q_{100-5yr}$ (m^3/s) = 1.017

OVERLAND FLOW CALCULATIONS
CATCHMENT 7A

Catchment 7A			100 Year Return Period Factor =	1.25
	Runoff Coefficient	Area (ha)	Weighted Runoff Coefficient (5 Year)	Weighted Runoff Coefficient (100 Year)
Single Houses	0.71	1.35	0.53	0.66
Townhouses	0.74	0.45	0.18	0.23
TOTAL		1.80	0.71	0.89

Catchment 7A	Return Period
	5 Year
Area (ha)=	1.80
Runoff Coeff. =	0.71
T_c (min)=	9.56
a =	**930**
b =	**4.00**
c =	**0.798**
Intensity (mm/hr) =	116.14
Runoff (m^3/s) =	**0.414**

(7min. plus 307m @ 2 m/s)

Catchment 7A	Return Period
	100 Year
Area (ha)=	1.80
Runoff Coeff. =	0.89
T_c (min)=	9.56
a =	**1770**
b =	**4.0**
c =	**0.820**
Intensity (mm/hr) =	208.72
Runoff (m^3/s) =	**0.930**

*Area and Runoff coefficient per **Figure D.1**
*IDF parameters per Town of East Gwillimbury

5 Year Flow (Catchment 7A)

Q_{5yr} (m^3/s) = 0.414

100 Year Flow (Catchment 7A)

Q_{100yr} (m^3/s) = 0.930

Required 100 Year Conveyance Capacity

$Q_{100-5yr}$ (m^3/s) = 0.516

OVERLAND FLOW CALCULATIONS
CATCHMENT 8A

Catchment 8A			100 Year Return Period Factor =	1.25
	Runoff Coefficient	Area (ha)	Weighted Runoff Coefficient (5 Year)	Weighted Runoff Coefficient (100 Year)
Single Houses	0.71	0.86	0.56	0.70
Right-of-way	0.90	0.22	0.18	0.20
TOTAL		1.08	0.74	0.91

Catchment 8A	Return Period 5 Year	
Area (ha)=	1.08	
Runoff Coeff. =	0.74	
T_c (min)=	9.12	(7min. plus 254m @ 2 m/s)
a =	**930**	
b =	**4.00**	
c =	**0.798**	
Intensity (mm/hr) =	119.25	
Runoff (m^3/s) =	**0.266**	

Catchment 8A	Return Period 100 Year
Area (ha)=	1.08
Runoff Coeff. =	0.91
T_c (min)=	9.12
a =	**1770**
b =	**4.0**
c =	**0.820**
Intensity (mm/hr) =	214.47
Runoff (m^3/s) =	**0.582**

*Area and Runoff coefficient per **Figure D.1**
*IDF parameters per Town of East Gwillimbury

5 Year Flow (Catchment 8A)

Q_{5yr} (m^3/s) = 0.266

100 Year Flow (Catchment 8A)

Q_{100yr} (m^3/s) = 0.582

Required 100 Year Conveyance Capacity

$Q_{100-5yr}$ (m^3/s) = 0.316

OVERLAND FLOW CALCULATIONS
CATCHMENT 9A

Catchment 9A			100 Year Return Period Factor =	1.25
	Runoff Coefficient	Area (ha)	Weighted Runoff Coefficient (5 Year)	Weighted Runoff Coefficient (100 Year)
Single Houses	0.71	0.97	0.71	0.88
TOTAL		0.97	0.71	0.88

Catchment 9A	Return Period 5 Year	
Area (ha)=	0.97	
Runoff Coeff. =	0.71	
T_c (min)=	8.82	(7min. plus 218m @ 2 m/s)
a =	**930**	
b =	**4.00**	
c =	**0.798**	
Intensity (mm/hr) =	121.47	
Runoff (m^3/s) =	**0.231**	

Catchment 9A	Return Period 100 Year
Area (ha)=	0.97
Runoff Coeff. =	0.88
T_c (min)=	8.82
a =	**1770**
b =	**4.0**
c =	**0.820**
Intensity (mm/hr) =	218.57
Runoff (m^3/s) =	**0.519**

*Area and Runoff coefficient per **Figure D.1**
*IDF parameters per Town of East Gwillimbury

5 Year Flow (Catchment 9A)

Q_{5yr} (m^3/s) = 0.231

100 Year Flow (Catchment 9A)

Q_{100yr} (m^3/s) = 0.519

Required 100 Year Conveyance Capacity

$Q_{100-5yr}$ (m^3/s) = 0.288

OVERLAND FLOW CALCULATIONS
SUMMARY OF FLOWS

Required Conveyance per Drainage Area

Drainage Area #	Drainage Area (ha)	Flow (m^3/s)
1A	1.58	0.47
2A	9.57	2.40
3A	21.79	4.25
4A	15.27	3.83
5A	1.69	0.49
6A	3.92	1.02
7A	1.80	0.52
8A	1.08	0.32
9A	0.97	0.29

Major System Capture Points (MSC - #)

Major System Capture 1 (MSC - 1)

Contributing Drainage Area	Flow (m^3/s)	Total Flow To MSC- 1 (m^3/s)
Catchment 1A	0.47	0.47

Major System Capture 2 (MSC - 2)

Contributing Drainage Area	Flow (m^3/s)	Total Flow To MSC- 2 (m^3/s)
Catchment 2A	2.40	3.60
1/4 of Catchment 4A	0.96	
1/2 of Catchment 5A	0.24	

Major System Capture 3 and 4 (MSC - 3 and MSC - 4)

Contributing Drainage Area	Flow (m^3/s)	Total Flow To MSC- 4 (m^3/s)
Catchment 3A	4.25	4.25

Major System Capture 5 (MSC - 5)

Contributing Drainage Area	Flow (m^3/s)	Total Flow To MSC- 5 (m^3/s)
Catchment 6A	1.02	2.93
1/2 of Catchment 4A	1.91	

Major System Capture 6 (MSC - 6)

Contributing Drainage Area	Flow (m^3/s)	Total Flow To MSC- 6 (m^3/s)
Catchment 7A	0.52	1.72
1/4 of Catchment 4A	0.96	
1/2 of Catchment 5A	0.24	

OVERLAND FLOW CALCULATIONS
CAPTURE SUMMARY

ROW Conveyance North - 18m @ 0.5%

Flow Capacity of ROW (m^3/s)	1.60	
Catchment 8A Flow (m^3/s)*	0.32	*all flow of this catchment to be conveyed in ROW
Remaining Flow available to be conveyed in ROW (m^3/s)	1.28	

Contributing Major System Capture	Flow to MSC (m^3/s)	Conveyed Flow in ROW (m^3/s)**	Flow to be captured in MSC (m^3/s)
MSC-3 and MSC-4	4.25	0.61	3.63
MSC-5	2.93	0.42	2.51
MSC-6	1.72	0.25	1.47

**Remaining Flow divided between number of Major system capture points weighted by drainage area

ROW Conveyance South - 18m @ 0.5%

Flow Capacity of ROW (m^3/s)	1.60	
Catchment 9A Flow (m^3/s)*	0.29	*all flow of this catchment to be conveyed in ROW
Remaining Flow available to be conveyed in ROW (m^3/s)	1.31	

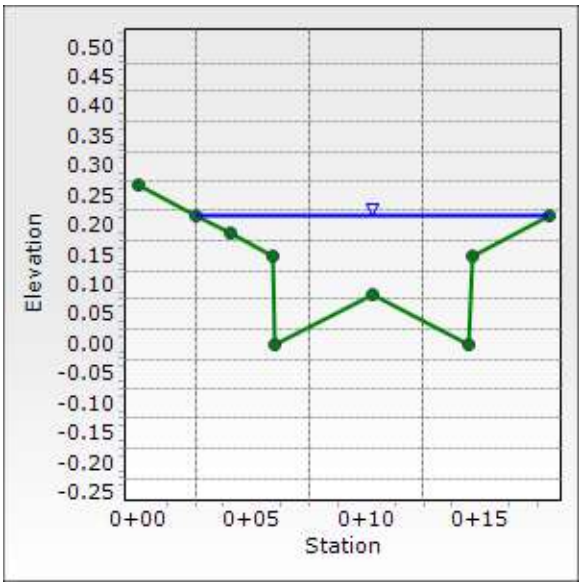
Contributing Major System Capture	Flow to MSC (m^3/s)	Conveyed Flow in ROW (m^3/s)**	Flow to be captured in MSC (m^3/s)
MSC-1	0.47	0.15	0.32
MSC-2	3.60	1.16	2.44

**Remaining Flow divided between number of Major system capture points weighted by drainage area

Cross Section for 18.0m Regular R.O.W. Capacity (0.5%)

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Channel Slope	0.50 %
Normal Depth	218.0 mm
Discharge	1.60 m³/s



Worksheet for 18.0m Regular R.O.W. Capacity (0.5%)

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Channel Slope	0.50 %
Normal Depth	218.0 mm

Section Definitions

Station (m)	Elevation (m)
0+00.00	0.268
0+02.50	0.218
0+04.00	0.188
0+05.90	0.150
0+06.00	0.000
0+10.25	0.085
0+14.50	0.000
0+14.60	0.150
0+18.00	0.218

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.268)	(0+02.50, 0.218)	0.025
(0+02.50, 0.218)	(0+04.00, 0.188)	0.013
(0+04.00, 0.188)	(0+05.90, 0.150)	0.025
(0+05.90, 0.150)	(0+06.00, 0.000)	0.013
(0+06.00, 0.000)	(0+10.25, 0.085)	0.013
(0+10.25, 0.085)	(0+14.50, 0.000)	0.013
(0+14.50, 0.000)	(0+14.60, 0.150)	0.013
(0+14.60, 0.150)	(0+18.00, 0.218)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Discharge	1.60 m³/s
Roughness Coefficient	0.018
Elevation Range	0.000 to 0.268 m
Flow Area	1.8 m²
Wetted Perimeter	15.664 m

Worksheet for 18.0m Regular R.O.W. Capacity (0.5%)

Results	
Hydraulic Radius	111.8 mm
Top Width	15.50 m
Normal Depth	218.0 mm
Critical Depth	203.9 mm
Critical Slope	0.67 %
Velocity	0.91 m/s
Velocity Head	0.042 m
Specific Energy	0.26 m
Froude Number	0.867
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 mm
Length	0.000 m
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 mm
Profile Description	N/A
Profile Headloss	0.00 m
Downstream Velocity	Infinity m/s
Upstream Velocity	Infinity m/s
Normal Depth	218.0 mm
Critical Depth	203.9 mm
Channel Slope	0.50 %
Critical Slope	0.67 %

Appendix E Stormwater Management

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North Pond

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Permanent Pool and Extented Detention Sizing North Pond

Weighted Impervious Calculation

Catchment ID	Total Area	Imperviousness	Impervious Area
	(ha)	(%)	(ha)
2101	61.28	66	40.44
2106	0.13	100	0.13
Total	**61.41**	**66**	**40.57**

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

Permanent Pool and Extended Detention Sizing North Pond

PERMANENT POOL

Level of Protection = Enhanced (Level 1)

Weighted Impervious = 66 %

Drainage Area = 61.41 ha

SWMP Type = 4. Wet Pond

Required Permanent Pool (including 40m^3/ha for extended detention)= 215.8 m^3/ha
Required Permanent Pool (minus 40m^3/ha for extended detention)= 176 m^3/ha

Required Permanent Pool = 10798 m^3

TABLE 3.2 - WATER QUALITY STORAGE REQUIREMENTS (FROM MOE SWM PLANNING AND DESIGN MANUAL - 2003)

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced (Level 1)	1. Infiltration	25	30	35	40
	2. Wetlands	80	105	120	140
	3. Hybrid Wet Pond/Wet	110	150	175	195
	4. Wet Pond	140	190	225	250
Normal (Level 2)	1. Infiltration	20	20	25	30
	2. Wetlands	60	70	80	90
	3. Hybrid Wet Pond/Wet	75	90	105	120
	4. Wet Pond	90	110	130	150
Basic (Level 3)	1. Infiltration	20	20	20	20
	2. Wetlands	60	60	60	60
	3. Hybrid Wet Pond/Wet	60	70	75	80
	4. Wet Pond	60	75	85	95
	5. Dry Pond (Continuous	90	150	200	240

EXTENDED DETENTION

Using the 25mm - 4 hour Chicago Storm

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m^3) / (mm)(ha)

Erosion Control Volume (V) = 11.68 mm x 61.41 ha x 10 m^3 / mm·ha

Erosion Control Volume (V) = 7173 m^3

Using 40m^3/ha

Extended Detention Volume (V) = 40m^3/ha x Drainage Area (ha)

Extended Detention Volume (V) = 40 m^3/ha 61.41 ha

Extended Detention Volume (V) = 2456.4 m^3

Governing Volume (V) = 7173 m^3

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

Permanent Pool and Extended Detention Sizing North Pond

Elevation (m)	Area (m^2)	Area (m^2)	H (m)	Vol (m^3)	Volume (m^3)	Storage (m^3)	Depth (m)	
268.2	6430.9				0		0	
		7632	1	7632.369				
269.2	8833.8				7632		1	
		10051	0.5	5025.632				
269.7	**11268.7**				12658	**0**	**1.5**	**N.W.L.**
		12377	0.5	6188.4				
270.2	13484.9				18846	6188.4	2	
		15343	1.5	23014				
271.7	17200.16				41860	29202	3.5	

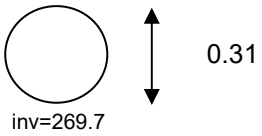
Permanent Pool Volume Required =	10798	m^3
Permanent Pool Volume Provided =	12658	m^3
Extended Detention volume required =	7173	m^3
Extended Detention waterlevel =	270.28	m

NW Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

CONTROL STRUCTURE SUMMARY
North Pond

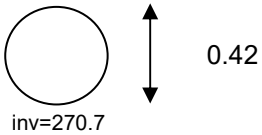
Orifice 1

Invert =	269.70	m
Size =	0.310	m
Orifice Coefficient, C =	0.62	
Obvert =	270.01	m



Orifice 2 (Round Only)

Invert =	270.70	m
Size =	0.420	m
C =	0.90	
Obvert =	271.12	m



OUTFLOW SUMMARY
North Pond

NW Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

Starting Water Level (m) = 269.70
Elevation Increment (m) = 0.02

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Backwater Elevation (m)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	4 Year Chicago Storm	12 Hour SCS Type II	24 Hour SCS Type II
269.70	0.000	0.000	0.00	269.70	0.000	0	0.0			
269.72	0.000	0.000	0.00	269.72	0.000	226	0.0			
269.74	0.002	0.000	0.00	269.74	0.002	454	0.0			
269.76	0.004	0.000	0.00	269.76	0.004	684	21.2			
269.78	0.007	0.000	0.00	269.78	0.007	916	32.5			
269.80	0.011	0.000	0.00	269.80	0.011	1149	39.7			
269.82	0.015	0.000	0.00	269.82	0.015	1384	44.6			
269.84	0.020	0.000	0.00	269.84	0.020	1621	48.3			
269.86	0.020	0.000	0.00	269.86	0.020	1860	51.5			
269.88	0.033	0.000	0.00	269.88	0.033	2100	54.0			
269.90	0.044	0.000	0.00	269.90	0.044	2342	55.8			
269.92	0.053	0.000	0.00	269.92	0.053	2586	57.2			
269.94	0.060	0.000	0.00	269.94	0.060	2832	58.4			
269.96	0.067	0.000	0.00	269.96	0.067	3080	59.5			
269.98	0.073	0.000	0.00	269.98	0.073	3329	60.4			
270.00	0.079	0.000	0.00	270.00	0.079	3580	61.4			
270.02	0.084	0.000	0.00	270.02	0.084	3833	62.2			
270.04	0.089	0.000	0.00	270.04	0.089	4088	63.0			
270.06	0.094	0.000	0.00	270.06	0.094	4344	63.8			
270.08	0.098	0.000	0.00	270.08	0.098	4602	64.6			
270.10	0.103	0.000	0.00	270.10	0.103	4862	65.3			
270.12	0.107	0.000	0.00	270.12	0.107	5124	66.0			
270.14	0.111	0.000	0.00	270.14	0.111	5387	66.7			
270.16	0.114	0.000	0.00	270.16	0.114	5653	67.3			
270.18	0.118	0.000	0.00	270.18	0.118	5920	67.9			
270.20	0.122	0.000	0.00	270.20	0.122	6188	68.6			
270.22	0.125	0.000	0.00	270.22	0.125	6459	69.2			
270.24	0.129	0.000	0.00	270.24	0.129	6730	69.8			
270.26	0.132	0.000	0.00	270.26	0.132	7002	70.4			
270.28	0.135	0.000	0.00	270.28	0.135	7275	70.9		EXTENDED DETENTION	
270.30	0.138	0.000	0.00	270.30	0.138	7549	71.5			
270.32	0.141	0.000	0.00	270.32	0.141	7824	72.0			
270.34	0.144	0.000	0.00	270.34	0.144	8101	72.6			
270.36	0.147	0.000	0.00	270.36	0.147	8378	73.1			
270.38	0.150	0.000	0.00	270.38	0.150	8656	73.6			
270.40	0.153	0.000	0.00	270.40	0.153	8935	74.1			
270.42	0.156	0.000	0.00	270.42	0.156	9215	74.6	2 Year		
270.44	0.159	0.000	0.00	270.44	0.159	9496	75.1			
270.46	0.161	0.000	0.00	270.46	0.161	9778	75.6			
270.48	0.164	0.000	0.00	270.48	0.164	10061	76.1			
270.50	0.166	0.000	0.00	270.50	0.166	10345	76.6			
270.52	0.169	0.000	0.00	270.52	0.169	10630	77.0			
270.54	0.172	0.000	0.00	270.54	0.172	10916	77.5			
270.56	0.174	0.000	0.00	270.56	0.174	11203	78.0		2 Year	
270.58	0.176	0.000	0.00	270.58	0.176	11491	78.4			
270.60	0.179	0.000	0.00	270.60	0.179	11780	78.9			
270.62	0.181	0.000	0.00	270.62	0.181	12070	79.3			2 Year
270.64	0.184	0.000	0.00	270.64	0.184	12361	79.8			
270.66	0.186	0.000	0.00	270.66	0.186	12653	80.2			
270.68	0.188	0.000	0.00	270.68	0.188	12946	80.6			
270.70	0.191	0.000	0.00	270.70	0.191	13240	81.1			
270.72	0.193	0.001	0.00	270.72	0.193	13535	81.5	5 Year		
270.74	0.195	0.002	0.00	270.74	0.197	13831	81.9			
270.76	0.197	0.005	0.00	270.76	0.202	14128	82.3			
270.78	0.199	0.009	0.00	270.78	0.208	14426	82.7			
270.80	0.201	0.013	0.00	270.80	0.215	14725	83.1			

OUTFLOW SUMMARY
North Pond

NW Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

Starting Water Level (m) = 269.70
Elevation Increment (m) = 0.02

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Backwater Elevation (m)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	4 Year Chicago Storm	12 Hour SCS Type II	24 Hour SCS Type II
270.82	0.204	0.019	0.00	270.82	0.222	15025	83.5			
270.84	0.206	0.025	0.00	270.84	0.231	15326	83.9			
270.86	0.208	0.032	0.00	270.86	0.240	15628	84.2		5 Year	
270.88	0.210	0.040	0.00	270.88	0.250	15931	84.6			
270.90	0.212	0.048	0.00	270.90	0.260	16235	84.9	10 Year		5 Year
270.92	0.214	0.055	0.00	270.92	0.269	16540	85.2			
270.94	0.216	0.096	0.00	270.94	0.312	16845	85.5			
270.96	0.218	0.123	0.00	270.96	0.341	17152	85.8			
270.98	0.220	0.146	0.00	270.98	0.366	17460	86.0			
271.00	0.222	0.166	0.00	271.00	0.387	17769	86.3			
271.02	0.224	0.183	0.00	271.02	0.407	18079	86.5			
271.04	0.226	0.199	0.00	271.04	0.425	18390	86.7		10 Year	
271.06	0.228	0.214	0.00	271.06	0.441	18701	86.9	25 Year		
271.08	0.229	0.228	0.00	271.08	0.457	19014	87.1			
271.10	0.231	0.241	0.00	271.10	0.472	19328	87.3			10 Year
271.12	0.233	0.253	0.00	271.12	0.486	19643	87.4			
271.14	0.235	0.265	0.00	271.14	0.500	19958	87.6			
271.16	0.237	0.276	0.00	271.16	0.513	20275	87.8			
271.18	0.239	0.287	0.00	271.18	0.526	20593	88.0			
271.20	0.240	0.297	0.00	271.20	0.538	20912	88.1			
271.22	0.242	0.308	0.00	271.22	0.550	21231	88.3			
271.24	0.244	0.317	0.00	271.24	0.561	21552	88.5		25 Year	
271.26	0.246	0.327	0.00	271.26	0.572	21874	88.6	50 Year		
271.28	0.247	0.336	0.00	271.28	0.583	22197	88.8			
271.30	0.249	0.345	0.00	271.30	0.594	22520	88.9			
271.32	0.251	0.354	0.00	271.32	0.605	22845	89.1			
271.34	0.253	0.362	0.00	271.34	0.615	23171	89.2			25 Year
271.36	0.254	0.370	0.00	271.36	0.625	23497	89.4			
271.38	0.256	0.379	0.00	271.38	0.635	23825	89.5	100 Year		
271.40	0.258	0.387	0.00	271.40	0.644	24154	89.7			
271.42	0.259	0.394	0.00	271.42	0.654	24483	89.8			
271.44	0.261	0.402	0.00	271.44	0.663	24814	89.9		50 Year	
271.46	0.263	0.410	0.00	271.46	0.672	25145	90.1			
271.48	0.264	0.417	0.00	271.48	0.681	25478	90.2			
271.50	0.266	0.424	0.00	271.50	0.690	25812	90.3			
271.52	0.267	0.431	0.00	271.52	0.699	26146	90.5			50 Year
271.54	0.269	0.438	0.00	271.54	0.707	26482	90.6			
271.56	0.271	0.445	0.00	271.56	0.716	26818	90.7		100 Year	
271.58	0.272	0.452	0.00	271.58	0.724	27156	90.9			
271.60	0.274	0.459	0.00	271.60	0.733	27495	91.0			
271.62	0.275	0.465	0.00	271.62	0.741	27834	91.1			100 Year
271.64	0.277	0.472	0.00	271.64	0.749	28175	91.3			
271.66	0.278	0.478	0.00	271.66	0.757	28516	91.4			
271.68	0.280	0.485	0.00	271.68	0.765	28859	91.5			
271.70	0.282	0.491	0.00	271.70	0.772	29202	91.6			

Southwest Pond

SCS consulting group ltd

Permanent Pool and Extended Detention Sizing Southwest Pond

Weighted Impervious Calculation

Catchment ID	Total Area	Imperviousness	Impervious Area
	(ha)	(%)	(ha)
2301	15.18	72	10.93
2305	0.39	70	0.27
2306	0.10	100	0.10
Total	**15.67**	**72**	**11.30**

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

Permanent Pool and Extended Detention Sizing Southwest Pond

PERMANENT POOL

Level of Protection = Enhanced (Level 1)

Weighted Impervious = 72 %

Drainage Area = 15.67 ha

SWMP Type = 4. Wet Pond

Required Permanent Pool (including 40m^3/ha for extended detention)= 228.5 m^3/ha
Required Permanent Pool (minus 40m^3/ha for extended detention)= 189 m^3/ha

Required Permanent Pool = 2955 m^3

TABLE 3.2 - WATER QUALITY STORAGE REQUIREMENTS (FROM MECP SWM PLANNING AND DESIGN MANUAL - 2003)

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced (Level 1)	1. Infiltration	25	30	35	40
	2. Wetlands	80	105	120	140
	3. Hybrid Wet Pond/Wetland	110	150	175	195
	4. Wet Pond	140	190	225	250
Normal (Level 2)	1. Infiltration	20	20	25	30
	2. Wetlands	60	70	80	90
	3. Hybrid Wet Pond/Wetland	75	90	105	120
	4. Wet Pond	90	110	130	150
Basic (Level 3)	1. Infiltration	20	20	20	20
	2. Wetlands	60	60	60	60
	3. Hybrid Wet Pond/Wetland	60	70	75	80
	4. Wet Pond	60	75	85	95
	5. Dry Pond (Continuous Flow)	90	150	200	240

EXTENDED DETENTION

Using the 25mm - 4 hour Chicago Storm

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m^3) / (mm)(ha)

Erosion Control Volume (V) = 13.29 mm x 15.67 ha x 10 m^3 / mm·ha

Erosion Control Volume (V) = 2083 m^3

Using 40m^3/ha

Extended Detention Volume (V) = 40m^3/ha x Drainage Area (ha)

Extended Detention Volume (V) = 40 m^3/ha 15.67 ha

Extended Detention Volume (V) = 627 m^3

Governing Volume (V) = 2083 m^3

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

Permanent Pool and Extended Detention Sizing Southwest Pond

Elevation (m)	Area (m^2)	Area (m^2)	H (m)	Vol (m^3)	Volume (m^3)	Storage (m^3)	Depth (m)	
262.2	1153.82				0		0	
		1716	1	1716				
263.2	2279				1716		1	
		2887	0.5	1443				
263.7	**3495**				3160	**0**	**1.5**	**N.W.L.**
		4005	0.5	2002				
264.2	4514.88				5162	2002	2	
		5430	1.50	8144				
265.70	6344.15				13307	10147	3.50	

Permanent Pool Volume Required = 2955 m^3
Permanent Pool Volume Provided = 3160 m^3

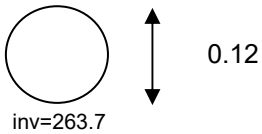
Extended Detention volume required = 2083 m^3
Extended Detention waterlevel = 264.22 m

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

CONTROL STRUCTURE SUMMARY
Southwest Pond

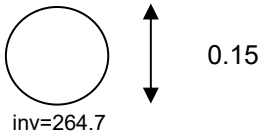
Orifice 1

Invert =	263.70	m
Size =	0.120	m
Orifice Coefficient, C =	0.62	
Obvert =	263.82	m



Orifice 2 (Round Only)

Invert =	264.70	m
Size =	0.150	m
C =	0.62	
Obvert =	264.85	m



OUTFLOW SUMMARY
Southwest Pond

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

Starting Water Level (m) = 263.70
Elevation Increment (m) = 0.02

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	4 Year Chicago Storm	12 Hour SCS Type II	24 Hour SCS Type II
263.70	0.000	0.000	263.70	0.000	0	0.0			
263.72	0.000	0.000	263.72	0.000	70	0.0			
263.74	0.001	0.000	263.74	0.001	141	0.0			
263.76	0.001	0.000	263.76	0.001	213	18.3			
263.78	0.004	0.000	263.78	0.004	286	25.7			
263.80	0.006	0.000	263.80	0.006	360	29.6			
263.82	0.008	0.000	263.82	0.008	434	32.6			
263.84	0.009	0.000	263.84	0.009	509	35.1			
263.86	0.010	0.000	263.86	0.010	585	37.4			
263.88	0.011	0.000	263.88	0.011	662	39.5			
263.90	0.012	0.000	263.90	0.012	740	41.4			
263.92	0.012	0.000	263.92	0.012	818	43.2			
263.94	0.013	0.000	263.94	0.013	898	44.9			
263.96	0.014	0.000	263.96	0.014	978	46.6			
263.98	0.015	0.000	263.98	0.015	1059	48.1			
264.00	0.015	0.000	264.00	0.015	1140	49.7			
264.02	0.016	0.000	264.02	0.016	1223	51.1			
264.04	0.016	0.000	264.04	0.016	1306	52.6			
264.06	0.017	0.000	264.06	0.017	1390	54.0			
264.08	0.018	0.000	264.08	0.018	1475	55.3			
264.10	0.018	0.000	264.10	0.018	1561	56.7			
264.12	0.019	0.000	264.12	0.019	1648	58.0			
264.14	0.019	0.000	264.14	0.019	1735	59.3			
264.16	0.020	0.000	264.16	0.020	1824	60.5			
264.18	0.020	0.000	264.18	0.020	1913	61.8			
264.20	0.021	0.000	264.20	0.021	2002	63.0			
264.22	0.021	0.000	264.22	0.021	2093	64.2		EXTENDED DETENTION	
264.24	0.022	0.000	264.24	0.022	2184	65.4			
264.26	0.022	0.000	264.26	0.022	2276	66.6			
264.28	0.022	0.000	264.28	0.022	2368	67.7			
264.30	0.023	0.000	264.30	0.023	2460	68.9			
264.32	0.023	0.000	264.32	0.023	2553	70.0			
264.34	0.024	0.000	264.34	0.024	2647	71.1			
264.36	0.024	0.000	264.36	0.024	2740	72.2			
264.38	0.024	0.000	264.38	0.024	2835	73.3	2 Year		
264.40	0.025	0.000	264.40	0.025	2930	74.3			
264.42	0.025	0.000	264.42	0.025	3025	75.4			
264.44	0.026	0.000	264.44	0.026	3121	76.4			
264.46	0.026	0.000	264.46	0.026	3218	77.5			
264.48	0.026	0.000	264.48	0.026	3314	78.5			
264.50	0.027	0.000	264.50	0.027	3412	79.5			
264.52	0.027	0.000	264.52	0.027	3510	80.5		2 Year	
264.54	0.027	0.000	264.54	0.027	3608	81.5			
264.56	0.028	0.000	264.56	0.028	3707	82.5			2 Year
264.58	0.028	0.000	264.58	0.028	3806	83.5			
264.60	0.028	0.000	264.60	0.028	3906	84.5			
264.62	0.029	0.000	264.62	0.029	4006	85.5			
264.64	0.029	0.000	264.64	0.029	4107	86.4	5 Year		
264.66	0.029	0.000	264.66	0.029	4208	87.4			
264.68	0.030	0.000	264.68	0.030	4310	88.4			
264.70	0.030	0.000	264.70	0.030	4412	89.3			
264.72	0.030	0.000	264.72	0.031	4515	90.2			
264.74	0.031	0.001	264.74	0.032	4618	91.2			
264.76	0.031	0.003	264.76	0.034	4722	92.0			
264.78	0.031	0.003	264.78	0.035	4826	92.9			
264.80	0.032	0.008	264.80	0.039	4931	93.7	10 Year	5 Year	
264.82	0.032	0.010	264.82	0.042	5036	94.4			5 Year
264.84	0.032	0.012	264.84	0.045	5142	95.1			
264.86	0.033	0.014	264.86	0.047	5248	95.7			
264.88	0.033	0.016	264.88	0.049	5355	96.3			
264.90	0.033	0.017	264.90	0.050	5462	96.9			
264.92	0.033	0.018	264.92	0.052	5569	97.5			
264.94	0.034	0.020	264.94	0.053	5677	98.1			
264.96	0.034	0.021	264.96	0.055	5786	98.6	25 Year	10 Year	
264.98	0.034	0.022	264.98	0.056	5895	99.2			
265.00	0.035	0.023	265.00	0.058	6005	99.7			
265.02	0.035	0.024	265.02	0.059	6115	100.2			10 Year
265.04	0.035	0.025	265.04	0.060	6225	100.8			
265.06	0.035	0.026	265.06	0.061	6336	101.3			
265.08	0.036	0.027	265.08	0.062	6448	101.8			
265.10	0.036	0.028	265.10	0.064	6560	102.3			

OUTFLOW SUMMARY
Southwest Pond

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

Starting Water Level (m) = 263.70
Elevation Increment (m) = 0.02

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	4 Year Chicago Storm	12 Hour SCS Type II	24 Hour SCS Type II
265.12	0.036	0.029	265.12	0.065	6672	102.7			
265.14	0.036	0.029	265.14	0.066	6785	103.2	50 Year		
265.16	0.037	0.030	265.16	0.067	6899	103.7		25 Year	
265.18	0.037	0.031	265.18	0.068	7013	104.2			
265.20	0.037	0.032	265.20	0.069	7127	104.6			
265.22	0.038	0.032	265.22	0.070	7242	105.1			
265.24	0.038	0.033	265.24	0.071	7357	105.5			25 Year
265.26	0.038	0.034	265.26	0.072	7473	106.0	100 Year		
265.28	0.038	0.034	265.28	0.073	7590	106.4			
265.30	0.039	0.035	265.30	0.074	7707	106.9			
265.32	0.039	0.036	265.32	0.075	7824	107.3			
265.34	0.039	0.036	265.34	0.076	7942	107.8			
265.36	0.039	0.037	265.36	0.076	8060	108.2		50 Year	
265.38	0.040	0.038	265.38	0.077	8179	108.6			
265.40	0.040	0.038	265.40	0.078	8298	109.1			
265.42	0.040	0.039	265.42	0.079	8418	109.5			50 Year
265.44	0.040	0.040	265.44	0.080	8538	109.9			
265.46	0.040	0.040	265.46	0.081	8659	110.3		100 Year	
265.48	0.041	0.041	265.48	0.081	8781	110.7			
265.50	0.041	0.041	265.50	0.082	8902	111.1			100 Year
265.52	0.041	0.042	265.52	0.083	9025	111.6			
265.54	0.041	0.042	265.54	0.084	9147	112.0			
265.56	0.042	0.043	265.56	0.085	9271	112.4			
265.58	0.042	0.044	265.58	0.085	9394	112.8			
265.60	0.042	0.044	265.60	0.086	9518	113.2			
265.62	0.042	0.045	265.62	0.087	9643	113.6			
265.64	0.043	0.045	265.64	0.088	9768	114.0			
265.66	0.043	0.046	265.66	0.088	9894	114.4			
265.68	0.043	0.046	265.68	0.089	10020	114.8			
265.70	0.043	0.047	265.70	0.090	10147	115.2			

Superpipe

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Weighted Impervious Calculation

Catchment ID	Total Area	Imperviousness	Impervious Area
	(ha)	(%)	(ha)
2102	4.47	70	3.13
Total	**4.47**	**70**	**3.13**

Extended Detention Sizing
Superpipe

EXTENDED DETENTION

Using the 25mm - 4 hour Chicago Storm

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m^3) / (mm)(ha)

Erosion Control Volume (V) = 13.11 mm x 4.47 ha x 10 m^3 / mm·ha

Erosion Control Volume (V) = 586 m^3

Using 40m^3/ha

Extended Detention Volume (V) = 40m^3/ha x Drainage Area (ha)

Extended Detention Volume (V) = 40 m^3/ha 4.47 ha

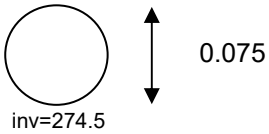
Extended Detention Volume (V) = 178.8 m^3

Governing Volume (V) = 586 m^3

CONTROL STRUCTURE SUMMARY
Superpipe

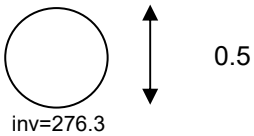
Orifice 1

Invert =	274.50	m
Size =	0.075	m
Orifice Coefficient, C =	0.62	
Obvert =	274.575	m



Orifice 2 (Round Only)

Invert =	276.30	m
Size =	0.500	m
C =	0.62	
Obvert =	276.800	m



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OUTFLOW SUMMARY
Superpipe

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

Starting Water Level (m) = 274.50
Elevation Increment (m) = 0.02

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	4 Year Chicago Storm	12 Hour SCS Type II	24 Hour SCS Type II
274.50	0.000	0.000	274.50	0.000	0	0.0			
274.52	0.000	0.000	274.52	0.000	0	0.0			
274.54	0.001	0.000	274.54	0.001	0	0.0			
274.56	0.002	0.000	274.56	0.002	1	0.1			
274.58	0.003	0.000	274.58	0.003	2	0.2			
274.60	0.003	0.000	274.60	0.003	2	0.3			
274.62	0.003	0.000	274.62	0.003	4	0.4			
274.64	0.004	0.000	274.64	0.004	5	0.5			
274.66	0.004	0.000	274.66	0.004	7	0.7			
274.68	0.005	0.000	274.68	0.005	10	0.8			
274.70	0.005	0.000	274.70	0.005	13	1.0			
274.72	0.005	0.000	274.72	0.005	16	1.2			
274.74	0.005	0.000	274.74	0.005	20	1.3			
274.76	0.006	0.000	274.76	0.006	24	1.6			
274.78	0.006	0.000	274.78	0.006	28	1.8			
274.80	0.006	0.000	274.80	0.006	33	2.0			
274.82	0.006	0.000	274.82	0.006	39	2.2			
274.84	0.007	0.000	274.84	0.007	45	2.5			
274.86	0.007	0.000	274.86	0.007	51	2.8			
274.88	0.007	0.000	274.88	0.007	58	3.0			
274.90	0.007	0.000	274.90	0.007	66	3.3			
274.92	0.008	0.000	274.92	0.008	74	3.6			
274.94	0.008	0.000	274.94	0.008	82	3.9			
274.96	0.008	0.000	274.96	0.008	91	4.2			
274.98	0.008	0.000	274.98	0.008	100	4.6			
275.00	0.008	0.000	275.00	0.008	110	4.9			
275.02	0.008	0.000	275.02	0.008	120	5.2			
275.04	0.009	0.000	275.04	0.009	131	5.6			
275.06	0.009	0.000	275.06	0.009	143	6.0			
275.08	0.009	0.000	275.08	0.009	155	6.4			
275.10	0.009	0.000	275.10	0.009	167	6.7			
275.12	0.009	0.000	275.12	0.009	180	7.1			
275.14	0.009	0.000	275.14	0.009	194	7.5			
275.16	0.010	0.000	275.16	0.010	208	7.9			
275.18	0.010	0.000	275.18	0.010	222	8.4			
275.20	0.010	0.000	275.20	0.010	237	8.8			
275.22	0.010	0.000	275.22	0.010	252	9.2			
275.24	0.010	0.000	275.24	0.010	268	9.6			
275.26	0.010	0.000	275.26	0.010	285	10.1			
275.28	0.010	0.000	275.28	0.010	301	10.5			
275.30	0.011	0.000	275.30	0.011	318	11.0			
275.32	0.011	0.000	275.32	0.011	335	11.4			
275.34	0.011	0.000	275.34	0.011	353	11.9			
275.36	0.011	0.000	275.36	0.011	371	12.3			
275.38	0.011	0.000	275.38	0.011	388	12.8			
275.40	0.011	0.000	275.40	0.011	406	13.2			
275.42	0.011	0.000	275.42	0.011	424	13.7			
275.44	0.012	0.000	275.44	0.012	442	14.1			
275.46	0.012	0.000	275.46	0.012	460	14.5			
275.48	0.012	0.000	275.48	0.012	479	15.0			
275.50	0.012	0.000	275.50	0.012	497	15.4			
275.52	0.012	0.000	275.52	0.012	515	15.8			
275.54	0.012	0.000	275.54	0.012	533	16.2			
275.56	0.012	0.000	275.56	0.012	551	16.6			
275.58	0.012	0.000	275.58	0.012	570	17.0			
275.60	0.013	0.000	275.60	0.013	588	17.5	EXTENDED DETENTION		
275.62	0.013	0.000	275.62	0.013	606	17.9			
275.64	0.013	0.000	275.64	0.013	625	18.3			
275.66	0.013	0.000	275.66	0.013	643	18.7			
275.68	0.013	0.000	275.68	0.013	661	19.1			
275.70	0.013	0.000	275.70	0.013	679	19.4			
275.72	0.013	0.000	275.72	0.013	698	19.8			

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OUTFLOW SUMMARY
Superpipe

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

Starting Water Level (m) = 274.50
Elevation Increment (m) = 0.02

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	4 Year Chicago Storm	12 Hour SCS Type II	24 Hour SCS Type II
275.74	0.013	0.000	275.74	0.013	716	20.2			
275.76	0.013	0.000	275.76	0.013	734	20.6			
275.78	0.014	0.000	275.78	0.014	753	21.0			
275.80	0.014	0.000	275.80	0.014	771	21.3	2 Year		
275.82	0.014	0.000	275.82	0.014	789	21.7			
275.84	0.014	0.000	275.84	0.014	808	22.1			
275.86	0.014	0.000	275.86	0.014	826	22.5			
275.88	0.014	0.000	275.88	0.014	844	22.8			
275.90	0.014	0.000	275.90	0.014	862	23.18			
275.92	0.014	0.000	275.92	0.014	881	23.53			
275.94	0.014	0.000	275.94	0.014	899	23.9			
275.96	0.014	0.000	275.96	0.014	917	24.2		2 Year	
275.98	0.015	0.000	275.98	0.015	936	24.6			2 Year
276.00	0.015	0.000	276.00	0.015	954	24.9			
276.02	0.015	0.000	276.02	0.015	972	25.3			
276.04	0.015	0.000	276.04	0.015	991	25.6			
276.06	0.015	0.000	276.06	0.015	1009	26.0			
276.08	0.015	0.000	276.08	0.015	1027	26.3			
276.10	0.015	0.000	276.10	0.015	1045	26.6			
276.12	0.015	0.000	276.12	0.015	1064	27.0			
276.14	0.015	0.000	276.14	0.015	1082	27.3			
276.16	0.015	0.000	276.16	0.015	1100	27.6			
276.18	0.016	0.000	276.18	0.016	1119	28.0			
276.20	0.016	0.000	276.20	0.016	1137	28.3			
276.22	0.016	0.000	276.22	0.016	1155	28.6	5 Year		
276.24	0.016	0.000	276.24	0.016	1174	28.9			
276.26	0.016	0.000	276.26	0.016	1192	29.3			
276.28	0.016	0.000	276.28	0.016	1210	29.6			
276.30	0.016	0.000	276.30	0.016	1228	29.9			
276.32	0.016	0.001	276.32	0.017	1247	30.2			
276.34	0.016	0.002	276.34	0.019	1265	30.5			
276.36	0.016	0.005	276.36	0.022	1283	30.7		5 Year	
276.38	0.016	0.009	276.38	0.026	1302	31.0			5 Year
276.40	0.017	0.015	276.40	0.031	1320	31.1			
276.42	0.017	0.021	276.42	0.037	1338	31.3	10 Year		
276.44	0.017	0.028	276.44	0.045	1357	31.4			
276.46	0.017	0.036	276.46	0.053	1375	31.5			
276.48	0.017	0.045	276.48	0.061	1393	31.6			
276.50	0.017	0.054	276.50	0.071	1411	31.7		10 Year	
276.52	0.017	0.064	276.52	0.081	1430	31.7	25 Year		
276.54	0.017	0.075	276.54	0.092	1448	31.8			10 Year
276.56	0.017	0.075	276.56	0.093	1466	31.9			
276.58	0.017	0.093	276.58	0.111	1485	31.9			
276.60	0.017	0.121	276.60	0.138	1503	31.9			
276.62	0.018	0.143	276.62	0.160	1521	32.0			
276.64	0.018	0.162	276.64	0.179	1540	32.0			
276.66	0.018	0.179	276.66	0.197	1558	32.0	50 Year	25 Year	
276.68	0.018	0.194	276.68	0.212	1576	32.1			
276.70	0.018	0.209	276.70	0.227	1594	32.1			25 Year
276.72	0.018	0.222	276.72	0.240	1613	32.1			
276.74	0.018	0.235	276.74	0.253	1631	32.1			
276.76	0.018	0.247	276.76	0.265	1649	32.1	100 Year		
276.78	0.018	0.259	276.78	0.277	1667	32.2		50 Year	
276.80	0.018	0.270	276.80	0.288	1685	32.2			
276.82	0.018	0.280	276.82	0.299	1703	32.2			
276.84	0.018	0.290	276.84	0.309	1721	32.2			50 Year
276.86	0.018	0.300	276.86	0.319	1739	32.2			
276.88	0.019	0.310	276.88	0.328	1757	32.2		100 Year	
276.90	0.019	0.319	276.90	0.338	1775	32.3			
276.92	0.019	0.328	276.92	0.347	1793	32.3			100 Year
276.94	0.019	0.337	276.94	0.356	1810	32.3			
276.96	0.019	0.345	276.96	0.364	1827	32.3			

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

OUTFLOW SUMMARY
Superpipe

Starting Water Level (m) = 274.50
Elevation Increment (m) = 0.02

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	4 Year Chicago Storm	12 Hour SCS Type II	24 Hour SCS Type II
276.98	0.019	0.354	276.98	0.373	1844	32.3			
277.00	0.019	0.362	277.00	0.381	1860	32.3			
277.02	0.019	0.370	277.02	0.389	1876	32.3			
277.04	0.019	0.377	277.04	0.397	1892	32.3			
277.06	0.019	0.385	277.06	0.404	1907	32.4			
277.08	0.019	0.393	277.08	0.412	1922	32.4			
277.10	0.019	0.400	277.10	0.419	1936	32.4			
277.12	0.019	0.407	277.12	0.427	1950	32.4			
277.14	0.020	0.414	277.14	0.434	1963	32.4			
277.16	0.020	0.421	277.16	0.441	1976	32.4			
277.18	0.020	0.428	277.18	0.448	1988	32.4			
277.20	0.020	0.435	277.20	0.455	2000	32.4			
277.22	0.020	0.441	277.22	0.461	2011	32.4			
277.24	0.020	0.448	277.24	0.468	2022	32.4			
277.26	0.020	0.454	277.26	0.474	2032	32.4			
277.28	0.020	0.461	277.28	0.481	2042	32.4			
277.30	0.020	0.467	277.30	0.487	2051	32.5			
277.32	0.020	0.473	277.32	0.493	2060	32.5			
277.34	0.020	0.479	277.34	0.500	2069	32.5			
277.36	0.020	0.485	277.36	0.506	2077	32.5			
277.38	0.020	0.491	277.38	0.512	2084	32.5			
277.40	0.021	0.497	277.40	0.518	2091	32.5			
277.42	0.021	0.503	277.42	0.524	2097	32.5			
277.44	0.021	0.509	277.44	0.529	2103	32.5			
277.46	0.021	0.514	277.46	0.535	2108	32.5			
277.48	0.021	0.520	277.48	0.541	2113	32.5			
277.50	0.021	0.526	277.50	0.546	2118	32.5			
277.52	0.021	0.531	277.52	0.552	2122	32.5			
277.54	0.021	0.537	277.54	0.558	2125	32.5			
277.56	0.021	0.542	277.56	0.563	2128	32.5			
277.58	0.021	0.547	277.58	0.568	2131	32.5			
277.60	0.021	0.553	277.60	0.574	2133	32.5			
277.62	0.021	0.558	277.62	0.579	2135	32.5			
277.64	0.021	0.563	277.64	0.584	2136	32.5			
277.66	0.021	0.568	277.66	0.590	2137	32.5			
277.68	0.022	0.573	277.68	0.595	2138	32.5			
277.70	0.022	0.578	277.70	0.600	2139	32.5			
277.72	0.022	0.583	277.72	0.605	2139	32.5			
277.74	0.022	0.588	277.74	0.610	2139	32.5			
277.76	0.022	0.593	277.76	0.615	2139	32.5			

Storage Summary
Superpipe

Control Structure Outlet Invert =	274.50	m		274.60		275.00	

Superpipe 1 Parameters

Length =	150	m
Slope =	0.5	%
Span =	3000	mm
Rise =	2400	mm
Haunch height =	305	mm
D/S Superpipe Invert =	274.50	m
Elevation Increment =	0.02	m
Cross-Sectional Area =	7.01395	m^2
Total Storage Provided =	1052.09	m^3
U/S Superpipe Invert =	275.25	m
U/S Superpipe Obvert =	277.65	m
U/S Haunch Invert =	275.56	m
U/S Haunch Obvert =	277.35	m
D/S Superpipe Obvert =	276.90	m
D/S Haunch Invert =	274.81	m
D/S Haunch Obvert =	276.60	m

Stage/Storage Table:

Stage (m)	Total Volume (m^3)
274.50	0.00
274.52	0.10
274.54	0.39
274.56	0.87
274.58	1.56
274.60	2.46
274.62	3.56
274.64	4.87
274.66	6.39
274.68	8.13
274.70	10.09
274.72	12.28
274.74	14.69
274.76	17.33
274.78	20.20
274.80	23.31
274.82	26.66
274.84	30.25
274.86	34.07
274.88	38.14
274.90	42.45

Superpipe 2 Parameters

Length =	85	m
Slope =	0.5	%
Span =	3000	mm
Rise =	2400	mm
Haunch height =	305	mm
D/S Superpipe Invert =	274.60	m
Elevation Increment =	0.02	m
Cross-Sectional Area =	7.01395	m^2
Total Storage Provided =	596.19	m^3
U/S Superpipe Invert =	275.03	m
U/S Superpipe Obvert =	277.43	m
U/S Haunch Invert =	275.33	m
U/S Haunch Obvert =	277.12	m
D/S Superpipe Obvert =	277.00	m
D/S Haunch Invert =	274.91	m
D/S Haunch Obvert =	276.70	m

Stage/Storage Table:

Stage (m)	Total Volume (m^3)
274.50	0.00
274.52	0.00
274.54	0.00
274.56	0.00
274.58	0.00
274.60	0.00
274.62	0.10
274.64	0.39
274.66	0.87
274.68	1.56
274.70	2.46
274.72	3.56
274.74	4.87
274.76	6.39
274.78	8.13
274.80	10.09
274.82	12.28
274.84	14.69
274.86	17.33
274.88	20.20
274.90	23.31

Superpipe 3 Parameters

Length =	70	m
Slope =	0.5	%
Span =	3000	mm
Rise =	2400	mm
Haunch height =	305	mm
D/S Superpipe Invert =	275.00	m
Elevation Increment =	0.02	m
Cross-Sectional Area =	7.01395	m^2
Total Storage Provided =	490.98	m^3
U/S Superpipe Invert =	275.35	m
U/S Superpipe Obvert =	277.75	m
U/S Haunch Invert =	275.66	m
U/S Haunch Obvert =	277.45	m
D/S Superpipe Obvert =	277.40	m
D/S Haunch Invert =	275.31	m
D/S Haunch Obvert =	277.10	m

Stage/Storage Table:

Stage (m)	Total Volume (m^3)
274.50	0.00
274.52	0.00
274.54	0.00
274.56	0.00
274.58	0.00
274.60	0.00
274.62	0.00
274.64	0.00
274.66	0.00
274.68	0.00
274.70	0.00
274.72	0.00
274.74	0.00
274.76	0.00
274.78	0.00
274.80	0.00
274.82	0.00
274.84	0.00
274.86	0.00
274.88	0.00
274.90	0.00

Storage Summary
Superpipe

Stage (m)	Total Volume (m^3)
274.92	47.00
274.94	51.79
274.96	56.81
274.98	62.08
275.00	67.59
275.02	73.34
275.04	79.32
275.06	85.55
275.08	92.02
275.10	98.73
275.12	105.68
275.14	112.86
275.16	120.29
275.18	127.96
275.20	135.87
275.22	144.02
275.24	152.40
275.26	161.01
275.28	169.68
275.30	178.40
275.32	187.16
275.34	195.96
275.36	204.79
275.38	213.65
275.40	222.54
275.42	231.46
275.44	240.40
275.46	249.35
275.48	258.32
275.50	267.31
275.52	276.30
275.54	285.30
275.56	294.30
275.58	303.30
275.60	312.30
275.62	321.30
275.64	330.30
275.66	339.30
275.68	348.30
275.70	357.30
275.72	366.30
275.74	375.30
275.76	384.30
275.78	393.30
275.80	402.30
275.82	411.30

Stage (m)	Total Volume (m^3)
274.92	26.66
274.94	30.25
274.96	34.07
274.98	38.14
275.00	42.45
275.02	47.00
275.04	51.73
275.06	56.52
275.08	61.35
275.10	66.22
275.12	71.12
275.14	76.06
275.16	81.03
275.18	86.03
275.20	91.05
275.22	96.09
275.24	101.15
275.26	106.23
275.28	111.31
275.30	116.41
275.32	121.51
275.34	126.61
275.36	131.71
275.38	136.81
275.40	141.91
275.42	147.01
275.44	152.11
275.46	157.21
275.48	162.31
275.50	167.41
275.52	172.51
275.54	177.61
275.56	182.71
275.58	187.81
275.60	192.91
275.62	198.01
275.64	203.11
275.66	208.21
275.68	213.31
275.70	218.41
275.72	223.51
275.74	228.61
275.76	233.71
275.78	238.81
275.80	243.91
275.82	249.01

Stage (m)	Total Volume (m^3)
274.92	0.00
274.94	0.00
274.96	0.00
274.98	0.00
275.00	0.00
275.02	0.10
275.04	0.39
275.06	0.87
275.08	1.56
275.10	2.46
275.12	3.56
275.14	4.87
275.16	6.39
275.18	8.13
275.20	10.09
275.22	12.28
275.24	14.69
275.26	17.33
275.28	20.20
275.30	23.31
275.32	26.66
275.34	30.25
275.36	34.05
275.38	37.92
275.40	41.84
275.42	45.80
275.44	49.80
275.46	53.83
275.48	57.90
275.50	61.99
275.52	66.10
275.54	70.24
275.56	74.40
275.58	78.57
275.60	82.75
275.62	86.94
275.64	91.14
275.66	95.34
275.68	99.54
275.70	103.74
275.72	107.94
275.74	112.14
275.76	116.34
275.78	120.54
275.80	124.74
275.82	128.94

Storage Summary
Superpipe

Stage (m)	Total Volume (m^3)
275.84	420.30
275.86	429.30
275.88	438.30
275.90	447.30
275.92	456.30
275.94	465.30
275.96	474.30
275.98	483.30
276.00	492.30
276.02	501.30
276.04	510.30
276.06	519.30
276.08	528.30
276.10	537.30
276.12	546.30
276.14	555.30
276.16	564.30
276.18	573.30
276.20	582.30
276.22	591.30
276.24	600.30
276.26	609.30
276.28	618.30
276.30	627.30
276.32	636.30
276.34	645.30
276.36	654.30
276.38	663.30
276.40	672.30
276.42	681.30
276.44	690.30
276.46	699.30
276.48	708.30
276.50	717.30
276.52	726.30
276.54	735.30
276.56	744.30
276.58	753.30
276.60	762.30
276.62	771.30
276.64	780.29
276.66	789.28
276.68	798.26
276.70	807.22
276.72	816.17
276.74	825.09

Stage (m)	Total Volume (m^3)
275.84	254.11
275.86	259.21
275.88	264.31
275.90	269.41
275.92	274.51
275.94	279.61
275.96	284.71
275.98	289.81
276.00	294.91
276.02	300.01
276.04	305.11
276.06	310.21
276.08	315.31
276.10	320.41
276.12	325.51
276.14	330.61
276.16	335.71
276.18	340.81
276.20	345.91
276.22	351.01
276.24	356.11
276.26	361.21
276.28	366.31
276.30	371.41
276.32	376.51
276.34	381.61
276.36	386.71
276.38	391.81
276.40	396.91
276.42	402.01
276.44	407.11
276.46	412.21
276.48	417.31
276.50	422.41
276.52	427.51
276.54	432.61
276.56	437.71
276.58	442.81
276.60	447.91
276.62	453.01
276.64	458.11
276.66	463.21
276.68	468.31
276.70	473.41
276.72	478.50
276.74	483.60

Stage (m)	Total Volume (m^3)
275.84	133.14
275.86	137.34
275.88	141.54
275.90	145.74
275.92	149.94
275.94	154.14
275.96	158.34
275.98	162.54
276.00	166.74
276.02	170.94
276.04	175.14
276.06	179.34
276.08	183.54
276.10	187.74
276.12	191.94
276.14	196.14
276.16	200.34
276.18	204.54
276.20	208.74
276.22	212.94
276.24	217.14
276.26	221.34
276.28	225.54
276.30	229.74
276.32	233.94
276.34	238.14
276.36	242.34
276.38	246.54
276.40	250.74
276.42	254.94
276.44	259.14
276.46	263.34
276.48	267.54
276.50	271.74
276.52	275.94
276.54	280.14
276.56	284.34
276.58	288.54
276.60	292.74
276.62	296.94
276.64	301.14
276.66	305.34
276.68	309.54
276.70	313.74
276.72	317.94
276.74	322.14

Storage Summary
Superpipe

Stage (m)	Total Volume (m^3)
276.76	834.00
276.78	842.87
276.80	851.72
276.82	860.54
276.84	869.32
276.86	878.06
276.88	886.75
276.90	895.40
276.92	903.91
276.94	912.18
276.96	920.21
276.98	928.00
277.00	935.54
277.02	942.85
277.04	949.92
277.06	956.75
277.08	963.34
277.10	969.68
277.12	975.79
277.14	981.66
277.16	987.29
277.18	992.68
277.20	997.82
277.22	1002.73
277.24	1007.40
277.26	1011.83
277.28	1016.01
277.30	1019.96
277.32	1023.67
277.34	1027.14
277.36	1030.37
277.38	1033.36
277.40	1036.11
277.42	1038.64
277.44	1040.94
277.46	1043.01
277.48	1044.86
277.50	1046.49
277.52	1047.91
277.54	1049.11
277.56	1050.11
277.58	1050.90
277.60	1051.49
277.62	1051.88
277.64	1052.07
277.66	1052.09

Stage (m)	Total Volume (m^3)
276.76	488.69
276.78	493.76
276.80	498.83
276.82	503.88
276.84	508.90
276.86	513.91
276.88	518.88
276.90	523.83
276.92	528.75
276.94	533.62
276.96	538.46
276.98	543.26
277.00	548.01
277.02	552.62
277.04	556.99
277.06	561.12
277.08	565.01
277.10	568.65
277.12	572.06
277.14	575.23
277.16	578.16
277.18	580.86
277.20	583.33
277.22	585.57
277.24	587.58
277.26	589.38
277.28	590.96
277.30	592.32
277.32	593.47
277.34	594.42
277.36	595.16
277.38	595.70
277.40	596.04
277.42	596.18
277.44	596.19
277.46	596.19
277.48	596.19
277.50	596.19
277.52	596.19
277.54	596.19
277.56	596.19
277.58	596.19
277.60	596.19
277.62	596.19
277.64	596.19
277.66	596.19

Stage (m)	Total Volume (m^3)
276.76	326.34
276.78	330.54
276.80	334.74
276.82	338.94
276.84	343.14
276.86	347.34
276.88	351.54
276.90	355.74
276.92	359.94
276.94	364.14
276.96	368.34
276.98	372.54
277.00	376.74
277.02	380.94
277.04	385.14
277.06	389.34
277.08	393.54
277.10	397.74
277.12	401.94
277.14	406.13
277.16	410.32
277.18	414.50
277.20	418.66
277.22	422.81
277.24	426.94
277.26	431.04
277.28	435.12
277.30	439.16
277.32	443.18
277.34	447.16
277.36	451.10
277.38	454.99
277.40	458.85
277.42	462.55
277.44	466.02
277.46	469.25
277.48	472.24
277.50	475.00
277.52	477.52
277.54	479.82
277.56	481.89
277.58	483.74
277.60	485.37
277.62	486.79
277.64	488.00
277.66	488.99

Storage Summary
Superpipe

Stage (m)	Total Volume (m^3)
277.68	1052.09
277.70	1052.09
277.72	1052.09
277.74	1052.09
277.76	1052.09

Stage (m)	Total Volume (m^3)
277.68	596.19
277.70	596.19
277.72	596.19
277.74	596.19
277.76	596.19

Stage (m)	Total Volume (m^3)
277.68	489.78
277.70	490.37
277.72	490.76
277.74	490.95
277.76	490.98

Collector Road Control

SCS consulting group ltd

Extended Detention Sizing
Collector Road Control

Weighted Impervious Calculation

Catchment ID	Total Area	Imperviousness	Impervious Area
	(ha)	(%)	(ha)
2107	0.68	65	0.44
Total	**0.68**	**65**	**0.44**

Extended Detention Sizing
Collector Road Control

EXTENDED DETENTION

Using the 25mm - 4 hour Chicago Storm

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m^3) / (mm)(ha)

Erosion Control Volume (V) = 13.02 mm x 0.68 ha x 10 m^3 / mm·ha

Erosion Control Volume (V) = 89 m^3

Using 40m^3/ha

Extended Detention Volume (V) = 40m^3/ha x Drainage Area (ha)

Extended Detention Volume (V) = 40 m^3/ha 0.68 ha

Extended Detention Volume (V) = 27.2 m^3

Governing Volume (V) = 89 m^3

Peak Flowrate (Q_p) = Extended Detention Volume (m^3) / Detention Time (hr) x 1 (hr) / 3600 (s) x 1.5 (peaking factor)

Peak Flowrate (Q_p) = 89 m^3 / 24 hr x 1 (hr) / 3600 (s) x 1.5 (peaking factor)

Peak Flowrate (Q_p) = 0.002 m^3/s

Southeast Pond

SCS consulting group ltd

Permanent Pool and Extended Detention Sizing Southeast Pond

Weighted Impervious Calculation

Catchment ID	Total Area	Imperviousness	Impervious Area
	(ha)	(%)	(ha)
2301	19.45	81	15.75
2305	0.10	85	0.09
2306	0.05	100	0.05
Total	**19.60**	**81**	**15.89**

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: J.S.

Permanent Pool and Extended Detention Sizing Southeast Pond

PERMANENT POOL

Level of Protection = Enhanced (Level 1)

Weighted Impervious = 81 %

Drainage Area = 19.60 ha

SWMP Type = 4. Wet Pond

Required Permanent Pool (including 40m^3/ha for extended detention)= 243.4 m^3/ha
Required Permanent Pool (minus 40m^3/ha for extended detention)= 203 m^3/ha

Required Permanent Pool = 3988 m^3

TABLE 3.2 - WATER QUALITY STORAGE REQUIREMENTS (FROM MECP SWM PLANNING AND DESIGN MANUAL - 2003)

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced (Level 1)	1. Infiltration	25	30	35	40
	2. Wetlands	80	105	120	140
	3. Hybrid Wet Pond/Wetland	110	150	175	195
	4. Wet Pond	140	190	225	250
Normal (Level 2)	1. Infiltration	20	20	25	30
	2. Wetlands	60	70	80	90
	3. Hybrid Wet Pond/Wetland	75	90	105	120
	4. Wet Pond	90	110	130	150
Basic (Level 3)	1. Infiltration	20	20	20	20
	2. Wetlands	60	60	60	60
	3. Hybrid Wet Pond/Wetland	60	70	75	80
	4. Wet Pond	60	75	85	95
	5. Dry Pond (Continuous Flow)	90	150	200	240

EXTENDED DETENTION

Using the 25mm - 4 hour Chicago Storm

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m^3) / (mm)(ha)

Erosion Control Volume (V) = 18.48 mm x 19.60 ha x 10 m^3 / mm·ha

Erosion Control Volume (V) = 3622 m^3

Using 40m^3/ha

Extended Detention Volume (V) = 40m^3/ha x Drainage Area (ha)

Extended Detention Volume (V) = 40 m^3/ha 19.60 ha

Extended Detention Volume (V) = 784 m^3

Governing Volume (V) = 3622 m^3

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: J.S.

Permanent Pool and Extended Detention Sizing Southeast Pond

Elevation (m)	Area (m^2)	Area (m^2)	H (m)	Vol (m^3)	Volume (m^3)	Storage (m^3)	Depth (m)	
275.10	2370				0		0	
		3006	1	3006				
276.10	3643				3006		1	
		4305	0.5	2153				
276.60	**4968**				5159	**0**	**1.5**	**N.W.L.**
		5679	0.5	2839				
277.10	6390				7998	2839	2	
		7453	1.50	11180				
278.60	8516				19178	14019	3.50	

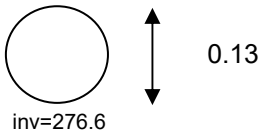
Permanent Pool Volume Required = 3988 m^3
Permanent Pool Volume Provided = 5159 m^3

Extended Detention volume required = 3622 m^3
Extended Detention waterlevel = 277.22 m

CONTROL STRUCTURE SUMMARY
Southeast Pond

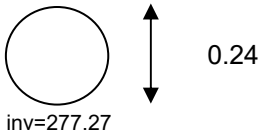
Orifice 1

Invert =	276.60	m
Size =	0.130	m
Orifice Coefficient, C =	0.62	
Obvert =	276.73	m



Orifice 2 (Round Only)

Invert =	277.27	m
Size =	0.240	m
C =	0.62	
Obvert =	277.51	m



OUTFLOW SUMMARY
Southeast Pond

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: J.S.

Starting Water Level (m) = 276.60
Elevation Increment (m) = 0.02

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	4 Year Chicago Storm	12 Hour SCS Type II	24 Hour SCS Type II
276.60	0.000	0.000	276.60	0.000	0	0.0			
276.62	0.000	0.000	276.62	0.000	100	0.0			
276.64	0.001	0.000	276.64	0.001	201	0.0			
276.66	0.002	0.000	276.66	0.002	303	15.9			
276.68	0.004	0.000	276.68	0.004	407	24.3			
276.70	0.007	0.000	276.70	0.007	511	29.4			
276.72	0.009	0.000	276.72	0.009	617	33.2			
276.74	0.010	0.000	276.74	0.010	723	36.4			
276.76	0.011	0.000	276.76	0.011	831	39.3			
276.78	0.012	0.000	276.78	0.012	940	41.8			
276.80	0.013	0.000	276.80	0.013	1050	44.2			
276.82	0.014	0.000	276.82	0.014	1162	46.4			
276.84	0.015	0.000	276.84	0.015	1274	48.5			
276.86	0.016	0.000	276.86	0.016	1388	50.5			
276.88	0.017	0.000	276.88	0.017	1502	52.5			
276.90	0.018	0.000	276.90	0.018	1618	54.3			
276.92	0.018	0.000	276.92	0.018	1735	56.1			
276.94	0.019	0.000	276.94	0.019	1853	57.9			
276.96	0.020	0.000	276.96	0.020	1973	59.6			
276.98	0.020	0.000	276.98	0.020	2093	61.3			
277.00	0.021	0.000	277.00	0.021	2215	62.9			
277.02	0.022	0.000	277.02	0.022	2337	64.5			
277.04	0.022	0.000	277.04	0.022	2461	66.0			
277.06	0.023	0.000	277.06	0.023	2586	67.6			
277.08	0.023	0.000	277.08	0.023	2712	69.1			
277.10	0.024	0.000	277.10	0.024	2839	70.6			
277.12	0.025	0.000	277.12	0.025	2967	72.0			
277.14	0.025	0.000	277.14	0.025	3096	73.5			
277.16	0.026	0.000	277.16	0.026	3225	74.9			
277.18	0.026	0.000	277.18	0.026	3355	76.3			
277.20	0.027	0.000	277.20	0.027	3485	77.6			
277.22	0.027	0.000	277.22	0.027	3616	79.0		EXTENDED DETENTION	
277.24	0.028	0.000	277.24	0.028	3748	80.3			
277.26	0.028	0.000	277.26	0.028	3880	81.6			
277.28	0.029	0.000	277.28	0.029	4013	82.9			
277.30	0.029	0.001	277.30	0.030	4146	84.2			
277.32	0.030	0.003	277.32	0.032	4279	85.4			
277.34	0.030	0.005	277.34	0.035	4414	86.5			
277.36	0.030	0.008	277.36	0.038	4549	87.5			
277.38	0.031	0.011	277.38	0.042	4684	88.5			
277.40	0.031	0.012	277.40	0.044	4820	89.4			
277.42	0.032	0.022	277.42	0.053	4957	90.2	2 Year		
277.44	0.032	0.028	277.44	0.060	5094	90.8			
277.46	0.033	0.033	277.46	0.065	5232	91.4			
277.48	0.033	0.037	277.48	0.070	5370	92.0			
277.50	0.033	0.041	277.50	0.075	5509	92.5		2 Year	
277.52	0.034	0.045	277.52	0.079	5648	93.0			
277.54	0.034	0.048	277.54	0.082	5788	93.5			2 Year
277.56	0.034	0.051	277.56	0.086	5929	94.0			
277.58	0.035	0.054	277.58	0.089	6070	94.4			
277.60	0.035	0.057	277.60	0.092	6212	94.9			
277.62	0.036	0.060	277.62	0.095	6354	95.3			
277.64	0.036	0.062	277.64	0.098	6497	95.7	5 Year		
277.66	0.036	0.065	277.66	0.101	6640	96.1			
277.68	0.037	0.067	277.68	0.104	6784	96.5			
277.70	0.037	0.069	277.70	0.106	6929	96.9			
277.72	0.037	0.071	277.72	0.109	7074	97.3			
277.74	0.038	0.074	277.74	0.111	7219	97.6			
277.76	0.038	0.076	277.76	0.114	7366	98.0		5 Year	
277.78	0.038	0.078	277.78	0.116	7512	98.3			
277.80	0.039	0.080	277.80	0.118	7660	98.7	10 Year		5 Year
277.82	0.039	0.081	277.82	0.121	7808	99.0			
277.84	0.040	0.083	277.84	0.123	7956	99.4			
277.86	0.040	0.085	277.86	0.125	8105	99.7			
277.88	0.040	0.087	277.88	0.127	8255	100.0			
277.90	0.041	0.089	277.90	0.129	8405	100.4			
277.92	0.041	0.090	277.92	0.131	8556	100.7			
277.94	0.041	0.092	277.94	0.133	8707	101.0			
277.96	0.041	0.094	277.96	0.135	8859	101.3	25 Year	10 Year	
277.98	0.042	0.095	277.98	0.137	9011	101.6			
278.00	0.042	0.097	278.00	0.139	9164	101.9			

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: J.S.

OUTFLOW SUMMARY
Southeast Pond

Starting Water Level (m) = 276.60
Elevation Increment (m) = 0.02

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	4 Year Chicago Storm	12 Hour SCS Type II	24 Hour SCS Type II
278.02	0.042	0.099	278.02	0.141	9318	102.2			10 Year
278.04	0.043	0.100	278.04	0.143	9472	102.5			
278.06	0.043	0.102	278.06	0.145	9627	102.8			
278.08	0.043	0.103	278.08	0.147	9782	103.1			
278.10	0.044	0.105	278.10	0.148	9938	103.4			
278.12	0.044	0.106	278.12	0.150	10095	103.7			
278.14	0.044	0.108	278.14	0.152	10252	104.0			
278.16	0.045	0.109	278.16	0.154	10409	104.3		25 Year	
278.18	0.045	0.110	278.18	0.155	10567	104.6	50 Year		
278.20	0.045	0.112	278.20	0.157	10726	104.9			
278.22	0.045	0.113	278.22	0.159	10885	105.1			
278.24	0.046	0.115	278.24	0.160	11045	105.4			25 Year
278.26	0.046	0.116	278.26	0.162	11206	105.7			
278.28	0.046	0.117	278.28	0.164	11366	106.0			
278.30	0.047	0.119	278.30	0.165	11528	106.2	100 Year		
278.32	0.047	0.120	278.32	0.167	11690	106.5			
278.34	0.047	0.121	278.34	0.168	11853	106.8			
278.36	0.047	0.122	278.36	0.170	12016	107.1		50 Year	
278.38	0.048	0.124	278.38	0.171	12180	107.3			
278.40	0.048	0.125	278.40	0.173	12344	107.6			
278.42	0.048	0.126	278.42	0.174	12509	107.9			50 Year
278.44	0.049	0.127	278.44	0.176	12675	108.1			
278.46	0.049	0.129	278.46	0.177	12841	108.4		100 Year	
278.48	0.049	0.130	278.48	0.179	13007	108.6			
278.50	0.049	0.131	278.50	0.180	13175	108.9			100 Year
278.52	0.050	0.132	278.52	0.182	13342	109.2			
278.54	0.050	0.133	278.54	0.183	13511	109.4			
278.56	0.050	0.134	278.56	0.185	13680	109.7			
278.58	0.050	0.136	278.58	0.186	13849	109.9			
278.60	0.051	0.137	278.60	0.187	14019	110.2			

Private On-Site Controls

Extended Detention Sizing
Beechway SWM Tank

Weighted Impervious Calculation

Catchment ID	Total Area	Imperviousness	Impervious Area
	(ha)	(%)	(ha)
2304	3.00	85	2.55
Total	**3.00**	**85**	**2.55**

Extended Detention Sizing
Beechway SWM Tank

EXTENDED DETENTION

Using the 25mm - 4 hour Chicago Storm

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m^3) / (mm)(ha)

Erosion Control Volume (V) = 20.07 mm x 3.00 ha x 10 m^3 / mm·ha

Erosion Control Volume (V) = 602 m^3

Using 40m^3/ha

Extended Detention Volume (V) = 40m^3/ha x Drainage Area (ha)

Extended Detention Volume (V) = 40 m^3/ha 3.00 ha

Extended Detention Volume (V) = 120 m^3

Governing Volume (V) = 602 m^3

Weighted Impervious Calculation

Catchment ID	Total Area	Imperviousness	Impervious Area
	(ha)	(%)	(ha)
2302	3.80	80	3.04
Total	**3.80**	**80**	**3.04**

Extended Detention Sizing
Northmarket SWM Tank

EXTENDED DETENTION

Using the 25mm - 4 hour Chicago Storm

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m^3) / (mm)(ha)

Erosion Control Volume (V) = 17.77 mm x 3.80 ha x 10 m^3 / mm·ha

Erosion Control Volume (V) = 675 m^3

Using 40m^3/ha

Extended Detention Volume (V) = 40m^3/ha x Drainage Area (ha)

Extended Detention Volume (V) = 40 m^3/ha 3.80 ha

Extended Detention Volume (V) = 152 m^3

Governing Volume (V) = 675 m^3

Weighted Impervious Calculation

Catchment ID	Total Area	Imperviousness	Impervious Area
	(ha)	(%)	(ha)
2307	2.02	85	1.72
Total	**2.02**	**85**	**1.72**

Extended Detention Sizing
Rice SWM Tank

EXTENDED DETENTION

Using the 25mm - 4 hour Chicago Storm

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m^3) / (mm)(ha)

Erosion Control Volume (V) = 20.07 mm x 2.02 ha x 10 m^3 / mm·ha

Erosion Control Volume (V) = 405 m^3

Using 40m^3/ha

Extended Detention Volume (V) = 40m^3/ha x Drainage Area (ha)

Extended Detention Volume (V) = 40 m^3/ha 2.02 ha

Extended Detention Volume (V) = 80.8 m^3

Governing Volume (V) = 405 m^3

Stormwater Filter Sizing

SCS consulting group ltd

STANDARD OFFLINE
Jellyfish Filter Sizing Report

Project Information

Date	Saturday, January 4, 2025
Project Name	Yonge St. and Green Lane
Project Number	Unit 2102
Location	East Gwillimbury

Jellyfish Filter Design Overview

This report provides information for the sizing and specification of the Jellyfish Filter. When designed properly in accordance to the guidelines detailed in the Jellyfish Filter Technical Manual, the Jellyfish Filter will exceed the performance and longevity of conventional horizontal bed and granular media filters.

Please see ***www.ImbriumSystems.com*** *for more information.*

Jellyfish Filter System Recommendation

The Jellyfish Filter model JF8-9-2 is recommended to meet the water quality objective by treating a flow of 50.5 L/s, which meets or exceeds 90% of the average annual rainfall runoff volume based on 36 years of BARRIE WPCC rainfall data for this site. This model has a sediment capacity of 569 kg, which meets or exceeds the estimated average annual sediment load.

Jellyfish Model	Number of High-Flo Cartridges	Number of Draindown Cartridges	Manhole Diameter (m)	Treatment Flow Rate (L/s)	Sediment Capacity (kg)
JF8-9-2	9	2	2.4	50.5	569

The Jellyfish Filter System

The patented Jellyfish Filter is an engineered stormwater quality treatment technology featuring unique membrane filtration in a compact stand-alone treatment system that removes a high level and wide variety of stormwater pollutants. Exceptional pollutant removal is achieved at high treatment flow rates with minimal head loss and low maintenance costs. Each lightweight Jellyfish Filter cartridge contains an extraordinarily large amount of membrane surface area, resulting in superior flow capacity and pollutant removal capacity.

Maintenance

Regular scheduled inspections and maintenance is necessary to assure proper functioning of the Jellyfish Filter. The maintenance interval is designed to be a minimum of 12 months, but this will vary depending on site loading conditions and upstream pretreatment measures. Quarterly inspections and inspections after all storms beyond the 5-year event are recommended until enough historical performance data has been logged to comfortably initiate an alternative inspection interval.

Please see ***www.ImbriumSystems.com*** *for more information.*

Thank you for the opportunity to present this information to you and your client.

Performance

Jellyfish efficiently captures a high level of Stormwater pollutants, including:

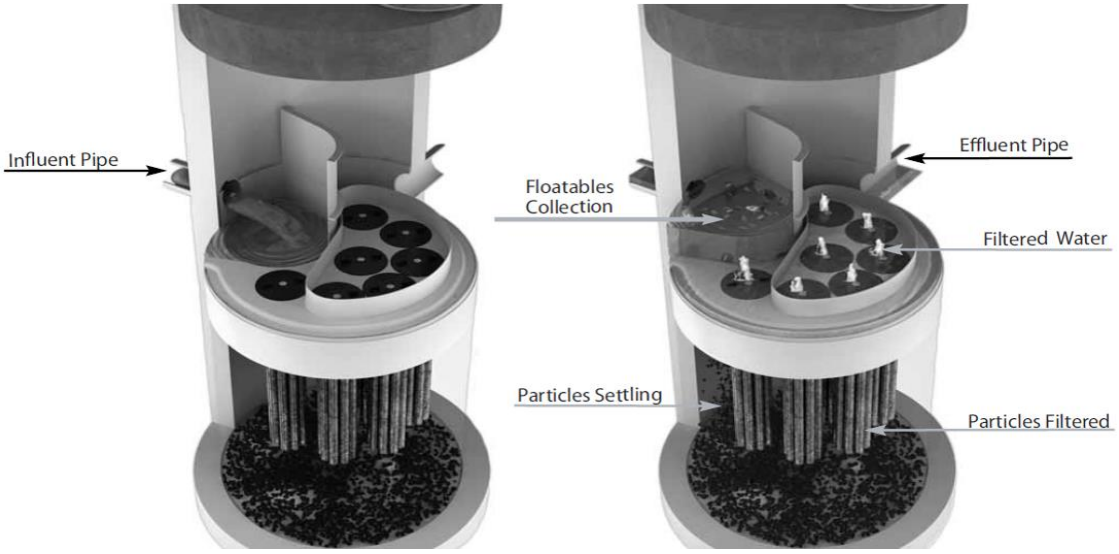
- ☑ 89% of the total suspended solids (TSS) load, including particles less than 5 microns
- ☑ 77% TP removal & 51% TN removal
- ☑ 90% Total Copper, 81% Total Lead, 70% Total Zinc
- ☑ Particulate-bound pollutants such as nutrients, toxic metals, hydrocarbons and bacteria
- ☑ Free oil, Floatable trash and debris

Field Proven Peformance

The Jellyfish filter has been field-tested on an urban site with 25 TAPE qualifying rain events and field monitored according to the TAPE field test protocol, demonstrating:

- A median TSS removal efficiency of 90%, and a median SSC removal of 99%;
- The ability to capture fine particles as indicated by an effluent d50 median of 3 microns for all monitotred storm events, and a median effluent turbidity of 5 NTUs;
- A median Total Phosphorus removal of 77%, and a median Total Nitrogen removal of 51%.

Jellyfish Filter Treatment Functions



Pre-treatment and Membrane Filtration

Jellyfish® Filter

Project Information

Date:	Saturday, January 4, 2025
Project Name:	Yonge St. and Green Lane
Project Number:	Unit 2102
Location:	East Gwillimbury

Designer Information

Company:	SCS Consulting Group Ltd.
Contact:	Hao Yang Yin
Phone #:	

Notes

Rainfall

Name:	BARRIE WPCC
State:	ON
ID:	557
Record:	1968 to 2003
Co-ords:	44°23'N, 79°41'W

Drainage Area

Total Area:	4.47 ha
Imperviousness:	70%

Upstream Detention

Peak Release Rate:	345 L/s
Pretreatment Credit:	0%

Design System Requirements

Flow Loading	90% of the Average Annual Runoff based on 36 years of BARRIE WPCC rainfall data:	**7.1 L/s**
Sediment Loading	Treating 90% of the average annual runoff volume, 9077 m³, with a suspended sediment concentration of 60 mg/L, and 0% removal by upstream detention.	**545 kg***

** Indicates that sediment loading is the limiting parameter in the sizing of this Jellyfish system*

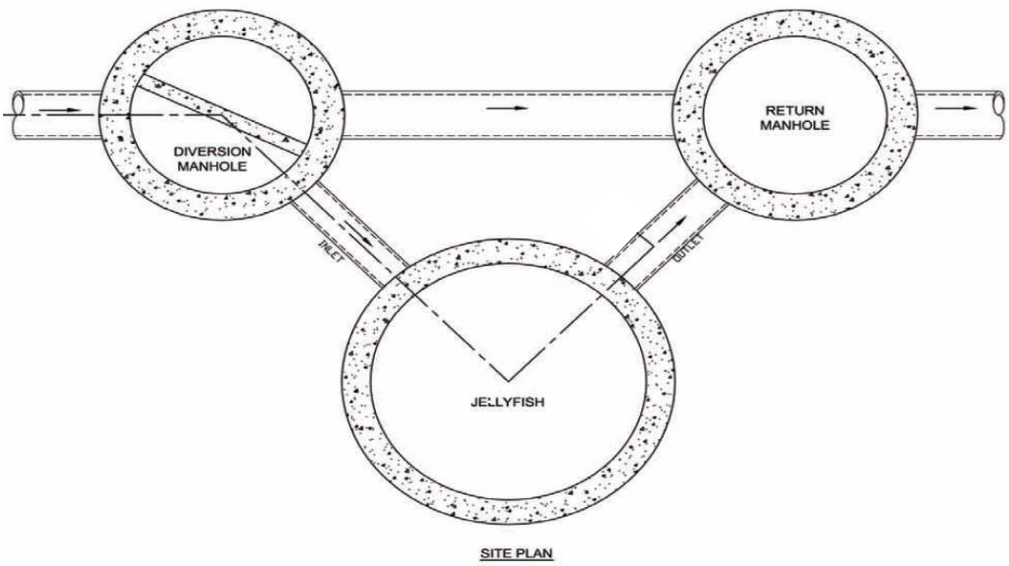
Recommendation

The Jellyfish Filter model JF8-9-2 is recommended to meet the water quality objective by treating a flow of 50.5 L/s, which meets or exceeds 90% of the average annual rainfall runoff volume based on 36 years of BARRIE WPCC rainfall data for this site. This model has a sediment capacity of 569 kg, which meets or exceeds the estimated average annual sediment load.

Jellyfish Model	Number of High-Flo Cartridges	Number of Draindown Cartridges	Manhole Diameter (m)	Wet Vol Below Deck (L)	Sump Storage (m³)	Oil Capacity (L)	Treatment Flow Rate (L/s)	Sediment Capacity (kg)
JF4-1-1	1	1	1.2	2313	0.34	379	7.6	85
JF4-2-1	2	1	1.2	2313	0.34	379	12.6	142
JF6-3-1	3	1	1.8	5205	0.79	848	17.7	199
JF6-4-1	4	1	1.8	5205	0.79	848	22.7	256
JF6-5-1	5	1	1.8	5205	0.79	848	27.8	313
JF6-6-1	6	1	1.8	5205	0.79	848	28.6	370
JF8-6-2	6	2	2.4	9252	1.42	1469	35.3	398
JF8-7-2	7	2	2.4	9252	1.42	1469	40.4	455
JF8-8-2	8	2	2.4	9252	1.42	1469	45.4	512
JF8-9-2	**9**	**2**	**2.4**	**9252**	**1.42**	**1469**	**50.5**	**569**
JF8-10-2	10	2	2.4	9252	1.42	1469	50.5	626
JF10-11-3	11	3	3.0	14456	2.21	2302	63.1	711
JF10-12-3	12	3	3.0	14456	2.21	2302	68.2	768
JF10-12-4	12	4	3.0	14456	2.21	2302	70.7	796
JF10-13-4	13	4	3.0	14456	2.21	2302	75.7	853
JF10-14-4	14	4	3.0	14456	2.21	2302	78.9	910
JF10-15-4	15	4	3.0	14456	2.21	2302	78.9	967
JF10-16-4	16	4	3.0	14456	2.21	2302	78.9	1024
JF10-17-4	17	4	3.0	14456	2.21	2302	78.9	1081
JF10-18-4	18	4	3.0	14456	2.21	2302	78.9	1138
JF10-19-4	19	4	3.0	14456	2.21	2302	78.9	1195
JF12-20-5	20	5	3.6	20820	3.2	2771	113.6	1280
JF12-21-5	21	5	3.6	20820	3.2	2771	113.7	1337
JF12-22-5	22	5	3.6	20820	3.2	2771	113.7	1394
JF12-23-5	23	5	3.6	20820	3.2	2771	113.7	1451
JF12-24-5	24	5	3.6	20820	3.2	2771	113.7	1508
JF12-25-5	25	5	3.6	20820	3.2	2771	113.7	1565
JF12-26-5	26	5	3.6	20820	3.2	2771	113.7	1622
JF12-27-5	27	5	3.6	20820	3.2	2771	113.7	1679

Jellyfish Filter Design Notes

- Typically the Jellyfish Filter is designed in an offline configuration, as all stormwater filter systems will perform for a longer duration between required maintenance services when designed and applied in off-line configurations. Depending on the design parameters, an optional internal bypass may be incorporated into the Jellyfish Filter, however note the inspection and maintenance frequency should be expected to increase above that of an off-line system. Speak to your local representative for more information.



Jellyfish Filter Typical Layout

- Typically, 18 inches (457 mm) of driving head is designed into the system, calculated as the difference in elevation between the top of the diversion structure weir and the invert of the Jellyfish Filter outlet pipe. Alternative driving head values can be designed as 12 to 24 inches (305 to 610mm) depending on specific site requirements, requiring additional sizing and design assistance.
- Typically, the Jellyfish Filter is designed with the inlet pipe configured 6 inches (150 mm) above the outlet invert elevation. However, depending on site parameters this can vary to an optional configuration of the inlet pipe entering the unit below the outlet invert elevation.
- The Jellyfish Filter can accommodate multiple inlet pipes within certain restrictions.
- While the optional inlet below deck configuration offers 0 to 360 degree flexibility between the inlet and outlet pipe, typical systems conform to the following:

Model Diameter (m)	Minimum Angle Inlet / Outlet Pipes	Minimum Inlet Pipe Diameter (mm)	Minimum Outlet Pipe Diameter (mm)
1.2	62º	150	200
1.8	59º	200	250
2.4	**52º**	**250**	**300**
3.0	48º	300	450
3.6	40º	300	450

- The Jellyfish Filter can be built at all depths of cover generally associated with conventional stormwater conveyance systems. For sites that require minimal depth of cover for the stormwater infrastructure, the Jellyfish Filter can be applied in a shallow application using a hatch cover. The general minimum depth of cover is 36 inches (915 mm) from top of the underslab to outlet invert.
- If driving head caclulations account for water elevation during submerged conditions the Jellyfish Filter will function effectively under submerged condtions.
- Jellyfish Filter systems may incorporate grated inlets depending on system configuration.
- For sites with water quality treatment flow rates or mass loadings that exceed the design flow rate of the largest standard Jellyfish Filter manhole models, systems can be designed that hydraulically connect multiple Jellyfish Filters in series or alternatively Jellyfish Vault units can be designed.

STANDARD SPECIFICATION
STORMWATER QUALITY – MEMBRANE FILTRATION TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

Specifies requirements for construction and performance of an underground stormwater quality membrane filtration treatment device that removes pollutants from stormwater runoff through the unit operations of sedimentation, floatation, and membrane filtration.

1.2 REFERENCE STANDARDS

ASTM C 891: Specification for Installation of Underground Precast Concrete Utility Structures
ASTM C 478: Specification for Precast Reinforced Concrete Manhole Sections
ASTM C 443: Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM D 4101: Specification for Copolymer steps construction

CAN/CSA-A257.4-M92
Joints for Circular Concrete Sewer and Culvert Pipe, Manhole Sections and Fittings Using Rubber Gaskets

CAN/CSA-A257.4-M92
Precast Reinforced Circular Concrete Manhole Sections, Catch Basins and Fittings

Canadian Highway Bridge Design Code

1.3 SHOP DRAWINGS

Shop drawings for the structure and performance are to be submitted with each order to the contractor. Contractor shall forward shop drawing submittal to the consulting engineer for approval. Shop drawings are to detail the structure's precast concrete and call out or note the fiberglass (FRP) internals/components.

1.4 PRODUCT SUBSTITUTIONS

No product substitutions shall be accepted unless submitted 10 days prior to project bid date, or as directed by the engineer of record. Submissions for substitutions require review and approval by the Engineer of Record, for hydraulic performance, impact to project designs, equivalent treatment performance, and any required project plan and report (hydrology/hydraulic, water quality, stormwater pollution) modifications that would be required by the approving jurisdictions/agencies. Contractor to coordinate with the Engineer of Record any applicable modifications to the project estimates of cost, bonding amount determinations, plan check fees for changes to approved documents, and/or any other regulatory requirements resulting from the product substitution.

1.5 HANDLING AND STORAGE

Prevent damage to materials during storage and handling.

PART 2 – PRODUCTS

2.1 GENERAL

2.1.1 The device shall be a cylindrical or rectangular, all concrete structure (including risers), constructed from precast concrete riser and slab components or monolithic precast structure(s), installed to conform to ASTM C 891 and to any required state highway, municipal or local specifications; whichever is more stringent. The device shall be watertight.

2.1.2 Cartridge Deck The cylindrical concrete device shall include a fiberglass deck. The rectangular concrete device shall include a coated aluminum deck. In either instance, the insert shall be bolted and sealed watertight inside the precast concrete chamber. The deck shall serve as: (a) a horizontal divider between the lower treatment zone and the upper treated effluent zone; (b) a deck for attachment of filter cartridges such that the membrane filter elements of each cartridge extend into the lower treatment zone; (c) a platform for maintenance workers to service the filter cartridges (maximum manned weight = 450 pounds (204 kg)); (d) a conduit for conveyance of treated water to the effluent pipe.

2.1.3 Membrane Filter Cartridges Filter cartridges shall be comprised of reusable cylindrical membrane filter elements connected to a perforated head plate. The number of membrane filter elements per cartridge shall be a minimum of eleven 2.75-inch (70-mm) diameter elements. The length of each filter element shall be a minimum 15 inches (381 mm). Each cartridge shall be fitted into the cartridge deck by insertion into a cartridge receptacle that is permanently mounted into the cartridge deck. Each cartridge shall be secured by a cartridge lid that is threaded onto the receptacle, or similar mechanism to secure the cartridge into the deck. The maximum treatment flow rate of a filter cartridge shall be controlled by an orifice in the cartridge lid, or on the individual cartridge itself, and based on a design flux rate (surface loading rate) determined by the maximum treatment flow rate per unit of filtration membrane surface area. The maximum design flux rate shall be 0.21 gpm/ft² (0.142 lps/m²).

Each membrane filter cartridge shall allow for manual installation and removal. Each filter cartridge shall have filtration membrane surface area and dry installation weight as follows (if length of filter cartridge is between those listed below, the surface area and weight shall be proportionate to the next length shorter and next length longer as shown below):

Filter Cartridge Length (in / mm)	Minimum Filtration Membrane Surface Area (ft2 / m2)	Maximum Filter Cartridge Dry Weight (lbs / kg)
15	106 / 9.8	10.5 / 4.8
27	190 / 17.7	15.0 / 6.8
40	282 / 26.2	20.5 / 9.3
54	381 / 35.4	25.5 / 11.6

2.1.4 Backwashing Cartridges The filter device shall have a weir extending above the cartridge deck, or other mechanism, that encloses the high flow rate filter cartridges when placed in their respective cartridge receptacles within the cartridge deck. The weir, or other mechanism, shall collect a pool of filtered water during inflow events that backwashes the high flow rate cartridges when the inflow

event subsides. All filter cartridges and membranes shall be reusable and allow for the use of filtration membrane rinsing procedures to restore flow capacity and sediment capacity; extending cartridge service life.

2.1.5 Maintenance Access to Captured Pollutants The filter device shall contain an opening(s) that provides maintenance access for removal of accumulated floatable pollutants and sediment, removal of and replacement of filter cartridges, cleaning of the sump, and rinsing of the deck. Access shall have a minimum clear vertical clear space over all of the filter cartridges. Filter cartridges shall be able to be lifted straight vertically out of the receptacles and deck for the entire length of the cartridge.

2.1.6 Bend Structure The device shall be able to be used as a bend structure with minimum angles between inlet and outlet pipes of 90-degrees or less in the stormwater conveyance system.

2.1.7 Double-Wall Containment of Hydrocarbons The cylindrical precast concrete device shall provide double-wall containment for hydrocarbon spill capture by a combined means of an inner wall of fiberglass, to a minimum depth of 12 inches (305 mm) below the cartridge deck, and the precast vessel wall.

2.1.8 Baffle The filter device shall provide a baffle that extends from the underside of the cartridge deck to a minimum length equal to the length of the membrane filter elements. The baffle shall serve to protect the membrane filter elements from contamination by floatables and coarse sediment. The baffle shall be flexible and continuous in cylindrical configurations, and shall be a straight concrete or aluminum wall in rectangular configurations.

2.1.9 Sump The device shall include a minimum 24 inches (610 mm) of sump below the bottom of the cartridges for sediment accumulation, unless otherwise specified by the design engineer. Depths less than 24 inches may have an impact on the total performance and/or longevity between cartridge maintenance/replacement of the device.

2.2 PRECAST CONCRETE SECTIONS

All precast concrete components shall be manufactured to a minimum live load of HS-20 truck loading or greater based on local regulatory specifications, unless otherwise modified or specified by the design engineer, and shall be watertight.

2.3 JOINTS All precast concrete manhole configuration joints shall use nitrile rubber gaskets and shall meet the requirements of ASTM C443, Specification C1619, Class D or engineer approved equal to ensure oil resistance. Mastic sealants or butyl tape are not an acceptable alternative.

2.4 GASKETS Only profile neoprene or nitrile rubber gaskets in accordance to CSA A257.3-M92 will be accepted. Mastic sealants, butyl tape or Conseal CS-101 are not acceptable gasket materials.

2.5 FRAME AND COVER Frame and covers must be manufactured from cast-iron or other composite material tested to withstand H-20 or greater design loads, and as approved by the

local regulatory body. Frames and covers must be embossed with the name of the device manufacturer or the device brand name.

2.6 DOORS AND HATCHES If provided shall meet designated loading requirements or at a minimum for incidental vehicular traffic.

2.7 CONCRETE All concrete components shall be manufactured according to local specifications and shall meet the requirements of ASTM C 478.

2.8 FIBERGLASS The fiberglass portion of the filter device shall be constructed in accordance with the following standard: ASTM D-4097: Contact Molded Glass Fiber Reinforced Chemical Resistant Tanks.

2.9 STEPS Steps shall be constructed according to ASTM D4101 of copolymer polypropylene, and be driven into preformed or pre-drilled holes after the concrete has cured, installed to conform to applicable sections of state, provincial and municipal building codes, highway, municipal or local specifications for the construction of such devices.

2.10 INSPECTION All precast concrete sections shall be inspected to ensure that dimensions, appearance and quality of the product meet local municipal specifications and ASTM C 478.

PART 3 – PERFORMANCE

3.1 GENERAL

3.1.1 Verification – The stormwater quality filter must be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV).

3.1.2 Function - The stormwater quality filter treatment device shall function to remove pollutants by the following unit treatment processes; sedimentation, floatation, and membrane filtration.

3.1.3 Pollutants - The stormwater quality filter treatment device shall remove oil, debris, trash, coarse and fine particulates, particulate-bound pollutants, metals and nutrients from stormwater during runoff events.

3.1.4 Bypass - The stormwater quality filter treatment device shall typically utilize an external bypass to divert excessive flows. Internal bypass systems shall be equipped with a floatables baffle, and must avoid passage through the sump and/or cartridge filtration zone.

3.1.5 Treatment Flux Rate (Surface Loading Rate) – The stormwater quality filter treatment device shall treat 100% of the required water quality treatment flow based on a maximum design treatment flux rate (surface loading rate) across the membrane filter cartridges of 0.21 gpm/ft^2 (0.142 lps/m^2).

3.2 FIELD TEST PERFORMANCE

At a minimum, the stormwater quality filter device shall have been field tested and verified with a minimum 25 TARP qualifying storm events and field monitoring shall have been conducted according to the TARP 2009 NJDEP TARP field test protocol, and have received NJCAT verification.

3.2.1 Suspended Solids Removal - The stormwater quality filter treatment device shall have demonstrated a minimum median TSS removal efficiency of 85% and a minimum median SSC removal efficiency of 95%.

3.2.2 Runoff Volume – The stormwater quality filter treatment device shall be engineered, designed, and sized to treat a minimum of 90 percent of the annual runoff volume determined from use of a minimum 15-year rainfall data set.

3.2.3 Fine Particle Removal - The stormwater quality filter treatment device shall have demonstrated the ability to capture fine particles as indicated by a minimum median removal efficiency of 75% for the particle fraction less than 25 microns, an effluent d_{50} of 15 microns or lower for all monitored storm events.

3.2.4 Turbidity Reduction - The stormwater quality filter treatment device shall have demonstrated the ability to reduce the turbidity from influent from a range of 5 to 171 NTU to an effluent turbidity of 15 NTU or lower.

3.2.5 Nutrient (Total Phosphorus & Total Nitrogen) Removal - The stormwater quality filter treatment device shall have demonstrated a minimum median Total Phosphorus removal of 55%, and a minimum median Total Nitrogen removal of 50%.

3.2.6 Metals (Total Zinc & Total Copper) Removal - The stormwater quality filter treatment device shall have demonstrated a minimum median Total Zinc removal of 55%, and a minimum median Total Copper removal of 85%.

3.3 INSPECTION and MAINTENANCE

The stormwater quality filter device shall have the following features:

3.3.1 Durability of membranes are subject to good handling practices during inspection and maintenance (removal, rinsing, and reinsertion) events, and site specific conditions that may have heavier or lighter loading onto the cartridges, and pollutant variability that may impact the membrane structural integrity. Membrane maintenance and replacement shall be in accordance with manufacturer's recommendations.

3.3.2 Inspection which includes trash and floatables collection, sediment depth determination, and visible determination of backwash pool depth shall be easily conducted from grade (outside the structure).

3.3.3 Manual rinsing of the reusable filter cartridges shall promote restoration of the flow capacity and sediment capacity of the filter cartridges, extending cartridge service life.

3.3.4 The filter device shall have a minimum 12 inches (305 mm) of sediment storage depth, and a minimum of 12 inches between the top of the sediment storage and bottom of the filter cartridge tentacles, unless otherwise specified by the design engineer. Variances may have an impact on the total performance and/or longevity between cartridge maintenance/replacement of the device.

3.3.5 Sediment removal from the filter treatment device shall be able to be conducted using a standard maintenance truck and vacuum apparatus, and a minimum one point of entry to the sump that is unobstructed by filter cartridges.

3.3.6 Maintenance access shall have a minimum clear height that provides suitable vertical clear space over all of the filter cartridges. Filter cartridges shall be able to be lifted straight vertically out of the receptacles and deck for the entire length of the cartridge.

3.3.7 Filter cartridges shall be able to be maintained without the requirement of additional lifting equipment.

PART 4 – EXECUTION

4.1 INSTALLATION

4.1.1 PRECAST DEVICE CONSTRUCTION SEQUENCE

The installation of a watertight precast concrete device should conform to ASTM C 891 and to any state highway, municipal or local specifications for the construction of manholes, whichever is more stringent. Selected sections of a general specification that are applicable are summarized below.

4.1.1.1 The watertight precast concrete device is installed in sections in the following sequence:

- aggregate base
- base slab
- treatment chamber and cartridge deck riser section(s)
- bypass section
- connect inlet and outlet pipes
- concrete riser section(s) and/or transition slab (if required)
- maintenance riser section(s) (if required)
- frame and access cover

4.1.2 The precast base should be placed level at the specified grade. The entire base should be in contact with the underlying compacted granular material. Subsequent sections, complete with joint seals, should be installed in accordance with the precast concrete manufacturer's recommendations.

4.1.3 Adjustment of the stormwater quality treatment device can be performed by lifting the upper sections free of the excavated area, re-leveling the base, and re-installing the sections. Damaged sections and gaskets should be repaired or replaced as necessary to restore original condition and watertight seals. Once the stormwater quality treatment device has been constructed, any/all lift holes must be plugged watertight with mortar or non-shrink grout.

4.1.4 Inlet and Outlet Pipes Inlet and outlet pipes should be securely set into the device using approved pipe seals (flexible boot connections, where applicable) so that the structure is watertight, and such that any pipe intrusion into the device does not impact the device functionality.

4.1.5 Frame and Cover Installation Adjustment units (e.g. grade rings) should be installed to set the frame and cover at the required elevation. The adjustment units should be laid in a full bed of mortar with successive units being joined using sealant recommended by the manufacturer. Frames for the cover should be set in a full bed of mortar at the elevation specified.

4.2 MAINTENANCE ACCESS WALL
In some instances the Maintenance Access Wall, if provided, shall require an extension attachment and sealing to the precast wall and cartridge deck at the job site, rather than at the precast facility. In this instance, installation of these components shall be performed according to instructions provided by the manufacturer.

4.3 FILTER CARTRIDGE INSTALLATION Filter cartridges shall be installed in the cartridge deck only after the construction site is fully stabilized and in accordance with the manufacturer's guidelines and recommendations. Contractor to contact the manufacturer to schedule cartridge delivery and review procedures/requirements to be completed to the device prior to installation of the cartridges and activation of the system.

PART 5 – QUALITY ASSURANCE

5.1 FILTER CARTRIDGE INSTALLATION Manufacturer shall coordinate delivery of filter cartridges and other internal components with contractor. Filter cartridges shall be delivered and installed complete after site is stabilized and unit is ready to accept cartridges. Unit is ready to accept cartridges after is has been cleaned out and any standing water, debris, and other materials have been removed. Contractor shall take appropriate action to protect the filter cartridge receptacles and filter cartridges from damage during construction, and in accordance with the manufacturer's recommendations and guidance. For systems with cartridges installed prior to full site stabilization and prior to system activation, the contractor can plug inlet and outlet pipes to prevent stormwater and other influent from entering the device. Plugs must be removed during the activation process.

5.2 INSPECTION AND MAINTENANCE

5.2.1 The manufacturer shall provide an Owner's Manual upon request.

5.2.2 After construction and installation, and during operation, the device shall be inspected and cleaned as necessary based on the manufacturer's recommended inspection and maintenance guidelines and the local regulatory agency/body.

5.3 REPLACEMENT FILTER CARTRIDGES When replacement membrane filter elements and/or other parts are required, only membrane filter elements and parts approved by the manufacturer for use with the stormwater quality filter device shall be installed.

END OF SECTION

STANDARD PERFORMANCE SPECIFICATION
STORMWATER QUALITY – MEMBRANE FILTRATION TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground stormwater quality membrane filtration treatment device that removes pollutants from stormwater runoff through the unit operations of sedimentation, floatation, and membrane filtration.

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental Management – Environmental Technology Verification (ETV)

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: filtration surface area, treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, filtration treatment device product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 GENERAL

2.1.1 Maintenance Access to Captured Pollutants The filter device shall contain an opening(s) that provides maintenance access for removal of accumulated floatable pollutants and sediment, removal of and replacement of filter cartridges, cleaning of the sump, and rinsing of the internal components. Access shall have a minimum clear vertical clear space over all of the filter cartridges. Filter cartridges shall be able to be lifted straight vertically out of their installed placement for the entire length of the cartridge.

2.1.2 Pollutant Storage: The Filter device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants.

PART 3 – PERFORMANCE

3.1 GENERAL

3.1.1 Verification – The stormwater quality filter treatment device shall have been field tested in accordance with either TARP Tier II Protocol (TARP, 2003) and New Jersey Tier II Stormwater Test Requirements – Amendments to TARP Tier II Protocol (NJDEP, 2009) or Washington State Technology Assessment Protocol – Ecology (TAPE), 2011 or later version. The field test shall have been verified in accordance with ISO 14034:2016 Environmental Management – Environmental Technology Verification (ETV). See Section 3.2 of this specification for field test performance requirements.

3.2 FIELD TEST PERFORMANCE

The field test (as specified in section 3.1.1)shall have monitored a minimum of twenty (20) TARP or TAPE qualifying storm events, and report at **minimum** the following results:

3.2.1 Suspended Solids Removal - The stormwater quality filter treatment device shall have ISO 14034 ETV verified load based median TSS removal efficiency of at least 85% and load based median SSC removal efficiency of at least 98%.

3.2.2 Runoff Volume – The stormwater quality filter treatment device shall be engineered, designed, and sized to treat a minimum of 90 percent of the annual runoff volume determined from use of a minimum 15-year rainfall data set.

3.2.3 Fine Particle Removal - The stormwater quality filter treatment device shall have demonstrated the ability to capture fine particles as indicated by a minimum median removal efficiency of 75% for the particle fraction less than 25 microns, and an effluent d_{50} of 15 microns or lower for all monitored storm events.

3.2.4 Turbidity Reduction - The stormwater quality filter treatment device shall have demonstrated the ability to reduce turbidity such that effluent turbidity is 15 NTU or lower.

3.2.5 Nutrients & Metals – The stormwater quality filter treatment device shall have ISO 14034 ETV Verified minimum load based removal efficiencies for the following:

3.2.5.1 Total Phosphorus (TP) Removal - Median TP removal efficiency of at least 49%.

3.2.5.2 Total Nitrogen (TN) Removal - Median TN removal efficiency of at least 39%.

3.2.5.3 Total Zinc (Zn) Removal - Median Zn removal efficiency of at least 69%.

3.2.5.4 Total Copper (Cu) Removal - Median Cu removal efficiency of at least 91%.

END OF SECTION

Volume Control Calculations

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Required LID Treatment Volumes

Impervious =	50	%
Drainage Area (Entire Site)=	117.76	ha

Volume Control Volume

	Minimum		Target
Required Depth of Retention (mm) =	5	12.5	25
Impervious Area (ha) =	58.93	58.93	58.93
Required Volume Control Volume (m^3) =	**2946.4**	**7365.9**	**14731.8**

Appendix F Phosphorus Budget

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Existing Phosphorus Budget

Watershed East Holland River
West Holland River

Land Cover	TP Loading (kg/ha/yr)	Area (ha)	TP Loading (kg/yr)
Cropland	0.36	92.72	33.38
Forest	0.10	4.21	0.42
Golf Course	0.24	7.90	1.90
High Intensity Commercial Development	1.82	1.33	2.42
Low intensity Development	0.13	5.21	0.68
Pasture	0.12	5.28	0.63
Wetland	0.10	1.11	0.11
TOTAL		117.76	39.54

Subwatershed	Phosphorus Export (kg/ha/yr)											
	Cropland	Hay-Pasture	Sod Farm/Golf Course	High Intensity Development		Low Intensity Development	Quarry	Unpaved Road	Forest	Transition	Wetland	Open Water
				Commercial /Industrial	Residential							
Monitored Subwatersheds												
Beaver River	0.22	0.04	0.01	1.82	1.32	0.19	0.06	0.83	0.02	0.04	0.02	0.26
Black River	0.23	0.08	0.02	1.82	1.32	0.17	0.15	0.83	0.05	0.06	0.04	0.26
East Holland River	0.36	0.12	0.24	1.82	1.32	0.13	0.08	0.83	0.10	0.16	0.10	0.26
Hawkestone Creek	0.19	0.10	0.06	1.82	1.32	0.09	0.10	0.83	0.03	0.04	0.03	0.26
Lovers Creek	0.16	0.07	0.17	1.82	1.32	0.07	0.06	0.83	0.06	0.06	0.05	0.26
Pefferlaw/Uxbridge Brook	0.11	0.06	0.02	1.82	1.32	0.13	0.04	0.83	0.03	0.04	0.04	0.26
Whites Creek	0.23	0.10	0.42	1.82	1.32	0.15	0.08	0.83	0.10	0.11	0.09	0.26
Unmonitored Subwatersheds												
Barrie Creeks	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
GeorginaCreeks	0.36	0.12	0.24	1.82	1.32	0.13	0.08	0.83	0.10	0.16	0.10	0.26
Hewitts Creek	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Innisfil Creeks	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Maskinonge River	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Oro Creeks North	0.36	0.12	0.24	1.82	1.32	0.13	0.08	0.83	0.10	0.16	0.10	0.26
Oro Creeks South	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Ramara Creeks	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Talbot/Upper Talbot River	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
West Holland River	0.36	0.12	0.24	1.82	1.32	0.13	0.08	0.83	0.10	0.16	0.10	0.26

Proposed Conditions Phosphorus Budget

Watershed: East Holland River
West Holland River

Description	Land Cover	TP Loading (kg/ha/yr)	Area (ha)	TP Loading (kg/yr)	BMP #1 BMP	BMP #1 TP Removal Rate (%)	BMP #1 TP Export (kg/yr)	BMP #2 BMP	BMP #2 TP Removal Rate (%)	BMP #2 TP Export (kg/yr)	Combined Removal Efficiency	Unmitigated P_{load} (kg/year)	Mitigated P_{load} (kg/year)
Commercial - No Treatment	High Intensity Dev. - Commercial/Industrial	1.82	0.89	1.62	None	0%	1.62	None	0%	1.62	0%	1.62	1.62
Residential - No Treatment	High Intensity Dev. - Residential	1.32	2.68	3.54	None	0%	3.54	None	0%	3.54	0%	3.54	3.54
Residential - Wet Detention Pond	High Intensity Dev. - Residential	1.32	83.96	110.83	Wet Detention Ponds	63%	41.01	None	0%	41.01	63%	110.83	41.01
Residential - Underground Storage + Filter	High Intensity Dev. - Residential	1.32	11.95	15.77	Underground Storage	25%	11.83	Jellyfish Filter	59%	4.85	69%	15.77	4.85
Commercial - Wet Detention Ponds	High Intensity Dev. - Commercial/Industrial	1.82	12.46	22.68	Wet Detention Ponds	63%	8.39	None	0%	8.39	63%	22.68	8.39
Commercial - Underground Storage + Filter	High Intensity Dev. - Commercial/Industrial	1.82	2.02	3.68	Underground Storage	25%	2.76	Jellyfish Filter	59%	1.13	69%	3.68	1.13
Transitional	Transitional	0.16	2.91	0.47	None	0%	0.47	None	0%	0.47	0%	0.47	0.47
Wetland	Wetland	0.10	0.88	0.09	None	0%	0.09	None	0%	0.09	0%	0.09	0.09
		Total	117.75								**Total**	158.67	61.09
												Removal Rate	**61%**

Subwatershed	Phosphorus Export (kg/ha/yr)											
	Cropland	Hay-Pasture	Sod Farm/Golf Course	High Intensity Development: Commercial /Industrial	High Intensity Development: Residential	Low Intensity Development	Quarry	Unpaved Road	Forest	Transition	Wetland	Open Water
Monitored Subwatersheds												
Beaver River	0.22	0.04	0.01	1.82	1.32	0.19	0.06	0.83	0.02	0.04	0.02	0.26
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East Holland River	0.36	0.12	0.24	1.82	1.32	0.13	0.08	0.83	0.10	0.16	0.10	0.26
Hawkestone Creek	0.19	0.10	0.06	1.82	1.32	0.09	0.10	0.83	0.03	0.04	0.03	0.26
Lovers Creek	0.16	0.07	0.17	1.82	1.32	0.07	0.06	0.83	0.06	0.06	0.05	0.26
Pefferlaw/Uxbridge Brook	0.11	0.06	0.02	1.82	1.32	0.13	0.04	0.83	0.03	0.04	0.04	0.26
Whites Creek	0.23	0.10	0.42	1.82	1.32	0.15	0.08	0.83	0.10	0.11	0.09	0.26
Unmonitored Subwatersheds												
Barrie Creeks	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
GeorginaCreeks	0.36	0.12	0.24	1.82	1.32	0.13	0.08	0.83	0.10	0.16	0.10	0.26
Hewitts Creek	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Innisfil Creeks	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
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Oro Creeks North	0.36	0.12	0.24	1.82	1.32	0.13	0.08	0.83	0.10	0.16	0.10	0.26
Oro Creeks South	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Ramara Creeks	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Talbot/Upper Talbot River	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
West Holland River	0.36	0.12	0.24	1.82	1.32	0.13	0.08	0.83	0.10	0.16	0.10	0.26

Appendix G Sanitary Flow Demand

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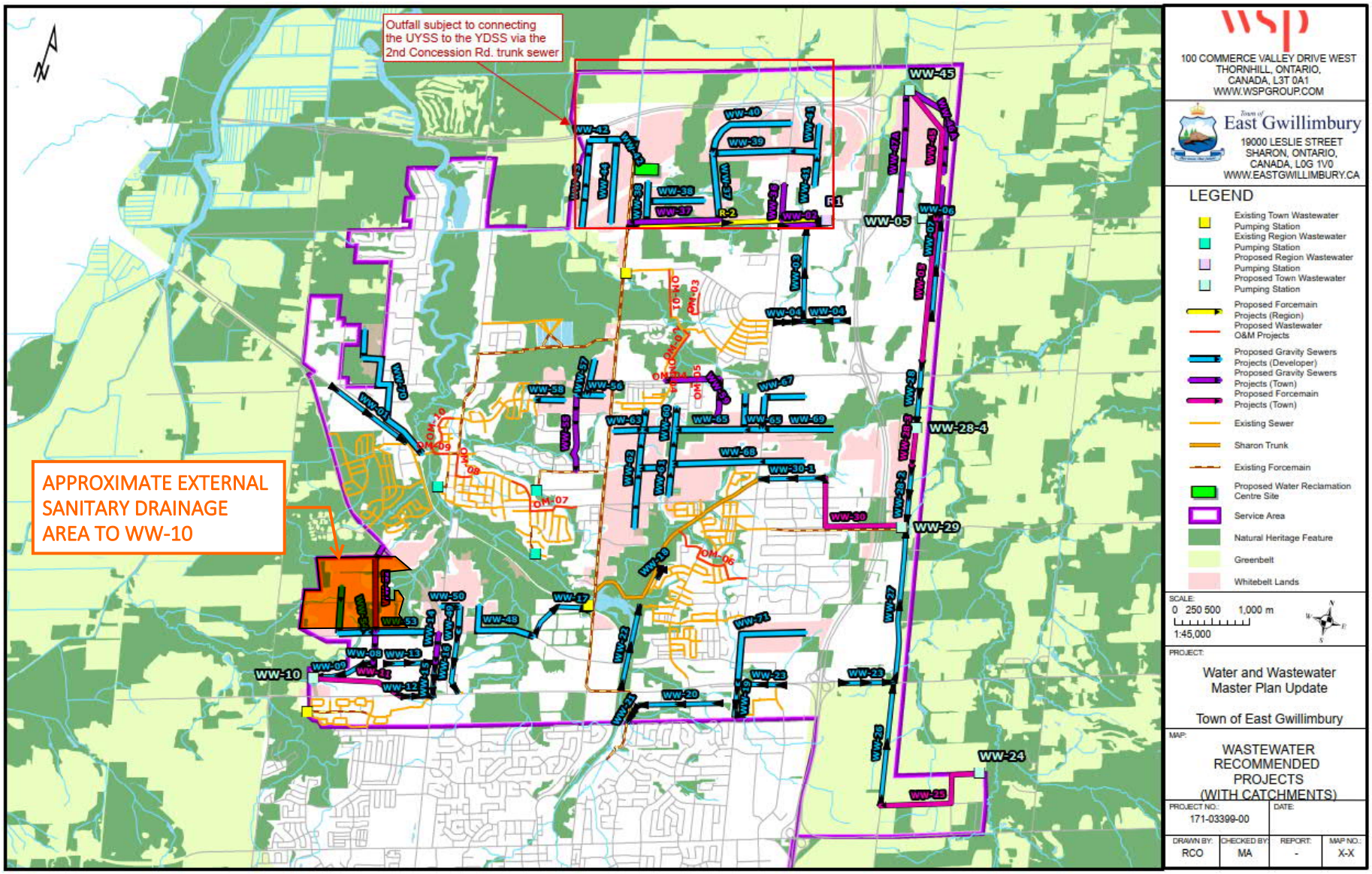

Figure 5-23 Wastewater Capital Projects in the CGA

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

SANITARY FLOW CALCULATIONS
CATCHMENT 201F

	No. of Units	PPU	Population
Single Family Dwelling	448	3.36	1505.28
Townhouse	457	2.78	1270.46
B2B Townhouse	386	2.78	1073.08
Apartments	113	1.76	198.88
Total			4047.70

Peaking Factor 2.00

	Area (ha)	Infiltration Rate (L/s/ha)	Flow (L/s)
Tributary Area	63.39	0.286	18.13

Domestic Flow (L/s) **50.92 L/s**

	Area (ha)	Flow Rate (L/ha/d)	Flow (L/s)
Institutional	2.42	18000	0.50

Total Sanitary Demand **51.43 L/s**

Northwest Yonge and Green Lane
Project Number: 2300
Date: February 2025
Designer Initials: H.Y.

SANITARY FLOW CALCULATIONS
CATCHMENT 201G

	No. of Units	PPU	Population
Single Family Dwelling	104	3.36	349.44
Townhouse	538	2.78	1495.64
B2B Townhouse	318	2.78	884.04
Apartments	4873	1.76	8576.48
Total			**11305.60**

Peaking Factor			2.00

	Area (ha)	Infiltration Rate (L/s/ha)	Flow (L/s)
Tributary Area	54.37	0.286	15.55

Domestic Flow (L/s) **107.15 L/s**

	Area (ha)	Flow Rate (L/ha/d)	Flow (L/s)
Commercial	11.74	28000	3.81

	Area (ha)	Flow Rate (L/ha/d)	Flow (L/s)
Institutional	2.45	18000	0.51

Total Sanitary Demand **111.46 L/s**

Appendix H Preliminary Water Distribution Modeling

SCS consulting group ltd

Municipal Engineering Solutions

February 6, 2025 Project No. 17002-193

Sent via email
Northwest Yonge Green Lane Landowners Group Inc.
c/o Loopstra Nixon LLP
Attn: Mr. Daniel Steinberg
130 Adelaide Street West. Suite 2800
Toronto. ON M5H 3P5

Subject: North West Green Lane Development
Preliminary Water Distribution Modeling
Town of East Gwillimbury, Region of York

Dear Mr. Steinberg,

We are pleased to submit our report entitled "North West Green Lane Development Preliminary Watermain Analysis" outlining the results of our preliminary water distribution analysis for the proposed development in the Town of East Gwillimbury, Region of York.

A WaterCAD model of the immediate area was developed utilizing the design information provided to Municipal Engineering Solutions and information received from the Region of York. The findings of our analysis are summarized in the following report.

We trust you find this report satisfactory. Should you have any questions or require further clarification, please call.

Yours truly,

Municipal Engineering Solutions

Kristin St-Jean, P.Eng.

/KS

File Location: C:\Users\krist\Documents\Projects\17002-193 NW Green Lane, East Gwilimbury\5.0 Report\2025 02 Update\17002-193 North West Green Lane Development Preliminary Watermain Analysis_20250206.docx

55 Gilbank Drive, Aurora, Ontario L4G 6H9

Tel: 905.726.1016 Cell: 416.434.0186 Fax: 905.726.1225

NORTH WEST GREEN LANE DEVELOPMENT

PRELIMINARY WATERMAIN ANALYSIS

PREPARED BY:

MUNICIPAL ENGINEERING SOLUTIONS

FOR:

2712103 ONTARIO INC.
February 2025

Project Number: 17002-193

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Section 1 – INTRODUCTION

Municipal Engineering Solutions ("MES") was retained by the Northwest Yonge Green Lane Landowners Group Inc. to conduct a hydraulic water analysis for the proposed development located north of Green Lane West and west of Yonge Street in the Town of East Gwillimbury (Region of York). As part of this hydraulic assessment MES was requested to undertake the following:

1. Calculate/verify water demands for the proposed development using Town of East Gwillimbury, provincial and industry design standards;
2. Add the subject watermains/development to the development water model;
3. Run the model to determine the feasibility of achieving service criteria during Average Day, Peak Hour, Minimum Hour and fire flow during Maximum Day demand; and
4. Prepare a Report summarizing the modeling results for agency review and design purposes.

1.1 Development Background

The development site is located on the north west corner of Yonge Street and Green Lane West in the Town of East Gwillimbury. The proposed development is made up of 6,986 residential units, over 20 Ha of commercial areas, and two schools. The breakdown of the units for each development area is shown in **Appendix A**. The proposed development is shown below on **Figure 1**. The development will be built in two phases.

Figure 1 – Proposed North West Green Lane Development

Section 2 – WATERMAIN DESIGN CRITERIA

The design criteria utilized to estimate the water demands for the hydraulic water model follows general industry standards and is calculated using the design criteria and guidelines outlined in the Town of East Gwillimbury Design Criteria and the Ministry of the Environment, Conservation and Parks (MECP) Watermain Design Criteria.

The following sections summarize the specific design criteria used to carry out the hydraulic watermain assessment for this development.

2.1 Equivalent Population Densities & Water Design Factors

To calculate the equivalent population and water design factors for this development MES used Town of East Gwillimbury standard demand rates as noted in the *Engineering Standards and Design Criteria (September 2012)*. The two elementary schools were estimated to have a population of 500 people each. **Table 1** summarizes the average daily demand and peaking factors used for this analysis.

Table 1 - Water Design Factors

Type of Development	Average Daily Demand	Maximum Daily Demand Peaking Factor	Peak Hourly Demand Peaking Factor	Minimum Hourly Demand Peaking Factor
Residential	350 L/capita/day	2.0	2.75	0.65 *
Institutional	420 L/capita/day *	2.0	2.75	0.65 *
Industrial	35,000 L/Ha/day	2.0	2.75	0.65 *
Commercial	28,000 L/Ha/day	2.0	2.75	0.65 *

Source: Town of East Gwillimbury Engineering Standards and Design Criteria, Sept 2012
* From MECP Design Guidelines for Drinking-Water Systems, 2008

Section 3 –FLOW DEMANDS

Utilizing the demand criteria and the Average Day, Maximum Day, Peak Hour and Minimum Hour peaking factors from Table 1 the water demands for this development were calculated.

3.1 Equivalent Population Flow Demands

The calculated demands for the development are summarized in **Table 2**. These water demands are based on typical commercial water usage by land area. Water demands must be re-calculated at the detailed design stage for the individual mixed-use and commercial sites. For additional details on the development water demands and assigned demand nodes used in the water model see **Appendix A**. The water demands include an additional 120 units (by others) at the intersection of Yonge Street and Green Lane West.

Table 2 – Water Demand for the North West Green Lane Development

	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)	Minimum Hour Demand (L/s)
Development	71.29	142.56	196.02	46.31

3.2 Fire Flow Demands

The minimum fire flow requirements for this development were taken from the Town of East Gwillimbury *'2023 Water and Wastewater Master Plan Update'* (WSP), dated March 2024. The Master Plan recommends a minimum fire flow requirement of 100 L/s for residential areas and 250 L/s for employment areas for planning purposes. This is higher than the minimum fire flow requirements in the Town Engineering Design Standards of 80 L/s for residential areas and 200 L/s for employment areas. The minimum required fire flow assumed for each development type is summarized in **Table 3**.

Table 3 - Fire Flow Requirements

Type of Development	Fire Flow (L/s)
Residential	100 (Master Plan minimum)
Employment (Commercial and Institutional)	250 (Master Plan minimum)

Source: Town of East Gwillimbury 2023 Water and Wastewater Master Plan Update (WSP), March 2024

Once the detailed design for each of the employment areas are known, the minimum fire flow requirements for each building must be determined using either the Town's minimum fire flow requirements or the Fire Underwriters Survey ("FUS") formula. The minimum fire flow requirement for each building must be determined at the detailed design stage.

Section 4 – OTHER SYSTEM REQUIREMENTS

4.1 System Pressure Requirements

In addition to meeting the various flow requirements, the system must also satisfy minimum and maximum pressure requirements as outlined by the Town. The Town's pressure requirements are outlined in the Design Criteria and stipulate the following:

1. The maximum system pressure under static load or during minimum hourly demand shall be 700 kPa (100 psi).
2. The minimum pressure during maximum (peak) hourly demand shall be 275 kPa (40 psi).
3. The minimum system pressure under simultaneous maximum day and fire flow demands shall not drop below 140 kPa (20 psi) at any point in the water system.

To comply with the Ontario Building Code, reduction of pressures to 550 kPa (80 psi) is required, normally by having reducing valves installed on individual services.

4.2 Watermain Sizing

The Town of East Gwillimbury requires that all watermains are adequately sized to maintain demand flows at the required pressures without causing excessive energy loss or result in water quality decay. The watermain system must therefore be designed to accommodate the greater of the following:

- Maximum day plus fire demand
- Peak hour demand

For distribution systems providing fire protection the minimum pipe size shall be 150 mm diameter in accordance with Ministry of the Environment, Conservation and Parks (MECP) and NFPA requirements.

To provide appropriate fire protection, reliable supply and pressures the water distribution system should be looped wherever possible to improve supply security and water quality.

4.3 Watermain C-Factor

In designing and modeling of the pipes the Coefficient of Roughness (C-Factor) factors from the Town's Design Criteria were utilized. The Coefficient of Roughness assigned to each pipe size is summarized in **Table 4** below.

Table 4 - Hazen-Williams Coefficient of Roughness (C-Factors)

Size of Pipe (Diameter in mm)	Coefficient of Roughness (C)
150 mm	100
200 mm to 250 mm	110
300 mm or Greater	120

Source: Town of East Gwillimbury Engineering Standards and Design Criteria, Sept 2012

Section 5 – ANALYSIS & MODELING RESULTS

In order to conduct the hydraulic water analysis for the proposed development the water demands were estimated by MES using the design criteria previously discussed and incorporated into a WaterCAD model created for the immediate area using boundary conditions received from the Region of York for the intersection of Yonge Street and Green Lane West. The following sections discuss the model setup and results.

5.1 Model Setup

The development is serviced from the Newmarket West pressure district through two Regional water meters on Yonge Street and Woodspring Avenue. A Regional trunk watermain (400 mm) is planned for Yonge Street, north of Green Lane West (Region Master Plan project W18). The development will be serviced from connections to the proposed Yonge Street Regional watermain, as well as the existing watermain on Green Lane West.

Pressures from the existing Regional hydraulic model, from the 2022 York Region Master Plan, were provided to MES in August 2024. Boundary conditions are for the intersection of Yonge Street and Green Lane West. The boundary conditions received from the Region are included in **Appendix B**.

Flow data was not provided by the Region, however as noted in the communications, Regional infrastructure is designed to meet a minimum standard of 17,000 L/min (283 L/s) for 3.5 hours for a single ICI fire. As such, it was assumed that a minimum fire flow of 283 L/s at 20 psi was available under maximum day demand conditions throughout the proposed Yonge Street Regional watermain under ultimate conditions, with the North West Green Lane development demands in place. The available flow in the Yonge Street Regional watermain must be confirmed by the Region prior to finalizing the watermain sizing and layout for the development.

A dummy pump and reservoir were added to the model to recreate the boundary conditions received from the Region. To check the adequacy of the pump curve entered into the model, a simulated hydrant curve (modeled flow) along the Yonge Street regional watermain was graphed against the data points of the boundary conditions. The comparison is included in **Appendix B**.

To find the service pressure range of the proposed development, the dummy tank water elevation was changed for each scenario to analyze the system under various conditions. The static pressure at the intersection of Yonge Street and Green Lane West was assumed to be at it's minimum and maximum for the peak hour and minimum hour scenarios, and at approximately 40% of that pressure range for the average day and maximum day scenarios. Pressures were taken from the 2041 Maximum Daily Demand pattern (York Region Master Plan 2022).

The initial pressure used in the hydraulic water model for each of the various demand scenarios are summarized in **Table 5** below.

Table 5 – Hydraulic Grade Lines Used for Boundary Conditions

Demand Scenario	Pressure (kPa) 2041 MDD Pattern	HGL 2041 MDD Pattern
Average Day	557 kPa	332.8 m
Maximum Day	557 kPa	332.8 m
Peak Hour	536 kPa	330.6 m
Minimum Hour	589 kPa	336.0 m

Friction factor for all new pipes added to the model were assigned according to Table 4. Fire flows were based on the recommendations of the Town of East Gwillimbury Master Plan. Elevations within the development vary from approximately 273.6 m to 293.1 m.

5.2 Watermain Sizing and System Pressures

The analysis was conducted under existing servicing conditions for Average Day, Maximum Day, Peak Hour, Minimum Hour and Maximum day plus Fire demands to size the watermains and meet the pressure requirements. The pipe sizes and layout are shown in **Appendix A**. Pipe sizes are considered preliminary until the available flows in the area can be confirmed by either modelling data or hydrant tests.

Modeled service pressures for the development are summarized in **Table 6**. All pressures lie within the required operating range under average day, maximum day, maximum day plus fire flow, minimum hour and peak hour demands. Hydrant tests must be conducted to confirm the available pressures and flows to the site prior to development. Detailed pipe and node tables for the various scenarios modeled are attached to this report in **Appendix C** for Phase 1 of the development and in **Appendix D** for the ultimate buildout of the development.

Table 6 - Modeled Service Pressures

Scenario	Average Day	Maximum Day	Peak Hour	Minimum Hour	Max. Day + Fire
Phase 1	385 – 523 kPa (55.8 to 75.9 psi)	375 – 513 kPa (54.4 to 74.4 psi)	341 – 479 kPa (49.5 to 69.5 psi)	419 – 557 kPa (60.7 to 80.8 psi)	139 to 340 L/s @ 140 kPa
Ultimate	382 – 573 kPa (55.5 to 83.1 psi)	364 – 554 kPa (52.8 to 80.4 psi)	319 – 510 kPa (46.3 to 73.9 psi)	418 – 608 kPa (60.6 to 88.2 psi)	121 to 302 L/s @ 140 kPa

The modeling indicates that pressures are expected to exceed 550 kPa for some areas within the development, at elevations below approximately 279.5 m under Minimum Hour conditions. Pressure reducing valves will be required on the domestic services for the areas with pressures exceeding 550 kPa to comply with the Ontario Building Code. A figure of the areas with pressures anticipated to be above 550 kPa is included in **Appendix D**.

5.3 Servicing Considerations

The proposed servicing of the North West Green Lane development assumes that regional watermain on Yonge Street has been constructed. Trunk watermains (300 mm) are recommended for the minor collector roads, as well as the commercial, institutional and mixed-use areas. The sizing and the layout of the trunk watermains within this development must be discussed with the Town to ensure that the proposed servicing is in line with the intent of the Town's Master Plan.

The final sizing of these watermains will need to be revisited once available flow information is available for the Yonge Street regional watermain, and once the detailed design for this development has been completed.

Section 6 – CONCLUSIONS/RECOMMENDATIONS

The proposed watermain layout for the North West Green Lane Development can achieve hydraulic requirements as prescribed by the Town of East Gwillimbury watermain design criteria as summarized below.

- The service pressures from the proposed watermain layout are expected to range between 319 kPa to 608 kPa (46.3 psi to 88.2 psi). The modeling indicates that pressures are expected to exceed 550 kPa (80 psi) at the west end of the development.
- The available fire flow meets or exceeds the minimum fire flow demands utilized for this assessment at the minimum pressure of 140 kPa. Once the building designs are completed and the specifics are known, the fire flow demands used in this analysis must be reviewed.
- The fire flows utilized in this analysis are based on the Town's Master Plan recommendations for minimum fire flow requirements. Once the buildings have been designed the minimum fire flow requirements must be determined using either the Town's Design Standards or the Fire Underwriters Survey formula.
- The modeling indicates that pressures are expected to exceed 550 kPa (80 psi) in areas at the west side of the development where elevations are lower than approximately 279.5 m. Pressure reducing valves will be required on individual services in those areas to comply with the Ontario Building Code.
- The model was developed using boundary conditions received from the Region of York and does not include the available flows for the area. The results of this analysis must be considered preliminary until the available flows for the area have been determined either through modelling or hydrant tests.
- The sizing and the layout of the trunk watermains within this development must be discussed with the Town to ensure that the proposed servicing is in line with the intent of the Town's Master Plan.
- The final sizing of these watermains will need to be revisited once available flow information is available for the Yonge Street regional watermain, and once the detailed design for this development has been completed.
- Detailed hydraulic modelling of each development area must be conducted at the detailed design stage to ensure that the water servicing strategy is still valid prior to the construction of the watermains within the development. Confirmation and/or changes to the criteria should also be provided to and reviewed with MES prior to the finalization of the detailed design.
- This report, including all modeling assumptions used, is to be submitted to and reviewed by the water operating authority (municipality) to confirm that the modeling parameters used are acceptable to the operating authority and/or confirm if modified domestic or fire flow requirements are required or should be implemented for this particular development.

Appendix A

Demands

Town of East Gwillimbury

Engineering Standards and Design Criteria, September 2012 (unless otherwise stated)

Equivalent Population

Type of Development	Equivalent Population Density *(Person/Unit)*
Single Family Homes/Semi-Detached	3.36
Townhouses	2.78
Apartments	1.76

Water Design Factors

Type of Development	Average Daily Demand (L/Ha/day)
Industrial	35,000
Commercial	28,000
Institutional	18,000

Water Design Factors

Average Daily Demand (litres/capita/day)	350
Average School Demand (litres/student/day)	420 *
Maximum Daily Demand P.F.	2.0
Peak Hourly Demand P.F.	2.75
Minimum Hourly Demand P.F.	0.65 **

* From MECP Design Guidelines (2008) for schools at 140 L/student/day over 8 hours (140 x 24/8)

** From MECP Design Guidelines (2008) for populations 25,001-50,000

Coefficient of Roughness

Size of Pipe (mm Dia.)	Coefficient of Roughness (C)
150	100
200-250	110
300 and over	120

Working Pressures

Parameter	Pressure
Normal Condition	
Minimum Pressure (Maximum Day)	275 kPa (40 psi)
Maximum (Building Code)	550 kPa (80 psi)
Maximum recommended	700 kPa (100 psi)
Fire Flow Conditions	
Minimum Pressure	140 kPa (20 psi)

Fire Flow Demands

Type of Development	Minimum Fire Demand (L/s)
Residential (Town Standard)	80
Residential (Master Plan)	100
Employment (Town Standard)	200
Employment (Marter Plan)	250

Water Demands
North West Green Lane Development, East Gwillimbury
February 2025

Municipal Engineering Solutions

Rice Group

Node	Type of Development							Equivalent Population		Demands			
	Det/Semi	Town	B2B Town	Apart	Ind	Com	Inst	Total Pop	Total Pop	Avg Day	Max Day	Peak Hr	Min Hr
	(units)	*(units)*	*(units)*	*(units)*	*(ha)*	*(Ha)*	*(Ha)*	*(Res)*	*(Inst)*	*(L/s)*	*(L/s)*	*(L/s)*	*(L/s)*
J-52				873		0.92		1536		6.52	13.04	17.94	4.24
J-51				320				563		2.28	4.56	6.27	1.48
J-46				683		4.88		1202		6.45	12.90	17.74	4.19
J-41				683		5.31		1202		6.59	13.18	18.12	4.28
J-38		186						517		2.09	4.19	5.76	1.36
J-42	(Future by others)			120		0.22		211		0.93	1.85	2.55	0.60
TOTAL	**0**	**186**	**0**	**2679**	**0**	**11.33**	**0**	**5232**	**0**	**24.87**	**49.72**	**68.38**	**16.15**

Total Residential Units 2865 **Total ICI (Ha) 11.11**

Sundial

Node	Type of Development							Equivalent Population		Demands			
	Det/Semi	Town	B2B Town	Apart	Ind	Com	Inst	Total Pop	Total Pop	Avg Day	Max Day	Peak Hr	Min Hr
	(units)	*(units)*	*(units)*	*(units)*	*(ha)*	*(Ha)*	*(Ha)*	*(Res)*	*(Inst)*	*(L/s)*	*(L/s)*	*(L/s)*	*(L/s)*
J-68							2.42	0	500 *	2.43	4.86	6.68	1.58
J-69	23	28						155		0.63	1.26	1.73	0.41
J-80	17	92	176					802		3.25	6.50	8.94	2.11
J-55	49	67						351		1.42	2.84	3.91	0.92
J-95	78	129						621		2.51	5.03	6.91	1.63
J-119	63	49						348		1.41	2.82	3.88	0.92
J-117	121	32						496		2.01	4.01	5.52	1.30
J-101	16	28	216					732		2.97	5.93	8.16	1.93
J-79	46	9	170					652		2.64	5.28	7.27	1.72
J-112				113				199		0.81	1.61	2.22	0.52
TOTAL	**413**	**434**	**562**	**113**	**0**	**0**	**2**	**4355**	**500**	**20.07**	**40.14**	**55.22**	**13.04**

Total Residential Units 1522 **Total ICI (Ha) 2.42**

* Elementary schools are assumed to have a population of 500 people each

Water Demands
North West Green Lane Development, East Gwillimbury
February 2025

Municipal Engineering Solutions

Northmarket Holdings Inc.

Node	Type of Development							Equivalent Population		Demands			
	Det/Semi	Town	B2B Town	Apart	Ind	Com	Inst	Total Pop	Total Pop	Avg Day	Max Day	Peak Hr	Min Hr
	(units)	*(units)*	*(units)*	*(units)*	*(ha)*	*(Ha)*	*(Ha)*	*(Res)*	*(Inst)*	*(L/s)*	*(L/s)*	*(L/s)*	*(L/s)*
J-65			74					206		0.83	1.67	2.29	0.54
J-64			36	130		0.75		329		1.58	3.15	4.33	1.02
J-66				661		1.45		1163		5.18	10.37	14.25	3.37
J-40	22							74		0.30	0.60	0.82	0.19
J-60		75						209		0.84	1.69	2.32	0.55
J-57							2.45	0	500 *	2.43	4.86	6.68	1.58
TOTAL	**22**	**75**	**110**	**791**	**0**	**2**	**2**	**1980**	**500**	**11.17**	**22.34**	**30.69**	**7.25**

Total Residential Units **998** **Total ICI (Ha)** **4.65**

Beechway Developments Inc.

Node	Type of Development							Equivalent Population		Demands			
	Det/Semi	Town	B2B Town	Apart	Ind	Com	Inst	Total Pop	Total Pop	Avg Day	Max Day	Peak Hr	Min Hr
	(units)	*(units)*	*(units)*	*(units)*	*(ha)*	*(Ha)*	*(Ha)*	*(Res)*	*(Inst)*	*(L/s)*	*(L/s)*	*(L/s)*	*(L/s)*
J-141		71	32					286		1.16	2.32	3.19	0.75
J-126	14	41						161		0.65	1.30	1.79	0.42
J-136	41	152						560		2.27	4.54	6.24	1.48
J-151	80							269		1.09	2.18	2.99	0.71
J-122				1290		2.50		2270		10.01	20.02	27.52	6.51
TOTAL	**135**	**264**	**32**	**1290**	**0.00**	**2.50**	**0.00**	**3547**	**0**	**15.18**	**30.36**	**41.73**	**9.87**

Total Residential Units **1721** **Total ICI (Ha)** **2.50**

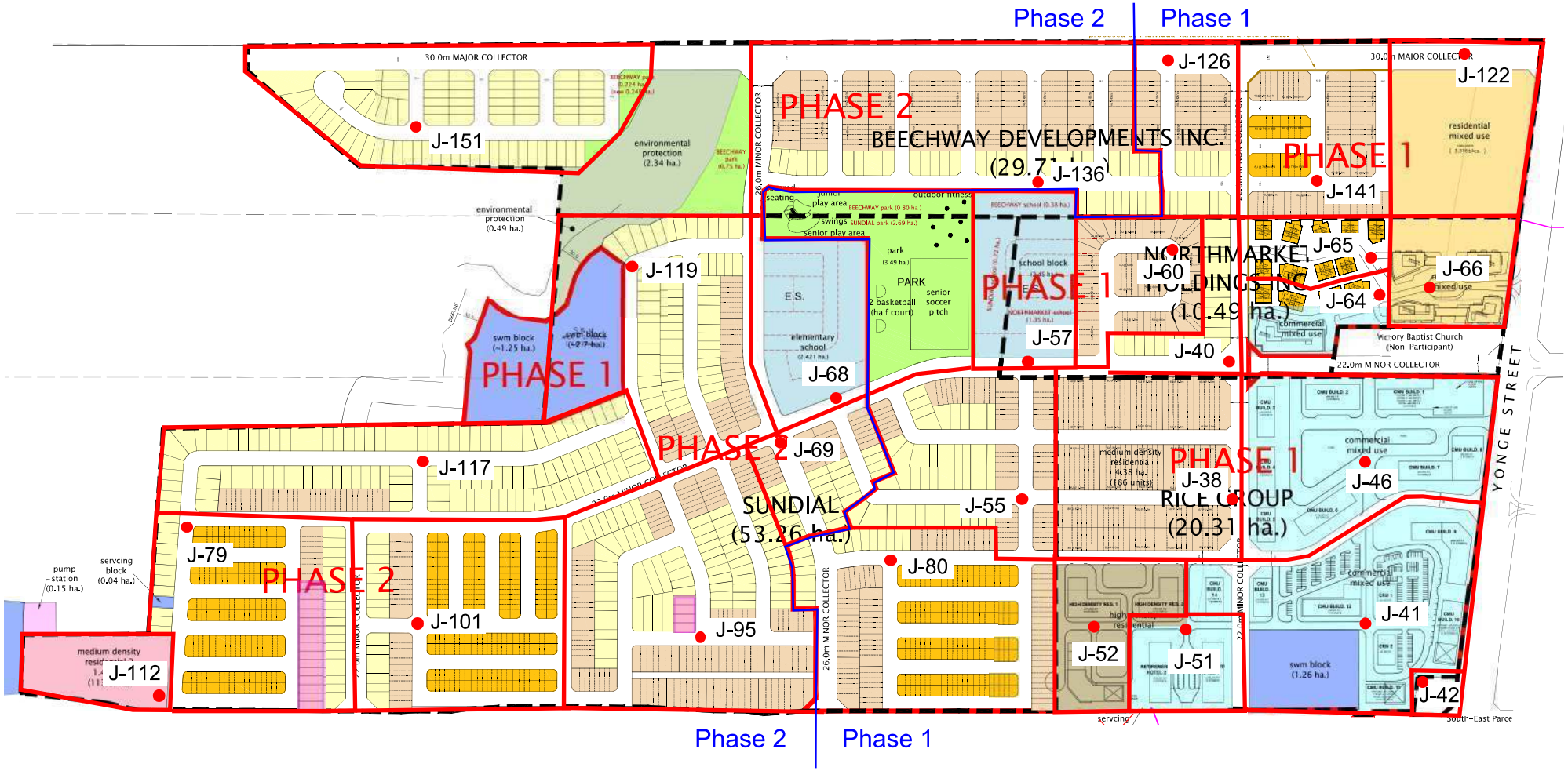
Northwest Green Lane Community (Total)

Phase	Type of Development							Equivalent Population		Demands			
	Det/Semi	Town	B2B Town	Apart	Ind	Com	Inst	Total Pop	Total Pop	Avg Day	Max Day	Peak Hr	Min Hr
	(units)	*(units)*	*(units)*	*(units)*	*(ha)*	*(Ha)*	*(Ha)*	*(Res)*	*(Inst)*	*(L/s)*	*(L/s)*	*(L/s)*	*(L/s)*
Phase 1	*102*	*532*	*318*	*4760*	*0*	*16.03*	*2.45*	*11083*	*500*	*52.52*	*105.04*	*144.42*	*34.11*
Phase 2	*468*	*427*	*386*	*113*	*0*	*0*	*2.42*	*4032*	*500*	*18.76*	*37.52*	*51.6*	*12.2*
TOTAL	**570**	**959**	**704**	**4873**	**0.00**	**16.03**	**4.87**	**15115**	**1000**	**71.29**	**142.56**	**196.02**	**46.31**

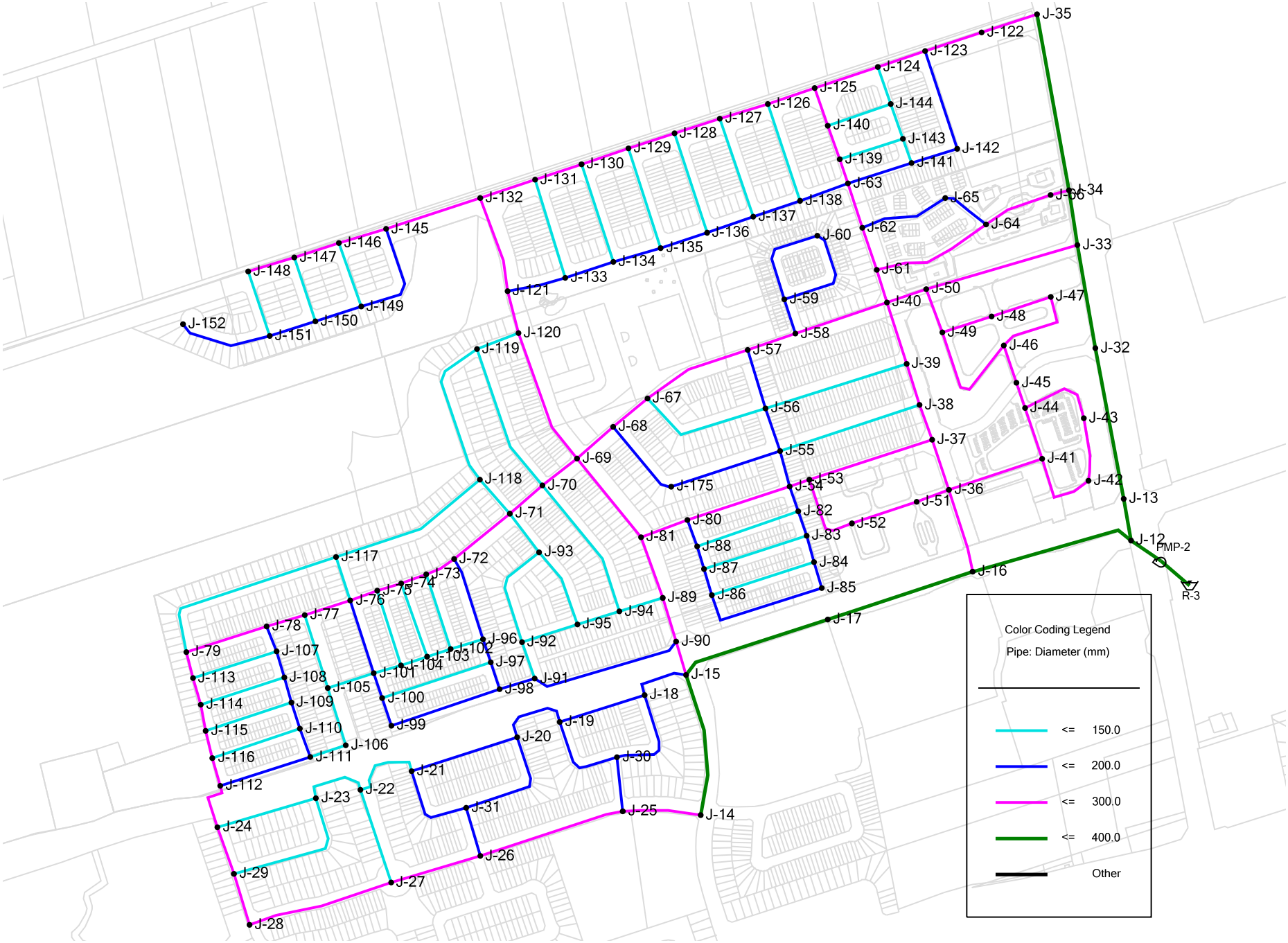
Total Residential Units **7106** **Total ICI (Ha)** **20.90**

* Elementary schools are assumed to have a population of 500 people each

Demand Allocation
North West Green Lane Development



Node IDs



North West Green Lane (Feb 2025).wtg

Pipe IDs

North West Green Lane (Feb 2025).wtg

Appendix B

Model Information

Kristin

From: Zhao, Ken <Ken.Zhao@york.ca>
Sent: Tuesday, 27 August 2024 2:10 pm
To: Kristin
Subject: FW: Water Model Boundary Conditions
Attachments: For Consultant_NW PD - Pressure at Green Lane and Younge.xlsx

Hi Kristin,

Please find attached the request data. Our modeler also states that this model node is in Newmarket West PD, and data is exported from Region's 2022 Infowater Master Plan Update model. For the request of flow availability at 140 kPa (or 20 psi) for the same node location, we suggest the consultant to check with the municipality as we are not able to confirm municipal pipe conveyance capacity during a fire event. Regional infrastructure (e.g., watermain) has been designed as per Regional guidelines such as 10,000 L/min for a single residential fire duration of 2 hours or 17,000 L/min for 3.5 hours for a single ICI fire; and these design guidelines may differ with municipal infrastructure.

Regards,

Our working hours may be different. Please do not feel obligated to reply outside of your scheduled working hours. Let's work together to help foster healthy work-life boundaries.

Ken Zhao, P.Eng. | Water and Wastewater Engineer, Infrastructure Asset Management, Public Works
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The Regional Municipality of York | 17250 Yonge Street | Newmarket, ON L3Y 6Z1
O:1-877-464-9675 | Ken.Zhao@york.ca| york.ca

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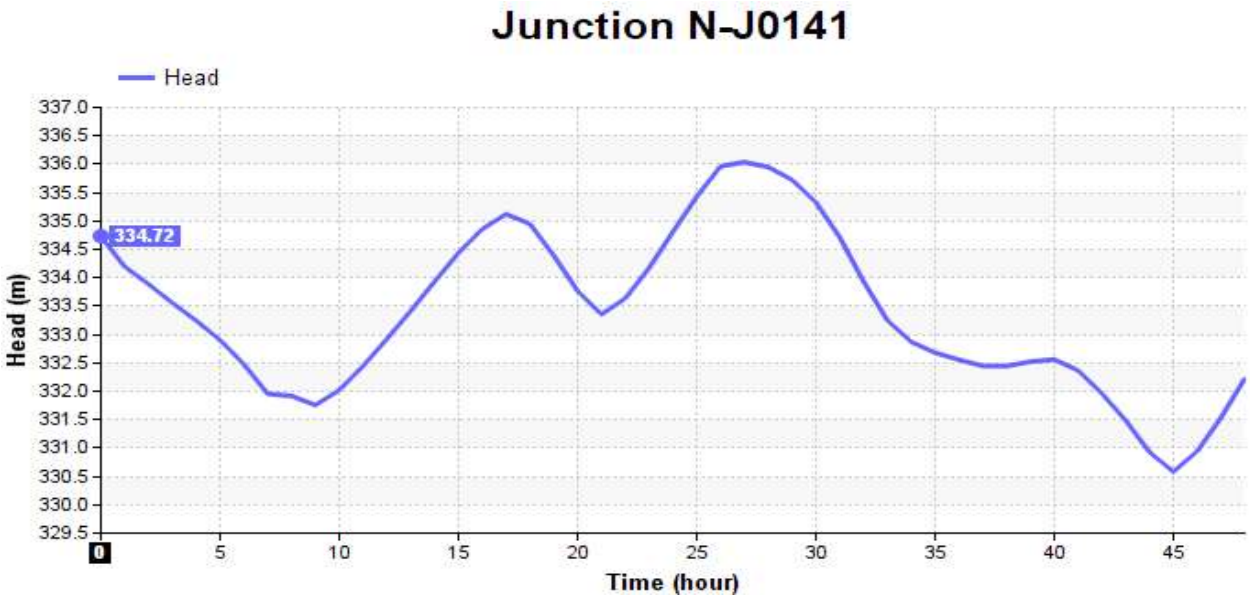
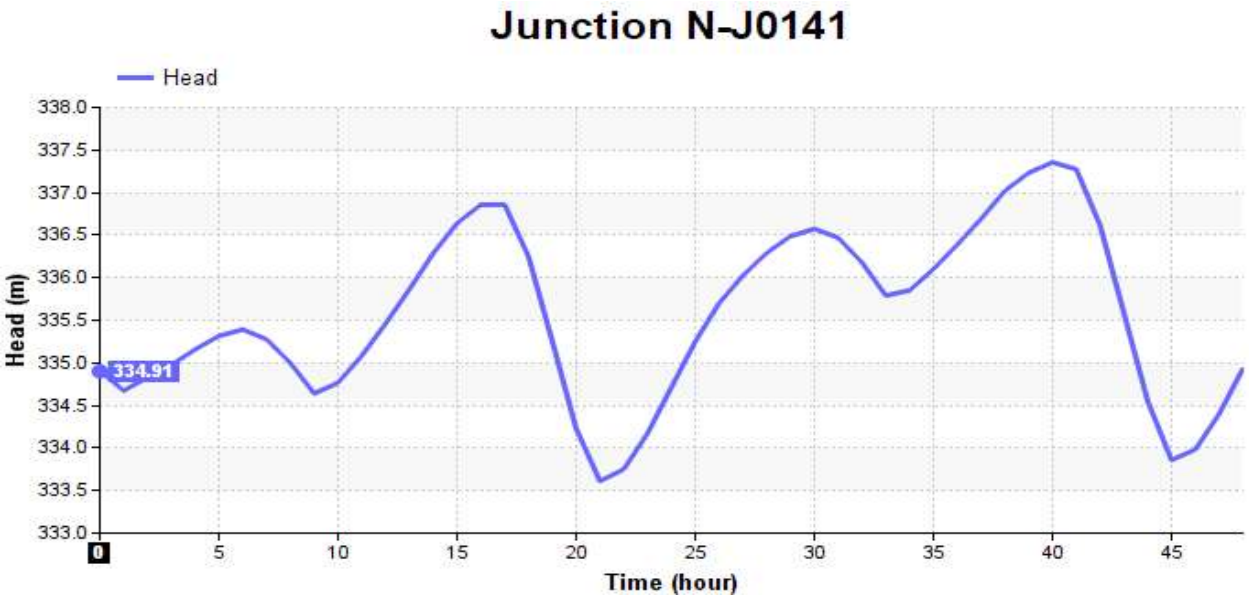
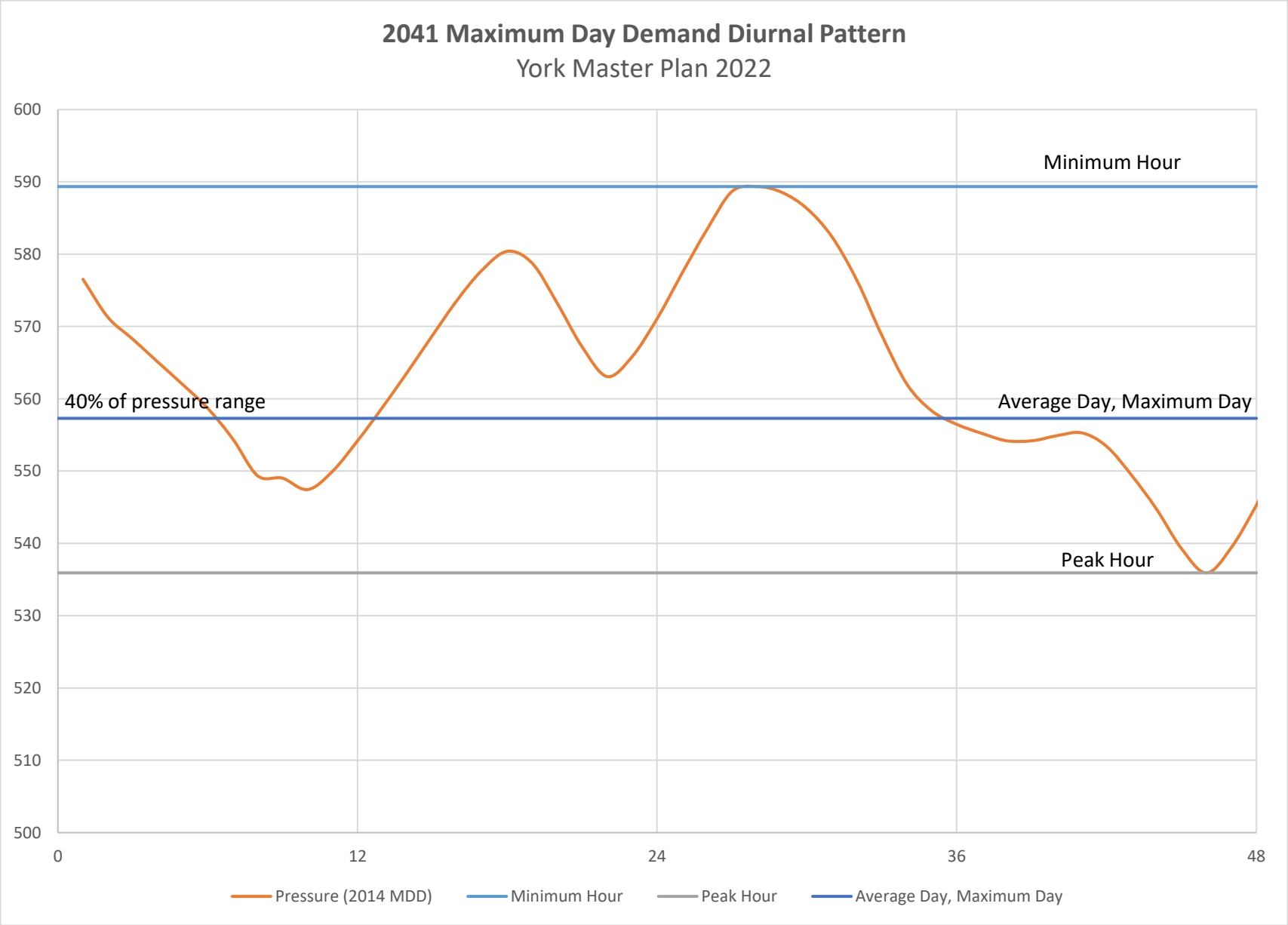
2041 Maximum Daily Demand
York Master Plan 2022

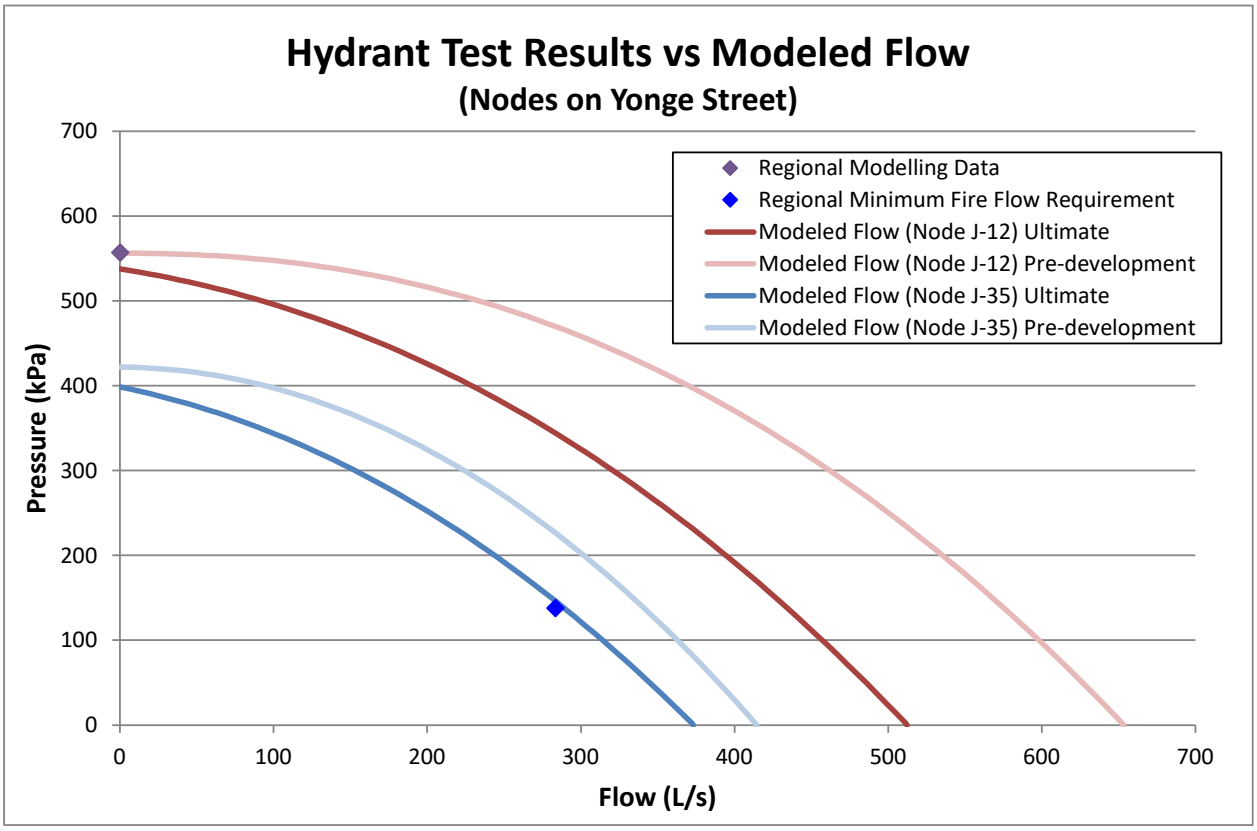


2061 Maximum Daily Demand
York Master Plan 2022



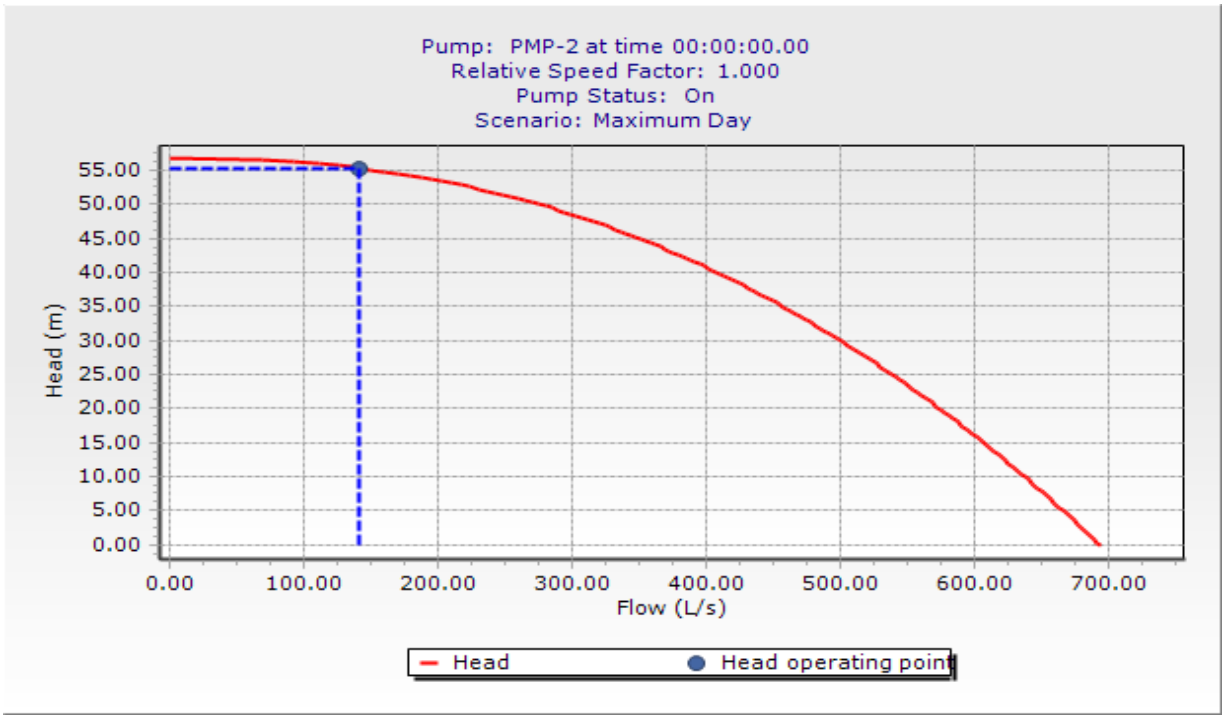

2041 Maximum Day Demand Diurnal Pattern
York Master Plan 2022
600
590
580
570
560
550
540
530
520
510
500
0
12
24
36
48
Minimum Hour
40% of pressure range
Average Day, Maximum Day
Peak Hour
Pressure (2014 MDD)
Minimum Hour
Peak Hour
Average Day, Maximum Day

Regional Boundary Conditions versus Model outputs



Node J-12: Intersection of Yonge Street and Green Lane West
Node J-35: Yonge Street at the northern boundary of the proposed development

Simulated Hydrant Flow Curve at Yonge Street and Green Lane West



Appendix C

Model Results Phase 1

Preliminary System Layout (Phase 1)

North West Green Lane (Feb 2025).wtg

Average Day

Node Table

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
J-12	0.00	275.92	332.54	554.13
J-13	0.00	276.01	332.53	553.14
J-14	0.00	293.50	332.49	381.56
J-15	0.00	291.28	332.49	403.28
J-16	0.00	279.83	332.50	515.44
J-17	0.00	285.33	332.49	461.56
J-18	0.00	290.67	332.49	409.25
J-19	0.00	288.78	332.49	427.75
J-20	0.00	287.29	332.49	442.33
J-21	0.00	285.39	332.49	460.93
J-22	0.00	281.15	332.49	502.43
J-23	0.00	279.65	332.49	517.11
J-24	0.00	273.90	332.49	573.38
J-25	0.00	291.96	332.49	396.63
J-26	0.00	284.87	332.49	466.02
J-27	0.00	280.26	332.49	511.14
J-28	0.00	270.43	332.49	607.34
J-29	0.00	272.69	332.49	585.22
J-30	0.00	291.67	332.49	399.47
J-31	0.00	284.94	332.49	465.33
J-32	0.00	279.54	332.49	518.22
J-33	0.00	283.00	332.46	484.10
J-34	0.00	284.05	332.46	473.75
J-35	0.00	289.65	332.45	418.89
J-36	0.00	281.15	332.45	502.10
J-37	0.00	284.94	332.45	464.98
J-38	2.09	287.58	332.45	439.13
J-39	0.00	289.16	332.45	423.66
J-40	0.30	290.30	332.45	412.50
J-41	6.59	280.00	332.44	513.25
J-42	0.93	279.00	332.44	523.03
J-43	0.00	279.00	332.44	523.03
J-44	0.00	281.00	332.44	503.46
J-45	0.00	283.37	332.44	480.26
J-46	6.45	285.00	332.44	464.31
J-47	0.00	283.00	332.44	483.90
J-48	0.00	286.00	332.44	454.55
J-49	0.00	288.00	332.45	434.98
J-50	0.00	290.95	332.45	406.14
J-51	2.28	283.00	332.45	483.97
J-52	6.52	286.00	332.45	454.59
J-53	0.00	288.92	332.45	426.03
J-54	0.00	288.73	332.45	427.90
J-55	1.42	289.09	332.45	424.35
J-56	0.00	290.21	332.45	413.38
J-57	2.43	290.46	332.45	410.92
J-58	0.00	290.96	332.45	406.03
J-59	0.00	291.12	332.45	404.46
J-60	0.84	291.86	332.45	397.21
J-61	0.00	290.35	332.45	412.01
J-62	0.00	291.53	332.45	400.45
J-63	0.00	290.90	332.45	406.61
J-64	1.58	289.00	332.45	425.24
J-65	0.83	289.00	332.45	425.22
J-66	5.18	284.00	332.45	474.21
J-67	0.00	287.25	332.45	442.34
J-80	3.25	287.61	332.46	438.90
J-81	0.00	287.27	332.46	442.32
J-82	0.00	288.01	332.45	434.95
J-83	0.00	288.23	332.45	432.81
J-84	0.00	287.97	332.45	435.35
J-85	0.00	287.13	332.45	443.57
J-86	0.00	289.70	332.45	418.43

Pipe Table

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
P-16	J-12	J-13	69.86	400.0	120.0	26.07	0.21
P-18	J-14	J-15	237.25	400.0	120.0	0.03	0.00
P-19	J-12	J-16	276.80	400.0	120.0	26.44	0.21
P-20	J-16	J-17	251.65	400.0	120.0	8.52	0.07
P-21	J-17	J-15	255.13	400.0	120.0	8.52	0.07
P-22	J-15	J-18	94.78	200.0	110.0	0.03	0.00
P-23	J-18	J-19	146.63	200.0	110.0	0.02	0.00
P-24	J-19	J-20	121.27	200.0	110.0	0.01	0.00
P-25	J-20	J-21	182.77	200.0	110.0	0.01	0.00
P-26	J-21	J-22	126.98	150.0	100.0	0.01	0.00
P-27	J-22	J-23	108.93	150.0	100.0	0.00	0.00
P-28	J-23	J-24	169.42	150.0	100.0	0.00	0.00
P-29	J-14	J-25	128.93	300.0	120.0	-0.03	0.00
P-30	J-25	J-26	246.30	300.0	120.0	-0.01	0.00
P-31	J-26	J-27	153.51	300.0	120.0	-0.01	0.00
P-32	J-27	J-28	244.15	300.0	120.0	0.00	0.00
P-33	J-28	J-29	87.76	300.0	120.0	0.00	0.00
P-34	J-29	J-24	81.77	300.0	120.0	0.00	0.00
P-35	J-18	J-30	166.83	200.0	110.0	0.01	0.00
P-36	J-19	J-30	148.09	200.0	110.0	0.01	0.00
P-37	J-30	J-25	89.80	200.0	110.0	0.02	0.00
P-38	J-20	J-31	195.46	200.0	110.0	0.00	0.00
P-39	J-21	J-31	145.60	200.0	110.0	0.00	0.00
P-40	J-31	J-26	82.64	200.0	110.0	0.01	0.00
P-41	J-22	J-27	161.10	150.0	100.0	0.00	0.00
P-42	J-23	J-29	243.12	150.0	100.0	0.00	0.00
P-43	J-13	J-32	252.83	400.0	120.0	26.07	0.21
P-44	J-32	J-33	172.71	400.0	120.0	26.07	0.21
P-45	J-33	J-34	91.48	400.0	120.0	18.62	0.15
P-46	J-34	J-35	294.77	400.0	120.0	8.27	0.07
P-47	J-16	J-36	140.80	300.0	120.0	17.92	0.25
P-48	J-36	J-37	87.15	300.0	120.0	4.47	0.06
P-49	J-37	J-38	61.00	300.0	120.0	4.55	0.06
P-50	J-38	J-39	71.03	300.0	120.0	2.26	0.03
P-51	J-39	J-40	106.32	300.0	120.0	2.04	0.03
P-52	J-36	J-41	161.99	300.0	120.0	7.79	0.11
P-53	J-41	J-42	130.74	300.0	120.0	0.63	0.01
P-54	J-42	J-43	104.04	300.0	120.0	-0.30	0.00
P-55	J-43	J-44	135.59	300.0	120.0	-0.30	0.00
P-56	J-41	J-44	88.38	300.0	120.0	0.57	0.01
P-57	J-44	J-45	43.92	300.0	120.0	0.27	0.00
P-59	J-45	J-46	64.90	300.0	120.0	0.27	0.00
P-60	J-46	J-47	141.55	300.0	120.0	-2.68	0.04
P-61	J-47	J-48	102.84	300.0	120.0	-2.68	0.04
P-62	J-48	J-49	85.28	300.0	120.0	-2.68	0.04
P-63	J-46	J-49	202.16	300.0	120.0	-3.50	0.05
P-64	J-49	J-50	76.11	300.0	120.0	-6.18	0.09
P-65	J-50	J-40	68.52	300.0	120.0	1.27	0.02
P-66	J-36	J-51	56.74	300.0	120.0	5.66	0.08
P-67	J-51	J-52	112.56	300.0	120.0	3.38	0.05
P-68	J-52	J-53	130.98	300.0	120.0	-3.14	0.04
P-69	J-37	J-53	212.79	300.0	120.0	-0.08	0.00
P-70	J-53	J-54	34.52	300.0	100.0	-3.22	0.05
P-71	J-54	J-55	60.88	200.0	110.0	2.05	0.07
P-72	J-55	J-56	74.15	200.0	110.0	0.83	0.03
P-73	J-56	J-57	100.80	200.0	110.0	0.83	0.03
P-74	J-40	J-58	159.39	300.0	120.0	2.21	0.03
P-75	J-58	J-57	83.09	300.0	120.0	1.37	0.02
P-76	J-38	J-55	242.19	150.0	100.0	0.20	0.01
P-77	J-39	J-56	244.16	150.0	100.0	0.23	0.01
P-78	J-58	J-59	59.45	200.0	110.0	0.84	0.03
P-79	J-59	J-60	160.12	200.0	110.0	0.43	0.01
P-80	J-60	J-59	173.58	200.0	110.0	-0.41	0.01

Average Day

Node Table

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
J-87	0.00	288.61	332.45	429.10
J-88	0.00	287.52	332.45	439.77
J-89	0.00	288.86	332.47	426.85
J-90	0.00	291.05	332.48	405.48
J-122	10.01	292.28	332.44	393.08
J-123	0.00	293.11	332.44	384.96
J-124	0.00	292.71	332.45	388.88
J-125	0.00	292.24	332.45	393.48
J-126	0.65	289.78	332.45	417.56
J-138	0.00	289.25	332.45	422.76
J-139	0.00	291.13	332.45	404.35
J-140	0.00	291.76	332.45	398.19
J-141	1.16	291.78	332.44	397.98
J-142	0.00	292.17	332.44	394.16
J-143	0.00	291.44	332.45	401.31
J-144	0.00	292.02	332.45	395.64
J-175	0.00	286.24	332.45	452.24
MIN		**279.00**		**384.96**
MAX		**293.11**		**523.03**

Min/Max for development (Nodes J-32 to J-152)

Node Table

ID	Elevation (m)	Flow Out (L/s)	Hydraulic Grade (m)
R-3	275.92	52.51	275.92

Pipe Table

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
P-81	J-40	J-61	56.33	300.0	120.0	0.79	0.01
P-82	J-61	J-62	73.33	300.0	120.0	3.06	0.04
P-83	J-62	J-63	77.10	300.0	120.0	3.55	0.05
P-84	J-61	J-64	200.68	300.0	120.0	-2.28	0.03
P-85	J-62	J-65	148.61	200.0	110.0	-0.49	0.02
P-86	J-65	J-64	82.37	200.0	110.0	-1.32	0.04
P-87	J-64	J-66	117.71	300.0	120.0	-5.18	0.07
P-88	J-66	J-34	31.38	300.0	120.0	-10.36	0.15
P-90	J-50	J-33	259.58	300.0	120.0	-7.45	0.11
P-91	J-57	J-67	185.91	300.0	120.0	-0.23	0.00
P-104	J-56	J-67	227.38	150.0	100.0	0.23	0.01
P-105(1)	J-55	J-175	188.89	200.0	110.0	0.00	0.00
P-106	J-54	J-80	177.61	300.0	100.0	-3.84	0.05
P-107	J-80	J-81	81.36	300.0	100.0	-8.52	0.12
P-109	J-54	J-82	43.02	200.0	110.0	-1.43	0.05
P-110	J-82	J-83	42.82	200.0	110.0	-0.99	0.03
P-111	J-83	J-84	45.09	200.0	110.0	-0.68	0.02
P-112	J-84	J-85	44.63	200.0	110.0	-0.44	0.01
P-113	J-85	J-86	218.76	200.0	110.0	-0.44	0.01
P-114	J-86	J-87	45.19	200.0	110.0	-0.68	0.02
P-115	J-87	J-88	38.94	200.0	110.0	-0.99	0.03
P-116	J-88	J-80	46.36	200.0	110.0	-1.43	0.05
P-117	J-84	J-86	176.89	150.0	100.0	-0.23	0.01
P-118	J-83	J-87	177.91	150.0	100.0	-0.32	0.02
P-119	J-82	J-88	176.33	150.0	100.0	-0.43	0.02
P-120	J-81	J-89	106.37	300.0	110.0	-8.52	0.12
P-121	J-89	J-90	75.29	300.0	110.0	-8.52	0.12
P-151	J-90	J-15	57.47	300.0	110.0	-8.52	0.12
P-177	J-35	J-122	96.21	300.0	120.0	8.27	0.12
P-178	J-122	J-123	98.33	300.0	120.0	-1.74	0.02
P-179	J-123	J-124	82.19	300.0	120.0	-1.58	0.02
P-180	J-124	J-125	109.71	300.0	120.0	-1.39	0.02
P-181	J-125	J-126	81.66	300.0	120.0	0.39	0.01
P-195	J-138	J-63	84.01	200.0	110.0	-0.26	0.01
P-196	J-63	J-139	41.99	300.0	120.0	2.31	0.03
P-197	J-139	J-140	58.74	300.0	120.0	2.00	0.03
P-198	J-140	J-125	65.62	300.0	120.0	1.78	0.03
P-204	J-138	J-126	168.38	150.0	100.0	0.26	0.01
P-205	J-63	J-141	110.20	200.0	110.0	0.99	0.03
P-206	J-141	J-142	78.81	200.0	110.0	0.17	0.01
P-207	J-142	J-123	169.54	200.0	110.0	0.17	0.01
P-208	J-141	J-143	42.20	150.0	100.0	-0.34	0.02
P-209	J-143	J-144	61.00	150.0	100.0	-0.03	0.00
P-210	J-144	J-124	64.75	150.0	100.0	0.19	0.01
P-211	J-139	J-143	109.29	150.0	100.0	0.30	0.02
P-212	J-140	J-144	109.90	150.0	100.0	0.22	0.01
P-247	R-3	PMP-2	62.51	400.0	120.0	52.51	0.42
P-248	PMP-2	J-12	59.37	400.0	120.0	52.51	0.42

Maximum Day

Node Table

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
J-12	0.00	275.92	331.77	546.57
J-13	0.00	276.01	331.73	545.31
J-14	0.00	293.50	331.58	372.64
J-15	0.00	291.28	331.58	394.37
J-16	0.00	279.83	331.61	506.77
J-17	0.00	285.33	331.59	452.77
J-18	0.00	290.67	331.58	400.34
J-19	0.00	288.78	331.58	418.83
J-20	0.00	287.29	331.58	433.42
J-21	0.00	285.39	331.58	452.01
J-22	0.00	281.15	331.58	493.51
J-23	0.00	279.65	331.58	508.19
J-24	0.00	273.90	331.58	564.46
J-25	0.00	291.96	331.58	387.71
J-26	0.00	284.87	331.58	457.10
J-27	0.00	280.26	331.58	502.22
J-28	0.00	270.43	331.58	598.42
J-29	0.00	272.69	331.58	576.31
J-30	0.00	291.67	331.58	390.55
J-31	0.00	284.94	331.58	456.42
J-32	0.00	279.54	331.59	509.40
J-33	0.00	283.00	331.49	474.61
J-34	0.00	284.05	331.47	464.07
J-35	0.00	289.65	331.45	409.07
J-36	0.00	281.15	331.45	492.32
J-37	0.00	284.94	331.45	455.15
J-38	4.19	287.58	331.44	429.26
J-39	0.00	289.16	331.44	413.78
J-40	0.60	290.30	331.44	402.60
J-41	13.18	280.00	331.42	503.19
J-42	1.85	279.00	331.41	512.98
J-43	0.00	279.00	331.41	512.98
J-44	0.00	281.00	331.41	493.40
J-45	0.00	283.37	331.41	470.21
J-46	12.90	285.00	331.41	454.26
J-47	0.00	283.00	331.42	473.88
J-48	0.00	286.00	331.42	444.55
J-49	0.00	288.00	331.43	425.00
J-50	0.00	290.95	331.44	396.25
J-51	4.56	283.00	331.45	474.14
J-52	13.04	286.00	331.44	444.72
J-53	0.00	288.92	331.45	416.20
J-54	0.00	288.73	331.45	418.08
J-55	2.84	289.09	331.44	414.46
J-56	0.00	290.21	331.44	403.47
J-57	4.86	290.46	331.43	400.99
J-58	0.00	290.96	331.43	396.11
J-59	0.00	291.12	331.43	394.52
J-60	1.69	291.86	331.43	387.26
J-61	0.00	290.35	331.44	402.11
J-62	0.00	291.53	331.43	390.53
J-63	0.00	290.90	331.43	396.66

Pipe Table

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
P-16	J-12	J-13	69.86	400.0	120.0	52.15	0.41
P-18	J-14	J-15	237.25	400.0	120.0	0.06	0.00
P-19	J-12	J-16	276.80	400.0	120.0	52.89	0.42
P-20	J-16	J-17	251.65	400.0	120.0	17.04	0.14
P-21	J-17	J-15	255.13	400.0	120.0	17.04	0.14
P-22	J-15	J-18	94.78	200.0	110.0	0.06	0.00
P-23	J-18	J-19	146.63	200.0	110.0	0.04	0.00
P-24	J-19	J-20	121.27	200.0	110.0	0.03	0.00
P-25	J-20	J-21	182.77	200.0	110.0	0.03	0.00
P-26	J-21	J-22	126.98	150.0	100.0	0.02	0.00
P-27	J-22	J-23	108.93	150.0	100.0	0.01	0.00
P-28	J-23	J-24	169.42	150.0	100.0	0.00	0.00
P-29	J-14	J-25	128.93	300.0	120.0	-0.06	0.00
P-30	J-25	J-26	246.30	300.0	120.0	-0.03	0.00
P-31	J-26	J-27	153.51	300.0	120.0	-0.02	0.00
P-32	J-27	J-28	244.15	300.0	120.0	-0.01	0.00
P-33	J-28	J-29	87.76	300.0	120.0	-0.01	0.00
P-34	J-29	J-24	81.77	300.0	120.0	0.00	0.00
P-35	J-18	J-30	166.83	200.0	110.0	0.02	0.00
P-36	J-19	J-30	148.09	200.0	110.0	0.02	0.00
P-37	J-30	J-25	89.80	200.0	110.0	0.03	0.00
P-38	J-20	J-31	195.46	200.0	110.0	0.00	0.00
P-39	J-21	J-31	145.60	200.0	110.0	0.01	0.00
P-40	J-31	J-26	82.64	200.0	110.0	0.01	0.00
P-41	J-22	J-27	161.10	150.0	100.0	0.01	0.00
P-42	J-23	J-29	243.12	150.0	100.0	0.01	0.00
P-43	J-13	J-32	252.83	400.0	120.0	52.15	0.41
P-44	J-32	J-33	172.71	400.0	120.0	52.15	0.41
P-45	J-33	J-34	91.48	400.0	120.0	37.25	0.30
P-46	J-34	J-35	294.77	400.0	120.0	16.53	0.13
P-47	J-16	J-36	140.80	300.0	120.0	35.85	0.51
P-48	J-36	J-37	87.15	300.0	120.0	8.95	0.13
P-49	J-37	J-38	61.00	300.0	120.0	9.11	0.13
P-50	J-38	J-39	71.03	300.0	120.0	4.52	0.06
P-51	J-39	J-40	106.32	300.0	120.0	4.07	0.06
P-52	J-36	J-41	161.99	300.0	120.0	15.57	0.22
P-53	J-41	J-42	130.74	300.0	120.0	1.26	0.02
P-54	J-42	J-43	104.04	300.0	120.0	-0.59	0.01
P-55	J-43	J-44	135.59	300.0	120.0	-0.59	0.01
P-56	J-41	J-44	88.38	300.0	120.0	1.13	0.02
P-57	J-44	J-45	43.92	300.0	120.0	0.54	0.01
P-59	J-45	J-46	64.90	300.0	120.0	0.54	0.01
P-60	J-46	J-47	141.55	300.0	120.0	-5.37	0.08
P-61	J-47	J-48	102.84	300.0	120.0	-5.37	0.08
P-62	J-48	J-49	85.28	300.0	120.0	-5.37	0.08
P-63	J-46	J-49	202.16	300.0	120.0	-6.99	0.10
P-64	J-49	J-50	76.11	300.0	120.0	-12.36	0.17
P-65	J-50	J-40	68.52	300.0	120.0	2.54	0.04
P-66	J-36	J-51	56.74	300.0	120.0	11.33	0.16
P-67	J-51	J-52	112.56	300.0	120.0	6.77	0.10
P-68	J-52	J-53	130.98	300.0	120.0	-6.27	0.09
P-69	J-37	J-53	212.79	300.0	120.0	-0.17	0.00

Maximum Day

Node Table

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
J-64	3.15	289.00	331.44	415.37
J-65	1.67	289.00	331.44	415.31
J-66	10.37	284.00	331.45	464.43
J-67	0.00	287.25	331.43	432.41
J-80	6.50	287.61	331.46	429.20
J-81	0.00	287.27	331.50	432.84
J-82	0.00	288.01	331.45	425.16
J-83	0.00	288.23	331.45	423.03
J-84	0.00	287.97	331.46	425.58
J-85	0.00	287.13	331.46	433.81
J-86	0.00	289.70	331.46	408.68
J-87	0.00	288.61	331.46	419.35
J-88	0.00	287.52	331.46	430.04
J-89	0.00	288.86	331.53	417.62
J-90	0.00	291.05	331.56	396.43
J-122	20.02	292.28	331.42	383.08
J-123	0.00	293.11	331.42	374.98
J-124	0.00	292.71	331.43	378.90
J-125	0.00	292.24	331.43	383.51
J-126	1.30	289.78	331.43	407.59
J-138	0.00	289.25	331.43	412.80
J-139	0.00	291.13	331.43	394.39
J-140	0.00	291.76	331.43	388.22
J-141	2.32	291.78	331.42	388.00
J-142	0.00	292.17	331.42	384.18
J-143	0.00	291.44	331.43	391.34
J-144	0.00	292.02	331.43	385.66
J-175	0.00	286.24	331.44	442.35
MIN		**279.00**		**374.98**
MAX		**293.11**		**512.98**

Min/Max for development (Nodes J-32 to J-152)

Node Table

ID	Elevation (m)	Flow Out (L/s)	Hydraulic Grade (m)
R-3	275.92	105.04	275.92

Pipe Table

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
P-70	J-53	J-54	34.52	300.0	100.0	-6.44	0.09
P-71	J-54	J-55	60.88	200.0	110.0	4.10	0.13
P-72	J-55	J-56	74.15	200.0	110.0	1.66	0.05
P-73	J-56	J-57	100.80	200.0	110.0	1.66	0.05
P-74	J-40	J-58	159.39	300.0	120.0	4.44	0.06
P-75	J-58	J-57	83.09	300.0	120.0	2.75	0.04
P-76	J-38	J-55	242.19	150.0	100.0	0.40	0.02
P-77	J-39	J-56	244.16	150.0	100.0	0.45	0.03
P-78	J-58	J-59	59.45	200.0	110.0	1.69	0.05
P-79	J-59	J-60	160.12	200.0	110.0	0.86	0.03
P-80	J-60	J-59	173.58	200.0	110.0	-0.83	0.03
P-81	J-40	J-61	56.33	300.0	120.0	1.58	0.02
P-82	J-61	J-62	73.33	300.0	120.0	6.13	0.09
P-83	J-62	J-63	77.10	300.0	120.0	7.11	0.10
P-84	J-61	J-64	200.68	300.0	120.0	-4.55	0.06
P-85	J-62	J-65	148.61	200.0	110.0	-0.98	0.03
P-86	J-65	J-64	82.37	200.0	110.0	-2.65	0.08
P-87	J-64	J-66	117.71	300.0	120.0	-10.35	0.15
P-88	J-66	J-34	31.38	300.0	120.0	-20.72	0.29
P-90	J-50	J-33	259.58	300.0	120.0	-14.90	0.21
P-91	J-57	J-67	185.91	300.0	120.0	-0.45	0.01
P-104	J-56	J-67	227.38	150.0	100.0	0.45	0.03
P-105(1)	J-55	J-175	188.89	200.0	110.0	0.00	0.00
P-106	J-54	J-80	177.61	300.0	100.0	-7.68	0.11
P-107	J-80	J-81	81.36	300.0	100.0	-17.04	0.24
P-109	J-54	J-82	43.02	200.0	110.0	-2.86	0.09
P-110	J-82	J-83	42.82	200.0	110.0	-1.99	0.06
P-111	J-83	J-84	45.09	200.0	110.0	-1.35	0.04
P-112	J-84	J-85	44.63	200.0	110.0	-0.89	0.03
P-113	J-85	J-86	218.76	200.0	110.0	-0.89	0.03
P-114	J-86	J-87	45.19	200.0	110.0	-1.35	0.04
P-115	J-87	J-88	38.94	200.0	110.0	-1.99	0.06
P-116	J-88	J-80	46.36	200.0	110.0	-2.86	0.09
P-117	J-84	J-86	176.89	150.0	100.0	-0.47	0.03
P-118	J-83	J-87	177.91	150.0	100.0	-0.63	0.04
P-119	J-82	J-88	176.33	150.0	100.0	-0.87	0.05
P-120	J-81	J-89	106.37	300.0	110.0	-17.04	0.24
P-121	J-89	J-90	75.29	300.0	110.0	-17.04	0.24
P-151	J-90	J-15	57.47	300.0	110.0	-17.04	0.24
P-177	J-35	J-122	96.21	300.0	120.0	16.53	0.23
P-178	J-122	J-123	98.33	300.0	120.0	-3.49	0.05
P-179	J-123	J-124	82.19	300.0	120.0	-3.15	0.04
P-180	J-124	J-125	109.71	300.0	120.0	-2.78	0.04
P-181	J-125	J-126	81.66	300.0	120.0	0.79	0.01
P-195	J-138	J-63	84.01	200.0	110.0	-0.51	0.02
P-196	J-63	J-139	41.99	300.0	120.0	4.61	0.07
P-197	J-139	J-140	58.74	300.0	120.0	4.01	0.06
P-198	J-140	J-125	65.62	300.0	120.0	3.57	0.05
P-204	J-138	J-126	168.38	150.0	100.0	0.51	0.03
P-205	J-63	J-141	110.20	200.0	110.0	1.98	0.06
P-206	J-141	J-142	78.81	200.0	110.0	0.33	0.01
P-207	J-142	J-123	169.54	200.0	110.0	0.33	0.01
P-208	J-141	J-143	42.20	150.0	100.0	-0.67	0.04
P-209	J-143	J-144	61.00	150.0	100.0	-0.07	0.00
P-210	J-144	J-124	64.75	150.0	100.0	0.37	0.02
P-211	J-139	J-143	109.29	150.0	100.0	0.61	0.03
P-212	J-140	J-144	109.90	150.0	100.0	0.44	0.02
P-247	R-3	PMP-2	62.51	400.0	120.0	105.04	0.84
P-248	PMP-2	J-12	59.37	400.0	120.0	105.04	0.84

Minimum Hour

Node Table

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
J-12	0.00	275.92	335.94	587.44
J-13	0.00	276.01	335.94	586.51
J-14	0.00	293.50	335.92	415.15
J-15	0.00	291.28	335.92	436.88
J-16	0.00	279.83	335.92	548.98
J-17	0.00	285.33	335.92	495.13
J-18	0.00	290.67	335.92	442.85
J-19	0.00	288.78	335.92	461.34
J-20	0.00	287.29	335.92	475.93
J-21	0.00	285.39	335.92	494.52
J-22	0.00	281.15	335.92	536.02
J-23	0.00	279.65	335.92	550.70
J-24	0.00	273.90	335.92	606.97
J-25	0.00	291.96	335.92	430.22
J-26	0.00	284.87	335.92	499.61
J-27	0.00	280.26	335.92	544.73
J-28	0.00	270.43	335.92	640.93
J-29	0.00	272.69	335.92	618.81
J-30	0.00	291.67	335.92	433.06
J-31	0.00	284.94	335.92	498.92
J-32	0.00	279.54	335.92	551.79
J-33	0.00	283.00	335.91	517.81
J-34	0.00	284.05	335.91	507.50
J-35	0.00	289.65	335.90	452.67
J-36	0.00	281.15	335.90	535.87
J-37	0.00	284.94	335.90	498.77
J-38	1.36	287.58	335.90	472.92
J-39	0.00	289.16	335.90	457.46
J-40	0.19	290.30	335.90	446.30
J-41	4.28	280.00	335.90	547.08
J-42	0.60	279.00	335.90	556.86
J-43	0.00	279.00	335.90	556.86
J-44	0.00	281.00	335.90	537.29
J-45	0.00	283.37	335.90	514.09
J-46	4.19	285.00	335.90	498.14
J-47	0.00	283.00	335.90	517.72
J-48	0.00	286.00	335.90	488.36
J-49	0.00	288.00	335.90	468.79
J-50	0.00	290.95	335.90	439.94
J-51	1.48	283.00	335.90	517.75
J-52	4.24	286.00	335.90	488.39
J-53	0.00	288.92	335.90	459.81
J-54	0.00	288.73	335.90	461.68
J-55	0.92	289.09	335.90	458.14
J-56	0.00	290.21	335.90	447.18
J-57	1.58	290.46	335.90	444.73
J-58	0.00	290.96	335.90	439.83
J-59	0.00	291.12	335.90	438.27
J-60	0.55	291.86	335.90	431.02
J-61	0.00	290.35	335.90	445.81
J-62	0.00	291.53	335.90	434.26
J-63	0.00	290.90	335.90	440.42
J-64	1.02	289.00	335.90	459.03
J-65	0.54	289.00	335.90	459.02
J-66	3.37	284.00	335.90	507.98
J-67	0.00	287.25	335.90	476.14
J-80	2.11	287.61	335.91	472.66
J-81	0.00	287.27	335.91	476.02
J-82	0.00	288.01	335.90	468.73
J-83	0.00	288.23	335.90	466.58
J-84	0.00	287.97	335.90	469.12
J-85	0.00	287.13	335.90	477.34
J-86	0.00	289.70	335.90	452.20

Pipe Table

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
P-16	J-12	J-13	69.86	400.0	120.0	16.93	0.13
P-18	J-14	J-15	237.25	400.0	120.0	0.03	0.00
P-19	J-12	J-16	276.80	400.0	120.0	17.18	0.14
P-20	J-16	J-17	251.65	400.0	120.0	5.53	0.04
P-21	J-17	J-15	255.13	400.0	120.0	5.53	0.04
P-22	J-15	J-18	94.78	200.0	110.0	0.03	0.00
P-23	J-18	J-19	146.63	200.0	110.0	0.02	0.00
P-24	J-19	J-20	121.27	200.0	110.0	0.01	0.00
P-25	J-20	J-21	182.77	200.0	110.0	0.01	0.00
P-26	J-21	J-22	126.98	150.0	100.0	0.01	0.00
P-27	J-22	J-23	108.93	150.0	100.0	0.00	0.00
P-28	J-23	J-24	169.42	150.0	100.0	0.00	0.00
P-29	J-14	J-25	128.93	300.0	120.0	-0.03	0.00
P-30	J-25	J-26	246.30	300.0	120.0	-0.01	0.00
P-31	J-26	J-27	153.51	300.0	120.0	-0.01	0.00
P-32	J-27	J-28	244.15	300.0	120.0	0.00	0.00
P-33	J-28	J-29	87.76	300.0	120.0	0.00	0.00
P-34	J-29	J-24	81.77	300.0	120.0	0.00	0.00
P-35	J-18	J-30	166.83	200.0	110.0	0.01	0.00
P-36	J-19	J-30	148.09	200.0	110.0	0.01	0.00
P-37	J-30	J-25	89.80	200.0	110.0	0.02	0.00
P-38	J-20	J-31	195.46	200.0	110.0	0.00	0.00
P-39	J-21	J-31	145.60	200.0	110.0	0.00	0.00
P-40	J-31	J-26	82.64	200.0	110.0	0.01	0.00
P-41	J-22	J-27	161.10	150.0	100.0	0.00	0.00
P-42	J-23	J-29	243.12	150.0	100.0	0.00	0.00
P-43	J-13	J-32	252.83	400.0	120.0	16.93	0.13
P-44	J-32	J-33	172.71	400.0	120.0	16.93	0.13
P-45	J-33	J-34	91.48	400.0	120.0	12.10	0.10
P-46	J-34	J-35	294.77	400.0	120.0	5.37	0.04
P-47	J-16	J-36	140.80	300.0	120.0	11.64	0.16
P-48	J-36	J-37	87.15	300.0	120.0	2.91	0.04
P-49	J-37	J-38	61.00	300.0	120.0	2.96	0.04
P-50	J-38	J-39	71.03	300.0	120.0	1.47	0.02
P-51	J-39	J-40	106.32	300.0	120.0	1.32	0.02
P-52	J-36	J-41	161.99	300.0	120.0	5.06	0.07
P-53	J-41	J-42	130.74	300.0	120.0	0.41	0.01
P-54	J-42	J-43	104.04	300.0	120.0	-0.19	0.00
P-55	J-43	J-44	135.59	300.0	120.0	-0.19	0.00
P-56	J-41	J-44	88.38	300.0	120.0	0.37	0.01
P-57	J-44	J-45	43.92	300.0	120.0	0.18	0.00
P-59	J-45	J-46	64.90	300.0	120.0	0.18	0.00
P-60	J-46	J-47	141.55	300.0	120.0	-1.74	0.02
P-61	J-47	J-48	102.84	300.0	120.0	-1.74	0.02
P-62	J-48	J-49	85.28	300.0	120.0	-1.74	0.02
P-63	J-46	J-49	202.16	300.0	120.0	-2.27	0.03
P-64	J-49	J-50	76.11	300.0	120.0	-4.01	0.06
P-65	J-50	J-40	68.52	300.0	120.0	0.82	0.01
P-66	J-36	J-51	56.74	300.0	120.0	3.68	0.05
P-67	J-51	J-52	112.56	300.0	120.0	2.20	0.03
P-68	J-52	J-53	130.98	300.0	120.0	-2.04	0.03
P-69	J-37	J-53	212.79	300.0	120.0	-0.05	0.00
P-70	J-53	J-54	34.52	300.0	100.0	-2.09	0.03
P-71	J-54	J-55	60.88	200.0	110.0	1.33	0.04
P-72	J-55	J-56	74.15	200.0	110.0	0.54	0.02
P-73	J-56	J-57	100.80	200.0	110.0	0.54	0.02
P-74	J-40	J-58	159.39	300.0	120.0	1.44	0.02
P-75	J-58	J-57	83.09	300.0	120.0	0.89	0.01
P-76	J-38	J-55	242.19	150.0	100.0	0.13	0.01
P-77	J-39	J-56	244.16	150.0	100.0	0.15	0.01
P-78	J-58	J-59	59.45	200.0	110.0	0.55	0.02
P-79	J-59	J-60	160.12	200.0	110.0	0.28	0.01
P-80	J-60	J-59	173.58	200.0	110.0	-0.27	0.01

Minimum Hour

Node Table

ID	Demand	Elevation	Head	Pressure
	(L/s)	*(m)*	*(m)*	*(kPa)*
J-87	0.00	288.61	335.90	462.86
J-88	0.00	287.52	335.90	473.53
J-89	0.00	288.86	335.91	460.51
J-90	0.00	291.05	335.92	439.10
J-122	6.51	292.28	335.90	426.90
J-123	0.00	293.11	335.90	418.78
J-124	0.00	292.71	335.90	422.70
J-125	0.00	292.24	335.90	427.30
J-126	0.42	289.78	335.90	451.37
J-138	0.00	289.25	335.90	456.56
J-139	0.00	291.13	335.90	438.16
J-140	0.00	291.76	335.90	432.00
J-141	0.75	291.78	335.90	431.80
J-142	0.00	292.17	335.90	427.98
J-143	0.00	291.44	335.90	435.13
J-144	0.00	292.02	335.90	429.45
J-175	0.00	286.24	335.90	486.03
MIN		**279.00**		**418.78**
MAX		**293.11**		**556.86**

Min/Max for development (Nodes J-32 to J-152)

Node Table

ID	Elevation	Flow Out	Hydraulic Grade
	(m)	*(L/s)*	*(m)*
R-3	279.19	34.11	279.19

Pipe Table

ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	*(mm)*	*(C)*	*(L/s)*	*(m/s)*
P-81	J-40	J-61	56.33	300.0	120.0	0.51	0.01
P-82	J-61	J-62	73.33	300.0	120.0	1.99	0.03
P-83	J-62	J-63	77.10	300.0	120.0	2.31	0.03
P-84	J-61	J-64	200.68	300.0	120.0	-1.48	0.02
P-85	J-62	J-65	148.61	200.0	110.0	-0.32	0.01
P-86	J-65	J-64	82.37	200.0	110.0	-0.86	0.03
P-87	J-64	J-66	117.71	300.0	120.0	-3.36	0.05
P-88	J-66	J-34	31.38	300.0	120.0	-6.73	0.10
P-90	J-50	J-33	259.58	300.0	120.0	-4.84	0.07
P-91	J-57	J-67	185.91	300.0	120.0	-0.15	0.00
P-104	J-56	J-67	227.38	150.0	100.0	0.15	0.01
P-105(1)	J-55	J-175	188.89	200.0	110.0	0.00	0.00
P-106	J-54	J-80	177.61	300.0	100.0	-2.50	0.04
P-107	J-80	J-81	81.36	300.0	100.0	-5.53	0.08
P-109	J-54	J-82	43.02	200.0	110.0	-0.93	0.03
P-110	J-82	J-83	42.82	200.0	110.0	-0.64	0.02
P-111	J-83	J-84	45.09	200.0	110.0	-0.44	0.01
P-112	J-84	J-85	44.63	200.0	110.0	-0.29	0.01
P-113	J-85	J-86	218.76	200.0	110.0	-0.29	0.01
P-114	J-86	J-87	45.19	200.0	110.0	-0.44	0.01
P-115	J-87	J-88	38.94	200.0	110.0	-0.64	0.02
P-116	J-88	J-80	46.36	200.0	110.0	-0.93	0.03
P-117	J-84	J-86	176.89	150.0	100.0	-0.15	0.01
P-118	J-83	J-87	177.91	150.0	100.0	-0.21	0.01
P-119	J-82	J-88	176.33	150.0	100.0	-0.28	0.02
P-120	J-81	J-89	106.37	300.0	110.0	-5.53	0.08
P-121	J-89	J-90	75.29	300.0	110.0	-5.53	0.08
P-151	J-90	J-15	57.47	300.0	110.0	-5.53	0.08
P-177	J-35	J-122	96.21	300.0	120.0	5.37	0.08
P-178	J-122	J-123	98.33	300.0	120.0	-1.14	0.02
P-179	J-123	J-124	82.19	300.0	120.0	-1.03	0.01
P-180	J-124	J-125	109.71	300.0	120.0	-0.91	0.01
P-181	J-125	J-126	81.66	300.0	120.0	0.25	0.00
P-195	J-138	J-63	84.01	200.0	110.0	-0.17	0.01
P-196	J-63	J-139	41.99	300.0	120.0	1.50	0.02
P-197	J-139	J-140	58.74	300.0	120.0	1.30	0.02
P-198	J-140	J-125	65.62	300.0	120.0	1.16	0.02
P-204	J-138	J-126	168.38	150.0	100.0	0.17	0.01
P-205	J-63	J-141	110.20	200.0	110.0	0.64	0.02
P-206	J-141	J-142	78.81	200.0	110.0	0.11	0.00
P-207	J-142	J-123	169.54	200.0	110.0	0.11	0.00
P-208	J-141	J-143	42.20	150.0	100.0	-0.22	0.01
P-209	J-143	J-144	61.00	150.0	100.0	-0.02	0.00
P-210	J-144	J-124	64.75	150.0	100.0	0.12	0.01
P-211	J-139	J-143	109.29	150.0	100.0	0.20	0.01
P-212	J-140	J-144	109.90	150.0	100.0	0.14	0.01
P-247	R-3	PMP-2	62.51	400.0	120.0	34.11	0.27
P-248	PMP-2	J-12	59.37	400.0	120.0	34.11	0.27

Peak Hour

Node Table

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
J-12	0.00	275.92	328.58	515.42
J-13	0.00	276.01	328.52	513.87
J-14	0.00	293.50	328.24	339.99
J-15	0.00	291.28	328.24	361.72
J-16	0.00	279.83	328.30	474.40
J-17	0.00	285.33	328.27	420.27
J-18	0.00	290.67	328.24	367.69
J-19	0.00	288.78	328.24	386.19
J-20	0.00	287.29	328.24	400.77
J-21	0.00	285.39	328.24	419.37
J-22	0.00	281.15	328.24	460.86
J-23	0.00	279.65	328.24	475.54
J-24	0.00	273.90	328.24	531.82
J-25	0.00	291.96	328.24	355.07
J-26	0.00	284.87	328.24	424.46
J-27	0.00	280.26	328.24	469.57
J-28	0.00	270.43	328.24	565.78
J-29	0.00	272.69	328.24	543.66
J-30	0.00	291.67	328.24	357.91
J-31	0.00	284.94	328.24	423.77
J-32	0.00	279.54	328.27	476.87
J-33	0.00	283.00	328.09	441.33
J-34	0.00	284.05	328.05	430.57
J-35	0.00	289.65	328.01	375.43
J-36	0.00	281.15	328.02	458.71
J-37	0.00	284.94	328.01	421.49
J-38	5.76	287.58	328.00	395.56
J-39	0.00	289.16	327.99	380.06
J-40	0.82	290.30	327.99	368.87
J-41	18.12	280.00	327.95	469.29
J-42	2.55	279.00	327.95	479.07
J-43	0.00	279.00	327.95	479.07
J-44	0.00	281.00	327.95	459.50
J-45	0.00	283.37	327.95	436.30
J-46	17.74	285.00	327.95	420.35
J-47	0.00	283.00	327.96	440.00
J-48	0.00	286.00	327.96	410.70
J-49	0.00	288.00	327.97	391.18
J-50	0.00	290.95	327.99	362.52
J-51	6.27	283.00	328.01	440.47
J-52	17.94	286.00	328.00	411.01
J-53	0.00	288.92	328.01	382.54
J-54	0.00	288.73	328.01	384.44
J-55	3.91	289.09	327.99	380.73
J-56	0.00	290.21	327.99	369.73
J-57	6.68	290.46	327.98	367.22
J-58	0.00	290.96	327.98	362.34
J-59	0.00	291.12	327.98	360.74
J-60	2.32	291.86	327.98	353.47
J-61	0.00	290.35	327.99	368.38
J-62	0.00	291.53	327.98	356.77
J-63	0.00	290.90	327.98	362.86
J-64	4.33	289.00	328.00	381.67
J-65	2.29	289.00	327.99	381.56
J-66	14.25	284.00	328.02	430.84
J-67	0.00	287.25	327.98	398.64
J-80	8.94	287.61	328.04	395.68
J-81	0.00	287.27	328.10	399.57
J-82	0.00	288.01	328.02	391.55
J-83	0.00	288.23	328.02	389.43
J-84	0.00	287.97	328.02	391.99
J-85	0.00	287.13	328.02	400.22
J-86	0.00	289.70	328.03	375.11

Pipe Table

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
P-16	J-12	J-13	69.86	400.0	120.0	71.70	0.57
P-18	J-14	J-15	237.25	400.0	120.0	0.06	0.00
P-19	J-12	J-16	276.80	400.0	120.0	72.72	0.58
P-20	J-16	J-17	251.65	400.0	120.0	23.43	0.19
P-21	J-17	J-15	255.13	400.0	120.0	23.43	0.19
P-22	J-15	J-18	94.78	200.0	110.0	0.06	0.00
P-23	J-18	J-19	146.63	200.0	110.0	0.04	0.00
P-24	J-19	J-20	121.27	200.0	110.0	0.03	0.00
P-25	J-20	J-21	182.77	200.0	110.0	0.03	0.00
P-26	J-21	J-22	126.98	150.0	100.0	0.02	0.00
P-27	J-22	J-23	108.93	150.0	100.0	0.01	0.00
P-28	J-23	J-24	169.42	150.0	100.0	0.00	0.00
P-29	J-14	J-25	128.93	300.0	120.0	-0.06	0.00
P-30	J-25	J-26	246.30	300.0	120.0	-0.03	0.00
P-31	J-26	J-27	153.51	300.0	120.0	-0.02	0.00
P-32	J-27	J-28	244.15	300.0	120.0	-0.01	0.00
P-33	J-28	J-29	87.76	300.0	120.0	-0.01	0.00
P-34	J-29	J-24	81.77	300.0	120.0	0.00	0.00
P-35	J-18	J-30	166.83	200.0	110.0	0.02	0.00
P-36	J-19	J-30	148.09	200.0	110.0	0.02	0.00
P-37	J-30	J-25	89.80	200.0	110.0	0.03	0.00
P-38	J-20	J-31	195.46	200.0	110.0	0.00	0.00
P-39	J-21	J-31	145.60	200.0	110.0	0.01	0.00
P-40	J-31	J-26	82.64	200.0	110.0	0.01	0.00
P-41	J-22	J-27	161.10	150.0	100.0	0.01	0.00
P-42	J-23	J-29	243.12	150.0	100.0	0.01	0.00
P-43	J-13	J-32	252.83	400.0	120.0	71.70	0.57
P-44	J-32	J-33	172.71	400.0	120.0	71.70	0.57
P-45	J-33	J-34	91.48	400.0	120.0	51.21	0.41
P-46	J-34	J-35	294.77	400.0	120.0	22.73	0.18
P-47	J-16	J-36	140.80	300.0	120.0	49.29	0.70
P-48	J-36	J-37	87.15	300.0	120.0	12.30	0.17
P-49	J-37	J-38	61.00	300.0	120.0	12.52	0.18
P-50	J-38	J-39	71.03	300.0	120.0	6.21	0.09
P-51	J-39	J-40	106.32	300.0	120.0	5.58	0.08
P-52	J-36	J-41	161.99	300.0	120.0	21.41	0.30
P-53	J-41	J-42	130.74	300.0	120.0	1.74	0.02
P-54	J-42	J-43	104.04	300.0	120.0	-0.81	0.01
P-55	J-43	J-44	135.59	300.0	120.0	-0.81	0.01
P-56	J-41	J-44	88.38	300.0	120.0	1.56	0.02
P-57	J-44	J-45	43.92	300.0	120.0	0.74	0.01
P-59	J-45	J-46	64.90	300.0	120.0	0.74	0.01
P-60	J-46	J-47	141.55	300.0	120.0	-7.38	0.10
P-61	J-47	J-48	102.84	300.0	120.0	-7.38	0.10
P-62	J-48	J-49	85.28	300.0	120.0	-7.38	0.10
P-63	J-46	J-49	202.16	300.0	120.0	-9.61	0.14
P-64	J-49	J-50	76.11	300.0	120.0	-17.00	0.24
P-65	J-50	J-40	68.52	300.0	120.0	3.49	0.05
P-66	J-36	J-51	56.74	300.0	120.0	15.58	0.22
P-67	J-51	J-52	112.56	300.0	120.0	9.31	0.13
P-68	J-52	J-53	130.98	300.0	120.0	-8.63	0.12
P-69	J-37	J-53	212.79	300.0	120.0	-0.22	0.00
P-70	J-53	J-54	34.52	300.0	100.0	-8.85	0.13
P-71	J-54	J-55	60.88	200.0	110.0	5.64	0.18
P-72	J-55	J-56	74.15	200.0	110.0	2.28	0.07
P-73	J-56	J-57	100.80	200.0	110.0	2.28	0.07
P-74	J-40	J-58	159.39	300.0	120.0	6.10	0.09
P-75	J-58	J-57	83.09	300.0	120.0	3.78	0.05
P-76	J-38	J-55	242.19	150.0	100.0	0.56	0.03
P-77	J-39	J-56	244.16	150.0	100.0	0.62	0.04
P-78	J-58	J-59	59.45	200.0	110.0	2.32	0.07
P-79	J-59	J-60	160.12	200.0	110.0	1.19	0.04
P-80	J-60	J-59	173.58	200.0	110.0	-1.13	0.04

Peak Hour

Node Table

ID	Demand	Elevation	Head	Pressure
	(L/s)	*(m)*	*(m)*	*(kPa)*
J-87	0.00	288.61	328.03	385.79
J-88	0.00	287.52	328.03	396.49
J-89	0.00	288.86	328.16	384.63
J-90	0.00	291.05	328.21	363.64
J-122	27.52	292.28	327.96	349.24
J-123	0.00	293.11	327.97	341.14
J-124	0.00	292.71	327.97	345.07
J-125	0.00	292.24	327.97	349.69
J-126	1.79	289.78	327.97	373.77
J-138	0.00	289.25	327.98	379.00
J-139	0.00	291.13	327.97	360.59
J-140	0.00	291.76	327.97	354.41
J-141	3.19	291.78	327.97	354.16
J-142	0.00	292.17	327.97	350.34
J-143	0.00	291.44	327.97	357.51
J-144	0.00	292.02	327.97	351.84
J-175	0.00	286.24	327.99	408.62
MIN		**279.00**		**341.14**
MAX		**293.11**		**479.07**

Min/Max for development (Nodes J-32 to J-152)

Node Table

ID	Elevation	Flow Out	Hydraulic Grade
	(m)	*(L/s)*	*(m)*
R-3	273.74	144.42	273.74

Pipe Table

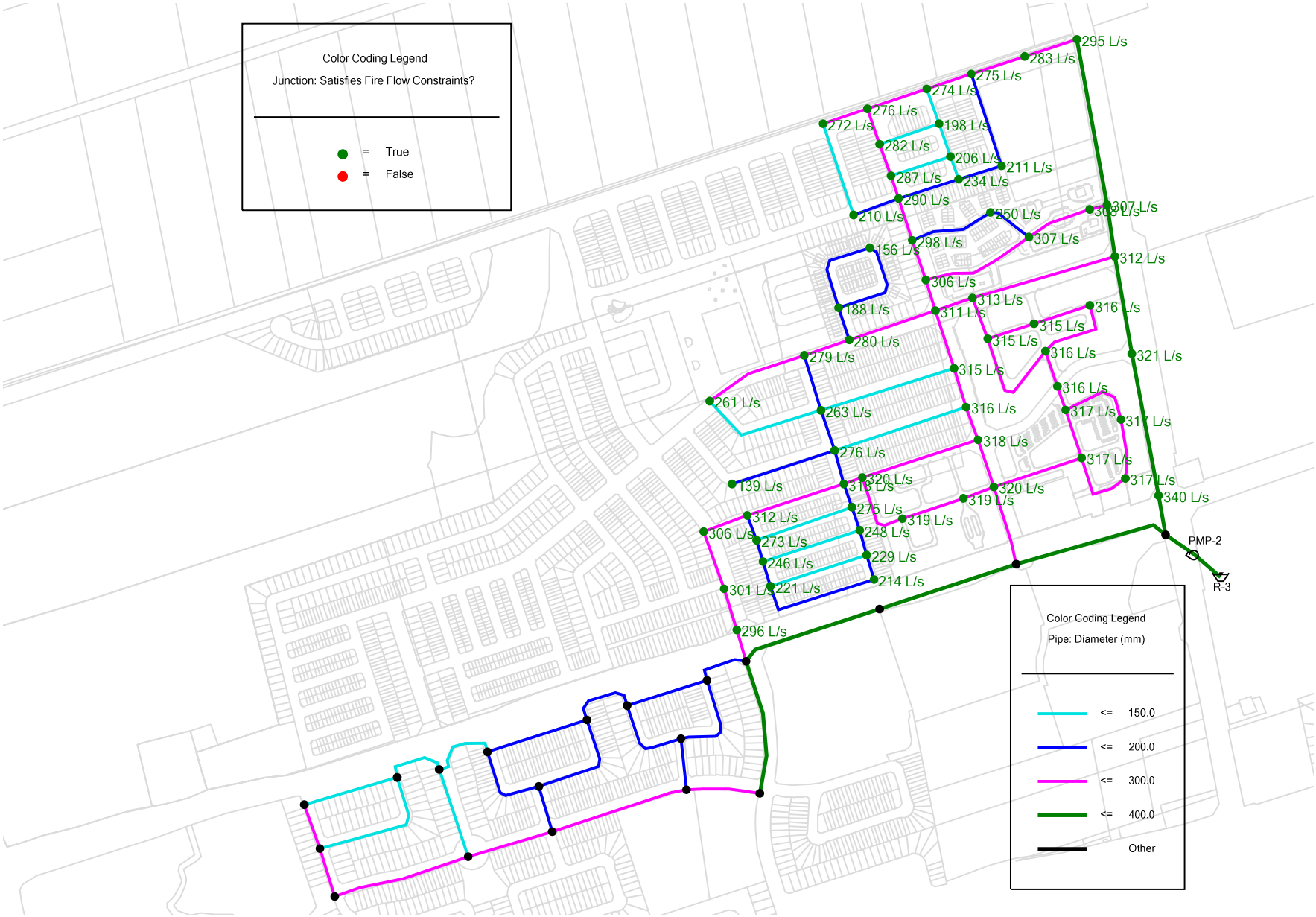
ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	*(mm)*	*(C)*	*(L/s)*	*(m/s)*
P-81	J-40	J-61	56.33	300.0	120.0	2.16	0.03
P-82	J-61	J-62	73.33	300.0	120.0	8.42	0.12
P-83	J-62	J-63	77.10	300.0	120.0	9.77	0.14
P-84	J-61	J-64	200.68	300.0	120.0	-6.27	0.09
P-85	J-62	J-65	148.61	200.0	110.0	-1.35	0.04
P-86	J-65	J-64	82.37	200.0	110.0	-3.64	0.12
P-87	J-64	J-66	117.71	300.0	120.0	-14.23	0.20
P-88	J-66	J-34	31.38	300.0	120.0	-28.48	0.40
P-90	J-50	J-33	259.58	300.0	120.0	-20.49	0.29
P-91	J-57	J-67	185.91	300.0	120.0	-0.62	0.01
P-104	J-56	J-67	227.38	150.0	100.0	0.62	0.04
P-105(1)	J-55	J-175	188.89	200.0	110.0	0.00	0.00
P-106	J-54	J-80	177.61	300.0	100.0	-10.56	0.15
P-107	J-80	J-81	81.36	300.0	100.0	-23.43	0.33
P-109	J-54	J-82	43.02	200.0	110.0	-3.93	0.12
P-110	J-82	J-83	42.82	200.0	110.0	-2.73	0.09
P-111	J-83	J-84	45.09	200.0	110.0	-1.86	0.06
P-112	J-84	J-85	44.63	200.0	110.0	-1.22	0.04
P-113	J-85	J-86	218.76	200.0	110.0	-1.22	0.04
P-114	J-86	J-87	45.19	200.0	110.0	-1.86	0.06
P-115	J-87	J-88	38.94	200.0	110.0	-2.73	0.09
P-116	J-88	J-80	46.36	200.0	110.0	-3.93	0.12
P-117	J-84	J-86	176.89	150.0	100.0	-0.64	0.04
P-118	J-83	J-87	177.91	150.0	100.0	-0.87	0.05
P-119	J-82	J-88	176.33	150.0	100.0	-1.20	0.07
P-120	J-81	J-89	106.37	300.0	110.0	-23.43	0.33
P-121	J-89	J-90	75.29	300.0	110.0	-23.43	0.33
P-151	J-90	J-15	57.47	300.0	110.0	-23.43	0.33
P-177	J-35	J-122	96.21	300.0	120.0	22.73	0.32
P-178	J-122	J-123	98.33	300.0	120.0	-4.79	0.07
P-179	J-123	J-124	82.19	300.0	120.0	-4.33	0.06
P-180	J-124	J-125	109.71	300.0	120.0	-3.82	0.05
P-181	J-125	J-126	81.66	300.0	120.0	1.08	0.02
P-195	J-138	J-63	84.01	200.0	110.0	-0.71	0.02
P-196	J-63	J-139	41.99	300.0	120.0	6.34	0.09
P-197	J-139	J-140	58.74	300.0	120.0	5.51	0.08
P-198	J-140	J-125	65.62	300.0	120.0	4.90	0.07
P-204	J-138	J-126	168.38	150.0	100.0	0.71	0.04
P-205	J-63	J-141	110.20	200.0	110.0	2.72	0.09
P-206	J-141	J-142	78.81	200.0	110.0	0.46	0.01
P-207	J-142	J-123	169.54	200.0	110.0	0.46	0.01
P-208	J-141	J-143	42.20	150.0	100.0	-0.92	0.05
P-209	J-143	J-144	61.00	150.0	100.0	-0.09	0.01
P-210	J-144	J-124	64.75	150.0	100.0	0.51	0.03
P-211	J-139	J-143	109.29	150.0	100.0	0.83	0.05
P-212	J-140	J-144	109.90	150.0	100.0	0.61	0.03
P-247	R-3	PMP-2	62.51	400.0	120.0	144.42	1.15
P-248	PMP-2	J-12	59.37	400.0	120.0	144.42	1.15

Fire Flow Table					
ID	Fire Flow Demand	Total Demand	Total Available Flow	Available Fire Flow	Fire Flow Met?
	(L/s)	*(L/s)*	*(L/s)*	*(L/s)*	
J-13	250.00	250.00	339.58	339.58	TRUE
J-32	250.00	250.00	320.98	320.98	TRUE
J-33	250.00	250.00	312.43	312.43	TRUE
J-34	250.00	250.00	307.35	307.35	TRUE
J-35	250.00	250.00	295.03	295.03	TRUE
J-36	250.00	250.00	319.66	319.66	TRUE
J-37	250.00	250.00	317.81	317.81	TRUE
J-38	254.19	250.00	320.62	316.43	TRUE
J-39	250.00	250.00	315.06	315.06	TRUE
J-40	250.60	250.00	312.02	311.42	TRUE
J-41	263.18	250.00	329.96	316.78	TRUE
J-42	251.85	250.00	318.52	316.67	TRUE
J-43	250.00	250.00	316.64	316.64	TRUE
J-44	250.00	250.00	316.55	316.55	TRUE
J-45	250.00	250.00	316.38	316.38	TRUE
J-46	262.90	250.00	328.89	315.99	TRUE
J-47	250.00	250.00	315.55	315.55	TRUE
J-48	250.00	250.00	315.35	315.35	TRUE
J-49	250.00	250.00	315.13	315.13	TRUE
J-50	250.00	250.00	313.41	313.41	TRUE
J-51	254.56	250.00	323.90	319.34	TRUE
J-52	263.04	250.00	332.53	319.49	TRUE
J-53	250.00	250.00	319.66	319.66	TRUE
J-54	100.00	100.00	318.34	318.34	TRUE
J-55	102.84	100.00	278.40	275.56	TRUE
J-56	100.00	100.00	262.64	262.64	TRUE
J-57	254.86	250.00	283.76	278.90	TRUE
J-58	250.00	250.00	279.87	279.87	TRUE
J-59	100.00	100.00	187.59	187.59	TRUE
J-60	101.69	100.00	157.80	156.11	TRUE
J-61	250.00	250.00	305.75	305.75	TRUE
J-62	100.00	100.00	298.22	298.22	TRUE
J-63	100.00	100.00	290.12	290.12	TRUE
J-64	253.15	250.00	310.08	306.93	TRUE
J-65	101.67	100.00	251.79	250.12	TRUE
J-66	260.37	250.00	318.00	307.63	TRUE
J-67	250.00	250.00	260.76	260.76	TRUE
J-80	106.50	100.00	318.05	311.55	TRUE
J-81	100.00	100.00	306.48	306.48	TRUE
J-82	100.00	100.00	274.75	274.75	TRUE
J-83	100.00	100.00	247.82	247.82	TRUE
J-84	100.00	100.00	228.65	228.65	TRUE
J-85	100.00	100.00	214.34	214.34	TRUE
J-86	100.00	100.00	220.86	220.86	TRUE
J-87	100.00	100.00	246.08	246.08	TRUE
J-88	100.00	100.00	272.70	272.70	TRUE
J-89	100.00	100.00	300.63	300.63	TRUE
J-90	100.00	100.00	295.83	295.83	TRUE
J-122	270.02	250.00	303.10	283.08	TRUE
J-123	250.00	250.00	274.63	274.63	TRUE
J-124	100.00	100.00	274.46	274.46	TRUE
J-125	100.00	100.00	276.41	276.41	TRUE
J-126	101.30	100.00	273.69	272.39	TRUE
J-138	100.00	100.00	210.48	210.48	TRUE
J-139	100.00	100.00	287.05	287.05	TRUE
J-140	100.00	100.00	281.77	281.77	TRUE
J-141	102.32	100.00	236.78	234.46	TRUE
J-142	100.00	100.00	211.18	211.18	TRUE
J-143	100.00	100.00	205.81	205.81	TRUE
J-144	100.00	100.00	198.04	198.04	TRUE
J-175	100.00	100.00	138.59	138.59	TRUE

MIN	**138.59**
MAX	**339.58**

Available Fire Flow at 140 kPa

Scenario: Maximum Day (Phase 1)



North West Green Lane (Feb 2025).wtg

Appendix D

Model Results

Preliminary System Layout

North West Green Lane (Feb 2025).wtg

Results
North West Green Lane Development, East Gwillimbury
February 2025

Municipal Engineering Solutions

Average Day

Node Table

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
J-12	0.00	275.92	332.33	552.11
J-13	0.00	276.01	332.32	551.06
J-14	0.00	293.50	332.21	378.86
J-15	0.00	291.28	332.21	400.60
J-16	0.00	279.83	332.25	513.01
J-17	0.00	285.33	332.23	459.01
J-18	0.00	290.67	332.21	406.54
J-19	0.00	288.78	332.21	425.02
J-20	0.00	287.29	332.21	439.58
J-21	0.00	285.39	332.20	458.16
J-22	0.00	281.15	332.20	499.61
J-23	0.00	279.65	332.19	514.23
J-24	0.00	273.90	332.19	570.46
J-25	0.00	291.96	332.21	393.91
J-26	0.00	284.87	332.20	463.24
J-27	0.00	280.26	332.20	508.32
J-28	0.00	270.43	332.19	604.47
J-29	0.00	272.69	332.19	582.33
J-30	0.00	291.67	332.21	396.74
J-31	0.00	284.94	332.20	462.56
J-32	0.00	279.54	332.26	515.93
J-33	0.00	283.00	332.21	481.66
J-34	0.00	284.05	332.20	471.27
J-35	0.00	289.65	332.20	416.38
J-36	0.00	281.15	332.19	499.53
J-37	0.00	284.94	332.19	462.41
J-38	2.09	287.58	332.19	436.56
J-39	0.00	289.16	332.19	421.10
J-40	0.30	290.30	332.19	409.94
J-41	6.59	280.00	332.18	510.69
J-42	0.93	279.00	332.18	520.48
J-43	0.00	279.00	332.18	520.48
J-44	0.00	281.00	332.18	500.90
J-45	0.00	283.37	332.18	477.71
J-46	6.45	285.00	332.18	461.76
J-47	0.00	283.00	332.18	481.35
J-48	0.00	286.00	332.18	451.99
J-49	0.00	288.00	332.18	432.43
J-50	0.00	290.95	332.19	403.59
J-51	2.28	283.00	332.19	481.40
J-52	6.52	286.00	332.18	452.01
J-53	0.00	288.92	332.19	423.43
J-54	0.00	288.73	332.19	425.29
J-55	1.42	289.09	332.18	421.75
J-56	0.00	290.21	332.18	410.79
J-57	2.43	290.46	332.18	408.34
J-58	0.00	290.96	332.18	403.45
J-59	0.00	291.12	332.18	401.88
J-60	0.84	291.86	332.18	394.64
J-61	0.00	290.35	332.19	409.46
J-62	0.00	291.53	332.19	397.90
J-63	0.00	290.90	332.18	404.05
J-64	1.58	289.00	332.19	422.71
J-65	0.83	289.00	332.19	422.68
J-66	5.18	284.00	332.20	471.71
J-67	0.00	287.25	332.18	439.75
J-68	2.43	284.85	332.18	463.24
J-69	0.63	282.30	332.18	488.19
J-70	0.00	279.76	332.18	513.05
J-71	0.00	277.82	332.18	532.03
J-72	0.00	278.66	332.18	523.81
J-73	0.00	278.86	332.18	521.85
J-74	0.00	279.09	332.18	519.60
J-75	0.00	279.01	332.18	520.38
J-76	0.00	277.79	332.18	532.32
J-77	0.00	276.55	332.18	544.46
J-78	0.00	275.26	332.18	557.09
J-79	2.64	274.07	332.18	568.73
J-80	3.25	287.61	332.19	436.25
J-81	0.00	287.27	332.19	439.59

Pipe Table

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
P-16	J-12	J-13	69.86	400.0	120.0	33.23	0.26
P-18	J-14	J-15	237.25	400.0	120.0	-4.04	0.03
P-19	J-12	J-16	276.80	400.0	120.0	38.05	0.30
P-20	J-16	J-17	251.65	400.0	120.0	17.33	0.14
P-21	J-17	J-15	255.13	400.0	120.0	17.33	0.14
P-22	J-15	J-18	94.78	200.0	110.0	1.56	0.05
P-23	J-18	J-19	146.63	200.0	110.0	0.90	0.03
P-24	J-19	J-20	121.27	200.0	110.0	1.42	0.05
P-25	J-20	J-21	182.77	200.0	110.0	0.73	0.02
P-26	J-21	J-22	126.98	150.0	100.0	0.79	0.04
P-27	J-22	J-23	108.93	150.0	100.0	0.96	0.05
P-28	J-23	J-24	169.42	150.0	100.0	0.62	0.04
P-29	J-14	J-25	128.93	300.0	120.0	4.04	0.06
P-30	J-25	J-26	246.30	300.0	120.0	4.17	0.06
P-31	J-26	J-27	153.51	300.0	120.0	4.81	0.07
P-32	J-27	J-28	244.15	300.0	120.0	4.64	0.07
P-33	J-28	J-29	87.76	300.0	120.0	4.64	0.07
P-34	J-29	J-24	81.77	300.0	120.0	4.97	0.07
P-35	J-18	J-30	166.83	200.0	110.0	0.66	0.02
P-36	J-19	J-30	148.09	200.0	110.0	-0.52	0.02
P-37	J-30	J-25	89.80	200.0	110.0	0.13	0.00
P-38	J-20	J-31	195.46	200.0	110.0	0.70	0.02
P-39	J-21	J-31	145.60	200.0	110.0	-0.06	0.00
P-40	J-31	J-26	82.64	200.0	110.0	0.63	0.02
P-41	J-22	J-27	161.10	150.0	100.0	-0.17	0.01
P-42	J-23	J-29	243.12	150.0	100.0	0.33	0.02
P-43	J-13	J-32	252.83	400.0	120.0	33.23	0.26
P-44	J-32	J-33	172.71	400.0	120.0	33.23	0.26
P-45	J-33	J-34	91.48	400.0	120.0	23.30	0.19
P-46	J-34	J-35	294.77	400.0	120.0	10.60	0.08
P-47	J-16	J-36	140.80	300.0	120.0	20.73	0.29
P-48	J-36	J-37	87.15	300.0	120.0	5.99	0.08
P-49	J-37	J-38	61.00	300.0	120.0	2.93	0.04
P-50	J-38	J-39	71.03	300.0	120.0	0.36	0.01
P-51	J-39	J-40	106.32	300.0	120.0	-0.12	0.00
P-52	J-36	J-41	161.99	300.0	120.0	7.51	0.11
P-53	J-41	J-42	130.74	300.0	120.0	0.58	0.01
P-54	J-42	J-43	104.04	300.0	120.0	-0.35	0.00
P-55	J-43	J-44	135.59	300.0	120.0	-0.35	0.00
P-56	J-41	J-44	88.38	300.0	120.0	0.35	0.00
P-57	J-44	J-45	43.92	300.0	120.0	-0.01	0.00
P-59	J-45	J-46	64.90	300.0	120.0	-0.01	0.00
P-60	J-46	J-47	141.55	300.0	120.0	-2.80	0.04
P-61	J-47	J-48	102.84	300.0	120.0	-2.80	0.04
P-62	J-48	J-49	85.28	300.0	120.0	-2.80	0.04
P-63	J-46	J-49	202.16	300.0	120.0	-3.65	0.05
P-64	J-49	J-50	76.11	300.0	120.0	-6.46	0.09
P-65	J-50	J-40	68.52	300.0	120.0	3.47	0.05
P-66	J-36	J-51	56.74	300.0	120.0	7.23	0.10
P-67	J-51	J-52	112.56	300.0	120.0	4.95	0.07
P-68	J-52	J-53	130.98	300.0	120.0	-1.57	0.02
P-69	J-37	J-53	212.79	300.0	120.0	3.06	0.04
P-70	J-53	J-54	34.52	300.0	100.0	1.49	0.02
P-71	J-54	J-55	60.88	200.0	110.0	1.58	0.05
P-72	J-55	J-56	74.15	200.0	110.0	0.19	0.01
P-73	J-56	J-57	100.80	200.0	110.0	0.47	0.01
P-74	J-40	J-58	159.39	300.0	120.0	4.00	0.06
P-75	J-58	J-57	83.09	300.0	120.0	3.16	0.04
P-76	J-38	J-55	242.19	150.0	100.0	0.48	0.03
P-77	J-39	J-56	244.16	150.0	100.0	0.48	0.03
P-78	J-58	J-59	59.45	200.0	110.0	0.84	0.03
P-79	J-59	J-60	160.12	200.0	110.0	0.43	0.01
P-80	J-60	J-59	173.58	200.0	110.0	-0.41	0.01
P-81	J-40	J-61	56.33	300.0	120.0	-0.95	0.01
P-82	J-61	J-62	73.33	300.0	120.0	3.16	0.04
P-83	J-62	J-63	77.10	300.0	120.0	4.16	0.06
P-84	J-61	J-64	200.68	300.0	120.0	-4.11	0.06
P-85	J-62	J-65	148.61	200.0	110.0	-1.00	0.03
P-86	J-65	J-64	82.37	200.0	110.0	-1.83	0.06
P-87	J-64	J-66	117.71	300.0	120.0	-7.52	0.11

Average Day

Node Table

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
J-82	0.00	288.01	332.19	432.34
J-83	0.00	288.23	332.19	430.18
J-84	0.00	287.97	332.19	432.73
J-85	0.00	287.13	332.19	440.95
J-86	0.00	289.70	332.19	415.80
J-87	0.00	288.61	332.19	426.46
J-88	0.00	287.52	332.19	437.13
J-89	0.00	288.86	332.19	424.11
J-90	0.00	291.05	332.20	402.75
J-91	0.00	284.28	332.18	468.84
J-92	0.00	283.93	332.18	472.23
J-93	0.00	278.67	332.18	523.70
J-94	0.00	286.97	332.18	442.51
J-95	2.51	285.15	332.18	460.26
J-96	0.00	280.83	332.18	502.57
J-97	0.00	281.95	332.18	491.62
J-98	0.00	283.00	332.18	481.34
J-99	0.00	281.99	332.18	491.21
J-100	0.00	280.84	332.18	502.47
J-101	2.97	279.79	332.18	512.74
J-102	0.00	279.99	332.18	510.79
J-103	0.00	279.47	332.18	515.88
J-104	0.00	279.42	332.18	516.37
J-105	0.00	279.65	332.18	514.12
J-106	0.00	281.16	332.18	499.35
J-107	0.00	274.89	332.18	560.71
J-108	0.00	275.39	332.18	555.82
J-109	0.00	276.03	332.18	549.56
J-110	0.00	277.15	332.18	538.61
J-111	0.00	278.00	332.18	530.29
J-112	0.81	275.14	332.19	558.29
J-113	0.00	273.85	332.18	570.89
J-114	0.00	273.63	332.18	573.05
J-115	0.00	273.83	332.18	571.10
J-116	0.00	274.82	332.18	561.42
J-117	2.01	277.12	332.18	538.83
J-118	0.00	276.01	332.18	549.73
J-119	1.41	276.82	332.18	541.79
J-120	0.00	278.68	332.18	523.62
J-121	0.00	279.10	332.18	519.51
J-122	10.01	292.28	332.18	390.53
J-123	0.00	293.11	332.18	382.41
J-124	0.00	292.71	332.18	386.33
J-125	0.00	292.24	332.18	390.92
J-126	0.65	289.78	332.18	414.99
J-127	0.00	287.39	332.18	438.38
J-128	0.00	284.96	332.18	462.16
J-129	0.00	282.89	332.18	482.42
J-130	0.00	281.09	332.18	500.03
J-131	0.00	280.43	332.18	506.49
J-132	0.00	279.98	332.18	510.89
J-133	0.00	281.11	332.18	499.83
J-134	0.00	283.68	332.18	474.68
J-135	0.00	284.83	332.18	463.42
J-136	2.27	286.47	332.18	447.37
J-137	0.00	288.37	332.18	428.79
J-138	0.00	289.25	332.18	420.18
J-139	0.00	291.13	332.18	401.79
J-140	0.00	291.76	332.18	395.63
J-141	1.16	291.78	332.18	395.43
J-142	0.00	292.17	332.18	391.61
J-143	0.00	291.44	332.18	398.76
J-144	0.00	292.02	332.18	393.08
J-145	0.00	279.47	332.18	515.88
J-146	0.00	282.26	332.18	488.58
J-147	0.00	286.19	332.18	450.11
J-148	0.00	288.43	332.18	428.19
J-149	0.00	280.75	332.18	503.35

Pipe Table

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
P-88	J-66	J-34	31.38	300.0	120.0	-12.70	0.18
P-90	J-50	J-33	259.58	300.0	120.0	-9.93	0.14
P-91	J-57	J-67	185.91	300.0	120.0	1.20	0.02
P-92	J-67	J-68	73.17	300.0	120.0	1.40	0.02
P-93	J-68	J-69	79.44	300.0	120.0	-0.57	0.01
P-94	J-69	J-70	72.35	300.0	120.0	1.85	0.03
P-95	J-70	J-71	71.03	300.0	120.0	1.78	0.03
P-96	J-71	J-72	118.42	300.0	120.0	0.74	0.01
P-97	J-72	J-73	52.75	300.0	120.0	1.06	0.02
P-98	J-73	J-74	44.14	300.0	120.0	1.09	0.02
P-99	J-74	J-75	41.03	300.0	120.0	1.00	0.01
P-100	J-75	J-76	47.42	300.0	120.0	0.80	0.01
P-101	J-76	J-77	78.95	300.0	120.0	-1.15	0.02
P-102	J-77	J-78	65.47	300.0	120.0	-1.21	0.02
P-103	J-78	J-79	139.12	300.0	120.0	-0.18	0.00
P-104	J-56	J-67	227.38	150.0	100.0	0.20	0.01
P-105(1)	J-55	J-175	188.89	200.0	110.0	0.45	0.01
P-105(2)	J-175	J-68	140.75	200.0	110.0	0.45	0.01
P-106	J-54	J-80	177.61	300.0	100.0	-0.09	0.00
P-107	J-80	J-81	81.36	300.0	100.0	-3.35	0.05
P-108	J-81	J-69	167.34	300.0	110.0	4.27	0.06
P-109	J-54	J-82	43.02	200.0	110.0	-0.01	0.00
P-110	J-82	J-83	42.82	200.0	110.0	0.01	0.00
P-111	J-83	J-84	45.09	200.0	110.0	0.01	0.00
P-112	J-84	J-85	44.63	200.0	110.0	0.00	0.00
P-113	J-85	J-86	218.76	200.0	110.0	0.00	0.00
P-114	J-86	J-87	45.19	200.0	110.0	0.01	0.00
P-115	J-87	J-88	38.94	200.0	110.0	0.01	0.00
P-116	J-88	J-80	46.36	200.0	110.0	-0.01	0.00
P-117	J-84	J-86	176.89	150.0	100.0	0.00	0.00
P-118	J-83	J-87	177.91	150.0	100.0	0.00	0.00
P-119	J-82	J-88	176.33	150.0	100.0	-0.01	0.00
P-120	J-81	J-89	106.37	300.0	110.0	-7.61	0.11
P-121	J-89	J-90	75.29	300.0	110.0	-9.17	0.13
P-122	J-90	J-91	253.20	200.0	110.0	2.56	0.08
P-123	J-91	J-92	63.51	150.0	100.0	0.90	0.05
P-124	J-92	J-93	178.49	150.0	100.0	0.17	0.01
P-125	J-93	J-71	79.88	150.0	100.0	-0.40	0.02
P-126	J-89	J-94	74.96	150.0	100.0	1.56	0.09
P-127	J-94	J-95	72.34	150.0	100.0	1.21	0.07
P-128	J-95	J-92	96.06	150.0	100.0	-0.73	0.04
P-129	J-94	J-70	247.39	150.0	100.0	0.35	0.02
P-130	J-95	J-93	137.05	150.0	100.0	-0.57	0.03
P-131	J-72	J-96	140.90	200.0	110.0	-0.32	0.01
P-132	J-96	J-97	40.22	200.0	110.0	-0.59	0.02
P-133	J-97	J-98	46.64	200.0	110.0	-0.90	0.03
P-134	J-98	J-99	188.30	200.0	110.0	0.76	0.02
P-135	J-99	J-100	47.99	200.0	110.0	0.76	0.02
P-136	J-100	J-101	43.45	200.0	110.0	1.07	0.03
P-137	J-101	J-76	126.02	200.0	110.0	-0.87	0.03
P-138	J-97	J-100	188.48	150.0	100.0	0.31	0.02
P-139	J-96	J-102	55.61	150.0	100.0	0.27	0.02
P-140	J-102	J-103	40.90	150.0	100.0	0.24	0.01
P-141	J-103	J-104	45.46	150.0	100.0	0.33	0.02
P-142	J-104	J-101	46.57	150.0	100.0	0.53	0.03
P-143	J-102	J-73	129.52	150.0	100.0	0.03	0.00
P-144	J-103	J-74	128.08	150.0	100.0	-0.09	0.01
P-145	J-104	J-75	129.37	150.0	100.0	-0.20	0.01
P-146	J-77	J-105	126.13	150.0	100.0	0.06	0.00
P-147	J-105	J-106	99.13	150.0	100.0	-0.44	0.03
P-148	J-101	J-105	79.75	150.0	100.0	-0.50	0.03
P-149	J-106	J-111	61.56	150.0	100.0	-0.44	0.03
P-151	J-90	J-15	57.47	300.0	110.0	-11.73	0.17
P-152	J-78	J-107	44.11	200.0	110.0	-1.03	0.03
P-153	J-107	J-108	45.00	200.0	110.0	-0.98	0.03
P-154	J-108	J-109	42.98	200.0	110.0	-0.88	0.03
P-155	J-109	J-110	45.18	200.0	110.0	-0.71	0.02
P-156	J-110	J-111	49.92	200.0	110.0	-0.44	0.01

Average Day

Node Table

ID	Demand	Elevation	Head	Pressure
	(L/s)	*(m)*	*(m)*	*(kPa)*
J-150	0.00	284.56	332.18	466.06
J-151	1.09	285.50	332.18	456.86
J-152	0.00	284.93	332.18	462.43
J-175	0.00	286.24	332.18	449.64
MIN		**273.63**		**382.41**
MAX		**293.11**		**573.05**

Min/Max for development (Nodes J-32 to J-152)

Node Table

ID	Elevation	Flow Out	Hydraulic Grade
	(m)	*(L/s)*	*(m)*
R-3	275.92	71.28	275.92

Pipe Table

ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	*(mm)*	*(C)*	*(L/s)*	*(m/s)*
P-157	J-111	J-112	155.85	200.0	110.0	-0.88	0.03
P-158	J-112	J-24	88.23	300.0	120.0	-5.59	0.08
P-159	J-79	J-113	44.09	300.0	120.0	-3.31	0.05
P-160	J-113	J-114	45.76	300.0	120.0	-3.36	0.05
P-161	J-114	J-115	43.84	300.0	120.0	-3.46	0.05
P-162	J-115	J-116	46.51	300.0	120.0	-3.64	0.05
P-163	J-116	J-112	47.28	300.0	120.0	-3.90	0.06
P-164	J-110	J-116	152.34	150.0	100.0	-0.27	0.02
P-165	J-109	J-115	149.23	150.0	100.0	-0.17	0.01
P-166	J-108	J-114	144.97	150.0	100.0	-0.10	0.01
P-167	J-107	J-113	144.59	150.0	100.0	-0.05	0.00
P-168	J-79	J-117	343.57	150.0	100.0	0.49	0.03
P-169	J-117	J-118	274.06	150.0	100.0	-0.44	0.02
P-170	J-76	J-117	75.27	150.0	100.0	1.08	0.06
P-171	J-71	J-118	74.70	150.0	100.0	0.64	0.04
P-172	J-118	J-119	257.52	150.0	100.0	0.20	0.01
P-173	J-119	J-120	73.17	150.0	100.0	-0.79	0.04
P-174	J-70	J-119	253.30	150.0	100.0	0.42	0.02
P-175	J-69	J-120	230.89	300.0	110.0	1.21	0.02
P-176	J-120	J-121	71.24	300.0	110.0	0.42	0.01
P-177	J-35	J-122	96.21	300.0	120.0	10.60	0.15
P-178	J-122	J-123	98.33	300.0	120.0	0.59	0.01
P-179	J-123	J-124	82.19	300.0	120.0	0.45	0.01
P-180	J-124	J-125	109.71	300.0	120.0	0.58	0.01
P-181	J-125	J-126	81.66	300.0	120.0	2.45	0.03
P-182	J-126	J-127	82.92	300.0	120.0	1.92	0.03
P-183	J-127	J-128	78.45	300.0	120.0	1.74	0.02
P-184	J-128	J-129	79.94	300.0	120.0	1.38	0.02
P-185	J-129	J-130	81.57	300.0	120.0	1.14	0.02
P-186	J-130	J-131	80.72	300.0	120.0	0.97	0.01
P-187	J-131	J-132	95.42	300.0	120.0	0.86	0.01
P-188	J-132	J-121	161.11	300.0	110.0	-0.23	0.00
P-189	J-121	J-133	97.89	200.0	110.0	0.19	0.01
P-190	J-133	J-134	83.47	200.0	110.0	0.31	0.01
P-191	J-134	J-135	81.34	200.0	110.0	0.47	0.02
P-192	J-135	J-136	80.64	200.0	110.0	0.72	0.02
P-193	J-136	J-137	80.49	200.0	110.0	-1.20	0.04
P-194	J-137	J-138	81.54	200.0	110.0	-1.02	0.03
P-195	J-138	J-63	84.01	200.0	110.0	-1.14	0.04
P-196	J-63	J-139	41.99	300.0	120.0	2.23	0.03
P-197	J-139	J-140	58.74	300.0	120.0	1.99	0.03
P-198	J-140	J-125	65.62	300.0	120.0	1.87	0.03
P-199	J-133	J-131	169.27	150.0	100.0	-0.11	0.01
P-200	J-134	J-130	169.34	150.0	100.0	-0.17	0.01
P-201	J-135	J-129	172.84	150.0	100.0	-0.24	0.01
P-202	J-136	J-128	172.61	150.0	100.0	-0.35	0.02
P-203	J-137	J-127	170.89	150.0	100.0	-0.18	0.01
P-204	J-138	J-126	168.38	150.0	100.0	0.12	0.01
P-205	J-63	J-141	110.20	200.0	110.0	0.79	0.03
P-206	J-141	J-142	78.81	200.0	110.0	-0.14	0.00
P-207	J-142	J-123	169.54	200.0	110.0	-0.14	0.00
P-208	J-141	J-143	42.20	150.0	100.0	-0.22	0.01
P-209	J-143	J-144	61.00	150.0	100.0	0.01	0.00
P-210	J-144	J-124	64.75	150.0	100.0	0.14	0.01
P-211	J-139	J-143	109.29	150.0	100.0	0.24	0.01
P-212	J-140	J-144	109.90	150.0	100.0	0.13	0.01
P-213	J-132	J-145	163.26	300.0	120.0	1.09	0.02
P-214	J-145	J-146	81.42	300.0	120.0	0.75	0.01
P-215	J-146	J-147	77.32	300.0	120.0	0.59	0.01
P-216	J-147	J-148	79.50	300.0	120.0	0.36	0.01
P-217	J-145	J-149	182.46	200.0	110.0	0.34	0.01
P-218	J-149	J-150	79.35	200.0	110.0	0.50	0.02
P-219	J-150	J-151	79.12	200.0	110.0	0.73	0.02
P-220	J-151	J-152	155.36	200.0	110.0	0.00	0.00
P-221	J-149	J-146	111.15	150.0	100.0	-0.16	0.01
P-222	J-150	J-147	111.15	150.0	100.0	-0.24	0.01
P-223	J-151	J-148	111.97	150.0	100.0	-0.36	0.02
P-224	J-91	J-98	60.42	200.0	110.0	1.66	0.05
P-247	R-3	PMP-2	62.51	400.0	120.0	71.28	0.57
P-248	PMP-2	J-12	59.37	400.0	120.0	71.28	0.57

Maximum Day

Node Table

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
J-12	0.00	275.92	330.82	537.31
J-13	0.00	276.01	330.76	535.84
J-14	0.00	293.50	330.38	360.94
J-15	0.00	291.28	330.38	382.70
J-16	0.00	279.83	330.51	496.04
J-17	0.00	285.33	330.45	441.58
J-18	0.00	290.67	330.37	388.58
J-19	0.00	288.78	330.37	407.02
J-20	0.00	287.29	330.36	421.50
J-21	0.00	285.39	330.35	440.05
J-22	0.00	281.15	330.34	481.38
J-23	0.00	279.65	330.31	495.84
J-24	0.00	273.90	330.30	551.96
J-25	0.00	291.96	330.37	375.92
J-26	0.00	284.87	330.35	445.13
J-27	0.00	280.26	330.34	490.10
J-28	0.00	270.43	330.31	586.09
J-29	0.00	272.69	330.31	563.89
J-30	0.00	291.67	330.37	378.76
J-31	0.00	284.94	330.35	444.46
J-32	0.00	279.54	330.54	499.16
J-33	0.00	283.00	330.39	463.84
J-34	0.00	284.05	330.35	453.17
J-35	0.00	289.65	330.32	398.06
J-36	0.00	281.15	330.31	481.11
J-37	0.00	284.94	330.30	443.90
J-38	4.19	287.58	330.29	418.03
J-39	0.00	289.16	330.29	402.57
J-40	0.60	290.30	330.29	391.41
J-41	13.18	280.00	330.27	492.01
J-42	1.85	279.00	330.27	501.80
J-43	0.00	279.00	330.27	501.80
J-44	0.00	281.00	330.27	482.23
J-45	0.00	283.37	330.27	459.03
J-46	12.90	285.00	330.27	443.08
J-47	0.00	283.00	330.28	462.70
J-48	0.00	286.00	330.28	433.38
J-49	0.00	288.00	330.28	413.83
J-50	0.00	290.95	330.30	385.09
J-51	4.56	283.00	330.30	462.89
J-52	13.04	286.00	330.29	433.42
J-53	0.00	288.92	330.29	404.86
J-54	0.00	288.73	330.29	406.71
J-55	2.84	289.09	330.28	403.12
J-56	0.00	290.21	330.28	392.16
J-57	4.86	290.46	330.28	389.70
J-58	0.00	290.96	330.28	384.85
J-59	0.00	291.12	330.28	383.26
J-60	1.69	291.86	330.28	376.00
J-61	0.00	290.35	330.29	390.93
J-62	0.00	291.53	330.29	379.35
J-63	0.00	290.90	330.29	385.46
J-64	3.15	289.00	330.31	404.28
J-65	1.67	289.00	330.30	404.17
J-66	10.37	284.00	330.33	453.47
J-67	0.00	287.25	330.28	421.11
J-68	4.86	284.85	330.28	444.59
J-69	1.26	282.30	330.28	469.54
J-70	0.00	279.76	330.28	494.39
J-71	0.00	277.82	330.27	513.37
J-72	0.00	278.66	330.27	505.14
J-73	0.00	278.86	330.27	503.18
J-74	0.00	279.09	330.27	500.93
J-75	0.00	279.01	330.27	501.71
J-76	0.00	277.79	330.27	513.65
J-77	0.00	276.55	330.27	525.79
J-78	0.00	275.26	330.27	538.42
J-79	5.28	274.07	330.27	550.07
J-80	6.50	287.61	330.29	417.67
J-81	0.00	287.27	330.29	421.05

Pipe Table

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
P-16	J-12	J-13	69.86	400.0	120.0	66.45	0.53
P-18	J-14	J-15	237.25	400.0	120.0	-8.07	0.06
P-19	J-12	J-16	276.80	400.0	120.0	76.11	0.61
P-20	J-16	J-17	251.65	400.0	120.0	34.65	0.28
P-21	J-17	J-15	255.13	400.0	120.0	34.65	0.28
P-22	J-15	J-18	94.78	200.0	110.0	3.11	0.10
P-23	J-18	J-19	146.63	200.0	110.0	1.80	0.06
P-24	J-19	J-20	121.27	200.0	110.0	2.84	0.09
P-25	J-20	J-21	182.77	200.0	110.0	1.45	0.05
P-26	J-21	J-22	126.98	150.0	100.0	1.58	0.09
P-27	J-22	J-23	108.93	150.0	100.0	1.92	0.11
P-28	J-23	J-24	169.42	150.0	100.0	1.25	0.07
P-29	J-14	J-25	128.93	300.0	120.0	8.07	0.11
P-30	J-25	J-26	246.30	300.0	120.0	8.34	0.12
P-31	J-26	J-27	153.51	300.0	120.0	9.61	0.14
P-32	J-27	J-28	244.15	300.0	120.0	9.27	0.13
P-33	J-28	J-29	87.76	300.0	120.0	9.27	0.13
P-34	J-29	J-24	81.77	300.0	120.0	9.93	0.14
P-35	J-18	J-30	166.83	200.0	110.0	1.31	0.04
P-36	J-19	J-30	148.09	200.0	110.0	-1.04	0.03
P-37	J-30	J-25	89.80	200.0	110.0	0.27	0.01
P-38	J-20	J-31	195.46	200.0	110.0	1.39	0.04
P-39	J-21	J-31	145.60	200.0	110.0	-0.13	0.00
P-40	J-31	J-26	82.64	200.0	110.0	1.27	0.04
P-41	J-22	J-27	161.10	150.0	100.0	-0.34	0.02
P-42	J-23	J-29	243.12	150.0	100.0	0.67	0.04
P-43	J-13	J-32	252.83	400.0	120.0	66.45	0.53
P-44	J-32	J-33	172.71	400.0	120.0	66.45	0.53
P-45	J-33	J-34	91.48	400.0	120.0	46.60	0.37
P-46	J-34	J-35	294.77	400.0	120.0	21.20	0.17
P-47	J-16	J-36	140.80	300.0	120.0	41.46	0.59
P-48	J-36	J-37	87.15	300.0	120.0	11.98	0.17
P-49	J-37	J-38	61.00	300.0	120.0	5.86	0.08
P-50	J-38	J-39	71.03	300.0	120.0	0.71	0.01
P-51	J-39	J-40	106.32	300.0	120.0	-0.25	0.00
P-52	J-36	J-41	161.99	300.0	120.0	15.02	0.21
P-53	J-41	J-42	130.74	300.0	120.0	1.15	0.02
P-54	J-42	J-43	104.04	300.0	120.0	-0.70	0.01
P-55	J-43	J-44	135.59	300.0	120.0	-0.70	0.01
P-56	J-41	J-44	88.38	300.0	120.0	0.70	0.01
P-57	J-44	J-45	43.92	300.0	120.0	-0.01	0.00
P-59	J-45	J-46	64.90	300.0	120.0	-0.01	0.00
P-60	J-46	J-47	141.55	300.0	120.0	-5.61	0.08
P-61	J-47	J-48	102.84	300.0	120.0	-5.61	0.08
P-62	J-48	J-49	85.28	300.0	120.0	-5.61	0.08
P-63	J-46	J-49	202.16	300.0	120.0	-7.30	0.10
P-64	J-49	J-50	76.11	300.0	120.0	-12.91	0.18
P-65	J-50	J-40	68.52	300.0	120.0	6.94	0.10
P-66	J-36	J-51	56.74	300.0	120.0	14.46	0.20
P-67	J-51	J-52	112.56	300.0	120.0	9.90	0.14
P-68	J-52	J-53	130.98	300.0	120.0	-3.14	0.04
P-69	J-37	J-53	212.79	300.0	120.0	6.12	0.09
P-70	J-53	J-54	34.52	300.0	100.0	2.97	0.04
P-71	J-54	J-55	60.88	200.0	110.0	3.17	0.10
P-72	J-55	J-56	74.15	200.0	110.0	0.38	0.01
P-73	J-56	J-57	100.80	200.0	110.0	0.94	0.03
P-74	J-40	J-58	159.39	300.0	120.0	8.01	0.11
P-75	J-58	J-57	83.09	300.0	120.0	6.32	0.09
P-76	J-38	J-55	242.19	150.0	100.0	0.96	0.05
P-77	J-39	J-56	244.16	150.0	100.0	0.96	0.05
P-78	J-58	J-59	59.45	200.0	110.0	1.69	0.05
P-79	J-59	J-60	160.12	200.0	110.0	0.86	0.03
P-80	J-60	J-59	173.58	200.0	110.0	-0.83	0.03
P-81	J-40	J-61	56.33	300.0	120.0	-1.91	0.03
P-82	J-61	J-62	73.33	300.0	120.0	6.32	0.09
P-83	J-62	J-63	77.10	300.0	120.0	8.31	0.12
P-84	J-61	J-64	200.68	300.0	120.0	-8.23	0.12
P-85	J-62	J-65	148.61	200.0	110.0	-1.99	0.06
P-86	J-65	J-64	82.37	200.0	110.0	-3.66	0.12
P-87	J-64	J-66	117.71	300.0	120.0	-15.03	0.21

Maximum Day

Node Table

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
J-82	0.00	288.01	330.29	413.76
J-83	0.00	288.23	330.29	411.60
J-84	0.00	287.97	330.29	414.15
J-85	0.00	287.13	330.29	422.37
J-86	0.00	289.70	330.29	397.22
J-87	0.00	288.61	330.29	407.88
J-88	0.00	287.52	330.29	418.55
J-89	0.00	288.86	330.32	405.77
J-90	0.00	291.05	330.35	384.62
J-91	0.00	284.28	330.28	450.24
J-92	0.00	283.93	330.27	453.55
J-93	0.00	278.67	330.27	505.02
J-94	0.00	286.97	330.28	423.90
J-95	5.03	285.15	330.26	441.50
J-96	0.00	280.83	330.28	483.91
J-97	0.00	281.95	330.28	472.96
J-98	0.00	283.00	330.28	462.70
J-99	0.00	281.99	330.27	472.53
J-100	0.00	280.84	330.27	483.78
J-101	5.93	279.79	330.27	494.03
J-102	0.00	279.99	330.27	492.12
J-103	0.00	279.47	330.27	497.21
J-104	0.00	279.42	330.27	497.68
J-105	0.00	279.65	330.27	495.45
J-106	0.00	281.16	330.28	480.72
J-107	0.00	274.89	330.28	542.06
J-108	0.00	275.39	330.28	537.19
J-109	0.00	276.03	330.28	530.94
J-110	0.00	277.15	330.28	519.99
J-111	0.00	278.00	330.28	511.67
J-112	1.61	275.14	330.29	539.72
J-113	0.00	273.85	330.28	552.24
J-114	0.00	273.63	330.28	554.42
J-115	0.00	273.83	330.28	552.48
J-116	0.00	274.82	330.28	542.82
J-117	4.01	277.12	330.25	520.02
J-118	0.00	276.01	330.27	531.01
J-119	2.82	276.82	330.26	523.06
J-120	0.00	278.68	330.27	504.95
J-121	0.00	279.10	330.27	500.84
J-122	20.02	292.28	330.28	371.92
J-123	0.00	293.11	330.28	363.80
J-124	0.00	292.71	330.28	367.71
J-125	0.00	292.24	330.28	372.31
J-126	1.30	289.78	330.28	396.36
J-127	0.00	287.39	330.28	419.74
J-128	0.00	284.96	330.28	443.51
J-129	0.00	282.89	330.28	463.76
J-130	0.00	281.09	330.28	481.37
J-131	0.00	280.43	330.28	487.83
J-132	0.00	279.98	330.27	492.23
J-133	0.00	281.11	330.27	481.17
J-134	0.00	283.68	330.27	456.01
J-135	0.00	284.83	330.27	444.75
J-136	4.54	286.47	330.27	428.68
J-137	0.00	288.37	330.28	410.13
J-138	0.00	289.25	330.28	401.56
J-139	0.00	291.13	330.28	383.20
J-140	0.00	291.76	330.28	377.02
J-141	2.32	291.78	330.28	376.81
J-142	0.00	292.17	330.28	373.00
J-143	0.00	291.44	330.28	380.15
J-144	0.00	292.02	330.28	374.47
J-145	0.00	279.47	330.27	497.21
J-146	0.00	282.26	330.27	469.90
J-147	0.00	286.19	330.27	431.44
J-148	0.00	288.43	330.27	409.51
J-149	0.00	280.75	330.27	484.67
J-150	0.00	284.56	330.27	447.37
J-151	2.18	285.50	330.27	438.15

Pipe Table

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
P-88	J-66	J-34	31.38	300.0	120.0	-25.40	0.36
P-90	J-50	J-33	259.58	300.0	120.0	-19.85	0.28
P-91	J-57	J-67	185.91	300.0	120.0	2.40	0.03
P-92	J-67	J-68	73.17	300.0	120.0	2.80	0.04
P-93	J-68	J-69	79.44	300.0	120.0	-1.16	0.02
P-94	J-69	J-70	72.35	300.0	120.0	3.68	0.05
P-95	J-70	J-71	71.03	300.0	120.0	3.54	0.05
P-96	J-71	J-72	118.42	300.0	120.0	1.46	0.02
P-97	J-72	J-73	52.75	300.0	120.0	2.11	0.03
P-98	J-73	J-74	44.14	300.0	120.0	2.16	0.03
P-99	J-74	J-75	41.03	300.0	120.0	1.98	0.03
P-100	J-75	J-76	47.42	300.0	120.0	1.58	0.02
P-101	J-76	J-77	78.95	300.0	120.0	-2.32	0.03
P-102	J-77	J-78	65.47	300.0	120.0	-2.43	0.03
P-103	J-78	J-79	139.12	300.0	120.0	-0.38	0.01
P-104	J-56	J-67	227.38	150.0	100.0	0.40	0.02
P-105(1)	J-55	J-175	188.89	200.0	110.0	0.90	0.03
P-105(2)	J-175	J-68	140.75	200.0	110.0	0.90	0.03
P-106	J-54	J-80	177.61	300.0	100.0	-0.19	0.00
P-107	J-80	J-81	81.36	300.0	100.0	-6.69	0.09
P-108	J-81	J-69	167.34	300.0	110.0	8.53	0.12
P-109	J-54	J-82	43.02	200.0	110.0	0.00	0.00
P-110	J-82	J-83	42.82	200.0	110.0	0.02	0.00
P-111	J-83	J-84	45.09	200.0	110.0	0.02	0.00
P-112	J-84	J-85	44.63	200.0	110.0	0.01	0.00
P-113	J-85	J-86	218.76	200.0	110.0	0.01	0.00
P-114	J-86	J-87	45.19	200.0	110.0	0.02	0.00
P-115	J-87	J-88	38.94	200.0	110.0	0.02	0.00
P-116	J-88	J-80	46.36	200.0	110.0	0.00	0.00
P-117	J-84	J-86	176.89	150.0	100.0	0.01	0.00
P-118	J-83	J-87	177.91	150.0	100.0	0.00	0.00
P-119	J-82	J-88	176.33	150.0	100.0	-0.03	0.00
P-120	J-81	J-89	106.37	300.0	110.0	-15.23	0.22
P-121	J-89	J-90	75.29	300.0	110.0	-18.35	0.26
P-122	J-90	J-91	253.20	200.0	110.0	5.12	0.16
P-123	J-91	J-92	63.51	150.0	100.0	1.81	0.10
P-124	J-92	J-93	178.49	150.0	100.0	0.34	0.02
P-125	J-93	J-71	79.88	150.0	100.0	-0.80	0.05
P-126	J-89	J-94	74.96	150.0	100.0	3.12	0.18
P-127	J-94	J-95	72.34	150.0	100.0	2.42	0.14
P-128	J-95	J-92	96.06	150.0	100.0	-1.47	0.08
P-129	J-94	J-70	247.39	150.0	100.0	0.70	0.04
P-130	J-95	J-93	137.05	150.0	100.0	-1.13	0.06
P-131	J-72	J-96	140.90	200.0	110.0	-0.65	0.02
P-132	J-96	J-97	40.22	200.0	110.0	-1.18	0.04
P-133	J-97	J-98	46.64	200.0	110.0	-1.80	0.06
P-134	J-98	J-99	188.30	200.0	110.0	1.51	0.05
P-135	J-99	J-100	47.99	200.0	110.0	1.51	0.05
P-136	J-100	J-101	43.45	200.0	110.0	2.13	0.07
P-137	J-101	J-76	126.02	200.0	110.0	-1.74	0.06
P-138	J-97	J-100	188.48	150.0	100.0	0.61	0.03
P-139	J-96	J-102	55.61	150.0	100.0	0.54	0.03
P-140	J-102	J-103	40.90	150.0	100.0	0.48	0.03
P-141	J-103	J-104	45.46	150.0	100.0	0.67	0.04
P-142	J-104	J-101	46.57	150.0	100.0	1.06	0.06
P-143	J-102	J-73	129.52	150.0	100.0	0.05	0.00
P-144	J-103	J-74	128.08	150.0	100.0	-0.18	0.01
P-145	J-104	J-75	129.37	150.0	100.0	-0.40	0.02
P-146	J-77	J-105	126.13	150.0	100.0	0.11	0.01
P-147	J-105	J-106	99.13	150.0	100.0	-0.89	0.05
P-148	J-101	J-105	79.75	150.0	100.0	-1.00	0.06
P-149	J-106	J-111	61.56	150.0	100.0	-0.89	0.05
P-151	J-90	J-15	57.47	300.0	110.0	-23.47	0.33
P-152	J-78	J-107	44.11	200.0	110.0	-2.05	0.07
P-153	J-107	J-108	45.00	200.0	110.0	-1.96	0.06
P-154	J-108	J-109	42.98	200.0	110.0	-1.76	0.06
P-155	J-109	J-110	45.18	200.0	110.0	-1.41	0.04
P-156	J-110	J-111	49.92	200.0	110.0	-0.88	0.03
P-157	J-111	J-112	155.85	200.0	110.0	-1.76	0.06
P-158	J-112	J-24	88.23	300.0	120.0	-11.18	0.16

Maximum Day

Node Table

ID	Demand	Elevation	Head	Pressure
	(L/s)	*(m)*	*(m)*	*(kPa)*
J-152	0.00	284.93	330.27	443.73
J-175	0.00	286.24	330.28	431.00
MIN		**273.63**		**363.80**
MAX		**293.11**		**554.42**

Min/Max for development (Nodes J-32 to J-152)

Node Table

ID	Elevation	Flow Out	Hydraulic Grade
	(m)	*(L/s)*	*(m)*
R-3	275.92	142.56	275.92

Pipe Table

ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	*(mm)*	*(C)*	*(L/s)*	*(m/s)*
P-159	J-79	J-113	44.09	300.0	120.0	-6.63	0.09
P-160	J-113	J-114	45.76	300.0	120.0	-6.73	0.10
P-161	J-114	J-115	43.84	300.0	120.0	-6.93	0.10
P-162	J-115	J-116	46.51	300.0	120.0	-7.28	0.10
P-163	J-116	J-112	47.28	300.0	120.0	-7.81	0.11
P-164	J-110	J-116	152.34	150.0	100.0	-0.54	0.03
P-165	J-109	J-115	149.23	150.0	100.0	-0.35	0.02
P-166	J-108	J-114	144.97	150.0	100.0	-0.20	0.01
P-167	J-107	J-113	144.59	150.0	100.0	-0.09	0.01
P-168	J-79	J-117	343.57	150.0	100.0	0.98	0.06
P-169	J-117	J-118	274.06	150.0	100.0	-0.88	0.05
P-170	J-76	J-117	75.27	150.0	100.0	2.15	0.12
P-171	J-71	J-118	74.70	150.0	100.0	1.28	0.07
P-172	J-118	J-119	257.52	150.0	100.0	0.40	0.02
P-173	J-119	J-120	73.17	150.0	100.0	-1.57	0.09
P-174	J-70	J-119	253.30	150.0	100.0	0.84	0.05
P-175	J-69	J-120	230.89	300.0	110.0	2.43	0.03
P-176	J-120	J-121	71.24	300.0	110.0	0.85	0.01
P-177	J-35	J-122	96.21	300.0	120.0	21.20	0.30
P-178	J-122	J-123	98.33	300.0	120.0	1.18	0.02
P-179	J-123	J-124	82.19	300.0	120.0	0.89	0.01
P-180	J-124	J-125	109.71	300.0	120.0	1.17	0.02
P-181	J-125	J-126	81.66	300.0	120.0	4.90	0.07
P-182	J-126	J-127	82.92	300.0	120.0	3.83	0.05
P-183	J-127	J-128	78.45	300.0	120.0	3.47	0.05
P-184	J-128	J-129	79.94	300.0	120.0	2.76	0.04
P-185	J-129	J-130	81.57	300.0	120.0	2.27	0.03
P-186	J-130	J-131	80.72	300.0	120.0	1.93	0.03
P-187	J-131	J-132	95.42	300.0	120.0	1.71	0.02
P-188	J-132	J-121	161.11	300.0	110.0	-0.47	0.01
P-189	J-121	J-133	97.89	200.0	110.0	0.39	0.01
P-190	J-133	J-134	83.47	200.0	110.0	0.61	0.02
P-191	J-134	J-135	81.34	200.0	110.0	0.94	0.03
P-192	J-135	J-136	80.64	200.0	110.0	1.43	0.05
P-193	J-136	J-137	80.49	200.0	110.0	-2.40	0.08
P-194	J-137	J-138	81.54	200.0	110.0	-2.03	0.06
P-195	J-138	J-63	84.01	200.0	110.0	-2.27	0.07
P-196	J-63	J-139	41.99	300.0	120.0	4.46	0.06
P-197	J-139	J-140	58.74	300.0	120.0	3.98	0.06
P-198	J-140	J-125	65.62	300.0	120.0	3.73	0.05
P-199	J-133	J-131	169.27	150.0	100.0	-0.22	0.01
P-200	J-134	J-130	169.34	150.0	100.0	-0.33	0.02
P-201	J-135	J-129	172.84	150.0	100.0	-0.49	0.03
P-202	J-136	J-128	172.61	150.0	100.0	-0.71	0.04
P-203	J-137	J-127	170.89	150.0	100.0	-0.37	0.02
P-204	J-138	J-126	168.38	150.0	100.0	0.24	0.01
P-205	J-63	J-141	110.20	200.0	110.0	1.58	0.05
P-206	J-141	J-142	78.81	200.0	110.0	-0.29	0.01
P-207	J-142	J-123	169.54	200.0	110.0	-0.29	0.01
P-208	J-141	J-143	42.20	150.0	100.0	-0.45	0.03
P-209	J-143	J-144	61.00	150.0	100.0	0.02	0.00
P-210	J-144	J-124	64.75	150.0	100.0	0.28	0.02
P-211	J-139	J-143	109.29	150.0	100.0	0.47	0.03
P-212	J-140	J-144	109.90	150.0	100.0	0.25	0.01
P-213	J-132	J-145	163.26	300.0	120.0	2.18	0.03
P-214	J-145	J-146	81.42	300.0	120.0	1.51	0.02
P-215	J-146	J-147	77.32	300.0	120.0	1.18	0.02
P-216	J-147	J-148	79.50	300.0	120.0	0.71	0.01
P-217	J-145	J-149	182.46	200.0	110.0	0.67	0.02
P-218	J-149	J-150	79.35	200.0	110.0	1.00	0.03
P-219	J-150	J-151	79.12	200.0	110.0	1.47	0.05
P-220	J-151	J-152	155.36	200.0	110.0	0.00	0.00
P-221	J-149	J-146	111.15	150.0	100.0	-0.32	0.02
P-222	J-150	J-147	111.15	150.0	100.0	-0.47	0.03
P-223	J-151	J-148	111.97	150.0	100.0	-0.71	0.04
P-224	J-91	J-98	60.42	200.0	110.0	3.31	0.11
P-247	R-3	PMP-2	62.51	400.0	120.0	142.56	1.13
P-248	PMP-2	J-12	59.37	400.0	120.0	142.56	1.13

Minimum Hour

Node Table

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
J-12	0.00	275.92	335.86	586.64
J-13	0.00	276.01	335.85	585.69
J-14	0.00	293.50	335.81	414.05
J-15	0.00	291.28	335.81	435.78
J-16	0.00	279.83	335.82	548.00
J-17	0.00	285.33	335.82	494.10
J-18	0.00	290.67	335.81	441.74
J-19	0.00	288.78	335.81	460.23
J-20	0.00	287.29	335.80	474.80
J-21	0.00	285.39	335.80	493.39
J-22	0.00	281.15	335.80	534.87
J-23	0.00	279.65	335.80	549.52
J-24	0.00	273.90	335.80	605.78
J-25	0.00	291.96	335.81	429.11
J-26	0.00	284.87	335.80	498.48
J-27	0.00	280.26	335.80	543.58
J-28	0.00	270.43	335.80	639.76
J-29	0.00	272.69	335.80	617.63
J-30	0.00	291.67	335.81	431.95
J-31	0.00	284.94	335.80	497.80
J-32	0.00	279.54	335.83	550.88
J-33	0.00	283.00	335.81	516.83
J-34	0.00	284.05	335.80	506.51
J-35	0.00	289.65	335.80	451.66
J-36	0.00	281.15	335.80	534.83
J-37	0.00	284.94	335.80	497.73
J-38	1.36	287.58	335.80	471.89
J-39	0.00	289.16	335.80	456.42
J-40	0.19	290.30	335.80	445.27
J-41	4.28	280.00	335.79	546.04
J-42	0.60	279.00	335.79	555.83
J-43	0.00	279.00	335.79	555.83
J-44	0.00	281.00	335.79	536.26
J-45	0.00	283.37	335.79	513.06
J-46	4.19	285.00	335.79	497.11
J-47	0.00	283.00	335.79	516.69
J-48	0.00	286.00	335.79	487.33
J-49	0.00	288.00	335.80	467.76
J-50	0.00	290.95	335.80	438.91
J-51	1.48	283.00	335.80	516.71
J-52	4.24	286.00	335.80	487.34
J-53	0.00	288.92	335.80	458.76
J-54	0.00	288.73	335.80	460.62
J-55	0.92	289.09	335.79	457.09
J-56	0.00	290.21	335.79	446.13
J-57	1.58	290.46	335.79	443.68
J-58	0.00	290.96	335.79	438.79
J-59	0.00	291.12	335.79	437.22
J-60	0.55	291.86	335.79	429.98
J-61	0.00	290.35	335.80	444.78
J-62	0.00	291.53	335.80	433.22
J-63	0.00	290.90	335.80	439.38
J-64	1.02	289.00	335.80	458.01
J-65	0.54	289.00	335.80	457.99
J-66	3.37	284.00	335.80	506.97
J-67	0.00	287.25	335.79	475.10
J-68	1.58	284.85	335.79	498.58
J-69	0.41	282.30	335.79	523.54
J-70	0.00	279.76	335.79	548.40
J-71	0.00	277.82	335.79	567.38
J-72	0.00	278.66	335.79	559.16
J-73	0.00	278.86	335.79	557.20
J-74	0.00	279.09	335.79	554.95
J-75	0.00	279.01	335.79	555.73
J-76	0.00	277.79	335.79	567.67
J-77	0.00	276.55	335.79	579.81
J-78	0.00	275.26	335.79	592.44
J-79	1.72	274.07	335.79	604.08
J-80	2.11	287.61	335.80	471.58
J-81	0.00	287.27	335.80	474.92

Pipe Table

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
P-16	J-12	J-13	69.86	400.0	120.0	21.59	0.17
P-18	J-14	J-15	237.25	400.0	120.0	-2.62	0.02
P-19	J-12	J-16	276.80	400.0	120.0	24.72	0.20
P-20	J-16	J-17	251.65	400.0	120.0	11.26	0.09
P-21	J-17	J-15	255.13	400.0	120.0	11.26	0.09
P-22	J-15	J-18	94.78	200.0	110.0	1.01	0.03
P-23	J-18	J-19	146.63	200.0	110.0	0.58	0.02
P-24	J-19	J-20	121.27	200.0	110.0	0.92	0.03
P-25	J-20	J-21	182.77	200.0	110.0	0.47	0.01
P-26	J-21	J-22	126.98	150.0	100.0	0.51	0.03
P-27	J-22	J-23	108.93	150.0	100.0	0.62	0.04
P-28	J-23	J-24	169.42	150.0	100.0	0.41	0.02
P-29	J-14	J-25	128.93	300.0	120.0	2.62	0.04
P-30	J-25	J-26	246.30	300.0	120.0	2.71	0.04
P-31	J-26	J-27	153.51	300.0	120.0	3.12	0.04
P-32	J-27	J-28	244.15	300.0	120.0	3.01	0.04
P-33	J-28	J-29	87.76	300.0	120.0	3.01	0.04
P-34	J-29	J-24	81.77	300.0	120.0	3.23	0.05
P-35	J-18	J-30	166.83	200.0	110.0	0.43	0.01
P-36	J-19	J-30	148.09	200.0	110.0	-0.34	0.01
P-37	J-30	J-25	89.80	200.0	110.0	0.09	0.00
P-38	J-20	J-31	195.46	200.0	110.0	0.45	0.01
P-39	J-21	J-31	145.60	200.0	110.0	-0.04	0.00
P-40	J-31	J-26	82.64	200.0	110.0	0.41	0.01
P-41	J-22	J-27	161.10	150.0	100.0	-0.11	0.01
P-42	J-23	J-29	243.12	150.0	100.0	0.22	0.01
P-43	J-13	J-32	252.83	400.0	120.0	21.59	0.17
P-44	J-32	J-33	172.71	400.0	120.0	21.59	0.17
P-45	J-33	J-34	91.48	400.0	120.0	15.14	0.12
P-46	J-34	J-35	294.77	400.0	120.0	6.89	0.05
P-47	J-16	J-36	140.80	300.0	120.0	13.47	0.19
P-48	J-36	J-37	87.15	300.0	120.0	3.89	0.06
P-49	J-37	J-38	61.00	300.0	120.0	1.90	0.03
P-50	J-38	J-39	71.03	300.0	120.0	0.23	0.00
P-51	J-39	J-40	106.32	300.0	120.0	-0.08	0.00
P-52	J-36	J-41	161.99	300.0	120.0	4.88	0.07
P-53	J-41	J-42	130.74	300.0	120.0	0.37	0.01
P-54	J-42	J-43	104.04	300.0	120.0	-0.23	0.00
P-55	J-43	J-44	135.59	300.0	120.0	-0.23	0.00
P-56	J-41	J-44	88.38	300.0	120.0	0.23	0.00
P-57	J-44	J-45	43.92	300.0	120.0	0.00	0.00
P-59	J-45	J-46	64.90	300.0	120.0	0.00	0.00
P-60	J-46	J-47	141.55	300.0	120.0	-1.82	0.03
P-61	J-47	J-48	102.84	300.0	120.0	-1.82	0.03
P-62	J-48	J-49	85.28	300.0	120.0	-1.82	0.03
P-63	J-46	J-49	202.16	300.0	120.0	-2.37	0.03
P-64	J-49	J-50	76.11	300.0	120.0	-4.19	0.06
P-65	J-50	J-40	68.52	300.0	120.0	2.26	0.03
P-66	J-36	J-51	56.74	300.0	120.0	4.70	0.07
P-67	J-51	J-52	112.56	300.0	120.0	3.22	0.05
P-68	J-52	J-53	130.98	300.0	120.0	-1.02	0.01
P-69	J-37	J-53	212.79	300.0	120.0	1.99	0.03
P-70	J-53	J-54	34.52	300.0	100.0	0.97	0.01
P-71	J-54	J-55	60.88	200.0	110.0	1.03	0.03
P-72	J-55	J-56	74.15	200.0	110.0	0.13	0.00
P-73	J-56	J-57	100.80	200.0	110.0	0.31	0.01
P-74	J-40	J-58	159.39	300.0	120.0	2.60	0.04
P-75	J-58	J-57	83.09	300.0	120.0	2.05	0.03
P-76	J-38	J-55	242.19	150.0	100.0	0.31	0.02
P-77	J-39	J-56	244.16	150.0	100.0	0.31	0.02
P-78	J-58	J-59	59.45	200.0	110.0	0.55	0.02
P-79	J-59	J-60	160.12	200.0	110.0	0.28	0.01
P-80	J-60	J-59	173.58	200.0	110.0	-0.27	0.01
P-81	J-40	J-61	56.33	300.0	120.0	-0.62	0.01
P-82	J-61	J-62	73.33	300.0	120.0	2.06	0.03
P-83	J-62	J-63	77.10	300.0	120.0	2.70	0.04
P-84	J-61	J-64	200.68	300.0	120.0	-2.67	0.04
P-85	J-62	J-65	148.61	200.0	110.0	-0.65	0.02
P-86	J-65	J-64	82.37	200.0	110.0	-1.19	0.04
P-87	J-64	J-66	117.71	300.0	120.0	-4.88	0.07

Minimum Hour

Node Table

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
J-82	0.00	288.01	335.80	467.67
J-83	0.00	288.23	335.80	465.52
J-84	0.00	287.97	335.80	468.06
J-85	0.00	287.13	335.80	476.28
J-86	0.00	289.70	335.80	451.13
J-87	0.00	288.61	335.80	461.80
J-88	0.00	287.52	335.80	472.46
J-89	0.00	288.86	335.80	459.39
J-90	0.00	291.05	335.80	437.99
J-91	0.00	284.28	335.80	504.17
J-92	0.00	283.93	335.79	507.58
J-93	0.00	278.67	335.79	559.06
J-94	0.00	286.97	335.80	477.84
J-95	1.63	285.15	335.79	495.63
J-96	0.00	280.83	335.79	537.92
J-97	0.00	281.95	335.79	526.96
J-98	0.00	283.00	335.79	516.69
J-99	0.00	281.99	335.79	526.57
J-100	0.00	280.84	335.79	537.82
J-101	1.93	279.79	335.79	548.10
J-102	0.00	279.99	335.79	546.14
J-103	0.00	279.47	335.79	551.23
J-104	0.00	279.42	335.79	551.72
J-105	0.00	279.65	335.79	549.47
J-106	0.00	281.16	335.79	534.70
J-107	0.00	274.89	335.79	596.06
J-108	0.00	275.39	335.79	591.17
J-109	0.00	276.03	335.79	584.91
J-110	0.00	277.15	335.79	573.95
J-111	0.00	278.00	335.79	565.63
J-112	0.52	275.14	335.80	593.63
J-113	0.00	273.85	335.79	606.24
J-114	0.00	273.63	335.79	608.39
J-115	0.00	273.83	335.79	606.44
J-116	0.00	274.82	335.80	596.75
J-117	1.30	277.12	335.79	574.21
J-118	0.00	276.01	335.79	585.09
J-119	0.92	276.82	335.79	577.16
J-120	0.00	278.68	335.79	558.97
J-121	0.00	279.10	335.79	554.86
J-122	6.51	292.28	335.79	425.87
J-123	0.00	293.11	335.79	417.75
J-124	0.00	292.71	335.79	421.67
J-125	0.00	292.24	335.79	426.26
J-126	0.42	289.78	335.79	450.34
J-127	0.00	287.39	335.79	473.73
J-128	0.00	284.96	335.79	497.51
J-129	0.00	282.89	335.79	517.76
J-130	0.00	281.09	335.79	535.38
J-131	0.00	280.43	335.79	541.84
J-132	0.00	279.98	335.79	546.24
J-133	0.00	281.11	335.79	535.18
J-134	0.00	283.68	335.79	510.03
J-135	0.00	284.83	335.79	498.77
J-136	1.48	286.47	335.79	482.72
J-137	0.00	288.37	335.79	464.13
J-138	0.00	289.25	335.79	455.53
J-139	0.00	291.13	335.80	437.13
J-140	0.00	291.76	335.79	430.96
J-141	0.75	291.78	335.79	430.77
J-142	0.00	292.17	335.79	426.95
J-143	0.00	291.44	335.79	434.09
J-144	0.00	292.02	335.79	428.42
J-145	0.00	279.47	335.79	551.23
J-146	0.00	282.26	335.79	523.93
J-147	0.00	286.19	335.79	485.47
J-148	0.00	288.43	335.79	463.54
J-149	0.00	280.75	335.79	538.70
J-150	0.00	284.56	335.79	501.42
J-151	0.71	285.50	335.79	492.21

Pipe Table

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
P-88	J-66	J-34	31.38	300.0	120.0	-8.25	0.12
P-90	J-50	J-33	259.58	300.0	120.0	-6.45	0.09
P-91	J-57	J-67	185.91	300.0	120.0	0.78	0.01
P-92	J-67	J-68	73.17	300.0	120.0	0.91	0.01
P-93	J-68	J-69	79.44	300.0	120.0	-0.37	0.01
P-94	J-69	J-70	72.35	300.0	120.0	1.20	0.02
P-95	J-70	J-71	71.03	300.0	120.0	1.15	0.02
P-96	J-71	J-72	118.42	300.0	120.0	0.48	0.01
P-97	J-72	J-73	52.75	300.0	120.0	0.69	0.01
P-98	J-73	J-74	44.14	300.0	120.0	0.70	0.01
P-99	J-74	J-75	41.03	300.0	120.0	0.64	0.01
P-100	J-75	J-76	47.42	300.0	120.0	0.51	0.01
P-101	J-76	J-77	78.95	300.0	120.0	-0.75	0.01
P-102	J-77	J-78	65.47	300.0	120.0	-0.79	0.01
P-103	J-78	J-79	139.12	300.0	120.0	-0.12	0.00
P-104	J-56	J-67	227.38	150.0	100.0	0.13	0.01
P-105(1)	J-55	J-175	188.89	200.0	110.0	0.29	0.01
P-105(2)	J-175	J-68	140.75	200.0	110.0	0.29	0.01
P-106	J-54	J-80	177.61	300.0	100.0	-0.07	0.00
P-107	J-80	J-81	81.36	300.0	100.0	-2.17	0.03
P-108	J-81	J-69	167.34	300.0	110.0	2.77	0.04
P-109	J-54	J-82	43.02	200.0	110.0	0.01	0.00
P-110	J-82	J-83	42.82	200.0	110.0	0.01	0.00
P-111	J-83	J-84	45.09	200.0	110.0	0.01	0.00
P-112	J-84	J-85	44.63	200.0	110.0	0.01	0.00
P-113	J-85	J-86	218.76	200.0	110.0	0.01	0.00
P-114	J-86	J-87	45.19	200.0	110.0	0.01	0.00
P-115	J-87	J-88	38.94	200.0	110.0	0.01	0.00
P-116	J-88	J-80	46.36	200.0	110.0	0.01	0.00
P-117	J-84	J-86	176.89	150.0	100.0	0.00	0.00
P-118	J-83	J-87	177.91	150.0	100.0	0.00	0.00
P-119	J-82	J-88	176.33	150.0	100.0	0.00	0.00
P-120	J-81	J-89	106.37	300.0	110.0	-4.95	0.07
P-121	J-89	J-90	75.29	300.0	110.0	-5.96	0.08
P-122	J-90	J-91	253.20	200.0	110.0	1.66	0.05
P-123	J-91	J-92	63.51	150.0	100.0	0.59	0.03
P-124	J-92	J-93	178.49	150.0	100.0	0.11	0.01
P-125	J-93	J-71	79.88	150.0	100.0	-0.26	0.01
P-126	J-89	J-94	74.96	150.0	100.0	1.01	0.06
P-127	J-94	J-95	72.34	150.0	100.0	0.79	0.04
P-128	J-95	J-92	96.06	150.0	100.0	-0.48	0.03
P-129	J-94	J-70	247.39	150.0	100.0	0.23	0.01
P-130	J-95	J-93	137.05	150.0	100.0	-0.37	0.02
P-131	J-72	J-96	140.90	200.0	110.0	-0.21	0.01
P-132	J-96	J-97	40.22	200.0	110.0	-0.38	0.01
P-133	J-97	J-98	46.64	200.0	110.0	-0.58	0.02
P-134	J-98	J-99	188.30	200.0	110.0	0.49	0.02
P-135	J-99	J-100	47.99	200.0	110.0	0.49	0.02
P-136	J-100	J-101	43.45	200.0	110.0	0.69	0.02
P-137	J-101	J-76	126.02	200.0	110.0	-0.57	0.02
P-138	J-97	J-100	188.48	150.0	100.0	0.20	0.01
P-139	J-96	J-102	55.61	150.0	100.0	0.17	0.01
P-140	J-102	J-103	40.90	150.0	100.0	0.16	0.01
P-141	J-103	J-104	45.46	150.0	100.0	0.22	0.01
P-142	J-104	J-101	46.57	150.0	100.0	0.35	0.02
P-143	J-102	J-73	129.52	150.0	100.0	0.02	0.00
P-144	J-103	J-74	128.08	150.0	100.0	-0.06	0.00
P-145	J-104	J-75	129.37	150.0	100.0	-0.13	0.01
P-146	J-77	J-105	126.13	150.0	100.0	0.04	0.00
P-147	J-105	J-106	99.13	150.0	100.0	-0.29	0.02
P-148	J-101	J-105	79.75	150.0	100.0	-0.33	0.02
P-149	J-106	J-111	61.56	150.0	100.0	-0.29	0.02
P-151	J-90	J-15	57.47	300.0	110.0	-7.62	0.11
P-152	J-78	J-107	44.11	200.0	110.0	-0.67	0.02
P-153	J-107	J-108	45.00	200.0	110.0	-0.64	0.02
P-154	J-108	J-109	42.98	200.0	110.0	-0.57	0.02
P-155	J-109	J-110	45.18	200.0	110.0	-0.46	0.01
P-156	J-110	J-111	49.92	200.0	110.0	-0.28	0.01
P-157	J-111	J-112	155.85	200.0	110.0	-0.57	0.02
P-158	J-112	J-24	88.23	300.0	120.0	-3.63	0.05

Minimum Hour

Node Table

ID	Demand	Elevation	Head	Pressure
	(L/s)	*(m)*	*(m)*	*(kPa)*
J-152	0.00	284.93	335.79	497.79
J-175	0.00	284.24	335.79	484.98
MIN		**273.63**		**417.75**
MAX		**293.11**		**608.39**

Min/Max for development (Nodes J-32 to J-152)

Node Table

ID	Elevation	Flow Out	Hydraulic Grade
	(m)	*(L/s)*	*(m)*
R-3	279.19	46.31	279.19

Pipe Table

ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	*(mm)*	*(C)*	*(L/s)*	*(m/s)*
P-159	J-79	J-113	44.09	300.0	120.0	-2.16	0.03
P-160	J-113	J-114	45.76	300.0	120.0	-2.19	0.03
P-161	J-114	J-115	43.84	300.0	120.0	-2.25	0.03
P-162	J-115	J-116	46.51	300.0	120.0	-2.37	0.03
P-163	J-116	J-112	47.28	300.0	120.0	-2.54	0.04
P-164	J-110	J-116	152.34	150.0	100.0	-0.17	0.01
P-165	J-109	J-115	149.23	150.0	100.0	-0.11	0.01
P-166	J-108	J-114	144.97	150.0	100.0	-0.07	0.00
P-167	J-107	J-113	144.59	150.0	100.0	-0.03	0.00
P-168	J-79	J-117	343.57	150.0	100.0	0.32	0.02
P-169	J-117	J-118	274.06	150.0	100.0	-0.28	0.02
P-170	J-76	J-117	75.27	150.0	100.0	0.70	0.04
P-171	J-71	J-118	74.70	150.0	100.0	0.42	0.02
P-172	J-118	J-119	257.52	150.0	100.0	0.13	0.01
P-173	J-119	J-120	73.17	150.0	100.0	-0.51	0.03
P-174	J-70	J-119	253.30	150.0	100.0	0.27	0.02
P-175	J-69	J-120	230.89	300.0	110.0	0.79	0.01
P-176	J-120	J-121	71.24	300.0	110.0	0.28	0.00
P-177	J-35	J-122	96.21	300.0	120.0	6.89	0.10
P-178	J-122	J-123	98.33	300.0	120.0	0.38	0.01
P-179	J-123	J-124	82.19	300.0	120.0	0.29	0.00
P-180	J-124	J-125	109.71	300.0	120.0	0.38	0.01
P-181	J-125	J-126	81.66	300.0	120.0	1.59	0.02
P-182	J-126	J-127	82.92	300.0	120.0	1.25	0.02
P-183	J-127	J-128	78.45	300.0	120.0	1.13	0.02
P-184	J-128	J-129	79.94	300.0	120.0	0.90	0.01
P-185	J-129	J-130	81.57	300.0	120.0	0.74	0.01
P-186	J-130	J-131	80.72	300.0	120.0	0.63	0.01
P-187	J-131	J-132	95.42	300.0	120.0	0.56	0.01
P-188	J-132	J-121	161.11	300.0	110.0	-0.15	0.00
P-189	J-121	J-133	97.89	200.0	110.0	0.13	0.00
P-190	J-133	J-134	83.47	200.0	110.0	0.20	0.01
P-191	J-134	J-135	81.34	200.0	110.0	0.31	0.01
P-192	J-135	J-136	80.64	200.0	110.0	0.47	0.01
P-193	J-136	J-137	80.49	200.0	110.0	-0.78	0.02
P-194	J-137	J-138	81.54	200.0	110.0	-0.66	0.02
P-195	J-138	J-63	84.01	200.0	110.0	-0.74	0.02
P-196	J-63	J-139	41.99	300.0	120.0	1.45	0.02
P-197	J-139	J-140	58.74	300.0	120.0	1.30	0.02
P-198	J-140	J-125	65.62	300.0	120.0	1.21	0.02
P-199	J-133	J-131	169.27	150.0	100.0	-0.07	0.00
P-200	J-134	J-130	169.34	150.0	100.0	-0.11	0.01
P-201	J-135	J-129	172.84	150.0	100.0	-0.16	0.01
P-202	J-136	J-128	172.61	150.0	100.0	-0.23	0.01
P-203	J-137	J-127	170.89	150.0	100.0	-0.12	0.01
P-204	J-138	J-126	168.38	150.0	100.0	0.08	0.00
P-205	J-63	J-141	110.20	200.0	110.0	0.51	0.02
P-206	J-141	J-142	78.81	200.0	110.0	-0.09	0.00
P-207	J-142	J-123	169.54	200.0	110.0	-0.09	0.00
P-208	J-141	J-143	42.20	150.0	100.0	-0.15	0.01
P-209	J-143	J-144	61.00	150.0	100.0	0.01	0.00
P-210	J-144	J-124	64.75	150.0	100.0	0.09	0.01
P-211	J-139	J-143	109.29	150.0	100.0	0.15	0.01
P-212	J-140	J-144	109.90	150.0	100.0	0.08	0.00
P-213	J-132	J-145	163.26	300.0	120.0	0.71	0.01
P-214	J-145	J-146	81.42	300.0	120.0	0.49	0.01
P-215	J-146	J-147	77.32	300.0	120.0	0.39	0.01
P-216	J-147	J-148	79.50	300.0	120.0	0.23	0.00
P-217	J-145	J-149	182.46	200.0	110.0	0.22	0.01
P-218	J-149	J-150	79.35	200.0	110.0	0.32	0.01
P-219	J-150	J-151	79.12	200.0	110.0	0.48	0.02
P-220	J-151	J-152	155.36	200.0	110.0	0.00	0.00
P-221	J-149	J-146	111.15	150.0	100.0	-0.11	0.01
P-222	J-150	J-147	111.15	150.0	100.0	-0.15	0.01
P-223	J-151	J-148	111.97	150.0	100.0	-0.23	0.01
P-224	J-91	J-98	60.42	200.0	110.0	1.08	0.03
P-247	R-3	PMP-2	62.51	400.0	120.0	46.31	0.37
P-248	PMP-2	J-12	59.37	400.0	120.0	46.31	0.37

Peak Hour

Node Table

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
J-12	0.00	275.92	326.67	496.69
J-13	0.00	276.01	326.56	494.75
J-14	0.00	293.50	325.88	316.85
J-15	0.00	291.28	325.88	338.65
J-16	0.00	279.83	326.12	453.02
J-17	0.00	285.33	326.00	398.05
J-18	0.00	290.67	325.87	344.45
J-19	0.00	288.78	325.86	362.85
J-20	0.00	287.29	325.84	377.25
J-21	0.00	285.39	325.83	395.77
J-22	0.00	281.15	325.80	436.95
J-23	0.00	279.65	325.76	451.24
J-24	0.00	273.90	325.73	507.24
J-25	0.00	291.96	325.86	331.76
J-26	0.00	284.87	325.83	400.83
J-27	0.00	280.26	325.80	445.68
J-28	0.00	270.43	325.76	541.49
J-29	0.00	272.69	325.74	519.23
J-30	0.00	291.67	325.86	334.60
J-31	0.00	284.94	325.83	400.17
J-32	0.00	279.54	326.17	456.36
J-33	0.00	283.00	325.90	419.87
J-34	0.00	284.05	325.83	408.88
J-35	0.00	289.65	325.77	353.53
J-36	0.00	281.15	325.75	436.47
J-37	0.00	284.94	325.72	399.16
J-38	5.76	287.58	325.72	373.28
J-39	0.00	289.16	325.72	357.81
J-40	0.82	290.30	325.72	346.65
J-41	18.12	280.00	325.68	447.09
J-42	2.55	279.00	325.68	456.87
J-43	0.00	279.00	325.68	456.87
J-44	0.00	281.00	325.68	437.30
J-45	0.00	283.37	325.68	414.11
J-46	17.74	285.00	325.68	398.15
J-47	0.00	283.00	325.69	417.82
J-48	0.00	286.00	325.70	388.52
J-49	0.00	288.00	325.70	369.00
J-50	0.00	290.95	325.73	340.36
J-51	6.27	283.00	325.73	418.16
J-52	17.94	286.00	325.71	388.59
J-53	0.00	288.92	325.71	360.04
J-54	0.00	288.73	325.71	361.89
J-55	3.91	289.09	325.70	358.26
J-56	0.00	290.21	325.70	347.29
J-57	6.68	290.46	325.69	344.83
J-58	0.00	290.96	325.70	340.00
J-59	0.00	291.12	325.70	338.40
J-60	2.32	291.86	325.69	331.13
J-61	0.00	290.35	325.72	346.17
J-62	0.00	291.53	325.72	334.56
J-63	0.00	290.90	325.70	340.63
J-64	4.33	289.00	325.75	359.64
J-65	2.29	289.00	325.73	359.44
J-66	14.25	284.00	325.79	409.04
J-67	0.00	287.25	325.69	376.22
J-68	6.68	284.85	325.69	399.69
J-69	1.73	282.30	325.69	424.65
J-70	0.00	279.76	325.69	449.49
J-71	0.00	277.82	325.69	468.46
J-72	0.00	278.66	325.69	460.23
J-73	0.00	278.86	325.68	458.27
J-74	0.00	279.09	325.68	456.01
J-75	0.00	279.01	325.68	456.79
J-76	0.00	277.79	325.68	468.73
J-77	0.00	276.55	325.68	480.87
J-78	0.00	275.26	325.69	493.51
J-79	7.27	274.07	325.69	505.15
J-80	8.94	287.61	325.71	372.86
J-81	0.00	287.27	325.72	376.28

Pipe Table

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
P-16	J-12	J-13	69.86	400.0	120.0	91.37	0.73
P-18	J-14	J-15	237.25	400.0	120.0	-11.10	0.09
P-19	J-12	J-16	276.80	400.0	120.0	104.65	0.83
P-20	J-16	J-17	251.65	400.0	120.0	47.64	0.38
P-21	J-17	J-15	255.13	400.0	120.0	47.64	0.38
P-22	J-15	J-18	94.78	200.0	110.0	4.28	0.14
P-23	J-18	J-19	146.63	200.0	110.0	2.47	0.08
P-24	J-19	J-20	121.27	200.0	110.0	3.91	0.12
P-25	J-20	J-21	182.77	200.0	110.0	1.99	0.06
P-26	J-21	J-22	126.98	150.0	100.0	2.17	0.12
P-27	J-22	J-23	108.93	150.0	100.0	2.63	0.15
P-28	J-23	J-24	169.42	150.0	100.0	1.72	0.10
P-29	J-14	J-25	128.93	300.0	120.0	11.10	0.16
P-30	J-25	J-26	246.30	300.0	120.0	11.47	0.16
P-31	J-26	J-27	153.51	300.0	120.0	13.21	0.19
P-32	J-27	J-28	244.15	300.0	120.0	12.75	0.18
P-33	J-28	J-29	87.76	300.0	120.0	12.75	0.18
P-34	J-29	J-24	81.77	300.0	120.0	13.66	0.19
P-35	J-18	J-30	166.83	200.0	110.0	1.80	0.06
P-36	J-19	J-30	148.09	200.0	110.0	-1.43	0.05
P-37	J-30	J-25	89.80	200.0	110.0	0.37	0.01
P-38	J-20	J-31	195.46	200.0	110.0	1.91	0.06
P-39	J-21	J-31	145.60	200.0	110.0	-0.17	0.01
P-40	J-31	J-26	82.64	200.0	110.0	1.74	0.06
P-41	J-22	J-27	161.10	150.0	100.0	-0.47	0.03
P-42	J-23	J-29	243.12	150.0	100.0	0.92	0.05
P-43	J-13	J-32	252.83	400.0	120.0	91.37	0.73
P-44	J-32	J-33	172.71	400.0	120.0	91.37	0.73
P-45	J-33	J-34	91.48	400.0	120.0	64.07	0.51
P-46	J-34	J-35	294.77	400.0	120.0	29.15	0.23
P-47	J-16	J-36	140.80	300.0	120.0	57.01	0.81
P-48	J-36	J-37	87.15	300.0	120.0	16.46	0.23
P-49	J-37	J-38	61.00	300.0	120.0	8.05	0.11
P-50	J-38	J-39	71.03	300.0	120.0	0.97	0.01
P-51	J-39	J-40	106.32	300.0	120.0	-0.35	0.00
P-52	J-36	J-41	161.99	300.0	120.0	20.66	0.29
P-53	J-41	J-42	130.74	300.0	120.0	1.58	0.02
P-54	J-42	J-43	104.04	300.0	120.0	-0.97	0.01
P-55	J-43	J-44	135.59	300.0	120.0	-0.97	0.01
P-56	J-41	J-44	88.38	300.0	120.0	0.96	0.01
P-57	J-44	J-45	43.92	300.0	120.0	-0.01	0.00
P-59	J-45	J-46	64.90	300.0	120.0	-0.01	0.00
P-60	J-46	J-47	141.55	300.0	120.0	-7.71	0.11
P-61	J-47	J-48	102.84	300.0	120.0	-7.71	0.11
P-62	J-48	J-49	85.28	300.0	120.0	-7.71	0.11
P-63	J-46	J-49	202.16	300.0	120.0	-10.04	0.14
P-64	J-49	J-50	76.11	300.0	120.0	-17.75	0.25
P-65	J-50	J-40	68.52	300.0	120.0	9.55	0.14
P-66	J-36	J-51	56.74	300.0	120.0	19.88	0.28
P-67	J-51	J-52	112.56	300.0	120.0	13.61	0.19
P-68	J-52	J-53	130.98	300.0	120.0	-4.33	0.06
P-69	J-37	J-53	212.79	300.0	120.0	8.42	0.12
P-70	J-53	J-54	34.52	300.0	100.0	4.09	0.06
P-71	J-54	J-55	60.88	200.0	110.0	4.35	0.14
P-72	J-55	J-56	74.15	200.0	110.0	0.52	0.02
P-73	J-56	J-57	100.80	200.0	110.0	1.29	0.04
P-74	J-40	J-58	159.39	300.0	120.0	11.01	0.16
P-75	J-58	J-57	83.09	300.0	120.0	8.69	0.12
P-76	J-38	J-55	242.19	150.0	100.0	1.32	0.07
P-77	J-39	J-56	244.16	150.0	100.0	1.32	0.07
P-78	J-58	J-59	59.45	200.0	110.0	2.32	0.07
P-79	J-59	J-60	160.12	200.0	110.0	1.19	0.04
P-80	J-60	J-59	173.58	200.0	110.0	-1.13	0.04
P-81	J-40	J-61	56.33	300.0	120.0	-2.64	0.04
P-82	J-61	J-62	73.33	300.0	120.0	8.69	0.12
P-83	J-62	J-63	77.10	300.0	120.0	11.42	0.16
P-84	J-61	J-64	200.68	300.0	120.0	-11.32	0.16
P-85	J-62	J-65	148.61	200.0	110.0	-2.73	0.09
P-86	J-65	J-64	82.37	200.0	110.0	-5.02	0.16
P-87	J-64	J-66	117.71	300.0	120.0	-20.68	0.29

Peak Hour

Node Table

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
J-82	0.00	288.01	325.71	368.94
J-83	0.00	288.23	325.71	366.79
J-84	0.00	287.97	325.71	369.33
J-85	0.00	287.13	325.71	377.55
J-86	0.00	289.70	325.71	352.40
J-87	0.00	288.61	325.71	363.07
J-88	0.00	287.52	325.71	373.74
J-89	0.00	288.86	325.77	361.23
J-90	0.00	291.05	325.82	340.30
J-91	0.00	284.28	325.70	405.41
J-92	0.00	283.93	325.68	408.63
J-93	0.00	278.67	325.68	460.08
J-94	0.00	286.97	325.70	379.07
J-95	6.91	285.15	325.66	396.48
J-96	0.00	280.83	325.69	439.01
J-97	0.00	281.95	325.69	428.06
J-98	0.00	283.00	325.69	417.81
J-99	0.00	281.99	325.68	427.61
J-100	0.00	280.84	325.68	438.84
J-101	8.16	279.79	325.68	449.08
J-102	0.00	279.99	325.68	447.21
J-103	0.00	279.47	325.68	452.29
J-104	0.00	279.42	325.68	452.75
J-105	0.00	279.65	325.68	450.53
J-106	0.00	281.16	325.69	435.84
J-107	0.00	274.89	325.69	497.17
J-108	0.00	275.39	325.69	492.31
J-109	0.00	276.03	325.70	486.07
J-110	0.00	277.15	325.70	475.13
J-111	0.00	278.00	325.70	466.82
J-112	2.22	275.14	325.71	494.91
J-113	0.00	273.85	325.69	507.35
J-114	0.00	273.63	325.69	509.54
J-115	0.00	273.83	325.70	507.62
J-116	0.00	274.82	325.70	497.98
J-117	5.52	277.12	325.65	474.95
J-118	0.00	276.01	325.67	486.05
J-119	3.88	276.82	325.67	478.07
J-120	0.00	278.68	325.69	460.05
J-121	0.00	279.10	325.69	455.93
J-122	27.52	292.28	325.70	327.08
J-123	0.00	293.11	325.70	318.95
J-124	0.00	292.71	325.70	322.86
J-125	0.00	292.24	325.70	327.46
J-126	1.79	289.78	325.69	351.49
J-127	0.00	287.39	325.69	374.86
J-128	0.00	284.96	325.69	398.62
J-129	0.00	282.89	325.69	418.86
J-130	0.00	281.09	325.69	436.47
J-131	0.00	280.43	325.69	442.92
J-132	0.00	279.98	325.69	447.32
J-133	0.00	281.11	325.69	436.26
J-134	0.00	283.68	325.69	411.10
J-135	0.00	284.83	325.68	399.83
J-136	6.24	286.47	325.68	383.74
J-137	0.00	288.37	325.69	365.24
J-138	0.00	289.25	325.70	356.69
J-139	0.00	291.13	325.70	338.36
J-140	0.00	291.76	325.70	332.17
J-141	3.19	291.78	325.70	331.96
J-142	0.00	292.17	325.70	328.14
J-143	0.00	291.44	325.70	335.30
J-144	0.00	292.02	325.70	329.62
J-145	0.00	279.47	325.68	452.29
J-146	0.00	282.26	325.68	424.98
J-147	0.00	286.19	325.68	386.52
J-148	0.00	288.43	325.68	364.60
J-149	0.00	280.75	325.68	439.75
J-150	0.00	284.56	325.68	402.44
J-151	2.99	285.50	325.68	393.21

Pipe Table

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
P-88	J-66	J-34	31.38	300.0	120.0	-34.93	0.49
P-90	J-50	J-33	259.58	300.0	120.0	-27.30	0.39
P-91	J-57	J-67	185.91	300.0	120.0	3.30	0.05
P-92	J-67	J-68	73.17	300.0	120.0	3.85	0.05
P-93	J-68	J-69	79.44	300.0	120.0	-1.59	0.02
P-94	J-69	J-70	72.35	300.0	120.0	5.08	0.07
P-95	J-70	J-71	71.03	300.0	120.0	4.89	0.07
P-96	J-71	J-72	118.42	300.0	120.0	2.03	0.03
P-97	J-72	J-73	52.75	300.0	120.0	2.92	0.04
P-98	J-73	J-74	44.14	300.0	120.0	2.99	0.04
P-99	J-74	J-75	41.03	300.0	120.0	2.74	0.04
P-100	J-75	J-76	47.42	300.0	120.0	2.19	0.03
P-101	J-76	J-77	78.95	300.0	120.0	-3.17	0.04
P-102	J-77	J-78	65.47	300.0	120.0	-3.33	0.05
P-103	J-78	J-79	139.12	300.0	120.0	-0.50	0.01
P-104	J-56	J-67	227.38	150.0	100.0	0.55	0.03
P-105(1)	J-55	J-175	188.89	200.0	110.0	1.24	0.04
P-105(2)	J-175	J-68	140.75	200.0	110.0	1.24	0.04
P-106	J-54	J-80	177.61	300.0	100.0	-0.32	0.00
P-107	J-80	J-81	81.36	300.0	100.0	-9.20	0.13
P-108	J-81	J-69	167.34	300.0	110.0	11.73	0.17
P-109	J-54	J-82	43.02	200.0	110.0	0.06	0.00
P-110	J-82	J-83	42.82	200.0	110.0	0.06	0.00
P-111	J-83	J-84	45.09	200.0	110.0	0.05	0.00
P-112	J-84	J-85	44.63	200.0	110.0	0.03	0.00
P-113	J-85	J-86	218.76	200.0	110.0	0.03	0.00
P-114	J-86	J-87	45.19	200.0	110.0	0.05	0.00
P-115	J-87	J-88	38.94	200.0	110.0	0.06	0.00
P-116	J-88	J-80	46.36	200.0	110.0	0.06	0.00
P-117	J-84	J-86	176.89	150.0	100.0	0.02	0.00
P-118	J-83	J-87	177.91	150.0	100.0	0.01	0.00
P-119	J-82	J-88	176.33	150.0	100.0	-0.01	0.00
P-120	J-81	J-89	106.37	300.0	110.0	-20.94	0.30
P-121	J-89	J-90	75.29	300.0	110.0	-25.23	0.36
P-122	J-90	J-91	253.20	200.0	110.0	7.04	0.22
P-123	J-91	J-92	63.51	150.0	100.0	2.49	0.14
P-124	J-92	J-93	178.49	150.0	100.0	0.46	0.03
P-125	J-93	J-71	79.88	150.0	100.0	-1.10	0.06
P-126	J-89	J-94	74.96	150.0	100.0	4.29	0.24
P-127	J-94	J-95	72.34	150.0	100.0	3.33	0.19
P-128	J-95	J-92	96.06	150.0	100.0	-2.02	0.11
P-129	J-94	J-70	247.39	150.0	100.0	0.97	0.05
P-130	J-95	J-93	137.05	150.0	100.0	-1.56	0.09
P-131	J-72	J-96	140.90	200.0	110.0	-0.89	0.03
P-132	J-96	J-97	40.22	200.0	110.0	-1.62	0.05
P-133	J-97	J-98	46.64	200.0	110.0	-2.47	0.08
P-134	J-98	J-99	188.30	200.0	110.0	2.08	0.07
P-135	J-99	J-100	47.99	200.0	110.0	2.08	0.07
P-136	J-100	J-101	43.45	200.0	110.0	2.93	0.09
P-137	J-101	J-76	126.02	200.0	110.0	-2.40	0.08
P-138	J-97	J-100	188.48	150.0	100.0	0.85	0.05
P-139	J-96	J-102	55.61	150.0	100.0	0.74	0.04
P-140	J-102	J-103	40.90	150.0	100.0	0.66	0.04
P-141	J-103	J-104	45.46	150.0	100.0	0.92	0.05
P-142	J-104	J-101	46.57	150.0	100.0	1.46	0.08
P-143	J-102	J-73	129.52	150.0	100.0	0.07	0.00
P-144	J-103	J-74	128.08	150.0	100.0	-0.25	0.01
P-145	J-104	J-75	129.37	150.0	100.0	-0.55	0.03
P-146	J-77	J-105	126.13	150.0	100.0	0.16	0.01
P-147	J-105	J-106	99.13	150.0	100.0	-1.22	0.07
P-148	J-101	J-105	79.75	150.0	100.0	-1.37	0.08
P-149	J-106	J-111	61.56	150.0	100.0	-1.22	0.07
P-151	J-90	J-15	57.47	300.0	110.0	-32.27	0.46
P-152	J-78	J-107	44.11	200.0	110.0	-2.82	0.09
P-153	J-107	J-108	45.00	200.0	110.0	-2.69	0.09
P-154	J-108	J-109	42.98	200.0	110.0	-2.42	0.08
P-155	J-109	J-110	45.18	200.0	110.0	-1.94	0.06
P-156	J-110	J-111	49.92	200.0	110.0	-1.20	0.04
P-157	J-111	J-112	155.85	200.0	110.0	-2.42	0.08
P-158	J-112	J-24	88.23	300.0	120.0	-15.38	0.22

Peak Hour

Node Table

ID	Demand	Elevation	Head	Pressure
	(L/s)	*(m)*	*(m)*	*(kPa)*
J-152	0.00	284.93	325.68	398.79
J-175	0.00	286.24	325.69	386.12
MIN		**273.63**		**318.95**
MAX		**293.11**		**509.54**

Min/Max for development (Nodes J-32 to J-152)

Node Table

ID	Elevation	Flow Out	Hydraulic Grade
	(m)	*(L/s)*	*(m)*
R-3	273.74	196.02	273.74

Pipe Table

ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	*(mm)*	*(C)*	*(L/s)*	*(m/s)*
P-159	J-79	J-113	44.09	300.0	120.0	-9.12	0.13
P-160	J-113	J-114	45.76	300.0	120.0	-9.25	0.13
P-161	J-114	J-115	43.84	300.0	120.0	-9.53	0.13
P-162	J-115	J-116	46.51	300.0	120.0	-10.00	0.14
P-163	J-116	J-112	47.28	300.0	120.0	-10.74	0.15
P-164	J-110	J-116	152.34	150.0	100.0	-0.74	0.04
P-165	J-109	J-115	149.23	150.0	100.0	-0.48	0.03
P-166	J-108	J-114	144.97	150.0	100.0	-0.28	0.02
P-167	J-107	J-113	144.59	150.0	100.0	-0.13	0.01
P-168	J-79	J-117	343.57	150.0	100.0	1.35	0.08
P-169	J-117	J-118	274.06	150.0	100.0	-1.21	0.07
P-170	J-76	J-117	75.27	150.0	100.0	2.97	0.17
P-171	J-71	J-118	74.70	150.0	100.0	1.76	0.10
P-172	J-118	J-119	257.52	150.0	100.0	0.55	0.03
P-173	J-119	J-120	73.17	150.0	100.0	-2.17	0.12
P-174	J-70	J-119	253.30	150.0	100.0	1.16	0.07
P-175	J-69	J-120	230.89	300.0	110.0	3.33	0.05
P-176	J-120	J-121	71.24	300.0	110.0	1.16	0.02
P-177	J-35	J-122	96.21	300.0	120.0	29.15	0.41
P-178	J-122	J-123	98.33	300.0	120.0	1.63	0.02
P-179	J-123	J-124	82.19	300.0	120.0	1.23	0.02
P-180	J-124	J-125	109.71	300.0	120.0	1.61	0.02
P-181	J-125	J-126	81.66	300.0	120.0	6.74	0.10
P-182	J-126	J-127	82.92	300.0	120.0	5.27	0.07
P-183	J-127	J-128	78.45	300.0	120.0	4.77	0.07
P-184	J-128	J-129	79.94	300.0	120.0	3.79	0.05
P-185	J-129	J-130	81.57	300.0	120.0	3.12	0.04
P-186	J-130	J-131	80.72	300.0	120.0	2.66	0.04
P-187	J-131	J-132	95.42	300.0	120.0	2.37	0.03
P-188	J-132	J-121	161.11	300.0	110.0	-0.62	0.01
P-189	J-121	J-133	97.89	200.0	110.0	0.54	0.02
P-190	J-133	J-134	83.47	200.0	110.0	0.83	0.03
P-191	J-134	J-135	81.34	200.0	110.0	1.29	0.04
P-192	J-135	J-136	80.64	200.0	110.0	1.97	0.06
P-193	J-136	J-137	80.49	200.0	110.0	-3.30	0.10
P-194	J-137	J-138	81.54	200.0	110.0	-2.80	0.09
P-195	J-138	J-63	84.01	200.0	110.0	-3.12	0.10
P-196	J-63	J-139	41.99	300.0	120.0	6.13	0.09
P-197	J-139	J-140	58.74	300.0	120.0	5.48	0.08
P-198	J-140	J-125	65.62	300.0	120.0	5.13	0.07
P-199	J-133	J-131	169.27	150.0	100.0	-0.29	0.02
P-200	J-134	J-130	169.34	150.0	100.0	-0.46	0.03
P-201	J-135	J-129	172.84	150.0	100.0	-0.68	0.04
P-202	J-136	J-128	172.61	150.0	100.0	-0.98	0.06
P-203	J-137	J-127	170.89	150.0	100.0	-0.50	0.03
P-204	J-138	J-126	168.38	150.0	100.0	0.33	0.02
P-205	J-63	J-141	110.20	200.0	110.0	2.17	0.07
P-206	J-141	J-142	78.81	200.0	110.0	-0.40	0.01
P-207	J-142	J-123	169.54	200.0	110.0	-0.40	0.01
P-208	J-141	J-143	42.20	150.0	100.0	-0.62	0.03
P-209	J-143	J-144	61.00	150.0	100.0	0.03	0.00
P-210	J-144	J-124	64.75	150.0	100.0	0.38	0.02
P-211	J-139	J-143	109.29	150.0	100.0	0.65	0.04
P-212	J-140	J-144	109.90	150.0	100.0	0.35	0.02
P-213	J-132	J-145	163.26	300.0	120.0	2.99	0.04
P-214	J-145	J-146	81.42	300.0	120.0	2.07	0.03
P-215	J-146	J-147	77.32	300.0	120.0	1.62	0.02
P-216	J-147	J-148	79.50	300.0	120.0	0.98	0.01
P-217	J-145	J-149	182.46	200.0	110.0	0.92	0.03
P-218	J-149	J-150	79.35	200.0	110.0	1.37	0.04
P-219	J-150	J-151	79.12	200.0	110.0	2.01	0.06
P-220	J-151	J-152	155.36	200.0	110.0	0.00	0.00
P-221	J-149	J-146	111.15	150.0	100.0	-0.44	0.03
P-222	J-150	J-147	111.15	150.0	100.0	-0.65	0.04
P-223	J-151	J-148	111.97	150.0	100.0	-0.98	0.06
P-224	J-91	J-98	60.42	200.0	110.0	4.55	0.14
P-247	R-3	PMP-2	62.51	400.0	120.0	196.02	1.56
P-248	PMP-2	J-12	59.37	400.0	120.0	196.02	1.56

Fire Flow Table					
ID	Fire Flow Demand (L/s)	Total Demand (L/s)	Total Available Flow (L/s)	Available Fire Flow (L/s)	Fire Flow Met?
J-13	250.00	250.00	301.59	301.59	TRUE
J-32	250.00	250.00	286.97	286.97	TRUE
J-33	250.00	250.00	280.30	280.30	TRUE
J-34	250.00	250.00	276.89	276.89	TRUE
J-35	250.00	250.00	268.82	268.82	TRUE
J-36	250.00	250.00	281.94	281.94	TRUE
J-37	250.00	250.00	281.32	281.32	TRUE
J-38	254.19	250.00	284.86	280.67	TRUE
J-39	250.00	250.00	280.13	280.13	TRUE
J-40	250.60	250.00	279.71	279.11	TRUE
J-41	263.18	250.00	294.27	281.09	TRUE
J-42	251.85	250.00	282.87	281.02	TRUE
J-43	250.00	250.00	281.00	281.00	TRUE
J-44	250.00	250.00	280.94	280.94	TRUE
J-45	250.00	250.00	280.87	280.87	TRUE
J-46	262.90	250.00	293.74	280.84	TRUE
J-47	250.00	250.00	280.78	280.78	TRUE
J-48	250.00	250.00	280.75	280.75	TRUE
J-49	250.00	250.00	280.71	280.71	TRUE
J-50	250.00	250.00	280.27	280.27	TRUE
J-51	254.56	250.00	286.20	281.64	TRUE
J-52	263.04	250.00	294.32	281.28	TRUE
J-53	250.00	250.00	280.57	280.57	TRUE
J-54	100.00	100.00	279.78	279.78	TRUE
J-55	102.84	100.00	268.23	265.39	TRUE
J-56	100.00	100.00	247.54	247.54	TRUE
J-57	254.86	250.00	277.02	272.16	TRUE
J-58	250.00	250.00	266.10	266.10	TRUE
J-59	100.00	100.00	178.29	178.29	TRUE
J-60	101.69	100.00	150.33	148.64	TRUE
J-61	250.00	250.00	276.51	276.51	TRUE
J-62	100.00	100.00	272.74	272.74	TRUE
J-63	100.00	100.00	268.36	268.36	TRUE
J-64	253.15	250.00	279.94	276.79	TRUE
J-65	101.67	100.00	233.52	231.85	TRUE
J-66	260.37	250.00	287.31	276.94	TRUE
J-67	250.00	250.00	278.94	278.94	TRUE
J-68	254.86	250.00	282.98	278.12	TRUE
J-69	251.26	250.00	277.92	276.66	TRUE
J-70	100.00	100.00	274.95	274.95	TRUE
J-71	100.00	100.00	273.69	273.69	TRUE
J-72	100.00	100.00	272.38	272.38	TRUE
J-73	100.00	100.00	271.95	271.95	TRUE
J-74	100.00	100.00	271.66	271.66	TRUE
J-75	100.00	100.00	271.40	271.40	TRUE
J-76	100.00	100.00	271.14	271.14	TRUE
J-77	100.00	100.00	270.61	270.61	TRUE
J-78	100.00	100.00	270.20	270.20	TRUE
J-79	105.28	100.00	275.06	269.78	TRUE
J-80	106.50	100.00	284.07	277.57	TRUE
J-81	100.00	100.00	275.41	275.41	TRUE
J-82	100.00	100.00	253.13	253.13	TRUE
J-83	100.00	100.00	229.54	229.54	TRUE
J-84	100.00	100.00	212.85	212.85	TRUE
J-85	100.00	100.00	200.56	200.56	TRUE
J-86	100.00	100.00	205.02	205.02	TRUE
J-87	100.00	100.00	227.76	227.76	TRUE
J-88	100.00	100.00	250.67	250.67	TRUE
J-89	100.00	100.00	272.29	272.29	TRUE
J-90	100.00	100.00	269.55	269.55	TRUE
J-91	100.00	100.00	251.36	251.36	TRUE
J-92	100.00	100.00	188.22	188.22	TRUE
J-93	100.00	100.00	198.67	198.67	TRUE
J-94	100.00	100.00	186.11	186.11	TRUE
J-95	105.03	100.00	182.13	177.10	TRUE
J-96	100.00	100.00	272.04	272.04	TRUE
J-97	100.00	100.00	266.30	266.30	TRUE
J-98	100.00	100.00	264.29	264.29	TRUE
J-99	100.00	100.00	236.26	236.26	TRUE
J-100	100.00	100.00	258.69	258.69	TRUE
J-101	105.93	100.00	277.43	271.50	TRUE

Fire Flow Table					
ID	Fire Flow Demand (L/s)	Total Demand (L/s)	Total Available Flow (L/s)	Available Fire Flow (L/s)	Fire Flow Met?
J-13	250.00	250.00	301.59	301.59	TRUE
J-102	100.00	100.00	232.62	232.62	TRUE
J-103	100.00	100.00	232.96	232.96	TRUE
J-104	100.00	100.00	236.62	236.62	TRUE
J-105	100.00	100.00	207.46	207.46	TRUE
J-106	100.00	100.00	172.00	172.00	TRUE
J-107	100.00	100.00	269.82	269.82	TRUE
J-108	100.00	100.00	269.70	269.70	TRUE
J-109	100.00	100.00	269.58	269.58	TRUE
J-110	100.00	100.00	269.52	269.52	TRUE
J-111	100.00	100.00	265.15	265.15	TRUE
J-112	101.61	100.00	270.32	268.71	TRUE
J-113	100.00	100.00	269.65	269.65	TRUE
J-114	100.00	100.00	269.48	269.48	TRUE
J-115	100.00	100.00	269.29	269.29	TRUE
J-116	100.00	100.00	269.05	269.05	TRUE
J-117	104.01	100.00	194.06	190.05	TRUE
J-118	100.00	100.00	201.30	201.30	TRUE
J-119	102.82	100.00	205.85	203.03	TRUE
J-120	250.00	250.00	276.85	276.85	TRUE
J-121	100.00	100.00	275.40	275.40	TRUE
J-122	270.02	250.00	280.12	260.10	TRUE
J-123	250.00	250.00	254.22	254.22	TRUE
J-124	100.00	100.00	256.81	256.81	TRUE
J-125	100.00	100.00	263.31	263.31	TRUE
J-126	101.30	100.00	268.20	266.90	TRUE
J-127	100.00	100.00	268.59	268.59	TRUE
J-128	100.00	100.00	269.90	269.90	TRUE
J-129	100.00	100.00	271.03	271.03	TRUE
J-130	100.00	100.00	272.04	272.04	TRUE
J-131	100.00	100.00	271.70	271.70	TRUE
J-132	100.00	100.00	264.72	264.72	TRUE
J-133	100.00	100.00	266.68	266.68	TRUE
J-134	100.00	100.00	248.82	248.82	TRUE
J-135	100.00	100.00	242.50	242.50	TRUE
J-136	104.54	100.00	240.07	235.53	TRUE
J-137	100.00	100.00	230.93	230.93	TRUE
J-138	100.00	100.00	236.91	236.91	TRUE
J-139	100.00	100.00	266.93	266.93	TRUE
J-140	100.00	100.00	265.52	265.52	TRUE
J-141	102.32	100.00	221.86	219.54	TRUE
J-142	100.00	100.00	198.06	198.06	TRUE
J-143	100.00	100.00	193.80	193.80	TRUE
J-144	100.00	100.00	186.69	186.69	TRUE
J-145	100.00	100.00	228.95	228.95	TRUE
J-146	100.00	100.00	218.86	218.86	TRUE
J-147	100.00	100.00	210.92	210.92	TRUE
J-148	100.00	100.00	202.98	202.98	TRUE
J-149	100.00	100.00	211.21	211.21	TRUE
J-150	100.00	100.00	192.90	192.90	TRUE
J-151	102.18	100.00	172.42	170.24	TRUE
J-152	100.00	100.00	120.54	120.54	TRUE
J-175	100.00	100.00	221.68	221.68	TRUE

MIN	**120.54**
MAX	**301.59**

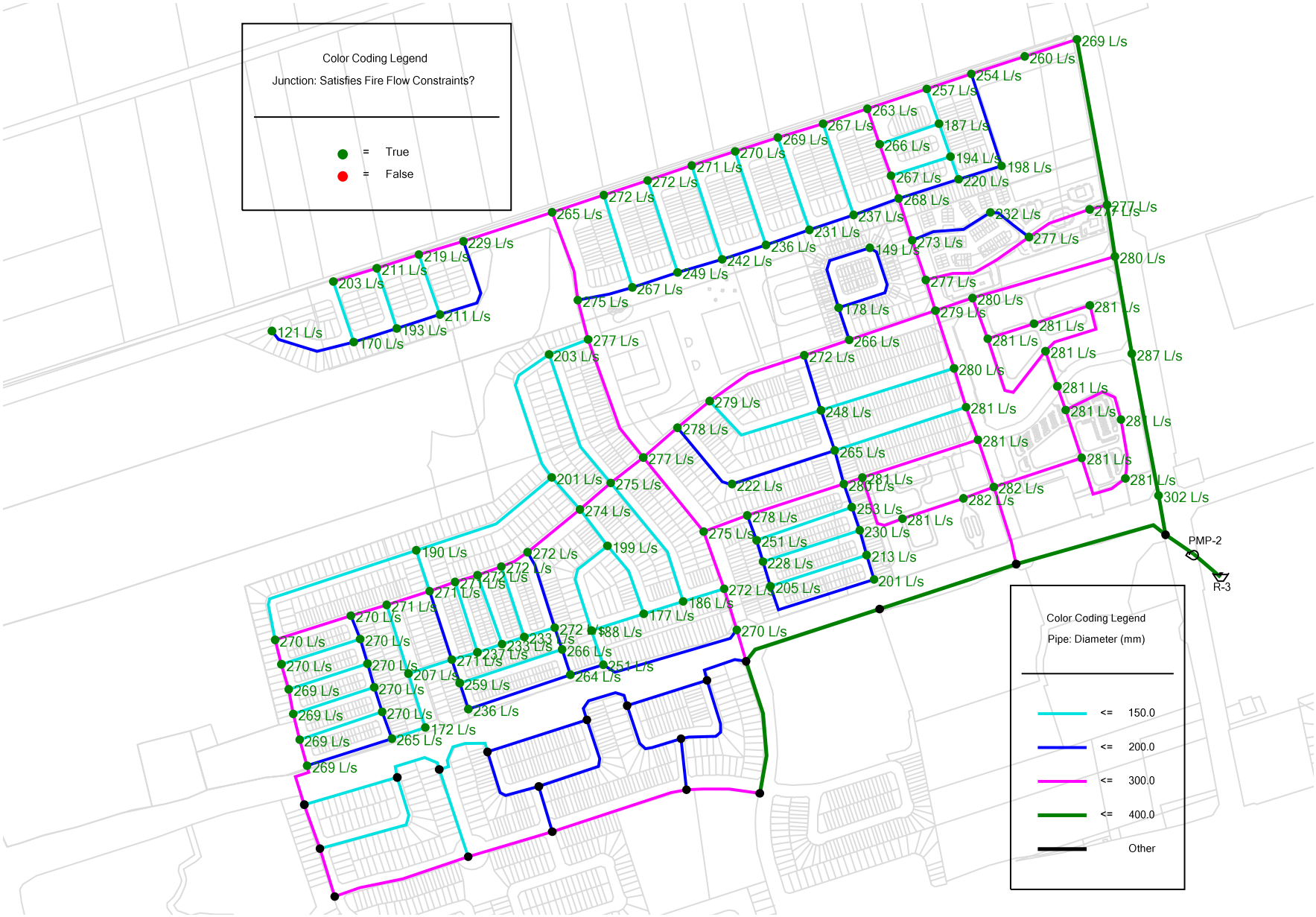
Areas with Pressures Exceeding 550 kPa

Scenario: Minimum Hour

North West Green Lane (Feb 2025).wtg

Available Fire Flow at 140 kPa

Scenario: Maximum Day



North West Green Lane (Feb 2025).wtg

Appendix I Utilities Coordination

SCS consulting group ltd

Yin, Hao Yang

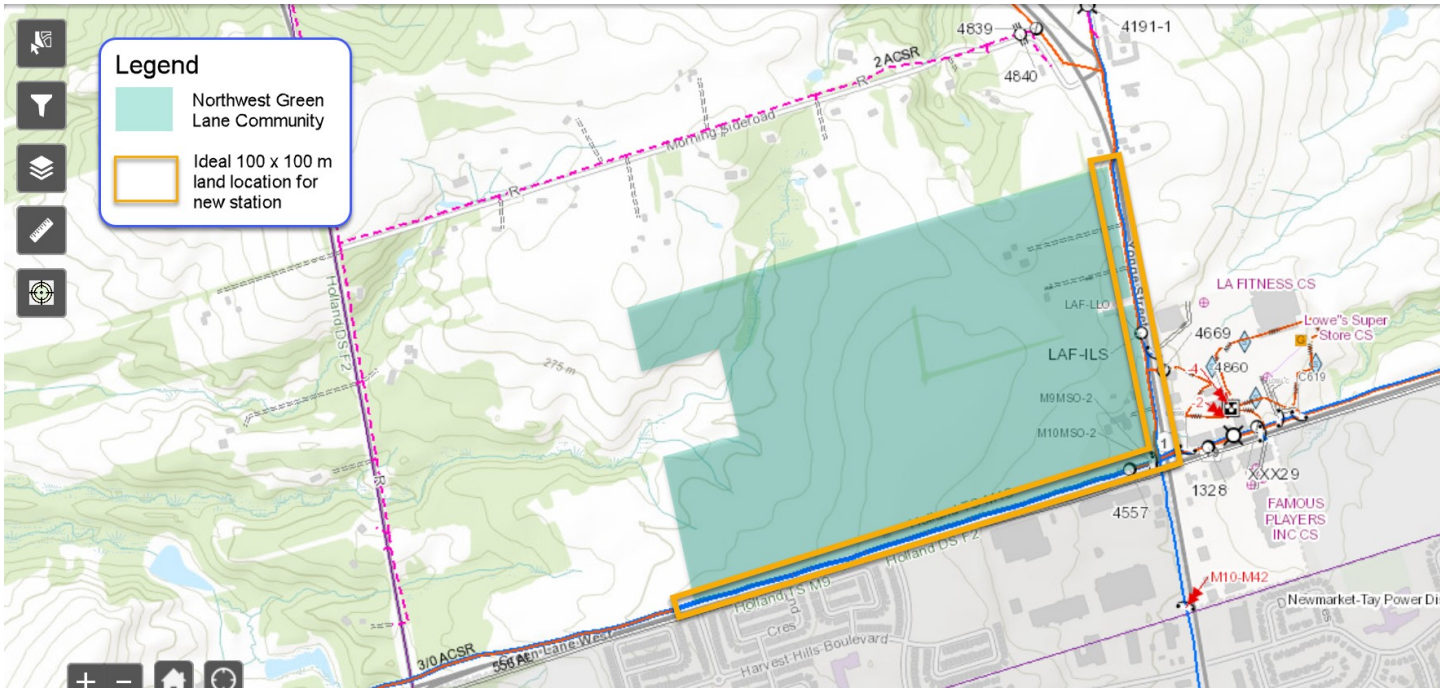
From: TEHRANI Bahareh <Bahareh.Tehrani@HydroOne.com>
Sent: August 30, 2024 1:36 PM
To: Yin, Hao Yang; NEWMARKET DX Asset Management
Cc: Sirrs, Emily
Subject: RE: Proposed Community Design Plan - East Gwillimbury

CAUTION: This email originated from an **EXTERNAL SOURCE**. Please use caution when opening attachments, clicking on links or responding. When in doubt, contact our IT Department.

Hello Hao Yang,
We completed our preliminary assessment, and it would be beneficial to have a virtual meeting to discuss the needs of this development further.
Do you have any availability on Sept 6th (any time), or Sept 9th in the afternoon?

To provide you background information, below is the result of our findings:

- As of Aug 30, 2024, there is sufficient capacity available in the area to support up to 500 residential lots (assuming gas heated lots and no significant electrification). Please note that Hydro One can not reserve capacity and that the capacity is allocated based on a first come/first serve basis once we receive the formal load connection application.
- After the initial 500 lots, we will require a new distribution substation to support the loading of the future phases of this development. For a new station, the land requirement is 100 x 100m land. The site should not be close to any bodies of water, have a level grading, and accessible form main roads. Potential location for new station is highlighted in yellow in the below map (100mx100m parcel of land along Green Lane or Yong street).
- We will require land owner and developer's assistance in sighting the appropriate parcel of land to build new station.
- We will require the developer's phasing plan specifically the planned in-servicing and occupancy dates so H1 can better coordinate with the developer's timelines and ensure capacity is available for residential sites.
- Large commercial lots will need to be discussed separately from the residential lots. These sites usually would require a direct 44kV connection and connection requirements will vary based on level of supply.



Thanks,
Bahareh

From: Yin, Hao Yang <hyin@scsconsultinggroup.com>
Sent: Monday, August 26, 2024 2:55 PM
To: TEHRANI Bahareh <Bahareh.Tehrani@HydroOne.com>; NEWMARKET DX Asset Management <AssetManagement.NewmarketDx@hydroone.com>
Cc: Sirrs, Emily <esirrs@scsconsultinggroup.com>
Subject: RE: Proposed Community Design Plan - East Gwillimbury

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Hi Tehrani:

We are still in the early stages of the design and would not need a completed study or any designs. We just would like to confirm if the hydro servicing can be provided to the development based on your current and planned infrastructures in the area.

Thank you
Regards

Hao Yang Yin
SCS Consulting Group Ltd.
30 Centurian Drive, Suite 100
Markham, ON, L3R 8B8
(T) 905.475.1900 Ext. 2274
(F) 905.475.8335
hyin@scsconsultinggroup.com
www.scsconsultinggroup.com

From: TEHRANI Bahareh <Bahareh.Tehrani@HydroOne.com>
Sent: August 26, 2024 1:32 PM
To: Yin, Hao Yang <hyin@scsconsultinggroup.com>; NEWMARKET DX Asset Management <AssetManagement.NewmarketDx@hydroone.com>
Cc: Sirrs, Emily <esirrs@scsconsultinggroup.com>
Subject: RE: Proposed Community Design Plan - East Gwillimbury

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Thanks a lot Hao,
We will complete the study and get back to you. It could take us a few weeks considering the magnitude of this development.
Is there a expected time frame with regard to these developments? When would the first phase of this development start and how long you expect this project would take for completion of all phases?

Bahareh

From: Yin, Hao Yang <hyin@scsconsultinggroup.com>
Sent: Monday, August 26, 2024 12:24 PM
To: TEHRANI Bahareh <Bahareh.Tehrani@HydroOne.com>; NEWMARKET DX Asset Management <AssetManagement.NewmarketDx@hydroone.com>
Cc: Sirrs, Emily <esirrs@scsconsultinggroup.com>
Subject: RE: Proposed Community Design Plan - East Gwillimbury

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Hello Tehrani:

Thank you for looking into this.

Please kindly find the CDP attached for your reference, it includes the unit counts and the various proposed land uses.

At the time we are still in the preliminary design, and would like to just get and understanding if Hydro One is able to service the area or if any system upgrade requirements can be identified at this stage. Please let us know if any additional information would be required.

Thank you
Regards

Hao Yang Yin

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(T) 905.475.1900 Ext. 2274
(F) 905.475.8335
hyin@scsconsultinggroup.com
www.scsconsultinggroup.com

From: TEHRANI Bahareh <Bahareh.Tehrani@HydroOne.com>
Sent: August 26, 2024 11:55 AM
To: Yin, Hao Yang <hyin@scsconsultinggroup.com>; NEWMARKET DX Asset Management <AssetManagement.NewmarketDx@hydroone.com>
Subject: FW: Proposed Community Design Plan - East Gwillimbury

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Hello Hao,
I am the manager of planning team for Central, and my teams covers East Gwillimbury area.

Providing you a capacity number can be misleading as East Gwillimbury is a growing area and Hydro One cannot reserve capacity.
To better assist you, can you please inform us what type of development is expected in this location, will it be residential, Commercial, or Industrial? Also is there a high-level plan of how many units are expected (along with the type) and what would be expected time frame for this development?

If you can provide us more information about this development and expected time frame, we can guide you better on what could be the short term, medium and long term supply option for this development and inform you about potential system upgrades.

Thanks,
Bahareh

From: Yin, Hao Yang <hyin@scsconsultinggroup.com>
Sent: Tuesday, August 20, 2024 9:12 AM
To: ANGELONE Nunziatina <Tina.Angelone@hydroone.com>
Cc: Sirrs, Emily <esirrs@scsconsultinggroup.com>
Subject: RE: Proposed Community Design Plan - East Gwillimbury

You don't often get email from hyin@scsconsultinggroup.com. Learn why this is important

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Hi Tina:

Hope this email finds you well.

We would like to follow up on the request for NW Yonge and Green Lane. Might you please assist us in confirming the system capacity?

Thank you
Regards

Hao Yang Yin

SCS Consulting Group Ltd.
30 Centurian Drive, Suite 100
Markham, ON, L3R 8B8
(T) 905.475.1900 Ext. 2274

(F) 905.475.8335
hyin@scsconsultinggroup.com
www.scsconsultinggroup.com

From: Yin, Hao Yang <hyin@scsconsultinggroup.com>
Sent: August 13, 2024 10:25 AM
To: ANGELONE Nunziatina <Tina.Angelone@hydroone.com>
Cc: Sirrs, Emily <esirrs@scsconsultinggroup.com>
Subject: RE: Proposed Community Design Plan - East Gwillimbury

Hi Tina:

Hope this email finds you well.

We would like to follow up on the request. Could you kindly assist us in confirming the system capacity for the proposed development?

Thank you
Regards

Hao Yang Yin

SCS Consulting Group Ltd.
30 Centurian Drive, Suite 100
Markham, ON, L3R 8B8
(T) 905.475.1900 Ext. 2274
(F) 905.475.8335
hyin@scsconsultinggroup.com
www.scsconsultinggroup.com

From: O'BRIEN Janet <Janet.Obrien@hydroone.com>
Sent: August 8, 2024 3:09 PM
To: Yin, Hao Yang <hyin@scsconsultinggroup.com>
Cc: Sirrs, Emily <esirrs@scsconsultinggroup.com>; ANGELONE Nunziatina <Tina.Angelone@hydroone.com>
Subject: RE: Proposed Community Design Plan - East Gwillimbury

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Good afternoon,

Thank you for your email, I am currently looking after Northern Ontario and Hamilton area so I will be passing you over to my colleague, Tina, I cc'd her above.

All the best.

Janet O'Brien (she/her)
Real Estate Coordinator

Hydro One Networks Inc.
Real Estate Management
905-379-4078
HydroOne.com

From: Yin, Hao Yang <hyin@scsconsultinggroup.com>
Sent: Thursday, August 8, 2024 2:46 PM
To: O'BRIEN Janet <Janet.Obrien@hydroone.com>
Cc: Sirrs, Emily <esirrs@scsconsultinggroup.com>
Subject: Proposed Community Design Plan - East Gwillimbury

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Hi Janet:

We hope this email finds you well.

We are currently preparing a Functional Servicing Report for a proposed Community Design Plan in East Gwillimbury. The project will include demolition within the site including the existing residences located along Yonge St and Green Lane as well as the Northern Greens Golf Range, though the Victory Baptist Church is to remain. Could you kindly help us in confirming if there is adequate capacity or if system upgrades are required to service the proposed development? Or if there is anyone you might know that we can ask?

Please kindly find the CDP attached for your reference.

Thank you
Regards

Hao Yang Yin

SCS Consulting Group Ltd.
30 Centurian Drive, Suite 100
Markham, ON, L3R 8B8
(T) 905.475.1900 Ext. 2274
(F) 905.475.8335
hyin@scsconsultinggroup.com
www.scsconsultinggroup.com

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Song, Jessie

From: Tom Erskine <Tom.Erskine@enbridge.com>
Sent: October 9, 2024 7:33 AM
To: Yin, Hao Yang
Cc: Sirrs, Emily; Heather Whitten
Subject: RE: Proposed Community Design Plan - East Gwillimbury

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Good morning Hao Yang,

I apologize for the delay in responding to this inquiry.

The gas availability analysis of this entire development is very high level. Based on this we have determined that to add the entire development you will require a reinforcement of our gas network. This reinforcement would consist of replacing our existing NPS 6 gas main on Younge St. north of Green Lane to a NPS 8 gas main for approximately two kilometers. This will likely be a Leave to Construct project with a timeline of two to three years. There may be availability to connect some of the development in phases prior to the reinforcement. We can take a more detailed view of this option once you have applied for gas and it is officially in our Get Connected system.

Thank you,

Tom

Tom Erskine GPI
Sr. Advisor, Construction & Project Management
New Business Projects

ENBRIDGE
CELL: 437-992-3766
101 Honda Blvd, Markham, ON L6C 0M6

enbridgegas.com
Safety. Integrity. Respect. Inclusion. High Performance.

From: Yin, Hao Yang <hyin@scsconsultinggroup.com>
Sent: Wednesday, September 4, 2024 12:44 PM
To: Tom Erskine <Tom.Erskine@enbridge.com>
Cc: Sirrs, Emily <esirrs@scsconsultinggroup.com>; Heather Whitten <Heather.Whitten@enbridge.com>
Subject: [External] RE: Proposed Community Design Plan - East Gwillimbury

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Were you expecting this email? TAKE A CLOSER LOOK. Is the sender legitimate?
DO NOT click links or open attachments unless you are 100% sure that the email is safe.

Hi Tom:

Good afternoon. We were wondering if there might be any updates regarding the capacity assessment?

Thank you
Regards

Song, Jessie

From: Kalia, Rishabh <rishabh.kalia@bell.ca>
Sent: July 29, 2024 1:52 PM
To: Yin, Hao Yang
Cc: Sirrs, Emily
Subject: RE: Proposed Community Design Plan - East Gwillimbury

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Hello,

I completely understand your concern and the stage of the planning. Please let me know when the plan move forward. As of current state, Yes, bell can and will be happy to server the upcoming development.

Sincerely

RISHABH KALIA
Specialist, Network
444 Millard Ave
Newmarket, Ontario
L3Y-2A3
@:-Rishabh.kalia@bell.ca
Cell : 905-301-1733
TEL: 905-895-7315

Bell

Bell Let's Talk

On January 25, let's create positive change.

Bell is proud to support International Women's Day on March 8

From: Yin, Hao Yang <hyin@scsconsultinggroup.com>
Sent: Monday, July 29, 2024 1:44 PM
To: Kalia, Rishabh <rishabh.kalia@bell.ca>
Cc: Sirrs, Emily <esirrs@scsconsultinggroup.com>
Subject: [EXT]RE: Proposed Community Design Plan - East Gwillimbury

Hi Rishabh:

Thank you very much. We might not have all the information to fill out the RFI at the moment since its still very much preliminary and may be subject to change, and might not need a network design for the area at the moment. We were just wondering if there might be any expected problems in servicing the development down the line based on the current bell infrastructure in the area?

Thank you,
Regards.

Hao Yang Yin

SCS Consulting Group Ltd.
30 Centurian Drive, Suite 100
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(T) 905.475.1900 Ext. 2274
(F) 905.475.8335
hyin@scsconsultinggroup.com
www.scsconsultinggroup.com

From: Kalia, Rishabh <rishabh.kalia@bell.ca>
Sent: July 29, 2024 12:56 PM
To: Yin, Hao Yang <hyin@scsconsultinggroup.com>
Cc: Sirrs, Emily <esirrs@scsconsultinggroup.com>
Subject: RE: Proposed Community Design Plan - East Gwillimbury

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Good Afternoon Yin,
Hope this email finds you well,

I would start by appreciating you reaching out regarding the new development. I would definitely be able to assist you in the matter. Could you please fill the attached RFI, so I can get started with creating a network to serve the development and start the designing process.

Sincerely

RISHABH KALIA
Specialist, Network
444 Millard Ave
Newmarket, Ontario
L3Y-2A3
@:-Rishabh.kalia@bell.ca
Cell : 905-301-1733
TEL: 905-895-7315

Bell

Bell Let's Talk

On January 25, let's create positive change.

Bell is proud to support International Women's Day on March 8

From: Yin, Hao Yang <hyin@scsconsultinggroup.com>
Sent: Monday, July 29, 2024 12:16 PM

To: Kalia, Rishabh <rishabh.kalia@bell.ca>
Cc: Sirrs, Emily <esirrs@scsconsultinggroup.com>
Subject: [EXT]RE: Proposed Community Design Plan - East Gwillimbury

Hi Rishabh:

We hope this email finds you well. We would like to follow up on the inquiry.

Could you kindly assist in confirming if there is adequate capacity or if system upgrades are required to service the proposed development at NW Yonge St and Green Lane?

Thank you
Regards

Hao Yang Yin

SCS Consulting Group Ltd.
30 Centurian Drive, Suite 100
Markham, ON, L3R 8B8
(T) 905.475.1900 Ext. 2274
(F) 905.475.8335
hyin@scsconsultinggroup.com
www.scsconsultinggroup.com

From: Ghobrial, Moudy <moudy.ghobrial1@bell.ca>
Sent: July 10, 2024 9:40 AM
To: Yin, Hao Yang <hyin@scsconsultinggroup.com>; Kalia, Rishabh <rishabh.kalia@bell.ca>
Cc: Sirrs, Emily <esirrs@scsconsultinggroup.com>
Subject: RE: Proposed Community Design Plan - East Gwillimbury

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Hi Hao,

Rishabh is now the Manger looking after this area, he should be able to help you

Thank you

Moudy Ghobrial
Implementation Manager

444 Millard Ave , Floor 2,
Newmarket, ON L3Y 2A3
Moudy.ghobrial1@bell.ca
☎: **9056143633**
Cell : 289-383-5081

From: Yin, Hao Yang <hyin@scsconsultinggroup.com>
Sent: Tuesday, July 9, 2024 4:58 PM

To: Ghobrial, Moudy <moudy.ghobrial1@bell.ca>
Cc: Sirrs, Emily <esirrs@scsconsultinggroup.com>
Subject: [EXT]Proposed Community Design Plan - East Gwillimbury

Hello Moudy:

We are currently preparing a Functional Servicing Report for a proposed Community Design Plan in East Gwillimbury. The project will include demolition within the site including the existing residences located along Yonge St and Green Lane as well as the Northern Greens Golf Range, though the Victory Baptist Church is to remain. Could you kindly confirm if there is adequate capacity or if system upgrades are required to service the proposed development?

Please kindly find the CDP attached for your reference.

Thank you
Regards

Hao Yang Yin

SCS Consulting Group Ltd.
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Song, Jessie

From: Graham McPherson <Graham.McPherson@rci.rogers.com>
Sent: July 11, 2024 10:29 AM
To: Yin, Hao Yang
Subject: RE: Proposed Community Design Plan - East Gwillimbury

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Hi Hao, Rogers has architecture fibre at the intersection of Green Lane and Yonge Street that can support this development.

Regarding potential demolitions in the area and markup requests; they can be sent directly to: YorkCirculations@rci.rogers.com
For the project itself I will be the point of contact regarding coordination. Please keep me updated on your progress for this site.

Thanks,

Graham McPherson
System Planner - Greenfield

Outside Plant Engineering - York
Rogers Communications
244 Newkirk Road Richmond Hill, ON L4C 3S5
e graham.mcpherson@rci.rogers.com
m 705.896.9608
o 705.812.4528

ROGERS

From: Harjit Allen <harjit.allen@rci.rogers.com>
Sent: Thursday, July 11, 2024 9:44 AM
To: Graham McPherson <Graham.McPherson@rci.rogers.com>
Subject: FW: Proposed Community Design Plan - East Gwillimbury

Hi Graham – for you.

Thanks!

From: Yin, Hao Yang <hyin@scsconsultinggroup.com>
Sent: Tuesday, July 9, 2024 5:02 PM
To: Harjit Allen <harjit.allen@rci.rogers.com>
Cc: Sirrs, Emily <esirrs@scsconsultinggroup.com>
Subject: Proposed Community Design Plan - East Gwillimbury

Hello Harjit:

We are currently preparing a Functional Servicing Report for a proposed Community Design Plan in East Gwillimbury. The project will include demolition within the site including the existing residences located along Yonge St and Green Lane as well as the Northern Greens Golf Range, though the Victory Baptist Church is to remain. Could you kindly confirm if there is adequate capacity or if system upgrades are required to service the proposed development?

Please kindly find the CDP attached for your reference.

Thank you
Regards

Hao Yang Yin

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