8075 Highway 7

Preliminary Stormwater Management Report

Project Location:
8075 Highway 7
Guelph/Eramosa Township, ON N1H 6H8

Prepared for:
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May 15, 2024

MTE File No.: 54565-100

Engineers, Scientists, Surveyors.

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1.0 INTRODUCTION

MTE Consultants Inc. was retained by MHBC Planning to complete a Preliminary Stormwater Management (SWM) Report for a parking lot to be constructed at 8075 Highway 7 in the Township of Guelph/Eramosa, in support of a Zoning By-Law Application. This report is herein referred to as the SWM Report and 8075 Highway 7 is herein referred to as the Site.

In existing conditions, the Site has agricultural land-use, and based on Township of Guelph/Eramosa Zoning By-Law is currently zoned as agricultural and an environmental protection area. The current Zoning By-Law Application will aim to grant industrial zoning for the Site. The Site is bound to the north by Highway 7, to the east by Wellington Road 29 and single – residential properties, to the south by agricultural lands and a Grand River Conservation Authority regulated wetland associated with the headwaters of Clythe Creek, and to the west by a municipal drain outletting to Clythe Creek (referred to as Highway No. 7 Drain). The municipal drain is regulated by the Township of Guelph/Eramosa. For the location of the Site refer to Figure 1.0.

The proposed development for the Site is the construction of a gravel parking lot. The proposed development is intended to provide parking for truck and trailers. No buildings, sanitary or water services are proposed.

This Report outlines the proposed grading and stormwater management strategy to align with regulatory criteria and meet the development objectives. The purpose of this Report is to ensure the development meets Guelph/Eramosa Township, the Grand River Conservation Authority (GRCA), and the Ministry of the Environment, Conservation and Parks (MECP) criteria, and any recommendations from earlier relevant studies and reports.

1.1 Background Information

In preparation of this SWM Report, the following pre-consultation comments were reviewed:

- Conceptual Development Plan (MHBC Planning, February 9, 2024).
- Corporation of the Township of Guelph/Eramosa Site (Virtual) Pre-consultation Meeting (Guelph Eramosa Township, July 20, 2023).
- Development Standards for the Township of Guelph/Eramosa (R.J. Burnside & Associates Limited, 2004).
- Erosion & Sediment Control Guideline for Urban Construction (Toronto and Region Conservation Authority, 2019).
- Pre-Consultation Meeting Notes, 8075 Highway 7 (Township, July 20, 2023).
- Stormwater Management Planning and Design Manual (MOE, 2003).
- Test Pits for the Site (CVD Engineering Ltd., 2001).

1.2 Existing Topography

The Site encompasses an area of 32.72ha and currently comprises of agricultural land. In the existing condition, surface runoff from the Site generally drains from north to south towards the municipal drain located along the west property line. There is an elevation difference of approximately 7.0m between the north and south property line. The Site currently only has a small gravel area, resulting in approximately 1.0% imperviousness in the existing conditions.

The municipal drain that is located along the west property line captures runoff from properties north of the Site, with an average slope of 0.50% across the drain. The municipal drain outlets to Clythe Creek. There is an associated floodplain and GRCA regulatory limit for the municipal drain.

1.3 Existing Soil Conditions

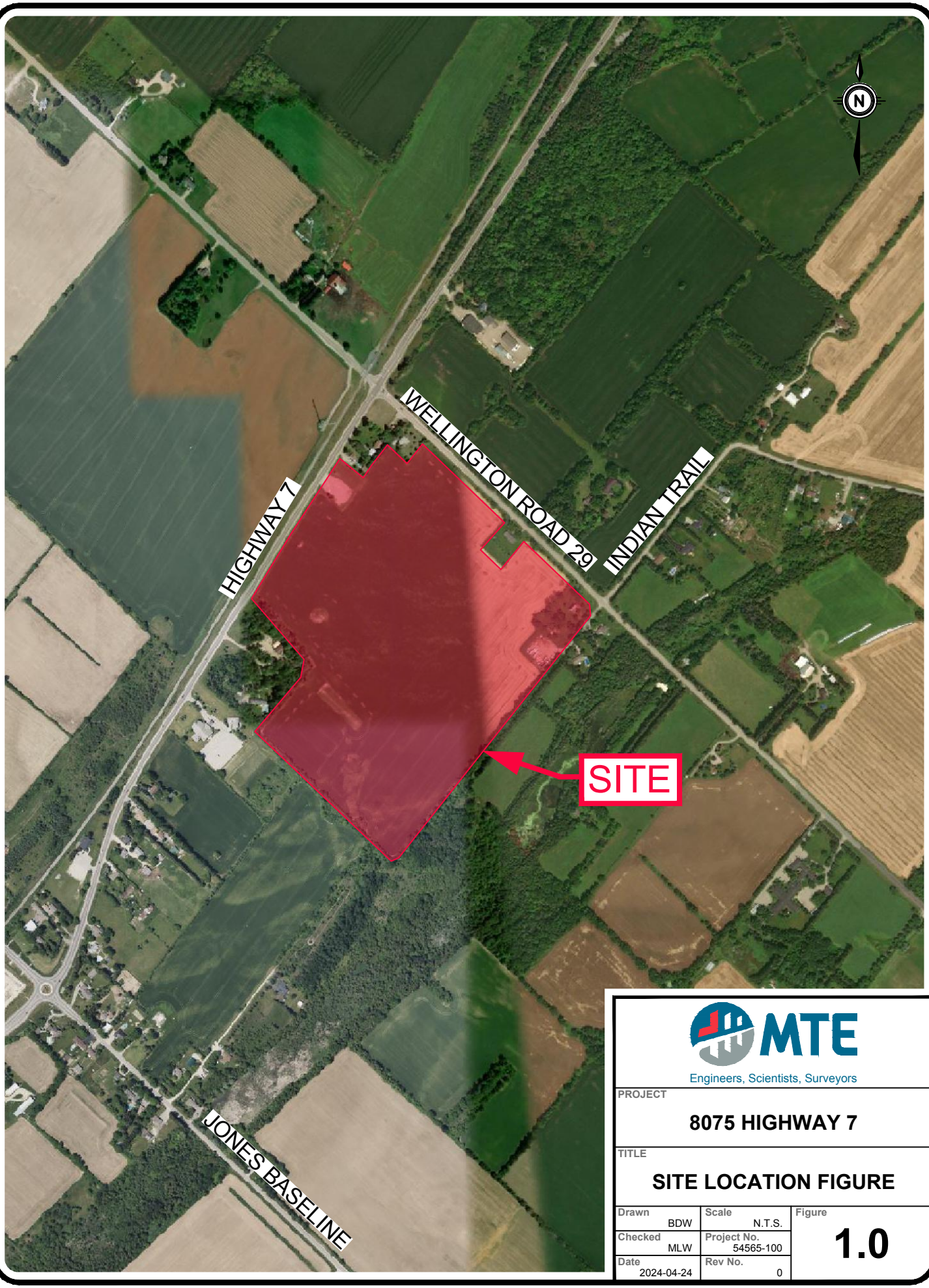
Existing soil conditions from the Site was determined referencing a series of historic test pit logs, completed by Chung & Vander Doelen in 2001. During this historic investigation, 42 test pits were completed on Site to a depth ranging from 0.50m to 3.70m below ground surface. The test pits typically showed a topsoil layer of approximately 215mm underlain by sand-silt layer typically 0.60 to 1.0m in depth. Beyond this layer was typically a sand and gravel layer to test pit termination. Most of the test pits were terminated on bedrock and were terminated as dry.

It is recommended that prior to the detailed design phase a geotechnical investigation be completed with boreholes to confirm subsurface soils conditions, including groundwater elevations and bedrock conditions.

1.4 Reviewing Agencies

The functional grading, and stormwater management designs as well as this SWM report will be required for submission to the Township of Guelph/Eramosa in support of the Zoning By-Law Amendment. The Township will be responsible for approval of the Functional Site Grading and Servicing Plans, including the stormwater management design.

The Site is located within a GRCA regulatory limit, as such the GRCA will be circulated on the Zoning By-Law Amendment application for their review and approval.



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PROJECT
8075 HIGHWAY 7

TITLE
SITE LOCATION FIGURE

Drawn: BDW	Scale: N.T.S.	Figure: **1.0**
Checked: MLW	Project No.: 54565-100	
Date: 2024-04-24	Rev No.: 0	

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Plot Date: April 24, 2024 - 3:33 PM

2.0 PROPOSED CONDITIONS

Preliminary grading and storm strategies for the proposed development have been developed based on the topographic survey, and Conceptual Site Plan prepared by MHBC, dated February 9, 2024.

2.1 Proposed Grading

The proposed grading strategy described below is preliminary and will be refined during detailed design. The proposed development consists of a gravel parking lot, complete with a stormwater management facility. The proposed grading strategy will respect the existing grades along all property boundaries, the existing grades of the GRCA regulated floodplain and any environmental setbacks associated with driplines and/or other environmental features.

The proposed grading scheme was designed to allow for sheet flow of a minimum slope of approximately 0.75% across the proposed gravel parking lot. In defined locations along the parking lot boundary, embankments were graded to connect into the existing grades. These embankments were designed with a maximum slope of 3:1.

The west boundary of the parking lot is adjacent to the floodplain. To maintain positive drainage to the Site stormwater management facility (SWM Facility) in this area, an embankment will be graded into the GRCA floodplain limit and will connect to existing grades. This grading will be limited to 3.0m beyond the GRCA floodplain limit and is not expected to have impacts to the regulatory flood elevation.

A proposed grassed swale was graded along the south property boundary to collect drainage to the south and direct this drainage west to the municipal drain.

2.2 Proposed Servicing

2.2.1 Storm

A storm sewer network is proposed, ranging in pipe sizes from 375mm to 1650mm, to service the Site stormwater runoff. The proposed storm sewer network will collect parking lot runoff and convey the runoff to the proposed SWM Facility, located at the southwest corner of the Site. A preliminary capacity assessment was conducted to determine the size of the catchbasins based on each drainage catchment.

It is anticipated that the new storm sewer network will be installed at a typical slope of 0.3%. The storm sewer network will be refined during detailed design.

3.0 PRELIMINARY STORMWATER MANAGEMENT STRATEGY

The following section documents the Preliminary Stormwater Management Strategy for the Site, designed considering relevant stormwater management criteria. For detailed calculations referenced in the sections below, please refer to Appendix B.

3.1 Stormwater Management Criteria

The stormwater management design criteria for the subject Site, as established by the *Development Standards for the Township of Guelph/*Eramosa (R. J. Burnsides & Associates Limited, 2004) are as follows:

i) Attenuation of the post-development peak flows for the 5-year (minor) and 100-year (major) 3-hour Chicago design storms (using parameters from the Fergus Shand Dam Rain Gauge) to the pre-development (existing) peak flow rates;

ii) Implementation of enhanced water quality controls to provide 80% Total Suspended Solids removal;

iii) Implementation of erosion and sediment control measures; and,

iv) On-site water balance.

3.2 Catchment Parameters

Based on review of existing contour data of the Site and the surrounding area, in pre-development conditions the entire site outlets to the municipal drain to the west. The pre-development drainage catchment areas are as follows:

- **Catchment 101** – This 26.60ha drainage catchment includes most of the Site area and is agricultural in existing conditions. Runoff from this catchment flows overland to the west and southwest and outlets to the municipal drain.
- **Catchment 102** – This 6.12ha drainage catchment includes a portion of the Site that flows overland to Wellington Road 29. Based on review of existing conditions topography, this runoff flows south in the ditch of Wellington Road 29. Indian Trail and the vegetated tree-line adjacent to Indian Trail create a drainage ridge such that contributing runoff is then directed west to the municipal drain.

Figure 2.0 illustrates the limits of the pre-development catchment drainage area.

The post-development drainage catchments maintain the pre-development drainage patterns, as the overall outlet of the municipal drain is maintained. Based on review of proposed grading scheme, the post-development drainage catchments are as follows:

- **Catchment 201** – This 3.54ha drainage catchments incudes the regulatory floodplain associated with the municipal drain to the west. This area is not impacted by the development and will be maintained as agricultural in proposed conditions. Runoff from this catchment flows overland to the west and southwest and outlets to the municipal drain, uncontrolled.
- **Catchment 202 –** This 24.37ha drainage catchment includes the proposed gravel parking lot. This area has been graded such that the 5-year (minor) runoff is collected by a storm sewer system and outlets to the proposed SWM Facility. The 100-year (major) runoff is directed to the proposed SWM Facility. The SWM Facility has been sized to

attenuate both the minor and major flow events to existing flow rates. This SWM Facility has been designed to outlet to the municipal drain. The SWM Facility also includes an infiltration cell to provide a Site water balance.

- **Catchment 203 –** This 4.81ha drainage catchment includes the grassed/landscaped area adjacent to the parking lot. This drainage flows overland to Wellington Road 29 and south, similar to existing conditions. The proposed grading scheme has been designed to include a perimeter swale along the south boundary of the property to collect this runoff and convey the runoff west to the municipal drain.

Figure 3.0 illustrates the limits of the post-development catchment drainage areas. Table 3.1 below summarizes the drainage catchment areas.

Table 3.1 – Catchment Parameters

#	Catchment	Area (m)	% Impervious	Pervious CN	Impervious CN	Slope (%)	Flow Length (m)
Pre-Development Drainage Catchment Areas							
101	Drain south and southwest to the Municipal Drain	26.60	1	70	98	1.0	740
102	Draining east to Wellington Road 29 with ultimate outlet of the Municipal Drain	6.12	1	70	98	1.0	300
Post-Development Drainage Catchment Areas							
201	Uncontrolled Area outletting to Municipal Drain	3.54	1	70	98	0.65	790
202	Controlled Area outletting to the SWM Facility	24.37	95	70	98	1.0	560
203	Uncontrolled Area outletting to the Municipal Drain	4.81	1	70	98	0.50	100

Historic Test Pits for the Site were available (CVD Engineering Ltd., 2001) and were referenced to characterize the existing soil conditions. Based on these Test Pits, the existing site soil is expected to be sand/gravel and generally well-drained. The assumed hydrologic group was selected as AB and a pervious CN value of 70 was deemed appropriate.

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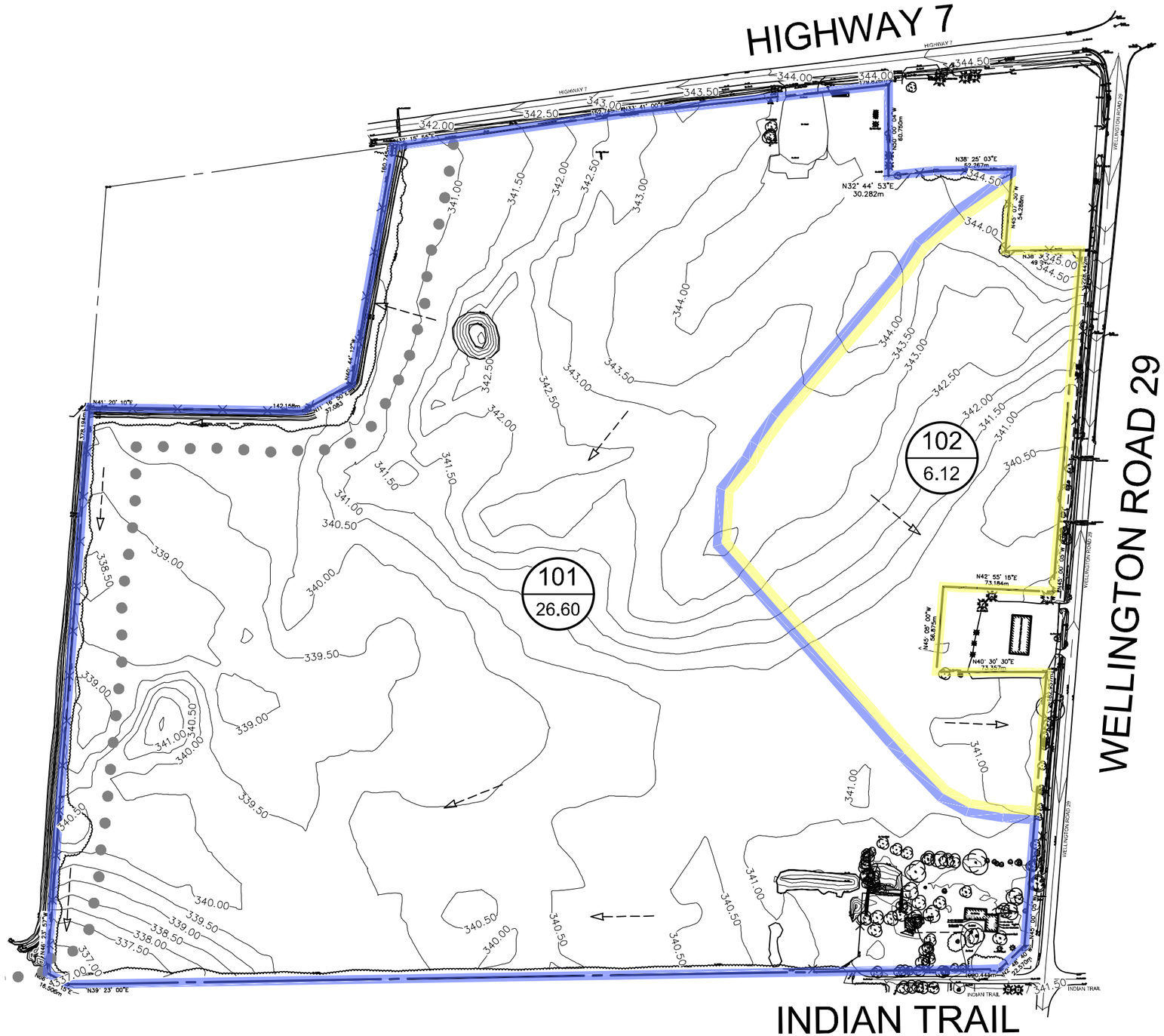

LEGEND

- CATCHMENT 101
- CATCHMENT 102
- 101 / 27.42 — SUB-CATCHMENT NUMBER / AREA (ha.)
- SITE BOUNDARY
- REGULATORY FLOODPLAIN LIMIT
- 341.00 — EXISTING CONTOURS
- EXISTING DIRECTION OF DRAINAGE

0 30 60 90 120 150m

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PROJECT
8075 HIGHWAY 7

TITLE
PRE-DEVELOPMENT CATCHMENTS FIGURE

Drawn: GLC	Scale: 1:3,000	Figure: **2.0**
Checked: MLW	Project No.: 54565-100	
Date: 2024-04-16	Rev No.: 0	

Plot Date: April 24, 2024 - 4:46 PM

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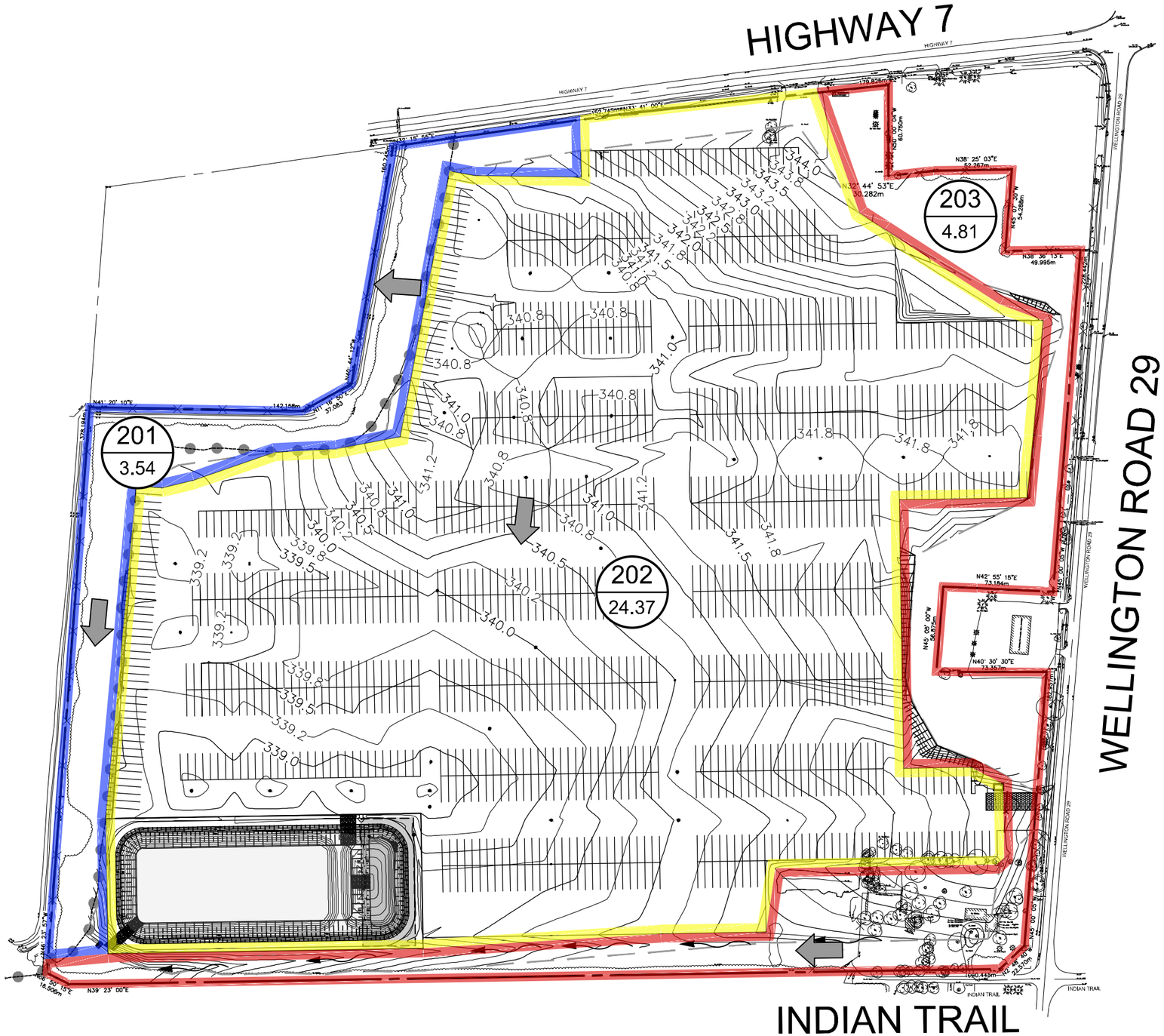

LEGEND

- CATCHMENT 201
- CATCHMENT 202
- CATCHMENT 203
- 201 / 3.54 — SUB-CATCHMENT NUMBER / AREA (ha.)
- SITE BOUNDARY
- REGULATORY FLOODPLAIN LIMIT
- 339.5 — PROPOSED CONTOURS
- OVERLAND FLOW ROUTE (MAJOR STORM)

0 30 60 90 120 150m

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PROJECT
8075 HIGHWAY 7

TITLE
POST-DEVELOPMENT CATCHMENTS FIGURE

Drawn: GLC	Scale: 1:3,000	Figure: **3.0**
Checked: MLW	Project No.: 54565-100	
Date: 2024-04-16	Rev No.: 0	

Plot Date: April 24, 2024 - 4:53 PM

3.3 Water Quantity – Modelling Results

To successfully complete the preliminary stormwater management design for the Site, the following specific tasks were undertaken:

i) Calculated the allowable runoff rates using SWMHYMO;

ii) Determined the percent impervious of the Site and catchment parameters for inclusion in SWMHYMO modeling; and,

iii) Calculated post-development runoff using SWMHYMO and routing Catchment 202 through the SWM facility.

The Site's impervious coverage percentage under the pre-development condition is approximately 1.0% and will increase to 71.0% under the post-development development conditions. To achieve the stormwater management requirements for the Site, runoff generated from the parking lot will be controlled by orifices within the SWM Facility and an overflow weir for regional storm events. The flow will be then conveyed to the municipal drain at the southwest corner of the Site.

The proposed parking lot has been graded such that a maximum depth of ponding is 0.30m. Any attenuation of minor flows within the gravel parking lot was not considered in the SWMHYMO modeling to produce a conservative SWM Facility design.

Table 3.2 below illustrates the outflow-storage-discharge relationship of the SWM Facility. As shown, over 0.30m of freeboard is provided for the 100-year (major) flow event to the top of the SWM Facility. Table 3.3 summarizes the flows generated by the Site and demonstrates that the pre-development flow rates are maintained in post-development conditions.

Table 3.2 – Outflow-Storage-Curve

Elevation (m)	Storage Volume (m^3)	Comments
335.85	0	Bottom of SWM Facility
337.20	11,641	Flow to Infiltration Gallery – Permanent Pool Elevation
337.50	15,105	250mm Diameter Orifice Invert
338.00	21,430	5-year storm
338.60	29,612	750mm Diameter Orifice Invert
338.70	31,024	100-year storm
338.85	33,170	Overland Flow Weir Invert
339.20	38,390	Top of SWM Facility

The following Table summarizes flows off-site in pre- and post-development conditions. As shown, the SWM Facility attenuates post-development flow rates to pre-development conditions.

Table 3.3 – Summary of Flows

Modelling Condition	5-Year Storm Event (m^3/s)	100-Year Storm Event (m^3/s)
Pre-Development	0.71	2.10
Post-Development	0.28	0.81

Please refer to Appendix C for the SWMHYMO input and output files which show the flow directed to the municipal drain in pre-development and post-development conditions. Please note that these flows are an estimate based on current hydrologic modeling and may be updated when more detailed modeling is completed at the detailed design stage. The SWM Facility sizing will be refined at the detailed design stage.

3.4 Water Quality Control

A treatment train approach is proposed for the Site to promote water quality. The treatment train consists of an oil-grit separator (OGS) unit and the permanent pool of the SWM Facility. These measures have been designed to provide a total of 80% TSS removal to off-site runoff, and are described below:

- OGS systems will be installed on the storm sewer system upstream of the SWM Facility and will provide pre-treatment of the proposed parking lot runoff. It is expected that this OGS will provide basic – enhanced TSS removal, with the size confirmed during the detailed design stage.
- The final overall TSS removal will be provided by the SWM Facility permanent pool. The permanent pool was sized using the *Stormwater Management Planning and Design Manual* (MECP, 2003) to provide Level 1 (enhanced) water quality control. The required permanent pool is 5,524m^3 and 11,641m^3 is provided within the SWM Facility; therefore, providing sufficient volume for water quality for 80% TSS removal.

The proposed OGS unit will require regular annual maintenance to ensure it is operating properly. The owner will enter into a maintenance agreement with a suitable contractor to complete this work. The SWM Facility will also need maintenance to remove any sediment build-up such that the required permanent pool is available for water quality control. In addition, all the storm structures will have a 600mm sump.

3.5 Site Water Balance

Based on the GRCA pre-submission comments the following preliminary infiltration water balance assessment was completed. To achieve Site water balance, and infiltration gallery is proposed to be included in the SWM block. The Canadian Climate Normals for Waterloo-Wellington provide an average precipitation estimate for the property of 917mm/yr.

3.5.1 Pre-Development Conditions

To calculate the annual infiltration volume for the pre-development condition, most of the Site was considered pervious with Type AB soils (sand/gravel) and moderately rooted crops with a flat landscape (0-5%). The infiltration rate for the pre-development is 263mm/yr/m^2.

The annual pre-development infiltration is estimated to be 84,333m^3.

3.5.2 Post-Development Conditions

In the post-development condition, the pervious are of the Site was considered with Type AB soils, urban lawn and a flat landscape. The infiltration rate for the post-development is 254mm/yr/m^2, considering the increased impervious coverage from the proposed gravel parking lot.

An end-of-pipe infiltration gallery is proposed such that site water balance is achieved. With the addition of the infiltration gallery, annual post-development infiltration is 104,547.3m^3, resulting in a gain of 44,519m^3 of runoff infiltrated on-site. This infiltration gallery will infiltrate the 10mm event over the gravel parking lot to provide on-site infiltration.

3.5.3 Infiltration On-Site

The base of the gallery must be set above the groundwater table with 1.0m of separation. The infiltration gallery has been designed to accommodate a 48-hour extended detention drawdown period. The gallery has been designed with a void ratio of 0.40 and a subsoil exfiltration rate of 20mm/hr considering the sand and gravel soil type. The runoff entering this gallery will be clean as it will first enter the OGS upstream.

In advance of the final design, additional in-situ tests will have to be conducted to confirm the groundwater level and confirm the infiltration rate of the native soils. Table 4.1 below summaries the infiltration gallery characteristics.

Table 4.1 –Design Characteristics of On-Site Infiltration Gallery

Parameter	2-Year Storm Event (m^3/s)
Contributing Drainage Area	24.37ha
Design Storm	10mm
Outflow rate from gallery	0.0165m^3/s
Required Contact Area of Gallery – including 1.10 Factor of Safety	2792.4m^2
Subsurface Soil Infiltration Rate	20mm/hr
Porosity of Granular Layer	40%
Gallery Depth	0.50m of clearstone, wrapped in filter fabric
Draw-down	48hr
Soil Cover	0.30
Proposed Contact Area of Gallery	2,975m^2

4.0 EROSION AND SEDIMENT CONTROL

Mitigation and control measures will need to be implemented during construction to limit erosion and sedimentation. Typically, the following measures are recommended during construction for erosion and sedimentation control:

i) Erosion and sedimentation controls are to be installed prior to any area grading operations.

ii) Embankments to be protected with 300mm topsoil and seed with cover crop to mitigate erosion.

iii) A sediment control fence is to be located along the Site perimeter to mitigate the transport of sediment downstream.

iv) To minimize the amount of mud being tracked onto the roadway, a mud mat should be installed at the primary construction entrance.

v) All erosion control measures are to be inspected and monitored by the contractor and repairs are to be completed as required.

vi) All materials and equipment used for the purpose of site preparation and project completion should be operated and stored in a manner that prevents any deleterious substance from leaving the site.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the foregoing analysis, it is concluded that:

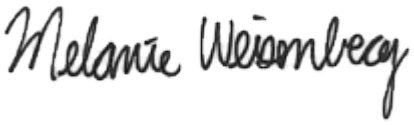
i) The proposed grading design will respect the natural topography of the Site and match into existing grades at all property lines.

ii) The SWM criteria can be satisfied with the implementation of OGS units and a SWM facility for water quality and quantity control.

iii) There will be a net gain in the Site infiltration balance due to the designed on-site infiltration gallery.

All of which is respectfully submitted,

MTE Consultants Inc.



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MLW:dlb

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Appendix A

BACKGROUND INFORMATION

Meeting Date: July 20th, 2023

Pre-consultation Meeting Notes
8075 Highway #7
Former 'Robertson' Subdivision

Proposal:

- The proposal is to develop the lands with a 'Transport Establishment', which will encompass approximately 1,290 spaces for truck trailers and two gated entries into the site.
- Landscaped and appropriate separation is proposed from adjacent residential properties.
- Through additional information supplied by the planning consultant on June 29th, 2023, it is confirmed that the site will be used for parking trucks (loaded and unloaded); leases would be entered into for parking and about 4-5 areas dedicated to an individual user/leasee); no on-site washroom facilities or building; no on-site sleeping; and no repairs on-site.
- Proposal is to rezone to allow all uses in the Rural Industrial (M1) Zone and that those additional uses may only be considered subject to a holding provision.
- At the meeting additional was also shared including that – access will be controlled through a automated system that will require pass codes; that the use will be 24/7; that there will be no onsite repairs to vehicles or trailers, no refueling on-site.

Additional Planning Comment:

- These comments and the studies required were based primarily on the introduction of a Transport Establishment. Additional discussion will be required about the uses proposed as part of the M1 Zone. Further, additional discussions will be required to understand the proposal to use the holding provision as a tool to limit uses.
- The additional discussion about the introduction of uses with the M1 Zone will likely change the study requirements.
- Additional discussion surrounding a public engagement strategy may wish to be considered.
- The Township's Fortification By-law will need to be reviewed and met when considering how the site will be secured.
- Discussions regarding Development Charges is to take place with Township staff.

Provincial Policy:

- The policies in place at the time of the submission will need to be considered when assessing a proposal on the subject lands.

County of Wellington Official Plan:

- Land Use Designation: 'Rural Employment' and 'Core Greenland System'
    - Rural Employment
        - Industrial and limited commercial that benefit from a rural location (i.e. due to larger lot sizing, access to transportation routes, close to rural resources, and separation from sensitive land uses etc.)
        - All uses required to be 'dry' – the Official Plan identifies this as "uses which do not use significant amounts of water in their operation and which do not produce

significant amounts of effluent, consistent with rural servicing levels which rely on private water and sewage systems."

- Permitted uses range from industrial uses such as manufacturing, to accessory uses and limited commercial uses such as office space.

- **Land Use Compatibility**
  - To be addressed through types of uses; setback & buffering from dwellings (i.e. distance and landscaping or visual barriers); and mitigations proposed through a support assessment.
  - Buffering/screening from roads will be required for any parking, loading, storage area

- **Core Greenland System Policies**
  - The features on-site is identified as a GRCA Floodplain Area, as such it is subject to Hazard Land policies in the Official Plan
    - An EIS required for development on adjacent lands
  - No development within and a buffer will be required – the proposed conceptual plan identifies berming; however, this setback distance will need to be assessed and consider the application Provincial policies.

Township Zoning By-law 40/2016

- The site is currently zoned Agriculture (A) with some Environmental Protection (EP) Zone
  - The EP Zone aligns with County's Core Greenland System designation.

  - A "Transport Establishment" is a defined term and is required to have a primary and the storage of the trucks is so that they would be dispatched as common carriers. The future Zoning By-law Amendment for this use would need to address these items as the use is more in line with commercial parking for transport trucks.

  - It is noted that planning staff have concerns with a proposal for a Transport Establishment that does not include a primary building and concerns about a Zoning by-law Amendment that would establish uses with having specific supporting studies. All studies would need to asses the most intensive use to justify the inclusion of a variety of uses and determine all uses are appropriate, serviceable and feasible.

  - Additional discussion is required to understand how the holding provision tool is proposed to be utilized as the Official Plan allows the use of holding provisions in the following situations --- "Where the use of land for a particular purpose has been established but details related to design, servicing, phasing, environmental considerations and other matters have not been completely resolved, a local council may use holding provisions in accordance with the Planning Act."

- *Buffer Strips (4.11)*

- Are required to be met; however it is noted that a 20 m setback is proposed.
- Request that the setback including berming and enhanced landscaping around the entire property and all senstivie land uses and that this mitigation tool (and others) be assessed.

- *Water Source Setback (4.23)* and *Setbacks from the Natural Environmental Protection Zone (4.25)* required a 30 m.
- *Parking Area Location for an Agricultural or Industrial Use (5.1.12.2)* is to be considered; however, enhanced setbacks will be required and are to be supported by a compatibility assessment.

- Ingress and Egress is to be meet Section *5.1.12.3 Ingress and Egress to Parking Area for Agricultural and Industrial Uses.*

Township Design Guidelines

- Review the guidelines when preparing a conceptual place for the Transportation Establishment
- The guidelines provide direction for Industrial Development, Landscaping, and Outdoor Lighting
    - Industrial Design Guidelines -- 2018_05_30 SitePlanApplicationFormIndustrialDevelopmentGuidelines.pdf (get.on.ca)
    - Landscape Design Guidelines – 2018_05_30 SitePlanApplicationFormLandscapeGuidelines.pdf (get.on.ca)
    - Outdoor Lighting Policy -- Microsoft Word - COR-0108 - Outdoor Lighting (get.on.ca)

Applications Required:

- ***Zoning By-law Amendment***
    - The meeting that took place on July 20th represents the 1st meeting of the Township's two(2) part mandatory pre-consultation meeting process.
    - The next steps are to address any outstanding items and prepare reports for a detailed preliminary review. All the reviewer major concerns will need to be addressed prior to deeming the application complete to meet the regulatory time limits for approval.

- ***Site Plan Application***
    - A separate pre-consultation meeting process will be required under the Township's Mandatory Pre-consultation Meeting Process.

Submission Requirements for a Zoning By-law Amendment:

The below items are the requirements for a Transport Establishment (only) without any building proposed. The supporting information requirements of a complete application are as follows:

- Planning Justification Report with a draft amending by-law
- Detailed conceptual plan which considers the Township's Design Guideline(s)

- Stormwater Management Report
- Noise Impact Study
- MOE-D Series Compatibility Study
- Environmental Impact Study – scoped (TOR to be peer reviewed by Township consultant)
- Traffic Impact Study
- Archaeological Assessment – applicant to confirm if previously completed.
- Source Water Protection Form
- Any additional studies or requirements identified by others and outlined in the Additional Comments (Summary)

Please note that all studies are to be prepared by qualified professionals and to address the study requirements as set out in Section 4.6 *Impact Assessment* of the Official Plan.

Additional Comments (Summary)

The comments below are based on the proposal for a Transport Establishment without a primary building:

- **Source Water Protection (Danielle Walker - Risk Management Official)**
  - Formal comments to be provided separately. Some key comments:
  - WHPA B - high vulnerability area to potential contamination
  - Fuel Plan, Road Salt Storage and Management Plan required.
  - Depending on other uses, a Risk Management Plan will be required.

- **Township Building Division (Dan Sharina, Chief Building Official)**
  - No building with the proposed Transport Establishment so comments are limited.
  - Additional discussions with the Fire Department will be required – additional discussions will be required to assess Fire Department requirements for this site based on the proposed use.

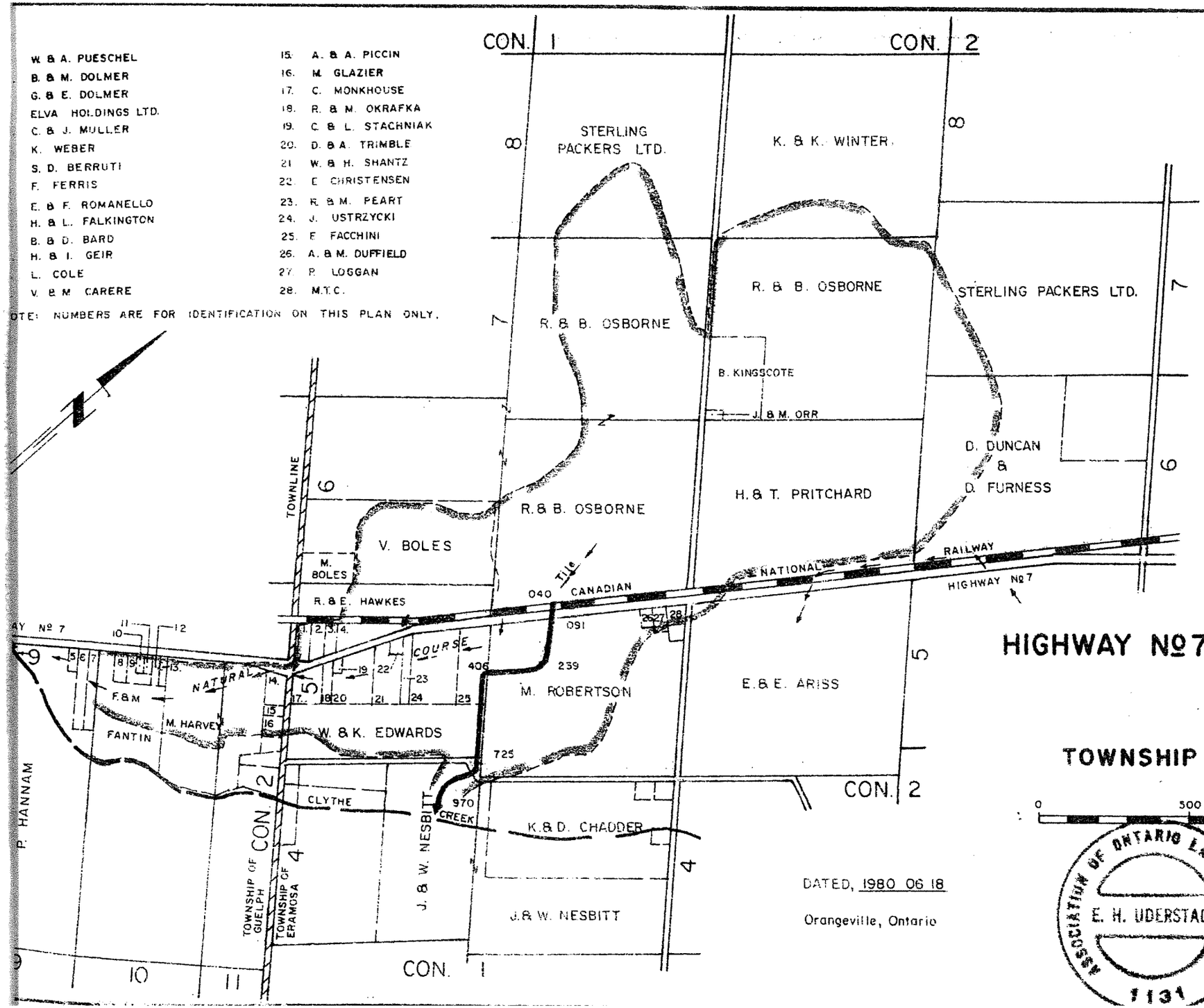
- **Township Public Works (Harry Neimi, Director of Public Works)**
  - Preference is for the trucking establishment to not use Indian Trail
  - Storm water Management Study required.
  - Concerns with 24/7 operation - lighting to be addressed.
  - Consider washroom facilities and including any lease agreements any roads that have limits on truck use.

- **Grand River Conservation Authority (Chris Lorenz, Supervisor of Resource Planning)**
  - A GRCA permit is required.
  - The floodplain limit is to be shown on the conceptual plans.
  - Grading, Stormwater Management Plan and associated study; and site water balance information is required.

- **County Engineering Services (Philippe Campbell, Engineer Technologist)**

- Traffic Impact Study required.
- Only one access is permitted onto the County Road
- Clarification has been provided (since the meeting) that an emergency access onto the County Road will not be permitted.
- Stormwater issues for existing house on property which will need to be addressed.

- **Ministry of Transportation (Jessica Pegelo, Corridor Management Planner)**
  - Comments provided separately by the Township on July 20th, 2023



W. & A. PUESCHEL
B. & M. DOLMER
G. & E. DOLMER
ELVA HOLDINGS LTD.
C. & J. MULLER
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F. FACCHINI
A. & M. DUFFIELD
P. LOGGAN
M.T.C.

NOTE: NUMBERS ARE FOR IDENTIFICATION ON THIS PLAN ONLY.

PLAN

OF THE

HIGHWAY Nº7 DRAINAGE WORKS

IN THE

TOWNSHIP OF ERAMOSA

SCALE

0 500 1000 1500 m

DATED, 1980 06 18

Orangeville, Ontario

SIGNED, E. H. Understadt, O.L.S.

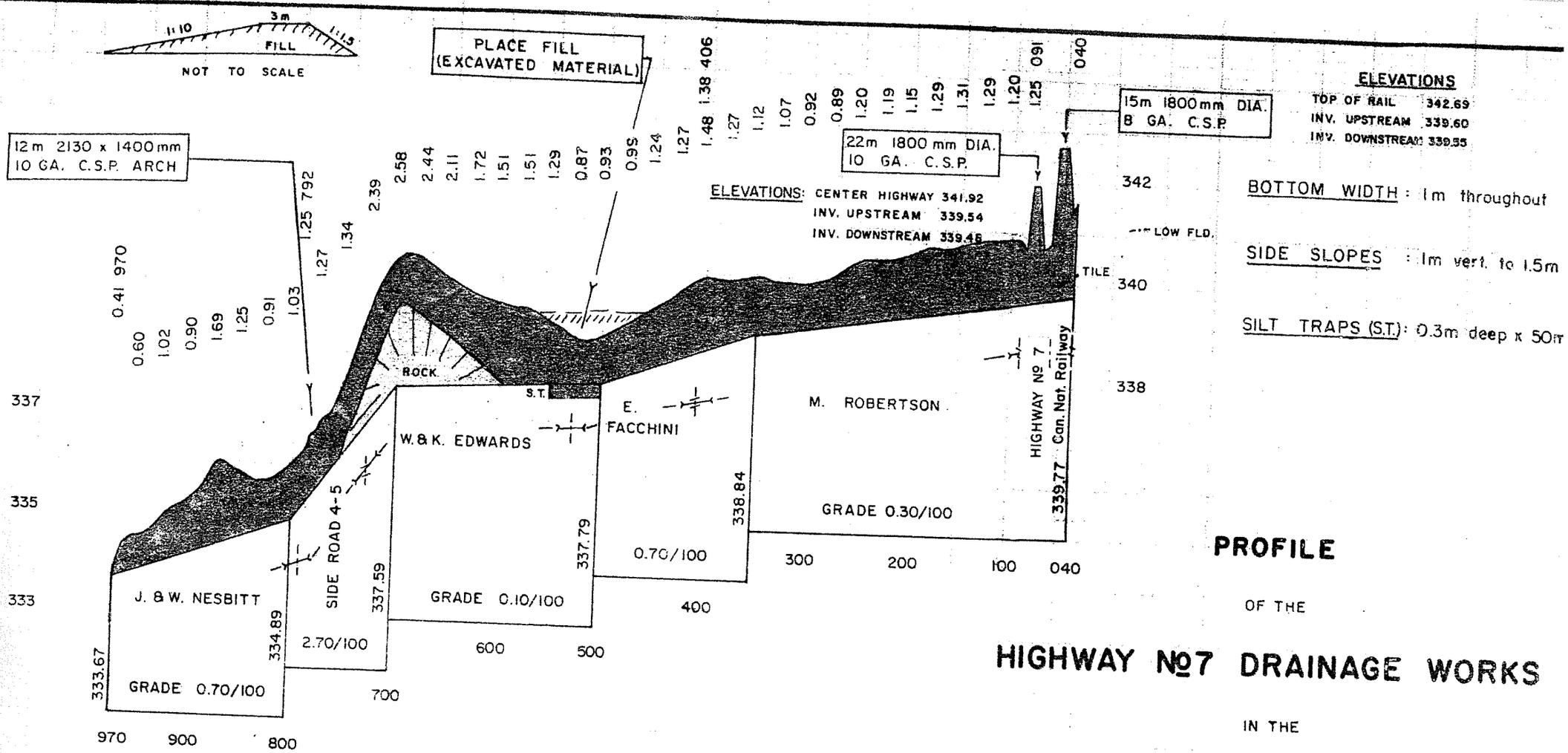
E. H. UDERSTADT INC.

Land Surveyors & Municipal Drainage Consultants

ASSOCIATION OF ONTARIO LAND SURVEYORS
E. H. UDERSTADT
1131

SHEET 1 of 2

D-ER-109



ELEVATIONS

TOP OF RAIL	342.69
INV. UPSTREAM	339.60
INV. DOWNSTREAM	339.55

BOTTOM WIDTH : 1m throughout

SIDE SLOPES : 1m vert. to 1.5m

SILT TRAPS (S.T.): 0.3m deep x 50m

BENCH MARKS

090	SPIKE	IN	HYDRO	POLE	150 m W. 340.41
750	SPIKE	IN	FENCE	POST	37m S. 337.34

PROFILE

OF THE

HIGHWAY Nº7 DRAINAGE WORKS

IN THE

TOWNSHIP OF ERAMOSA

SCALE

VERT. 0 2 4 6 8 m

HORZ. 0 200 300 400m

DATED, 1980 06

SIGNED E. H. UDERSTADT, O.L.

H. UDERSTADT IN

Orangeville, Ontario

Land Surveyors & Municipal Engineers

ASSOCIATION OF ONTARIO LAND SURVEYORS

E. H. UDERSTADT

Appendix B

CALCULATIONS

CALCULATIONS

Orifice Equation (MIDUSS NET)

$$Q = C_c \, p/4 \, D5 \, \text{sqrt}(2g(H-2/3D))$$

where

- C_c coefficient of contraction
- H head relative to the invert of the orifice
- D orifice diameter
- g gravitational acceleration

Weir Equation (MIDUSS NET)

$$Q_{cr} = B \, \text{sqrt}(g) \, y_{cr}^{3/2} \qquad \text{where } y_{cr} = 2/3 \, (H-Z)$$

Where

- B weir breadth
- g gravitational acceleration
- H head relative to the invert of the weir
- Z weir sill elevation

8075 Highway 7
Preliminary SWM Design Parameters
By: CVP
54565-100
May-24

HYDROLOGIC PARAMETERS
Pre-Development Conditions

Sub-Catchment Number	Area	Overland Slope	Overland Length	SCS Curve Number		Percent Impervious	Weighted Curve Number	Runoff Coefficient		Weighted Runoff Coefficient	Time of Concentration	Peak Flow	Land Use	Command	Comment
				Pervious (AMC II)	Impervious		CN	Pervious	Impervious	RC	ToC	Tp			
	(ha)	*(%)*	*(m)*			*(%)*					*(hr)*	*(hr)*			
101	26.60	1.00	740	70	98	1.00	70.28	0.20	0.90	0.21	1.32	0.79	Crop	Design Nashyd	Existing area draining west and outletting to the Municipal Drain
102	6.12	1.00	300	70	98	1.00	70.28	0.20	0.90	0.21	0.84	0.50	Crop	Design Nashyd	Existing area draining east to Wellington Road 29. Ultimately outlets to the Municipal Drain.
Total	**32.72**														

Post-Development Conditions

Sub-Catchment Number	Area	Overland Slope	Overland Length	SCS Curve Number		Percent Impervious	Weighted Curve Number	Runoff Coefficient		Weighted Runoff Coefficient	Time of Concentration	Peak Flow	Land Use	Command	Comment
				Pervious (AMC II)	Impervious		CN	Pervious	Impervious	RC	ToC	Tp			
	(ha)	*(%)*	*(m)*			*(%)*					*(hr)*	*(hr)*			
201	3.54	0.65	790	70	98	1.00	70.28	0.20	0.90	0.21	1.57	0.94	Uncontrolled drainage area	Design Nashyd	Uncontrolled area outletting to the Municipal Drain
202	24.37	1.00	560	70	98	95.00	70.00	0.20	0.90	0.87	0.39	0.23	Parking lot	Design Standhyd	Parking lot outletting to the SWM Block
203	4.81	0.50	100	70	98	1.00	70.28	0.20	0.90	0.21	0.61	0.37	Uncontrolled drainage area	Design Nashyd	Uncontrolled area outletting to Wellington Road 29. Ultimately outlets to the Municipal Drain.
Total	**32.72**														

Storm IDF Parameters - used City of Guelph

Notes on Parameter Estimation:
Slope
Slope measured from the topo survey, and estimated from the concept plan considering the tie in grades
Flow length based on average flow path, based on current preliminary grading plan
Catchment Areas
Existing catchment areas measured from topo survey, and proposed catchments measured from grading plan, considering entire parking lot to drain to the SWM Facility
Soil Type
As per the MTE Robertson Commercial Development presentation, the site soils are sand / gravel and generally well drained - assume AB hydrologic group
SCS Curve Number
Existing conditions land use is crop or improved land. Therefore, existing conditions pervious SCS Curve Number is 70, using MTO Drainage Management Manual Table 1.09 and from soil description using soil type of AB (MTO, 1997)
Proposed conditions is impervious, so use a Curve Number of 98
CN is weighted average for Design Nashyd, is pervious only for Design Standhyd
Runoff Coefficient
Existing pervious area is park with > 4 ha, therefore, use RC = 0.20, from Table 5.5.1.3 Runoff Coefficient - City of Guelph Development Engineering Manual (January 2019)
Proposed impervious area is gravel. Use RC = 0.90 to be conservative and represent heavy development.
Equations
Time of Concentration
When RC < 0.4 (Rural) use the Airport Method for Time of Concentration Calculation

$$t_c = \frac{3.26 * (1.1 - C) * L^{0.5}}{S_w^{0.33}} \quad (2)$$

tc = time of concentration (min)
L = catchment length (m)
Sw = catchment slope (%)
A = catchment area (ha)
C = runoff coefficient

When RC > 0.4 (Urban), use the Bransby- Williams Method for Time of Concentration

$$t_c = \frac{0.057 * L}{S_w^{0.2} * A^{0.1}} \quad (1)$$

tc = time of concentration (min)
L = catchment length (m)
Sw = catchment slope (%)
A = catchment area (ha)

Since RC < 0.4 for existing conditions, use Airport Method
Since RC > 0.4 for proposed conditions, use Bransby-Williams Method

Time to Peak
Tp = 0.6*Tc

8075 HWY 7
STORMWATER MANAGEMENT
Guelph - Eramosa TWP

Project Number: 54565-100
Date: 25-04-2024
Design By: MLW/CVP
File: Q:\54565\100\swm\54565-100_Master SWM Facility Design Sheet_20240425.xlsx

Orifice Calculations

$Q_o = C_d * A_o * (2 * g * H_o)^{0.5}$

	Orifice 1	Orifice 2	Orifice 2
C_d	0.63	0.63	0.63
Invert (m)	337.20	337.50	338.60
Diameter/Height (m)	0.100	0.250	0.750
Type (H/V)	V	V	V

C_d	Description
0.63	Orifice Plate
0.80	Orifice Tube

Weir Calculations

$Q_w = 2/3 * C_d * (2g)^{1/2} * L * H_w^{3/2} + 8/15 * C_d * (2g)^{1/2} * \tan\theta * H_w^{5/2}$

C_d	0.50	
Invert (m)	338.85	
Length (m)	2.000	
Side Slope (H:V)	1	
Side Slope (rad)	0.785	

STAGE-DISCHARGE RELATIONSHIP

		Flow to Infiltration Gallery			Flow to Municipal Drain						Total Flow to Municipal Drain						Extended Detention
		Orifice 1			Orifice 2			Orifice 3									
Stage	Active Volume	Area	H_o	Flow	Area	H_o	Flow	Area	H_o	Flow	Weir 1 Flow	Total Flow		Average Discharge	Increment Volume	Increment Dewatering Time	Cumulative Dewatering Time
m	m^3	m^2	*m*	m^3/s	m^2	*m*	m^3/s	m^3	*m*	m^3/s	m^3/s	m^3/s		m^3/s	m^3	*hours*	*hours*
337.20	0	0.01	0.00	0.0000	0.05	0.00	0.0000	0.44	0.00	0.0000	0.0000	0.0000	To gallery	0.0000	1117		
337.30	1117	0.01	0.05	0.0049	0.05	0.00	0.0000	0.44	0.00	0.0000	0.0000	0.0000		0.0000	571		
337.35	1688	0.01	0.10	0.0069	0.05	0.00	0.0000	0.44	0.00	0.0000	0.0000	0.0000		0.0000	585		
337.40	2273	0.01	0.15	0.0085	0.05	0.00	0.0000	0.44	0.00	0.0000	0.0000	0.0000		0.0000	1190		0.00
337.50	3463	0.01	0.25	0.0110	0.05	0.00	0.0000	0.44	0.00	0.0000	0.0000	0.0000		0.0153	1215	22.04	22.04
337.60	4678	0.01	0.35	0.0130	0.05	0.05	0.0306	0.44	0.00	0.0000	0.0000	0.0306		0.0370	1240	9.32	31.35
337.70	5918	0.01	0.45	0.0147	0.05	0.10	0.0433	0.44	0.00	0.0000	0.0000	0.0433		0.0503	1266	6.99	38.34
337.80	7184	0.01	0.55	0.0163	0.05	0.18	0.0573	0.44	0.00	0.0000	0.0000	0.0573		0.0646	1291	5.55	43.90
337.90	8475	0.01	0.65	0.0177	0.05	0.27	0.0718	0.44	0.00	0.0000	0.0000	0.0718		0.0779	1314	4.69	48.59
338.00	9789	0.01	0.75	0.0190	0.05	0.38	0.0839	0.44	0.00	0.0000	0.0000	0.0839	5-year	0.0891	1329	4.14	52.73
338.10	11118	0.01	0.85	0.0202	0.05	0.48	0.0944	0.44	0.00	0.0000	0.0000	0.0944		0.0991	1343	3.76	56.49
338.20	12461	0.01	0.95	0.0214	0.05	0.57	0.1039	0.44	0.00	0.0000	0.0000	0.1039		0.1082	1357	3.48	59.97
338.30	13818	0.01	1.05	0.0225	0.05	0.68	0.1125	0.44	0.00	0.0000	0.0000	0.1125		0.1166	1370	3.26	63.24
338.40	15188	0.01	1.15	0.0235	0.05	0.77	0.1206	0.44	0.00	0.0000	0.0000	0.1206		0.1244	1385	3.09	66.33
338.50	16573	0.01	1.25	0.0245	0.05	0.88	0.1281	0.44	0.00	0.0000	0.0000	0.1281		0.1317	1398	2.95	69.28
338.60	17971	0.01	1.35	0.0255	0.05	0.98	0.1353	0.44	0.00	0.0000	0.0000	0.1353		0.2765	1412	1.42	70.70
338.70	19383	0.01	1.45	0.0264	0.05	1.07	0.1420	0.44	0.05	0.2757	0.0000	0.4177	100-year	0.4780	1426	0.83	71.53
338.80	20809	0.01	1.55	0.0273	0.05	1.18	0.1485	0.44	0.10	0.3899	0.0000	0.5383		0.6021	1440	0.66	72.19
338.90	22249	0.01	1.65	0.0282	0.05	1.27	0.1547	0.44	0.15	0.4775	0.0337	0.6658		0.7798	1454	0.52	72.71
339.00	23703	0.01	1.75	0.0290	0.05	1.38	0.1606	0.44	0.20	0.5513	0.1818	0.8938		1.0413	1468	0.39	73.10
339.10	25171	0.01	1.85	0.0298	0.05	1.48	0.1664	0.44	0.25	0.6164	0.4060	1.1888		1.3665	1578	0.32	73.42
339.20	26749	0.01	1.95	0.0306	0.05	1.57	0.1719	0.44	0.30	0.6752	0.6971	1.5442		0.7721	1578	0.57	73.99

8075 Highway 7
STORMWATER MANAGEMENT
Township of Guelph/Eramosa

Project Number: 54565-100
Date: April 16, 2024
Design By: CVP
File: Q:\54565\100\swm\54565_swm design_cvp_draft_20240119.xlsx

Step 1: Choose Level of Water Quality Control

Enhanced 80% long-term S.S. removal

Step 2: Choose Type of Facility

Wet Pond

Step 3: Define Catchment area and Imperviousness

Catchment Area (ha)	Imperviousness (%)
24.37	95.00

Interpolated Storage Volume Requirement (m^3/ha)

266.67

Permanent Pool Required (m^3)

5523.87

Extended Detention Volume Required (m^3)

974.80

Stormwater Management Planning and Design Manual, March 2003)

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35	55	70	85
Enhanced 80% long-term S.S. removal	*Wetlands*	80	105	120	140
	Hybrid Wet Pond/Wetland	110	150	175	195
	Wet Pond	140	190	225	250
Normal 70% long-term S.S. Removal	*Wetlands*	60	70	80	90
	Hybrid Wet Pond/Wetland	75	90	105	120
	Wet Pond	90	110	130	150
Basic 60% long-term S.S. Removal	*Wetlands*	60	60	60	60
	Hybrid Wet Pond/Wetland	60	70	75	80
	Wet Pond	60	75	85	95
	Dry Pond (Continuous Flow)	90	150	200	240

8075 HWY 7
54565-100
4/23/2024
CVP

Table 1 - Required Cell Depth (m)

Native Soil Percolation Rate - P (mm/hr)	20.00
Void Ratio	0.40
Draw-down Time - T (hr)	48.00
Maximum Surface Ponding - dp (mm)	300
Maximum depth - d cmax (mm)	1650

Table 2 - Gallery Footprint Area Determination (m^2)

10 mm Storm Volume (m^3)	10
Drainage Area (ha)	24.37
Volume to be Infiltrated (m^3)	2,437
Soil Percolation Rate (mm/hr.)	20.00
Draw-down Time (hr.)	48.000
Footprint Required (m^2)	2538.54
Footprint with applied 1.10 Factor of Safety (m^2)	2792.40

Table 3 - Infiltration Inflow and Outflow Check (m^3/s)

Contact Area of Gallery - A (m^2)	2975.00
Percolation Rate - P (mm/hr)	20.00
Outflow -Q - (m^3/s)	0.0165
Inflow (m^3/s)	0.0001

Notes:
Footprint sized to infiltrate the 10 mm event over the Site drainage area to the SWM Facility
Assumed percolation rate of sandy-gravel is 20 mm / hr for sand gravel native soil, to be confirmed through Geotechnical Investigation
Water Table - minimum separation of 1 metre to groundwater (CVC LID Design Manual, 4-68)
Assume a 48-hr retention time t (LID Design Manual, CVC, 4-57)

8075 Highway 7
WATER BALANCE (INFILTRATION) ANALYSIS
Tonwship of Guelph/Eramosa

Project Number:	54565-100					
Date:	April 16, 2024	Topography:	Flat Lands (0-5%)	Topography:	Flat Lands (0-5%)	
Design By:	MLW	Coverage:	Moderately Rooted Crops	Coverage:	Urban Lawns	
File:	Q:\54565\100\water balance - infiltration\54565-100-Micro	Soil Type:	AB - Sand/Gravel	Soil Type:	AB - Sand/Gravel	
Weather Station:	Waterloo Wellington Airport	ET:	567	ET:	554	
Total Precipitation:	916.5mm	Runoff:	87	Runoff:	108	
		Infiltration:	263	Infiltration:	254	

INFILTRATION

Location	Pre-development			Post-development						Comments
				Pervious			Impervious			
	Area Draining to Location	Infiltration Rate	Infiltration Volume	Area Draining to Location	Infiltration Rate	Infiltration Volume	Area Draining to Location	Infiltration Rate	Infiltration Volume	
	ha	*mm/yr/m^2*	*m^3/yr*	*ha*	*mm/yr/m^2*	*m^3/yr*	*ha*	*mm/yr/m^2*	*m^3/yr*	
Total Site - pervious	32.066	263	84333							
Total Site - impervious	0.654	0	0							
Parking Lot				1.219	254.00	3095	24.370	429	104547	To SWM Facility
Landscaped Area				8.350	254.00	21209	0.084	0	0	To municipal drain
Total	32.720	263	**84,332.53**	9.569	254.000	**24303.990**	24.454	429.000	**104547.300**	

SUMMARY

Post-development Infiltration Volume			
Pervious		24304	*m^3/yr*
Impervious	+	104547	*m^3/yr*
		128851	*m^3/yr*
Pre-development Infiltration Volume	-	84333	*m^3/yr*
Net Gain of Infiltration		**44519**	***m^3/yr***

Appendix C

SWMHYMO OUTPUTS

Pre-Development

```
2     Metric units
*#************************************************************************
*#  Project Name: [8075 Highway 7]    Project Number: [54565-104]
*#  Date        : 10-04-2024
*#  Modeller    : [Melanie Weisenberg]
*#  Company     : MTE Consultants Ltd.
*#  License #   : 3057174
*#************************************************************************
*# EXISTING CONDITIONS ANALYSIS
*#************************************************************************
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[001]
*%-----------------|-------------------------------------------------------|
*#************************************************************************
*# EXISTING CONDITIONS ANALYSIS - 5-year storm
*#************************************************************************
CHICAGO STORM       IUNITS=[2],  TD=[ 3.0  ](hrs), TPRAT=[ 0.333  ],  CSDT=[ 10
](min),
                    ICASEcs=[1],
                     A=[1746.737],  B=[13.708], and C=[0.884],
*%-----------------|-------------------------------------------------------|
*%-----------------|-------------------------------------------------------|
*#************************************************************************
*# Existing Catchment 1 - Outlet is north to HWY 7
*#************************************************************************
*%-----------------|-------------------------------------------------------|
DESIGN NASHYD       ID = [1], NHYD=["101"], DT=[1]min, AREA=[26.60](ha),
                    DWF=[ 0 ](cms), CN/C=[ 70.28 ], TP=[  0.79 ]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------|
*%-----------------|-------------------------------------------------------|
*#************************************************************************
*# Existing Catchment 2 - Outlet is east to Wellington Road 29 and then South
*#************************************************************************
*%-----------------|-------------------------------------------------------|
DESIGN NASHYD       ID = [2], NHYD=["102"], DT=[1]min, AREA=[6.12](ha),
                    DWF=[ 0 ](cms), CN/C=[ 70.28 ], TP=[  0.50 ]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------|
*%-----------------|-------------------------------------------------------|
*#************************************************************************
*# Total to South
*#************************************************************************
*%-----------------|-------------------------------------------------------|
ADD HYD             IDsum=[ 3 ], NHYD=["Total"], IDs to add=[1+2]
*%-----------------|-------------------------------------------------------|
**************************************************************************
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[001]
*#************************************************************************
*# EXISTING CONDITIONS ANALYSIS - 100-year storm
*#************************************************************************
CHICAGO STORM       IUNITS=[2],  TD=[ 3.0  ](hrs), TPRAT=[ 0.333  ],  CSDT=[ 10
```

```
](min),
                    ICASEcs=[1],
                     A=[5061.200],  B=[22.167], and C=[0.958],
*%-----------------|---------------------------------------------------------|
*%-----------------|---------------------------------------------------------|
*#*************************************************************************
*# Existing Catchment 1 - Outlet is north to HWY 7
*#*************************************************************************
*%-----------------|---------------------------------------------------------|
DESIGN NASHYD       ID = [1], NHYD=["101"], DT=[1]min, AREA=[26.60](ha),
                    DWF=[ 0 ](cms), CN/C=[ 70.28 ], TP=[  0.79 ]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|---------------------------------------------------------|
*%-----------------|---------------------------------------------------------|
*#*************************************************************************
*# Existing Catchment 2 - Outlet is east to Wellington Road 29 and then South
*#*************************************************************************
*%-----------------|---------------------------------------------------------|
DESIGN NASHYD       ID = [2], NHYD=["102"], DT=[1]min, AREA=[6.12](ha),
                    DWF=[ 0 ](cms), CN/C=[ 70.28 ], TP=[  0.50 ]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|---------------------------------------------------------|
*%-----------------|---------------------------------------------------------|
*#*************************************************************************
*# Total to South
*#*************************************************************************
*%-----------------|---------------------------------------------------------|
ADD HYD             IDsum=[ 3 ], NHYD=["Total"], IDs to add=[1+2]
*%-----------------|---------------------------------------------------------|
**************************************************************************
**%----------------|---------------------------------------------------------|
FINISH
```

```
==============================================================================

   SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
   S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
   SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
       S   W W   M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
   SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9   =========
                                                        9   9  9   9   # 3053466
        StormWater Management HYdrologic Model           999    999    =========

 ******************************************************************************
 ***************************** SWMHYMO Ver/4.05  ******************************
 *********  A single event and continuous hydrologic simulation model  *********
 *********     based on the principles of HYMO and its successors      *********
 *********                  OTTHYMO-83 and OTTHYMO-89.                  *********
 ******************************************************************************
 ********* Distributed by:  J.F. Sabourin and Associates Inc.           *********
 *********                   Ottawa,  Ontario: (613) 836-3884           *********
 *********                   Gatineau, Quebec: (819) 243-6858           *********
 *********                   E-Mail: swmhymo@jfsa.Com                   *********
 ******************************************************************************

 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++++ Licensed user: MTE Consultants Inc.                        +++++++++
 +++++++++                Burlington           SERIAL#:3053466       +++++++++
 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 ******************************************************************************
 *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++            *********
 *********           Maximum value for ID numbers  :     10           *********
 *********           Max. number of rainfall points: 105408           *********
 *********           Max. number of flow points    : 105408           *********
 ******************************************************************************

 ***** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) *****
 *****----------------------------------------------------------------------*****
 *****    ID:  Hydrograph IDentification numbers, (1-10).                   *****
 *****  NHYD:  Hydrograph reference numbers, (6 digits or characters).      *****
 *****  AREA:  Drainage area associated with hydrograph, (ac.) or (ha.).    *****
 ***** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).      *****
 ***** TpeakDate_hh:mm is the date and time of the peak flow.               *****
 *****  R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).         *****
 *****  R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).         *****
 *****     *:  see WARNING or NOTE message printed at end of run.           *****
 *****    **:  see  ERROR  message printed at end of run.                   *****
 ******************************************************************************
 ******************************************************************************

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

 ******************************************************************************
```

```
 **********   S U M M A R Y   O U T P U T   **********
 ********************************************************************************
 *         DATE: 2024-05-13     TIME: 13:12:00     RUN COUNTER: 000586          *
 ********************************************************************************
 * Input   filename: Q:\54565\100\SWM\SWMHYMO\pre.dat                            *
 * Output  filename: Q:\54565\100\SWM\SWMHYMO\pre.out                            *
 * Summary filename: Q:\54565\100\SWM\SWMHYMO\pre.sum                            *
 * User comments:                                                               *
 * 1:_____________________________________________________________________________*
 * 2:_____________________________________________________________________________*
 * 3:_____________________________________________________________________________*
 ********************************************************************************


#*******************************************************************************
#  Project Name: [8075 Highway 7]    Project Number: [54565-104]
#  Date        : 10-04-2024
#  Modeller    : [Melanie Weisenberg]
#  Company     : MTE Consultants Ltd.
#  License #   : 3057174
#*******************************************************************************
# EXISTING CONDITIONS ANALYSIS
#*******************************************************************************
 RUN:COMMAND#

001:0001---------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]
#*******************************************************************************
# EXISTING CONDITIONS ANALYSIS - 5-year storm
#*******************************************************************************

001:0002---------------------------------------------------------------------------
     CHICAGO STORM
      [SDT=10.00:SDUR=   3.00:PTOT=  49.80]
      [A/B/C=1746.737/  13.708/    .884]
#*******************************************************************************
# Existing Catchment 1 - Outlet is north to HWY 7
#*******************************************************************************

001:0003--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      01:101           26.60     .560 No_date    2:01   14.98 .301
      [CN= 70.3: N= 3.00]
      [Tp=  .79:DT= 1.00]
#*******************************************************************************
# Existing Catchment 2 - Outlet is east to Wellington Road 29 and then South
#*******************************************************************************
```

```
001:0004--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      02:102            6.12     .176 No_date    1:38   14.98 .301
      [CN= 70.3: N= 3.00]
      [Tp=  .50:DT= 1.00]
#*******************************************************************************
# Total to South
#*******************************************************************************

001:0005--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            01:101           26.60     .560 No_date    2:01   14.98  n/a
                      +  02:102            6.12     .176 No_date    1:38   14.98  n/a
      [DT= 1.00]  SUM=  03:Total         32.72     .711 No_date    1:55   14.98  n/a
 RUN:COMMAND#

001:0001--------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]
# EXISTING CONDITIONS ANALYSIS - 100-year storm
#*******************************************************************************

001:0002--------------------------------------------------------------------------
     CHICAGO STORM
      [SDT=10.00:SDUR=   3.00:PTOT=  93.80]
      [A/B/C=5061.200/  22.167/    .958]
#*******************************************************************************
# Existing Catchment 1 - Outlet is north to HWY 7
#*******************************************************************************

001:0003--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      01:101           26.60    1.643 No_date    2:00   42.66 .455
      [CN= 70.3: N= 3.00]
      [Tp=  .79:DT= 1.00]
#*******************************************************************************
# Existing Catchment 2 - Outlet is east to Wellington Road 29 and then South
#*******************************************************************************

001:0004--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      02:102            6.12     .516 No_date    1:38   42.66 .455
      [CN= 70.3: N= 3.00]
      [Tp=  .50:DT= 1.00]
#*******************************************************************************
# Total to South
#*******************************************************************************

001:0005--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            01:101           26.60    1.643 No_date    2:00   42.66  n/a
                      +  02:102            6.12     .516 No_date    1:38   42.66  n/a
```

```
      [DT= 1.00]  SUM=  03:Total         32.72    2.089 No_date    1:54   42.66  n/a

001:0006--------------------------------------------------------------------------
      FINISH
-------------------------------------------------------------------------------
-
*******************************************************************************
*
     WARNINGS / ERRORS / NOTES
     -------------------------
   Simulation ended on 2024-05-13     at 13:12:01
===============================================================================
=
```

Post-Development

```
2     Metric units
*#************************************************************************
*#  Project Name: [8075 Highway 7]    Project Number: [54565-104]
*#  Date        : 10-04-2024
*#  Modeller    : [MLW]
*#  Company     : MTE Consultants Ltd.
*#  License #   : 3057174
*#************************************************************************
*# PROPOSED CONDITIONS ANALYSIS
*#************************************************************************
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[001]
*%-----------------|-------------------------------------------------------|
*#************************************************************************
*# PROPOSED CONDITIONS ANALYSIS - 25 mm
*#************************************************************************
CHICAGO STORM       IUNITS=[2],  TD=[ 3.0  ](hrs), TPRAT=[ 0.333  ],  CSDT=[ 10
](min),
                    ICASEcs=[1],
                     A=[508.50],  B=[6.00], and C=[0.799],
*%-----------------|-------------------------------------------------------|
*#************************************************************************
*# Proposed Catchment 202 - Controlled Flow to Pond
*#************************************************************************
*%-----------------|-------------------------------------------------------|
DESIGN STANDHYD     ID = [1], NHYD=["202"], DT=[ 1  ]min, AREA=[24.37](ha),
                    XIMP=[ 0.95 ], TIMP=[ 0.95  ], DWF=[ 0  ](cms), LOSS=[2],
CN=[70],
                    SLOPE=[ 1.00 ](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------|
*#************************************************************************
*# Proposed Catchment 201 - Uncontrolled Flow to Swale
*#************************************************************************
*%-----------------|-------------------------------------------------------|
DESIGN NASHYD       ID = [2], NHYD=["201"], DT=[1]min, AREA=[3.54](ha),
                    DWF=[ 0 ](cms), CN/C=[ 70.28 ], TP=[  0.94 ]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------|
*%-----------------|-------------------------------------------------------|
*#************************************************************************
*# Proposed Catchment 203 - Uncontrolled Flow to the South
*#************************************************************************
*%-----------------|-------------------------------------------------------|
DESIGN NASHYD       ID = [3], NHYD=["203"], DT=[1]min, AREA=[4.81](ha),
                    DWF=[ 0 ](cms), CN/C=[ 70.28 ], TP=[  0.37 ]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------|
*%-----------------|-------------------------------------------------------|
*#************************************************************************
*# Preliminary SWMF Design
*#************************************************************************
*%-----------------|-------------------------------------------------------|
```

```
ROUTE RESERVOIR     IDout=[ 4 ],   NHYD=["SWMF"],  IDin=[ 1 ],
                    RDT=[1](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                     (cms) - (ha-m)
                                    [  0.0000 , 0.000]
                                    [  0.0306, 0.467]
                                    [  0.0718, 0.847]
                                    [  0.1039, 1.246]
                                    [  0.1281 ,1.657]
                                    [  0.5383, 2.080]
                                    [  1.5442 ,2.674]
                                    [   -1  , -1  ]  (max twenty pts)
                          IDovf=[  5 ], NHYDovf=["ovflw-1"]
*%-----------------|---------------------------------------------------------|
*#*************************************************************************
*# Total Flow to the South
*#*************************************************************************
*%-----------------|---------------------------------------------------------|
ADD HYD             IDsum=[ 6 ], NHYD=["Total-S"], IDs to add=[2+3+4+5]
*%-----------------|---------------------------------------------------------|
***************************************************************************
*%-----------------|---------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[001]
*#*************************************************************************
*# PROPOSED CONDITIONS ANALYSIS - 5 - year Storm
*#*************************************************************************
CHICAGO STORM       IUNITS=[2],  TD=[ 3.0  ](hrs), TPRAT=[ 0.333  ],  CSDT=[ 10
](min),
                    ICASEcs=[1],
                     A=[1746.737],  B=[13.708], and C=[0.884],
*%-----------------|---------------------------------------------------------|
*#*************************************************************************
*# Proposed Catchment 202 - Controlled Flow to Pond
*#*************************************************************************
*%-----------------|---------------------------------------------------------|
DESIGN STANDHYD     ID = [1], NHYD=["202"], DT=[ 1  ]min, AREA=[24.37](ha),
                    XIMP=[ 0.95 ], TIMP=[ 0.95  ], DWF=[ 0  ](cms), LOSS=[2],
CN=[70],
                    SLOPE=[ 1.00 ](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|---------------------------------------------------------|
*#*************************************************************************
*# Proposed Catchment 201 - Uncontrolled Flow to Swale
*#*************************************************************************
*%-----------------|---------------------------------------------------------|
DESIGN NASHYD       ID = [2], NHYD=["201"], DT=[1]min, AREA=[3.54](ha),
                    DWF=[ 0 ](cms), CN/C=[ 70.28 ], TP=[  0.94 ]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|---------------------------------------------------------|
*%-----------------|---------------------------------------------------------|
*#*************************************************************************
*# Proposed Catchment 203 - Uncontrolled Flow to the South
```

```
*#************************************************************************
*%-----------------|-------------------------------------------------------|
DESIGN NASHYD       ID = [3], NHYD=["203"], DT=[1]min, AREA=[4.81](ha),
                    DWF=[ 0 ](cms), CN/C=[ 70.28 ], TP=[  0.37 ]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------|
*%-----------------|-------------------------------------------------------|
*#************************************************************************
*# Preliminary SWMF Design
*#************************************************************************
*%-----------------|-------------------------------------------------------|
ROUTE RESERVOIR     IDout=[ 4 ],   NHYD=["SWMF"],  IDin=[ 1 ],
                    RDT=[1](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                     (cms) - (ha-m)
                                   [  0.0000 , 0.000]
                                   [  0.0306, 0.467]
                                   [  0.0718, 0.847]
                                   [  0.1039, 1.246]
                                   [  0.1281 ,1.657]
                                   [  0.5383, 2.080]
                                   [  1.5442 ,2.674]
                                   [   -1  , -1  ]  (max twenty pts)
                          IDovf=[  5 ], NHYDovf=["ovflw-1"]
*%-----------------|-------------------------------------------------------|
*#************************************************************************
*# Total Flow to the South
*#************************************************************************
*%-----------------|-------------------------------------------------------|
ADD HYD             IDsum=[ 6 ], NHYD=["Total-S"], IDs to add=[2+3+4+5]
*%-----------------|-------------------------------------------------------|
**************************************************************************
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[001]
*#************************************************************************
*# PROPOSED CONDITIONS ANALYSIS - 100 - year Storm
*#************************************************************************
CHICAGO STORM       IUNITS=[2],  TD=[ 3.0  ](hrs), TPRAT=[ 0.333  ],  CSDT=[ 10
](min),
                    ICASEcs=[1],
                     A=[5061.200],  B=[22.167], and C=[0.958],
*%-----------------|-------------------------------------------------------|
*#************************************************************************
*# Proposed Catchment 202 - Controlled Flow to Pond
*#************************************************************************
*%-----------------|-------------------------------------------------------|
DESIGN STANDHYD     ID = [1], NHYD=["202"], DT=[ 1  ]min, AREA=[24.37](ha),
                    XIMP=[ 0.95 ], TIMP=[ 0.95  ], DWF=[ 0  ](cms), LOSS=[2],
CN=[70],
                    SLOPE=[ 1.00 ](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------|
*#************************************************************************
```

```
*# Proposed Catchment 201 - Uncontrolled Flow to Swale
*#*************************************************************************
*%-----------------|-------------------------------------------------------|
DESIGN NASHYD       ID = [2], NHYD=["201"], DT=[1]min, AREA=[3.54](ha),
                    DWF=[ 0 ](cms), CN/C=[ 70.28 ], TP=[  0.94 ]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------|
*%-----------------|-------------------------------------------------------|
*#*************************************************************************
*# Proposed Catchment 203 - Uncontrolled Flow to the South
*#*************************************************************************
*%-----------------|-------------------------------------------------------|
DESIGN NASHYD       ID = [3], NHYD=["203"], DT=[1]min, AREA=[4.81](ha),
                    DWF=[ 0 ](cms), CN/C=[ 70.28 ], TP=[  0.37 ]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------|
*%-----------------|-------------------------------------------------------|
*#*************************************************************************
*# Preliminary SWMF Design
*#*************************************************************************
*%-----------------|-------------------------------------------------------|
ROUTE RESERVOIR     IDout=[ 4 ],   NHYD=["SWMF"],  IDin=[ 1 ],
                    RDT=[1](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                     (cms) - (ha-m)
                                   [  0.0000 , 0.000]
                                   [  0.0306, 0.467]
                                   [  0.0718, 0.847]
                                   [  0.1039, 1.246]
                                   [  0.1281 ,1.657]
                                   [  0.5383, 2.080]
                                   [  1.5442 ,2.674]
                                   [   -1  , -1  ]  (max twenty pts)
                          IDovf=[  5 ], NHYDovf=["ovflw-1"]
*%-----------------|-------------------------------------------------------|
*#*************************************************************************
*# Total Flow to the South
*#*************************************************************************
*%-----------------|-------------------------------------------------------|
ADD HYD             IDsum=[ 6 ], NHYD=["Total-S"], IDs to add=[2+3+4+5]
*%-----------------|-------------------------------------------------------|
**************************************************************************
*%-----------------|-------------------------------------------------------|
FINISH
```

```
==============================================================================

   SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
   S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
   SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
       S   W W   M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
   SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9   =========
                                                        9   9  9   9   # 3053466
        StormWater Management HYdrologic Model           999    999    =========

 ******************************************************************************
 ***************************** SWMHYMO Ver/4.05  ******************************
 *********  A single event and continuous hydrologic simulation model  *********
 *********     based on the principles of HYMO and its successors      *********
 *********                  OTTHYMO-83 and OTTHYMO-89.                  *********
 ******************************************************************************
 ********* Distributed by:  J.F. Sabourin and Associates Inc.           *********
 *********                   Ottawa,  Ontario: (613) 836-3884           *********
 *********                   Gatineau, Quebec: (819) 243-6858           *********
 *********                   E-Mail: swmhymo@jfsa.Com                   *********
 ******************************************************************************

 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++++ Licensed user: MTE Consultants Inc.                        +++++++++
 +++++++++                Burlington           SERIAL#:3053466       +++++++++
 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 ******************************************************************************
 *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++            *********
 *********           Maximum value for ID numbers  :     10           *********
 *********           Max. number of rainfall points: 105408           *********
 *********           Max. number of flow points    : 105408           *********
 ******************************************************************************

 ***** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) *****
 *****----------------------------------------------------------------------*****
 *****    ID:  Hydrograph IDentification numbers, (1-10).                   *****
 *****  NHYD:  Hydrograph reference numbers, (6 digits or characters).      *****
 *****  AREA:  Drainage area associated with hydrograph, (ac.) or (ha.).    *****
 ***** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).      *****
 ***** TpeakDate_hh:mm is the date and time of the peak flow.               *****
 *****  R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).         *****
 *****  R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).         *****
 *****     *:  see WARNING or NOTE message printed at end of run.           *****
 *****    **:  see  ERROR  message printed at end of run.                   *****
 ******************************************************************************
 ******************************************************************************

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

 ******************************************************************************
```

```
 **********   S U M M A R Y   O U T P U T   **********
 ********************************************************************************
 *         DATE: 2024-05-14     TIME: 15:42:07     RUN COUNTER: 000587         *
 ********************************************************************************
 * Input   filename: Q:\54565\100\SWM\SWMHYMO\post.dat                           *
 * Output  filename: Q:\54565\100\SWM\SWMHYMO\post.out                           *
 * Summary filename: Q:\54565\100\SWM\SWMHYMO\post.sum                           *
 * User comments:                                                               *
 * 1:_____________________________________________________________________________*
 * 2:_____________________________________________________________________________*
 * 3:_____________________________________________________________________________*
 ********************************************************************************


#*******************************************************************************
#  Project Name: [8075 Highway 7]    Project Number: [54565-104]
#  Date        : 10-04-2024
#  Modeller    : [MLW]
#  Company     : MTE Consultants Ltd.
#  License #   : 3057174
#*******************************************************************************
# PROPOSED CONDITIONS ANALYSIS
#*******************************************************************************
 RUN:COMMAND#

001:0001---------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]
#*******************************************************************************
# PROPOSED CONDITIONS ANALYSIS - 25 mm
#*******************************************************************************

001:0002---------------------------------------------------------------------------
     CHICAGO STORM
      [SDT=10.00:SDUR=   3.00:PTOT=  23.43]
      [A/B/C= 508.500/   6.000/    .799]
#*******************************************************************************
# Proposed Catchment 202 - Controlled Flow to Pond
#*******************************************************************************

001:0003--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    01:202           24.37    2.566 No_date    1:03   21.68 .925
      [XIMP=.95:TIMP=.95]
      [SLP=1.00:DT= 1.00]
      [LOSS= 2 :CN= 70.0]
#*******************************************************************************
# Proposed Catchment 201 - Uncontrolled Flow to Swale
```

```
#*******************************************************************************

001:0004--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      02:201            3.54     .015 No_date    2:15    3.72 .159
      [CN= 70.3: N= 3.00]
      [Tp=  .94:DT= 1.00]
#*******************************************************************************
# Proposed Catchment 203 - Uncontrolled Flow to the South
#*******************************************************************************

001:0005--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      03:203            4.81     .039 No_date    1:28    3.72 .159
      [CN= 70.3: N= 3.00]
      [Tp=  .37:DT= 1.00]
#*******************************************************************************
# Preliminary SWMF Design
#*******************************************************************************

001:0006--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 01:202          24.37    2.566 No_date    1:03   21.68  n/a
      [RDT= 1.00] out<- 04:SWMF         24.37     .035 No_date    3:13   21.68  n/a
            overflow <= 05:ovflw-1        .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.5031E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*******************************************************************************
# Total Flow to the South
#*******************************************************************************

001:0007--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            02:201            3.54     .015 No_date    2:15    3.72  n/a
                      +  03:203            4.81     .039 No_date    1:28    3.72  n/a
                      +  04:SWMF          24.37     .035 No_date    3:13   21.68  n/a
                      +  05:ovflw-1         .00     .000 No_date    0:00     .00  n/a
      [DT= 1.00]  SUM=  06:Total-S       32.72     .074 No_date    1:37   17.10  n/a
 RUN:COMMAND#

001:0001--------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]
# PROPOSED CONDITIONS ANALYSIS - 5 - year Storm
#*******************************************************************************

001:0002--------------------------------------------------------------------------
     CHICAGO STORM
      [SDT=10.00:SDUR=   3.00:PTOT=  49.80]
      [A/B/C=1746.737/  13.708/    .884]
#*******************************************************************************
# Proposed Catchment 202 - Controlled Flow to Pond
#*******************************************************************************
```

```
001:0003--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    01:202           24.37    5.578 No_date    1:02   47.29 .950
      [XIMP=.95:TIMP=.95]
      [SLP=1.00:DT= 1.00]
      [LOSS= 2 :CN= 70.0]
#*******************************************************************************
# Proposed Catchment 201 - Uncontrolled Flow to Swale
#*******************************************************************************

001:0004--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      02:201            3.54     .066 No_date    2:12   14.98 .301
      [CN= 70.3: N= 3.00]
      [Tp=  .94:DT= 1.00]
#*******************************************************************************
# Proposed Catchment 203 - Uncontrolled Flow to the South
#*******************************************************************************

001:0005--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      03:203            4.81     .167 No_date    1:28   14.98 .301
      [CN= 70.3: N= 3.00]
      [Tp=  .37:DT= 1.00]
#*******************************************************************************
# Preliminary SWMF Design
#*******************************************************************************

001:0006--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 01:202           24.37    5.578 No_date    1:02   47.29  n/a
      [RDT= 1.00] out<- 04:SWMF          24.37     .091 No_date    3:08   47.29  n/a
            overflow <= 05:ovflw-1         .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.1087E+01, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*******************************************************************************
# Total Flow to the South
#*******************************************************************************

001:0007--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            02:201            3.54     .066 No_date    2:12   14.98  n/a
                      +  03:203            4.81     .167 No_date    1:28   14.98  n/a
                      +  04:SWMF          24.37     .091 No_date    3:08   47.29  n/a
                      +  05:ovflw-1         .00     .000 No_date    0:00     .00  n/a
      [DT= 1.00]  SUM=  06:Total-S       32.72     .282 No_date    1:35   39.04  n/a
 RUN:COMMAND#

001:0001--------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]
# PROPOSED CONDITIONS ANALYSIS - 100 - year Storm
#*******************************************************************************
```

```
001:0002-------------------------------------------------------------------------
     CHICAGO STORM
      [SDT=10.00:SDUR=   3.00:PTOT=  93.80]
      [A/B/C=5061.200/  22.167/    .958]
#*************************************************************************
# Proposed Catchment 202 - Controlled Flow to Pond
#*************************************************************************

001:0003--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    01:202           24.37   10.389 No_date    1:01   90.47 .964
      [XIMP=.95:TIMP=.95]
      [SLP=1.00:DT= 1.00]
      [LOSS= 2 :CN= 70.0]
#*************************************************************************
# Proposed Catchment 201 - Uncontrolled Flow to Swale
#*************************************************************************

001:0004--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      02:201            3.54     .193 No_date    2:11   42.66 .455
      [CN= 70.3: N= 3.00]
      [Tp=  .94:DT= 1.00]
#*************************************************************************
# Proposed Catchment 203 - Uncontrolled Flow to the South
#*************************************************************************

001:0005--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      03:203            4.81     .488 No_date    1:28   42.66 .455
      [CN= 70.3: N= 3.00]
      [Tp=  .37:DT= 1.00]
#*************************************************************************
# Preliminary SWMF Design
#*************************************************************************

001:0006--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 01:202           24.37   10.389 No_date    1:01   90.47  n/a
      [RDT= 1.00] out<- 04:SWMF          24.37     .430 No_date    2:37   90.46  n/a
            overflow <= 05:ovflw-1         .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.1968E+01, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*************************************************************************
# Total Flow to the South
#*************************************************************************

001:0007--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            02:201            3.54     .193 No_date    2:11   42.66  n/a
                      +  03:203            4.81     .488 No_date    1:28   42.66  n/a
                      +  04:SWMF          24.37     .430 No_date    2:37   90.46  n/a
                      +  05:ovflw-1         .00     .000 No_date    0:00     .00  n/a
      [DT= 1.00]  SUM=  06:Total-S       32.72     .889 No_date    1:46   78.26  n/a

001:0008-------------------------------------------------------------------------
```

```
      FINISH
-------------------------------------------------------------------------------
-
*******************************************************************************
*
     WARNINGS / ERRORS / NOTES
     -------------------------
   Simulation ended on 2024-05-14     at 15:42:08
===============================================================================
=
```